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Why Not Reuse?

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Why do we send all the water we use--no matter how clean--straight to the sewer?

Why do we use pure drinking water to flush toilets? Wouldn't soapy water from bathtubs or laundries do just as good a job?

Why don't we use shower water or laundry water to irrigate lawns and gardens? Wouldn't that water have nutrients beneficial to growing plants?

These questions and others were asked and answered during a severe drought in the Western United States in the 1970's. Many Californians installed some type of home reuse system when public water supplies failed. Because of water rationing, they reused water to protect their lifestyle and property by watering their lawns with bath water and saving laundry water for toilet flushing.

Researchers who studied the reuse systems installed in California reported that home water reuse is technically feasible and environmentally sound. Home reuse is also becoming more economically attractive, according to the researchers, because of rapidly increasing energy costs.

How about a reuse system for your home? Most components to build simple reuse systems using bath or laundry water are available from swimming pool supply houses or hardware stores. Local building codes will have to be changed in some Texas cities before such reuse systems would be allowed. State and federal laws, however, do not discourage home reuse systems. New federal laws requiring water conservation will probably even speed the acceptance of home reuse.

You can order an excellent book on recycling systems: Residential Water Reuse by Murray Milne. The book is available for $10 from the California Water Resources

Center, University of California, Davis, California 95616. This recently published book details the various ways to collect, store, treat, and distribute wastewater. It suggests dividing household wastewater into two categories: graywater and blackwater. Blackwater is any water carrying human wastes which should go directly into the sewer system. Graywater is all other household wastewater.

The most effective way to recycle water within the home, according to California researchers, is to eliminate the need for treatment between uses. This can be done by "cascading" water in a sequence of uses. Water from a shower, for instance, might be reused in a washing machine, then in a toilet.

Another way to reuse water without treatment is to recycle it in the same appliance. Recycling has long been practiced by homemakers with "suds saver" attachments on their washing machines. Swimming pools, in effect, also recycle water by filtering and returning water rather than adding fresh water.

Laundry and bath water can be reused without treatment for flushing toilets. It is more esthetically pleasant, however, to at least add color and deodorizer to the wash water. Soap and detergent do not need to be filtered out because they add to the efficiency of water used for toilet flushing.

Home reuse systems are certainly not practical for everyone. They should at least be considered, however, by those building new homes. Homeowners in areas susceptible to emergency water shortages either due to drought or inadequate supply systems will also find reuse installations worth considering.

Twenty-five percent of all American homes have no public sewer system available. Homeowners with onsite sewage treatment systems--usually septic tanks--postpone or eliminate replacement costs by simply reducing the amount of wastewater produced in their homes. Reusing graywater is a good way to reduce wastewater.

Urban growth places extreme demands on existing water distribution systems. Many cities cannot keep up with the pumping, piping, and storage facilities to meet demands. Home reuse is an attractive alternative to (1) rate surcharges, (2) penalties for excessive use, (3) connection prohibitions, (4) building permit moratoriums, or (5) water rationing.

Because energy is a major expense of distribution and treatment of municipal water and sewage systems, energy shortages will mean more interest in home reuse. Experts promise that energy shortages are certain to force stringent water conservation programs in the future. Onsite water reuse systems require virtually no energy input and are therefore reliable and cost-effective alternatives for an energy-short future.

The Texas Department of Water Resources (TDWR) looks at residential reuse as a promising way to stretch present supplies of state water. The state planning agency reported in 1977 that using graywater for flushing toilets could mean significant savings in home water use. If recirculation of graywater for toilet flushing is instituted in 20

percent of new homes built after 1980, according to TDWR, 35,000 acre-feet could be saved in the state annually by the year 2000. This figure would jump to 120,000 acre-feet savings by the year 2030. Even though these dates seem far into the future, water development projects take at least 20 years to plan and construct. More than likely, most plumbing systems installed today will still be in use in the year 2030.

Checking into Reuse

One of the best examples of residential water reuse is not in a home, but in a motel.

