

# BOILER NEWS

Number 33, Winter 2006

**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.*

**JANSEN CELEBRATES ANNIVERSARY**


## 30 Years of Customized Engineered Solutions!

*On the 16th of January 2006, Jansen officially celebrated 30 years of being in business. Anniversary activities included an Open House on January 13 and an employees' dinner on January 21. In this Newsletter, through three special articles, we're looking back at the Company's beginnings, the growth years, where we are today, and where we will be going...*

For 30 years, Jansen Combustion and Boiler Technologies, Inc. has delivered the highest standard of professional engineering services to owner/operators of industrial waste-fueled boilers. Starting in 1976 with combustion and boiler process consulting and providing design concepts for modifications and upgrades, today, we provide fully customized engineered solutions for biomass, chemical recovery, municipal solid waste (MSW) and fossil fuel-fired boilers.

Recognized as experienced specialists who provide full-service process and design engineering, equipment procurement, construction capabilities, and field services, we have improved the operational performance and fuel economy of numerous waste fuel-fired boilers.



*Jansen employees shown in September '05 photo. From left to right, back row: Marcel Berz, Mirela Dumitru, Dave Tracey, Matt Henderson, John Towner, Mark Leffler, Steve Campbell, Mike Britt, John La Fond, Jan Hulteen, Cathy Thomas, Pat Azeltine, and Samit Pethe. Front row: Elan Baumchen, Ryan Zarnitz, James Luksan, Arie Verloop, John Van Aelstyn, Paul Schuldt, Ned Dye, and Chris Dayton. Insert: Jerry Drott and Allan Walsh. *

**INSIDE THIS ISSUE**

- Jansen Celebrates 30th Anniversary
- An Update on Biomass Boiler OFA Upgrades
- A Look Back and into the Future;
  - How the Company had its beginnings
  - The growth years
  - Where we are today and where we will be going
- Did You Know...?
- Designing Superheaters
- News Briefs
- Newsletter By E-mail
- Boiler House Cartoon
- Biomass Boiler Workshops in 2006

**AN UPDATE ON**

## Biomass Boiler OFA System Upgrades

*Since 1998, Jansen has been awarded contracts to design/supply overfire air (OFA) system upgrades on forty (40) biomass boilers in the Forest Products Industries. With these upgrades (of which several are under contract for installation in 2006), to the best of our knowledge, Jansen continues to supply the most biomass boiler OFA system upgrades to the industry.*

A breakdown by original equipment manufacturer (OEM) shows that these OFA system upgrades were installed on nearly equal numbers of units from each Babcock & Wilcox (B&W), Combustion Engineering (CE), and Foster Wheeler (FW), with the remaining six on Erie City (2), Zurn, Kipper, and Riley (2) units. Many of Jansen's OFA upgrade projects are supplied to "repeat customers", such as International Paper, MeadWestvaco, Weyerhaeuser, and SAPPI, as these four companies have placed a combined total of twenty-seven (27) OFA upgrade orders.



*Continued on page 6*

## A Look Back and into the Future

In three articles in this Newsletter, we are looking back and a bit into the future of Jansen Combustion and Boiler Technologies, Inc. The articles are:

- > *How the Company had its beginning*, by Johan H. Jansen, P.E.
- > *The growth years*, by Arie Verloop, P.E.
- > *Where we are today and where we will be going*, by Edward ("Ned") C. Dye, P.E.

### >How the Company had its beginning...

*Johan H. Jansen, P.E., Founder and Past President*

**On a dark and rainy day** early in January 1976, I received a telephone call from John Gray, Vice President of ITT Rayonier West Coast Operations inviting me to a dinner meeting with George Scofield (Vice President of the same company in charge of production nationwide), from the company's New York head office, in Olympia, Washington (WA), to discuss the new B&W spent sulfite liquor recovery boiler they had installed and were operating at their pulp mill in Port Angeles, WA.



