Salty Solution to Texas' Water Wars

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Situation

Texans have debated and fought over the State's water resources for decades. Water has been the foundation of business fortunes and failures. A reliable source of clean water is essential to the commercial attractiveness of the State and the economic prosperity of all Texans. Yet, according to the Texas Parks and Wildlife Department's senior director for aquatic resources, Dr. Larry McKinney, with Texas' population expected to double by 2050, almost 900 Texas cities will not have enough water from current sources to meet their needs. Estimates are that more than 120 of Texas' 281 major springs have dried up and, in 2001, the Rio Grande, the third longest river system in the United States, was so callously abused that her last trickle of toxic sludge never reached the Gulf.

The U.S. population grew 3.5 times from 1900 to 1995, yet water consumption grew 10 times during that same period. As our economy expands, we will continue to demand greater amounts of water per capita for recreational, commercial, industrial and personal use.

When the general public thinks of water, we tend to think in terms of essential consumer uses such as personal hygiene, cooking, cleaning and watering our lawns. However, such usage accounts for less than 11% of total water consumption; 41% is used for agriculture, 40% for thermoelectric and 8% for industrial. For example, 2,800 to 3,200 gallons of “ultra-pure” water are needed to produce a single eight-inch silicon wafer for semiconductor manufacturing; 50,000 gallons are needed for the average rayon living room carpet; and 40,000 gallons are used to manufacture the steel components in one automobile. [*Adams, Harkness & Hill*]

Texas cannot wait, nor can Texans expect to solve our water shortage problem with tax dollars alone. Construction of dams and reservoirs can take decades, cost billions of dollars, and drown habitats. The Texas Water Development Board estimates it would take $25 million in public funds to determine whether there is enough water in West Texas aquifers to allow pumping for commercial sale. Such proposals have been almost universally condemned by area farmers and ranchers who say the drought-parched land can barely sustain current demand. [*Associated Press*]

Salty Solution

The good news, however, is that Texas is blessed with more than 400 miles of coastline and an unlimited supply of seawater. Recognizing such limitless potential, in April 2002, Governor Rick Perry announced an initiative to develop a seawater desalination project in Texas and has said that Texas should be a national seawater desalination leader. In order to continue to provide an essentially inexhaustible supply of potable (drinkable) water without depleting our valuable natural wetlands and aquifers, Texas must consider desalination of seawater as an essential component of any water initiative.

Seawater is a solution of salts (primarily Chloride: 55%, Sodium: 31% and Sulphate: 8%), of nearly constant composition for billions of years. Desalination is the conversion of seawater to potable water. There are three primary forms of desalination, however, reverse osmosis (RO) is the most effective and efficient conversion process, and the only way to produce the ultra-pure water essential in a variety of growing industries such as the semiconductor, pharmaceutical and electronic display markets. RO requires no dams or reservoirs, is drought proof, unaffected by local hydrological activity, and circumvents water rights disputes and the destruction of habitats.

However, seawater RO operations are technically complex, security sensitive and capital intensive. In fact, the water industry is the most capital intensive of all public utilities with more capital invested per dollar of revenue than either electric or gas utilities. In a report to Congress in February 2001, the EPA estimated that the nation's water systems must invest a minimum of $141 billion by 2018 just to meet the requirements of the Safe Drinking Water Act of 1974.

Yet, dollars are only one of two great hurdles in the design and operation of potable water systems. Seawater reverse osmosis (SWRO) filtration plants are intensely scientifically intricate. Design engineering on feed water analysis, pre-treatment components to remove suspended particles, precipitation inhibitors, energy recovery systems, degasifiers, scrubbers and post-treatment aesthetics must be performed by professional engineers with extensive SWRO operations experience or any such venture is doomed.

