

WATER DESALINATION REPORT

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Company News

MF/UF COMPANY ACQUIRES RO CAPABILITIES

Microdyn-Nadir, the German-based water business unit of Mann+Hummel, announced last week that it has acquired California-based TriSep Corporation. TriSep is a specialty membrane company with a broad product range that includes NF and RO membrane technology in addition to MF and UF products that include its iSep spiral-wound UF membrane. The forty-year-old company also reportedly private-label manufactures FO membrane products.

Although the specifics of the deal were not announced, the combined company sales are estimated at \$60 million.

Mann+Hummel is one of the world's top air and water filtration companies and celebrates its 75th anniversary this year with annual sales of €4 billion (\$4.5 billion). It acquired 50 percent of Microdyn-Nadir in 2014 and took full control of the company last year. It offers MF/UF membrane products in flat sheet, tubular and hollow-fiber configurations.

WDR readers may be most familiar with the company's flat sheet, Bio-Cel UF membrane for submerged MBR applications. The frame-free membrane laminate provides a 'self-healing' effect if the membrane surface is damaged or punctured.

In 2013, Microdyn formed a partnership with Ovivo under which Ovivo became the exclusive representative for Microdyn's MBR products in the US. Microdyn is currently building a Bio-Cel production line in Austin, Texas, with production set to begin in early 2017.

At last week's WEFTEC conference, Microdyn CEO Walter Lamparter told *WDR*, "[TriSep president] Peter Knappe and I have known each other and worked together for a long time. We look forward to pooling our expertise to accelerate the growth of this new, one-stop shop for membrane products."

American Water Summit

This year's American Water Summit will be held at the Miami Hilton Hotel in Miami, Florida, on 6-7 December. For more information, visit <http://www.americanwatersummit.com>. The IDA's Energy & Environment Conference will immediately follow on 7-8 December.

Company News

MEMBRANE R&D COMPANY SEEKS BUYER

Much of the original development work for today's ubiquitous spiral-wound RO membrane can be traced back to a 1962 grant from the US Office of Saline Water. The three-year, \$275,000 grant was awarded to General Atomic Company based on a proposal written by three researchers, one of whom was Bob Riley.

After completing that initial project, Riley continued to conduct RO research for the company and its successors before founding Separation Systems Technologies (SST) in San Diego, California, in 1984. SST—which specializes in membrane design, synthesis, product fabrication, process development and associated technology transfer in both hollow-fiber and spiral-wound configurations—has expanded its scope to also include MF/UF, NF, RO and FO membrane technology.

Now, after thirty-two years of operation as a successful and unique membrane research process development company, Riley told *WDR* that he is seeking a financial partner or buyer. The partnership/sale would include all of SST's patents, internal project reports, related intellectual property and trade secrets, plus custom membrane fabrication and testing equipment and a specialized polymer inventory.

Since its inception, the company has collaborated with more than 150 industrial, governmental and academic clients around the globe, with an excellent track record of winning Phase 1 and Phase 2 Small Business Innovation Research (SBIR) grants. It maintains a fully equipped membrane R&D and testing facility, three professional employees and two associate consultants for hollow fiber design/processing and molecular dynamics modeling.

Interested individuals or parties may obtain more information by contacting Riley at riley1034@gmail.com.

Reuse

EUROPEAN REUSE ASSOCIATION LAUNCHED

Although water reuse is playing an increasingly important role in European water strategies, there hasn't been a single unifying body through which it has been able to share best



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practice and develop one voice on its important issues. The recent formal launch of Water Reuse Europe now appears to have filled that void.

Two weeks ago, at EurEau Congress 2016 in Copenhagen, Water Reuse Europe (WRE) was announced with a mission “to create a collective identity for the European water reuse sector and promote an innovative and dynamic industry.” The association is intended to offer a range of services for commercial companies and public organizations involved in water reuse system design, operation and regulation.

