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PAPERMAKER

FLAMBEAU  
RIVER PAPERS



William "Butch" Johnson

## On the **RIGHT PATH** in Wisconsin

Park Falls faces a brighter future thanks to a wood supplier who took a risk to save a small-town mill

GLENN OSTLE  
(STORY AND PHOTOS)

In early 2006, the pulp and paper mill in Park Falls, WI—built in 1896 and owned most recently by Smart Papers—closed due to high energy costs and poor profitability.

The impact of the closing rippled throughout the town of 3,000, affecting not only the 300 men and women who worked at the facility but also many businesses and suppliers that depended on the mill for a large part of their income. One of those suppliers was Johnson Timber, which had millions of dollars worth of pulp logs sitting idle on the property.

Johnson Timber owner William "Butch" Johnson had grown up in the area and felt something had to be done. After obtaining a US\$4 million commitment from the state, he bought the mill in July 2006 and renamed it Flambeau River Papers (FRP) after the river that runs past its back door. On Aug. 9, 2006, the mill reopened, made its first roll of paper, and set out to implement some ambitious

plans (see *Paper360°*, December 2006).

As a new mill owner and also new to the paper industry, Johnson brought fresh thinking to the business, says Bob Byrne, FRP president and COO. "This industry has always been very competitive and secretive. But Butch isn't from the paper industry, so he behaves differently. As a result, the rest of us have started behaving differently."

Over the last two years the company has had successes and setbacks, won grant money from the Department of Energy, and garnered a number of awards from state and national organizations. Best of all, decisions and commitments made early on are starting to pay off.

### A NOVEL APPROACH

Johnson began with a novel management approach. He called together the union workforce and told them that while he had restarted the mill, it was up to them to improve the way it operated or it would

shut down again. He stressed that doing the right things to transform the way they worked on the mill floor took precedence over everything else.

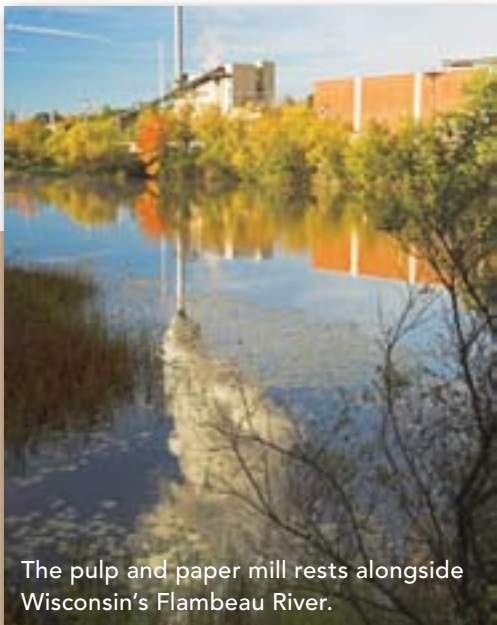
The result was that the mill produced record paper and pulp tonnage while improving quality. Sulfite pulp brightness has been raised from 87 to 92 while increasing the xylose concentration in the red liquor used to make Xylotol. Process and quality improvements continue to be a top priority, resulting in the lowest paper claims in the history of the mill, in part because of improvements made to the integrated deinking facility.

In the past, the mill had produced 360 tons of uncoated paper per day. For the last 10 months, FRP has averaged more than 410 tons per day. “Two years ago we brought everyone back at the same wage, and in return they’ve given us 50 tons of paper more a day. That’s a definite edge for this mill,” says Johnson.

Today FRP employs 305 people, many of them older employees who have worked at the mill much of their life, and is in the process of hiring 13 people and boosting its maintenance staff.

“We’ve hired a lot of younger people to replace and prepare for the older employees as they retire,” says Johnson. Some are sons of current employees, including the new safety manager, Brian Gilbert, son of Johnson Timber forester Bill Gilbert, and Adam Hoffman, son of No. 3 Paper Machine Manager Bob Hoffman.

Adam is a paper science graduate from Univer-



The pulp and paper mill rests alongside Wisconsin’s Flambeau River.

sity of Wisconsin-Stevens Point with five years of experience at a larger mill. He married a local girl and for years wanted to return to Park Falls, but his father advised him against it, saying, “Things are bad at the mill.” But a year after Johnson bought the mill, Adam’s father encouraged his son to return. Today Adam is responsible for the No. 1 and 2 paper machines.

