Clean Power Plan

In August 2015, EPA and President Obama introduced the Clean Power Plan (CPP). The goal of the plan is to reduce emissions of carbon dioxide from fossil-fuel power plants to 32% below 2005 levels by 2030, and to promote renewable energy sources. Fossil-fuel power plants account for nearly one third of U.S. CO2 emissions (compared to 36% from transportation). Fossil fuels are the primary contributor to climate change.

As part of the plan, EPA has established interim and final goals for CO2 emissions. Each state must develop plans to achieve the interim goals by 2020 and the final goals by 2030. States must submit final plans by September 6, 2016, or by September 6, 2018, for states granted extensions. The CPP also allows multi-state approaches such as emissions trading.

The CPP allows for emissions reduction credits to offset emissions from fossil-fuel-fired power sources, within certain guidelines. Credits are available for power generation from renewable sources (gas, nuclear, and biomass), including electric utilities and other large generators such as landfills, biogas plants (WTE, biogas portion only), and nuclear power.

In addition, states must demonstrate that WTE generation does not negatively impact local recycling or composting activities. Landfill gas is not considered renewable, and is therefore not eligible for inclusion in emissions reduction credits.

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High Efficiency NOx Removal for Biomass Applications

- Combustion optimization to minimize NOx and achieve low NOx.
- Patented gas-air syngas/N2 syngas reduction option by Ecospray.
- CFD modeling to determine optimum injection locations in the furnace.
- Odor control package for maximum emissions control.

Optimizing Combustion with High Efficiency SNCR

- Biofuel gas (no) (on)-feasibility evaluation and cost estimation.
- Chemical recovery and biomass boilers engineering evaluations.
- Combustion system upgrades for both new and existing biomass boilers.
- Chemical recovery boiler NOx control assessments, diagnostic evaluation, and tuning.
- Boiler bedroom-near-side evaluation.
- CFD modeling of biomass, chemical recovery, and with flue gas.
- BF, CRF, and stoker-fired boiler operational tuning and optimization support.
- Boiler MACC compliance review and operational testing.

Jansen Celebrates 40 Years!

Jansen has completed 40 years of experience in the pulp and paper industry, which started in the late 1970s. Over the years, Jansen has grown to become a market leader in the boiler industry, both in North America and Europe.


customized-engineered-solutions

Continued from Page 1

Jansen Celebrates 40 Years!

Although Jansen’s upgrade work in 2015–16 focused mainly on biomass power boilers, there was plenty of activity on the recovery boiler side. Jansen engineers carried out the following studies and evaluations on recovery boilers:

- NOx evaluation for a black liquor recovery boiler in Virginia. The mill was targeting an increase in its boiler’s throughput, and for a recovery boiler system that was already close to the mill’s limit in current operations, would exceed the limit at the higher firing rate. Jansen performed a study incorporating CFD modeling to predict NOx levels at the highest throughput rate. The study identified key system upgrades that, due to the future NOx levels, would be highly questionable.

- Bypass burner tuning and performance evaluation for a recovery boiler in Wisconsin. The mill had recently been experiencing problems with the old bypass burner system, which often caused the load to shift back up to 80% with it, including a three-level air system upgrade for a recovery boiler in Washington State. The study concluded that bypass burners provide more unnecessary NOx generation than other burners. The study recommended installing a new bypass burner system in the pulp and paper industry and with independent power producers. Between 2010 and 2015, Jansen installed upgraded NOx systems in more than 40 biomass boilers, and several 21st century upgrade and economic evaluation projects were developed beginning in 2015 to support waste-to-energy boilers in this period.

Looking to the Future

Jansen is poised to maintain its position as an industry leader for years to come. Looking at the future, Jansen is expected to focus on quality engineering, which is driven by the company’s mission. Jansen is committed to providing the highest-quality products and services to its customers across the world. The company is always looking for new opportunities to expand its business and is committed to providing the best possible solutions to its clients.

For more information or specific inquiries, please contact John La Fond at 425.952.2832 or by e-mail at john.lafond@jansenboiler.com.

Jansen Busy with Startups in 2015

This year is a busy one for Jansen’s startup crews, with the company involved in more than six startups following biomass boiler upgrades between April and June. In each case, Jansen is providing operator training and startup, several days of on-site support during the startup for tuning, and in some cases during a later guarantee test.

Here are some highlights of three of these upgrades, located in the southeastern United States:

- Boiler A is a biomass boiler at a paper mill in Mississippi. Jansen installed a side wall overfire air system on the boiler in 2006. Jansen is now installing two new burners sized for a total steam load of 100,000 lb/hr. The burners will be fully integrated with the existing hardware and dust modification, so the owner can convert the boiler’s auxiliary firing from oil to natural gas.

