

WATER DESALINATION REPORT

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Direct Potable Reuse

TECHNICALLY FEASIBLE, BUT...

Last week, the California State Water Resources Control Board released a draft report on the feasibility of developing statewide direct potable reuse (DPR) regulations. The 43-page report, which is now available for public review and comment, is entitled *Investigation on the Feasibility of Developing Uniform Water Recycling Criteria for Direct Potable Reuse*.

The report includes a discussion of the Board's process to address DPR issues, knowledge gaps and research recommendations before criteria can be adopted. It concludes that while the Board can move ahead and start the process of developing DPR criteria, completion of six research recommendations and filling in the key knowledge gaps must be achieved before a uniform set of criteria can be adopted.

A 45-day public comment period opened on 8 September, and will close on 25 October. The State Board staff will hold two public workshops to present an overview of the Draft Report to the Legislature and accept public comments. The first workshop will be held on 4 October in Los Angeles and the second will be held on 6 October in Sacramento.

To download the report, visit <http://tinyurl.com/jvdfv19>.

Research

NEW R&D CENTER SHORTLISTED FOR FUNDING

Although the National Centre of Excellence in Desalination Australia (NCEDA) will formally wind up its research efforts at the end of this month, a group of former NCEDA executives are poised to continue the Centre's advanced research tradition. On 30 August, Australia's Minister for Industry, Innovation and Science announced that a bid for a new Cooperative Research Centre (CRC)—to be known as Future Water CRC—has been shortlisted to participate in the final stage of the selection process.

Future Water CRC is seeking Australian Government funding of A\$35 million (\$26.4 million) in addition to a commitment of cash and in-kind from 25 partners that amounts to A\$87.5 million (\$66 million), resulting in a total research effort of more than A\$130 million (\$98 million) over ten years.

Neil Palmer, the CEO of NCEDA, told *WDR* that although the A\$5 million desalination research facility at Murdoch

University's Rockingham campus would be available to the new CRC, Future Water would not be an extension of the NCEDA, but a new organization with a much broader research mandate.

"Future Water CRC aims to position Australia as a world leader in innovative water technologies and management. We plan to foster research collaboration between industry and science to provide new water technologies and management solutions to enable the use of our impaired water resources for the country's economic benefit," said Palmer.

An extended business case for the Future Water CRC will be submitted by the end of October with an outcome expected by early 2017.

Reader Survey

WDR asks readers to take a short, 9-question survey, which can be completed in less than two minutes, at <https://www.surveymonkey.co.uk/r/wdrreadersurvey2016>.

Company News

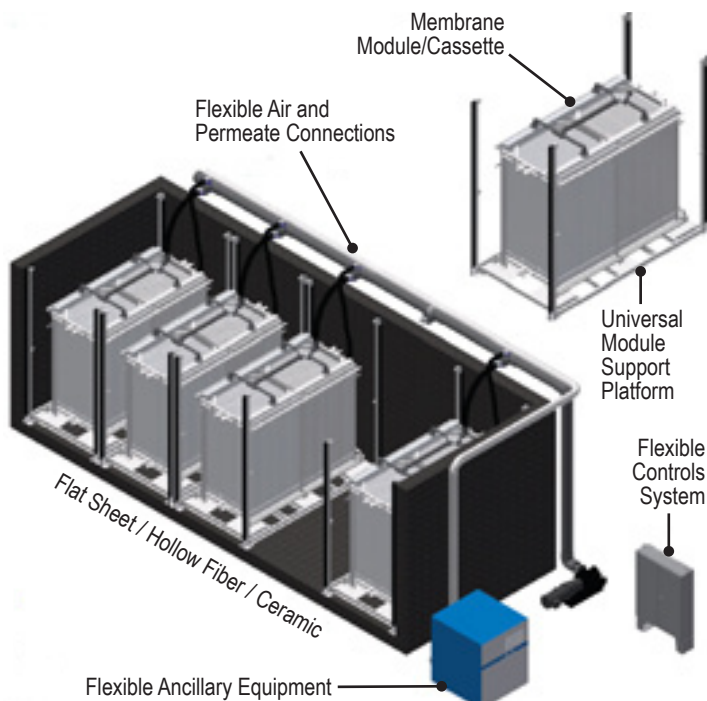
UNIVERSAL MBR OFFERS MORE OPTIONS

A 2006 study evaluated the technical potential and market interests of standardizing membrane bioreactor (MBR) designs based on the input of 45 European companies and institutions involved in the MBR sector. The report concluded that the main expected advantage was that an increased level of standardization would contribute to MBR market growth by avoiding vendor lock-in, decreasing price and increasing trust and acceptance.

