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# Research

season turfgrass greens.

- Implement a periodic irrigation distribution monitoring program to ensure optimum distribution – greater than 75 percent distribution unifor-

mity – is maintained.

- Install a water flow meter on one fairway to enable accurate calculation of leaching fractions. Consider installing an in-line electrical conduc-

tivity meter to monitor water quality fluctuations.

- Become even more meticulous about irrigation system maintenance, including replacing misaligned, sunken, broken or poorly selected sprinkler heads and dealing with pressure fluctuations.

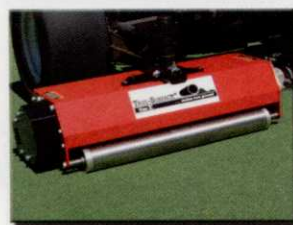
- Implement a leaching fraction for areas where reclaimed water is used.

- Require the water district to provide access to daily, weekly and monthly summary values for water quality indicators. Of particular interest is electrical conductivity, sodium, chloride and boron levels. Consider conducting independent water test for more complete evaluations.

Despite all of the efforts outlined above, some reduction of golf course playability because of salt-related turf and tree damage might result. Addi-

**Table 3. Comparison of well water sources used at several golf courses in Southern California.** Note that in several cases (Fairbanks Ranch, Vista Valley, and San Diego) well water quality is inferior to reclaimed water quality values reported in Tables 1 and 2. These courses would benefit from use of higher quality reclaimed water.

Factor	Average domestic	Fairbanks Ranch	Vista Valley	San Diego	Arrowhead	Friendly Hills	Oakmont
EC (dS/m)	0.8	2.8	2.8	4.0	0.5	0.7	0.9
SAR	1.9	3.2	2.8	5.2	0.8	1.2	1.6
SARadj	3.4	8.2	6.7	13.3	1.4	2.4	3.1
HCO3 (ppm)	173.8	366.1	389.5	363.9	189.5	244.1	185.4
B (ppm)	0.17	0.05	0.21	0.41	0.15	0.13	0.13
Cl (ppm)	81.7	322.7	609.3	1004.2	9.8	59.6	73.2
Na (ppm)	70.0	195.0	194.8	406.5	24.6	44.4	65.3



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## IMPACT ON THE BUSINESS

tionally, development of wet areas because of leaching programs might be difficult to avoid. It's critical to communicate with golfers so they adjust their expectations for high-quality turf.

If, after several years of efforts, the above management programs don't provide effective salinity management for the soil-turfgrass system, it might be necessary to switch turfgrasses to more salt-tolerant types such as bermudagrass or paspalum.

As mentioned, the quality of reclaimed water is in the eye of the beholder, and might be a benefit in some situations, as illustrated in Table 3 on page 52. The value of reclaimed water must be judged on a case-by-case basis. **GCI**

*By Larry J. Stowell, Ph.D. and Wendy Gelerner, Ph.D. are research directors with the PACE Turfgrass Research Institute ([www.paceturf.org](http://www.paceturf.org)). References for this article can be found posted with this article at [www.golfcourseindustry.com](http://www.golfcourseindustry.com).*

### Learning from San Pedro's contract troubles

By Marisa Palmieri

Coming off the late June settlement of a four-year-old lawsuit about an effluent water contract, the management staff at San Pedro Golf Course in Benson, Ariz., can't stress enough the due diligence managers and superintendents must perform when entering a contract with a government entity. Though Dan Wickman, PGA golf course manager, and superintendent Brad Quiring weren't around when the contract was created, the two have endured many difficulties during the past few years as a result of the litigation and running out of water.

"Watching your course die in Arizona in May and June is painful," Wickman says. "My superintendent and I had some long days."

