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Questions answered

By Sherry Seethaler
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QUESTION: There has been coverage in the newspaper about a project of recycling wastewater to make it drinkable again. If purifying wastewater is a lengthy and costly process, wouldn't it be cheaper to do the same thing with seawater? Add to that the mental health (aspects) associated with the concept.

– Eddie Endo,
Chula Vista

ANSWER: It may seem surprising, but according to the City of San Diego Water Department, it currently costs about two times as much to desalinate seawater as it costs to take the same quantity of water "from toilet to tap." The reason is that ocean water is about 25 times saltier than the starting point for recycled water.

Because removing dissolved salts is the most energy-intensive step in producing drinking water, the more salt in the water, the more energy required to remove it. Salt removal is accomplished either via distillation, or more commonly, reverse osmosis. In reverse osmosis, water is pushed through a membrane that allows water molecules through, but not the dissolved salts. It costs around \$800-\$1,000 to desalinate enough water to meet the needs of two to three households a year. This does not include the costs of pumping seawater to the desalination plant, or distributing drinking water to customers.

San Diego imports about 90 percent of its drinking water from Northern California and the Colorado River. As the costs of alternative sources of water rise, due to drought and increased demand, desalination will become a more viable option. It already has in the Middle East, which is home to about 60 percent of the world's desalination plants.

In the U.S., direct recycling of wastewater to drinking water is not accepted practice, probably for the psychological reasons you mention. On the other hand, indirect recycling of wastewater into drinking water is common. For example, cities upstream discharge treated wastewater into rivers that serve as the drinking water supply for cities downstream. Also, in some places, including Los Angeles and Orange County, recycled water is used to top up underground aquifers that supply drinking water. Recycled water does not contain levels of bacteria, heavy metals or organic compounds that exceed drinking water standards. However, levels of dissolved salts are higher than those in the drinking water supply. In San Diego, recycled water is used mainly for irrigation. Some new high-rise buildings are being built with a dual plumbing system via

which the city supplies recycled water for flushing toilets. The dual system adds around 10 percent to the cost of installing plumbing.

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