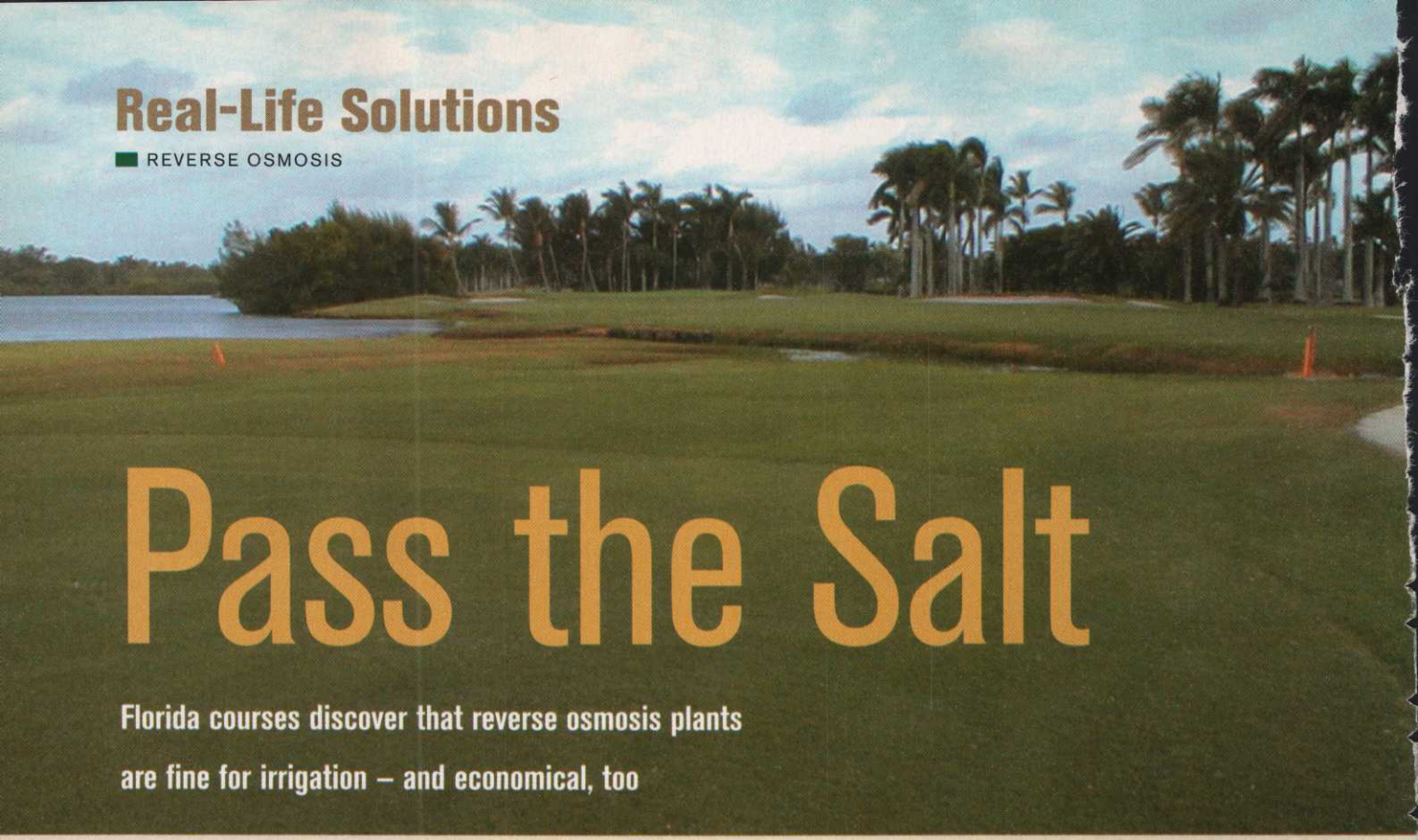

# Pass the Salt

## Florida courses discover that reverse osmosis plants are fine for irrigation – and economical, too

**The turf at Jupiter Island Club is always well-irrigated, thanks to the course's reverse-osmosis system.**

BY LARRY AYLWARD, EDITOR

The summer of 1996 in Hobe Sound, Fla., was fiercely hot and desert-like dry. It was scorching enough that the city's utility company cut off the water supply to its nonemergency-use customers, including The Jupiter Island Club. Rob Kloska, superintendent of the Jupiter Island Club in Hobe Sound, was left without adequate irrigation. While Kloska wasn't happy with the ruling, he understood. And deep down, Kloska even felt a hint of bliss. He knew the course needed to make a change regarding its irrigation supply, and he had to sell members on it.

