

WATER DESALINATION REPORT

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Global Water Awards

WINNERS ANNOUNCED IN PARIS

Winners of the 2010 Global Water Awards were announced in Paris last week. Her Majesty Queen Noor of Jordan presented the awards following her keynote address.

The winners are selected based on votes cast by subscribers to *WDR* and *GWI*, and members of the International Desalination Association. The winner and runner-up in each category are:

Desalination Plant of the Year



Winner: *Barcelona Llobregat, Spain* — This 200,000 m³/d SWRO plant serves metropolitan Barcelona, and the EPC contract was carried out by a joint venture of Degrémont, Agbar, DRACE Medioambiente and Dragados. Degrémont supplied the equipment, with Hydranautics supplying the membranes. ERI provided the energy recovery devices. The client is Aigües Ter Llobregat (ATLL).

Distinction: *Shoaiba RO, Saudi Arabia* — This 150,000 m³/d SWRO plant built on reclaimed land near to Saudi Arabia's Red Sea Coast was built by Doosan Heavy Industries for ACWA Power International. In the summer of 2007, finding water was becoming a daily battle for the people of Jeddah. ACWA Power was asked about the possibility of bringing additional desalination capacity online at Shoaiba in double-quick time. Together, Doosan and ACWA Power came up with a proposal to build the RO plant on land reclaimed from the sea, and delivered it in just 19 months, to address an ongoing water shortage.

Desalination Company of the Year

Winner: *Degrémont SA* — Degrémont celebrated its 70th anniversary in 2009 by winning the contract to design, build and operate Australia's largest seawater desalination project – the 411,000 m³/d SWRO plant at Wonthaggi, near Melbourne. Degrémont also commissioned Europe's largest membrane desalination plant, the 200,000 m³/d Barcelona

Llobregat SWRO facility, and completed the 120,000 m³/d Barka II SWRO plant in Oman. It also broke ground on two new projects: the 220,000 m³/d plant at Ad Dur in Bahrain, and the 50,000 m³/d Mutxamel-Marina Baja plant in Spain.

Distinction: *Hyflux* — In 2009, Hyflux successfully closed the financing as the developer and sole private partner on the 500,000 m³/d Mactaa SWRO project in Algeria. It also commissioned the 100,000 m³/d Tianjin Dagang plant, China's largest RO facility. Through its Hydrochem subsidiary, Hyflux was also awarded the \$68 million contract to supply a 68,200 m³/d SWRO plant at the Salalah IWPP in Oman.

Water Company of the Year

Winner: *Acciona Agua* — In 2009, Acciona Agua broadened the scope of its service offering by penetrating new geographical markets. In February, the company broke into the Australian desalination market by taking the 280,000 m³/d Adelaide SWRO contract. Deals in Italy, Brazil and the Dominican Republic followed, before the company rounded off the year by winning the contract to build the world's largest wastewater treatment plant at Atotonilco in Mexico.

Distinction: *Cascal* — During this past year, equity investors finally bought into the Cascal story. The stock outperformed the major indices, ending the year 35 percent higher than where it started, while the company's P&L took a turn for the better, as it called in some key payments relating to past activities in Belize and Panama. Cascal also negotiated important rate increases at its UK and Chilean regulated subsidiaries, while furthering its ambitions in the Caribbean.

Public Water Agency of the Year:

Winner: *Sydney Water, Australia* — This water and wastewater utility serves over four million consumers in Sydney, the Illawarra region and the Blue Mountains. Sydney Water has taken decisive action to drought-proof its water supply while implementing a water conservation strategy yielding an 18 percent reduction in overall water consumption. The new 250,000 m³/d SWRO plant at Kurnell was commissioned on time and under budget, while Sydney Water continues to roll out an array of public and private recycled water schemes that will meet up to 12 percent of its water needs by 2015.

Distinction: *San Diego Water Agencies, USA* — The San Diego County Water Authority (SDCWA) is the wholesale water supplier to three million residents through 24 member agencies in Southern California. The Public Utilities Department (formerly City of San Diego Water Department)

provides water utility services to more than 1.3 million people. SDCWA has continued to be an engine of innovation and diversification in one of the most water-starved, environmentally sensitive regions of the US, pursuing non-conventional water supply projects and leading water conservation efforts. During 2009, the Public Utilities Department received approval for a pioneering indirect potable reuse demonstration project that could pave the way for a full-scale, 660,000 m³/d project. SDCWA was also instrumental in continuing to help the 189,250 m³/d Carlsbad SWRO project move forward.

