chat room

"It appears that utilities are beginning to take the long view toward total water resource management instead of looking at quick fixes to dwindling supplies."

—*Jack Hoffbuhr*

# What's Driving Water Reuse?

**RISING POPULATION AND DEMAND, DWINDLING SUPPLIES, AND DROUGHT ARE A FEW OF THE FACTORS DRIVING WATER PURVEYORS TO EXAMINE ALTERNATIVE MEANS OF AUGMENTING SUPPLIES.**

*At a meeting in Denver, Colo., in October 2003, AWWA Executive Director Jack Hoffbuhr led a discussion regarding trends in water reuse. Participants in the discussion included Ed Archuleta—general manager, El Paso Water Utilities, El Paso, Texas; James Crook—water reuse consultant, Norwell, Mass.; Michael Gritzuk—water services director, City of Phoenix/ Water Services Department, Phoenix, Ariz.; Gary Lynch—vice-president water quality, Park Water Co., Downey, Calif.; Andrew Richardson—principal, Greeley and Hansen, Phoenix, Ariz.; and Joseph V. Towry—assistant director, Water Resources Department, City of St. Petersburg, Fla.*

**HOFFBUHR:** *Do you believe that water reuse is becoming more common in the United States? Is this growth regional or local in nature? Is reuse increasing at the international level as well?*

**LYNCH:** In California we're recycling about 500,000 acre-ft a year. The long-term goal of the 2002 California Recycled Water Task Force is to triple that amount by 2020. We have ambitious plans to increase recycling in our state.

**CROOK:** Interest in water reuse is increasing everywhere, including along the East Coast. While reuse is well established in Florida, Georgia, and the Carolinas, other states, such as Massachusetts and Virginia, have recognized the need to consider reclaimed water as a resource and are in the process of developing criteria in support of water reuse.

**GRITZUK:** Many cities in the Phoenix, Ariz., region want to have a water reclamation plant built in the area. The plant would basically be a localized wastewater treatment plant that recycles or reclaims wastewater for irrigation purposes. We are envisioning a heavy reliance on reclaimed water in the future. That's primarily because we are running out of traditional sources. We will have to turn to alternate sources to meet demand.

**ARCHULETA:** This sounds quite similar to our situation in Texas. The state water plan calls for using the water we have versus developing new reservoirs or undertaking huge water projects. Because we've been reclaiming water for some time and the public is educated about the benefits of doing that, reclamation and reuse are accepted practices in our state.

**HOFFBUHR:** *The WateReuse Association figures that 90% of all water reuse takes place in California, Arizona, Texas, and Florida.*

*I think we'll continue to see an increase in this trend throughout the United States, as we're beginning to in the mid-Atlantic states. It appears that utilities are beginning to take the long view toward total water resource management instead of looking at quick fixes to dwindling supplies.*

**RICHARDSON:** There's also a lot of interest in treating brackish groundwater. Desalination plants are springing up like popcorn all along the coast of Florida. Of course, with desalination there's the brine issue that has to be dealt with. It could be as much as 70% of the cost of treatment.

**GRITZUK:** I definitely see more movement now toward desalination of seawater in coastal areas, along with increased interest in desalination of brackish water in areas such as Texas and Arizona. We are looking closely at studies examining this technology.

**LYNCH:** I see that in California as well. The growth in seawater desalination has been phenomenal. Many pilot projects are being proposed up and down the California coast, all the way from San Francisco to San Diego. I think this is a diversification of the water portfolio that's badly needed.

**TOWRY:** I agree, but there's still the issue of what to do with the concentrates generated by membrane processes. Regardless of why a utility selects membrane filtration, we have to figure out how to handle the waste products from these processes.

**ARCHULETA:** You're right. We're in the midst of designing a 27.5-mgd plant in El Paso that will treat brackish water. Our main concern after the pilot-plant studies were conducted was what to do with the waste. We chose deep well injection as the solution. Of course, we'll have to go through the permitting process to do that, but this is a technique that's been used in the oil and gas industry for years. It seems to be the best alternative for disposal. As for desalination, a number of us in El Paso, Phoenix, Tucson, Scottsdale, Las Vegas, and numerous California cities are involved in a multistate coalition to map out how we'll handle this issue—all the way from research to application to waste disposal.

