

## QUICK FACTS

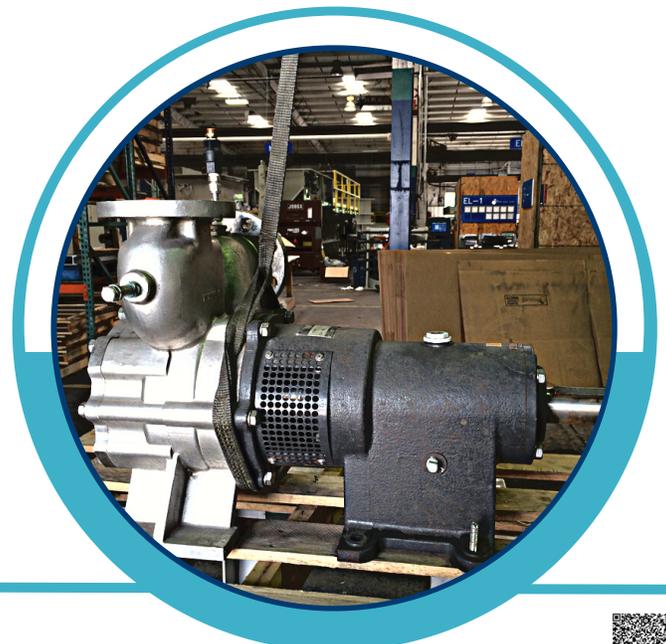
- INDUSTRY: Recycle Pump Mill
- STARTUP DATE: September 2005
- TECHNOLOGY: IDEAL DAF

### BACKGROUND

Great Lakes Pulp & Fibre, Menominee, Michigan, USA invited World Water Works to demonstrate the ability to reduce operational costs associated with two Poseidon dissolved air flotation systems (DAFs). The mill stipulated that the performance of the DAFs must not be negatively affected by any operational cost reductions. The inefficiency of the existing air dissolving technology presented the area of greatest savings and was the focus of this study. For the testing period, World Water Works provided two Nikuni pumps at no charge to the mill for the testing period. The goal of the test was to maintain performance while eliminating compressed air consumption and substantially reducing the horsepower associated with operating the system.

### OVERVIEW

In 1996, Great Lakes Pulp & Fibre built a recycle pulp mill in Menominee. A Poseidon PPM-4200-E was installed to clarify the gravity decker filtrate. The units were functioning well, achieving 95% removal of suspended solids at low polymer dosages. However, Joe Ziemba, senior process engineer, understood that profitability in the pulp industry required getting the most from equipment. The high energy consumption, cost of chemistry, and maintenance associated with these DAFs appeared to offer an opportunity for improvement. Ziemba's research led him to World Water Works, a manufacturer of DAF systems. The company improves existing DAF systems by applying portions of its technology to existing systems to reduce operational costs and/or improve performance. World Water Works was invited onsite to investigate the opportunity. World Water Works found that the existing air dissolving technology, the Poseipump, was extremely inefficient, noisy and a major maintenance item associated with the DAFs.



## OVERVIEW - CONTINUED

The two Poseipumps on “A” DAF consumed 250 HP, while the Poseipumps on “B” DAF consumed 125 HP. Each pump was delivering 3 SCFM of compressed air into the water. Based upon WWW’s calculations, this provided an air: solids ratio of  $\sim 0.006$ . This A:S ratio is on the low side, but technically still acceptable. World Water Works uses the Nikuni Regenerative Turbine pump to dissolve air into water. WWW exclusively imports the pump into the North American market. WWW projected that the mill would be able to reach an air/solids ratio of  $\sim 0.02$  with the use of 2 – 30 HP Nikuni M80FP pumps for each 125 HP Poseipumps. With this design, the A:S ratio could be increased by over 300%, while reducing horsepower by over 50% and eliminating the use of compressed air. Although the resultant A:S ratio is higher than typically recommended, World Water Works suggested that the mill test this two-pump design. After a careful review of the potential savings, GLPF accepted the offer. The pumps were installed and started up in September 2005. Without fine-tuning, the performance of the DAF remained the same. Compressed the air was not being consumed and the horsepower was reduced from 125 to 60 HP. Based upon these initial results, World Water Works communicated to GLPF that it might be possible to only run one M80FP pump for each 125 hp Poseipump, but with a 40 HP motor and achieve the desired treatment results. GLPF agreed to test this configuration to maximize the ROI of the project. Again, performance remained nearly identical while the polymer consumption decreased slightly. After running the trial into late October, GLPF placed an order for five 40 HP M80FP Nikuni pumps to allow them to eliminate compressed air demand and reduced the horsepower currently used by 85 per unit for a total savings of over 425 HP.

When the pumps were installed, GLPF found some other notable advantages. The local vibration levels, measured by PK Velocity in IN/SEC, were reduced by 75-80% and the noise levels were reduced from  $\sim 0.26$  to 0.04, a  $\sim 85\%$  reduction. It is too early to calculate the reduction in maintenance costs. However, the mill’s maintenance staff has been impressed with the robust design of the pumps. With the very low vibration levels, the maintenance staff is confident that these will be low-maintenance pumps.

## CONCLUSION

GLPF and WWW worked together to successfully test and implement a plan to reduce the operational costs of five Poseidon DAF systems. Testing on one of the DAFs showed system performance was not sacrificed, while compressed air was eliminated and energy consumed was reduced by over 85 HP. The positive results from the testing allowed GLPF to move forward on the capital purchase and installation of five Nikuni pumps, one for each DAF. The ROI for the entire project is less than one year.