Cranfield University’s Professor Paul Jeffrey, the chair of the WRE Board of Directors, said, “Europe now has an industry-focused association dedicated to ensuring that the European water reuse sector is able to deliver innovative and safe water reuse solutions. With the global water reuse sector growing at about 20% per annum, Water Reuse Europe will also ensure that European products, services and expertise are accessible to communities around the world.”

WRE will hold its first specialist workshop on 23 November in Le Puy du Fou, France, with invited speakers delivering presentations on innovation, business models and water reuse technologies. It will be organized as a side-event to the REUSE conference organized by Vendée Eau and Veolia on 24-25 November.

More information will be available later this month at info@water-reuse.eu.

Technology

BRINE CONCENTRATION TECHNOLOGY UNVEILED

During an innovative technology session at last week’s Texas Desalination Association’s annual conference in Austin, Texas, IDE Technologies’ Jacky Ben-Yaish gave a brief introduction to the company’s new brine concentration technology. Employing a fluidized bed pellet reactor, the process concentrates brine from a conventional membrane or thermal desal system to improve recovery by an additional 5 to 20 percent.

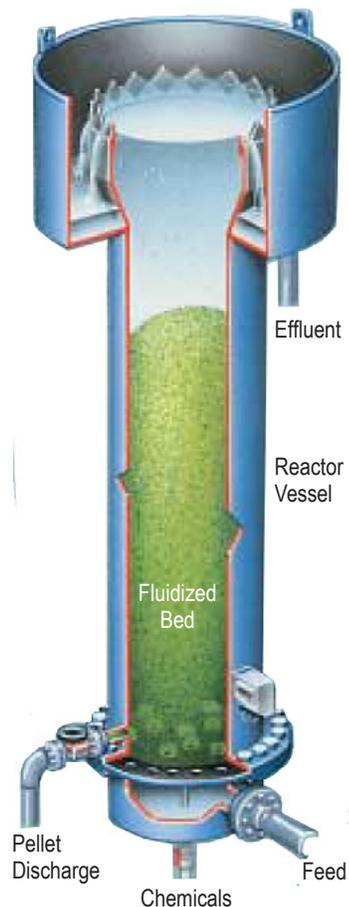
The system operates on a semi-batch basis and consists of a three-step process. In the first step, brine rejected from the primary desal process is fed to a secondary RO system consisting of a maximum of four elements in each pressure vessel to recover additional permeate. Feed and concentrate tanks are utilized to allow the brine to be recycled and concentrated via repeated RO treatment.

The novel step in this process is that prior to being recycled, the brine is first passed through a fluidized bed pellet reactor.

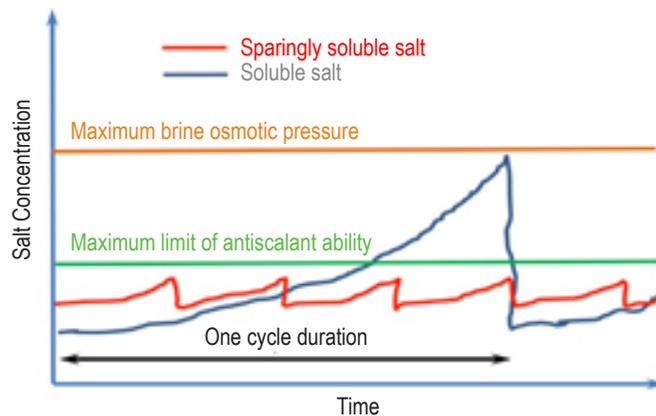
The feedwater is introduced at the bottom of the reactor and pumped upward through a bed filled with seed pellets at such a velocity that the pellets are kept in a fluidized state. The pellets serve as nucleation sites for sparingly soluble precipitating salts, while the solids-free brine flows upwards, out of the unit. The feed water recycled to the RO will have a continually increasing concentration of soluble salts, which can be recycled repeatedly until the maximum osmotic and working pressures of the RO are reached.

The pellets containing CaSO_4 , or other sparingly soluble salts, are removed as necessary to ensure only soluble salts such as NaCl are concentrated in the RO. Reagents and pH are usually combined with seed particles in this type of reactor—

known under the Crystalactor brand name—which was originally developed by DHV and licensed to IDE. Unlike other types of crystallizers, a Crystalactor can operate on chemistry changes alone; none of which were discussed during last week’s short, time-restricted presentation.