Their interest, as it turned out, was to appoint me to the position of corporate power and recovery boiler engineer; they had learned that I was available and their company needed someone with strong recovery boiler experience to fill that post.

I politely declined the offer and instead proposed to work with ITT Rayonier as an independent contractor. The terms of the contract were that I was to guarantee them at least half the available hours for the coming year. The parties agreed and the J.H. Jansen Company became a reality.

Company business was conducted from our home in Bellevue, WA. The first company asset was an IBM typewriter. A few years later the office was moved to a 900 sq.ft. space in Redmond, WA, and later on to a converted home in Woodinville, WA.

I reported to the Port Angeles mill on January 16, 1976 and worked on the project to improve the operation of the recovery boiler. I had been involved in procuring this boiler when I was the sales engineer for my former employer Babcock & Wilcox Company. I commuted between Bellevue and Port Angeles, coming home on the weekends when I had time to get re-acquainted with the family and to write the weekly activities reports.

After the Port Angeles project came to an end I was asked to work with the staff at their Hoquiam, WA pulp mill and several other mills in their system, Jesup (Georgia), Woodfibre (British Columbia), Fernandina Beach (Florida), and Port Cartier (Quebec) come to mind.

## Did you know...

**that since the beginning of the Company in 1976...**

- the company was first named J.H. Jansen Company Inc. and changed its name in 1993 to Jansen Combustion and Boiler Technologies, Inc.
- the company was formed as sole proprietorship and was incorporated in 1981.
- five different office locations have been used, beginning with the family room above the garage in the Jansen's home. We're in our 9th year in our current location in Kirkland.
- more than 56% of the current employees have been with the company at least 10 years. That percentage increases to 75% for employees with at least 5 years.
- the current management group has been in place for over nine years.
- we have done paid work in the following countries; USA, Canada, Venezuela, Colombia, Brazil, France, Russia, Indonesia, Slovakia, the Czech Republic, South Africa, Australia and New Zealand.
- performance evaluations have been conducted for over 200 industrial biomass and chemical recovery boilers.
- Jansen High Energy Combustion Air Nozzles™ are being used in 76 waste fueled boilers. More than 700 nozzles have been installed.
- Computational Fluid Dynamics (CFD) modeling of recovery boilers has been conducted in-house by Jansen personnel since 1988. To-date, over 60 power, MSW, and recovery boilers have been modeled.
- boiler circulation studies have been carried out for over 85 large industrial boilers.

www.jansenboiler.com

Word was spreading that Jansen Company could “fix” recovery and power boilers and I had requests from companies such as Weyerhaeuser, Georgia-Pacific, Scott Paper, Tembec and others to provide boiler engineering services.

In the meantime the Recovery Boiler Committee of the American Paper Institute (now AF&PA) requested me to assist them in writing the Recovery Boiler Reference Manuals. This project started in 1978 and ended in 1984 after the three volumes were published.

J.H. Jansen Company became a structured group when International Paper Company hired the company to conduct power plant surveys of most of their pulp and paper mills. Jansen Company put a team of experts together to conduct Power Plant Surveys at 13 IP mills over a time frame of several years.

This is how the company got started and how it conducted business in the first years of its history.

## > The growth years...

*Arie Verloop, P.E., Vice President,  
Technology and Client Relations*



**When I came from Holland** and joined Johan in 1980, I was excited about the challenge and adventure that lied ahead, but had thought by myself to stay for a couple of years and then go back to the old country. Well, 25 years later I am still here and the rest in between is history!

In the first couple of years there were four people at the office: Johan, two engineers, including me, and an administrative assistant. We evaluated the performance and fuel economy of quite a few recovery and power boilers for IP, as fossil fuel prices had steadily climbed through the 1970s. I “cut my teeth” in the chemical recovery area and with boiler performance calculations; those were all done by hand using standard calculators, without the help of computer spreadsheets. Client reports were handwritten, and then typed out.

