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## Case Studies: Aeration Systems

# Updated Aeration System Saves District Money

The city of Oswego, N.Y., has expanded the capacity of its two wastewater treatment plants and greatly improved their energy efficiency by installing a new diffuser system with automatic blower control units.

Oswego's wastewater plants are designated the East and West plants. Both are standard activated sludge plants. The East plant has four large aeration tanks and a current capacity of 5.35 mgd. The West plant has six smaller aeration tanks and a capacity of 4 mgd.

In 1993, an economic development zone on the city's eastside was growing, but the East Plant was at capacity. To counter that problem, the plant was fitted with fine-bubble diffusers from Sanitaire and an automatic blower system controlled by multi-channel dissolved oxygen (DO) analyzers manufactured by Royce Instrument Corp.

The existing three 60 HP blowers were 25 years old and considered inadequate. They were replaced with three 100 HP units.

After the system went on line, BOD loadings at the East Plant were increased by 20 percent, yet energy costs remained roughly the same, said Michael Coffey, Superintendent of Wastewater Treatment. The city has since completed a \$6 million

upgrade of the East Plant, which had an original capacity of 3.05 mgd. The project included the addition of a new aeration tank and a fourth blower.

Although the West Plant was not at capacity, city leaders decided the success of the East Plant upgrade could be matched at the West Plant. They ordered the plant's aeration system to be updated, with the expectation that the cost would be offset by energy savings, Coffey said.

In September 1996, the West Plant completed a \$40,000 upgrade that included



Dissolved oxygen sensors at the Oswego, N.Y. West Plant have an adjustable set point that automatically regulates the flow of air into the diffuser system.

the replacement of a 200 HP blower with three 75 HP units, the installation of Sanitaire fine bubble diffusers, and a Royce DO control system.

The fine bubble diffuser system includes approximately 300 9-inch-diameter ceramic discs scattered in a pattern across the bottom of each aeration tank. They provide a significantly higher oxygen transfer rate than the old coarse bubble diffusers that were original equipment at the plant.

The DO units have an adjustable set point that automatically controls an inlet valve which regulates the flow of air into the diffuser system. At the West Plant, they are set at 2.24 ppm. As loadings fluctuate, the controllers trigger the multistage blowers on and off on an "as needed basis." A minimum speed of 44 percent is maintained for good mixing in the basins.

The aeration system "puts out just what

our tanks, and our bugs, need. That's why we're saving money," Coffey said.

After four months of operation in the West Plant, a survey estimates the city will save approximately \$26,000 per year in electrical costs because of the upgrade.

Maintenance on the diffuser systems has been practically non-existent since the East Plant went on line more than three years ago. The district has a cleaning system that pumps dilute chlorine gas through the airline and out through the ceramic discs. It has only been used once and that cleaning was not really needed, Coffey said.

Maintenance of the DO control system sensors is estimated to be no more than 30 minutes every 6 months. This time includes an occasional visual check of the DO sensors plus a six month planned maintenance program where sensor membranes are changed and the DO electronics are recalibrated.

## DO Control