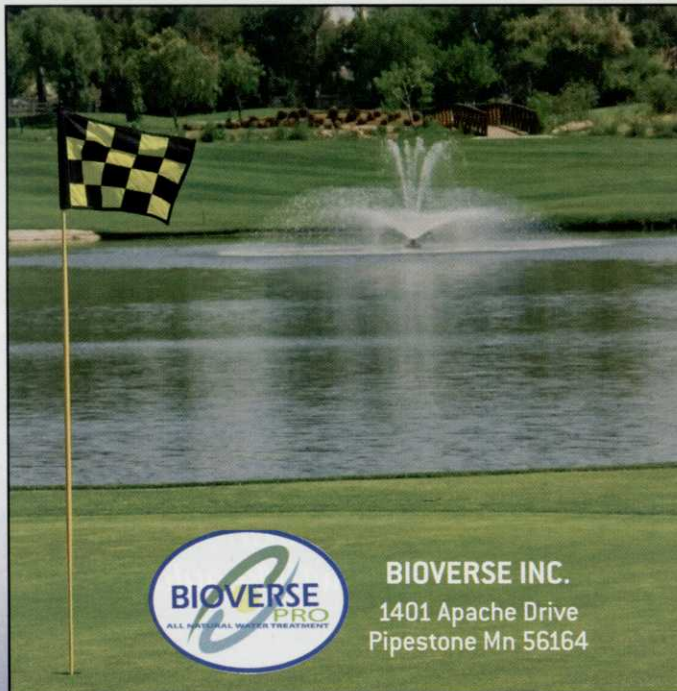
In August 2004, the course's owner filed the suit, alleging the city of Benson failed to provide the amount of effluent water stipulated in a contract between the city and the course. Benson, from which

San Pedro's owner originally leased the course's land, had promised to provide 180 million gallons of effluent water per year but was about 30 million gallons short, says Quiring, who joined the crew after construction and grow-in.

Though the city said, in the contract, it would make up for any water shortfalls from a nearby well, that water was never tested before the contract was signed. It turns out the salty well water was unsuitable for growing turfgrass, but no one discovered this until Quiring tested the water well after the course's effluent water storage facility, a 9-acre lake, was close to running dry.

The maintenance staff made due with the unsuitable water for a short time, supplementing the turf with gypsum and soil treatments to combat the poor water quality. After a while, the city provided some relief, allowing the course access to fire hydrants, Quiring says. Thankfully, the original superintendent on the project overestimated the amount of water the course would need, and the maintenance staff was successful at limiting water use thanks to an efficient irrigation system.

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## IMPACT ON THE BUSINESS (continued)

The staff's efforts to work with what it had weren't without significant changes and financial losses, Wickman says. Unsure when the suit would be settled, management opted to reduce the turf area and switch from a rye blue course to bermudagrass. This change shut down the course for almost three months during reseeding. Additionally, the course's owner purchased a nearby piece of land equipped with a well for a supplemental water supply.

Though the city settled the lawsuit, which turned over ownership of the course, valued at \$1.4 million, to the lessee, Arizona Golf Systems, the settlement didn't come close to the estimated damages, which topped \$5 million. Damages include costs of reseeding the course, sodding several areas, lost revenue from a year's worth of grow-in delays and the effects on the business value's from poor course conditions early on.

"If people come in to play and the course isn't in good shape, they might never come back," Wickman

says. "We really struggled for the first three years. If we opened correctly, would the business be under those circumstances?"

Though Wickman says the development team did many of the right things when signing the original contract with the city, going a few steps farther and probing the city about its effluent water-producing capabilities might have raised some red flags that could've prevented the lawsuit.

"Unless you've been through what we just went through, you probably wouldn't think a city could run out of water, but they did," Wickman says. "If I were part of another development, that's definitely something

I'd look at. It's something I wouldn't have known to question before, but it's something I'll never forget."

In addition to recommending traditional contract procedures, such as having an attorney review everything, Wickman encourages superintendents to get involved in evaluating the water quantity and quality terms of effluent water contracts. One thing to consider is including a buffer amount of water based on weather-related fluctuations.

"You need a buffer, and it can't just be a couple thousand gallons," Wickman says. "You'll have hot years and dry years, and you can't count on the weather."

Also, consider a contingency clause stipulating that any supplemental water sources must be suitable for turfgrass grow-in and maintenance. Don't forget to test these sources, and ask questions.