Desalination Deal of the Year

Winner: Melbourne, Australia — This 30-year BOT contract for a 444,000 m³/d SWRO project will supply the city of Melbourne, its suburbs and regional towns in Australia. The Victorian Department of Sustainability and Environment (DSE) is responsible for the management of the contract on behalf of the Victorian Government. The AquaSure consortium – consisting of Suez Environnement, Thiess and Macquarie Capital – won the contract to develop the project in July 2009. A Thiess-Degrémont joint venture will design, construct and operate the plant, along with an 84km transfer pipeline and an 87km underground power supply. Suez Environnement, Thiess and Macquarie Capital provided the bulk of the A\$800 million (US\$670 million) equity component, while 32 financial institutions provided a debt package of A\$3.7 billion (US\$3.1 billion). PricewaterhouseCoopers advised on the financing package.

Distinction: Qingdao, China — A 25-year BOT contract to supply a 100,000 m³/d seawater reverse osmosis project serving a municipality in Shandong Province, China. Befesa is the developer, with Qingdao Soda Ash putting up 27 percent of the equity. A consortium of Agricultural Bank of China, China Exim Bank, China Construction Bank and China Merchants Bank put up an RMB880 million (€94.5 million) 18-year loan to fund 70 percent of the €135 million financing cost.

Water Reuse Project of the Year

Winner: Changi NEWater Plant, Singapore — Singapore's fifth and largest NEWater plant employs MF, RO and UV to polish treated effluent from the Changi water reclamation plant (CWRP) to produce 228,000 m³/d of 'NEWater' for industrial and commercial consumers. Sembcorp developed the plant under a 25-year DBOO contract with Singapore's Public Utilities Board (PUB). Black & Veatch provided design engineering and construction support services and CH2M Hill led the conceptual and preliminary design phase and acted as lead consultant on the implementation.

Distinction: Fillmore Water Recycling Plant, California — A 9,084 m³/d state-of-the-art treatment plant serving the

City of Fillmore featuring a zero liquid discharge MBR/UV. American Water and Boyle Engineering (now part of AECOM) designed and built the \$42.5 million plant, and American Water is operating it under a 20-year DBO contract. The plant produces 3,785 m³/d of effluent suitable for unrestricted reuse and groundwater recharge, with the balance used for irrigation. The DBO procurement showed how public-private partnerships can contribute to meeting infrastructure needs on a fast-track basis.

Power and Water Plant of the Year

Winner: Jubail, Saudi Arabia — This \$3.4 billion power and water plant on Saudi Arabia's east coast produces 800,000 m³/d of desalted seawater through MED and generates 2,743MW of electricity. A consortium of GdF Suez Energy, ACWA Power Projects and Gulf Investment developed the project. EPC contractors GE and Hyundai Heavy Industries were responsible for the power island, while Veolia Sidem supplied the MED technology. The off-taker is Marafiq.

Distinction: Barka II, Oman — This greenfield IWPP on Oman's Gulf coast produces 120,000 m³/d of desalted seawater via SWRO and 678MW of new power generation capacity. As part of the IWPP, the developers also acquired a 668MW brownfield power plant at Al Rusail. The developer consortium featured GdF Suez Energy International, Mubadala Development Company and National Trading Company. The EPC contractors were Doosan Heavy Industries (power) and Degrémont (water).

Water Technology Company of the Year

Winner: Koch Membrane Systems — In 2009, KMS made a bet on its new large-diameter RO membrane elements, investing in an automated manufacturing facility in Boston. It has also developed new applications for its Puron hollow-fiber UF membrane. Most big corporations with a subsidiary that is a distant fourth in the market would cut and run, but KMS believed in the power of technology. KMS' large-diameter RO element achieved its first seawater reference at the Esperanza mine in Chile in 2009. KMS has also developed seawater pressure vessels to house its large-diameter elements and was a UF industry pioneer during the 1960s and 1970s.