Soon, we got work with other Pulp & Paper companies, not only consulting work and process studies, but customers were also interested in mechanical engineering designs and for Jansen to implement recommended equipment modifications. The Company quickly grew to 15 people in just a few years; many of these “old timers” have stayed with us until this day.

With the arrival of personal computers and advances in software development, the Company was contracted by API (now called AF&PA) to develop the Recovery Boiler Tutor (RBT), a computerized recovery boiler simulator and operator training program. With RBT, an operator could learn about the recovery boiler process, do’s and don’ts, and how to work operating problems and address emergency situations. The RBT program found its way to over 100 mills in the US and Canada.

Another milestone from those earlier years was the patent the Company received on a High Energy Combustion Air Nozzle™ that was exclusively developed to improve air jet penetration in recovery boilers. As a result, J.H. Jansen Co. was awarded the contract to design the first recovery boiler air system upgrade in North America from conventional two- to three-levels of air supply on a CE unit operated by Georgia-Pacific in Palatka, Florida. As a result, the boiler’s throughput capacity was increased and the run time between water washes was increased from 7 months to over 16 months! Many others have since followed and today, most recovery boilers in North America are operated

with modernized, higher capacity, and more efficient air delivery systems, using multiple air levels.

After the Palatka success, word spread around quickly, and within a few years the Company had designed/ supplied air system upgrades on more than ten recovery boilers. Because of continued growth, we moved offices again (some of you will remember Woodinville), and in the early 1990s, the number of employees exceeded 30. To better reflect our capabilities and experience, in 1993 we changed our official name to Jansen Combustion and Boiler Technologies, Inc., or short: JANSEN.

In the meantime, the technical side of the company continued to rely on two pillars of strength, namely the boiler analytical process engineering and consulting work as well as the mechanical design engineering, which was later expanded to include installation construction responsibilities. In both, our clients recognized our dedication and expertise to help plants improve the waste fuel burning capacity, emissions performance, thermal efficiency, and fuel economy of existing boilers that burn difficult fuels, such as spent chemical liquors, biomass (waste wood), mill sludge, and others.

With the downturn in the Pulp & Paper industry in the early to mid-1990s, the Company went through some tough times (like most in the industry) but would stay in business because of a core of loyal customers and employees alike!

With the costs of fossil fuels again on the rise the last ten years, the focus in many mills has turned to upgrading existing biomass boilers. Jansen has been fortunate to work on many of these units, improving the fuel economy as well as operating and emissions performance. Often, our customers have seen a return on investment and payback that for these kinds of boilers was unheard of before!


## > Where we are today and where we will be going!

*Edward (“Ned”) C. Dye, P.E., President*



**Over the years** we have developed the technological skills and project management expertise to better provide our customer with solutions that meet their needs. We have grown from a firm that specialized in operational support only to one that provides full services - from problem definition, through solution creation, to design, material supply, and equipment installation. By providing a single point of responsibility for power house projects, our customers can better focus on the ongoing operations and maintenance challenges facing all production facilities these days.

Jansen’s projects in recent years have included combustion air system upgrades on biomass and chemical recovery boilers, superheater designs for power, MSW, and chemical recovery boilers using state of the art materials. We have also provided biomass and recovery boiler island upgrades that include new fuel feed systems, furnace rebuilds/modifications, generating banks, economizers, air heaters, mechanical dust collectors, fans, and particulate emission abatement equipment.

It is our intention to be the “go-to” company whenever a boiler owner has a challenge with any problem in their boiler house. By customizing our solutions to meet the customer’s needs, and completing every project in an exemplary manner, we strive to be the first choice for boiler retrofit projects. 

## UPCOMING

# Biomass Boiler Workshops



Participants take notes during a past Biomass Boiler Workshop.

Continuing an annual tradition that was started by Jansen in the year 2000, we are again organizing several Biomass Boiler Workshops with our co-sponsors. The purpose of the workshop is to share information with our customers about new developments and results of improving the operating performance and fuel economy of existing biomass fueled power boilers.

