

CONVERSION FROM COAL TO NATURAL GAS AT COGENERATION FACILITY



Conversions of older coal fired boilers to natural gas have been ongoing for over a decade. Changes in the price of natural gas have made that fuel economically attractive, and it has the added benefit of reduced air emissions.

It makes more sense to convert an existing facility instead of building a new one since converting the existing boilers are 15-30% of the cost of installing new natural gas boilers.

Reasons for converting an old facility rather than building a new facility include:

- No additional land disturbance
- The major electrical transmission infrastructure is in place
- The turbine(s) may require only a nominal upgrade
- Boiler remains in place and is re-used
- Cooling towers and water treatment facilities remain in place and are re-used
- Stacks are left in place and re-used
- Limited demolition of all in-place structures: tanks, baghouses, conveyors and silos

Waco recently completed a project with SourceOne (a Veolia Energy Company), to convert a cogeneration facility from coal to natural gas at the Veolia Spruance Plant. The plant provides steam to the Dupont Spruance Fibers facility in Richmond, Virginia. Rather than spending millions to dismantle and remove all the equipment that supported the use of coal, the conveyors, baghouses and lime silos remained in place and are now inoperative. Waco worked with SourceOne engineers to develop ways to work around these structures and install the new gas piping, steam piping, burners, economizers, fans, pumps, ducts and breeching. Much of the existing structural steel was utilized, with some minor modifications for additional support for the new economizers and associated ductwork.

The power plant had to continue to consistently supply steam to the manufacturing facility nearby. While half of the facility was being converted, the remaining aging power plant had to continuously supply steam to the nearby manufacturing facility with minimal shutdowns for 18 months. This required additional coordination and expertise to maintain the production of steam needed by the customer for their plant operations.

The conversion has allowed these original boilers to increase their steam capacity at a higher rate than originally engineered. The power plant now produces steam more reliably to the manufacturing facility, and also sells the excess electricity to the local power grid.

The overall scope consisted of two major projects – Boiler Conversion, and Balance of Plant (with additional energy efficiency projects.)



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Conversion, removal or replacement of the following equipment:

- Four coal stoker systems removed to make room for new burners
- Four cyclone and baghouse internals modified for clear gas path
- Four forced draft fans removed and replaced with larger fans
- Miscellaneous controls, piping, and ducting not needed for NG
- Four boilers - Modification of the Over Fire Air System
- Four boilers – Modification of the FGR System

Waco provided the following in-house contracting services for the project:

- Selective dismantling and demolition of equipment and piping.
- Rigging and alignment of all equipment.
- Pipe fitting and welding of all process steam (R-stamp) , air lines, condensate piping, exhaust stack connections
- Breeching and duct work fabrication for new fans to boilers and economizers.
- Refractory insulation for rebuilding of boiler walls and bottom for new burners
- High temperature insulation for all steam and condensate piping, valves, fittings, flanges, breeching, fans, economizers, pumps and turbine covers.
- Selective scaffold erection and adjusting

Installation of the following new equipment:

- Four Coen Burner Assemblies – two burners per assembly (eight total)
- Four Howden Force Draft Fans
- Four Economizers to preheat the feed water
- Approximately 1,500 LF of 10" Natural Gas Piping with supports
- Approximately 3,200 LF of 8" Condensate Return Piping with insulation and supports
- Associated Piping (10,000 LF of assorted sizes), Conduit & Wiring (for approximately 400 devices plus equipment) and Delta-V Controls

Project Specifics:

- Manhours : 92,000
- Contract Value : \$18 Million
- Completion: less than 18 months
– Two weeks ahead of schedule
- Boiler output – 4 at 275,000 PPH each
- Drum pressure – 1,580 PSIG
- Superheater temperature – 950 degrees F
- Condensate return piping – 3,200 feet
- Ultra-low NOx limits < 30 PPM
- Project Manager: James Davis
- Project Superintendent: Jimmy Edwards

Waco continues to be a major player in the repair, renovation and rehabilitation of power facilities in the Mid-Atlantic region. Waco has the in-house capabilities for performing the many skilled trades required to complete these conversions. When you need a contractor you can depend on for major projects, call Waco.



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