

# WATER DESALINATION REPORT

The international weekly for desalination and advanced water treatment since 1965

Volume 43, Number 29

6 August 2007

## United States

### SWRO RIDES THE WAVES

Water Standard Company (WSC) CEO Amanda Brock told *WDR* that interest in the company's vessel-mounted desalination systems is increasing at a rate similar to that of new seawater desalination initiatives being announced around the world. "We've received serious bid requests from every continent but Antarctica... from Australia to Saudi Arabia and Florida to China," she said, "and we are currently in the early stage of negotiations with a major food and beverage multinational interested in a large-scale transportable water production facility."

Andrew Gordon developed the vessel-mounted concept and started the Florida-based company in 2003. "We already have a significant worldwide intellectual property portfolio which will broadly protect a number of pioneering innovations in this area in almost 100 different countries throughout the world," said Gordon.

Late last year, after securing relationships with suppliers including ship management firm V.Ships and naval architect SeaTec, he brought Brock on board to globalize the business and manage the company's growth. She has since lined up investors and is talking to a significant international equity fund with hopes of fully capitalizing the firm and having the first vessel under construction within the next six months.

WSC's reference design is scalable between 5 and 50 MGD (18,925-189,250 m<sup>3</sup>/d) and employs high-quality components including Pall's MF pretreatment system and state-of-the-art power generation, mooring and water transfer systems. "We've integrated all the industry's recent incremental advances into a fully engineered system that addresses the most important issues facing seawater desalination," said Brock.

Perhaps more important are the environmental impact mitigation measures the company has taken, including a proprietary intake arrangement to reduce impingement and entrainment and a concentrate outfall that virtually eliminates the discharge plume. The company believes its design will reduce many of the environmental and permitting issues that land-based plants face.

Vessels would be constructed in shipyards using readily available skills/trades and can be customized to meet client requirements. Based on vessel capacity, location, seawater salinity and amortization period, the total cost of water

produced could be as low as \$0.75-\$0.80/m<sup>3</sup> (\$2.84-\$3.03/kgal), including the amortized capital cost of the power generating facility. Typical vessel delivery is 18 months, although a fast-track project for a smaller vessel could be completed in 12 to 14 months.

Vessel-mounted desal systems have long been talked about as possible short-term water supply solutions. Like many aspects of the rapidly changing desal market, that situation seems about to change. A well-designed system may offer a competitive, flexible solution for both short- and long-term applications.

## Africa

### SWRO TO COMPLEMENT DIRECT REUSE

Namibian Water Corp (NamWater) is seeking technical assistance as it enters the implementation phase of a plan to develop a 45 ML/d (11.9 MGD) SWRO plant in the central coastal city of Swakopmund. Terms of Reference (ToR) for the consulting appointment will include assistance in prequalifying and selecting preferred bidders to develop the project, prepare technical specifications, evaluate development tenders, oversee commissioning and to conduct post-commissioning inspections.

Namibia is best known to the water industry as the home of the world's first and only direct potable water reuse facility. The city of Windhoek's 4,800 m<sup>3</sup>/d (1.3 MGD) reclamation plant began direct potable reuse in 1968 and the treatment plant has undergone a series of upgrades to its present 40,000 m<sup>3</sup>/d (11 MGD) capacity, including the addition of UF membranes in May 2002.

NamWater's senior manager of business development told *WDR* that large volumes of potable water will be required due to the unprecedented growth of the country's uranium mining industry. "It is our intention to finance the facility from our own sources, and we intend to select a suitable developer by means of a tendering process making use of the standard 1999 FIDIC Conditions of Contract for Plant and Design Build, with an additional O&M period of at least 2 years," he said.

The project should prove challenging because seawater in the area is reported to have a high organic content and the SDI is not significantly reduced by sand filtration. In addition to algal blooms and red tides, the water is said to be prone to sulfur 'eruptions.'