When planners for a new La Quinta Motor Inn found what they considered the right location for an inn in College Station, Texas, they were faced with a major problem. The city sewer line was not adequate to handle the volume of wastewater produced by the planned inn. Not only would the motel have wastewater from each of 114 bathrooms, but from all of the laundry operations each day as well.

The motel planners had two alternatives. They could select another location for their motel, or they could reduce the amount of wastewater which would enter the sewer.

La Quinta management chose to build on the original site which faces the Texas A&M University campus. They promised the city of College Station, however, that wastewater volume would be less than half that which would normally flow from an inn of that size. The inn opened in January 1980 with a unique graywater treatment system which meets all city health and building codes. The system has indeed reduced water demand and wastewater volume by more than 50 percent.

All water from sinks and showers in the inn's 114 guest bathrooms is piped to four underground tanks. Each tank holds 10,000 gallons of the used water. The graywater is filtered and disinfected with chlorine, then piped to the laundry area where it is used to wash an average of 500 pounds of towels and sheets each day. From the laundry, the water goes back into the graywater storage tanks. There it is filtered, chlorinated, colored, and scented before being piped into each bathroom for toilet flushing. The colored and scented water is also used for watering landscaped areas around the motel.

The new system has meant many additional headaches for veteran La Quinta manager Charles Shaddox. Some of the problems he has faced in the three months of operation are:

- Frozen pipes in February causing a complete breakdown of the system.
- Malfunctioning chlorine dispensers.
- Algae problems in the distribution system.
- Clogged filters requiring caustic backwash.
- A backup freshwater system not yet approved by the city.
- Problems with automatic and hand-operated valves, gauges, meters, and switches.

Shaddox, however, has received few complaints from inn guests. When told that the water used to flush the toilet is treated graywater, guests generally respond: "That's a good idea."

Shaddox agrees that it is a good idea even though the system has meant extra problems in opening a new inn. As far as he knows, it is the only reuse system installed in a motel, so he has no one else's experience to help him. Most of the equipment is supplied by Culligan Water Conditioning, however, and he has relied heavily on their long years of water treatment experience.

Shaddox has learned in the three months the inn has been open that he will never have to worry about having too little graywater. Guests regularly use far more water in the showers and sinks than they do for toilet flushing. This is in contrast with studies of California homes where almost half of water used inside was for toilet flushing.

The inn's water bill has been about one-third what it would have been if the reuse system had not been installed. Shaddox quickly points out, however, that the graywater treatment system does not mean an economic savings to the inn. The system itself cost over $100,000. It is too early to know what maintenance and chemical costs will be each month, but they will probably offset any saving in water costs.

The manager feels, however, that the system will eventually require little maintenance and surveillance. For now, though, he stays very busy with the one-of-a-kind reuse system.

As he works with water reuse, Shaddox may be solving more than specific operation problems. More than likely he is working on solutions which will help Texans face future water shortages.

Why Not, Indeed?

We've said it before, but it is worth repeating: If we cut household water use, we can stretch Texas' dwindling water supplies for years to come. We will also keep our cities from having to build larger distribution and treatment systems. . . or from needing new reservoirs or wells.

The state's total dependable water supply is about 15 million acre-feet annually. We're already using more than this each year (about 17 million acre-feet) by pumping more water from underground reservoirs than nature replaces. The Texas Department of Water Resources estimates that if present water use and population trends continue, Texans will need as much as 27 million acre-feet annually by the year 2000.

Recent issues of Texas Water Resources have encouraged you to save water in your home and yard. How are you doing? Do you have a flow control in your shower? Have you measured the water you put on your lawn? What about a plastic bottle in the toilet tank to save a gallon or more each flush?

These water saving tips presented in past issues have been small in comparison to the reuse systems suggested this month. While reuse means money and effort on your part, it also means BIG savings in water use and wastewater volume.

Keeping Up With The Squeegees

The Squeegees are a family of watersavers introduced by the Institute this Spring. Ways they save water are presented on a colorful, house-shaped box. Boxes have been distributed to civic leaders and science teachers throughout Texas.

If you would like to keep up with the Squeegees in saving water, energy, and money, write Texas Water Resources Institute, Texas A&M University, College Station, TX 77843 for a free box.