FRP is hiring journeymen and has restarted the apprentice program that was in place before the mill closed. “If we were in this business for the short term, we wouldn’t be doing all this,” says Johnson.

### SAVING ENERGY

The second area Johnson focused on was energy conservation and in the last two years has invested US\$26.7 million in capital and energy projects. The US\$15.2 million in energy project spending means that by the beginning of the second quarter of next year the mill will save US\$10.9 million every year.

“Energy conservation will be the savior of many mills,” says Johnson. “Saving US\$10.9 million dollars is the difference between us being profitable or not.”

Completed projects—identified and implemented by six mill teams—include: a mill-wide hot water heat recovery (that won the Wisconsin Governor’s Energy Conservation Award for the Pulp and Paper Industry); installing dissolved oxygen meters in the wastewater treatment plant; installing a deflaker for the pulp mill to increase pulp yield; limiting cooling water flow to the pulp mill evaporator; insulating pipes; and capturing vent steam. All contribute to the use of natural gas and coal.

Some proposed projects include: a lighting efficiency upgrade; continued mill piping insu-



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## Key successes at FLAMBEAU RIVER PAPER

PARAMETER	Prior to Restart	Level Achieved
Steam Production No. 6 boiler	145,000 pph	153,000 pph
Feedstock no. 6 boiler	20% coal, 80% biomass	5% coal, moving to 0%
Steam requirements Other boilers	150,000 pph (from natural gas)	90,000 pph moving to 30,000 pph

lation projects; addition of a low-pressure acid accumulator to capture heat for reuse; a sludge and biomass dryer; a new pellet plant; ventilation improvement on PM3; a steam system improvement lowering steam usage; and converting PM3 from steam to electric drive. These projects will lower energy costs and improve efficiencies in the pulp and paper departments while continuing to improve quality of both the pulp and paper.

Three proposed projects targeted for completion in the second quarter of 2009 have been funded by two US\$5 million grants—one from the state and another from the federal government.



William "Butch" Johnson and Masood Akhtar, president, Clean Tech Partners, Inc.

"I was recently asked 'What can a 100-year-old paper mill do?'" says Johnson. "Basically it can do what we've done: knock off one-third of energy costs through conservation and another almost two-thirds by innovation. That's a big, big number."

When slated projects are completed, the mill will have reduced natural gas usage by nearly 90%, coal usage by 100% and removed 92,000 tons of fossil fuel CO<sub>2</sub> from its emissions. "I am confident in our workforce's ingenuity and that we will find a way to replace the remaining 10,000 dekatherms/month natural gas requirements to become carbon neutral," says Johnson.

### MODEL COOPERATION

Much of the credit for FRP's energy improvement goes to Wisconsin's Focus on Energy (FOCUS) program and to Clean Tech Partners, Inc. (CTP), who helped the company save about US\$1.35 million per year and have suggested programs that have the potential to save about US\$2.4 million per year. FOCUS also helped pay a portion of the salary of a new employee dedicated to energy projects.

"Without the improvements that FOCUS and CTP identified, made recommendations for and

helped finance, we would have had to shut down our production," said Johnson. "By reducing our power demand we were able to run under the curtailed amounts."

According to CTP President Masood Akhtar, FRP has a good model and that other companies could benefit from the lessons of working together. "A lot of companies don't think that way," he says. "This is a great success story. Butch is doing a great job of getting the word out, and other companies are now requesting and seeking the same level of attention from us. For instance, two large mills recently said, 'We have seen what you have done, and we want to be another Flambeau.'"

### GREEN POWER

Two years ago, FRP planned to add a biorefinery in the form of an additional pulping line, and submitted two proposals to the DOE, one of which finished ninth out of 44 submittals. Today Johnson still plans to pursue his biorefinery, but in a different way.

"Where we dare to be big enough dreamers, we think we will have a biorefinery that will be a driving force and a true profit center, with the mill using the energy to make it fossil fuel-free."

