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Roundtable Series Examines Challenges, Benefits of Water Reuse

By Dan McCarthy

Greater cooperation and interaction among agencies working with water, wastewater and stormwater can ensure that water reuse gets the consideration it deserves as part of an integrated water portfolio. A more robust database that includes rigorous cost/benefit analyses and other factors would help decision-makers objectively assess where reuse fits with other supply alternatives in their own portfolio. As the marginal cost of alternative sources escalate and public views are influenced by quality of services and perceived consequences of different approaches, water managers will broaden their portfolio to consider programs such as water reuse that were not previously considered when cheaper or more accessible alternatives were available.

Those were key findings from a reuse roundtable that Black & Veatch held on June 23 at the American Water Works Association's annual conference, ACE10, in Chicago. This dialogue with invited media was the fifth in a series of six dialogues taking place globally over the last year. Seven water and wastewater industry leaders from the United States took part in the AWWA roundtable, which focused on the question "How do we overcome barriers to reuse as part of an integrated water portfolio?"

Peter Binney, director of sustainability for Black & Veatch's global water business, opened the dialogue by pointing out the wide spectrum of experience with reuse among the participants. These industry leaders came from geographic regions with rapidly expanding populations, from arid or water-stressed locations and from areas where water was plentiful. Some had well-established water reuse programs, whereas others were either starting down that path or were starting to consider the possibility of adding reuse to their portfolio. All were there to learn from their fellow leaders' perspectives and to expand their network of colleagues interested in water reuse.

A commonly voiced appreciation among members of the roundtable was for the opportunity to share approaches and experiences with their peer group. While technology and process advances are readily shared, it was noted that high value can be achieved through discussions related to barriers resulting from public perceptions, financing, responding to regulations and standards that may inhibit reuse projects and institutional support for Total Water Management approaches.

In answer to a journalist's question, the group began the discussion by laying out the following general definitions:

- Direct potable - pipe to pipe connection from wastewater treatment to potable water systems;
- Indirect potable -pedigree is human but treated wastewater is recharged into groundwater, reservoirs or other natural systems before being withdrawn for further treatment to potable water standards;
- Non-potable - treated wastewater that is used for industrial, agricultural or irrigation uses as a way of decreasing the need for potable water supplies.

Consensus among the panelists was that reuse will be more commonly found as part of a community's water portfolio in the next 10-20 years. The key challenges participants mentioned included taking a more holistic approach to portfolio planning, keeping up with technological advances in a financially constrained world, informing and influencing the public, dealing with institutional and regulatory issues and learning continuously from best-management practices and models around the world.

Portfolio Planning

In the words of one participant, "We need a holistic approach to deal with flood management, water supply and wastewater rather than separate agencies dealing with them."

Sitting with colleagues from other technical and planning sectors could create a more cooperative environment for dealing with the whole cycle of water, wastewater and storm water.

"With more integrated resource planning, reuse can then become an important part of the portfolio," he said.

A strong, viable portfolio strategy maximizes local resources and can lead to more efficient and effective solutions, according to one of the leaders, and reflects concern about the economics of reuse. It's important to keep in mind the bottom-line impact of water reuse because water scarcity and financial scarcity often go hand in hand, he said.

One key selling point for reuse is its energy efficiency, another panelist pointed out.

"When you compare and contrast reuse with alternatives such as water importation and desalination, you find that there are tradeoffs so we need to make the public aware of their options. Traditional approaches will often not be the most practicable nor desirable in the future."

Explaining the lack of feasibility of other options can help to increase the publics' acceptance of water reuse as a practical alternative. One utility leader, for example, told his constituents that the next best bet was to pump water from 300 miles away.

"They understood that this option would have meant we had a carbon footprint of about size 18 and it would take another five years for permitting."

That brought up the question of how to measure whether reuse is a valid option.

"When someone asks, 'Why aren't you considering reuse?' we can't always tell them definitively," a participant said. "We need a fully loaded cost analysis of all alternatives."

Utilities also need to consider a range of environmental and social elements (the triple bottom line assessment) because these decisions are often made around non-economic factors.

Another panelist agreed, saying, "We need a better database with economics built in and best practice examples of where reuse has worked or is being actively considered for future use."

Peter Binney, director of sustainability for Black & Veatch's global water business, opened discussion at the reuse roundtable in Chicago by pointing out the participants' wide spectrum of experience with reuse.

Technology

The body of knowledge about reuse projects is expanding, participants believe, but technology is advancing even more rapidly.

