Water Desalination Report

The international weekly for desalination and advanced water treatment since 1965

Volume 50, Number 37 6 October 2014

WEFTEC

Miles of aisles

New Orleans, Louisiana hosted this year's Water Environment Federation's Annual Technical Exhibition and Conference (WEFTEC) and its 22,000 attendees. The event, which is the largest water-related conference in the US, always has a strong wastewater and water reuse following. However, as membrane technology continues to make inroads in wastewater applications, more companies with a historically water treatment focus seem to be exhibiting, attending and presenting papers.

The front of the Convention Center's main building is 0.6 miles (1km) long and more than 1,000 exhibitors filled the 300,000 ft^2 (27,870m^2) exhibition hall. Your correspondent came to the conference outfitted with a digital activity tracker to measure the distance traveled and number of steps walked. Some diligence was required to stay on track and walk the entire serpentine network of aisles uninterrupted, a task that required 9,378 steps and measured 4.24 miles (6.8km) of thinly carpeted, cement-covered conference floor.

One benefit of holding an event in New Orleans is that after spending the day on the conference floor, there is no lack of good food at the numerous vendor events. The only difficulty was deciding which reception, hospitality room or party to attend.

Although there was not a lot of breaking news, or new desal/membrane product launches, some of the interesting items that were announced (or overheard) last week included:

- When *WDR* asked Stephan Schuchardt, HTI's new CEO, about the company's recent personnel changes, he said, "My role in coming to HTI was not to make management changes, it has to do with the future growth of the company."
- CH2M Hill is 'right-sizing' its global overhead structure and will reduce its workforce by 5 percent—approximately 1,200 people—largely by offering a voluntary retirement program. It will also "take a more disciplined approach to risk mitigation and project delivery, and a refreshed strategy."
- Toray Membrane introduced two new 'GD' RO membrane elements. The 8-inch BWRO elements are available in 400 and 440 ft^2 configurations with improved rejection, better pH tolerance and increased oxidant tolerance.
- GE Power & Water introduced a new anaerobic membrane bioreactor (AnMBR) that combines anaerobic digestion technology with its ZeeWeed 500 UF membranes. In addition to offer better treatment performance, the AnMBR is able to generate biogas—a renewable energy—from industrial wastewater.
- Evoqua did not announce a new CEO, as some were predicting, but there were reports that interim CEO Gary Cappeline's replacement would be in place in December.
- Although it isn't a desal company, one company did stand out among the other exhibitors: Assmann Corporation, an Indiana-based company that makes polyethylene tanks with capacities of up to 12,000 gallons (45.4 m^3).

A metaphor for life

Technology

Large-diameter RO element update

A 2004 study conducted by the US Bureau of Reclamation and a consortium of RO/NF membrane element suppliers concluded that there was a market for large-diameter elements and recommended a 16-inch nominal diameter as the standard large-diameter. The study projected a life cycle cost savings of four to six percent for 16-inch elements versus standard, 8-inch elements in SWRO applications.

Global Water Intelligence

Tom Pankratz, Editor, P.O. Box 75064, Houston, Texas 77234-5064 USA
Telephone: +1-281-857-6571, www.desalination.com/wdr, email: tp@globalwaterintel.com

By 2007, Dow, Hydranautics, Saehan (CSM) and Toray had developed 16-inch elements while Koch Membrane Systems (KMS), who did not participate in the consortium, offered an 18-inch diameter element. Now, seven years later, there are only a couple dozen large-diameter membrane installations. Although most are small to mid-sized installations, one—IDE's Sorek plant in Israel—is the world's largest SWRO plant.

Over the past week, *WDR* contacted several of the study participants to ask why they thought that the large-diameter concept had been slower to be embraced by the industry than expected? The short answer seems to be that the economies of scale weren't as dramatic as expected, and that the elements and pressure vessels were more expensive than anticipated.

One supplier said flatly, "There simply are no capital cost savings. On a cost per unit of membrane area, the membrane and spacer costs are identical for the 8-inch and 16-inch elements, but the pressure vessel and core [permeate] tube costs are considerably more expensive for large-diameter elements. The system's intake, pump packages and pretreatment systems are identical, and although there are fewer fittings and connections, the fittings are larger, more difficult to handle and cost more."

Another membrane supplier noted that most suppliers are just responding to market demand. "Because we don't have a dedicated 16-inch line, it's not a make or break decision for us. We can roll either 8-inch or 16-inch elements, depending on what our customers prefer."

Some suppliers apparently experienced lower yields, or a higher number of rejected elements, during early production runs, especially on projects with very strict water quality requirements. However, most of those problems have now been addressed.

