Special Feature: Irrigation Technology (P.24)

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نيسان (أبريل) ٢٠١١ مجلد ٣٥ – عدد رقم ٤

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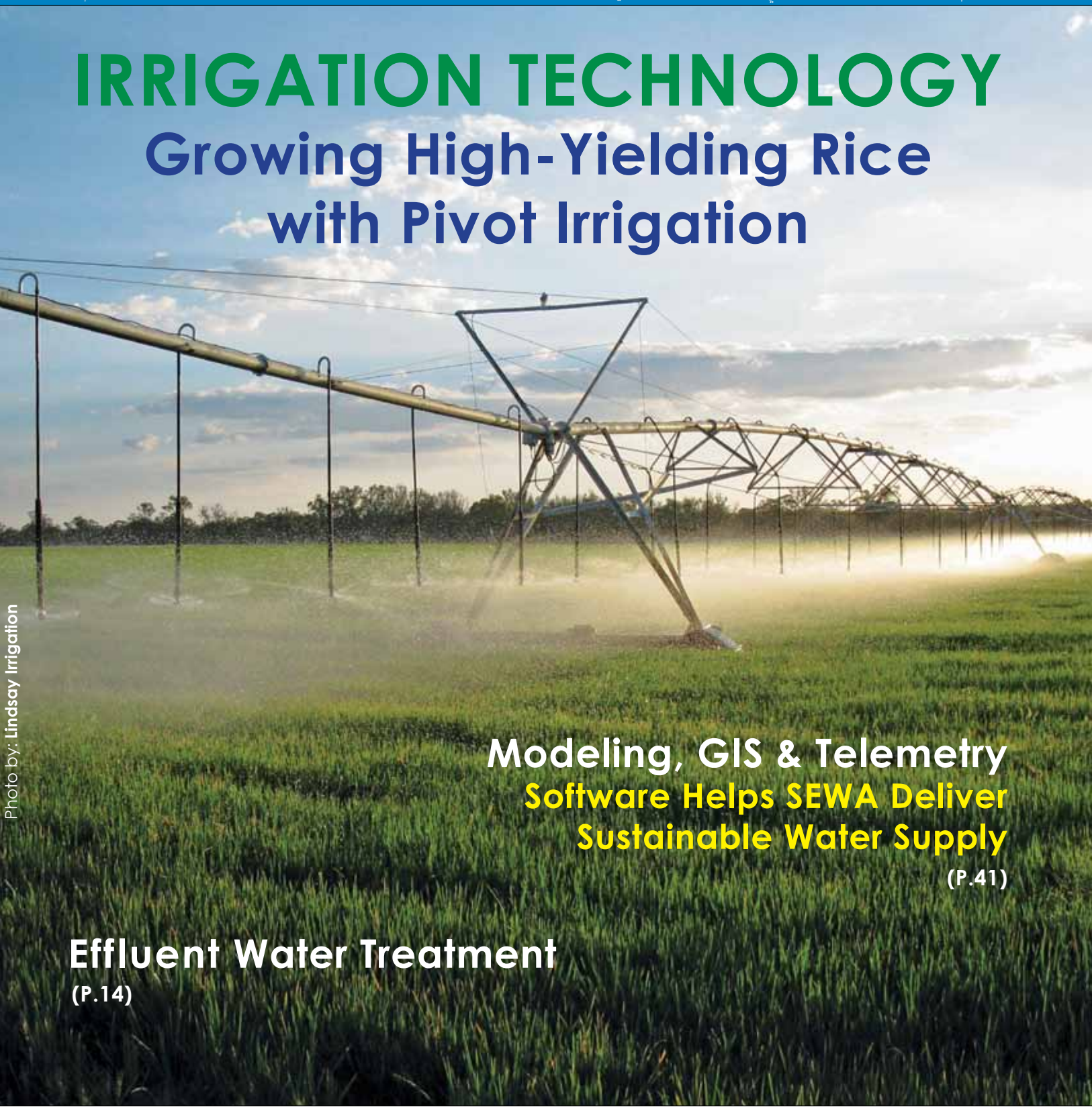

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Modeling, GIS & Telemetry Software Helps SEWA Deliver Sustainable Water Supply

(P.41)

Effluent Water Treatment

(P.14)

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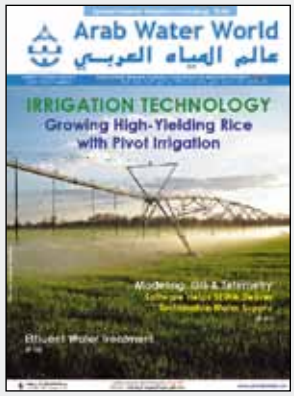
مجلد ٣٥ – عدد رقم ٤، نيسان (أبريل) ٢٠١١

ISSUE CONTENTS

محتويات العدد



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Emergency Water Storage

During the last few months, I have noticed that some Arab countries (Gulf countries in particular) are building huge water storage reservoirs as backup in case something goes wrong at desalination facilities. This shows the extent to which the authorities would go in order to avoid any water supply shortages that could be due to technical or human errors, or any other unexpected factors. One of these countries is Qatar, where the authorities have decided in March 2011 to allocate US$2.75 billion for the construction of gigantic reservoirs that could store 1.9 billion gallons of water (7.2 billion liters), enough to meet the population's water demands for seven days.