**In 2006, the dates and locations for the workshops are:**


- June 8–9 in Birmingham, Alabama
- September 21–22 in Seattle, Washington

The day-and-a-half workshop consists of presentations about new and proven technologies and cost effective solutions to improve the bottom line performance of bark-fired boilers, with the following goals:

1. Increase biomass (wood waste and sludge) burning capacity (sometimes also TDF)
2. Reduce reliance on fossil fuel firing
3. Increase thermal efficiency
4. Reduce carryover and unburned char
5. Improve emissions performance (CO, VOC, NOx, 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
- Power Specialists Assoc. Inc. (PSA)

Participation in the workshop is by invitation and prior request only and is free of charge. 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 425.952.2835, or Pat Azeltine at 425.952.2843 (e-mail: [FirstName.LastName@jansenboiler.com](mailto:FirstName.LastName@jansenboiler.com)).

## NEWS Briefs

Since our last newsletter (Summer of 2005), Jansen conducted the following process and design engineering projects in the Forest Products and Waste-to-Energy industries:

- Biomass boiler engineering evaluations.
- Chemical recovery boiler performance evaluation.
- Boiler circulation studies and UFM data collection.
- CFD modeling of biomass and chemical recovery boilers.
- Biomass boiler OFA system upgrades, design, supply, and installation.
- Biomass boiler superheater design and supply (in progress).
- Chemical recovery boiler air system upgrade (in progress).
- Evaluation and implementation of HVLC NCG disposal in existing boilers.

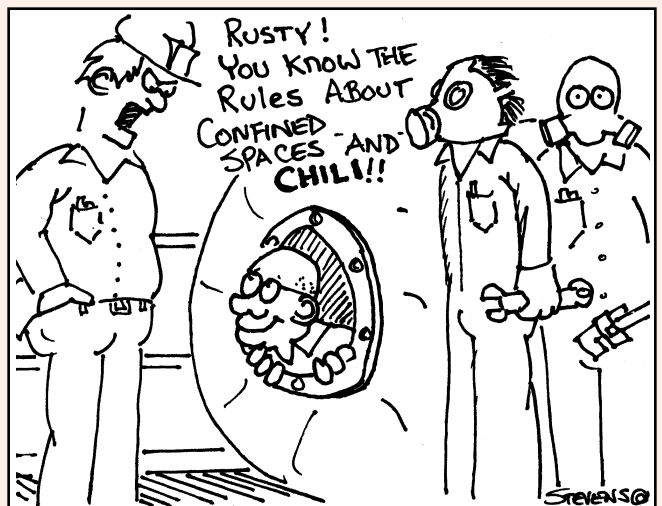
This work was conducted (or is currently underway) for the following companies:

- Alabama River Pulp Company
- BOISE
- Bowater Inc.
- Brunswick Cellulose
- Corner Brook Pulp and Paper Limited
- Delta Natural Kraft
- Evergreen Elyo
- Georgia-Pacific Corporation
- International Paper Company
- Kimberly-Clark
- Minnesota Power
- Mustang Tampa, Inc.
- NewPage Corporation
- Rayonier, Inc.
- SAPPi North America
- Simpson Tacoma Kraft
- Smurfit-Stone Container Corporation
- SP Newsprint
- Weyerhaeuser Company

For further information on this type of work, please contact Arie Verloop at 425.952.2825 or by e-mail at [Arie.Verloop@jansenboiler.com](mailto:Arie.Verloop@jansenboiler.com). Additional information and specific project references can be found on our website at: [www.jansenboiler.com](http://www.jansenboiler.com).

## Boiler House Cartoons on Jansen Website

A collection of boiler house cartoons can be viewed on our website: [www.jansenboiler.com](http://www.jansenboiler.com). Some 30 cartoons by Gordon Stevens shown previously in this newsletter are presented on the site. Each cartoon depicts a humorous situation with people and equipment in the boiler house. As you will agree, Gord has the rare insight to find humor in the operation of power and recovery boilers and we hope you enjoy his cartoons as much as we do.