Distinction: Pump Engineering — Pump Engineering (PEI) pushed aside the established players to double its market share in 2009, securing the energy recovery contract for the largest SWRO plant in the world. PEI's proposition is two-fold. First, it requires engineers to look at the energy efficiency of the whole power train, rather than just the energy recovery device. And second, it is available at lower capital costs than the market-leading isobaric devices. The power of this proposition was underscored in December 2009 when the market leader, Energy Recovery Inc, acquired PEI.

Technology Idol

Five technologies were presented at last week's GWI Global Water Summit in Paris. After each presentation, the participants responded to panelist questions and the winner was selected by an audience vote. *WDR* will showcase several of the technologies in the coming weeks.

Winner: Voltea's Flow Through Capacitor (FTC) — This electrically driven FTC process desalts brackish water at a 90 percent recovery and 99 percent salt rejection using ion-selective membranes and positive and negative electrodes. Said to use less electricity than RO or EDR, it is not sensitive to fouling or scaling.

Distinction: Danfoss AquaZ — This technology employs aquaporin-embedded desalination membranes that mimic nature's water transport proteins found in cell membranes to increase membrane permeability and provide near-perfect solute rejection while minimizing energy consumption.

California

AGENCIES SIGN DESAL MOU

San Diego County Water Authority (SDCWA) and the US Marine Corps have approved a Memorandum of Understanding (MOU) that provides a framework for on-site studies to determine the feasibility of constructing a regional seawater desalination facility at Camp Pendleton. The facility would produce between 50 and 150 MGD (189,250 to 567,750 m³/d).

The agreement outlines terms for SDCWA studies that will provide a framework for evaluating whether a desal facility would adversely impact military training, the environment or the quality of the residents' lives. The studies, which do not obligate either party beyond the study phase, will enable the Water Authority to evaluate the feasibility and cost of building and operating a desal plant on the base.

The Camp Pendleton studies, along with similar studies planned or under way for potential sites in Baja California, will be used in the development of a 2012 Regional Water Facilities Master Plan. If the project is recommended for inclusion in a capital improvement program to meet future water supply reliability needs, it could be online by 2018.

Company News

CASCAL REBUFFS ACQUISITION OFFER

On the same day that it received the runner-up trophy as GWI's Water Company of the Year, Cascal rejected Sembcorp Utilities' \$6.75-per-share acquisition offer. The NYSE-listed water and wastewater services provider called the Singapore-based Sembcorp's offer "inadequate and coercive", which sent the share price plummeting by 9 percent.

Under the proposed deal, Biwater agreed to sell its 58.4 percent stake in Cascal to Sembcorp at \$6.75 per share, while a public tender is offered at the same price. If Sembcorp fails to acquire 80% of the company, the tender period will be extended and the tender price will drop to \$6.40.

Cascal's desal ambitions took a leap forward in December, when it acquired three of Veolia's businesses which serve municipalities and resorts on the Caribbean islands of Antigua, Curaçao and Bonaire. Biwater, meanwhile, has been active on desal projects in the British Virgin Islands and the Maldives.

Reuse

WHITE PAPER LOOKS AT DIRECT REUSE

In response to the growing interest in direct potable reuse, the National Water Research Institute (NWRI) has published a white paper entitled *Regulatory Aspects of Direct Potable Reuse in California*. The paper, which was prepared by James Crook, assesses the research needs, regulatory requirements and public acceptance issues related to direct reuse.

Although indirect potable reuse (IPR) is currently practiced in California, some water utilities, water-related associations and environmental advocacy groups believe that direct potable reuse – the introduction of highly-treated recycled water into a potable water distribution system – would provide greater flexibility to augment some potable water supplies.

Dr Crook delineates the public health implications, summarizes the health effects studies of direct reuse and reviews a Colorado demonstration study, the Windhoek direct potable reuse system and a five-month emergency direct potable reuse program in Kansas. He also includes information on public policy guidance and applicable regulations.

The paper was presented at last week's Direct Potable Reuse Workshop and can be downloaded at www.nwri-usa.org. The workshop's outcome will be available this summer, and will include a list of direct potable reuse research activities.

Arizona

YUMA BEGINS ONE-YEAR RUN

Since it was constructed in the early 1990's to control the salinity of the Colorado River before it entered Mexico, the 72 MGD (272,500 m³/d) Yuma Desalting Plant has been operated for a combined total of less than one year. Today, the plant will be restarted and operate at one-third capacity for the next year to gather information about its capability to reliably produce water for a variety of purposes.

