

# WATER DESALINATION REPORT

The international weekly for desalination and advanced water treatment since 1965

Volume 46, Number 3

18 January 2010

## Haiti

### AFTER TREMORS, WATER CRISIS INEVITABLE

Like many impoverished nations, Haiti's water purification and sanitation systems are inadequate, providing only 70 percent of the country's urban population, and one half of its rural population, with access to improved water supply and sanitation. Its infrastructure is old, poorly maintained and relies on aging pipes and trucks for distribution.

There have been few reports of Haiti's water supply and sanitation systems' status since last week's devastating earthquake, but if the damage to the buildings and roads is any indication, the fragile water system that existed before the quake has surely suffered severe damage. A potable water shortage will certainly emerge as the new focus of the disaster.

In his *City Lights* column, Pacific Institute's Peter Gleick suggests that desal systems from big US Navy ships such as the USS Carl Vinson might provide some relief. But with a production rate of only 1,514 m<sup>3</sup>/d (0.4 MGD) and a crew of 6,000, any "excess" desal production from the USS Vinson's distillers won't go very far in a city of 2.5 million thirsty people with forecast temperatures of 31°C (88°F).

Practically speaking, the unfortunate situation in Haiti may serve as a lesson for regions and communities without reliable local water supplies, particularly those located in areas susceptible to earthquakes or other natural disasters.

#### How can you help?

Water for People is the water industry's best-known humanitarian organization, so *WDR* asked CH2M Hill's Elisa Speranza, the organization's current president, what those who would like to help during Haiti's current crisis could do.

She explained, "Water for People is a development agency involved with longer-term, sustainable water and sanitation programs. Unfortunately, we are not set up to provide emergency response and are unable to do relief work. We do receive a lot of calls at a time like this and work closely with several organizations that provide excellent aid and support during disasters, including [Catholic Relief Services](#), [Mercy Corps](#), and [CARE](#). We recommend that those who would like to help in the Haitian crisis donate to one of these organizations."

## UAE

### DUBAI LOOKS AT IWPP...FINALLY

In a move that could result in a further erosion of MSF market share, Dubai Electricity & Water Authority (DEWA) has issued a tender invitation to firms interested in providing consultancy services to study the implementation of an independent power

and water producer (IWPP) project delivery model. DEWA and Kuwait's Ministry of Electricity and Water are the last two major GCC utilities that have not yet adopted the privatization model for water and power production.

Both Dubai and Kuwait are also the only two utilities to rely almost solely on MSF technology for seawater desalination. Although Kuwait's recent 30 MIGD (36 MGD) Shuwaikh SWRO project broke its MSF tradition, it was delivered using a traditional EPC model, rather than an IWPP.

All of DEWA's major desal plants rely on MSF technology, and when the Hassyan 1 project was initially bid (on three separate occasions), MSF technology was the only acceptable process that could be employed. The capital costs for the 120 MIGD (144 MGD) MSF desalination system gradually declined from \$1.21 billion in April 2008, to \$998 million in August 2008, and finally to \$904 million in November 2009.

According to Waleed Salma, DEWA's business development vice president, only the new Hassyan 1 project will initially employ the privatized IWPP model. All existing plants will continue to be run by DEWA, although the other facilities could be handed over to the private sector "one by one".

Saeed Al Tayer, DEWA's managing director and chief executive, told *Gulf News* that the IWPP business model depends on "competitiveness and the latest technology available" for its energy needs and environmental considerations. When other similarly sized projects in the region went forward as IWPPs, many turned to MED, MED/SWRO or MSF/SWRO technology as a way to reduce capital and operating costs.

DEWA currently produces 275 MIGD (330 MGD) of desalted water, and 32 MIGD (38.4 MGD) of well water.

Tenders can be purchased online at [www.dewa.gov.ae](http://www.dewa.gov.ae) under e-services and are due 22 February.

#### Desal Market Webinar

*Global Water Intelligence* publisher Christopher Gasson will hold a webinar on 27 January during which he will analyze the 22<sup>nd</sup> Desalting Plants Inventory. He will focus on the size and value of the global desal market, technology market share, regions and suppliers, and how the industry has changed.

