Sheaffer combines best of two technologies

New aeration system tackles wastewater with ease, efficiency

By Chris Loynd

David Harms was concerned when he heard the new Tustin Ranch Golf Course would be supplied by water from a treatment plant.

"Reclaimed water is great because it lessens demand on the domestic supply," said the Yorba Linda, Calif., builder. "We've built a lot of courses that have reclaimed water. There's always a multitude of problems. The water is so salty it kills the grass. Or there's a slime build up on the water surface and it floats over the shoreline. You can get all kinds of real bad situations."

But Jeff Alderman of Alderman Engineering, who designed the Tustin, Calif., course's three effluent-filled lakes, convinced the developer, The Irvine Co., to try a relatively new water treatment system. The system sends activated oxygen into the water through ledged air lines along the lake bottom.

How effective is the R.C. Sheaffer Co.-designed system?

"The water quality has been great," said Harms. "I've never seen a reclaimed water situation work so well."

How does it work?

Drawing on technologies from the water treatment and pool and spa industries, the system uses activated oxygen and aeration, carefully proportioned and then diffused into water at the lake bottom, said Ron Sheaffer, president of the Sandwich, Ill., company that designed the system five years ago.

Systems are custom designed for each lake or pond application. Activated oxygen is produced on site from oxygen and water vapor present in ambient air by passing the air over special lamps. Activated oxygen contains some of the most powerful oxidizing agents available.

All necessary equipment, lamps and compressor, are placed in a small shed or underground vault. The system requires little pressure. Electricity use and maintenance are lower than aeration systems for a comparable-sized pond.

"An important quality of these powerful short-lived oxidizing agents is that they convert back into oxygen and water, leaving no harmful residuals or toxic buildup," Sheaffer said.

The system is particularly effective where effluent is used for irrigation, an increasingly popular way to use sewage water in lakes and ponds work against nature.

"Most have no water flow in or out of the same water. Even a swamp has more water flow with a periodic replenishing of old water with new."

"Superintendents can draw from an arsenal of chemical and mechanical weapons to fight the annual water war against algae, scum and odors. Unfortunately it's a losing battle because none of the available chemicals, dyes, aeration, paddles or pumps adequately address the root causes of eutrophic lakes and ponds."

"It's high levels of dissolved nutrients and low levels of dissolved oxygen that cause all the problems superintendents face. Water flow in a natural body of water flushes out nutrients and replenishes oxygen. In a golf course lake you can't generally do this."

"Unfortunately the first step by most superintendents is to use chemicals to kill nuisance algae blooms. However, chemical treatments only re-release nutrients trapped in the algae back into the water. As it decomposes, the rotting algae basically acts as oxygen demand high enough to prevent anaerobic decomposition. But aeration alone can cut down on odors by keeping dissolved oxygen levels high enough to prevent anaerobic decomposition. But aeration does nothing to affect the levels of dissolved nutrients that feed successive algae blooms."

— Ron Sheaffer

The waterfall at Tustin Ranch Golf Course.

ACTIVATED OXYGEN AND AERATION SYSTEM

ACTIVATED OXYGEN FEED MANIFOLD

ACTIVATED OXYGEN COLLECTION MANIFOLD

A—AIR COMPRESSORS

B—ACTIVATED OXYGEN & AIR MIXING PIPE TO SHORELINE

C—LEAD WEIGHTED AERATION TUBING

D—ACTIVATED OXYGEN & AIR MIXING PIPE TO ALGAE TREATMENT SYSTEM

E—ACTIVATED OXYGEN GENERATOR

F—ACTIVATED OXYGEN & AIR MIXING PIPE TO EUTROPHIC LAKE

G—ACTIVATED OXYGEN & AIR MIXING PIPE TO BAY

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**Sheaffer**

Continued from page 54

Concealed fertilizer for the next turfgrass crop. Furthermore, this decomposition uses up a lot of oxygen. Once all the oxygen is gone, decomposition goes anaerobic and that releases the methane and sulfur gases that smell so bad. "Properly employed, aeration alone can cut down on odors by keeping dissolved oxygen levels high enough to prevent anaerobic decomposition. But aeration does nothing to affect the levels of dissolved nutrients that feed successive algae blooms. Aeration can beat the water severely enough to prevent green filamentous algae growth. But it can't stop the blue-green algae that stay suspended throughout the pond and contribute to a dark, murky appearance.

"Important for sewage treatment water is the high levels of chlorine and other salts. These cause grass damage when this water is used for irrigation. Neither aeration nor chemicals can remove these salts."

Sheaffer explained that his system, "restores and renews the water by oxidizing harmful organics and nutrients that build up otherwise. It oxidizes out salts like chlorine. The activated oxygen destroys the elements that lead to so many problems."

"Immediately, we supply aeration at the bottom to raise dissolved oxygen levels. This prevents odors associated with anaerobic decomposition and keeps nutrients tied up in the bottom sediments. Instead of killing algae blooms, we keep the nutrient levels low enough to prevent them from ever occurring. We work to restore water by creating a true ecological balance. That includes plants, fish, plankton, etc."

Sheaffer said he has installed the system on a dozen courses, primarily in California and Arizona. The cost has ranged from $8,000 for a one-acre pond to $120,000 for a 30-acre lake. Hardman said the installation and $80 to $180 per year maintenance costs are "very reasonable. It also uses less electricity than other systems, he added. "In all honesty, there's no other treatment method I have seen that is as effective, and as cost effective, as the Sheaffer System," Alderman said.

Chris Loynd is a writer based in Milford, Conn.