



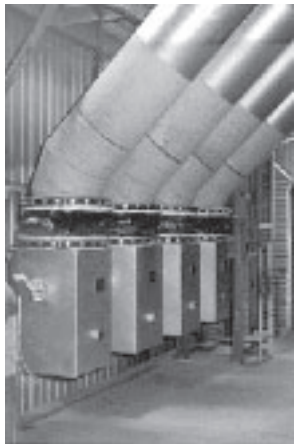
# Bark Boiler Overfire Air Upgrades

## Cashing in on Opportunities

Many mills are beginning to realize opportunities that become available when improving wood waste boiler operation and saving significantly on their monthly fuel bill. With the high cost for oil and natural gas, the economic mix has shifted to the point where facilities are placing more emphasis on improving the performance of their wood waste boilers. This can be accomplished by increasing the boiler's wood waste burning capacity and reducing the need for co-firing of costly auxiliary fuels. These key boiler performance issues are a function of the boiler's combustion hardware, particularly the quality of overfire air (OFA) delivery.

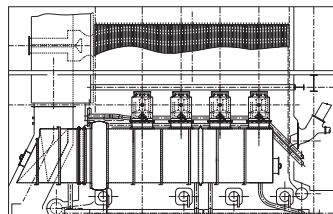


For a long time, the operating performance of many boilers might have been marginal, at best, with funding typically not available for powerhouse projects that showed a payback time of more than a year.



Many old (and even new units) are equipped with poorly designed or altogether abandoned OFA systems. Inadequate OFA delivery is known to result in poor emissions performance, high ash

carryover, combustion instabilities, and the need for oil or natural gas co-firing (see related articles in our previous two newsletters; they are included in our web site: [www.jansenboiler.com](http://www.jansenboiler.com)).



Projects to upgrade wood waste boiler OFA systems are now often seen as "low hanging fruits," indicating a project that has a very good return on investment.

Jansen is involved with numerous plants with OFA upgrade projects. Various stages of these projects are currently underway, such as initial process engineering, Computational Fluid Dynamics (CFD) modeling, design engineering, and supply of the materials for the OFA upgrade.



In the first half of this year, Jansen worked on projects for Appleton Papers, Boise Cascade, International Paper, Mead Coated Board, Westvaco, Weyerhaeuser, and Willamette Industries for mills located in Texas, Louisiana, Mississippi, New York, Oklahoma, Pennsylvania, Washington, and Alabama.



*(continued on back page)*

## Projects in Municipal Waste to Energy Industry

Since our last Newsletter, Jansen has completed two engineering projects for the **Municipal Solids Waste (MSW) Combustion Industry in North America**. Following is a brief description of these projects.

### Montenay, Inc., at Burnaby Facility, British Columbia

Montenay incinerates MSW that is generated by the greater Vancouver regional district in three boilers in Burnaby, British Columbia, Canada. Montenay wishes to upgrade these boilers to increase their thermal efficiency, superheat the steam to generate

*(continued on page 2)*

**Jansen Combustion  
and Boiler  
Technologies, Inc.**

**Kirkland, WA  
(425) 825-0500**

[www.jansenboiler.com](http://www.jansenboiler.com)

**Customized  
Engineered  
Solutions**

*(continued from page 1)*

electrical power, and reduce tube metal corrosion. As a first step towards achieving these goals, Jansen was contracted to conduct an analysis of the boilers' current performance and carry out process engineering for the upgraded conditions. The following activities were included in the project:

- Quantify boiler performance issues in a modified configuration with a new superheater and additional economizer surface.
- Determine preliminary sizing for new economizer modules.
- Develop preliminary design and sizing for a new superheater and screen.
- Comment on the capability of the boilers' natural circulation conditions to support future operational scenarios.
- Evaluate the benefits of removing the refractory from portions of the furnace.

**Barlow Projects, Inc., at Harrisburg Facility, Pennsylvania**

Jansen conducted a Phase 1 engineering evaluation for the upgrade of two MSW boilers in operation in Harrisburg, Pennsylvania. The boilers' operating

performance, including heat and mass loadings were evaluated, as well as the feasibility and technical practicality of several potential upgrade scenarios. Upgrade scenarios included modifying the heating surface in the superheater, screen, generating bank, and/or economizer, as well as installing a feedwater coil air heater and/or preheating condensate by feedwater.

