JANSEN
Combustion and Boiler Technologies, Inc.

Recovery & Power BOILER NEWS

No. 29 Winter 2003

Are High Fuel Prices Hurting Your Bottom Line... Again?

Two years ago we asked the readers of our Newsletter the following question:

"…Would you like to burn more wood waste to reduce burning of expensive purchased fuels but your boiler cannot handle it…?
If your answer was "Yes", we replied that you were not alone.

In the past 12 months, spot prices for oil and natural gas have again increased by more than 50%, after easing off the year before. And, current world events indicate that this trend is not likely to be reversed soon.

In one combination fuel power boiler on the east coast, the annual cost for burning one (1) gallon per minute of oil translated to an annual fuel bill exceeding $200,000; this boiler burned up to 15 gpm oil in the winter months. A midsized biomass boiler in the southeast saw daily natural gas firing costs in the neighborhood of $25,000 (daily!), while the boiler was burning only half the amount of wood waste it was designed for. The math is simple.

These examples illustrate the fact that on an annual basis, significant amounts of money can be involved with day-to-day burning of even moderate amounts of fossil fuels. And with today's prices, the payback potential (or return on investment, ROI) for boiler upgrade projects to burn additional biomass fuels is again becoming more and more attractive.

There are many reasons why biomass (wood waste and sludge) boilers also need to co-fire auxiliary purchased fuels, such as coal, oil, and/or natural gas. These reasons may be any one or combination of the following factors:

- Design arrangement and grate fuel heat release rate,
- Shortage of biomass grate fuels,
- Inadequate materials handling or biomass supply system,
- Incineration of CNCG and/or DNCG,
- Boiler permitting issues and/or air emissions limitations,
- The need to be able to quickly respond to load changes, and
- Inability of the boiler's combustion air system to handle biomass grate fuels.

Some of these reasons make it necessary to co-fire a minimum amount of fossil fuel at all times, therefore limiting the savings potential. However, experience has shown that poor combustion is one major cause for having to burn large quantities of fossil fuels in biomass boilers. Therefore, many biomass boilers have opportunities to significantly lower their operating costs by displacing fossil fuels by burning more waste fuels.

Let's look at this a little closer. Poor combustion is typically characterized by these symptoms:

- Piling of unburned fuel on the grate
- High ash carryover from the furnace
- High unburned carbon content in the fly ash
- High emissions of CO and VOC
- Furnace puffing and other combustion stability problems
- Delayed combustion into the superheater, gas temperature excursions
- Need for high excess air usage
- Tube erosion from carryover
- High stack opacity, if gas clean-up system is marginally adequate

From performance evaluations conducted by Jansen on over 65 biomass fueled boilers, we have concluded that these performance shortcomings are typically caused by ineffective overfire air (OFA) delivery, or simply the absence thereof. And, to compensate for ineffective OFA delivery, poor combustion can be partly treated by co-firing auxiliary fossil fuels.

The key to resolving these operating problems and reducing fossil fuel usage is to upgrade the boiler's OFA delivery. Jansen's OFA upgrades have shown to significantly reduce or altogether eliminate combustion problems, therefore eliminating the need for high auxiliary fuel co-firing rates.

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Bark Boiler Workshops in Pensacola and Seattle

Jansen is scheduling two Bark Boiler Workshops to take place in February and March, respectively.

See details on back cover.

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Customized Engineered Solutions