- Boiler B was designed for a maximum steam load of 293,000 lb/hr on natural gas or 232,000 lb/hr on biomass plus natural gas on oil. The boiler had issues with high excess air, heavy char carryover, high 

- Boiler C is a biomass boiler for which Jansen had supplied an overfire air system in 2006. Jansen is now replacing the original single level, hand operated overfire air nozzles with new multi-level range- 

- Looking to the Future

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Here are some highlights of three of these upgrades, located in the southeastern United States:

- Boiler A is a biomass boiler at a paper mill in Mississippi. Jansen installed a side wall overfire air system on the boiler in 2006. Jansen is now installing two new burners sized for a total steam load of 100,000 lb/hr. The burners will be fully integrated with the existing hardware and dust modification, so the owner can convert the boiler’s auxiliary firing from oil to natural gas.

- Boiler B was designed for a maximum steam load of 293,000 lb/hr on natural gas or 232,000 lb/hr on biomass plus natural gas on oil. The boiler had issues with high excess air, heavy char carryover, high 

- Boiler C is a biomass boiler for which Jansen had supplied an overfire air system in 2006. Jansen is now replacing the original single level, hand operated overfire air nozzles with new multi-level range- 

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Jansen WELCOMES

Tim Wilson. We are pleased to announce the addition of Timothy Wilson to our Design team. Tim graduated high school in 2013 with interest in becoming an engineer. During high school he was a member of a team that designed and built an efficient car in the Shell Eco Marathon Americas. This led to a year of study at Western Washington University where he focused on Mechanical Engineering. Along the way he got a job at a pet store, where he learned a lot about aquariumkeeping; he is still an avid aquarist with multiple planted aquariums.

In September of 2014 Tim enrolled in ITT Technical Institutes Drafting and Design Technology program and is on track to earn a degree in March of 2017. Tim plans to move into a full time draftsman position with Jansen after graduation from ITT, and hopes to continue his education at some point thereafter. In the meantime, Tim continues to work part time for Jansen, go to school at ITT, and on a daily basis walk a five-mile route encompassing the small road in front of our corporate office.

Tim is working as drafter in Jansen’s Design Engineering department.

This can be reached by phone at 425.952.2440 or by email at tim.wilson@jansenboiler.com. Please join us in welcoming Tim.

Jansen Busy with

Startups in 2016

This year is a busy one for Jansen’s startup crews, with the company scheduled to work on or complete six startups following biomass boiler upgrades between April and June. In each case, Jansen is providing operator training and startup, several days of support on site during the startup for tuning, and in some cases during a later guarantee.

Here are some highlights of three of these upgrades, located in the southeastern United States:

- **Boiler A** is a biomass boiler at a pulp mill in Florida, where new CFD modeling was done to predict NOx levels at the target liquor throughput rate. The study was designed for a maximum steam load of 250,000 lb/hr on natural gas or oil or 232,000 lb/hr on biomass. The boiler had issues with high NOx at a target liquor throughput rate. The study included a boiler evaluation and NOx generation and to define any necessary upgrades in the air system, liquor firing rate.

- **Boiler B** was designed for a maximum steam load of 290,000 lb/hr on natural gas or 322,000 lb/hr on biomass. The boiler had issues with NOx control at high liquor throughput rates. The study included a boiler evaluation and NOx generation and to define any necessary upgrades in the air system, liquor firing rate.

- **Boiler C** is a biomass boiler for which Jansen had supplied air system hardware in 2006. Jansen is now replasting the original single level, hand dumped overfire air nozzles with multi-level range level nozzles including smoke gas recirculation. Jansen is also providing a boiler performance optimization upgrade. The upgrade will include a new air flow control system and have the effect of reducing NOx generation at the original (350,000 lb/hr on biomass), but with much greater overall control to handle variations in steam demand and fuel quality.

**Measurably, on the other side of the continent, three upgrades in western Canada:**

- **Boiler D** is a former chemical recovery boiler converted to biomass firing with a maximum steam generation rate of 300,000 lb/hr on biomass firing. The boiler was designed for a maximum steam load of 360,000 lb/hr on oil or coal or 410,000 lb/hr on biomass. Jansen’s boiler evaluation, which included Computational Fluid Dynamics (CFD) modeling, concluded that the boiler’s biomass firing capacity was limited by an inadequate overfire air system. The new Jansen side wall overfire air system will provide improved biomass combustion as well as incineration of dilute non-condensable gases.