Randy Truby, a consultant with 40 years of membrane manufacturing experience agreed, "Rolling 16-inch elements is fairly routine and not overly expensive. There is no element cost advantage that would justify a lower price on a comparative basis. On the other hand, the pressure vessels for 16-inch elements have been more expensive on an equivalent basis, although this may change with time."

Avista's Doug Eisberg, a pressure vessel expert who was an advisor on the 2007 study, told *WDR*, "With respect to the pressure vessels, volume is the key to success. It was clear to me at the time that it would have to be a very big market if three or four vessel suppliers were to each invest tens of thousands of dollars in tooling and have to divide up a new market."

Ian Lomax, formerly with Dow, said that another fairly recent development has eroded the large-diameter advantage a bit more, noting, "The use of 440 ft^2 elements has reduced the large-diameter advantage by another 10 percent."

The Sorek SWRO plant is the only large-scale installation to use large-diameter elements. Notably, the elements are vertically oriented, a configuration that provides for a more compact footprint and employs a proprietary element loading technique that significantly reduces the time to load/unload elements.

"It's going to require a radical design approach, like that used at Sorek, to take full advantage of opportunities offered by large-diameter elements. Unfortunately, there aren't many membrane supplierrs, OEMs or EPCs that are aggressively pursuing the large-diameter market," said one observer.

KMS's Imran Jaferey summarized his company's large-diameter membrane position as follows: "We still make and supply large-diameter elements to support our existing installations, but no new projects are being pursued…but that doesn't mean that we won't make them if someone really needed or wanted them."

California

Demo plant will precede IPR project

San Diego County-based Padre Dam Municipal Water District has awarded Integrated Water Services a contract to build a 100,000 GPD (380 m^3/d) indirect potable reuse (IPR) demonstration project at the Ray Stoyer Water Reclamation Facility (WRF). The $1.5 million demo project is being conducted in advance of a planned expansion of the WRF from 2 MGD (7,579 m^3/d) to 4.4 MGD (16,654 m^3/d).

The District is currently considering the expansion, which will employ MF/UF technologies to serve the Santee Basin Aquifer Recharge Project with highly treated recycled water. A design RFP for the expansion could be advertised in 2016 and the expansion could be completed by 2020.

Meanwhile, Kennedy/Jenks will undertake a study to consider an expansion of the WRF to 10 MGD (37,850 m^3/d).

Research

Project to develop desal planning tool

As part of its Solicited Research Program, the WateReuse Research Foundation has issued an RFP for a desktop research project entitled, *Performance and Cost Review of Existing Desal Plants Which Use Conventional and Membrane Pretreatment Processes Prior to Reverse Osmosis*.

The study's objectives are to provide utilities with information on key planning criteria related to the evaluation of different pretreatment processes, and to prepare a process selection decision matrix that optimizes capital and operating costs against performance and regulatory requirements.

The maximum amount of funding available for this project is $125,000, and it will require matching funds of at least 25 percent of the total project costs.

Proposals are due 5 November and the estimated duration of the project is eighteen months. For more information, visit https://www.watereuse.org/foundation/rfp/WRRF-14-07.

Technology

Stylish and modestly functional

Architect Arturo Vittori of Architecture and Vision design studio in Italy, has developed a 12m (40 ft) tall structure that condenses potable water from the air. The 'Warka Water'—a name inspired by the giant Ethiopian fig tree—was conceived for communities in rural areas in Ethiopia that lack safe drinking water, and was exhibited at Virada Sustentavel in São Paulo, Brazil in late August.

The tower weighs about 90kg (200 lbs) and consists of five modules, which can be constructed and assembled by local villagers without the need of scaffolding or electrical equipment. Made up of a rattan or bamboo exoskeleton, the Warka Water has an internal polyethylene mesh fabric on which moisture condenses and drains down into a basin at the bottom of the structure, at a reported rate of up to 100 liters (25 gallons) of fresh water per day.

The Warka Water Tower on display

The conical shape is said to improve stability and optimizes packaging and transportation, while the 'crown' is designed to keep birds away.

The estimated the total cost of a Warka Water structure is $500 to $1,000 and the designer says that it can be built and assembled by a six-person team in about five days.

The design is interesting, and the ability to construct the structure from relatively inexpensive, local materials is advantageous. However, many 'low tech' water solutions look better than they perform. The Warka Water's performance is highly dependent on temperature and humidity, and it remains to be seen if non-technical users are able to effectively control the inevitable biofouling that will occur, and if the unit can sustainably produce water that meets drinking water standards.

Research

Spotlight on Kobe University

Since it was founded in 2007, Kobe University's Center for Membrane and Film Technology (MaFTech Center) has quickly established itself as Japan's largest academic-driven membrane research center. The center's director, Professor Hideto Matsuyama, told *WDR* that the 15 faculty and 110 students are engaged in a wide range of membrane-related research.