Among the obstacles to harmonizing MBR plant designs, the study identified four factors—module dimensions, tank dimensions, production capacity and aeration demand—as having "a high to extremely high potential for nuisance" to standardization. It went on to say that "a standardization process common for both flat sheet and hollow fiber membranes/modules is riddled with difficulties and challenges."

At the upcoming WEFTEC conference in New Orleans, Louisiana, Québec-based H2O Innovation will introduce its flexMBR™, an open-source MBR that has successfully addressed the challenges identified in that 2006 study. According to Fraser Kent, the company's manager of wastewater engineering, the flexMBR is the result of a two-





Open source flexMBR™ system

year development effort, which can operate with virtually any commercially available submerged membrane module, whether hollow fiber or flat sheet, polymeric or ceramic.

“The MBR market is still relatively young, having lived through only about two membrane lifetimes, but module sizes and process designs have already started to converge. This is especially prevalent among new manufacturers who have conformed to current practices and existing companies trying to position themselves for retrofit opportunities. We have evaluated all of the available MBR offerings and developed the flexMBR, a design that is so flexible that it’s possible for users to select from over a dozen membrane products from virtually any supplier for commercial or technical reasons,” Dr Kent told *WDR*.

“Users can select an MBR product independent of process design, change MBR products at any time, leverage competitive membrane replacement to reduce costs and adapt new technologies as they become available. And this flexibility goes far beyond having a tank that will simply accept different membrane modules or cassettes. When designing the controls system, for example, our goal was to develop a package that was versatile enough to be adapted for any MBR process design without requiring new programming. This same level of flexibility extends to the permeate and air piping connections and ancillary systems.”

Over the last year, the company has been conducting a university pilot study in which hollow fiber and flat sheet modules operate in the same tank, using the same controls system and supporting equipment. They have also recently

received a letter of intent for a flexMBR system from Birch Mountain Enterprises (BME) in Alberta, Canada. The BME system will operate three different membrane products in the three trains treating the same domestic sewage. “This will allow BME to clearly identify the best product for their application when the time comes for membrane replacement. It will also allow the company to leverage a competitive bid to reduce replacement costs,” Kent added.

Although he acknowledges that the cost of providing such adaptability may be marginally higher than “a conventional MBR product”, H2O Innovation intends to price the flexMBR competitively, and Kent notes that “end-users will be well-compensated for any premium by the increased flexibility. In the end, this is a cost saving approach that allows users to gain control over their own destiny.”

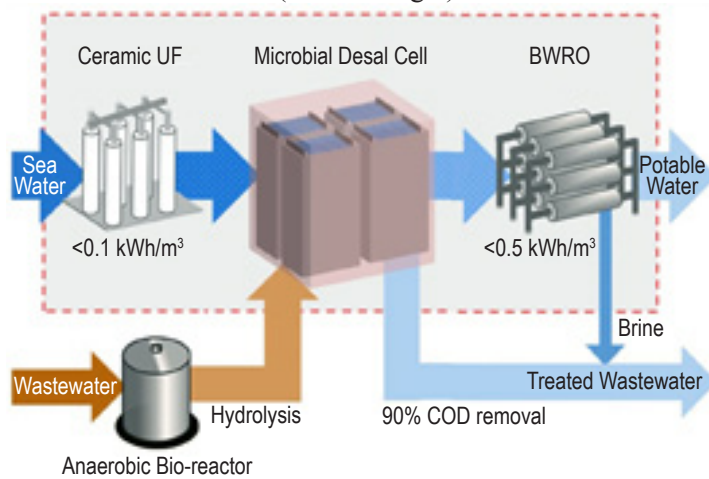
Editor’s note: Subscribers can see *WDR’s* story on the Universal Rack for pressurized MF/UF systems, in the 5 May 2015 (vol 51 no 18) issue archived at www.desalination.com.

Research

PROJECT TO DEMO MICROBIAL DESAL CELL

Earlier this summer, the European Union’s Horizon 2020 R&D program co-funded a €7.9 million (\$8.9 million), 48-month research project to develop and demonstrate a sustainable low-energy seawater desal process. Known as the MIDES (MICROBIAL DESALINATION) Project, it will employ microbial desalination cells (MDC) to pretreat seawater “to overcome thermodynamical limitations of RO”.