"We all recognize that the technology exists today to manufacture water to extremely high levels of purity. The decision to develop water by reuse applications is not likely based on our ability to treat the water to protect public safety and health. It is rather a question of whether the public chooses to accept that water source," someone said.

There was a lively discussion about the bottled water industry and how it has usurped a market cache beyond its value as a pristine water source. Can the water industry consider lessons learned here and promote a higher public awareness and acceptance of municipal water?

A further part of the discussion focused on the industry's increasing ability to measure contaminant levels in water before and after treatment and whether the water industry is helping its cause when there are few available public health studies that would link very low concentrations with health risks.

"We can measure microconstituents with greater accuracy," one speaker noted. "Not too long from now, zero won't be zero anymore - what we don't find today we will find tomorrow."

The question then was what concentration of a particular compound could be acceptable, how is public health affected (if at all) by other pathways or synergies and what level of treatment is affordable, particularly in these tough economic times?

"That's a matter of public perception of a risk that may or may not be material but which is a hurdle when there is zero tolerance," one participant said. "The technology is there; it's just a matter of how to help the public understand its implications from a public health, risk, alterative approaches and cost-of-service perspective."

For that reason, another participant predicted, "The public information officer will be as critical as the water plant operator in the future."

But the burden of proof that the reclamation process is reliable and safe will still remain with the water industry, one panelist pointed out.

Informing, Influencing the Public

Binney posed the question, "Do we have the tools and information about water reuse to allow for informed discussion with the public and is the body of knowledge adequate for consensus building on an informed basis? Are we dealing with perceptions and value-based judgments or is this a decision that is based primarily on objective consideration of technical and economic factors."

One participant recommended starting the process of informing the public as early as possible.

"We need to institute strong programs of public education about water reuse in the schools that carry the messages up from children to parents," the participant said.

Singapore's ABC Water Programme was cited as a best practice for that approach.

Among other model programs, the Santa Clara Valley Water District got the public - including parks and wildlife officials and health experts - involved early in decision making about reuse projects. Also in California, the City of San Diego sponsored public opinion surveys as part of the Water Reuse Study in 2006. They appointed citizen stakeholders to their independent advisory board based on the person's reputation, experience and awareness of local issues.

The public tends to forget or is unaware that it's often indirectly using recycled water, participants said.

"They've been playing on ballparks irrigated by reclaimed water for 20 years," one said, "but they're surprised when you point that out."

An oft cited factoid is the observation that the water supply systems in the lower parts of all river systems incorporate wastewater discharges from upstream areas. This includes the water rich areas of the Mid-West where non-point sources of pollution - such as confined animal feeding operations and agricultural activities - contribute contaminants to a water system. It is not just municipal and industrial point source discharges.

Quoting an example of challenges faced in Cucamonga, Calif., a participant explained that one of the city's neighborhood groups didn't like the color of purple and decided to paint the recycled water hydrants brown so they would blend in to the urban setting: "But now without that reminder from purple pipes, people have forgotten that they are using reclaimed water in their irrigation systems."

Institutional, Regulatory Issues

Participants agreed that the approaches taken by regulators and standard setting agencies have a considerable impact on public perception and the viability of reuse projects. Policy makers and media influence the public and vice versa. For example, compliance with nutrient management regulations - rather than water scarcity - may be a strong driver for choosing water reuse.

"Reuse, when considered as a disposal management alternative, allows you to minimize your discharges and effectively side step some of those nutrient requirements with a point source discharge permit," one panelist said.

That led to a discussion of whether drinking water agencies should be required to take out micro-contaminants to meet drinking water standards or whether wastewater agencies should be required to remove them before discharge to the waterway.

"And once the wastewater has been treated to meet permit requirements and discharged to that waterway, we have many re-polluting activities before the water is removed to be treated for

drinking water purposes. This is why a Total Water Management approach is advisable," Binney said.

Another person explained that regulatory frameworks often drive utilities and cited Miami Dade's need to reduce ocean discharges and to beneficially reuse the majority of treated wastewater that was previously discharged.

Utility leaders should work in partnership with local, regional, state and federal agencies to develop appropriate guidelines for water reuse well before that option is needed, all participants agreed.

Best Management

During the roundtable discussion, several specific examples of best management practices were cited, including the following:

- Singapore's PUB is seen as a global leader in indirect potable reuse through its Four National Taps program.
- Water utilities in Australia, including Perth in particular, have made extensive investment in indirect potable water reuse with Perth having found broad public acceptance for a proposed groundwater recharge approach.
- Orange County, Calif., is often held up as a model for promoting public acceptance of reuse as a saltwater intrusion barrier, for industrial uses and now for groundwater recharge.