Crystalactor fluidized bed reactor



Process parameter changes during process cycle

Ben-Yaish said that the system can handle different feed salinity levels and adjust its recovery accordingly, keeping brine solution constant at highest possible level, and that

the changes in osmotic pressure of the liquid dramatically reduces the tendency for system biofouling.

The system has been successfully operated in pilot tests and plans call for continued testing through 2017.

WDR's current C_{DR} for this technology is 4.5.

Company News

MBR PROJECTS ANNOUNCED AT WEFTEC

GE Water used last week's annual gathering of an estimated 25,000 water and wastewater industry professionals at the WEFTEC conference in New Orleans, Louisiana, to make three membrane bioreactor (MBR) project announcements. New projects announced were an upgrade to an existing wastewater treatment plant using its LEAPmbr technology and the company's first commercial installation of its ZeeLung technology. The company also announced the results of a year-long demonstration study.

Cranberry Township, Pennsylvania – The Brush Creek Water Pollution Control Facility currently has a wastewater treatment capacity of 3.4 MGD. When the township, located 20 miles (32km) north of Pittsburgh, had to increase its secondary treatment capacity to 7.2 MGD (27,252 m³/d) while meeting stringent phosphorus and nitrogen limits, GE's LEAPmbr was selected.

LEAPmbr employs GE's ZeeWeed submerged membrane technology, and the upgraded plant is scheduled to be operational in early 2018.

Yorkville-Bristol Sanitary District, Illinois – The twin cities of Yorkville and Bristol are located 45 miles (72km) west of Chicago in the Fox River watershed. The District's existing 3.62 MGD (13,700 m³/d) activated sludge WWTP is operating near its design load. To accommodate additional capacity resulting from new industries and more stringent phosphorous discharge limitations, it selected GE's ZeeLung membrane aerated biofilm reactor (MABR).

The MABR process employs a hollow-fiber, gas transfer membrane to efficiently deliver oxygen to biofilm attached to the membrane's periphery. The improved aeration efficiency enables an increase in treatment capacity while reducing the system's energy consumption without increasing the plant footprint.

The plant, which will be GE's first commercial ZeeLung MABR installation, is scheduled to be operational in 2017.

Metropolitan Water Reclamation District, Chicago – GE also announced the results of a 12-month demonstration project

of its ZeeLung MABR technology. The 0.5 MGD (1,892 m³/d) demo plant employed a full-scale MABR cassette operating in a side-stream configuration at the Metropolitan Water Reclamation District's O'Brien Water Reclamation Plant in Skokie, Illinois, near Chicago. The results, which were presented in a paper at WEFTC, showed a 30 percent energy demand reduction with enhanced nutrient removal.

Company News

DESAL COMPANY SETS IPO SHARE PRICE

It has been almost exactly one year since Tampa-based AquaVentures—the parent company of Seven Seas Water—announced that it would launch an initial public offering (IPO) on the New York Stock Exchange. At the time, it did not offer a share price, although its value was estimated at \$100 million.

The company has now set an indicative IPO price range of \$18-\$20 for each of the 6.5 million shares that it will sell on the expected trade date of 6 October. Following the completion of the offering, the company will have a total of 25.4 million ordinary shares outstanding.

The company will trade under the ticker symbol "WAAS", a reference to the company's trademarked tag line, "Water-as-a-Service".

IN BRIEF

Tianjin Motimo, a Chinese manufacturer of hollow-fiber MF/UF membranes, has announced that it would acquire ceramic membrane manufacturer Jiangsu Kaimi Membrane Technology for RMB1 billion (\$150 million) and Western China-based systems integrator Gansu Jinqiao Water Technology for RMB420 million (\$63 million).