"Most people are going to trust a government entity can live up to the terms it's promised," Wickman says. "Don't feel like you're the little guy compared to the government. If there's something that doesn't meet your needs, get it changed." **GCI**

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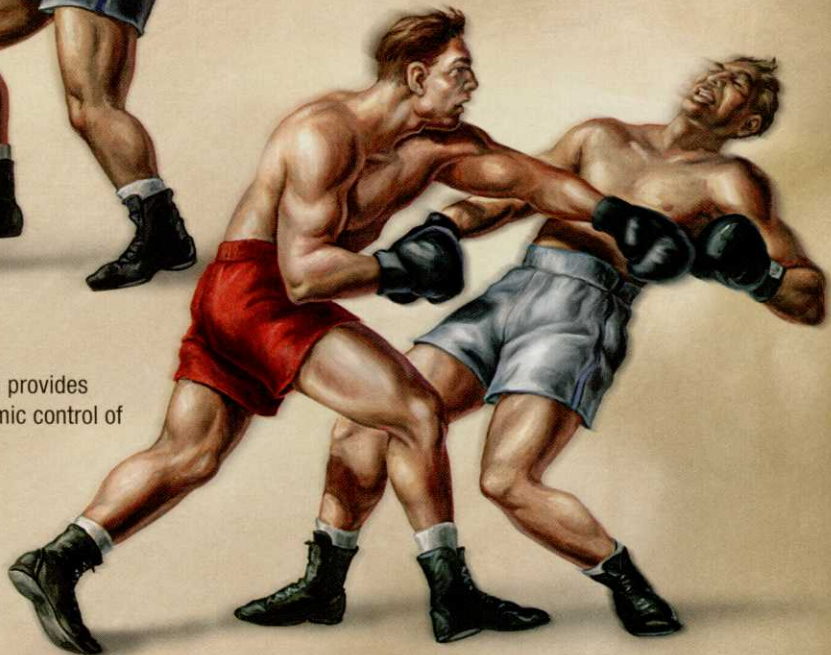
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GRINDERS

BY MARGARET HEPP

## Reel sharp

An equipment manager starts from scratch with new grinders in Raleigh, N.C.

Jim Swartzel loved his job as equipment manager, but in Fort Lauderdale, Fla., enough was enough.

"After four hurricanes in a year, I had to say goodbye," he says.

Fortunately for Hasentree Golf Club in Raleigh, N.C., Swartzel wanted a fresh start. He accepted a position at the then-unfinished club in early 2006. By the time the course opened in October 2007, Swartzel had just the clean slate he'd been seeking: a brand new course, a new fleet of equipment and an entire shop full of new tools.

As Swartzel compiled his list of necessities for the shop, among the most essential pieces were a bedknife sharpener and a spin grinder. Both pieces – the Anglemaster 3000 DX (\$15,566) and the Express Dual 5000 (\$39,302) – were purchased from Bernhard and Co. as part of the club's capital expenditure budget.

But before Swartzel could get the grinders running, there were a few things to consider. Because the machines required 220 to 230 volts of electricity, he had to add a voltage device. Also, the two machines were put in a separate room to combat

noise and dust. The grinding room at Hasentree is 10 feet by 15.5 feet, equipped with an exhaust fan and a 10-foot roll-up door.

Partly because he had experience using Bernhard machines, Swartzel was happy to continue using the grinders. If your mowers cut well, don't change a thing, Swartzel says.

"They're so easy to use and set up, it's a no-brainer," he says. "I'd consider Bernhard the leaders in the industry. They've been doing this for many years. But it's really Ford versus Chevy. It's not a matter of right or wrong but a matter of what you feel comfortable with and what you've been successful with."

The rotary grinder is equipped with an automatic switch, but thanks to extensive lessons from Bernhard, Swartzel feels comfortable grinding manually. It's important to get a feel for the number of passes and the speed and pressure required for the proper sharpness, he says. Automatic programs can come in handy if one has been working



The grinding process looks simple, but if you're not doing it right, you'll see a dramatic effect on the golf course, says Jim Swartzel, equipment manager at Hasentree Golf Club. Photos: Bernhard and Co.



through sand. With three degrees – light, medium and heavy – and three reel sizes to choose from, the Anglemaster and the Express Dual are equipped to handle difficult jobs.

“The machines are under a lot of stress,” Swartzel says. “You’ve got three different motors running at the same time in different directions. I put these things under a lot of pressure and literally have them running eight hours a day. No trouble. They keep on going.”

