

'LOVE THAT DIRTY WATER...'

Improvements in treatment have made reclaimed wastewater a viable source of irrigation water, and a way to conserve valuable freshwater supplies.

The lyrics "Well I love that dirty water..." from the Standells' 1966 hit song "Dirty Water" were 20 years ahead of their time. More than a few landscape and turfgrass managers will be singing it soon.

The use of dirty water, commonly known as effluent or recycled water, is a growing trend in a country that is wasting water resources at an alarming rate.

The use of recycled water is not a new concept, but only in the last five or 10 years, with the advancement of waste treatment technology has its

widespread use gone beyond discussion and into common practice.

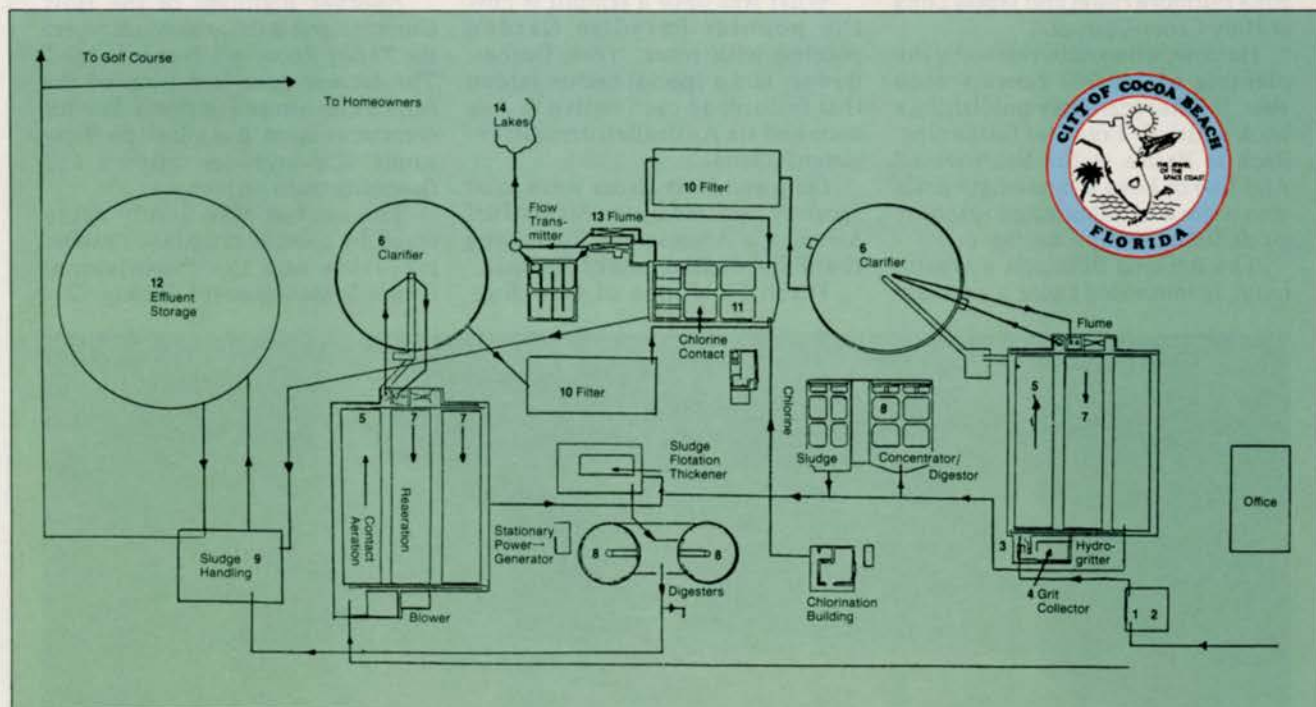
For now, its use is mostly on golf courses, though effluent use is spreading to parks and residential landscapes as water supplies become more scarce.

According to Toro vice president James R. Watson, Ph.D., 10 years ago about 70 to 75 golf courses in the entire country were using effluent irrigation. In California alone, notes Roger Lindholm of the California Department of Water Resources, at least that many courses were using effluent by 1985.

Water re-use in Florida is equally extensive. The 160 wastewater recycling projects in the state have a capacity to pump 380 million gallons per day (mgd). Of that total, golf courses account for 61 percent of the small systems (under 1 mgd), landscaped areas five percent. Of large systems, golf courses and landscaped areas account for 24 percent each. The balance in each case goes to fodder and direct consumption food crops.

One of the benefits of using reclaimed water, besides saving existing supplies, is its nutrient content. Most supplies have their share of ben-

DIAGRAM OF PLANT OPERATIONS/COCOA BEACH'S WASTEWATER TREATMENT PLANT



KEY

- | | | | |
|----------------------------------|--------------------|-----------------------------|--------------------------------|
| 1. Wet Well | 4. Grit Chambers | 7. Reaeration Tanks | 10. Automatic Backwash Filters |
| 2. Main Lift Station | 5. Contact Tanks | 8. Aerobic Digesters | 11. Chlorine Contact Chamber |
| 3. Filter Screen and Aqua Guards | 6. Main Clarifiers | 9. Sludge Handling Facility | 12. Effluent Irrigation System |

eficial nitrogen and phosphorous.

But a major problem with effluent, says Iowa State University professor Mike Agnew, Ph.D., is that a pipeline needs to be established to pump it. "If a superintendent has a problem with getting (fresh) water and he's close enough to a treatment plant, he could use effluent," Agnew says.

However, notes Lindholm, "It is expensive to put in a separate system for transport."

Effluent is not completely pure, or drinkable. But with proper treatment and filtration it's pretty close—about 99.9 percent pure, according to Watson.

"The source is the determining factor in its value," Watson says. "The biggest problem is public acceptance."