- **Boiler E** has a maximum steam rate on biomass of 267,000 lb/hr and up to 397,000 lb/hr on natural gas or oil. The owner wanted to increase the boiler’s total steam output to 300,000 lb/hr, 50% of which would come from biomass combustion, and to increase thermal efficiency and reduce that carrier emissions. Following Jansen’s boiler evaluation, again including CFD modeling, the owner awarded Jansen a contract to supply a system upgrade, including multiple overfire air systems.

- **Boiler F** was installed in the mid-1960s with original design steam demand of 300,000 lb/hr on oil and biomass firing and 450,000 lb/hr on oil and biomass firing and 290,000 lb/hr on oil and biomass firing. The project will include the boiler itself as well as four new air ports in the biomass overfire air system.

- **Boiler G** was designed for a maximum steam load of 290,000 lb/hr on oil or coal or 322,000 lb/hr on biomass. This boiler was designed for a maximum steam load of 360,000 lb/hr on oil or coal or 410,000 lb/hr on biomass.

The boiler currently fires hog fuel, sludge and excels in carbon efficiency but has some issues with ash plugging. The client wants to generate 320,000 lb/hr steam flow from biomass only, while reducing the quantity of ash carried over and reducing the rate of ash plugging in the grate. Jansen conducted a boiler evaluation in late 2015 and was subsequently awarded the contract to supply a new overfire air system for the boiler.

Further information on specific projects can be found in our web site at www.jansenboiler.com. Contact us for additional information and specific project references. The email address is john.lafond@jansenboiler.com.
Recovery Boiler PROJECT BRIEFS

Although Jansen’s upgrade work in 2015–16 focused mainly on biomass power boilers, there was plenty of activity on the recovery boiler side. Jansen engineers carried out the following studies and evaluations on recovery boilers:

- NOx evaluation for a black liquor recovery boiler in Virginia. The mill was targeting an increase in liquor throughput, and Jansen, as the system design engineer, were already far ahead of the new steam facility that was already under construction. The mill was interested in replacing the boiler’s oil burners by gas burners capable of achieving a significant amount of liquor interaction, but was anxious to avoid any boiler performance penalties. Jansen performed a study that included boiler and burner design, CFD modeling of the burners and the entire unit, and temperature analysis to define parameters for broadband emissions.

- Burner tuning and performance evaluation for a black liquor recovery boiler in Wisconsin. The mill had recently been experiencing boiler plugging and air system operation issues. Jansen spent several weeks on site tuning the boilers, and later provided an evaluation of the burners as well as current boiler performance.

- Capacity study for a black liquor recovery boiler in Wisconsin. The mill was interested in defining upper limits in the boiler’s steam generation capacity, both for the boiler’s future steam generation capability and to determine whether any modifications would be required to the boiler equipment, including the auxiliary systems.

High Efficiency NOx Removal for Biomass Applications

- Combustion optimization to minimize NOx and achieve low NOx boiler operation.
- Patented gas turbine UNX system reduces nitrogen oxides by 80–90%.
- CFD modeling to determine optimum injection locations in the furnace.

ANNOUNCING our AlliANce

- Customized engineered solutions
- Ecospray

NEWS Briefs

- Since our previous newsletter (No. 1, Winter 2015), Jansen was contracted for the following new process and design engineering projects in the Paper, Forest Products, Agricultural, Energy-from-Waste Industries and Independent Power Producers (as well as Power Plants): nitric acid (NOx)-forming feasibility studies and cost estimating.
- Chemical recovery and biomass boilers engineering evaluations.
- Combustion system upgrades for existing biomass boilers.
- Chemical recovery boiler capacity assessments, diagnostic evaluation, and tuning.
- Boiler burner-related system evaluations.
- CFD modeling of biomass, chemical recovery, and WtE boilers.
- CFB, PCF, and stoker-fired boiler operational tuning and optimization support.
- Boiler MAC-T compliance review and operational support.

- This work was completed, or is currently under way, for the following companies:
  - Arrow River Cedarbile LLC
  - Calpine/Capital Power
  - Capital Power Puyallup
  - C F Industries (sodium bisulfite)
  - Dashani (Atlas mine)
  - Interlink Energy Power
  - Sonera Inc.
  - Suncor Energy

- For further information on the types of projects, contact John La Ford at 425.952.2622 or by e-mail at john.laford@jansenboiler.com. Additional information and project references can be found at our website at www.jansenboiler.com

Jansen Celebrates 40 Years!