Errata: In last week's issue, *WDR* reported that the **Padre Dam MWD** in San Diego County is conducting an IPR demonstration project in which a third-stage RO system employing Desalitech's ReFlex RO technology was successfully operating at a 96 percent recovery. In that story, Desalitech said that it didn't know of another similar system that was continually operating at more than 85 percent recovery. However, a *WDR* reader pointed out that the Water Replenishment District of Southern California's (WRD) Leo J. Vander Lans Water Treatment Facility had been operating its full-scale IPR plant at 92 percent recovery. *WDR* subsequently confirmed with the District's Paul Fu that the plant had indeed been operating with a third stage RO at a 92

percent recovery since it was commissioned in 2014. *WDR* plans to compare the schemes in an upcoming issue.

The Northwest Membrane Operator Association (NWMOA) will hold a workshop entitled *UF/MF Technologies and Trends – The Bend Experience*, on 4 November in Bend, Oregon. For more information, visit <http://tinyurl.com/h6j22dx>.

Pentair has been awarded the contract to supply its X-Flow Xiga UF membranes on the first phase of the three-phase Lackarebäck Water Treatment plant in Sweden. The initial phase will include four skids with a production capacity of 42,750 m³/d (11.3 MGD). At build-out, the plant will have a total capacity of 186,000 m³/d (49.1 MGD) and will be Sweden's largest membrane facility.

San Diego County's **Otay Water District** has plans to purchase up to 20 MGD (75,700 m³/d) of desalted seawater from the 100 MGD (378,500 m³/d) Rosarito Desalination Plant to be constructed across the US-Mexican border in Baja California, Mexico. However, before that can happen, the US State Department must evaluate the project and a Presidential Permit issued. As part of the review process, the public is invited to comment on whether the project proposed by the Otay Water District is the national interest. To submit comment to the State Department, go to www.regulations.gov and search for docket number DOS-2016-0061.

The **International Desalination Workshop** (IDW 2016) : Sustainable Desalination will be held on 13-15 November in Abu Dhabi, UAE. For more information, visit <http://www.desalworkshop.org/main/>.

PEOPLE

Jorge Aguinaldo, formerly the director of business development with RWL Water, has left the firm and is now available to consider other assignments. He is based in Tampa, Florida, and may be contacted at jaguinaldo@aol.com.

Gary Crisp has joined the John Holland Group, where he will be involved with the company's Australian and Asia Pacific water projects. Formerly Sacyr/Valoriza Agua's

water business development director, he has relocated from Washington DC to Perth. He may be contacted at gary.crisp@jhg.com.au.

Cheryln Stithem, an administrative assistant with Veolia Water Technologies for the past twelve years, will leave the firm and is available to consider other offers. She is based in Houston, Texas, and may be contacted at stithem@att.net.

Tarek El-Shafie, formerly vice president of sales and marketing of American Water Chemicals and later, a product line manager with Graver Water Systems, has left the firm and is available for independent consulting assignments while he considers other longer-term options. He may be contacted at telshafie@netzero.com.

Saif Saleh al-Sayari has been appointed as director-general for Abu Dhabi Water & Electricity Authority (ADWEA). He was formerly the head of energy solutions at Abu Dhabi National Energy Company (TAQA).

Tom Vanden Heuvel, formerly a vice president with newterra (Crane Water) and the managing principal with Blue Water Advisors, has been appointed president of Kemco Systems. He is based in Clearwater, Florida, and may be contacted at tvandenheuvel@kemcosystems.com.

Israel's Amiad Water Systems has appointed **Dori Ivzori** as CEO. He was formerly the managing director of Tamma Plastics and his appointment occurs after Arik Dayan's recent announcement that he would step down.

Timothy Lam has joined Water Planet as its chief representative for the Asia Pacific region. Formerly Pall's vice president of sales for Asia Pacific and Hyflux's head of business development for modular systems, he will be based in Singapore and may be contacted at tlam@waterplanet.com.

JOBS

akvola Technologies, the Berlin-based supplier of proprietary flotation-filtration technology is seeking a sales engineer and an application engineer to support its increased business activities. For more information, send your resume to jobs@akvola.com.