The project provided Barlow with a description of required boiler modifications, and associated effects on boiler performance issues, such as steam generation rate, thermal efficiency and flue gas temperature profile.

**Previous Experience**

To those readers in the MSW Combustion Industry that are unfamiliar with Jansen, our company has conducted performance analyses of over one hundred large, industrial boilers that burn 'difficult' fuels, such as biomass (different types of wood wastes and agricultural wastes), various pulp/paper mill sludges, waste chemicals from pulping operations, as well as MSW and RDF. These fuels are typically burned alone or in combination with more traditional fossil fuels. Most of these 'difficult' fuels are

characterized by their low heating value, high moisture content (i.e., 25% to 60%), high inorganic chemicals content, and fire-side corrosion and erosion issues. Accordingly, these fuels are difficult to burn and require well-designed combustion systems and proper boiler materials.

In addition to process engineering evaluations, feasibility studies, and troubleshooting, Jansen has provided design engineering and materials supply for the physical upgrade of the combustion system and/or pressure part modifications of over 30 'difficult' fueled boilers. The purpose of these projects is typically to improve operating performance in the areas of efficiency, waste fuel burning capacity, emissions performance, and boiler availability.

**Contact Us**

*If you wish to get to know us better or discuss a specific project on your MSW or RDF fueled boiler, please contact Arie Verloop (ext. 111) at 425.825.0500 or by e-mail at [arie.verloop@jansenboiler.com](mailto:arie.verloop@jansenboiler.com). Additional information about our company can be found on our website at: [www.jansenboiler.com](http://www.jansenboiler.com)*

## Problem / Solution

# Highly Loaded Recovery Boiler Receives Breath of Fresh Air

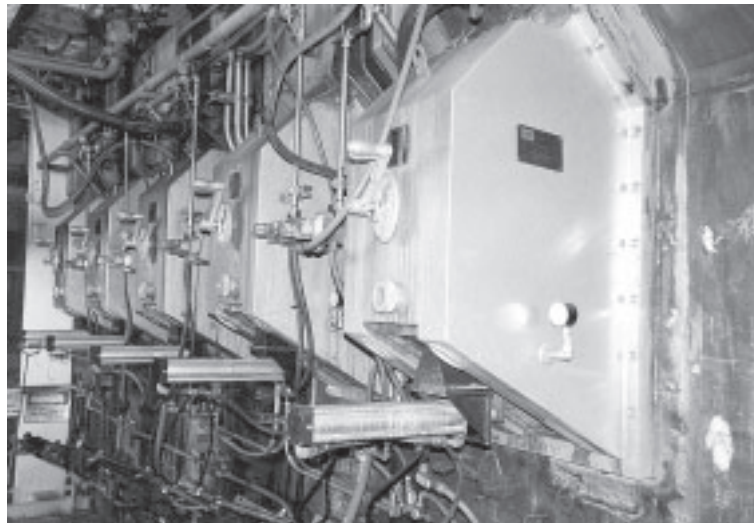
A kraft recovery boiler in an undisclosed location in North America was upgraded early this summer with the installation of 12 new Jansen High Energy Combustion Air Nozzles™ at the level of secondary air. Jansen supplied the patented air nozzles, tube bend openings and associated hardware to complete the installation. The mill's main goal with this modification is to be able to burn additional quantities of black liquor dry solids, without releasing unacceptable quantities of TRS.

In the past, this 'short and stubby' unit had been modified and upgraded by others and furnace heat and solids loadings are uncommonly high. However, a significant portion of the boiler's steam generating capability was often not utilized because of the need to cut back liquor flows due to difficulties in maintaining TRS emissions below the regulatory limit. As a result, excess black liquor was trucked to nearby mills, leading to high transportation costs and loss of valuable energy.

