Sheaffer combines best of two technologies

New aeration system tackles wastewater with ease, efficiency

By Chris Loynd

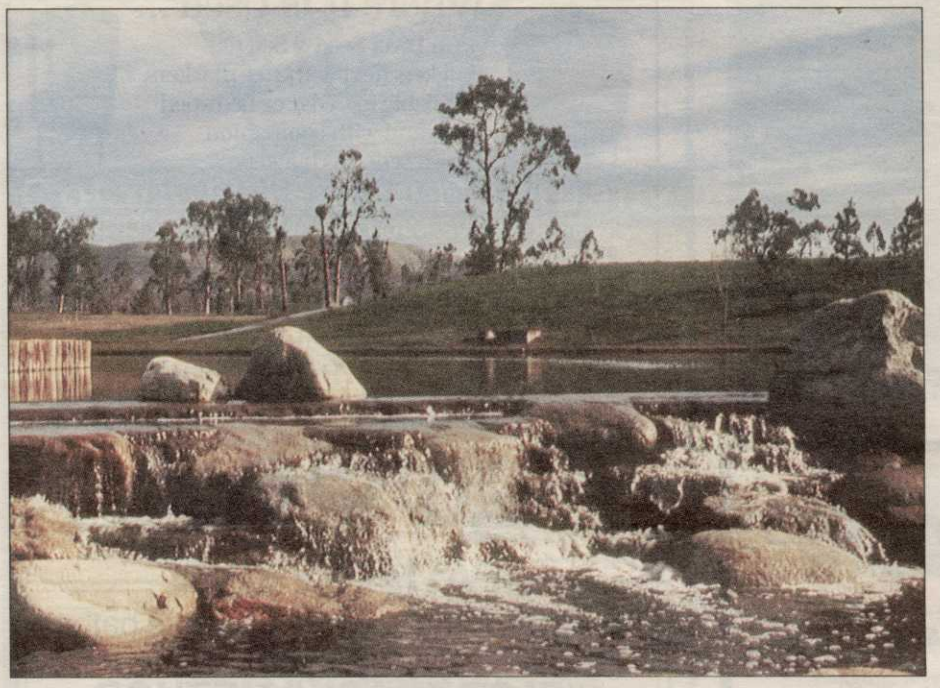
David Harms was concerned when he heard the new Tustin Ranch Golf Course would be supplied by water from a treatment plant.

"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 leaded air lines along the lake bottom.

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

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



The waterfall at Tustin Ranch Golf Course.

'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

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 common situation with water shortages cropping up across the country.

Two of Tustin Ranch's lakes are 4-1/2 acres. The third is just under an acre. One of the larger lakes feeds the course irrigation system of 2,000 sprinkler heads. That lake is drawn down anywhere from 200,000 to its maximum capacity of 800,000 gallons per day to supply the sprinklers.

"Clarity in the two self-contained lakes has been excellent," said superintendent Steve Plummer. "You can see six to eight feet from the bank to the bottom. The irrigation lake isn't quite as clear because it keeps getting replenished by reclaimed water. There's probably a four-foot-deep visibility from the bank. But there has been no odor and minimal surface scum and nuisance algae on it, or on any of the lakes."

The system has attracted attention from area superintendents and developers, said Alderman.

"We're getting calls about other golf course lakes where they're using effluent water and having some real problems. There are serious concerns when using sewage water in lakes that don't have an activated oxygen system. Number one, they smell. Second, they're a health nuisance. But most importantly, these lakes don't fulfill their original mission, to add aesthetic value and beauty to the golf course," Alderman added.

Said golf course architect Michael Hurdzan: "The system makes good sense. It's only possible drawback would be if a lake has a lot of sediment. Then you might have to raise the line."

Chemicals, aerators unnecessary

From a design standpoint, all artificial lakes and ponds work against nature.

"Most have no water flow in or out of the lake," said Sheaffer. "Some may have a pump, waterfall or aerator. But these only turn over 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, aerators, 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 or-

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