**HOFFBUHR:** *What do you see as the drivers in this trend toward reuse and desalination?*

**RICHARDSON:** Certainly one driver will be economics just because of the energy costs associated with this technology. However, it's possible that the rising costs associated with producing potable water may make reuse an even more attractive alternative in the near future.

**GRITZUK:** Well, our major motivator is the fact that we are running out of traditional sources of water in our area.

**LYNCH:** Many water industry professionals are examining numerous alternatives in order to get more water resources for consumers in their communities. One thing I think we need to be mindful of as we work toward increasing our supply is the no-growth mind-set. A lot of people associate the acquisition of new water sources with growth, and there's a strong constituency that will fight source expansion regardless of the reason you're seeking additional supply.

Other drivers are technological advancements and reduced costs. Competition among membrane manufacturers as well as higher costs for developing new sources also contribute to making water reuse more attractive.

**CESARIO:** In Colorado, it's nearly impossible to build new dams, so we are concentrating on our right to reuse water to which we already hold rights. We're also in the seventh year of a long-term drought, so it's critical to take advantage of every option available for stretching your water supply.

**RICHARDSON:** There's also a potential issue we'll have to deal with regarding discharge standards to navigable waters. Right now, standards for wastewater treatment plants are so high that often the water being discharged from the plant is of a higher quality

**"We spend a lot of time on research and development, but we need to make sure that we're spending an equal amount of time on operations training."**

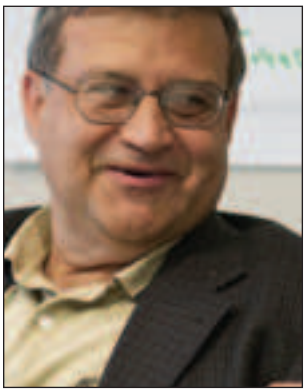
*—Andrew Richardson*

**"We need to make sure reuse programs are well-managed, with the utmost attention being paid to protecting public health."**

*—James V. Towry*

**"We need to do a better job of publicizing what we've done already in the area of reuse."**

*—James Crook*



**"Many areas overseas have a tremendous amount of experience with the membrane process; it's vital we communicate and work with each other on the issues involving water reuse."**

*—Ed Archuleta*

than the water in the river or stream. A possible future—and frightening—driver for reuse might be that we'll have to treat water to an even higher standard before discharge because of aquatic life protection, not just for preserving a drinking water source.

**TOWRY:** We also need to make sure reuse programs are well-managed, with the utmost attention being paid to protecting public health. One of the most important ways we can advance public acceptance of reuse is to make sure that those who manage these programs as well as those who perform the actual operations are well-trained.

**RICHARDSON:** Yes, I agree. These programs must be laid out very methodically. We spend a lot of time on research and development, but we need to make sure that we're spending an equal amount of time on operations training. We have to maintain our public health focus in the area of water reclamation as we have in other areas of water treatment.

**TOWRY:** I wouldn't be surprised to see a larger number of dual-distribution systems being built.

**LYNCH:** I believe many people are hesitant about dual distribution for domestic users because they're worried about cross-connections. There is also the issue of direct potable reuse, which may be 20 to 30 years out as people are worried about health effects. We'll have to educate people and provide them with scientific evidence of safety before this idea becomes readily acceptable.

**GRITZUK:** I also believe that direct potable reuse is farther out in the future. Even though there's a high demand now for reclaimed water for irrigation, it's not necessary to go to direct potable reuse at this point in time.

**RICHARDSON:** I'm beginning to see what I call "designer reuse" in industrial applications. There have been some situations in which companies have been able to get reclaimed water for half the cost of potable water. This could be a significant factor because industry uses a large percentage of our potable water supply. We also need to be clear about whether we're talking about indirect reuse or direct reuse such as irrigation, landscape watering, and industrial applications.