The ToR closing date is 30 August and copies can be requested by contacting [kotzeb@namwater.com.na](mailto:kotzeb@namwater.com.na)

## California

### CONTRACTOR PICKED FOR COASTAL RO

While the State's large-scale seawater desal projects continue to pursue permits and conduct pilot studies, a more modest project to supply desalinated water to the Monterey Peninsula quietly moves forward. The Sand City project is now fully permitted – including having received a Coastal Commission coastal development permit – and the City is negotiating with CDM to design and build the 0.3 MGD (1,135 m<sup>3</sup>/d) RO project. A contract could be in place by the end of this month.

Sixty-foot (18m) deep production wells will draw water with a salinity of 17,000 to 26,000 mg/L from a shallow aquifer near the freshwater/saltwater interface adjacent to Monterey Bay. RO concentrate will be injected into wells located 15 feet (4.5m) below sea level and will have a TDS similar to seawater.

Project civil engineer Stan Kulakow for Sand City's consultant Creegan + D'Angelo, told *WDR* that the City will advertise for bids later this week for the construction of four wells, pipelines, a directionally-drilled concentrate percolation system and the bore-and-jack installation of two 18-inch (450mm) conduits crossing State Route 1. A pre-proposal meeting is scheduled for 29 August and bids are to be received on 12 September.

The project will be ready to deliver water in late 2008.

## California

### MOSS LANDING PILOT GETS FINAL 'OK'

Last week, the California Energy Commission (CEC) voted unanimously to allow a modification of Dynegey's Moss Landing Power Plant cooling water intake to allow withdrawal of feedwater for a new seawater desalination pilot project. California American Water (CalAm) had already received the Coastal Commission's required coastal development permit; this is the first seawater project understood to have required CEC approval.

CalAm has proposed building a 10 MGD (37,850 m<sup>3</sup>/d) SWRO plant at the Moss Landing site near Monterey using once-through cooling water from the power plant. The need for the project is driven by a State ruling that forces CalAm to reduce diversions from the Carmel River by 70 percent, to restore stream flows to support endangered species.

Acciona will construct and operate the 20-gpm (1.26 L/s) pilot plant, and RBF Consulting will be program manager.

The study will include a side-by-side evaluation of GE/Zenon and Siemens/Memcor low-pressure membrane pretreatment systems. Product water produced by the pilot unit will be mixed with concentrate and discharged with the power plant cooling water.

At the nearby National Refractories site, Poseidon continues with source water characterization for its proposed 20 MGD (75,700 m<sup>3</sup>/d) SWRO plant. Poseidon's Nikolay Voutchkov told *WDR*, "We will wait until we finish the EPC and O&M contractor selection process and the permitting and design for the Carlsbad and Huntington Beach projects before finalizing the Monterey pilot project scope and design. We will take a systematic approach that combines a comprehensive understanding of the source water quality and cutting edge thinking, capitalizing on our Southern California desal experience."

John Klein, CalAm's coastal water project technical manager, told *WDR*, "Of the two seawater desal projects currently being considered at the Moss Landing site, only one full-scale plant is expected to move forward. Whoever does that facility will have to demonstrate the necessary technical, managerial and financial capability. With the CEC's approval, we plan to commission our pilot in October, and will show our technical capabilities."

## California

### CARLSBAD GETS COUNTY'S SUPPORT

When the San Diego County Water Authority (SDCWA) and Poseidon Resources each announced plans for different seawater desalination projects and prepared individual EIRs, there was speculation of litigation between the two 'competing' projects. But the Poseidon project received a big boost from SDWCA when the board recently passed a resolution to support the development of the project as a new local water supply.

The directors present voted unanimously to pass a resolution that says that the project is essential to the Water Authority's ability to achieve the supply diversification goals contained in the 2005 Urban Water Management Plan, and that it believes the project can be developed in an environmentally responsible manner.

Bob Yamada, SDCWA's senior desalination program manager, told *WDR* that Poseidon is continuing to pursue water purchase contracts with its member agencies. "The Water Authority is facilitating that process as well as participating in discussions regarding the configuration of a distribution system for the project that would serve our member agencies near the project. Our agency will also be there to support the project in front of the Coastal Commission and other agencies," he said.