The MIDES Project concept calls for using MDC to treat wastewater by utilizing electroactive bacteria to convert organic matter into up to 1.8 kWh of bioelectricity per cubic meter (6.8 kWh/kgal) of wastewater. During the process, it is expected that the cell will also partially desalinate seawater. The brackish effluent will then undergo a conventional BWRO step to produce potable water with an energy target of less than 1 kWh/m³ (3.8 kWh/kgal).



MIDES Technology Concept

Spain's FCC Aqualia will lead a consortium of 12 companies and research organizations from eight European countries that combine key areas of required expertise in water and technology innovation. The focus will be on overcoming MDC's current low desal rates, high manufacturing costs and membrane biofouling/scaling problems. Its goals include optimizing the microbial-electrochemical process and scaling up the technology.

The project tasks have been broken down into nine work packages ranging from the development of nanostructured electrodes to developing new membranes to the scale-up of the lab unit into a 'pre-pilot' MDC.

The project, which was launched in April and will run through 2020, expects to also conduct the world's largest demonstration of MDC technology with demo sites planned for Chile, Spain and Tunisia.

Company News

GETTING THE OLD BAND BACK TOGETHER

When Whitney Irons started Matrix Utilities in 1985, the company focused on furnishing small BWRO and SWRO plants with capacities that ranged from a modest 400 GPD (1.5 m³/d) to a slightly less modest 10,000 GPD (37.9 m³/d). In an early 1992 interview, Irons told *WDR* that the company had exceeded the projections outlined in its first five-year plan and was on its way to repeating its success in its second five years, based on the introduction of modular 20,000 to 40,000 GPD (75.7-151.4 m³/d) SWRO systems and land-based plants with capacities to 100,000 GPD (378.5 m³/d).

In 2000, with its SWRO systems operating in Antarctica, Asia, Central America and on cruise ships sailing the Seven Seas, the company began to focus on build-own-operate (BOO) water plants for utilities and resorts throughout the Caribbean. Then, in 2008, Irons sold the company to Aqua-Chem, the Tennessee-based manufacturer of vapor compression distillers, which was re-establishing itself as a full service desalination company.

Irons remained with the firm until 2012, when he left to start Matrix Enviro LLC (MENV), a British Virgin Islands company and joint venture with Aqua-Chem, which focused on developing and operating island-sized municipal waste-to-energy, water and power plants. He left MENV two years later to start iWater & Power LLC (iWP) to meet client demands outside of MENV's interests.

"iWP specializes in supplying turnkey SWRO systems and infrastructure for island projects with production capacities up to 5 MGD [18,925 m³/d]," he explained. "We also build, own and operate extended aeration and MBR wastewater treatment plants to fit most island requirements, and have

partnered with Caterpillar and Wärtsilä to provide land-based power generating solutions for almost any island application or resort development.

"Several former employees have joined me at iWP, where we're capitalizing on our 30 years of water and power experience to provide our clients with 'first world' quality services for projects that include greenfield planning, design optimization and upgrading mature installations."

Aqua-Chem update: Founded as a Cleaver Brooks subsidiary, Aqua-Chem began building mobile desal systems in 1943, and went on to develop MSF, MED and VC distillers in the 1950s and 1960s. It sold off its land-based MSF, MED and ZLD product lines in 2000, and acquired the Vaponics brand of stills and steam generators. Then, in early 2006, Cleaver Brooks sold the remainder of the company to Altus Capital Partners, who then sold it to Crimson Investment in mid-2014. Gary Edwards, the former Maxcess chairman and Webex CEO, was recently named as Aqua-Chem's president and CEO, replacing David Gensterblum, who had held the position since 2006. Aqua-Chem has closed the former Matrix facility in Florida and maintains manufacturing/assembly plants in Knoxville, Tennessee; Houston, Texas; and Huishan, China.

Education

FELLOWSHIP NOMINATIONS CALLED

Last week, a new membrane technology Fellowship program was announced by a partnership between the American Membrane Technology Association (AMTA) and the Bureau of Reclamation. The organizations will collaborate to award Fellowships to four full-time Master's or PhD students at a US university or college conducting research in innovations for water treatment in membrane related research.