Kloska also knew what he wanted for his new irrigation source. "[The utility company's] decision was a great bullet in the gun for reverse osmosis," he says.

Reverse osmosis is the process of extracting salt and other minerals from brackish salt water and converting it to irrigation-quality water. Reverse osmosis plants are popular in the Middle East, where fresh water is scarce. Some critics say reverse osmosis plants are too expensive too build and operate in the coastal United States. Environmentalists voice concerns about how to dispose of the salty brine extracted during the conversion process.

### Problem

Superintendent Rob Kloska needed to find an alternative irrigation source for the Jupiter Island Club in Hobe Sound, Fla., mainly for two reasons – to offset the high price of potable water and to be free from local water restrictions.

### Solution

Build a reverse-osmosis plant to manufacture the course's own water for irrigation.

The Jupiter Island Club is a high-end golf course located on a barrier island. The Atlantic Ocean borders the course to the east, and the Intracoastal Waterway is to the west. The course's location leaves it with few options for its irrigation source, Kloska says.

"We looked at piping in effluent water, but the one entity that creates wastewater is too far away," Kloska says. "The cost to get the pipe from there to here is well over the amount it would cost to build a reverse osmosis plant."

Drawing water from a shallow well also isn't feasible because the island is only about a half-mile wide and doesn't hold a lot of fresh water in the ground, Kloska notes.

That leaves the city's potable water, which the course was using. But it was expensive and getting more costly. The course paid about $1.87 per 1,000 gallons of water in 1996. If there was a water restriction, like in the summer of '96, it was a good chance the course would be left high and dry if the city decided to scale back consumption. If that happened, Kloska would have to improvise when it came to irrigation. He also wouldn't have water to use for renovation or construction projects.

### A field trip

Kloska was hired at Jupiter Island in June 1995. In February 1996, the members purchased the club from its private owner.

Around that time, Kloska met with the few members tabbed to operate the club. They talked about a five-year plan for equipment replacement, rebuilding the greens and updating the irrigation system. They also talked briefly about a reverse osmosis plant as the course's source for irrigation water.

In the summer of 1996, Kloska took a field trip to The Everglades Club located in nearby Palm Beach, Fla., which had recently installed a reverse osmosis plant. Like Jupiter Island, The Everglades Club purchased potable water from the city and paid more for it than Jupiter Island. "Our bills were up in the $250,000 range," says Peter Brooks, the course's certified superintendent.

After Brooks gave Kloska a tour of the plant and talked about its benefits, Kloska was sold. "I saw it and said, 'This is what we need at Jupiter Island,' " Kloska says.

Kloska knew the dirt on desalinization was that it was too expensive to use on a golf course. A plant costs around $1 million and can also be expensive to operate because it uses electricity to clean the water. But the more Kloska studied the feasibility of installing a system at his course, the more he realized the expense factor was overrated, at least for Jupiter Island.

In early 1997, Jupiter Island hired an outside firm to conduct a study to determine if a reverse osmosis plant was feasible for the course and how long it would take to pay for itself.

"The members of The Everglades Club are similar to the members of our club," Kloska says. "If something doesn't make financial sense, they won't commit to it."

The study revealed a plant was feasible, and Jupiter Island's members agreed with Kloska to purchase a reverse-osmosis system in early 1998 from Waterlink, a Columbus, Ohio-based provider of integrated water and air purification solutions for industrial and municipal customers. A little more than four years later, the system paid for itself, Kloska says.

"Ultimately, Mother Nature decides how fast you must pay off a reverse-osmosis system," Kloska says. "If She decides it's going to be dry, your payoff is going to be shorter. If She decides it's going to be wet, your payoff will be longer."

The price of municipal water also plays a role. "Every time the price of water gets raised, your payoff is shortened," Kloska adds, noting the price of water increased to about $2.25 per 1,000 gallons by the time construction of the course's plant was completed.