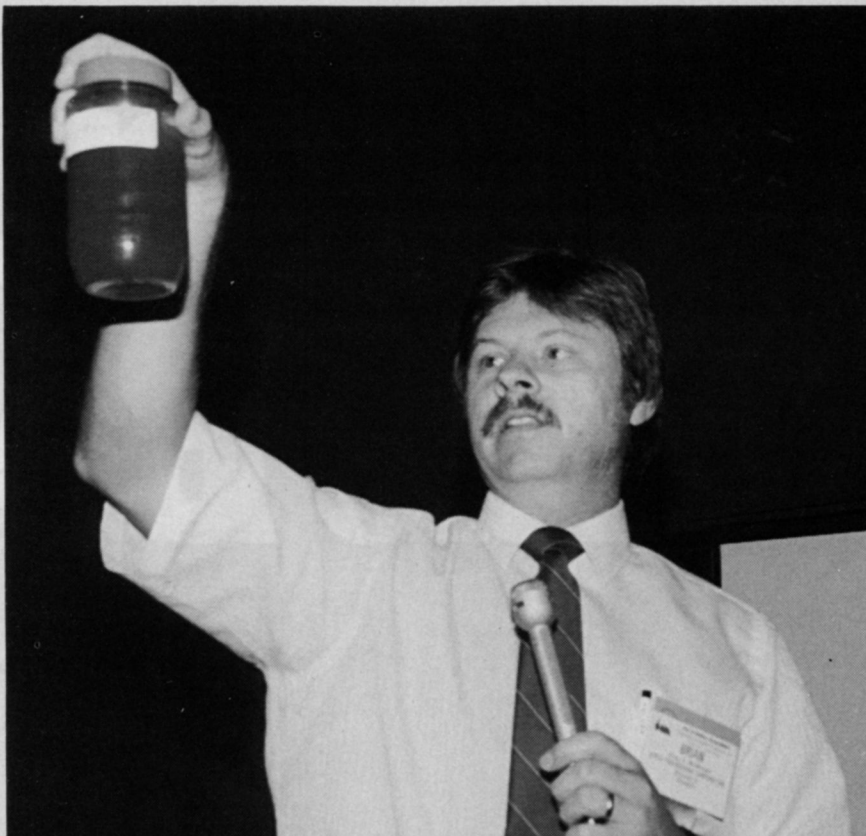
Brian R. McMahon, P.E., of Boyle Engineering Corp., which constructed Florida's huge Conserv II wastewater treatment plant, concurs.

"The public's lack of knowledge about the nature of reclaimed water can make the prospect of irrigating a community's golf course, lawns or food supply with wastewater an unattractive one," McMahon says.

"However," he continues, "knowing the process by which the waste product you flushed down the drain today becomes a valuable resource tomorrow can be the first step in making rational decisions about reuse."

Wastewater can go through several stages of pre-treatment before use, depending on where it will be applied. The first involves screening and settling of large solids from the liquid stream with minimal removal of dissolved or suspended solids. This is generally not acceptable for re-use because of the possibility pathogens remain in the water.

Stage two includes primary plus biological treatment to further remove suspended solids, break down



McMahon: "Treated water in many respects can meet drinking water standards."

organics and remove some dissolved solids. The finished product is then disinfected, usually with chlorine.

According to McMahon, secondary treated water is acceptable in areas restricted to access by the general public.

Tertiary treatment, for areas of full public access, includes sand filtration and chlorination to achieve higher levels of solids removal and disinfection.

"To achieve high level disinfection as defined by the Florida Department of Environmental Regulations," McMahon explains, "the treated water must contain no detectable fecal coliforms. This requirement is quite stringent and usually results in a clear, odorless reclaimed water that in many respects can meet drinking water standards."

Safeguards

Despite filtration, considerations must be made for pumping and storing effluent water. "Exposure to humans must be considered," Lindholm says. "Irrigate at times when humans wouldn't be exposed."

Storage areas (usually ponds or tanks) must be kept circulated to avoid stagnation. Effluent is potentially corrosive on non-plastics and can clog valves and sprinkler heads if larger particles are present. Dissolved salts can also corrode metal parts.

However, Watson says, when treated effluent is used, remaining impurities are filtered out by the turf. "Turf is a great filter," he says. "It permits water to percolate into the soil and back into the groundwater in a very 'pure form.'"

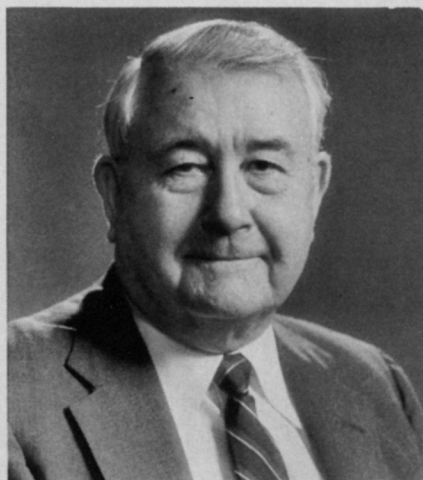
Agnew stresses, though, that "you have to monitor it at all times for salt content." But he adds that filtration processes usually take care of the hazardous salts. He notes that one golf

Storage areas (usually ponds or tanks) must be kept circulated to avoid stagnation.

course in Iowa uses effluent that actually has a lower salt content than the town's "fresh" water supply.

"We feel that this is an efficient way to use the water supply," Lindholm says. "In California, we encourage water agencies to re-use the water supply. We think that its use should be increased, and we think it will be."

"It's a great source of water," Watson agrees. "It's an economic way of dispersing wastewater. It permits grass to be grown in areas where it otherwise wouldn't be grown." **LM**



Watson: "Turf is a great filter."