**CESARIO:** It seems that 100 years ago, the water wasn't as high-quality as it is today, but people still drank it. Since that time standards have improved, but now additional water supply is hard to get. Maybe we have to step back a bit and lower the standards for lesser uses such as irrigation. In the future, we might be looking at indirect potable reuse and eventually direct reuse.

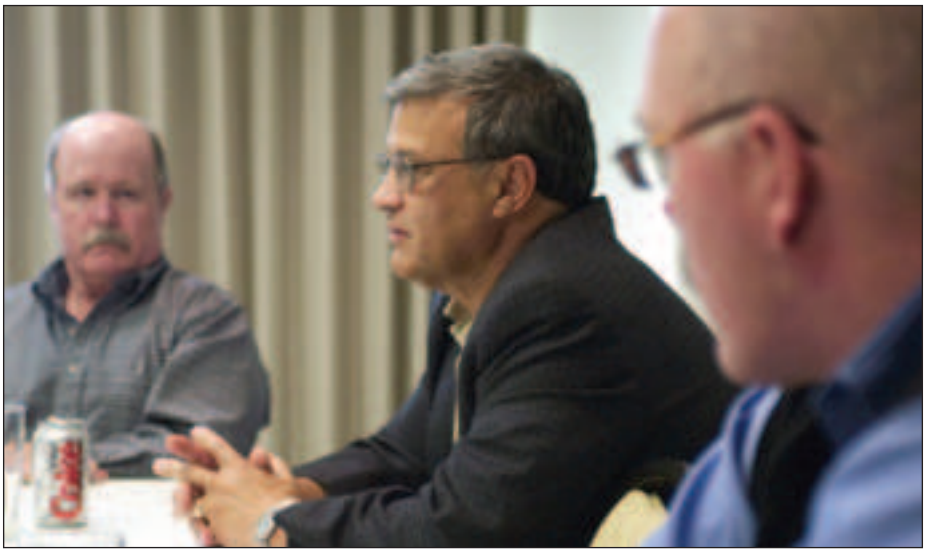
**LYNCH:** We'll probably also see a lot of movement toward the transfer of water from agriculture to cities. In California, we're already seeing metropolitan water districts and large water agencies making deals with the farmers to acquire some of the water that's used for crop irrigation. I think that as farming becomes more efficient, more water will be available for other uses. It seems to me that this kind of arrangement could become more common across the United States.

Also, earlier we mentioned the costs of reuse versus desalination, and I'd like to note that we've found that desalination might actually be cheaper than reclamation, even for applications such as parks, golf courses, schools, and so forth.

**CROOK:** I believe we need to do a better job of publicizing what we've done already in the area of reuse. It's been around for years, but many people think it's something new that we've just discovered as a way of expanding supplies.

**GRITZUK:** Well, that's one of the things that the WateReuse Association is going to do. One of the basic goals of that association is to educate people about the value of water reuse. The association has developed 10 case studies representing various projects that people can look at to determine what's being done, how it's being done, what experiences you can expect, and so on.

**RICHARDSON:** Do you think there will be an increase in the number of water reuse projects because of concerns about river and stream discharge requirements, NPDES permits, as well as the cost associated with treatment and disposal of membrane residuals?



**TOWRY:** Many of the early reuse projects were about convenience and disposal issues, but that's changed. In St. Petersburg our whole goal used to be achieving zero discharge into Tampa Bay, so disposal was our focus. By 1988, that focus had changed to reclamation. Now our focus is primarily conservation.

**LYNCH:** I think conservation is definitely a driving force. We've recently had a big problem in the Bay area getting acceptance for groundwater recharge with recycled water. We have to expand supply somehow, and conservation is our best choice right now.

**RICHARDSON:** Many efforts that were started up because of disposal issues have now changed because the focus has shifted to integrated water resource management. Is it clear who should run these reuse plants? Should they be run by water treatment plant operators or wastewater plant operators?

**TOWRY:** In many utilities, the same person who runs the water treatment plant runs the wastewater plant. So, in those cases, the answer is easy about who will run the reuse plant. Often, though, water and wastewater applications are under different management. I guess the bottom line is whether we treat our reuse applications as the ugly stepchild or as an equal resource.