# DESIGNING *Superheaters*

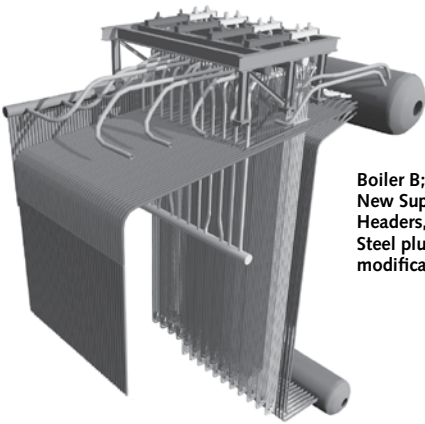
In recent years, Jansen has provided superheater modification designs for several waste fueled boilers. With increased emphasis on in-house power generation, many plants wish to improve the performance of their boilers' superheaters, i.e., by increasing final steam temperature and/or pressure.

**A brief synopsis of these Jansen projects are:**

**Boiler A.** Jansen design/supplied a replacement superheater for a spent sulfite (SSL) red liquor recovery boiler in operation in western Canada. The Combustion Engineering MU-X type unit was installed in the mid 1970s to produce 470,000 lb/hr of steam at 600 psig and 725°F. After over 25 years of service, due to metal loss and failures, a complete replacement of the two superheater sections was warranted. Jansen first conducted an engineering evaluation to address the problem's root cause and to conceptualize modified design features for superheater arrangement and metallurgy to meet the mill's goals.

Jansen then carried out design engineering, materials supply, and fabrication of the new primary and secondary superheater sections and two outlet headers. Selected portions of the new superheater were of composite tube material for improved corrosion resistance and extended useful life.

**Boiler B.** Jansen designed new superheaters for three identical Municipal Solid Waste (MSW) incinerators. By original design, these Babcock & Wilcox boilers did not produce superheated steam, and with the purchase of a new turbine generator, the units had to be retrofitted with superheaters.



**Boiler B;  
New Superheater,  
Headers, and Support  
Steel plus other  
modifications**

*The Jansen scope of work consisted of the following activities:*

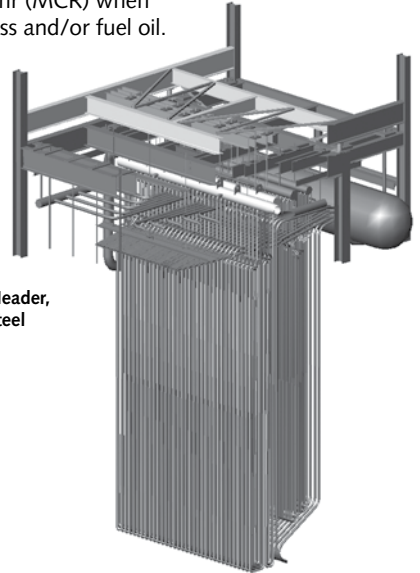
- Sizing of heat transfer surfaces.
- Preparing ASME calculations.
- Preparing general arrangement and fabrication assembly drawings for the new superheater and associated equipment modifications.
- Preparing fabrication specifications for the new superheater and associated equipment.
- Preparing drawings for structural modifications.
- Preparing installation detail drawings and contractor specifications.

The superheaters have been in service since 2003.

**Boiler C.** Last year, superheater modifications were installed on a small bark boiler, together with a new economizer and other upgrades. On this unit, an overfire air (OFA) upgrade was supplied that would result in higher bark burning rates at increased thermal efficiency and reduced excess air usage. In the initial process engineering evaluation for the project, it was

determined that these performance improvements would result in lower steam temperatures leaving the existing superheater (by more than 50°F). To counteract this drop in steam temperature, additional superheater surface was installed by adding four tubes to each element. This assured that pre-upgrade steam temperatures could be maintained after installation of a new economizer and reducing excess air.