Johan Jansen retired in 1997, and a shift in the company’s management and ownership followed. The company was restructured to reflect the current owner’s vision of quality engineering, design, and customer-centered service.

The company has enjoyed the benefit of experienced, staffed seasonal veterans and sharp new hires, and a well-named reputation for quality engineering. Jansen is poised to maintain its mission as an industry leader for years to come.

For general information or specific inquiries, please contact John La Ford at 425.952.2622 or by e-mail at john.laford@jansenboiler.com.
ATTEND OUR SECOND 2016 Biomass Boiler Workshop
September 22-23, 2016
Seattle, WA

Since 2000, these workshops have been attended by over 1,100 representatives of numerous plants in the Pulp/Paper Products and Food Industries, Power Sector, Independent Power Producers and Energy-from-Waste. The workshops consist of presentations about new technological developments and results and to improve the operating performance, fuel burning capability, efficiency, and fuel economy of biomass-fired boilers (mostly stoker-fired). In addition, the program will include troubleshooting and learning solving discussions of challenges that attendees bring to the workshop. Participants will benefit by 1) learning about current accepted practices; 2) being exposed to the latest innovations and developments in the biomass boiler area; and 3) receiving information and training on to their specific problems.

Stay tuned at jansenboiler.com/biomass-boilerworkshops for more information on our 2016 workshop.

The workshops are presented and co-sponsored by:

Jansen Combustion and Boiler Technologies, Inc.

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RECENT BIOMASS UPGRADE Passes Performance Test
Jansen finished 2015 on a high note with the successful performance test of an air for our newsletter.

Boiler News is published regularly by Jansen Combustion and Boiler Technologies, Inc.

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For further information and specific inquiries, please contact John La Fond at 425-952-2832 or by e-mail at john.lafond@jansenboiler.com.

Cathy Thomas by phone at 425-852-2036 or by e-mail at cathy.thomas@jansenboiler.com.

boiler also tended to co-fire a significant amount of recycled fuel oil to maintain load.

The company's early projects focused on energy efficiency of recovery and power boilers in the North American pulp and paper industry, and included boiler evaluations and audits in a dozen major mills. These endeavors helped to establish Jansen's experience and reputation and allowed for some gradual growth in the company. In 1981, the company was contracted by the American Paper Institute (API, currently the AFIA) to write the Recovery Boiler Reference Manuals, Volumes I, II, and III, followed by development and implementation of the Recovery Boiler Tutor (RBT).

In 1956, Johan Jansen recognized a niche that was not well served by the boiler OEMs, namely upgrading and improving performance for existing industrial boilers. So Johan Jansen left his job with Babcock & Wilcox and began his career. The company's early projects focused on energy efficiency of recovery and power boilers in the North American pulp and paper industry, and included boiler evaluations and audits in a dozen major mills. These endeavors helped to establish Jansen's experience and reputation and allowed for some gradual growth in the company. In 1981, the company was contracted by the American Paper Institute (API, currently the AFIA) to write the Recovery Boiler Reference Manuals, Volumes I, II, and III, followed by development and implementation of the Recovery Boiler Tutor (RBT).

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Clean Power Plan

In August 2015, EPA and President Obama introduced the federal Clean Power Plan (CPP). The goal of the plan is to reduce emissions of carbon dioxide from fossil-fuel power plants to 32% below 2005 levels by 2030, and to promote renewable energy sources. Fossil-fuel power plants account for nearly one third of US CO2 emissions (compared to 40% in 1980). The CPP is designed to achieve these goals, which are widely believed to contribute to climate change.

As part of the plan, EPA has established final and guidelines for CO2 emissions. Each state must develop plans to achieve the interim goals between 2016 and 2023, and final goals by 2030. States must submit final plans by September 6, 2014, or by September 6, 2015, for states granted an extension. The CPP also allows multi-state approaches such as emissions trading.

The CPP allows for emissions reductions to offset emissions from fossil-fuel power plants, with certain exceptions. Credits are available for power generation from renewable sources (24 states), hydroelectric, waste-to-energy (WTE, biogas portion only), and nuclear power.

The CPP is said to achieve its climate goals, but there remain questions to be proven. What exactly is a qualified biomass power facility? The answer involves determining the sustainability of the biomass source and its potential to be CO2-neutral. EPA is working with its Science Advisory Board to establish firmer guidelines in this area. In the meantime, states are responsible for demonstrating that a biomass source is qualified, and thus eligible for emissions credits.

