Industrial WaterWorld

Case Study

New Batch WWT System Reduces Costs, Sludge

By Erick Mandt and Bill Graves

Chapman's Ice Cream has become the first dairy operation in Ontario to have its own wastewater treatment plant, according to the *Markdale Standard*, the local newspaper. The firm selected a state-of-the-art Fluidyne ISAM™ (Integrated Surge Anoxic Mix) anaerobic/aerobic batch reactor after also considering conventional Sequencing Batch Reactor (SBR), up-flow sludge blanket filtration (USBF) and trickling filter systems.

"It's working great…I have no complaints," said Jerry Schwarts, plant operator, referring to Chapman's new Fluidyne ISAM™ system, shown here during installation.

Founded in 1973 by David and Penny Chapman, the firm is the largest independent manufacturer of ice cream and water ice products in Canada. Chapman's rapidly growing operation has more than doubled production within the last five years, and now is the community's largest employer.

Chapman's system treats high strength wastewater generated in the production of ice cream. While flow may be, and usually is, irregular, the plant handles flows to the designed capacity.

Influent/effluent design parameters for the installation specified BOD_5 at 1,300/200 mg/L and TSS at 600/200 mg/L. David Chapman, however, wanted the plant to meet a higher, more environmentally friendly BOD_5 /TSS effluent standard of 50 mg/L for discharge to the city sewer system.

"Actual influent BOD_5 ranged from 1,210 to 1,860 and suspended solids from 143 to 417," said Jerry Schwartz, plant operator. At startup, the influent BOD_5 registered 1,330. Effluent BOD immediately dropped to below 200, and now consistently falls under 10. Numbers for effluent suspended solids dropped to single digits within a few brief weeks after start up.

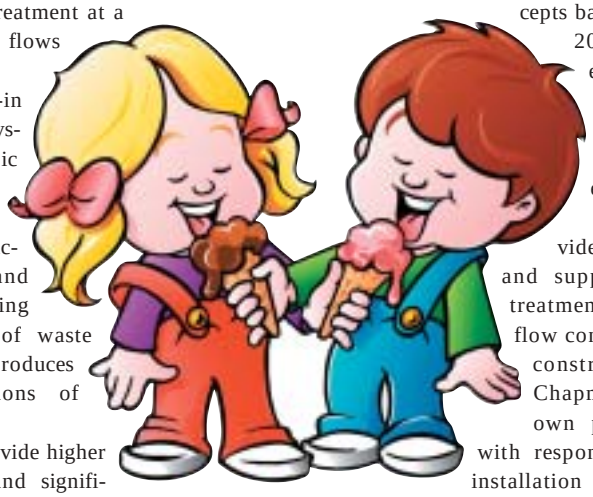
"We sample every week and the effluent is consistently far better than the standards prescribed for us," Schwartz said. Now the operation will not overwhelm the municipal lagoon.

The plant delivers next to potable water to the municipal treatment plant, removing more than 98% of suspended solids and BOD. Although Chapman did not require it, the Fluidyne system has California Title 22 approval authorizing non-residential use of the effluent for irrigation purposes.

The new system cannot wash out solids at peak flows. Unlike continuous flow processes such as the USBF with concurrent inflow and discharge, the ISAM has no flow entering the reactor during effluent discharge. This is designed to promote the highest effluent quality at all flow rates.

A surge/anoxic mix tank optimizes process control and provides both rapid and complete wastewater treatment. The tank provides flow and nutrient equalization and treatment at a full 10:1 range of flows and loadings.

The built-in sludge reduction system's anaerobic compartment significantly reduces total sludge production, handling and disposal. Treating 350,000 gallons of waste water each week produces only 1,760 gallons of sludge.



Jet aerators provide higher oxygen transfer and significantly higher alpha values than fine bubble diffusers, making the jets ideal for industrial wastewater treatment. The jet aerators have large solids handling capability and can be serviced without entering or draining the tank because they have a built in self-cleaning mechanism.

An Allen-Bradley PLC in the Fluidyne control panel automatically controls the process. The flexible process control strategy automatically adjusts aeration/mixing to meet incoming loadings, significantly reducing power requirements.

Charlie Rheaume, Chapman's vice president of manufacturing and technical operations, said, "We actually gave the municipality back 40 percent of the total capacity of their treatment plant and, especially, the BOD. Before our new system came on stream, the local municipal lagoon was up to 80 percent of capacity. With our anticipated growth, the system soon would have been overwhelmed."

"Naturally, we sought a waste handling system with equipment and design that would establish a benchmark for the industry, both in Canada and the USA. We wanted the best, a system that could become a showcase for the industry and for North America," said Rheaume.

Chapman's stewardship has reached far beyond the community. "We've been recognized by our industry and by the Ontario Minister of Environment for our ecological stewardship. Since the Chicago World-Wide Food and Dairy Expo we've hosted a stream of foreign visitors - from Australia, Russia and many other eastern countries. They all were favorably impressed with the ISAM system," Rheaume said.

The ISAM is the latest advancement in Fluidyne's series of wastewater treatment concepts based on more than 20 years of experience with reliable wastewater treatment systems offering high effluent quality.

Fluidyne provided process design and supplied all related treatment, processing and flow controls for the site-constructed tanks. Chapman served as its own prime contractor with responsibility for final installation of the Fluidyne ISAM. D.J. Peach & Associates, Ltd., provided consulting engineering on the project. IWW

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