The plant was initially operated for nine months before being put into ‘ready reserve’ because the US was able to meet its water delivery obligations to Mexico without it. In the spring of 2007, the plant was rehabilitated and operated at 10 percent capacity for a 90-day test period to determine its effectiveness and establish operational cost estimates.

Under a partnership, the Metropolitan Water District of Southern California (MWD), Central Arizona Water Conservation District (CAWCD), and Southern Nevada Water Authority are funding nearly \$14 million of the pilot run’s estimated \$23.2 million cost. In return, each agency will receive storage credits in Lake Mead proportionate to its funding contribution.

Conference

MEMBRANE BIOFOULING ADDRESSED

While global business leaders, financiers and technologists from the water industry met in Paris at the GWI/IDA Global Water Summit last week, the world’s leading membrane scientists were meeting at the International Symposium on Membrane Biofouling in Bisbee, Arizona. Organized by Stanford’s Harry Ridgway, the two-day symposium explored the fundamental nature of membrane biofouling to help identify effective new strategies for its control.

A full house of 40 attendees heard an international panel of experts discuss how to best integrate fundamental theory and knowledge of membrane biofouling processes with real-world treatment problems. Hans Vrouwenvelder, of the Wetsus Center in the Netherlands, introduced a recently designed membrane fouling simulator device that provides real-time information on the growth of biofouling in membrane systems, which can accurately predict the impact of biofouling on system hydraulics.

A full line-up of speakers can be seen at www.ismb-2010.com/program/program.html and copies of papers are available from Dr Ridgway at ridgway@vtc.net.

IN BRIEF

ConocoPhillips and **GE Water & Process Technologies** officially opened the companies’ joint Global Water Sustainability Center last week. The Center will be located at the Qatar Science and Technology Park in Doha. Dr Samer Adham, the Center’s managing director, told *WDR* that it will examine ways of treating and recycling water produced from oil and gas production and refining operations, as well as other projects related to industrial and municipal water sustainability.

ITT Corporation regional manager Raafat Ali has announced that the company’s Water Equipment Technologies Division/Flowtronex has successfully commissioned the 4,000 m³/d (1.06 MGD) Elein Water Project brackish water RO plant in Sokhna, Egypt. The plant, which was shipped in 14 weeks, produces water with a TDS of less than 400 mg/L for residential use and golf course irrigation from a 12,000 mg/L TDS supply source.

Siemens Water has been awarded a contract to supply an integrated wastewater treatment system for Petrobras’ Presidente Getulio Vargas Refinery in southern Brazil. The system will pretreat 10,800 m³/d (2.8 MGD) of wastewater for reuse as boiler feedwater using an API oil water separator, DAF, walnut shell filters and a Petro MBR system with four membrane trains. The system will be operational in 2012.

PEOPLE

Eric Jankel has announced that he has joined Hatch Infrastructure as the Dubai-based director of the Middle East region. He formerly held a similar position at CH2M Hill and was also CEO of Aqualyng Holding AS. He can be contacted at EJankel@hatch.ca.

Jeff Connelly, formerly vice president and general manager of supply chain, has been named GE Water & Process Technologies’ vice president of engineered systems. He can be contacted at jeffrey.connelly@ge.com.

Veteran desalter **OJ Morin** has been appointed chief technology officer of Shuangliang Desalination Group located near Shanghai, in Jiangyin, China. The company is focusing on offering MED systems, but has not ruled out membrane processes. He can be contacted at oj.morin@shuangliang.com.

Nitto Denko/Hydranautics has announced the appointment of **Raj Kishor Kapoor** as the national sales manager for the Indian Subcontinent. He will be based in Mumbai and can be contacted at rkapoor@hydranautics.com.

JOBS

Woongjin Chemical Co Ltd, (formerly Saehan) a leading manufacturer and global supplier of RO membranes (CSM: www.csmfilter.com) from South Korea, seeks a Regional Manager for our branch office in the UAE free zone to be in charge of business development for the MENA region. Candidates must have a minimum of ten years of experience in a water-related field, be technically well-versed, and be fluent in English (Arab-speaking applicants will be preferred). Email resumes to weee9@wjchemical.co.kr.