TAMPA BAY SEAWATER DESALINATION: THE BUSINESS MODEL

Eugene A. Schiller
Deputy Executive Director
Southwest Florida Water Management District
Brooksville, Florida
352/796-7211
Gene.Schiller@swfwmd.state.fl.us

There has been national and international interest in the successful public-private partnership procurement process developing the largest economically viable seawater desalination project in the United States. When the Tampa Bay plant is operational in the next few months, the $108 million project will initially produce 25 million gallons a day (mgd) of drinking water (permitted up to 28 mgd and expandable to 35 mgd). The full first-year wholesale cost is projected to be $2.02 per thousand gallons with an average 30-year net average cost of $2.49 per thousand gallons. These historically low prices are approximately 25 percent of the world cost; actual prices will be even lower. These dramatically-lower prices are competitive with other traditional sources, especially when the final product water is mixed with lower cost ground and surface waters. A 25-mgd seawater desalination plant requires a service population of approximately 200,000 people. The Seawater Desalination project is expected to provide 10 percent of the wholesale water supply required for Tampa Bay Water's six member governments--Hillsborough, Pasco and Pinellas counties, and the cities of New Port Richey, St. Petersburg, and Tampa. The Seawater Desalination project includes 14 miles of 42-inch diameter transmission lines and is collocated with Tampa Electric Company's coal–fired Big Bend Power Station on the east side of Tampa Bay in Hillsborough County, Florida.

Questions asked since inception of the project in the mid-1990s include why the water management district has been promoting seawater desalination as a water supply source and can the cost effective project in Tampa Bay be duplicated in other locations. The goal in this brief article is to share some of the important lessons learned.

Why is seawater desalination needed in Tampa Bay? Seawater desalination is an environmentally-safe, sustainable, drought-proof portion of the water supply. The Southwest Florida Water Management District (SWFWMD) is the regional agency, established by constitutional amendment, primarily responsible for managing water resources necessary to maintain a balance between the water needs of current and future water users without damaging the environment. Tampa Bay Water is the regional wholesale water supply agency responsible for developing and supplying potable water to its members who serve approximately two million customers in the Tampa Bay area.

The SWFWMD has ad valorem taxing authority to serve and protect four million people and 10,000 square miles of southwest Florida. In the mid-1990s, the SWFWMD offered to help fund a large scale seawater desalination project in the Tampa Bay area after determining it could be permitted and could provide a safe, sustainable alternative supply to offset damaging

groundwater pumping from regional wellfields. A partnership agreement successfully negotiated in April 1998 among the SWFWMD, Tampa Bay Water and the member governments resulted in the SWFWMD agreeing to contribute $183 million to develop sustainable alternative supplies, of which $85 million would be contributed to offset the capital cost of a seawater desalination facility. And, Tampa Bay Water agreed to reduce groundwater pumping (40 percent) from 158 mgd to 121 mgd by 2003 and to 90 mgd by 2007. The SWFWMD funds will enable Tampa Bay Water to further reduce its wholesale price for seawater desalinated water by $0.61 per thousand gallons, creating a $1.41 first-year cost and an average cost of $1.88 over 30 years.

What has been learned in developing the Tampa Bay desalination project that can help others in determining whether other projects are economically viable? In general, the low cost to develop the Tampa Bay large-scale seawater desalination project can be attributed to:

- Sustained agreement among key local stakeholders to provide "partnership" leadership and resources (money, staff and third party experienced owners engineering consultants) is necessary to explore and create a shared vision, and project funding agreement (discussions and scientific studies started in 1995). Constructive public and private sector participation, clear public and media communications along with solid science and business practices throughout the process helped to keep all focused together on the collective need for success.

- Support from the 2001 Florida State Legislature approving a "Desal Bill" which:
  - Encourages the use and advancement of membrane technology as an alternate water supply technique.
  - Clearly define demineralization concentrate discharge as a "potable water bi-product" regardless of quality or facility size.
  - Directs the Florida Department of Environmental Protection to create a specific rule addressing membrane facility and associated disposal practices.

- Public-Private Partnership with Poseidon Resources Corporation (Design, Build, Own, Operate and Transfer--DBOOT) selected through the competitive negotiations process provided an opportunity to:
  - Reduce costs while keeping tight government control utilizing a market-driven risk/reward (take or pay) commodity purchase agreement with guarantees to flush out flaws in proposals and achieve lower prices through tough negotiations with multiple potential providers.
  - Reduce or minimize risk to participating governments by requiring contractors to use proven technology (system design failure); provide and ensure performance after completion and testing (systems operation failure); and indemnify government customers from casualty loss, labor interruption, and change in regulatory laws (force majeure). The SWFWMD dollars will not be provided through funding agreement with Tampa Bay Water until the plant is fully operational after achieving environmentally-safe, high-quality water production.
  - Co-locate with a large conventional power facility which was determined during the development of the request for proposals to create the best economic model because of the ability to:
    - Utilize existing/permitted intake system (reduce sea life mortality potential)

    - Utilize existing/permitted discharge system needed for dilution of the concentrate through blending with power plants cooling water discharge (minimum 20:1 dilution ratio or 390 mgd cooling water to 19.5 mgd concentrate at the Tampa Bay Desalination Plant).
    - Utilize heated power plant cooling water to help reduce the cost of driving the feed water through the Reverse Osmosis (RO) system along with energy used through the production process.
    - Co-location provides an opportunity to share land and support facilities further reducing cost along with negotiating favorable off-peak and alternative energy costs.
  - Seek advantageous financial instruments/conditions to get best of both worlds with state-of-the-art private sector construction and operating efficiencies combined with tax free financing available to governments (low interest, federal, tax-free Private Activity Bonds through the State of Florida). Resulted in guaranteed amortized capital cost over original 30-year life of contract.

- Site conditions that impacted project costs and permitting time:
  - Mandatory Environmental Feasibility Studies (before decision that seawater desalination project was viable and could be permitted, conducted extensive scientific impact analyses)
  - Source and Product Water Qualities (lower salinity equals lower costs)
  - Intake/Discharge Design (shorter distance equals lower costs)
  - Delivery/Transmission Distances (shorter distance equals lower costs)
  - Land/Facility (co-locating with conventional power plant site equals lower costs and favorable permitting)
  - Citizen Acceptance (longer time delays if organized activist groups oppose the facility and appeal associated permits)

Much remains to be learned about best practices for creating cost-effective, long-term public-private partnerships to help deliver environmentally-safe potable water. It is a work in progress that is as much about money as it is about water. However, the first Tampa Bay Desalination project has helped to create the first economically viable model for delivering potable water from seawater.