One need only examine the Tampa Bay project to appreciate the inherent dangers with large-scale desalination design and operations projects. Various problems, including pre-filtration and a flawed plant design have caused the filters to foul and idle the $100 million, 25-million-gallons-per-day SWRO desalination plant built more than a year ago and estimates to fix the plant are in the range of $29 million. [*PWFinancing, April 2004. Water Desalination Report, August 12, 2004*]

Public-Private Partnerships

Public-Private Partnerships (PPP) can avoid similar disasters in Texas. There are two advantages to PPPs: 1) they transfer risk from taxpayers to private companies and 2) they provide access to private capital. For example, working with the State, a private operator is able to finance some capital expenditures with tax-exempt bonds or private activity bonds rather than relying solely on tax dollars. New York's JFK Air Terminal was financed with such bonds. The terminal redevelopment project used a Vertically Integrated Project model that consisted of the design, construction and operation (DBO) of the $1.2 billion, 1.5 million square foot terminal. The project took four years to complete and experts estimate that if the New York Port Authority had attempted the project without the PPP it could have taken 15 years or more. [*Lehman Brothers, August 2004]*

Aqua America, Inc. originated a regulatory benefit known as Distribution Service Investment Charge (DSIC), which allows companies to put into their rate base any finished item – plant or equipment – that is a replacement for an existing rate base item. These items can then earn the current allowed rate of return subject to ultimate regulatory review.

Regulatory agencies and investor-owned operators may negotiate rate base adjustments for energy costs, which are 40% of the production expense. Municipal power station cooling water can be blended with the seawater thereby further reducing costs (the warmer the water, the less energy is required). Water authorities and private operators can agree on a Modular Unit Sequencing plant design, which allows the plant to grow as the demand grows without sinking capital into excess capacity. These and other public/private cooperative strategies can bring the cost-per-thousand-gallons of RO water to within reasonable range of existing surface and groundwater sources, which have no ability to expand with growing demand. In fact, with such partnerships and constantly improving technology, the cost of SWRO water has declined from $6.00 per thousand gallons (Santa Barbara, 1991) to less than $2.00 per thousand gallons (Singapore, 2003). [*T. Pankratz, CH2M Hill, August 2004*]

Vertical Integration Models

Texas regulators should be encouraged to use the Vertically Integrated Project model used by municipalities to provide other public facilities such as hospitals, highways, buildings and bridges. Using some form of the Design, Build, Own, Operate, Transfer (DBOOT) model, the municipality does not need to spend the tens of millions of dollars required to own the plant from the outset. With this model, competitors would be bidding for a finished product rather than separate stages and components of the finished product. It also eliminates any possibility of the component contractors blaming each other if there is an operating problem down the road, which could result in an idle plant and protracted litigation. This is what happened at Tampa Bay.

The DBOOT, DBO, or some other vertically integrated project model also affords the municipality an extended warranty period (as long as the operating contract) during which time the contractor is solely responsible for the design, maintenance and final product cost. At the end of the operating contract, the contractor turns over a water plant to the customer that meets all performance criteria, has all the “bugs” worked out, and has a proven production track record. The most sensible, cost-effective model for Texas is for the municipality to simply buy the water, at a specified quality and quantity, from an experienced operator who has personally designed and maintained the plant to work properly. This model is currently used in dozens of municipal systems around the world and gives the municipality a very easy way to measure whether the contractor is performing.

The central question in evaluating any bid proposal submitted by a DBOOT water company then becomes simply, “Does the operator have the technical and financial ability to supply the municipality with potable water in the quantity, quality and at the price proposed by the operator’s bid?” It is the company’s responsibility to demonstrate, to the regulatory authority’s satisfaction, that it has the operational experience to deliver the quantity of water, with the chemical specifications, within the timeframe and at the cost outlined in its proposal.

It is not too late to solve our state's inevitable water crisis. With properly designed SWRO facilities, operated by SWRO-experienced, investor-owned companies, Texans have access to all the clean water we could ever want. However, the expense and expertise required demands we begin now to enact legislation that will enable municipalities and water authorities to partner with such companies through Public-Private Partnerships. Only then will we secure an abundant supply of pure, clean water that future generations of Texans will need for personal enjoyment and economic prosperity.