



# HOW TO HANDLE A WATER SHORTAGE

You would think the exclusive, internationally known Valley Club of Montecito, Calif. would not have a problem in the world. At least not a serious one. It has what must be one of California's most beautiful golf courses, which lies along the gently rolling foothills of the Coast Range very near the Pacific Ocean. Clusters of magnificent oaks and sycamores line the undulating fairways of the 100-acre course, which is modeled after St. Andrews of Scotland. The Valley Club course is never crowded, its 350 members being well-to-do, influential people who insist on privacy and the freedom to play golf far from crowds.

The rich rural community of Montecito which adjoins Santa Barbara enjoys one of the most favorable climates in the country. Coastal moisture, plus cooling summer fogs and an average of 17 inches of rainfall annually. When the temperature reaches 80 to 85 degrees, Montecito's residents imagine they are having a hot spell.

This idyllic countryside does have a problem, one shared by the Valley Club and the community of Montecito. Both are suffering from a sudden shortage of water, a moisture famine that is likely to become more severe. Water is rationed. Violators face fines and even jail terms. At present homes cannot be built in the area, which is served by the Cashuma Dam reservoir to the

west. The region has been developing rapidly and there is heavy use of water for agriculture.

Golf superintendent Don Lokey of Valley Club is facing the problem head-on. He saw the possibility of a water shortage more than two years ago while planning a new irrigation system for the course.

"We asked that the design of our new system include the ability to cut back to meet such a shortage," he recalls. "But we didn't think it would come this quickly."

Now Lokey has been handed the not entirely welcome opportunity to test his theory that "golf courses in general get too much water." He will try to find out how little water he can get by with without having bad looking turf. The research project should be of considerable interest to golf superintendents everywhere.

Lokey's first step is calibrating all parts of his new irrigation system so that he will be able to control accurately its water output and can link the output accurately to the meter reading. He must know this, he emphasizes, in order to learn how little water he can use to maintain his green golfing pastures. Among the devices he is using to get his answers are calibrated cups, like rain gauges.

Lokey, who originally was an ornamental horticulturalist and became a golf superintendent by acci-

dent, has an engineering turn of mind. He came to Valley Club more than three years ago to help plan the new irrigation system. The decision to replace a golf course irrigation system is a major one. But it wasn't too difficult to make in this case. The old, patched-up system was wearing out and getting too unwieldy.

It had been installed in 1929 and was designed on the old principle, Lokey recalled, "that you watered only tees, landing areas just before the greens, and the greens. There was very little sprinkler coverage and you relied a lot on the coastal dampness."

As it became necessary to water more and more of the course, including the fairways, extensions were added to the old cast iron pipe system. All kinds of sprinkler heads were used. Gardeners worked night and day to maintain watering schedules. Labor and water costs mounted. Then came early warnings of a possible water shortage. A new, much more efficient irrigation system became mandatory.

"To get the accuracy in the system that we considered necessary," Lokey said, "we asked all manufac-

*A battery of rotor pop-ups operating on the sixth fairway at Valley Club in Montecito, Calif. Each fairway has its own separate automatic controller.*

turers we felt were reputable to send us samples of their sprinkler heads. We said we'd like to test them.

"We took each head and set it at the manufacturer's recommended pressure. Then we took a vessel, turned the head upside down in it, got a stopwatch, and turned on the water to the recommended pressure. We watched to see how many gallons came out.

"One of the heads missed its mark by 25 percent! How can a de-

sign engineer for an irrigation system take those specs and be successful?

"From the tests," he said, "we selected our system. The selection was based on the performance of the company's head. It produced the amount of water it was supposed to."

Then the company was given the task of designing the irrigation system. It was decided that 1,228 sprinklers would be required to ade-

quately cover the course. There was much discussion over how far apart to space them. This is interpreted as the irrigation ratio. Common but poor installations have ratios as high as five to one Lokey said. This means that for every inch of water you put on the dry spots, in a typical pattern of four sprinklers, you must put five inches on the rest of the turf. Many systems are four to one, which is not much better.

The ideal, according to Lokey, is one-and-a-half to one. But that's about impossible to achieve with the present design standards. The new system at Valley Club is two to one. A group of four sprinkler heads farms corners of a rectangle 60 by 70 feet on a side.

Lokey would like the spacings to have been closer than 60 by 70 feet, but he acknowledges that his two to one system is surprisingly effective.

The Formost Construction Company of Venice, California, contracted to install the new system and was able to do so without shutting the course down. Plastic pipes were laid throughout, the largest mains being eight inches in diameter and the smallest, four. The pipe was laid three feet deep. Some of the digging was rugged. Many rocks had to be removed.

