Conference Report

Water Policy in The Hands of Bottlers

by Ramtanu Maitra

The national conference on water for a sustainable and secure future, organized by the National Council for Science and Environment (NCSE) and held on Jan. 29-30 at the Ronald Reagan Building in Washington, D.C., was the proverbial mountain delivering a mouse. It became evident at the outset that water is no longer seen as a national issue; the concept of water management has boiled down to bottling the water, and no more.

To begin with, the presence of Debra G. Coy of Schwab Capital Markets LP Water and Jud Hill of Aqua International Partners in the poster sessions, and Harry Ott, Director of Global Environmental Assurance at the Coca-Cola Company, in the main Round Table Session, was indicative of who would be the movers and shakers in the discussions concerning water. And keynote speaker William Reilly, former Environmental Protection Agency head, founded Aqua International in 1997.

During discussions, one panelist pointed out that people do not often appreciate how invaluable a resource water is. The typical American lunch of hamburger, fries, and a soft drink, for instance, takes 1,500 gallons of water to produce. Another said: "Water is hot. But it's probably the most misunderstood and underinvested industry around." "There is a list of only about 20-25 names and that includes the global companies," said Debra Coy, a senior analyst for water industry and environmental policy at the Schwab Washington Research Group in D.C.

The Schwab analyst said gleefully that the vast spending required to meet demand for new supplies, and to upgrade deteriorating or nonexistent water infrastructure around the world, is gradually creating a global water industry. Technology solutions—such as membrane filtration and ultraviolet disinfection—combined with rising industrial demand for pure process water, are also generating investment opportunity.

Unfortunately, Ms. Coy pointed out, the water sector remains mostly obscure to Wall Street, generating little investor attention or analyst coverage. Though shrouded in obscurity, "water stocks" as a group have outperformed the broader markets for the past three years.

The Schwab representative was not the only one keen to outperform the hydrologists and water experts at the conference. It was evident that Aqua International is flying high, and has worked out good working relations with the Bush Administration. In October 2002, Overseas Private Investment Company's board of directors approved up to $245 million in OPIC financing to help establish three new investment funds, with a combined capitalization of more than $1.5 billion. One of the three beneficiaries was Aqua International. The board approved an OPIC guarantee of up to $70 million for the second fund, Aqua International Partners II, which will invest in companies involved in the treatment, supply, distribution, or protection of water in emerging markets. The fund has a total capitalization target of $220 million for investment in emerging markets, as part of a global water fund with target capitalization of $400 million. The fund is a successor to Aqua International Partners I, formed in 1997 with $235 million in commitments, including an OPIC investment guarantee of $150 million.

The fund will target investments in projects involving products and equipment; desalination; bottled water and beverages; and infrastructure, with an eye to improving quality and safety, resource maximization, convenience of delivery, and competitive pricing. One report indicated that Aqua is supplying bottled water to U.S. troops in Afghanistan.

Micro-Commercial Interests

Then, there was Florida's Pinellas County Commissioner Barbara Sheen Todd, who recently relented after a long fight against adding fluoride to the bulk of the county's water supply. She had pointed out medical studies and newspaper articles to justify her position, that fluorosilicic acid comes from phosphate mines and can be toxic. She urged fellow commissioners to hold off on the decision until a Centers for Disease Control and Prevention study is completed in November 2004.

But Todd was clearly in the minority, as her colleagues overwhelming adopted a concept first used in the 1940s, which now, among health officials, is widely considered among the ten greatest public-health measures.

Along with the rabble-rousers and micro-commercializers of water were present also those who have contributed in the past, significantly, in the studies and understanding of water. It became evident, however, that many of those veteran warriors have changed their approach to the development of surface water and groundwater.

One of the areas of discussion was "smart growth" and water use—a subject of much interest to sprawl developers. There is no question that laying of impervious surfaces such as concrete, asphalt, and turf grass, laid over compacted soils, prevents rainwater and snowmelt from penetrating and recharging the underground aquifers. This is a problem particularly in areas of suburban sprawl, where the rain and snowmelt run-off gets channeled into streams and rivers through storm drains.

