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Two Becoming One

A WISCONSIN COMMUNITY MAKES A DEWATERING BELT PRESS DO DOUBLE DUTY FOR WATER TREATMENT LIME SLUDGE AND WASTEWATER BIOSOLIDS

By Ted J. Rulseh

The City of Beaver Dam (Wis.) water and wastewater utilities are pulling closer together, in part thanks to a dewatering system that now handles lime slurry from the water treatment plant but will eventually handle wastewater biosolids, too.

In July 2008, a 1.7-meter skid-mounted belt filter press from Bright Technologies went to work at the wastewater treatment plant, dewatering lime slurry trucked over from the water plant across town, about one mile away.

The press has already driven down the water utility's lime slurry handling costs by producing cake at greater than 60 percent solids for land application as a soil amendment on two local farms.

THROWN A CURVEBALL

Beaver Dam, a city of about 15,000 in south central Wisconsin, operates separate water and wastewater utilities. The activated sludge wastewater treatment plant handles average flows of 4.3 mgd. The 5.8-mgd water treatment plant uses lime softening, the source of the lime slurry, produced at 1.5 million gallons per year.

For years the water utility wasted lime slurry from the water plant



PHOTOS COURTESY OF BRIGHT TECHNOLOGIES

City of Beaver Dam utility foreman Rob Minnema and operator Greg Goodrich review the touchscreen controls on the skid-mounted belt filter press from Bright Technologies. The press serves both the water and wastewater sides of utility operations.

clarifiers, held it in storage tanks, and hired a contractor to haul it to farm fields for land application. In early May 2008, the state Department of Natural Resources (DNR) determined that the lime slurry could no longer be land-applied under regulations that applied to wastewater biosolids and instead had to be treated as solid waste and landfilled.

However, the city could not landfill its lime slurry because, in its liquid state, the material could not pass the filter test needed to prove that landfilled material contains no free liquid. That meant the city's contractor had to haul the material to its own storage facility and mix it with other sludges before landfilling. That more than tripled the handling cost from about 3 cents per gallon for the land application program to more than 9 cents per gallon.

ACTING QUICKLY

Meanwhile, the water plant was producing about 7,000 gpd of lime slurry. The existing belt filter press at the wastewater plant had been in service for 25 years and was not sized to handle the additional volume.

To solve the problem, utility director Don Quarford and utility foreman Rob Minnema quickly went to work on a dewatering system with the help of Tom Stebbins, operations and process specialist with Bright Technologies. In the third week of May, Stebbins organized and completed an onsite pilot test showing that a belt filter press could take lime slurry at 15 to 20 percent solids and produce a cake containing more than 60 percent solids that would pass the filter test for landfilling.

After a successful pilot test, the city decided to acquire a belt filter press from Bright Technologies. The skid-mounted belt press system was manufactured, installed and operational at the wastewater treatment plant in a temporary installation in less than 60 days. Then, with

The 1.7-meter belt filter press from Bright Technologies has driven down water treatment plant lime slurry handling costs and is also used at times to dewater wastewater biosolids.

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ROB MINNEMA

the assistance of Bright Technologies the city designed and built a permanent facility for the press, completed in December 2008.

“Right now, we’re using the press to dewater the lime slurry, but we have used it to dewater wastewater biosolids at times when we’re behind in processing the material on our existing dewatering press,” says Minnema. “Eventually, we will waste biosolids directly from digester to the press and regularly use it to batch process either



The belt filter press gravity deck in operation.

biosolids or lime slurry.” The existing belt filter press will eventually be used as a backup while the new press will be the primary press for both utilities.

The latest analysis showed the press delivering biosolids cake at 22 to 25 percent from liquid material coming from the digesters at 2.5 to 3 percent solids. The plant’s biosolids are land-applied. The city’s total biosolids output is about 1,350 dry tons per year, and the lime slurry output is 1,600 dry tons per year.

ATTRACTIVE COST

Initially, the city dewatered and landfilled the lime slurry material at a cost of nearly 8 cents per gallon. Then Stebbins used his 20-year background, as a contractor in the liquid and solid waste recycling industry, to work with the DNR and help the city get a variance for two farmers to land-apply the dewatered lime cake for beneficial reuse.

Therefore, the city has discontinued landfilling. In some cases, the city mixes lime slurry with biosolids to produce a more beneficial soil amendment, according to Minnema.

The city bought the press on a five-year lease-purchase plan that allows the utility to include its capital and operating costs in the same budget category that covered the hauling of liquid slurry. The water utility now pays farmers \$6 per cubic yard to haul and land-apply the lime slurry cake.

“We are paying a lot less to handle it now,” says Minnema. “We just have to haul it across town and press it. Our total cost is about 3.25 to 3.3 cents per gallon, counting our lease cost, operations, chemicals and transport. When the lease payments end in five years, that’s when we’ll really see the savings.”

SMOOTH PROCESS

The lime slurry process is simple and automated. Lime transported from the water treatment plant is received in an 18,000-gallon nurse tank. The material is drawn onto the press by a Boerger rotary lobe pump mounted on the press skid. Cationic polymer is added to flocculate the lime, and the mixture is introduced to the gravity section of the press, where primary drainage occurs.

From there the material enters the radius wedge section of the press. The radius wedge brings the material into contact with both belts sooner than in a typical linear wedge section and applies pressure over a greater area. The large radius of the wedge simulates a large-diameter roll and promotes rapid drainage.

The material then enters the high-pressure section of the press, with a series of eight pressure rollers. The first roller is a wing roll with 50 percent open area that further aids in dewatering. The radius wedge and open wing roller design increases useful dewatering space within the press, making the process more efficient and giving the press a smaller footprint, according to Stebbins. The finished cake exits onto a belt conveyor that carries it to a storage building next door.

A Siemens touchscreen control panel will be tied into the plant SCADA system, enabling the staff to monitor and operate the press from anywhere in the facility.

LOOKING AHEAD

Minnema notes that the wastewater treatment plant has received \$20 million in federal government stimulus funds, half as a grant

“The new press really benefits both the water and wastewater utilities. In the past, the two utilities have operated essentially as separate entities. With the management structure we have in place now, we operate more as one utility. The belt press delivers efficiencies and cost savings that help both sides in the long run.”

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and half as a loan. The city will use part of the money for equipment upgrades throughout the plant that will make the belt filter press a more integral part of the facility.

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