**Boiler D.** Currently, Jansen is designing a superheater upgrade on a vintage 1968 combination biomass and oil-fired boiler with the purpose to increase the overall power cycle efficiency of the plant. The goal is to increase final steam temperature from 825 to 850°F (at 850 psig) in the steaming range of 350,000 to 600,000 lb/hr (MCR) when firing biomass and/or fuel oil.



**Boiler D;  
Superheater, Header,  
and Support Steel  
Modifications**

Various design arrangements were considered and the final configuration involves a nearly three-times increase in the secondary SH surface area and the design and supply of new inlet and outlet headers, as well as modifying steam attemperation equipment to improve steam temperature control. New support steel was designed and will be supplied to handle the increased weight of the new SH assemblies.

Jansen provides project management, design, engineering, materials procurement, fabrication, and delivery to the mill. Installation of the superheater modification will take place during the boiler outage scheduled for May 2006. 

*For further information and specific inquiries, please contact Arie Verloop at 425.952.2825, or Mike Britt at 425.952.2829 or by e-mail at [Firstname.Lastname@jansenboiler.com](mailto:Firstname.Lastname@jansenboiler.com).*


## An Update on Biomass Boiler OFA System Upgrades

For a large number of projects, the rising cost of auxiliary fossil fuels (natural gas, oil, and coal) provides the economical "impetus" for the OFA delivery system upgrades. In many cases, an improvement in the boiler's environmental performance is sought as well (i.e., Boiler MACT).

Key elements in the Jansen approach and project execution are:

- A thorough initial process evaluation is conducted to characterize the boiler and identify its individual strengths and weaknesses.
- CFD modeling is carried out early to evaluate design options and verify that the project goal(s) can be met.
- A customized, engineered solution is developed that is tailor-made for each boiler.
- Jansen uses relatively few but large Jansen High Energy Combustion Air Nozzles™ that provide excellent OFA jet penetration and mixing. The Jansen nozzle efficiency provides high jet velocities without the need for excessive combustion air supply pressures. As a result, in most of our upgrades, the existing FD fan can be used to supply OFA and no new fans are needed.

- OFA is supplied at an elevation low in the furnace, just above the fuel distributor spouts. With increased burning of waste wood fuel (often supplemented by TDF), large amounts of volatiles are released from these grate fuels that are quickly mixed with air and fully burned.
- OFA nozzles are usually placed on the side walls, where there are few interferences. Therefore, the nozzles can be located to achieve the best combustion performance.
- Uncomplicated installation of OFA nozzles on the side walls is also more cost effective. Installation costs are minimized and boiler downtime can be kept within four to five days.
- Follow-up support to assure that the boiler is operating to the owner's satisfaction.

More specific project information can be found in previous Newsletters which can be found on our website: [www.jansenboiler.com](http://www.jansenboiler.com). (Note: Jansen Newsletter back issues beginning with issue No. 23, Winter 2000, are included in its entirety on the website.) 

For further information and specific inquiries, please contact Arie Verloop at 425.952.2825, or Ned Dye at 425.952.2827 or by e-mail at [Firstname.Lastname@jansenboiler.com](mailto:Firstname.Lastname@jansenboiler.com).

**Our success is based on professional and personal relationships** with our customers, vendors, subcontractors, and business associates. We thank our customers for their continued support and repeat business, and look forward to another successful 30 years!




## RECEIVE OUR Newsletter by E-mail

This Newsletter, No. 33 Winter 2006, is again being sent by e-mail to our contacts for 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 mailings (e-mail and regular mail)

If 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](mailto:editor@jansenboiler.com) and you will be included on the list. 



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.

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

Inquiries should be directed to:

**Editor, Recovery & Power Boiler News**  
Jansen Combustion and Boiler Technologies, Inc.  
12025 115th Avenue NE, Suite 250  
Kirkland, WA 98034-6943

Phone: (425) 825-0500

Fax: (425) 825-1131

E-mail: [editor@jansenboiler.com](mailto:editor@jansenboiler.com)