The second goal of the project was better bed control. The existing air ports had demonstrated their inability to control bed height, particularly when reducing secondary air quantities. Mill operational trials had shown that reducing secondary air flows and moving it to the tertiary air level would be beneficial in reducing carryover and convection surface plugging. Excessive growth of the char bed, resulting

from poor air jet penetration from the existing air ports, restricted the mill's attempt to reduce secondary air flows. With the new Jansen air nozzles, air jet

TRS. The scope of these upgrades has been design and materials supply or complete Engineer, Procure, and Construct (EPC) responsibility.



penetration has been significantly improved, providing for good bed control.

Early in the engineering phase of the project, Jansen conducted Computational Fluid Dynamics (CFD) modeling and confirmed that the project goals could be met.

In the first few weeks after the installation, the boiler has performed as predicted and is now burning more liquor than before while maintaining stack TRS levels consistently well below 3 ppm. The unit's fouling rate has also been slowed down.

This air system installation marks the 20th recovery boiler upgraded by Jansen to increase the black liquor burning capacity and/or to reduce emissions of

*For further information on how Jansen can assist in improving the capacity of recovery boilers and reduce stack emissions at the same time, please contact Arie Verloop (ext. 111) at 425.825.0500, or e-mail: [arie.verloop@jansenboiler.com](mailto:arie.verloop@jansenboiler.com). Information and specific project references can also be found on our website at: [www.jansenboiler.com](http://www.jansenboiler.com)*

*Customized  
Engineered  
Solutions*

## Jansen to Supply New Superheater for Port Alice Recovery Boiler

Western Pulp Ltd. at the mill in Port Alice, British Columbia, has contracted with Jansen for the design and supply of a replacement superheater in the mill's recovery boiler.

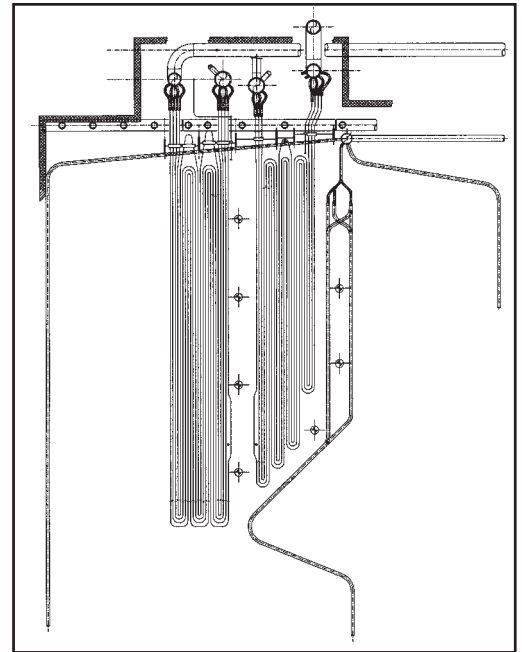
The spent sulfite liquor (SSL) recovery boiler at Port Alice was supplied by Combustion Engineering in the mid 1970s. The MU-X type unit is designed to produce 470,000 lb/hr of steam at 600 psig and 725°F from the burning of 1.6 million lb/day dry SSL. Unlike kraft liquor, SSL is the spent liquor from ammonia sulfite pulping operations, that produces a high quality 'dissolving' grade pulp.

The unit's superheater has experienced metal loss and failures to the point where a complete replacement is warranted. With the replacement, Western Pulp wishes to implement design improvements to avoid the type of wastage that has been experienced. Last year, in the first phase of the project, Jansen conducted an engineering evaluation of the superheater to

address the problem's root cause and to define modified design features for superheater arrangement and metallurgy to meet Western Pulp's goals.

This spring, Jansen was awarded the contract to carry out engineering, materials supply, and fabrication of the new primary and secondary superheater sections and two outlet headers. The engineering details associated with the platen and header design and supports are being provided by Jansen. Jansen awarded separate contracts to subcontractors for the supply of composite tube material and fabrication/assembly of the panels and headers.

Production of the platens is currently underway and the new superheater sections are scheduled for installation during an upcoming outage.



*Please contact Mike Britt, Manager, Design and Construction, phone: 425.825.0500, ext. 127, or e-mail: [mike.britt@jansenboiler.com](mailto:mike.britt@jansenboiler.com) for further information on how Jansen can support your mill with the design and fabrication of boiler pressure part replacements.*

Our Company provides combustion and boiler technology, products, and services.

