

A SCARCE AND PRECIOUS RESOURCE: WATER

By Richard Nugent, Golf Course Architect

Probably the most important concern of golf course architects, course superintendents and other turf grass managers in the world today is water — its availability, its quality, its application.

Fresh water is a scarce and precious resource. There is a great deal of water on the earth but little of it is available to us as "fresh water." We are reminded of lines from Samuel T. Coleridge's *The Rime of the Ancient Mariner*, "Water, water everywhere, nor any drop to drink."

The drought prevailing in California during the recent PGA championship at Pebble Beach brought forcibly to our attention, through the medium of television, the situation faced by many water-poor areas in the world. If existing courses are to continue to be maintained to today's standards, and if new golf course development is going to occur to meet the growing need of our population for recreational facilities, new water sources must be found.

It was this problem which brought together the American Society of Golf Course Architects' Foundation, the Golf Course Superintendents Association of America, the United States Golf Association and the National Golf Foundation, as allied associates in golf, to sponsor their first joint seminar to address an industry-wide concern. This was the Wastewater Conference held in Chicago last November. The proceedings of this seminar are available through the offices of each of the participating organizations.

The Wastewater Conference highlighted many of the opportunities, as well as some of the problems, in the current state of the art of using recycled water for irrigation purposes.

The Federal Government is interested in recycled water — so much so that up to 85 percent government financing can be available for golf course construction, should the golf course be used also as a primary on-land disposal system for effluent water. Recycled water is a promising solution to two problems. First, as the source of water for irrigation and, second, as a method of effluent disposal which will serve to recharge ground water tables.

As with any such new technique, there are inherent problems. Sewage disposal plants discharge effluent 365 days a year, winter and summer, rain or shine. The irrigation needs will obviously not always mesh with the disposal needs and the water will have to be recycled through construction of temporary holding ponds or other types of reservoirs.

Many people are apprehensive about this type of water re-use and if the program is to be successful, the public must be convinced that use of waste water is not only desirable but is safe as well. The quality of waste water going through treatment plants is not always consistent, nor is the level of pollutants. There are times when the water treatment plants may receive more disposal water than can be adequately treated and will have to discharge a more raw product, or a product with higher levels of contaminants.

There are a number of projects in the United States where recycled water is currently being applied successfully.

In Muskegon, Michigan, waste water is being applied in a large agricultural project where it meets EPA and

FDA standards in the production of food safe for human consumption. This project was instituted after a number of legal ramifications where the state successfully prosecuted a lawsuit against local groups attempting to block the project.

This particular project is important for two reasons — first, the legal precedent is established for the use of recycled water, and second, this water is used to grow crops for human consumption — a far more critical usage of recycled water than when employed for turf grass irrigation.

Another instance is in the Caribbean area of heavy tropical rainfall and insufficient fresh ground water supplies. The golf courses at the Dorado Beach Hotel in Puerto Rico are irrigated with recycled water.

Last year our firm did a feasibility study for a golf course development in the Virgin Islands. On the site was one well which had the greatest capacity of any on the island (50 gallons per minute) and several other wells capable of producing five gallons per hour. Obviously, this is an insufficient supply of fresh water for a golf course/housing development. Golf course irrigation in such a situation is feasible only through the use of recycled water, or other more expensive forms of desalinization of salt water.

The golf course feasibility depended on the use of fresh water for the housing development, as potable water, and use of the water again, recycled, for irrigation of the golf course and landscaped areas. This was at St. Thomas where much of the fresh water for the entire island is brought in by barge from other areas in the Caribbean.

In our own western states there is a successful project at Los Alamos, New Mexico, where a golf course constructed during the second World War has had about 35 years of successful operation, using recycled water.

The Air Force Academy at Colorado Springs is another golf course recreational turf facility which is successfully irrigated with recycled water.

