



Keeping It Green

By Jeff Dunn

Perhaps the most attractive aspect of golfing is the idea of spending several hours in a park-like setting strolling across lush fairways, putting greens and tees. For this reason, golf course managers dedicate a great deal of resources to the maintenance and health of special turf grasses.

RO treatment system
keeps golf course
grass healthy

The most important ingredient for keeping golf courses green is water, and plenty of it. The typical amount of irrigation water required daily for an 18-hole golf course varies from approximately 400,000 gal per day (gpd) to 1 million gpd, depending on property location, type of grass, soil conditions and other factors.

Irrigation water with approximately 400 parts per million (ppm) total dissolved solids (TDS) contains the right mix of minerals for healthy turf. If irrigation feed source contains too much sodium, for example, it can

detrimentally affect the turf physically and chemically. Soils with an accumulation of exchangeable sodium often are characterized by poor tilth and low permeability, making them unfavorable for plant growth. Golf course superintendents are familiar with the sodium absorption ratio (SAR) and they desire a low SAR index.

Irrigation Issues

At Spirit Hollow Golf Course, high TDS and high SAR made turf maintenance a nightmare.

Spirit Hollow is a public daily fee

course in Burlington, Iowa, about an hour south of the Quad Cities, and almost equidistant from Chicago; Des Moines, Iowa; and St. Louis. The upscale 18-hole track plays mostly through a small river valley that contributes to its picturesque holes and significant elevation changes. The course conditioning is top notch, with bent grass tees, fairways and greens.

During periods of abundant rain, there is plenty of acceptable water available in the lake, which is then pumped onto the property for irrigation. Unfortunately, the six-month golf season coincides with seasonal drought conditions. With little water remaining in the lake, the golf course superintendent supplements lake water with water from a well that flows approximately 700 gal per minute and contains approximately 2,800 ppm TDS. This brackish water is unacceptable for golf course irrigation and was detrimental to the turf grass, fairways and tees, making the property unattractive in appearance and playability.



This 500,000-gpd RO system succeeded in substantially reducing sodium and chloride levels in Spirit Hollow's water.

Implementing Treatment

Spirit Hollow contacted consulting firm Water Treatment Systems Inc. (WTS) of Boca Raton, Fla., in search of a solution. Because it is located in Florida, WTS has experience finding treatment solutions for brackish well water considered unusable for golf course irrigation. The solution for Spirit Hollow, based on its daily irrigation requirements, was a 500,000 gpd reverse osmosis (RO) system.

Last winter, Spirit Hollow's superintendent oversaw construction of a water treatment plant conveniently located close to both the water well and freshwater lake that would provide storage for the RO permeate. The RO system, manufactured by Water Management Group Inc., and the auxiliary process equipment supplied by WTS were delivered and installed in April. The auxiliary process equipment consisted of multi-media prefiltration and chemical injection of antiscalant chemical. The multi-media filtration system was necessary because of high turbidity in the feed water and because the well casing was made of steel and had the potential to contribute solid and oxidized iron to the feed water.

The process flow for the water treatment plant is as follows: A level control device, located in the lake, sends a signal to the RO control panel when the level in the lake falls below a set point. The RO panel sends a signal to the well pump to turn on, and well feed water flows to the prefiltration system, the prefilter cartridge system and finally to the RO high-pressure pumps. Along the way, the feed water receives a dose of antiscalant chemical to control precipitation of sparingly soluble salts onto the RO membranes.

Project Success

In May, Spirit Hollow's new RO water treatment plant was commissioned. The plant is producing water with approximately 100 ppm TDS. The treated water is directed into the natural lake, where TDS increases to approximately 400 ppm. More importantly, sodium and chloride

levels have been reduced substantially and the SAR is now in the desired range. Spirit Hollow owners and managers are pleased with the new treatment plant and are happy with its ease of operation and low maintenance requirements. *wqp*

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