**The Jupiter Island Club's reverse-osmosis system draws about 520,000 gallons of water a day from a well, and the course uses an average of 400,000 gallons a day.**

The course's reverse-osmosis plant consists of a 1,700-foot well that supplies the brackish water; equipment and machinery; and a building. The system draws about 520,000 gallons of water a day from the well and produces 400,000 gallons a day for irrigation use. The course uses an average of 270,000 gallons a day during the year. The course also

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**"The No. 1 thing it gives the course is immunity to all water restrictions."**

ROB KLOSKA,
SUPERINTENDENT,
JUPITER ISLAND CLUB

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uses recycled water captured by drainage systems from the greens and bunkers. Kloska explains how the reverse osmosis system works:

"We're taking the source water, which has salt in it, and we're increasing the pressure of it and pushing it through what are called vessels. As the water passes through the vessels, the salt of the water is pushed to one part of a vessel and the clean water is pushed to the other part. Then the clean water is saved and sent in one direction, and the brine is sent in the other direction."

Of every four gallons of water taken out of the well, three are made into water that the course uses to irrigate. The remaining gallon of brine is dumped in a gravel swale that percolates into the ground.

"The salinity of that water is similar in parts per million to the water in the Intercoastal Waterway, which is only about 200 yards from the swale," Kloska says. "So it's a good fit."

What to do with the concentrated brine is an issue with reverse-osmosis plants, but not a problem, Kloska and Brooks agree. At The Everglades Club, the brine flows to a percolation pond on the west end of the golf course, where it filters safely into the ground. Brooks says brine disposal varies from course to course.

Other than brine disposal, the reverse-osmosis system has created few maintenance challenges, Kloska says. "The one negative about reverse osmosis is that it cleans the water so thoroughly that it takes all of the ions out of the water, which makes the water more corrosive than salt water," he notes.

As a result, the course's pump station becomes corroded much faster than it would if it was using municipal water. "It's not that big of a deal, but it comes with the territory," Kloska says.

Initially, Kloska was concerned about irrigating with the ionless water, but the only problem he says he's seen is a spike in the pH level of the pond water, which ran as high as 8.5. Kloska added an acid injection system to the irrigation system and the pH level dropped. "The turf looks good," he says.

There are standard short-term and long-term maintenance issues. For instance, filters need to be cleaned regularly, and the well's membranes should be replaced every 10 years.

While it costs nearly $1 million, Kloska and Brooks say a reverse-osmosis system makes perfect economical sense for clubs like Jupiter Island, Everglades and others that use expensive potable water. "In this area, only the coastal golf courses are currently looking into [reverse osmosis] because we're the clubs who predominantly buy potable water for irrigation purposes," Kloska says.

Brooks says Everglades' reverse-osmosis system produces the course's water for only $25,000 a year.

"This has turned out wonderfully for us," he adds. "The water quality is superb, and the plant runs like a top."

The expensive-to-operate issue is overrated, both superintendents agree. Kloska says it now only costs the course 78 cents to make 1,000 gallons of water by reverse osmosis, and that includes the price of electricity. If Jupiter Island were still using potable water, it would pay $2.90 per 1,000 gallons today.

There are different types of reverse-osmosis plants. For instance, Jupiter Island's plant is designed to run continuously for better efficiency. But Everglades' plant is not designed to run continuously and usually operates only at night when the city's local utility company offers cheaper rates for electricity. The plant can produce up to 35,000 gallons of water an hour. "I'm running it cheap," Brooks says.

Kloska says he wouldn't be surprised if the day comes when more golf courses in the Northeast and Southern California turn to reverse osmosis for irrigation purposes.

"[Golf courses] get a bad rap because people say they use too much drinking water for irrigation," he says. "If enough people get behind such a movement, they can make a lot of noise. There may come a time when other superintendents may have to look at reverse osmosis as an alternative because they're being threatened [with the fact that] that their potable water is going to be taken away."

The best thing about reverse osmosis, Kloska says with a sigh of relief, is that he no longer worries about the course's water supply being shut off.

"The No. 1 thing it gives the course is immunity to all water restrictions," Kloska says. "Like I've told people many times, 'He who has the water has the power.' " ■

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