The Sharp Park golf course near San Francisco operated successfully from 1932 through 1976 with effluent from the county jail. In 1976, the flow from the county jail was tied into a new sewer system. However, recent drought developments have caused the local officials to consider re-establishing their use of the effluent water for irrigation purposes. The only complaints at this golf course came from a few players who objected to the odor at the beginning of each season, after the ponds had been sitting for most of the winter.

Another example is Innisbrook Golf Course near Tarpon Springs in Florida. There are 63 holes completely irrigated with effluent water on all the tees, greens, fairways and roughs. An effluent treatment plant was built in 1975 by the Pinellas County Pollution Control Department. To dispose of the effluent, the county would have been required to build an expensive waste



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water disposal system which would carry the sewage effluent far out into the Gulf of Mexico to avoid potential shoreline pollution problems.

Meanwhile, Innisbrook was having a problem with salt infusion into their fresh water wells. Therefore, the use of the golf course as an on-land disposal area for the county's effluent was an answer to problems of both parties, and the county contracted with Innisbrook to deliver 3 million gallons per day by underground pipeline, constructed by the county, to Innisbrook, where this water is fed into five pumping stations located throughout the golf course properties.

The golf courses along the north branch of the Chicago River are known around the world as some of the finest in existence. These courses have been irrigated for over fifty years with water drawn out of what is in essence a drainage ditch.

Recent studies have shown that in periods of low flow, these waters tend to contain more pollutants which may be detrimental to the development of fine turf grass; consequently, during these periods the golf courses have been supplementing their irrigation water from the canal with fresh water from the city water lines.

The North Shore Sanitary District is in the process of completing a new water treatment plant in Highland Park, Illinois. The Sanitary District's engineer, John P. Kottcamp, Jr., is working with the local golf course superintendents and the University of Illinois to develop some test plots to determine the feasibility of using the effluent for turf grass irrigation. Should the tests prove positive, as anticipated, the North Shore Sanitary District will install a water main to carry the effluent water along its right-of-way to supply water for irrigation purposes to the golf courses, parks and other recreational facilities within its jurisdiction.

According to Kottcamp, the situation in the area is becoming critical. As the population of Chicago's northern suburbs continues to increase, so do water needs increase. However, they are limited by law as to the amount of water that can be drawn from Lake Michigan, as this water does not return to the lake but through the Chicago River system feeds to the west into the Mississippi basin.

With this limitation in the amount of available water, the Sanitary District is looking for alternate sources for irrigation use, to supplement its supplies and meet the growing demand.

The turf plots at the new Clavey Road sewage treatment plant will be maintained by the staff of the Northmoor Country Club and tests will be made and evaluated by the University of Illinois. We were privileged to assist in the design of the plots and local contractors and suppliers have volunteered their services to assist in the project. We feel that this research being done by the local people at the grass roots level is the type of thing that all communities should be doing.

Probably the greatest achievement in the history of mankind has occurred in our lifetime. Man has gone out into space, walked on the moon, and returned to tell about it. And we have had the privilege of watching the whole thing on our television sets. One of the most stirring things to come out of the space program was the picture of the planet Earth taken by the astronauts

from space. It has made us realize that this beautiful and fragile sphere on which we exist is really Spaceship Earth and its care has been entrusted to us. Our responsibility is to use it, enjoy it and leave it better than we found it. But water is the primary source of life on this planet — there is no new water; only recycled water.

NOTE: Richard Nugent is a member of Killian and Nugent, Inc., a golf course architectural firm located in Long Grove, Ill. This article is based on a presentation made by Nugent at the GCSAA Turfgrass Conference in Atlanta in February 1979.

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Everglades Elects Officers

The Everglades G.C.S.A. has elected officers for 1979-80. Elected were: President, Bob Sanderson, C.G.C.S., Port Charlotte Golf Club; Vice President, Clint Smalridge, C.G.C.S., Royal Poinciana C.C., Naples; Secretary-Treasurer, Virgil Petty, Golden Gate Golf Club, Naples.

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