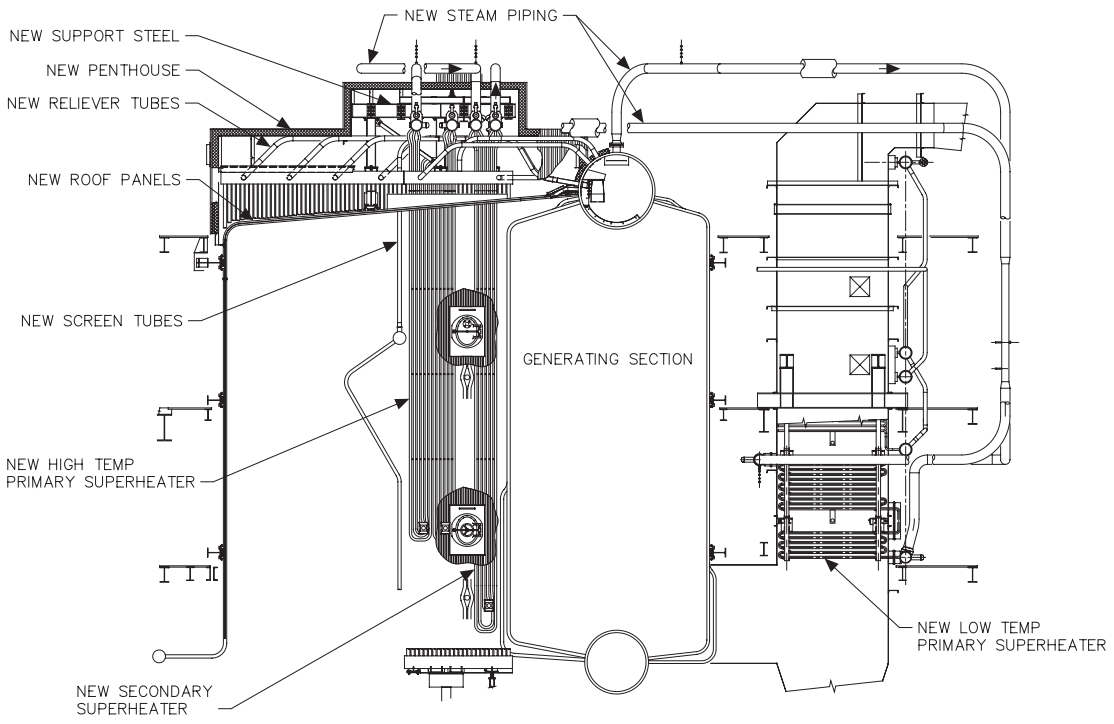
Jansen Presents Technical Paper at NAWTEC XI on MSW Boilers

This coming April (28-30), Jansen will present a technical paper at the 11th annual meeting of the North American Waste-to-Energy Conference, NAWTEC-XI, in Tampa, Florida.

The paper is titled Power Generation and Superheater Upgrade Project at the Burnaby MSW Plant. The paper is co-authored by Montenay plant personnel (Leo Lakowski, Russ Anderson, and Ron Richter) and Jansen engineers (Marcel Berz, Mike Britt, and John La Fond). The paper describes the superheater upgrade project on three MSW boilers with the purpose of raising final steam temperature to benefit in-house power generation. Jansen was contracted by Montenay to perform the process and design engineering for the required boiler modifications; the work included defining target process conditions, deriving conceptual design options, sizing the new superheater, selecting materials, specifying equipment, and providing fabrication and installation drawings.

After presentation at NAWTEC-XI, the paper will be included on the list with technical papers that can be ordered from our website (www.jansenboiler.com).

(Note: the listing of Jansen technical papers on the website contains over 35 titles, including brief abstracts.)



BOILER SIDE ARRANGEMENT
SHOWING NEW PRESSURE PARTS

News Briefs

In the past year, Jansen conducted the following process and design engineering projects:

- Bark boiler capacity and performance evaluations
- Chemical recovery boiler capacity upgrade studies and reviews
- Boiler circulation studies and UFM data collection
- CFD modeling of bark, recovery, and bubbling fluidized bed boilers
- Bark boiler overfire (OFA) system upgrades
- Chemical recovery boiler operations training seminars (RBOTS)
- Chemical recovery boiler audits
- Boiler tube failure analysis
- Boiler NO_x evaluations
- Incineration of DNCG in existing boilers
- Design superheaters for MSW boilers
- Combustion review MSW boilers

This work was conducted for the following mills (in alphabetical order unrelated to the above listing):

- Asian Pulp & Paper - Sumatra, Indonesia
- AV Cell - Atholville, NB
- Blue Ridge Paper Company - Canton, NC
- Boise - Wallula, WA
- Bowater Inc. - Catawba, NC
- Cariboo Pulp & Paper - Quesnel, BC
- Carter Holt Harvey - Tasman mill, Kawerau, New Zealand
- CII Carbon - Gramercy, LA
- Daishowa America - Port Angeles, WA
- Georgia-Pacific Corporation - Crossett, AR, Port Hudson, LA, Clatskanie, OR
- Inland Pulp & Paper - Rome, GA
- International Paper Company - Bastrop, LA, Pine Bluff, AR, Franklin, VA, Roanoke Rapids, NC, Mansfield, LA
- Kruger Wayagamack - Trois Rivières, PQ
- MeadWestvaco - Covington, VA, Escanaba, MI, Evadale, TX
- Montenay Inc. - Burnaby, BC, Miami, FL
- SAPPI North America - Skowhegan, ME
- SCP - Ruzomberok, Slovakia
- Smufit Cartón de Colombia - Cali, Colombia
- Weldwood - Hinton, AB
- Weyerhaeuser - Columbus, MS
- Wheelabrator - Spokane, WA

Are High Fuel Prices Hurting Your Bottom Line... Again?