The lack of recharging of groundwater, and the flushing of rainwater and snowmelt into the rivers and streams, can pose a problem to a community. But if the same community

The Madras Atomic Power Station at Kalpakkam, India, includes a Nuclear Desalination Demonstration Project. Contrary to the narrow perspective of most conference participants, desalination is a vital technology to supply water for agriculture, especially in populous nations of Eurasia.

has access to major water bodies containing surface water, the lack of groundwater recharging does not affect them. There was much discussion on modeled infiltration lost due to sprawling development, using a formula that includes development acreage, typical coverage of "impervious" surfaces that cannot absorb rainwater and snowmelt, approximate rates of groundwater infiltration for each metro area, and average annual precipitation for those areas.

Shirking Challenges: The Ogallala Aquifer

On the other hand, groundwater recharging at the macrolevel remains a challenge, because the U.S. Geological Survey estimates that some 40% of the American public gets its water directly from underground sources. The rest of the public gets its water from surface sources such as rivers and lakes. On average, 50% of the water in rivers and lakes also comes from underground sources.

At the conference were Robert Glennon, who is the Morris K. Udall Professor at the James E. Rogers College at the University of Arizona Dr. Glennon is an internationally recognized expert on global freshwater resources, and has done work on the macro-level recharging of groundwater.

However, this time around he did not speak on the issue of recharging the Ogallala Aquifer. This is one of the largest aquifer systems in the world, stretching across parts of eight states—South Dakota, Nebraska, Wyoming, Colorado, Kansas, Oklahoma, New Mexico, and Texas—and underlying about 174,000 square miles. The Ogallala Aquifer lies near the land surface, and some wells drilled into the aquifer yield only a few gallons per minute, while others yield 1,000 gallons or more.

The Ogallala Formation was deposited about 10 million years ago, during the geologic time periods of the late Miocene and early Pliocene, by eastwardly flowing braided streams, which originated in the Rocky Mountains. Coarse-grained sand, gravel, fine clay, silt, and sand were deposited over the pre-Ogallala land surface, which was much like the present-day area just east of the High Plains: low, rolling hills, valleys, and streams. The amount of water in storage in the aquifer in each state is dependent on the actual extent of the formation's saturated thickness. In 1990, the Ogallala Aquifer in the eight-state area of the Great Plains contained 3.270 billion acre-feet of water, of which about 65% was located under Nebraska. Texas had about 12% of the water in storage, or approximately 417 million acre-feet of water. Kansas had 10% of the water. About 4% was located under Colorado; 3.5% under Oklahoma; 2% under South Dakota; 2% under Wyoming; and the remaining 1.5% of the water under New Mexico. The surface area of each state covered by the Ogallala Formation varies in about the same proportion as the volume of water in storage. Nebraska with 64,400 square miles, and Texas with 36,080 are the largest. New Mexico, Oklahoma, South Dakota, and Wyoming all have less than 10,000 square miles of surface area underlain by the Ogallala.

Approximately 95% of the water pumped from the Ogallala is for irrigation. The High Plains area represents 65% of the total irrigated acreage in the United States. The quality of the water pumped from the aquifer is suitable for irrigation; but in some places, it does not meet U.S. Environmental Protection Agency (EPA) drinking-water quality standards. The water contains concentrations of sulfate, chloride, selenium, fluoride, nitrate, and dissolved solids. Natural recharge to the Ogallala Aquifer occurs primarily through the percolation of precipitation through the formation to the water table. Recent studies reveal that playa lakes (shallow, depressional wetlands that are generally round and small, averaging 17 acres) also play a significant role in recharge. Early settlers believed the water supply that lay beneath them was inexhaustible, but that proved to be an illusion.

A drought began in the area in mid-1992, and continued until late 1996. Agricultural producers pumped water for irrigation to supplement precipitation. The increased demand for crop water by irrigators resulted in an increased rate of water level decline, averaging 1.35 feet per year from January 1992 to January 1997. Researchers are continuing to work on methods to increase natural recharge to the aquifer and improve water-use efficiency, but not much has been achieved, threatening an eventual draw-down of the aquifer

But Glennon also points out how groundwater pumping is having a deleterious effect on surface waters—rivers, creeks, estuaries, and wetlands. Groundwater migrates laterally to and from surface water bodies, so unsustainable use of either source affects the other. Large-scale pumping of groundwater for irrigation of cotton in the desert, or from springs for bottled water, threatens the very hydrological system in many areas. And Glennon argued that water laws written under the reasonable-use doctrine are powerless to stop this degradation.