**ARCHULETA:** In El Paso our indirect potable plant is part of our wastewater operations. For reuse we have a water reclamation engineer and a technician, and they deal with all the issues that pertain to that reuse effort. However, we have the operation and maintenance of the facilities on the water side of our utility operations because of water quality issues.

**HOFFBUHR:** *TheWateReuse Association did a survey that showed the public generally favored reuse operations being under the control of the water treatment side of the industry. To me that says the public sees water professionals as the guardians of public health and trusts them to maintain the safety of such supplies.*

**RICHARDSON:** What about desalination? Will it come under water or wastewater?

**GRITZUK:** It may be seen as both. I think operation and promotion will be on the water side, but it could be viewed as wastewater once you begin dealing with disposal of the waste streams. Also, we're close to the point that we won't be able to use reclaimed water to irrigate golf courses because of the high salt content, so it may be that we will have to desalinate before we can reuse the water. Many view reclaimed water as on the wastewater side and desalination on the water side.

**LYNCH:** There is also a concern regarding the long-term effect of brine discharges on the marine environment. A lot of organizations in Southern California are examining this issue right now. We thought we found a silver bullet in membrane processes, but I

**"It is critical for the industry to have a uniform approach to these issues whether we're talking to regulators, farmers, citizens, interested civic groups, or customers."**

*—Gary Lynch*

**"In the future, we might be looking at indirect potable reuse and eventually direct reuse."**

*—Lee Cesario*

guess we have to rethink that considering the brine problem.

**HOFFBUHR:** *How do you think we should proceed with this issue?*

**ARCHULETA:** This is an area in which we can work with our international colleagues to develop methods to deal with the brine concentrate. Many areas overseas have a tremendous amount of experience with membrane processes; it's vital we communicate and work with each other on the issues involving water reuse.

**GRITZUK:** I think it's also critical for us to involve our customers as partners. Our customers are more knowledgeable than they've ever been about water issues, and I think that trend will continue. Our job as water purveyors is to educate them about the product we provide and what it takes to get it to the quality we do. Our customers need to be a pivotal part of the decision-making process. If we're going to implement water reclamation or desalination processes, we have to engage the public early on so we can build a coalition together.

**TOWRY:** I think one thing we need to remember is that these are huge issues. They are related, yes. But it's important that we explore them separately so that people can gain a full understanding of what each issue encompasses.

**LYNCH:** I agree. It's critical for the water industry to have a uniform approach to these issues whether we're talking to regulators, farmers, citizens, interested civic groups, or customers.

**Roundtable participants included (from left): Gary Lynch, Lee Cesario, Ed Archuleta, Joseph V. Towry, Andrew Richardson, and James Crook. Michael Gritzuk participated via phone conferencing.**

*If you're interested in contacting one of the discussion participants, their contact information is given below:*

**Ed Archuleta**—general manager, El Paso Water Utilities, 1154 Hawkins Blvd. (79925), POB 511, El Paso, TX 79961-0001; earchuleta@epu.org

**Lee Cesario**—engineer, Denver Water, 1600 W. 12th Ave., Denver, CO 80204-3412; lee.cesario@denverwater.org

**James Crook**—water reuse consultant, 17 Woods Rd., Norwell, MA 02061-1238; jimcrook@msn.com

**Michael Gritzuk**—water services director, City of Phoenix/Water Services Dept., 200 W. Washington St., 9th Fl., Phoenix, AZ 85003-1611; michael.gritzuk@phoenix.gov

**Gary Lynch**—vice-president water quality, Park Water Co., POB 7002, Downey, CA 90241-7002; gary@parkwater.com

**Andrew Richardson**—principal, Greeley and Hansen, 426 N. 44th St., Suite 400, Phoenix, AZ 85008-7697; arichardson@greeley-hansen.com

**Joseph V. Towry**—assistant director, Water Resources Dept., City of St. Petersburg, 290 16th St. N., St. Petersburg, FL 33705-2012.