

Purification process removes solids from irrigation systems

By PETER BLAIS

A Massachusetts firm is putting a time-honored technology to new use at golf courses.

Ionics Inc. of Watertown is using electro-dialysis reversal (EDR) purification, the process of removing unwanted solids from water by exposing it to an electric charge, to make effluent and poor-quality water suitable for golf course use.

Midland (Texas) Country Club's 100,000-gallon-per-day capacity unit installed late last year is believed to be the first of its kind used

on golf courses. Makakilo Golf Course in Hawaii is installing a 1-million-gallon-per-day module, according to Ionics Marketing Engineer Peter Waldron.

EDR units have been in use since the 1950s. Manufacturing plants, hospitals and other businesses dependent on pure water have been the main customers.

Golf courses have traditionally used city, well or pond water for irrigation. These untreated waters were of high enough quality to grow grass. But effluent and other

poorer quality waters can make it difficult to manage turf. Purifying systems are one way to make that water usable.

The quality of well water in the Midland/Odessa area has been declining the past 15 years, according to Midland Country Club superintendent Tom Brown. The club's irrigation wells contained between 2,000 and 6,000 parts per million of dissolved solids, 60 to 70 percent of which are harmful salts.

Brown researched two types of units — EDR and reverse osmo-

sis (RO), a filtration system that cleanses water by passing it through a semi-permeable membrane. While the initial cost of the units are roughly equal, the computer controls make EDR units easier to operate, said Waldron, whose company sells both. Brown opted for the EDR.

A 100,000-gallon-per-day EDR unit is roughly 32-by-7-by-10 feet in size and costs about \$100,000. Much larger capacities are available. The cost is roughly \$1 per gallon of capacity, Waldron said.

One of the advantages of EDR over RO is the amount of water that can be recovered. Waldron said. Ninety-four percent of treated water from EDR units is useable, compared to 75 to 80 percent for RO, he added.

"The amount of recoverable water was the deciding factor at Midland Country Club," said Lee Roy Patin, area sales manager for Ionics South Central U.S. territory.

The high concentrations of gypsum found in West Texas well water were also a factor, Patin said. EDR units are better at filtering out gypsum than RO units, whose filters quickly clog up from gypsum deposits.

In other areas of the county, like Florida, a RO unit would probably work better because gypsum levels are low and RO membranes are cheaper to replace than EDR membranes.

"It just depends on the water in different areas of the country," Patin said.

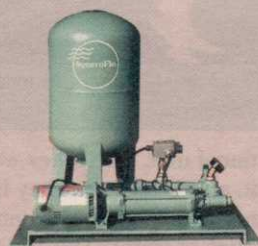
Both systems create a waste stream of solids-containing water (brine) that must be disposed of. That creates a problem. Industry has typically gotten rid of the waste stream by flushing it into the sewage system, Waldron said. That option isn't always available to golf courses. It wasn't at Midland, which is located in a desert-like environment that did not have access to a public sewage or storm-water removal system.

Brown was fortunate he had two irrigation lines, one for his greens and the other for fairways. He was able to use the purified water on just his greens. The brine was blended with the fairway water and distributed there without harmful effects.

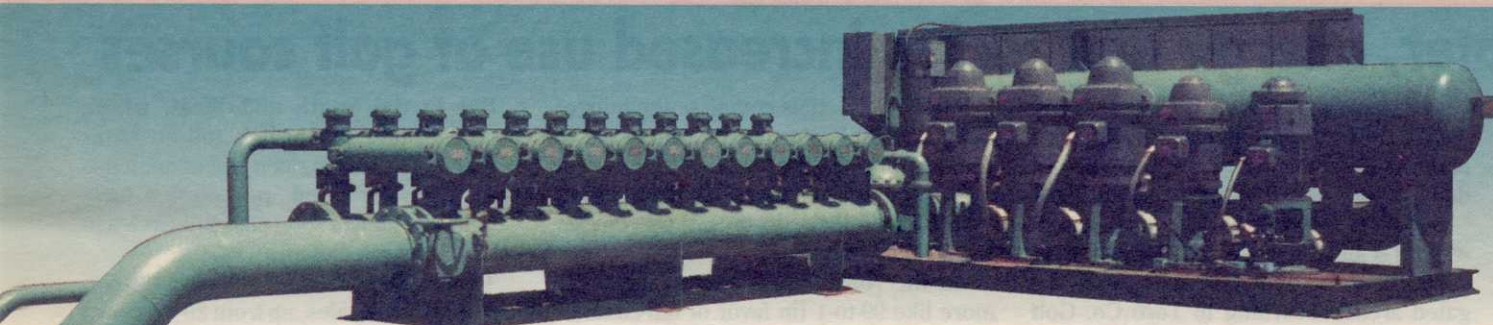
With the increased use of effluent and poorer-quality waters on golf courses, EDR and RO units will become more popular, Waldron predicted.

Patin said he has contacted many golf course superintendents. The cost in the still-economically-depressed Southwest is usually the problem, he said.

"Midland Country Club actually saved money with our unit," Patin said. "Tom found he was replacing large portions of his greens every year. Now he doesn't have to do that."



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Page 1's chart is explained

Brackish water passes through the ion exchange membranes (red plates). Unwanted chemicals are attracted to the positive (top) and negative (bottom) poles of the filtering system and then flushed out in the concentrated waste water as calcium phosphate (CaSO₄) and sodium chloride (NaCl). The purified product water can be used for irrigation.