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A sampling of benefits seen on recent Jansen OFA projects are:

- Increase in bark burning by 15 ton per hour (a 30% increase).
- Reduction by over 75% in fuel oil consumption.
- Increase in bark firing by 50%.
- Reduction in stack CO emissions from 1,500 ppm to below 250 ppm.
- Follow load swings on bark alone, with steaming range of 50,000 to 300,000 lb/hr.
- Project payback time in six months.
- Rapid and complete incineration of DNCG without support from auxiliary fuel.
- Elimination of ash re-injection system due to low carbon content in the ash.
- Increased ash bed height on the stoker and reduction in grate temperature by 80°F.

Jansen has successfully upgraded OFA delivery systems on 15 biomass boilers of different design, vintage, and manufacturer, and is currently working on several additional upgrades for the first half of 2003.

With fuel prices rising once more, the time is right to seize the opportunities that may be available to improve your boiler's performance 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 by e-mail at Firstname.Lastname@jansenboiler.com. Additional information and specific project references can be found on our website at: www.jansenboiler.com.

Customized Engineered Solutions

Customized Engineered Solutions

Consider This...

In the past decade, our industry has seen many mergers, corporate consolidations, plant closures, lay-offs, and other moves designed to meet the challenges of our changing economic environment.

We at Jansen have watched these changes unfold to our customers, colleagues, and competitors. Fortunately, we have been able to maintain a steady course; in fact, our core group of employees has been with us for nearly 15 years. And we have continued our focus on meeting our client's needs with customized, engineered solutions. *Consider that…!*

Boiler "Needs" Survey

Jansen has developed a survey for power plant owners and operators especially developed to get a better understanding of the type of boiler projects that would be of interest to our customers in the areas of improving the operating performance, waste fuel burning capacity, maintenance upkeep, and useful life span of their large industrial boilers.

The survey covers a variety of technical issues, such as emissions performance, maintenance repairs and replacements, biomass burning capacity, fuel economy, etc.

The survey is confidential and the (anonymous) survey results will be shared with all participants. In February, the survey will be posted on the Jansen website (www.jansenboiler.com).

To receive a copy of this survey and be kept abreast of the survey results, please send an e-mail to Cathy Thomas, at Cathy.Thomas@jansenboiler.com.

Receive Our Newsletter by E-mail

This Newsletter, No. 29 Winter 2003, is again being sent by e-mail to our contacts of whom we have an e-mail address. It will also be sent via regular postal service.

We are continually expanding the electronic distribution list for our bi-annual newsletter. To receive future newsletters, you are given the following choices:

- Prefer receipt by e-mail (no regular mail)
- Prefer receipt by regular mail (no e-mail)
- Prefer both mailing (e-mail and regular mail)

In case we do not hear from you, we will assume the third choice.

To receive this and upcoming Newsletters electronically, please send your e-mail address to editor@jansenboiler.com and you will be included on the list.

PROBLEM SOLUTION

Newly Awarded Biomass Boiler Upgrade Projects

In recent months, Jansen was awarded contracts for the upgrade of the combustion air system of several biomass boilers. These projects are:

Mill in Virginia. The subject boiler is a B&W unit with design steaming capacity of 325,000 lb/hr at 750ºF and 600 psig. The purpose of the upgrade is to minimize emissions of CO and NO_X from burning wood waste and stoker coal, while following mill steam demand fluctuations.

The work includes necessary improvements to the combustion air system, namely installation of upgraded OFA delivery and combustion air preheating to the undergrate air (UGA) and OFA. The upgraded OFA system will maximize wood waste combustion, minimize ash carryover, and reduce excess air useage in the lower furnace.

Engineering is currently in progress and the installation is planned for the upcoming boiler shutdown in April of 2003.

