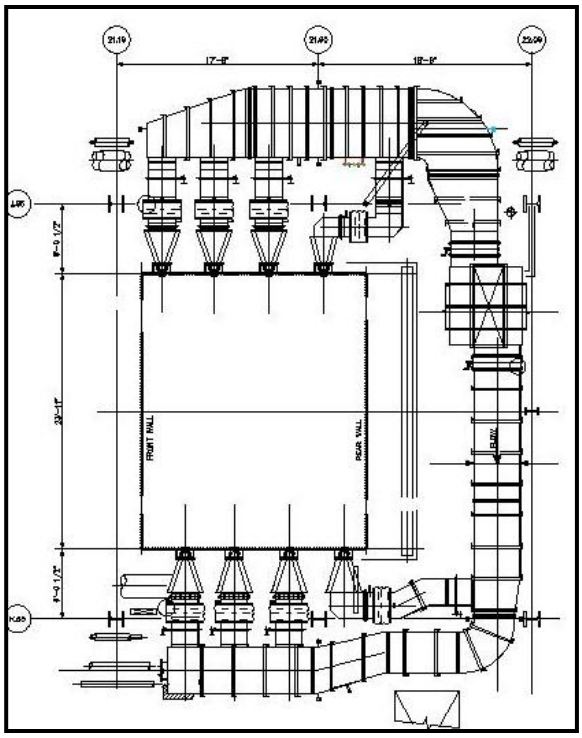
Project Description

JANSEN Combustion and Boiler Technologies, Inc.

No. 1 Hog Fuel Boiler Overfire Air Delivery System Upgrade
SAPPI Fine Paper North America
Skowhegan, Maine

Project Scope



The No. 1 Hog Fuel Boiler, supplied by Babcock and Wilcox in the mid 1970's, was originally designed to generate 290,000 lb/hr of steam at 855°F and 900 psig from waste wood alone and a Maximum Continuous Rating (MCR) of 550,000 lb/hr when firing auxiliary fuel oil. On the grate, the unit fires a combination of waste wood and mill sludge. Auxiliary fuel oil and pulverized wood pellets are also fired through burners to satisfy the steam demand of approximately 500,000 lb/hr.

The old overfire air (OFA) system consisted of air registers on the boiler side walls that introduced OFA into the unit in a tangential pattern. Due to a fundamental design limitation that prevented adequate penetration and mixing of the OFA with the in-flight fuel particles, the unit was limited in achieving higher grate fuel firing rates. The unit was typically operated with an indicated grate fuel firing rate of around 45 tons per hour.

The mill had a desire to improve the combustion performance of the No. 1 Hog Fuel Boiler by upgrading the OFA system. The goals of the upgrade project were:

- Reliably increase grate fuel firing rates to an indicated value of 51 tons per hour.
- Reduce auxiliary fuel oil firing by at least 50%.
- Reduce or eliminate pulverized wood pellets firing.
- Maintain adequate combustion conditions when firing increased grate fuels.
- Maintain flue gas Carbon Monoxide (CO) and Nitrogen Oxides (NO_x) emissions below permit levels.

The new OFA system was installed in the summer of 2003. Four custom designed Jansen High Energy Combustion Air Nozzles™ were placed on each side wall, arranged in an interlaced pattern. A new OFA booster fan was installed to supply heated combustion air to the OFA nozzles. The low pressure drop design of the JANSEN nozzles allowed increased OFA flow capacity and penetration.

Results

Operation with the new OFA system demonstrated the following performance improvements:

- Indicated grate fuel firing rates in excess of 51 tons per hour were achieved.
- Reduced need for fuel oil firing in the unit.
- Elimination of pulverized wood pellets firing.
- CO and NO_x emission compliance at the increased grate fuel firing rates.

The second bark boiler at this mill (No. 2) was also upgraded successfully by JANSEN two years later.

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