

Cost-Efficient Ditch Provides A Sustainable Solution

Munising, Mich., needed a system that would weather the Upper Peninsula's harsh winters

By Shawn Brown

The Munising Wastewater Treatment Plant in Munising, Mich., sits on the shores of rugged and picturesque Lake Superior in the state's Upper Peninsula. When the city needed to replace an aging system, they chose the [Tri-Oval oxidation ditch system](#) for its overall costs savings, process control and operational flexibility.

Until February of this year, the city was using two conventional activated sludge package plants consisting of a circular clarifier surrounded by an outer ring containing an aerobic digester section, a section for aerobic treatment and a chlorine contact chamber section. The plant needed to expand to meet increasing flows and loads. Also, the package plant equipment was experiencing high levels of corrosion in the steel tank and piping and had to be replaced. The new plant would need to stand up to the rigors of tough winters on the shores of Lake Superior, be operator friendly, produce a high-quality effluent and meet an installed cost within the city's budget.

The city's engineer, Mead & Hunt, selected an oxidation ditch as the activated sludge process that would satisfy all of these requirements. The 0.9-million-gal-per-day design flow of the plant is split evenly between two ditches operating in parallel. To keep costs low, the city's engineer competitively bid the oxidation ditch to two major wastewater treatment system manufacturers using the same overall ditch footprint but offering radically different technologies for process control and operation in the oxidation ditches as dictated by the type of aeration and mixing equipment offered by each company.



Installation was quick and easy

Two Ditch Options

Option I was a low-speed surface aeration oxidation ditch. This option involved mounting a single large 75-hp gear box on the end of each oxidation ditch. To protect operators from the splashing created by the aeration and mixing equipment and to reduce temperature loss during the winter, a large and expensive concrete platform was required across the top of the end of the ditch where the aerator would be installed. This platform also supported the large gear box at the end of the ditch.

Option II was the [Tri-Oval oxidation ditch](#) designed and supplied by [Aeration Industries](#) of Chaska, Minn. The Tri-Oval has the cleanest concrete design of any other ditch on the market, which results in a significant savings in installation costs. At Munising, this translated into a concrete savings of more than 300 cu yards of concrete versus the design offered under Option I. Each of the two single-ring Tri-Oval ditches designed for Munising contains one 30-hp and one 40-hp [Aire-O2 Triton process aerator mixer](#) affording more process control, operational flexibility and electrical savings than the single 75-hp low-speed surface aerator offered by the alternative ditch manufacturer.

Concrete and Installation Savings

“Aeration Industries was by far the better option,” said Stan Kaczmarek, winning contractor with Gundlach Champion, who selected the Tri-Oval oxidation ditch for their quote to the city. The firm is located in Iron Mountain, Mich. “The concrete savings and the ease of installation were two of the major reasons for choosing the system,” Kaczmarek added.

The Triton units utilize fabricated bridge mounts that are anchored directly to concrete walkways spanning the ditch, making installation quick and easy. This design also facilitates easy operator access to the equipment. The Triton units also mix and aerate below the surface of the wastewater, which means that covers are never needed and equipment operates quietly, making the system both operator and environmentally friendly.



The Triton aerators offer more process control.

At the end of February, the oxidation ditches were brought on-line. The ditches are 15.5 ft deep and each has a volume of just over 500,000 gal. The operation of the Triton units is controlled automatically by feedback control based on dissolved oxygen (DO) setpoints. The DO in the ditch is constantly monitored by a handrail-mounted Hach LDO probe installed in each ditch. Effluent results discharged from the plant have been excellent, with biological oxygen demand and total suspended solids values averaging less than 10 mg/L.

The cutting-edge technology of the Tri-Oval oxidation ditch should provide many years of trouble-free service helping, to ensure that the coast of Lake Superior maintains its picturesque beauty.



AIRE-O₂®

Aeration Industries International Inc.
4100 Peavey Rd.
Chaska, MN 55318-2353
P: 952.448.6789
F: 952.448.7293
cheric@aireo2.com
www.aireo2.com

Copyright ©2009 Scranton Gillette Communications Inc.
3030 W. Salt Creek Lane, Suite 201
Arlington Heights, Illinois 60005-5025 USA