

## Recycled Irrigation Water for Sale

Probably one of the earliest examples of recycling is told in the Egyptian myth about the phoenix—the lonely bird living in the Arabian desert—that renewed itself from its own ashes every 500 or 600 years.

Some sort of parallel can be made between that bird and the modern city of Phoenix that will soon be renewing its "used" water for use as irrigation.

The city will be utilizing

methods researched since 1967 by U.S. Department of Agriculture (USDA) scientists on a pilot project dubbed Flushing Meadows. USDA's Agricultural Research Service (ARS) set up the research project in cooperation with the Salt River Project—the main local irrigation district—the Environmental Protection Agency (EPA) and the city of Phoenix.

One of the great things about

the Phoenix Wastewater Reclamation Project is that the water will not only be safe for irrigation but will meet requirements for unrestricted recreation use as well.

Predictions on a national scale are that multiple reuse of water will be necessary by 1980 when water consumption for all uses in this country will equal or exceed the recoverable streamflow and ground water supply. Phoenix is getting ready.

The EPA-financed treatment facility may also serve as a model for other cities with sewage disposal and water shortage problems.

The Roosevelt Irrigation District (RID) near the city will buy the Phoenix reclaimed water at about half the price of RID's present operating costs which are about \$5.00 per acre foot. The District already is in a sort of bind since it "mines" its water from dwindling underground supplies. The overworked pumps operate on a rotation cycle of 21 days to pump nearly 153,000 acre-feet of water annually to supply some 38,000 acres. The restricted cycle sometimes leaves a considerable acreage without water during the peak of the irrigation

season.

By this time next year, Phoenix expects to have 20,000 acre-feet a year of the reclaimed water coming off a 40-acre land infiltration site downstream from its sewage treatment plant. If that works out, there are 80 additional acres that can be used for other infiltration basins.

While the 20,000 acre-feet is only about a seventh of the annual usage of RID, it is enough to ease the pressure on the pumps and even bring on more intensive cultivation of crops in the District.

At Flushing Meadows, on the Walt River flats, it was learned that under favorable soil and hydrogeologic conditions, infiltration basins can cleanse 300 acre-feet or more of secondary sewage effluent per year per acre of filter for unrestricted irrigation, recreation or other uses. Secondary effluent is the final product of most present day sewage treatment plants.

One of the key men in the reclamation project is Dr. Herman Bouwer, ARS hydraulic engineer who heads the U.S. Water Conservation Laboratory at Phoenix. It was he and his fellow scientists who developed the Flushing Meadows studies

and from that work Dr. Bouwer drew complete plans for the Phoenix project.

Infiltration basins use nature's methods of reclaiming waters. The filters are grass covered or bare soil shallow basins that when flooded allow the soil, percolating deep beneath the surface to the underground water supply. The plants, soil, soil microorganisms (bacteria) and length and time of underground travel all aid in removing nitrates, phosphorous, fecal bacteria, virus and organic waste matter from the water and by the time it is pumped from the ground it has become sparkling-clear renovated water.

The 40-acre Phoenix Reclamation Project site will be divided into four 10-acre plots by earthen dikes. In the center dike of the project will be several large wells. The basins will be inundated with effluent which will filter down about 50 feet beneath the surface and then travel horizontally from 10 to 500 feet to the wells in the center. The water will then be pumped into RID irrigation canals for use on crops. Total underground time will be about three weeks.

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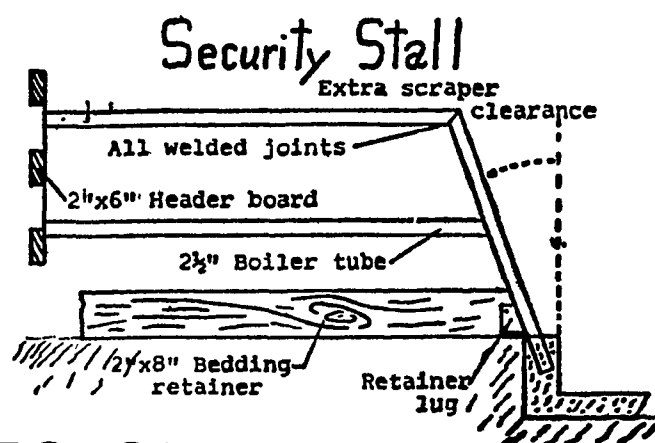
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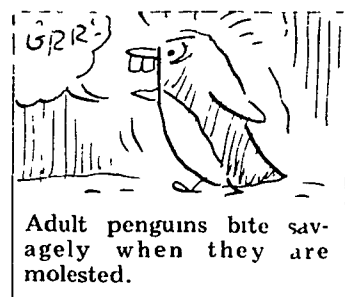
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When all the wells are operating, it is expected that then 20,000 acre-feet will be coming from the project each year.

Dr. Bouwer estimates that a plant-soil filter system of about 1,000 acres could handle all of the secondary effluent from Phoenix and adjacent cities—a projected 300,000 acre-feet annually by the year 2000. What's more, the reclaimed water is less costly than most water purchased or pumped by irrigation districts. Cost of chemical treatment to produce renovated water of similar quality would be at least \$50 per acre-foot.



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