

Project Description



*No. 2 Hog Fuel Boiler Overfire Air System
Willamette Industries, Inc.
Campti, Louisiana*

Project Scope

No. 2 Hog Fuel Boiler is a two-drum unit supplied by Zurn in the early 1990s to burn wood waste, sludge, and natural gas. The MCR steaming capacity of the unit is 500,000 lb/hr at an operating pressure of 600 psig and final steam temperature of 800°F. Before the upgrade, the unit averaged around 375,000 lb/hr steaming rate on bark, other mill wastes, and sludge.

The original overfire air (OFA) system consisted of small ports located at five different elevations on the rear wall and four elevations on the front wall. The size and location of these OFA ports made them ineffective, as evidenced by elevations on the front wall. The size and location of these OFA ports made them ineffective, as evidenced by excessive carryover and elevated emissions in CO and VOC. With the JANSEN OFA system upgrade, Willamette had several objectives:



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- Enhance gasification characteristics by staging combustion.
- Minimize particulate carryover out of the furnace.
- Minimize furnace exit gas temperatures.
- Reduce unburned fuel in the fly ash.

During the spring outage of 2001, a new JANSEN OFA system was installed utilizing 15 custom sized Jansen High Energy Combustion Air Nozzles™ on each of the front and rear walls. Computational Fluid Dynamics (CFD) modeling conducted by JANSEN for this boiler demonstrated that the new OFA nozzles would provide excellent mixing, burnout of wood materials and volatiles, and a reduction in carryover out of the furnace. To accommodate an accelerated schedule, the new OFA system was designed and installed utilizing a long primary outage and a short “tie-in” outage. The JANSEN OFA system upgrade utilized the existing FD fan without modifications.

Results

The owner has been very pleased with the performance of the boiler since the OFA system upgrade. In summary the following project goals were achieved:

- The gasification characteristics met customer’s needs.
- Carryover has been significantly reduced.
- The unburned carbon in the bottom ash and fly ash has been reduced by a factor greater than five.
- Boiler operation and performance have improved significantly.