We are dedicated to working with our clients to achieve their production, reliability, efficiency, safety, and environmental goals.

We accomplish this by:

- Listening and understanding.
- Providing a flexible approach to problem solving.
- Developing creative and innovative solutions.
- Working with clients to implement these solutions.

Our team of talented and experienced individuals is committed to the highest standards of professional ethics.

We commit ourselves to creating a challenging and supportive work environment that fosters opportunity for professional growth, fulfillment, and rewards.

## Bark Boiler Workshop Great Success

In February, Jansen organized a Bark Boiler Workshop that took place in Jacksonville, Florida. Twenty-five participants attended the workshop, coming from 20 different locations from all corners of North America. The workshop was co-sponsored by Jansen, Orion CEM, Inc., and MillPro, Inc. Participants included representatives from Weyerhaeuser Company, International Paper, Georgia-Pacific, Smurfit-Stone Container Corporation, and others.

The two-day workshop consisted of presentations about



new technological developments and cost effective solutions to improve the operating performance of bark fired boilers.

The next bark boiler workshop is planned for February of 2002.

*For early registration for the upcoming workshop, please call Cathy Thomas at 425.825.0500, ext. 108, or e-mail:*

*cathy.thomas@jansenboiler.com*



### Recovery & Power Boiler News

is published twice a year by Jansen Combustion and Boiler Technologies, Inc. to provide information to Owners and Operators of boilers.

Inquiries should be directed to:

**Editor**

Recovery & Power Boiler News

**Jansen Combustion and Boiler Technologies, Inc.**

12025 115th Avenue NE,  
Suite 250

Kirkland, WA 98034-6935

Phone: (425) 825-0500

Fax: (425) 825-1131

E-mail:

editor@jansenboiler.com

Reproduction of the information contained in this newsletter is only allowed with proper reference to the source.

Customized  
Engineered  
Solutions

(continued from page 1)

**An overview of benefits achieved by past Jansen OFA upgrade projects show:**

- Reduction in auxiliary fuel consumption by 75% or more
- Increase in bark firing rate by 25% to 50%
- Reduction in CO stack emissions from 1,500 ppm to below 250 ppm
- Reduction in VOC/hydrocarbons stack emissions from 500 ppm to below 25 ppm
- Increase the paper mill sludge burning capacity by 25%
- Reduction in the unburned carbon content in the ash by a factor greater than five
- Elimination of the ash re-injection system due to low carbon content in the ash
- Reduction in excess air/O<sub>2</sub> usage (%O<sub>2</sub> as low as 4%)
- Following load swings on bark alone in steaming range of 50,000 to 300,000 lb/hr

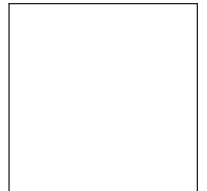
- Providing opportunities to reduce NO<sub>x</sub> emissions
- Elimination of puffing and combustion instabilities
- Elimination of delayed combustion and steam temperature excursions
- Project payback time within six months
- Rapid and complete incineration of HVLC NCG (without causing odor problems in the boiler house)

Times have never been better to seize on opportunities to improve your boiler's operation and reduce your monthly fuel bill at the same time!

*For further information please contact Arie Verloop (ext. 111) or Ned Dye (ext. 125) at 425.825.0500 (or e-mail: [firstname.lastname@jansenboiler.com](mailto:firstname.lastname@jansenboiler.com)). Additional information and specific project references can also be found on our website at: [www.jansenboiler.com](http://www.jansenboiler.com)*



12025 115th Avenue NE, Suite 250  
Kirkland, WA 98034-6935 USA



**In This Issue:**

- Bark Boiler Overfire Air Upgrades
- Projects in Municipal Waste to Energy Industry
- Jansen to Supply New Superheater for Port Alice Recovery Boiler
- Highly Loaded Recovery Boiler Receives Breath of Fresh Air
- Bark Boiler Workshop Great Success

Recovery  
& Power  
**BOILER  
NEWS**