Swartzel and his coworkers typically grind twice a week. There are about 20 units at Hasentree, including two greensmowers, and their reels are ground weekly. The other units’ reels are sharpened as needed, about every two to three weeks.

Echoing Steven Tucker’s column about grinding techniques (“Setting the cutting unit,” page 18, July ’08, GCI), it’s important to have the same person sharpening all the equipment at one golf course, Swartzel says.

“Unless you’re both really consistent, it’s best to have one guy doing most of the grinding,” he says. “Otherwise, turf can look shaggy.”

Still, Swartzel is teaching his assistant, Brandon Reams, the ins and outs of grinding to perfection – just in case.

“The grinding process looks simple, but if you’re not doing it right, you’ll see a dramatic effect on the golf course,” he says.

Here are some of his training tips:

- Look at the wear pattern. It’ll change how you grind next time.

- Reel speed is another crucial consideration. It’s essential to grind as slowly as possible; grind too quickly, and the reel blade will bounce, causing the stone to miss and skip the blade.

- A lack of pressure can diminish the relief on the blade. If you’re not aggressive enough, you’ll sharpen only the tips.

“Sixty percent of my job is keeping mowers sharp,” he says. “I can do a greensmower in

about 15 minutes. I break it down, grind it, then it’s ready to go.”

Swartzel spends a bit more time on larger machines, about 20 to 30 minutes per reel or up to three hours for a five-reel mower.

“I always have four heads at the shop I can work on,” he says. “It gives us a little extra time and flexibility. That was just one of the ways I put together our equipment package to give us a little more versatility.”

It’s a philosophy Swartzel extends to his career: Be knowledgeable and versatile. He’s the president of an equipment association in the Carolinas and is also a member of the International Golf Course Equipment Managers Association.

“I simply do what’s supposed to be done,” he says. “The results are there. If you have a busy morning, it means something went wrong. I like to roll the equipment out the door and get everybody going, first thing.” GCI

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BY MARGARET HEPP

## Modern marvels

Golf and parks superintendent Jeff Kreie leads an upgrade in Ulysses, Kan.

Born and raised in Ulysses, Kan., Jeff Kreie is inclined to be ever-so-slightly old school. But while he's been at the same golf course 27 years, he's not archaic. Let him finish when he says he used a "modern" 50-year-old grinder during his first years at Bentwood Golf Course – he's referring to the manufacturer, Modern Equipment.

Kreie has made frequent tweaks to keep the machine up to speed. It belonged to the father of Bentwood's former superintendent, who used it to grind push-mower reels. It was still going strong when Kreie finally got rid of it earlier this year.

"We bought a bunch of Foley parts and made it work," he says. "We built some jigs and turned it into a rotary grinder. It did a nice job. It didn't have an overhead bar or any of the fancy stuff for strapping down and

tightening the reels, but it worked the same way as the reel grinder."

Change comes gradually in Ulysses, and Kreie knows just how to make it happen. He's now the city golf and parks superintendent, and he's slowly but surely updated his grinder repertoire to include a Foley Model 388 relief grinder, purchased in 1991 for about \$2,300, and a Foley 405 spin grinder, purchased in 2006 for about \$15,300.

"Those old Foley relief grinders were kind of the only thing going for little budget clubs for a long time," he says. "We might be the only nine-hole course in the area that has a spin grinder. At the time, \$2,300 sounded like a lot of money. Now, \$15,000 sounds like a cheap greensmower."

Kreie works with about 50 reels. Most superintendents in the area send their reels out daily to technicians, but he says the job is more cost effective when done in house.

"One of the reasons for buying the spin grinder was to be able to trim reels up during the season," he says, adding that the sheer quantity of work was becoming a daunting task with such a small staff. "We throw them in there, touch them up, and they're like new again. It's so much nicer when you can walk off. You don't have to stand there and drag the motor over the reel again and again."

With the Modern grinder, reels required constant baby-sitting. If equipment mainte-



Bentwood Golf Course crew members acquired new grinding skills after manufacturer representatives put on a clinic at the course. Photo: Bentwood Golf Course