The webinar – which will be sponsored by Koch Membrane Systems – will last approximately one hour and will start at 15:30 GMT, 10:30 AM EST, 7:30 AM PST.

A limited number of spaces are available to *WDR* readers by contacting [jmc@globalwaterintel.com](mailto:jmc@globalwaterintel.com).

**OpEd****DUMB & DUMBER**

For a “fact sheet” that seems obsessed with appearing credible – 980 words were used to footnote the 1,260-word diatribe – Food & Water Watch’s most recent attack on desalination made a very basic mistake. It mistakenly identified a photo of seven power plant stacks as “A desalination plant in the Canary Islands.”

Much of *Not Worth Its Salt* focuses on the fact that the investor-owned, regulated utility that has proposed a \$79 million, 7.5 MGD (28,385 m<sup>3</sup>/d) brackish water desal project on New York’s Hudson River, expects to generate a profit. The balance of the story repeats Food & Water Watch’s familiar complaints, all of which were addressed in the recently completed Draft Environmental Impact Statement.

If someone doesn’t even know what a plant looks like, how can he/she be expected to know how it works?

On Saturday, Circle of Blue’s *WaterNews* used the very same photo in a story on desal’s impact on Israeli water rates. Circle of Blue is affiliated with the Pacific Institute – a usually reliable group that should know better – and calls itself a “network of leading journalists, scientists and communications design experts” that says it “practices non-advocacy journalism and science, striving to report issues to the highest standards of journalistic and scientific ethics.”



*The frequently misidentified power plant*

**Florida****CONSULTANT PICKS LAND-BASED SWRO OPTION**

Taurant Consulting president Jerry Salsano confirmed to *WDR* that an alternative water supply project looking into seawater desalination has completed the first phase of its investigation and determined that a land-based facility is the preferred option. According to the report prepared by Malcolm Pirnie, a land-based facility would cost less and be more reliable than a vessel-based approach.

Salsano is a consultant for St Johns River Water Management District (SJRWMD), one of nine local governments forming the Coquina Coast Cooperative that is funding the study. He said that the study would now move to its second stage, which will include a 35 percent design, an evaluation of permitting requirements and a determination of the recommended project procurement method.

Water Standard CEO Amanda Brock, a supplier of vessel-based desalination systems, told *WDR*, “We have watched the project over the last year, and recognized early on that it was not a good fit for us. The vessel-based desal option was penalized severely due to the Atlantic’s shallow topography which results in long product water pipe runs. That, combined with significant on-land storage requirements, drove the cost north of where we believe vessel-based desalination is for most applications.”

The initial 30 MGD (113,550 m<sup>3</sup>/d) project would come online after 2015 at a cost of up to \$1.2 billion, including 190 miles (300km) of distribution pipelines. It could ultimately supply 80 MGD (302,800 m<sup>3</sup>/d) by 2050.

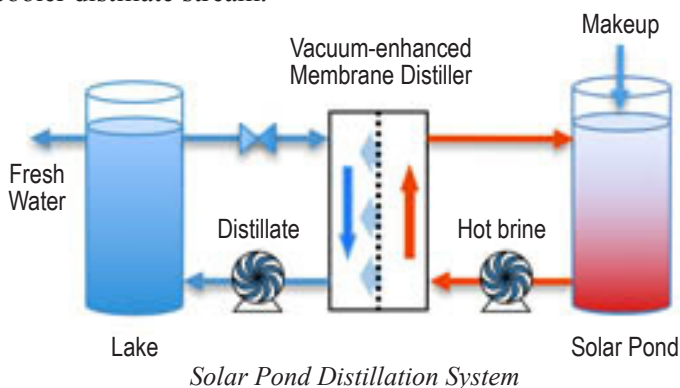
**Technology****SOLAR POND AND MEMBRANE DISTILLATION**

In the 1980s, Ormat Industries developed one of the world’s first successful solar power stations using evaporation ponds as thermal energy collectors. Inspired by the use of solar ponds in conjunction with terminal lakes – saline waterbodies like the Dead Sea or Salton Sea with no ocean outflow – two university professors initiated a DOE-funded study to look at solar ponds in conjunction with their newly patented membrane distillation process.