As for the WTE industry, WTE plants are not classified as affected sources under the CPP, meaning they are not subject to CO2 limits. WTE generation can be used for obtaining emissions reduction credits, but only for the biogas portion (for instance, from food and yard waste rather than from plastics). In addition, states must dem- onstrate that WTE generation does not negatively impact local recycling or composting activities. Landfill gas is not considered renewable, and therefore not eligible for inclusion in emissions reduction credits.

New Ground-Level Ozone Standards

EPA introduced new National Ambient Air Quality Standards (NAAQS) in October 2015. The new rules tighten ozone limits for areas with high ozone levels, including industrial facilities and power plants. The final NAAQS will be 0.075 ppm, compared to 0.06 ppm in the old standard. The changes may require new air pollution controls and emissions reductions for new and existing facilities.

The workshops are presented and co-sponsored by: Jansen Combustion and Boiler Technologies, Inc.

For more information and specific locations contact Matt Hendelick at 405-252-2844 or via e-mail at matt.hendelick@jansenboiler.com

To register for this and upcoming workshops electronically, you may directly sign up through the link on our website (http://jansenboiler.com/events/newsletters) or alternatively, send your email address to editor@jansenboiler.com and you will be included on the list.

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• Jansen Combustion & Boiler Technologies
• Performance Test
• Recovery Boiler Performance Test
• Jansen Cary with Stirling Metal
• New Biofuel
• New Biofuel Tax Credits
• Biomass Boiler Workshops
• High Efficiency NOx Reduction

The workshops consist of presentations about new technological developments and results and improve the operat-

ing performance, fuel burning capacity, efficiency, and flexibility of biomass-fired boilers (mostly stoker-fired).

In addition, the program will include troubleshooting and 4 days of discussion of challenges that attendees bring to the workshop. Participants will benefit by understanding current issues and best practices in operating, maintaining, and troubleshooting their biomass boiler area problems; and 3) reviewing information related to their specific problems in the workshop to free of charge, any limits.

Stay tuned for jansenboiler.com/biomass-boiler-workshops for more information for our 2015 workshops.

The workshops are presented and co-sponsored by:

Jansen Combustion and Boiler Technologies, Inc.

To register for our workshops directly, please contact Matt Hendelick by phone at 405-252-2844 or by e-mail at matt.hendelick@jansenboiler.com.

Cathy Thomas at phone by 405-252-2844 or by e-mail at cathy.thomas@jansenboiler.com.

Jansen Combustion & Boiler Technologies, Inc.

Jansen Celebrates 40 Years!

Jansen introduced Computer Aided Fuel Dynamics (CADF) modeling a novel design tool for the new era in system.

The final design incorporated eight new Multi-Range Jansen High Energy Combustion Air Nozzles, and utilized the boiler’s existing forced draft fan and two OFA booster fans for OFA supply. Jansen also supplied three new Detroit Stoker pneumatic fuel distributors to replace the boiler’s mechanical distributors.

The upgrade was installed in October 2015, and after a minor commissioning issue, the boiler was placed into service December 1, 2015. The total savings from the new design were approximately $250,000 per year on the heating oil and the biomass fuel in the boiler. As a result, the boiler was able to generate a lower overall stack temperature of approximately 250°F on gas stacks, even with the fuel delivery system working at full capacity. But at the stack. Measured NO and CO emissions were improved over the baseline NOX and CO levels. This has lead to a significant improvement in the boiler’s reliability, efficiency, and safety.

We appreciate this by: Writing continuous evaluations
Providing a flexible approach to software
Developing continuous training and support for our clients
We cannot overlook to: creating a challenging and improving environment that fosters opportunity for professional growth and advancement.

We do our best to meet the highest standards of professional ethics and integrity.

The Early Years

The J.H. Jansen Company was founded in 1976 by Johan Hendelick. Since its inception, the company has come to the United States in 1992 to further the company’s market reach. Initially, Jansen worked closely with the American Paper Institute (API) to recognize a niche that was not well served by the boiler OEMs, namely upgrading and improving performance for existing industrial boilers. So Johan approached the API with the idea of conducting some initial feasibility studies and allowed for some gradual growth in the concept. Jansen is an engineering design and services firm that operates in the Biomass, Chemical Recovery & Energy-from-Waste industry.

Jansen introduced Computer Aided Fuel Dynamics (CADF) modeling a novel design tool for the new era in system. The final design incorporated eight new Multi-Range Jansen High Energy Combustion Air Nozzles, and utilized the boiler’s existing forced draft fan and two OFA booster fans for OFA supply. Jansen also supplied three new Detroit Stoker pneumatic fuel distributors to replace the boiler’s mechanical distributors.

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Continued on page 3

New EPA Regulation

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