

OUR MISSION

Our company provides advanced technologies, products, and services for the pulp and paper industry, including evaporation, NCG collection and incineration, heat recovery, tall oil, turpentine and soap recovery, combustion systems, and energy optimization solutions that reduce emissions, improve efficiency, and enhance boiler performance.

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

We accomplish by:

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

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

Our team is dedicated to the highest standards of professional ethics and integrity.

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Welcome to the Inaugural Lundberg Jansen Newsletter!

In 1988, the J. H. Jansen Company published the first issue of **Recovery Boiler News**, a newsletter intended to provide information to the pulp and paper industry particularly with respect to recovery boilers. Over the years both the company and the newsletter have evolved. In 1994, the company name was changed to Jansen Combustion and Boiler Technologies, Inc. (JCBT) and the newsletter was renamed **Recovery & Power Boiler News** to reflect an increasing emphasis on optimizing power boilers.

The year 2008 introduced the Biomass, Chemical Recovery & Waste-To-Energy newsletter as JCBT expanded into the WTE marketplace. Then, 2022 involved a corporate rebranding around the name Jansen as well as a simplification of the newsletter name to **Boiler News**. Throughout all of these years, a total of 59 issues, the focus remained on providing useful information to the pulp and paper industry and other complementary boiler users regarding new technologies and useful information for boiler operation.



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Crude Tall Oil Update

Over the past decade, there has been a significant decline in third party soap processing facilities in North America. At the same time, the demand for crude tall oil (CTO) has significantly increased. The decline in processing capacity has led to pulp mills not having outlets for their soap and a corresponding loss of revenue. As the market for CTO has increased, the value of soap has decreased due to insufficient acidulation capacity.

The Lundberg® team at LJTI has addressed this by developing an efficient and effective gravity decanting CTO plant. The plant offered is a fully automated, semi-continuous CTO plant that has a proven record of delivering high-quality CTO with minimal operator attention and maintenance.

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Crude Tall Oil Update, continued from page 1

Currently, LJTI has two plants operating in Sweden that were started in 2019 and 2020. In North America, there is currently one system that is being installed with a December commissioning date and two more that are in the engineering/fabrication phase scheduled for a 2027 start-up.



Schematic of a Typical Tall Oil Plant

Features common to the Lundberg® CTO Plant include:

- ✎ Fully automated process requiring minimal operator attention.
- ✎ External acidulation with static mixers to promote complete soap acidulation.
- ✎ Bottom pump out for the effective management of the Rags CTO interface.
- ✎ Density controls switch automatically between the brine and CTO product.
- ✎ The non-condensable gases (NCGs) generated can be collected in either the dilute non-condensable gas (DNCG) or concentrated non-condensable gas (CNCG) system.
- ✎ Built in Clean In Place (CIP) system for weekly caustic washes.
- ✎ Turndown to 10% of design.
- ✎ Bleach plant spent acid can be used to reduce sulfuric acid consumption and better manage liquor cycle sulfidity.
- ✎ Components in acidic medium are either PTFE lined parts or feature 2507 super duplex stainless steel.

A key benefit of this type of system is the reliability that it offers. The moving parts are traditional positive displacement and centrifugal pumps that every mill is familiar with. These components have a high degree of reliability and operate at rotational speeds that are common to the mills. Without high-speed rotating equipment to maintain, we can guarantee 99% availability for the process. This design approach keeps operating spare parts to a minimum, helping to make the semi-continuous, gravity decanting process a champion for mill operations.

With over six years of operation, the Lundberg® CTO system has a proven track record for reliable operation and ease of operation. Contact us to learn how we can debottleneck your soap handling system.

Key Evaporator Inspections to Improve Performance

Fall outage season is upon us once again and those mills that take a fall outage will be inspecting the major systems within their processes. The evaporator/concentrator plant is one of those critical processes that warrant an inspection so that the plant restart meets the expectations of the owner and management team. Here we describe key areas that are essential to a thorough evaporator inspection.

Mist Eliminators: All modern evaporator systems have chevron type entrainment separators or mist eliminators. These are critical to limiting soda losses and generating a process condensate that is suitable for brown stock washing and other users in the mill. Key things to look for include plugged vanes, tipped or poorly supported modules that allow vapor by-passing, and failed support systems. Fouled modules should be cleaned or replaced to ensure that adequate face area is available when the system restarts. Chronic plugging suggests that an on-line wash system should be considered to improve the reliability of the mist eliminators.

Ejector Based Vacuum Systems: Ejector vacuum systems typically feature two steam ejectors with shell and tube inter and after condensers. Ejector performance can suffer when supplied with wet steam, and the consequence can

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With this issue, our 60th, we are renaming the newsletter and also making some significant content changes to reflect the latest evolution of the company. As we have noted in previous newsletters, the companies Jansen Combustion and Boiler Technologies, Inc. and Lundberg, LLC (formerly A. H. Lundberg Associates, Inc.) have merged and become Lundberg Jansen Technologies, Inc. (LJTI). The merged companies have a broad line of products for the pulp and paper industry, and our newsletter will now evolve with a new name and enhanced content.