Dr Amy Childress of the University of Nevada-Reno and Dr Tzahi Cath of the Colorado School of Mines conducted a lab-scale demonstration that showed that it was possible to use renewable heat stored in dense brine to drive the process, producing distillate-quality permeate with no additional energy input, even from saturated brine feed. “The only additional energy input is that which is required to drive the feed and distillate pumps,” said Cath.

While the University of Texas-El Paso had looked at the use of membrane distillation (MD) for a 2004 study, Cath said that new membranes, new techniques and new auxiliary technologies have improved MD, solar ponds and their synergistic combination. “Our new system uses hollow-fiber, hydrophobic membranes in a vacuum-enhanced direct contact MD configuration that allows us to operate at twice the flux of conventional MD systems and more than six times higher than the 2004 study.”

Childress explained that when used with a terminal lake, a small portion of the lake is partitioned off and converted to a solar pond. Hot brine in the lower storage zone of a pond can reach temperatures of 90°C (195°F), and it is this brine that is pumped through the membrane fiber's lumen, while cooler distillate is pumped counter-currently across the outside of the fiber. The temperature and vapor pressure gradient across the membrane causes some water vapor from the brine to pass through it, where it is condensed into the cooler distillate stream.



The brine exiting the system is now cooler and more concentrated, and is discharged back to the solar pond, while the slightly warmer distillate can be sent to the main body of the lake, or put to some other beneficial use. A portion of the distillate will be recycled to the inlet side of the MD unit to continue the process.

Childress told *WDR* that the lack of an optimized membrane is holding back the advancement and commercialization of the MD process. “Capillary membranes that maximize surface area for evaporation and facilitate flow of water on both sides of the MD membrane will not only benefit the new vacuum-enhanced configuration, but also other MD configurations,” she said.

Cath added that they are now looking for a site and funding to take the project from the lab to the field.

Things always become more challenging when there is a need to integrate two or more heat and mass balances. As one desal skeptic told *WDR*, “Processes that claim to offer the best of both worlds are often limited by compromises on one or both.”

Although MD produces high-quality water using low-grade waste heat and a low-cost heat transfer surface, most systems have high specific heat consumption which increases the required heating and cooling infrastructure. There could be a steep learning curve as the systems to control the process and sustain the required gradients are developed and optimized.

*WDR*'s  $C_{DR}$  rating for the technology is 6.5.

## California

### TEAM PICKED FOR SWRO INTAKE PILOT

A Project Participant's Committee consisting of six Orange County water utilities has approved the recommended award of a seawater desalination pilot project to a team led by Separation Processes Inc (SPI). The issue will now go before the Municipal Water District of Orange County (MWDOC) board later this week to formalize the award.

SPI's team includes CDM, marine microbiologist Dr Sunny Jiang from UC-Irvine, and Environ Strategy Consultants which will operate and maintain the pilot system.

Project manager Richard Bell told *WDR* that the project's major goal is to confirm the ability of a slant well intake system to produce the desired quantity and quality of seawater, and to develop a process design specification for a full-scale desalination plant. The project's scope includes the staffing, operation and maintenance of a SWRO test facility, determination of pre- and post-treatment requirements and water characterization studies.

“Based on our previous studies, we know the new intake can provide feedwater with SDIs of less than one, so we plan to focus on potential microbial fouling issues on this study,” he said.

A successful pilot project could pave the way for the South Orange Coastal Ocean Desalination Project – previously referred to as the Dana Point Desalination Project – with a production capacity of up to 25 MGD (94,625 m<sup>3</sup>/d).

The \$1.2 million pilot project should begin in April or early May.

## Company News

### STOVER HEADS EAST

Massachusetts-based Oasys Water, Inc has announced that Dr Rick Stover, ERI's former chief technology officer, will join the company as vice president of engineering. Oasys CEO Aaron Mandell said that effective today, Stover would lead the company's engineering, product development and commercialization efforts.

Oasys, formed with a seed investment from GreatPoint Ventures, received \$10 million in venture capital funding in February 2009 to further develop its forward osmosis (FO) desalination technology, known as Engineered Osmosis™ (EO™).

Unlike RO, which uses hydraulic pressure as its driving force, EO employs the natural osmotic pressure gradient created by a highly concentrated ammonia/carbon dioxide 'draw solution' to pull water from a feedwater stream

through a membrane. The ammonia and carbon dioxide are then easily separated from product water using low-grade waste heat.

