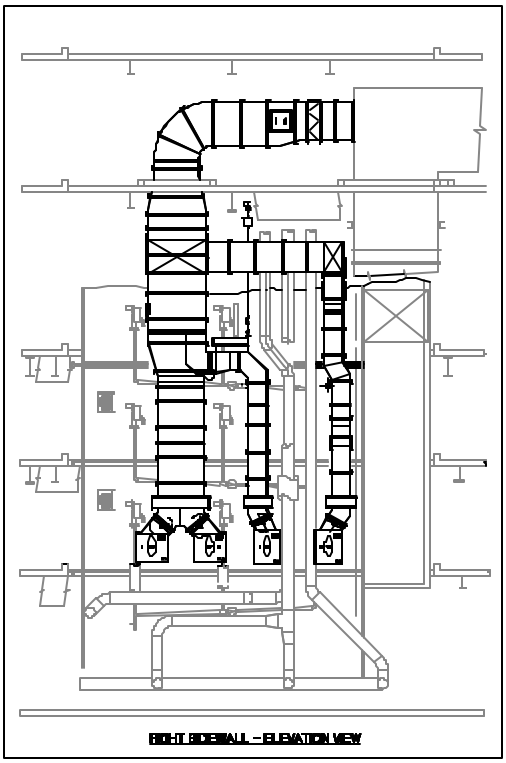
Project Description

JANSEN Combustion and Boiler Technologies, Inc.

No. 3 Power Boiler Overfire Air System Upgrade
Large Paper Company
Location: North America (US South)



Project Scope

JANSEN provided Engineering and Materials Supply to an undisclosed customer in the southern US for the overfire air (OFA) system upgrade on their No. 3 Power Boiler. The unit is a Foster Wheeler combination fuel-fired boiler built in 1982. The MCR steaming rate of the unit is 550,000 lb/hr at an operating pressure of 1,250 psig and final steam temperature of 925°F. The typical steaming rate prior to the upgrade was between 425,000 and 550,000 lb/hr from the burning of a combination of waste wood, TDF, sludge, pulverized coal and/or natural gas.

The old OFA system consisted of numerous small air ports located at three different elevations on the front and rear walls. Due to limited capacity of the OFA system, and the resulting high undergrate air flows, the unit experienced heavy carryover of fly ash with a high content of unburned carbon (ashes were disposed to the landfill). As a result, the multiclone dust collector and ID fan were severely eroded and in need of replacement. Under these operating conditions, the unit had reached its upper limit for bark throughput and this limitation increased the need to burn more costly fossil fuels.

The mill had the following goals for the OFA system upgrade of the No. 3 Power Boiler:

- Reduce the quantity of landfill ash by reducing the carryover and amount of unburned carbon in the fly ash.
- Increase the boiler's capability to burn waste fuels (bark, TDF, and sludge), thereby reducing the reliance on burning coal or natural gas.
- Improve the ability to handle load swings on bark firing.
- Maintain or improve the boiler's current emission performance (particulate, NO_x, CO, and SO_2).

In May of 2002, the new OFA system was installed utilizing four custom sized Jansen High Energy Combustion Air Nozzles™ on each of the side walls. As with most JANSEN OFA system upgrades, FD fan modifications/replacements were not needed. The pressure parts and air system modifications were installed during the regular boiler outage that took five days.

Results: After start-up of the No. 3 Power Boiler, initial operation with the upgraded OFA system, the boiler has demonstrated the following capabilities:

- Grate heat release rates from bark, TDF, and sludge has increased by more than 17%. The boiler can operate at full MCR on grate fuels only, without requiring fossil fuel co-firing.
- Need for auxiliary fuel firing has been virtually eliminated.
- CO emissions have been kept to less than 100 ppm.
- Total carryover from the furnace has been significantly reduced.
- Unburned carbon in the ash has been reduced by more than 50%.

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