Mill in Louisiana. In late December, Jansen was awarded the contract to upgrade the OFA delivery system of two identical boilers originally supplied by B&W. The units, each rated at 500,000 lb/hr steaming capacity (at 925ºF and 1,275 psig) currently burn a combination of wood waste, sludge and tire-derived fuel (TDF), along with fuel oil, pulverized coal, or natural gas.

The size and location of the existing OFA ports are ineffective as evidenced by the difficulty in sustaining proper combustion of wood waste fuels. The objective of the upgrades are to:

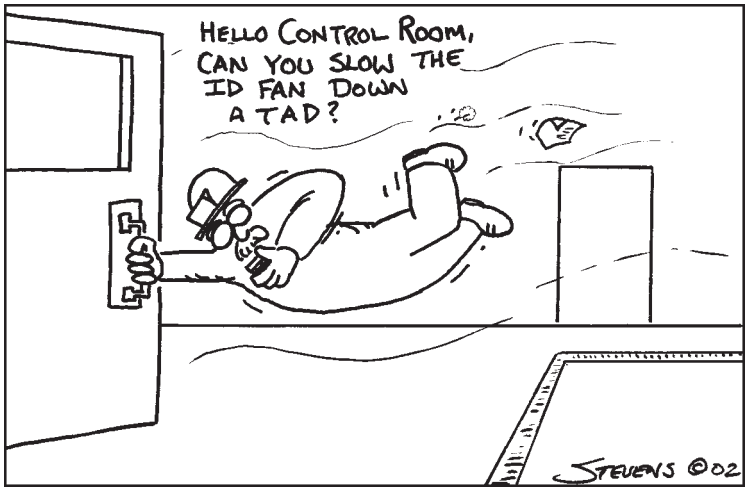
- Increase combustion efficiency,
- Reduce carryover of ash and unburned carbon,
- Reduce maintenance caused by excessive erosion,
- Provide for more stable combustion conditions over the full range of wood waste fuel qualities and quantities, and,
- Maintain emissions of SO_2, NO_X and particulate below permit levels.

The OFA upgrades will be installed during two phases; pressure part modifications will be made during the boilers' back-to-back outages in late February. The balance of the OFA upgrades will be installed in May while the boilers are operating, with final tie-ins in late May.

Mill in Washington. Early in January, this west coast mill released funding for Jansen to start engineering for the OFA delivery upgrade of a wood waste fired power boiler, originally supplied by Combustion Engineering. The design steaming rate of the unit is up to 120,000 lb/hr from firing wood and oil.

The mill wishes to upgrade the boiler to maximize the steam generation from wood waste firing and minimize the need to burn fossil fuel, as well as to improve the boiler's efficiency and minimize emissions. The installation of the upgraded OFA delivery system will accomplish these goals.

The installation of the work is currently scheduled for late May-early June of 2003.



OUR MISSION

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.

Customized Engineered Solutions

Upcoming Bark Boiler Workshops

Jansen is again organizing two Bark Boiler Workshops to share information with our customers about new developments and results of improving the operating performance and economics of existing biomass fueled power boilers.

This winter, two workshops are scheduled:

- February 20 and 21, in Pensacola, Florida
- March 27 and 28, in Bellevue (Seattle area), Washington

The two-day workshop consist of presentations about new technologies and cost effective solutions to improve the operating performance of bark-fired boilers with the following goals:

1. Increase biomass (wood waste and sludge) burning capacity
2. Reduce reliance on fossil fuel firing
3. Increase efficiency
4. Reduce carryover and unburned char
5. Improve emissions performance (CO, VOC, NO_X, particulate)
6. Facilitate efficient and safe incineration of DNCG

The workshop is co-sponsored by:

- Jansen Combustion and Boiler Technologies, Inc
- Process Equipment / Barron Industries
- Emerson Atlanta Solutions Center (formerly Orion)
- Power Specialists Associates, Inc.

Participation in the workshop is by invitation and is free of charge. As of press time of this newsletter, a number of seats remain available for both locations and you may contact us about this. Jansen reserves the right without advance notice to cancel or postpone the workshops at any time without obligation or liability.

To check availability and receive additional information, please call Cathy Thomas at 425.825.0500, ext. 108, or e-mail: Cathy.Thomas@jansenboiler.com.

Recovery & Power
BOILER NEWS

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.

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