Pilot tests are continuing and Mandell said that a demonstration plant would be completed in the fourth quarter of 2010, with Stover working closely with Oasys' partners on a commercial installation.

Stover told *WDR* that he considers Oasys' EO process to be one of the most exciting new developments he has seen. "The process recovers energy rejected from waste heat sources and also opens the door to a host of new osmotic membrane treatment processes," he said.

Stover will relocate to Cambridge, Massachusetts and can be contacted at [rstover@oasyswater.com](mailto:rstover@oasyswater.com).

## Jordan NEW DESAL, REUSE ORGANIZATION MEETS

As Jordan considers new water supply sources, a new organization has been established to facilitate the dissemination of desalination and wastewater reuse knowledge and aid in the transfer of technical know-how. The founders of the new Jordan Desalination and Reuse Association (JoDRA) met in Amman last week to select its inaugural board.

According to Koussai Quteishat, the newly elected president, the organization is going to focus on regional cooperation and will align its activities with those of other regional affiliates. "The new organization is an environmental association with Jordan's Ministry of Environment as its counterpart. Our members include public officials and representatives from industry and academia," he told *WDR*.

"Jordan is embarking on new seawater and brackish water desalination projects and is the scene of the well-known Red Sea/Dead Sea Conveyance project involving desalination of hundreds of millions of cubic meters of seawater."

Quteishat, the former director of the Middle East Desalination Research Center (MEDRC), can be contacted at [koussaiquteishat@gmail.com](mailto:koussaiquteishat@gmail.com) for more information.

## IN BRIEF

**Sydney Water's** Susan Trousdale told *WDR* that Sydney Water's 250,000 m<sup>3</sup>/d (66 MGD) SWRO plant is progressing well and that commissioning of the first module is well underway. It should be supplying water later this month or early February. "The pipeline delivering water from the plant

to the people of Sydney is complete and being disinfected," she said.

As part of its solicited research program, the **WateReuse Foundation** has issued an RFP for a project that will investigate the value of water supply reliability for commercial, industrial and institutional customers. The project will look at the differences between the water users to better understand the unique values each places on supply reliability through the application of relevant economic valuation techniques. A maximum of \$250,000 is available from WRF for funding the 24-month project, which will require matching funds of at least 25 percent. Proposals are due 22 February and information is available at [www.watereuse.org/node/842](http://www.watereuse.org/node/842).

Degrémont has selected PROTEC pressure vessels from **Bekaert Progressive Composites** for use in the 218,000 m<sup>3</sup>/d (57.6 MGD) Ad Dur SWRO plant in Bahrain. The company began production of the units in June 2009.

**Energy Recovery Inc** (ERI) has been awarded a contract to furnish its PX energy recovery device for the 411 ML/d (108 MGD) Victoria Desalination Plant south of Melbourne. AquaSure, a consortium of Degrémont, Thiess and Macquarie, is constructing the plant, and ERI says the energy recovery devices will be delivered in two phases during the first half of this year.

The Southwest Florida Water Management District (SWFWMD) is offering a free publication that explains the **history and safety of reclaimed water** at [www.swfwmd.state.fl.us/publications/files/reclaimed\\_water\\_lev2\\_08.09.pdf](http://www.swfwmd.state.fl.us/publications/files/reclaimed_water_lev2_08.09.pdf).

UAE-based **Metito** has announced the launch of a 57,000 m<sup>3</sup>/d (15 MGD) MBR wastewater plant on Abu Dhabi's Yas Island, a new leisure and entertainment destination. Metito will also operate and maintain the plant – which employs Toray membranes – for the next three years.

## JOBS

**Pump Engineering** (PEI) a Division of ERI, is seeking qualified Technical Sales Engineering candidates. Responsibilities include: work with Technical Support to develop and issue quotes and proposals under the direction of the International Sales Manager; support the Sales Team in following up and closing orders; act as project/contract manager on designated projects. Preferred candidates will have an engineering degree and 5 years' sales/sales support experience, preferably in the water treatment industry. Email resume to: [ireau@pumpengineering.com](mailto:ireau@pumpengineering.com).