Not fond of bottlers in general, Glennon is unhappy about how water has become a market commodity. "It's more valuable than milk, oil, gasoline—more valuable than Coke, because the profit markup is remarkable," he said on one occasion.

Desalination: Lack of a Wider View

The experts called upon to participate in the conference were also less than resourceful on the growing importance of desalination of sea and brackish water. The thrust of discussion on desalination remained centered on its cost. In addition, experts were keen to point out, almost apologetically, that although the potential for developing desalination may be high in some regions, the extent and extreme level of poverty in some countries is expected to "delay market take-off"!

"The market has seen some degree of funding from foreign bodies to provide small plants in the most dismally poverty-stricken regions; however, desalination is perceived as an expensive extravagance in comparison with alternative options to solve water shortages," one expert pointed out.

What became evident, however, is that not much thought has been given in the United States to large-volume desalination. Desalination is still considered as a temporary measure to tide over short-term water shortages. In southern California, for instance, a number of desalination plants, set up at the time of drought, were abandoned once rains came.

It is difficult for American technologists to comprehend that desalination is not simply for producing bottled water, but for large-scale use in agriculture. In fact, such large-volume desalination can be done using "waste heat' " of a nuclear power plant. What the "market-oriented technologists" must realize, is that this is no longer a "maybe option," but a necessity. Nonetheless, the lack of funding in this area has kept the development stymied.

For instance, the BN-350 fast reactor at Aktau, in Kazakstan, has successfully produced up to 135 MW of electricity and 80,000 cubic meters (m^3) per day of potable water over some 27 years (this much water can spread to a depth of 1 foot over almost 65 acres of land per day), and about 60% of its power is used for heat and desalination. In fact, oil/gas boilers were used in conjunction with it, and total desalination capacity of the plant is 120,000 m^3/day.

In Japan, some ten desalination facilities linked to pressurized water reactors operating for electricity production have yielded 1,000-3,000 m^3/day each of potable water. The water is used for the reactors' own cooling systems, to avoid corrosion of the cooling water system.

Where the NCSE and others in the United States are way off-base, is on the importance of desalination. The general refrain that runs through the mindset of water people in this country, is that desalination is for those people who do not have freshwater, such as the Middle East and Arabia. But, the world has changed beyond that. Populous nations, such as China, India, Pakistan, Bangladesh, Russia, for instance, have found out the importance of desalinating the seawater in the coastal areas, and brackish water elsewhere, to supplement agricultural water demand. This is particularly important for regions where rainfall is seasonal and dry weather prevails most of the year. These populous nations have been left with little choice, since importation of water, although discussed at the conference, is simply ridiculous.

It is for this reason, that China is looking at the feasibility of a nuclear seawater desalination plant in the Yantai area, producing 160,000 m^3/day by MED (multiple-effect distillation) process, using a 200 MW thermal reactor.

India has been engaged in desalination research since the 1970s, and has set up a demonstration plant coupled to twin 170 MW pressurized heavy-water nuclear power reactors (PHWR) at the Madras Atomic Power Station, at Kalpakkam, in southeast India. This Nuclear Desalination Demonstration Project will be a hybrid reverse osmosis/multi-stage flash plant, the RO with 1,800 m^3/day capacity and the higher-quality MSF 4,500 m^3/day. Plants delivering 63,000 m^3 per day are now in the works, using both kinds of desalination technology. Russia has embarked on a nuclear desalination project using dual barge-mounted KLT-40 marine reactors (each 150 MW thermal) and Canadian RO technology to produce potable water. Pakistan is continuing efforts to set up a demonstration desalination plant coupled to its KANUPP reactor (125 MW PWHR) near Karachi and producing 4,500 m^3/day.