"Our membrane research is divided into five main groups: the water treatment group, bio-process group, organic membrane group, gas separation group and film/membrane coating group. We are also focusing on collaborating with other membrane institutions and industries, establishing inter-center research agreements with membrane and environmental study centers in Australia, Taiwan, Korea, Hong Kong, China and Indonesia. In addition, we are collaborating with more than 56 Japanese companies," he said. "We have already outgrown our facility and are nearing completion on a new six floor, 6,000 m^2 [64,583 ft^2] building."

The center is also involved in a five-year innovation project funded by the Japanese government in which it acts as the central research unit covering membrane topics ranging from biomimetics and FO to molecular dynamics and novel membrane fabrication techniques.

Four to six times each year, the center hosts a Global Water School for its academic and industrial partners. *WDR* attended one of these events in late August, where experts are invited to discuss new membrane and water treatment

trends and listen to selected researchers present the results of their work.

"Japan is one of the world's leading membrane producers, and the MaFTech Center's mission is to make use of international networks, industrial collaboration and professional research development to ensure that we remain an innovative leader," said Professor Matsuyama.

In brief

Four bidders have responded to **West Basin Municipal Water District's** RFP for a consultant to conduct a subsurface intake study. The study will include a literature review, an investigation of subsurface intakes and the first two parts of a three-part guidance manual that can be used to evaluate a potential subsurface intake for a 20-60 MGD (75,700-227,100 m^3/d) SWRO project currently being studied by West Basin at the El Segundo Power Generating Station. Debbie Gatza, the District's project manager, said that the four bidding teams were Geoscience, Geosyntec, RBF and Tetra Tech. A recommendation will be submitted for board approval on 27 October and an award is expected on 3 November.

Following almost 13 years of dealing with water quality issues, the town of Hawker, in **Flinders Ranges**, 400km (250 mi) north of Adelaide, Australia, has installed and begun operating a 440 m^3/d (116,300 GPD) BWRO plant. The A$5.75 million ($5 million) project includes a treated water storage tank.

Fluid Equipment Development Company (FEDCO) will dedicate its newly expanded head office and manufacturing facility in Monroe, Michigan, on 24 October.

The Moresby Island Management Committee has issued an RFP for professional services to assist in the technical and financial evaluation of a centralized nanofiltration (NF) system for the Sandspit Water System. The committee manages the system on behalf of the **Skeena-Queen Charlotte Regional District**, a quasi-municipal administrative agency in British Columbia, Canada. The project's objective is to consider treatment options for a community of 300 people who rely on a groundwater source with high concentrations of organics, hardness and arsenic. The project budget is C$19,738 ($17,625), and proposals are due on 2 November. For information, contact mimc@gcislands.net.

The **City of Alice, Texas**, is expected to issue an RFP for a consultant to conduct a study into water supply options later this month. The options will include a 3 MGD (11,355 m^3/d) BWRO system. The city currently purchases water from Corpus Christi, but is exploring ways to be self-sufficient.

In a joint statement prior to the start of Hajj 2014, which falls between 2-7 October this year, Saudi Arabia's Saline Water Conversion Corporation (SWCC) and the National Water Company (NWC) said that they are prepared to supply 680,000 m3/d (180 MGD) of desalinated water to pilgrims at the various holy sites near Mecca. This amount represents an increase of 3 to 5 percent over last year. SWCC said that most of the water would be produced at the **Al Shuaibah Desalination Plant**, south of Jeddah, while NWC noted that the water would be distributed through a piping network totaling 763km (477 mi) long.

The Orange County Sanitation District (OCSD) is expected to issue a January 2015 RFP for a master reuse study plan that will focus on finding flows for a final expansion of the **Groundwater Replenishment System** (GWRS). The first phase of the 70 MGD (264,950 m^3/d) project, which was jointly funded with the Orange County Water District, was completed in 2007 and a second phase, which increases the capacity to 100 MGD (378,500 m^3/d), will be completed in 2015. A third and final phase could add another 30 MGD (113,550 m^3/d).

People

Pall Corporation has appointed **Michael Moll** as its manager of industrial systems sales for the Western Hemisphere. He has over 20 years of sales experience in the water industry and will be based in Cortland, New York. He may be contacted at michael_moll@pall.com.

GHD has announced the appointment of **Blair Shackleton** as its water market leader for Western Australia. He was formerly with the PDC Group and Worley Parsons, where he was the design manager for the Perth 1 and 2 SWRO projects. He is based in Perth and may be contacted at blair.shackleton@ghd.com.