The new system was designed by Rain Bird Sprinkler Mfg. Corp., Glendora, Calif. to irrigate more than 100 acres of turf. Pressure is maintained by a booster pump with a capacity of 1,350 gallons per minute. It is expected to boost 75 psi water from the main Cachuma line to 105 psi, but Lokey admitted he has not yet achieved this goal.

When the rationing program was instigated after the new irrigation system had been installed, it sounded at first as if the Valley Club would be getting a generous allotment of water. The amount was to be based on the amount of water used over the years. This turned out to be less than bountiful. The meter on the old system had been faulty. And, as Lokey explained, when water meters go awry, they don't give you less water than they record, but most often much more.

Thus the Valley Club historically used more water than it is now allowed — which is 200 acre feet a year. It's apportioned into three-



Valley Club superintendent Don Lokey testing moisture level with a moisture sensing instrument to determine water required for the next irrigation cycle.

month blocks that cannot be carried over. If they could, Lokey is certain he could work more effectively with the rationing schedule.

"I sympathize with the water department," he declared. "We'd voluntarily curtail our present amount of water rather than let the community run short — even though it's painful. And it is painful."

Lokey and his club committees have taken the rationing philosophically.

"We've had shortages before and survived them," he said. "And we can do it again. During one shortage only the tees and greens were watered."

Lokey is convinced that with the new, more efficient irrigation system and tensiometers he can make it. He has the advantages of humidity, little evaporation, and a variety of fairway grasses that have been allowed to grow and mingle as they wish — bluegrass, bent and Bermudas. They grow in Montecito beautifully. There also is some native annual bluegrass that does very well. The greens are all of seaside bent; they were planted forty years ago. The grasses don't require heavy watering because of the mild climate.

After it was installed, Lokey began calibrating the new system immediately so that the water output would agree with the meter reading. He makes daily checks of the amount of water used.

"We're coming pretty close to knowing how much water we're putting on," he commented. "Our rain gauge-like calibration cups are helping."

As far as depth of watering, Lokey isn't interested in getting it eight inches deep. His turf doesn't have roots down there. But he is interested in three inches, and wants to keep things moist at least to that depth. The Montecito soil is good at holding moisture, unlike the sandy soils of many desert golf courses.

At present, the watering periods are two cycles of 20 minutes each every other night. The whole course gets this amount, which in summer is about .84 of an inch a week.

"I can go our right now and find a dry spot, put tensiometers on it and get virtually zero," Lokey says.



*Clubhouse complex at Valley Club in Montecito, Calif.*

"On a couple of them now I'm getting five centibars. I can get along beautifully with 20."

There are indications that he can reduce his water. But he doesn't want to cut back to the point where he's creating dry spots.

"On the average course where you find a dry spot, you just turn up more water," he said. "That's just a cover-up."

To make certain he stays well within his ration quota, Lokey has turned off sprinklers at the edge of fairways and in the roughs. Of the total of 1,228 sprinklers, he has cut off 286, explaining: "I'd rather have an area completely dead and try to balance the rest of the system so the parts that are watered look good."

As for the course's many great trees, they do better without watering. In fact, over-watering the course fosters the growth of fungus at the base of the tree trunks. Lokey's men are careful to keep the base of the trees as dry as possible.

"All courses have dry spots," Lokey said. "And when the greens committee jumps on a superintendent for this, he turns on more water. That ends the dry spots for a time, but it over-waters the course. Pretty soon you're standing with mud on one leg and dust on the other. The big problems are underpressure of water and over-spacing of sprinkler heads."

The spacing of heads of the key

to a successful irrigation system, according to Lokey.

Many system designers will space the heads too far apart so that they can bid a lower price for the system. It's the competitive thing.

He thinks golf management is willing to pay a higher price for well-spaced heads if the sales people would explain to them that they would save in the long run on water and labor. Clubs don't want to have to try to cover up for a poor system by over-watering. The original cost of additional sprinklers and pipe is soon made up in savings in water. And where water is scarce, there is additional incentive for an efficient water system because it saves water. The irrigation equipment is excellent and can perform much better with well planned installations.

Lokey thinks the locations of sprinkler heads should be determined with transits, instruments that civil engineers use. This isn't done. The common practice is to line up the sprinkler sites with the eye and plant flags on the selected sites. Sprinkler heads located by that method invariably are off by a few feet and that can upset the pattern, he said.

One thing appears certain. The Valley Club's irrigation system will be one of the most efficient in the country when Lokey completes his research project. And not many systems will be as well understood. □