



**SANITAIRE**

a xylem brand

Case study

# Sanitaire and Flygt team up for efficiency in Fond du Lac, WI

State-of-the-art treatment equipment greatly reduces plant's energy consumption

Driven by compliance with more stringent water treatment standards, the Fond du Lac Wastewater Treatment Plant (WWTP) leveraged the upgrade opportunity to improve beyond limiting ammonia effluent levels. The plant improved energy efficiency, reduced maintenance and operating costs, and eliminated bypasses into Lake Winnebago during high rainfall.

## Scope

The upgrade was based on an average daily design flow of 9.84 million gallons per day (MGD) and a projected BOD load of 22,500 pounds per day. To contain costs, the utility used its existing 22-acre site and reused two, 95-foot diameter retired clarifiers, which also served as storage basins during peak flows to avoid untreated water from reaching Lake Winnebago. The more challenging aspect of the project was meeting the energy reduction targets despite having to double the hydraulic capacity and pump 50 percent more head.

## Solution

After thorough analyses, Xylem was selected to deliver a comprehensive aeration solution utilizing Flygt pumps and Sanitaire fine bubble aeration equipment. Twenty-six Flygt recycle pumps and more than 1,900, 9-inch-diameter Sanitaire diffusers (five grids per tank) drove the energy-efficient activated sludge process.

Extremely energy-efficient influent pumping and aeration equipment were integral to meeting the energy reduction requirements of the plant upgrade.



Aeration basin equipped with Sanitaire fine bubble diffusers.

**END USER:** Fond du Lac, WI  
**ENGINEER:** Strand Associates  
**COMPLETION:** 2013

The plant's Flygt pumps and mixers operate in two capacities. Two 85-horsepower pumps cover the low end of the influent flow range (up to 5 MGD) while four, 215-horsepower pumps in combination with the two smaller pumps provide the 50 MGD peak capacity for the pumping station. Variable speed drives minimized energy consumption by synchronizing the combination of pumps and their operating speed with the flow conditions. The energy-saving features of the self-cleaning N-pumps yielded the plant additional cost savings.

The Flygt equipment performs a variety of essential missions in the plant process. Mixers blend primary sludge with waste-activated sludge to facilitate pumping and digestion in the anaerobic digesters. Still others pump drainage from the primary sludge building sump as part of the plant's wastewater collection system, and the two, 1.7-horsepower pumps maintain a dry basement in the solids processing building. Six, 44-horsepower propeller pumps discharge the plant's treated effluent to Lake Winnebago while three, 27-horsepower propeller-type units pump stormwater collected in a segregated retention basin to the Fond du Lac River.

## Sanitaire fine bubble aeration equipment drives the energy-efficient activated sludge process.

Low energy, ultra-low head Flygt pumps enable the plant to comply with permit limits for ammonia with greater energy efficiency. By recovering oxygen from bound nitrates, the plant reduces aeration consumption and utilizes the energy-efficient Flygt pumps to transfer the nitrate recycled from the aeration zone into the anoxic zone. For the remaining aeration requirement, energy consumption is minimized by using state-of-the-art, high-efficiency blowers and Sanitaire fine-bubble diffused aeration.

Alliant Energy, the electric utility serving the area, honored the Fond du Lac utility for adding advanced technology that saved 1.95 million kilowatt-hours of electricity and 188,140 therms of natural gas--enough to power 212 average-sized homes for one year. The plant also reduced its operating costs, including a reduction in personnel from 15 to six on one shift and a 20 percent reduction in overtime compared to previous levels.

While compliance is not an option, the choice of technologies is. Flygt pumps and mixers, along with Sanitaire fine bubble diffused aeration, provide a more energy-efficient option to achieve compliance and operational efficiencies.



Renovations allowed the Fond du Lac WWTP to double hydraulic capacity.



Flygt provided 26 pumps for the project, including the influent pump shown here.

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