The newsletter will be renamed the Lundberg Jansen Newsletter, and its content will reflect the broader range of technology solutions offered by our combined organization. Boiler technologies remain central to our expertise, but we now will also offer content created by our subject matter experts on complementary technologies across the evaporation, environmental, energy efficiency, and chemical processing areas.

We hope you enjoy this latest edition of our newsletter. If you have any questions or comments, or if you need help optimizing or upgrading any of your pulp mill or boiler processes, please visit our website www.lundbergjansen.com to find contact information for our Kirkland, Washington and Bilbao, Spain offices, as well as our regional offices and representatives throughout the world.

Key Evaporator Inspections to Improve Performance, continued from page 2

be steam by-passing around the ejector nozzle and directly into the throat of the ejector(s), which leads to a significant loss of vacuum at the surface condenser. Maintaining functional steam traps is the preventative action needed to resolve this problem. Inspect the steam nozzles any time reduced vacuum is observed or once every other outage.

Additionally, the cover flanges on the inter and after condensers should be opened so that the tubes can be inspected and, if necessary, hydro blasted. Condensing inefficiencies caused by fouled inter and after condensers back pressure the ejector system and result in diminished vacuum. We recommend that these vessels be opened and inspected annually.

Surface Condensers: It is easy to overlook the surface condenser tubeside since it only has water in the tubes. The reality is that cooling water quality can result in both fouling and corrosion issues that can lead to diminished evaporator performance from a loss in vacuum. Baffle corrosion is common in older condensers with carbon steel water boxes. This can result in water by-passing and cause a loss of condensing capacity. Inspecting the water box baffles will identify this problem, allowing proper maintenance solutions to be implemented.

Condenser tube fouling is often overlooked, and this too can reduce the condensing capacity. In a condenser, tubes do not need to be completely blocked to represent a loss of condensing capacity. A scale thickness as thin as 50 mils can have a significant performance impact. The two common

approaches to address condenser tube fouling are hydro blasting and acid cleaning. Acid cleaning is common when mineral based deposits are encountered. Our recommendation is to inspect the surface condensers each outage.

In summary, inspections of the auxiliary systems within the evaporator plant are equally important to inspecting the evaporative heat transfer surfaces. The system vacuum and condensate quality are important to the capacity and environmental performance of the overall evaporator system. Focusing on these areas can pay dividends in the form of operational reliability.



Failed Surface Condenser Baffle

Tackling Tighter Emissions Limits for MSW and RDF Boilers

In March 2026, the U.S. Environmental Protection Agency issued a final action updating New Source Performance Standards and Emission Guidelines under 40 CFR Part 60 for existing and new municipal solid waste (MSW) combustors. This rule tightens emissions limits for large facilities combusting MSW and refuse-derived fuel (RDF). Pollutants covered include cadmium (Cd), lead (Pb), particulate matter (PM), dioxins and furans, hydrochloric acid (HCl), sulfur dioxide (SO₂), nitrogen oxides (NO_x), and carbon monoxide (CO). A detailed description of the new emissions standards can be accessed via this link.

<https://www.federalregister.gov/documents/2026/03/10/2026-04646/standards-of-performance-for-new-stationary-sources-and-emission-guidelines-for-existing-sources>

Boiler systems that fire RDF are the most impacted by these new regulations. For example, for existing boilers classified under the RDF stoker classification, the new CO and NO_x emissions limits are specified to be 110 ppm and 160 ppm (both dry and corrected to 7% oxygen), respectively. Previous CO emissions limits for RDF stoker units were 200 ppm (dry, corrected to 7% oxygen). Many RDF plant owners may find that their boilers are not compliant with these new emission standards.

For facilities that may face challenges with meeting the new standards, pathways to achieve compliance exist via combustion system retrofits, introducing NO_x reduction technologies like Selective Catalytic Reduction (SCR) and Selective Non-catalytic Reduction (SNCR) or even via optimization of existing equipment.

LJTI has had extensive experience in evaluating and optimizing MSW and RDF combustion in many boilers across North America. We have retrofitted several RDF-fired boilers with our advanced combustion system to improve fuel burnout, stabilize combustion, and minimize CO emissions while staying in compliance with NO_x. Our stepwise work includes site visits for optimization tuning of the air and fuel delivery systems and data collection to develop a baseline of boiler operation. These activities help us to determine whether changes in operation parameters can achieve lowered emissions. If the existing combustion system is deemed unable to sufficiently lower CO, then additional analysis using Computational Fluid Dynamics (CFD) modeling is implemented to identify the root cause of the poor combustion and elevated CO emissions. Further modeling then allows us to determine upgrade pathways

in the air and fuel delivery systems to achieve our client's combustion goals. We can execute a boiler upgrade project starting from initial analysis all the way to design, supply, installation, and start-up of new combustion equipment.

We are currently working with several RDF-fired plants in the US Midwest to help them assess their existing combustion system performance against the upcoming new emissions limits and to determine pathways to ensure compliance.

Are you an RDF- or MSW-fired plant facing the possibility of non-compliance with the new emissions standards? Call us. We can help.