FRP plans to build a separate biorefinery with an indirect gasifier, using a Fisher-Tropsch process that will produce 1,100 barrels of liquid per day based on 1,000 bone dry tons of biomass. This equates to about 17 million barrels per year, a little more than half of which will be renewable or "green" diesel (600 barrels per day) and a small fraction of Naptha. The rest will be paraffinic waxes. In the future it will be possible to produce only diesel, if desired.

Says Byrne, "We'll convert as much of the syngas to liquid transportation fuel and wax as we can with two stages of FT reactors. To convert more takes either more capital or a heat sink, and the paper mill is a wonderful heat sink because we have need for the steam and electricity."

Class 30 engineering studies have been completed for the biorefinery, which will be located in Park Falls. If successful, the company is considering a second and even a third. "It's a question of what brings the highest value from the fiber," says Johnson.

The biorefinery also offers other possibilities, such as the potential to produce up to 25,000 tons of fertilizer per year.

"In the past we were using our ash for road construction, and giving the sludge away. Now we can sell both," says Johnson. "If we go into the fertilizer business, we can cut US\$700,000 to US\$800,000 in

cost.” Adds Byrne, “We can also make steam and electricity out of the tail gas.”

On July 14, 2008, the DOE awarded US\$40 million in funding for two small-scale biorefinery projects, one of which was for FRP. The company hopes to have all fund-raising for the biorefinery done by the end of the year. After that, the soonest it could be up and running would be 30 months. If this project goes forward, it could be the first biorefinery as part of an integrated pulp and paper mill in North America.

### MAKING FUEL

“In my opinion, eliminating CO<sub>2</sub> is going to be one of the biggest challenges we are going to face as an industry,” says Johnson. “We will have reduced our fossil fuel CO<sub>2</sub> emissions by 92,069 tons and we want to be carbon-neutral by 2011.”

Says Byrne, “As engineers we told Butch that you can’t become totally fossil fuel-free because we still need a dense fuel to put on the grates. So Butch says, ‘OK, we better invent something.’”

The result is FRP’s Densified Fuel Pellet Project that will reside in a structure being erected on mill property, and will produce high-density pellets to replace the rest of the coal in FRP’s No. 6 wood-fired boiler. Tests to date show that the pellets produced by FRP are effective. Says Byrne, “We are getting 10,000 BTUs out of the pellets compared to a standard wood chip that produces about 7,500 BTUs per pound.”

Construction of the new pellet plant is under the direction of Milan Kluko of Fountainhead Engineering.

The pelletizer is a continuous feed system that begins with trucks loaded with biomass unloading onto walking floors and conveyors, which transport the material to a surge bin. It is then mixed with a high-density polyethylene binder and cooled to an ambient temperature to harden. In the process, fugitive dust is captured, and everything is recycled.

“The system will be able to produce 65 tpd of output fuel, and we can double the capacity without having to change anything. But the real innovation is the mobility of the system. It can be moved and operational in three months,” Kluko says.

Flambeau River Papers was one of two companies recognized for outstanding industry performance by the American Forest & Paper Association in its 2008 Annual Environmental & Energy Achievement Awards. FRP received the Small Company Award for its Densified Fuel Pellet Project.




### THE FUTURE

Despite the ups and downs during the last two years, Johnson remains optimistic. “The paper business is never going to be a high-margin business, and it is very susceptible to commodity price changes.

“Everything we do is pretty much private label. We are pushing production toward specialty products, which will eventually be up to 30 percent of our business. At the same time we are trying to work our way out of low-margin businesses.

“Today, 60 percent of our business is on long-term contracts; we didn’t have any of that in the beginning. Back then we started out as a “C” supplier, but we’ve now put ourselves in a position to be a “B” supplier and, in many cases, an “A” supplier,” he says.



“We have finally started making a profit here, but we really paid the price in the first 20 months. This is a tough business and we’re just a little guy. It’s all about keeping jobs here. If we tried to operate the way the mill used to, we wouldn’t have survived. We’re not out of the woods yet, but I’m convinced we’re on the right path.” 

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Flambeau River BioFuels Facility Conceptual Depiction (pellet plant not shown), produced by Earth Tech Engineering.

High density pellets produced on-site at Flambeau River Papers.