## Caribbean MEMBERS WANTED

Curaçao has a long and colorful history as a desalting pioneer and will commemorate the 80<sup>th</sup> anniversary of the startup of its first commercial seawater desal plant next year. Humphrey Gouverneur, managing director of production for Aqualectra, the island's water and energy supplier, would like to make the event even more memorable by launching a Caribbean affiliate of the International Desalination Association (IDA).

In order to be an IDA affiliate, the Caribbean Desal Association (CDA) should have at least 50 members "We hereby make a call to all interested parties, individuals, companies or organizations which form part of, or are related to the Caribbean desalination family, to contact us," he said.

Mr Gouverneur can be contacted at: [hgouverneur@aqualectra.com](mailto:hgouverneur@aqualectra.com)

## California MBR REUSE PLANT CANNIBALIZES SLUDGE

Construction has begun on a new 2.8 MGD (10,600 m<sup>3</sup>/d) water reuse plant, signaling an end to the City of Clovis' dependence on Fresno to provide wastewater treatment capacity. To accommodate the community's new growth, the facility is anticipated to have an ultimate treatment capacity of 8.3 MGD (31,416 m<sup>3</sup>/d), and will be constructed in phases for cost and operational reasons.

CH2M Hill was selected to undertake the project using a performance-driven, integrated design-build-operate contract. According to Shawn Sock, the company's operations group project procurement director, CH2M Hill will operate the facility under a 10-year contract with an option to extend it for an additional five years.

Steve White, Clovis' City Engineer and project manager, told *WDR* the city chose a DBO procurement after evaluating the risks involved. "We have never built a wastewater plant before and a fixed price DBO procurement offered the lowest price and schedule risk. We'll be able to design and construct the project before the end of next year for a fixed price of less than \$39 million," he said.

Like many growing communities, Clovis required a plant that was compact, odor-free and produced a high quality effluent that would meet California's tough Title 22 requirements for effluent reuse. After considering a wide range of process options, CH2M Hill chose a Siemens MBR incorporating the Cannibal<sup>®</sup> solids reduction process to reduce biological solids production.

According to project engineer Bruce Johnson, Cannibal is a two-step system that first employs a physical process – fine screens remove particulates smaller than 1mm – followed by a biological process where waste-activated sludge is sent to a partially aerated interchange reactor for further biological treatment before being returning to the aeration basin.

"The Cannibal process results in a 50 percent solids reduction when compared to a conventional treatment plant, and the energy consumption of this facility will be less than that of a plant utilizing an aerobic digester," said Johnson. An added advantage of the lower solids production is the reduced transportation cost of hauling the sludge and the fact that the plant will realize a reduction in staffing requirements of 1 or 2 full-time employees.

One of the drivers for selecting the MBR process was the significant reduction in plant footprint. Johnson said the treatment plant would require only 2 acres (0.81ha) of the 7-1/2 acre (3ha) site. The facility is designed to blend in with the local community, employing prairie-style architecture, water features, and extensive landscaping and screening to minimize visual impact. The facility will also include extensive odor control. Odorous headworks air will be collected and used in the aeration process and the balance of plant air will be filtered with bark mulch biofilters.

Following membrane filtration, effluent will undergo UV disinfection using a low-pressure, high-intensity lamp that CH2M Hill estimates has a life cycle cost much lower than other alternatives. The treated water will be distributed for reuse using a 'purple pipe.'

The City is no stranger to membranes, having installed a 15 MGD (56,775 m<sup>3</sup>/d) Pall MF water plant in 2004 to treat surface water from the Enterprise Canal.

Sock told *WDR*, "The reuse plant is already at 100 percent design completion and ground was broken in June. Initial startup is planned for November 2008 and project completion to follow a month later."