Jansen Overfire Air Nozzles on an RDF-fired Boiler

Lundberg Jansen Welcomes...



Nicole Brister

Regional Sales Manager

Nicole Brister brings more than ten years of experience in the power generation and pulp and paper industries to Lundberg Jansen. Her background includes engineering leadership, project support, and technical problem solving, providing her with a strong understanding of industrial processes and customer needs. Nicole earned a Bachelor of Science degree in Chemistry from Louisiana College. As a Regional Sales Manager, Nicole works closely with plant personnel, engineers, and operations teams to support projects while building strong, long-term relationships.

In her free time, Nicole enjoys watching football, attending live music events, and spending time with her husband and three children. She also enjoys outdoor activities and taking advantage of opportunities to explore and stay active with her family.



Andrew Kent

Project Manager

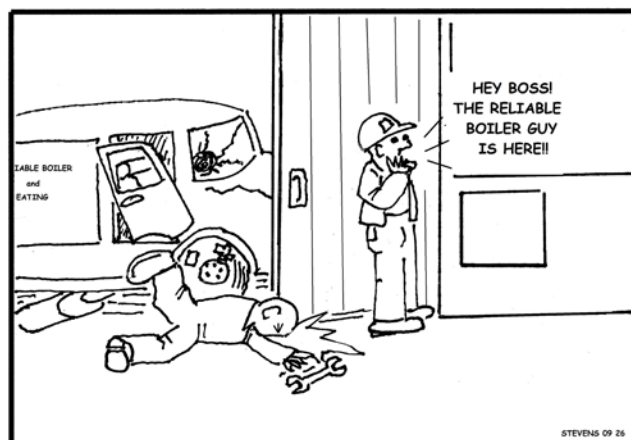
Andrew Kent joined Lundberg Jansen this year as a Project Manager. He holds a bachelor's degree in chemical engineering from Washington State University and worked in the pulp and paper industry for three years before joining our team. His professional experience includes such varied roles as Process Engineer, Shift Supervisor, and Power and Recovery Assistant Superintendent. In his position at Lundberg Jansen, Andrew will be handling projects large and small across our range of work supporting the pulp and paper industry.

Away from the office, Andrew is an avid outdoorsman and can often be found hiking, rock climbing, mountaineering, or skiing.

News Briefs

Lundberg Jansen has extensive experience across multiple industries, with a particular focus on pulp and paper. Services recently provided include the following, many of which are in progress:

- 🔧 Engineering evaluations of biomass, recovery, waste-to-energy, and coal-fired boilers.
- 🔧 Black liquor evaporator and concentrator systems.
- 🔧 Upgrades to boiler air systems, economizers, and superheaters.
- 🔧 NCG collection and incineration systems.
- 🔧 Boiler circulation studies and CFD modeling.
- 🔧 Heat recovery systems (batch, continuous, liquor heaters, etc.).
- 🔧 Boiler optimization tuning and Boiler MACT Tune-ups.
- 🔧 Tall oil, turpentine, and soap recovery systems.



A collection of boiler house cartoons by Gordon Stevens shown previously in our newsletter can be viewed on our website: www.jansenboiler.com.

For further information on Lundberg Jansen's projects and capabilities, contact Paul Seefeld at 904.614.6492 (paul.seefeld@lundbergjansen.com) or Mark McCabe at 425.736.9758 (mark.mccabe@lundbergjansen.com). Additional information and specific project references can be found on our website at www.lundbergjansen.com.

Fall 2026 Evaporation, Power, and Recovery Boiler Operations Workshop

October 28 and 29 | Richmond, Virginia

Lundberg Jansen Technologies brings the Evaporation, Recovery Boiler, and Power Boiler Operations Workshop for the first time to North America to the historic city of Richmond, VA. Our Workshop is the premier event for representatives from the pulp and paper, forest products, food, power sector, independent power producers, and energy-from-waste industries to learn and network.

This unique meeting comprises presentations and discussions of the latest technology to improve black liquor evaporation, NCG collection and incineration, crude tall oil recovery, biomass boiler and chemical recovery boiler area performance, reliability, and operational flexibility.

- Explore the latest advances to improve black liquor evaporation, heat recovery, NCG collection and incineration, and crude tall oil separation.
- Learn about the latest retrofit technologies for biomass, chemical recovery and other solid, liquid, and gaseous fuel fired boilers and associated equipment.
- Acquire knowledge regarding how other plants have solved their process and production challenges.
- Receive information for solutions to meet specific goals.



Attendance to the Workshop is FREE OF CHARGE, but space is limited. Our event fills up quickly!
AN EARLY SIGN-UP IS REQUIRED TO GUARANTEE YOUR SPOT

To sign up and receive a detailed agenda, workshop location, hotel information, etc., please contact
Cathy Thomas: Cathy.Thomas@lundbergjansen.com, +1 425.952.2835

Workshop Sponsors



This newsletter is published by Lundberg Jansen Technologies, Inc. to provide information to owners and operators of evaporation, non-condensable gas collection, and boiler system assets.

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