Each of the four Fellowships to be offered will be granted as one-time payments of \$11,750 for work in the 2017-2018 academic years. And, according to Black & Veatch's Scott Freeman, the current AMTA president, the research undertaken by the awardees must pertain to the advancement of membrane technology in the water, wastewater or water reuse industries.

"The research must be consistent with AMTA's vision statement, which is: *Solving water supply and quality issues through the widespread application of membrane technology.* One of the Fellowship conditions is that awardees attend the 2018 AMTA/AWWA Membrane Technology Conference and give a presentation or poster on their research," he said.

The application deadline is 9 November, and Freeman predicted that awards would be made by the end of the year. For more information, visit <http://tinyurl.com/homqk5p>.

IN BRIEF

The **Southeast Desalting Association** (SEDA) will hold a one-day technology transfer workshop entitled “*Chemical Pretreatment for RO/NF*” in Cape Coral, Florida, on 15 November. For information, visit <http://tinyurl.com/jrgaxel>.

The Reserva Conchal Beach Resort in Santa Cruz, Costa Rica, on the Central American country’s Pacific Coast, has commissioned two **RWL Nirobox** containerized SWRO units. Each unit consists of disc filters and UF pretreatment, a SWRO system and all ancillary systems with a combined production capacity of 1,000 m³/d (264,000 gpd). The company said that the unit will diminish use of the local aquifer and increase water availability for area communities. In a news report, The Voice of Guanacaste said that five other businesses have since submitted paperwork to begin the permit process to install desal systems, and the Costa Rica Water and Sewerage Institute plans to build a desal plant at Playa Panamá in the near future.

Research on a **seawater flow battery** at Indiana University-Purdue University Indianapolis (IUPUI) has been halted due to a lack of funding and research interest following the lead faculty researcher’s departure to Korea and the University’s abandonment of the related intellectual property. Professor Peter Schubert, the director of IUPUI’s Richard G. Lugar Center for Renewable Energy, told *WDR* that no further research on the project—which combines the use of seawater as an electrolyte to produce energy and accomplish desalination—will continue until a new funding source is identified.

Following the acquisition of Schlumberger Water Services USA by WSP/Parsons Brinckerhoff, the company will be known as **PB Water Services USA**.

akvola Technologies, the Berlin, Germany-based startup and the developer of the akvoFloat—a flotation-filtration process employing ceramic membranes that is designed for RO pretreatment and industrial wastewater applications—has completed a Series A financing round. Among the investors participating were Bruno Steis, the ex-CEO of Inge, and Detlef Taprogge, the managing director of Taprogge GmbH, a supplier of MSF sponge ball cleaning systems and seawater intake systems. New investors include VNG

Innovation GmbH and BAMAC GmbH, while High-Tech Gründerfonds, an existing shareholder, also participated.

In conjunction with the upcoming **Caribbean Water & Wastewater Association’s** 25th Annual Conference & Exhibition on 24-28 October in Trinidad (<http://tinyurl.com/jm3mxkl>), the **Caribbean Desalination Association** (CaribDA) will hold a pre-conference workshop on *RO Pretreatment & Low-pressure Membrane Basics*. The half-day workshop will be held on 24 October and more information is available at <http://tinyurl.com/zm9812r>.

PEOPLE

Scott Lacy, formerly of SPI Engineering and Underground Solutions, has been appointed as a managing engineer at Brown and Caldwell where he will focus on advanced water treatment applications. He will remain based in the San Diego, California, area, and may be contacted at slacy@brwnclad.com.

American Water Chemicals has appointed **Darrell Byrer** as technical sales manager. Formerly with STW Resources and Bob Johnson and Associates, he has nearly 20 years of membrane systems design, installation, commissioning and maintenance experience. He will remain in Bastrop, Texas, and may be contacted at dbyrer@membranechemicals.com.

JOBS

UGSI Solutions, the leader in on-site hypochlorite generation and polymer activation, seeks a Regional Sales Manager to support its Texas and Mid-Central regions. Candidates should have an engineering degree with 3+ years of consulting or technical sales experience in the water industry. This Texas-based position will require 60% travel with annual compensation in the \$200,000 range. Send your resume to mhill@ugsicorp.com.

Project Manager – Membrane Treatment Biwater is seeking a Project Manager to serve its membrane treatment projects in the US. Ten years of municipal water/waste treatment plant delivery experience, including at least two membrane applications, and a relevant degree are required. Location is Southern California. Apply at HR.Department@biwater.com.