## United States AMTA ELECTS NEW BOARD MEMBERS

Three new directors for the 2007-2009 term were announced at last week's American Membrane Technology Association's (AMTA) conference in Las Vegas. Bob Castle (Marin Municipal Water District) was elected to fill the Division 1 position vacated by Bob Yamada (San Diego County Water Authority) and Mike Gabaldon (US Bureau of Reclamation) was elected for a Division 3 position. Harold Fravel (Dow Water Solutions) was appointed to the SEDA liaison board position.

The newly seated board chose David Brown (Town of Jupiter, Florida) as president of the executive committee for a second term, and numerous awards were presented, including:

*Hall of Fame Awards*

- John E. Potts,
- C. Peter Darby
- John E. Cadot (posthumous)

*Outstanding Member Award*

- Mehul Patel (Orange County Water District)

*Membrane Facility Award*

- North Clackamas County Water Commission

*Robert O. Vernon Award*

- Brad Macek (City of Port St Lucie)

After 12 years on the AMTA board, past president Bob Yamada decided not to run for another term because new responsibilities at the Water Authority require a cutback on external activities. He told *WDR* the decision not to run again was a difficult one, and most of all, he will miss the camaraderie that came from seeing his fellow board members on a regular basis.

**Best Paper Award:** Roger Noack (HDR) won the award for best paper for *It Works – Direct Coagulant Addition on Low Pressure Membranes*. The paper evaluated the performance of the City of Pflugerville, Texas' new surface water treatment plant and was co-authored by Jason Christensen (HDR) and Joey Miller and Darrell Winslett of the City of Pflugerville.

Data from the pilot study and the actual full-scale operation determined that the generally accepted 10-30 minute coagulant contact time for poly-aluminum chloride prior to the membrane system was not necessary to meet the required treatment goals.

As a result of the study, the 16.1 MGD (60,940 m<sup>3</sup>/d) full-scale surface water treatment plant was constructed using GE/Zenon UF membranes and separate flocculation and intermediate pumping facilities were eliminated, saving \$1 million in construction costs and \$10,000 in annual O&M costs.

The total plant construction costs were \$15.3 million, and the plant was commissioned in March 2006.

**Best Poster Award:** Walter Johnson and Jacimaria Batista (University of Nevada Las Vegas) shared Best Poster Award for *Trading Water for Salt: An Alternative Water Resource*

*for the Las Vegas Valley Facilitated by RO Technology.*

The poster presented data from a comprehensive water balance of the Las Vegas Valley including all possible pathways for water and wastewater into the Valley. It described how RO technology could be used to reduce wastewater TDS and desalinate shallow groundwater not currently amenable to RO treatment, noting that for each 1 mg/L of TDS over 500 mg/L discharged to the Colorado River, more than \$2.6 million in damage resulted to water consumers.

The presentation concluded that the Las Vegas Valley could offer to remove TDS from the Colorado and in return, extract more water for its needs, trading salt removal for water entitlement.

Next year's AMTA conference will be held on 13-17 July in Naples, Florida.

## IN BRIEF

A consortium of Marubeni and International Power signed a 20-year power and water purchase (PWPA) with Abu Dhabi Water & Electricity Authority (ADWEA) last week for the **Fujairah 2 IWPP**. The 2,000 MW power plant includes 590,460 m<sup>3</sup>/d (156 MGD) of hybrid desalination capacity, 78 percent of which will be provided by Sidem MED units, with the remaining capacity to be produced using SWRO. The total value of the project is \$2.2 billion and commercial operation is scheduled for 2010.

**IDA director voting** will open for eligible members on Tuesday of this week. Visit [www.idadesal.org](http://www.idadesal.org) to cast your ballot.

**Hydranautics/Nitto Denko** announced that its membranes have been selected for the 125 ML/d (33 MGD) Gold Coast SWRO plant in Queensland, Australia. SWC5 elements will be furnished for the first pass and ESPA2+ elements will be furnished for the second pass.

## PEOPLE

Doosan Hydro Technology has appointed **Gil Turner**, formerly of Aerex Industries, as sales manager focusing on the Florida market. He will remain based in Tampa and can be contacted at [gturner@doosanhydro.com](mailto:gturner@doosanhydro.com)