As we realize how important it is to store potable water for emergencies, we call on all financially capable Arab countries to implement this solution as a last resort when other methods are not applicable. One of those methods involves the underground storage of desalinated water, away from pollution and evaporation. Geological and Hydrogeological feasibility studies should be conducted for this purpose; they allow the pinpointing of appropriate locations where desalinated water can be stored when not needed.

The underground storage of desalinated water has many benefits in comparison to aboveground storage projects. Underground reservoirs do not require much maintenance and it does not cost much to store water in them. Groundwater does not evaporate and is impervious to pollution, which makes it safe for consumption all year round. Most importantly, aboveground water reservoirs are prone to breakages and fissures due to weather conditions, technical reasons, or sabotage.

I call on all Arab countries, especially Gulf countries that rely on desalination plants to supply their potable water needs, to seriously consider underground emergency water storage, as it could provide them with enough water to last not only for seven days, but for weeks and months.

Finally some good news for our dear readers. The World Bank's Board of Executive Directors met on March 10, 2011 to discuss the Eligibility Report for the Lebanon - Greater Beirut Water Supply Project. Executive Directors considered the Inspection Panel's Report and Recommendation regarding the "Lebanon - Greater Beirut Water Supply Project" issued on January 20, 2011, in relation to a Request for Inspection submitted in November 2010. During the meeting, Management proposed to expand a study already undergoing on water quality issues to cover water availability and costs. Acknowledging the legitimacy of the requesters' concerns, the Board invited the Inspection Panel to return by July after considering and taking into account the analysis of the study commissioned by Management on the water quality, availability, and cost, in order to inform the Board on whether or not subsequent investigation is warranted, and if so, on its precise focus.

We will be following up on this case with updates regarding the outcome of the Inspection Panel's visit to Lebanon when a report is available. In the next few weeks, however, we will be taking steps towards revealing potential damage and losses that will be incurred by the residents of Beirut City in case the project to draw the Litani River water to Beirut is implemented.

تخزين المياه للحالات الطارئة

لفت انتباهي خلال الأشهر القليلة الماضية قيام بعض الدول العربيّة، والخليجيّة منها بشكلٍ خاص، ببناء خزانات ضخمة لتخزين المياه تحسّباً لحدوث خللٍ ما في مشاريع التحلية. وهذا العمل يدل على مدى حرصِ الأجهزة المختصّة لتلافي حصول نقصاً في إمدادات المياه بسبب أعطال تقنيّة أو بشريّة قد تحصل في محطّات تحلية المياه أو لغيرها من الأسباب التي يصعب التكهّن بها. ومن بعض هذه الدول التي لجأت الى أخذ الحيطة لحصول مثل هذه الأعطال هي دولة قطر التي قرّرت خلال شهر آذار (مارس) ٢٠١١، تخصيص مبلغ قدره ٢,٧٥ مليار دولار أميركي لبناء خزانات عملاقة قادرة على لتخزين ١,٩ مليار غالون من المياه تكفي لسد حاجات السكان لمدّة ٧ أيام.

إننا إذ ندرك مدى أهمّية تخزين مياه الشرب للحالات الطارئة، ندعو جميع البلدان العربيّة التي تسمح إمكانياتها المالية باعتماد هذا الحل عند تعذر اللجوء الى أساليب أخرى يمكن بواسطتها تحقيق الغاية ذاتها. ومن أهم هذه الأساليب، إعتماد تخزين المياه المحلّاة في جوف الأرض، حيث تكون هذه المياه في منأى عن التلوّث والتبخّر. ولمعرفة مدى إمكانية تحقيق هذه الغاية، ينبغي القيام بدراسات جيولوجيّة تتبعها دراسات هيدروجيولوجية يتم على أثرها تحديد المواقع الملائمة التي يمكن بواسطتها تخزين المياه المحلّاة خلال الفترات التي تنخفض فيها الحاجة إليها.

إن تخزين المياه المحلّاة في جوف الأرض له فوائد عديدة مُقارنةً مع المشاريع المتعلّقة بتخزينها فوق سطح الأرض. فالخزانات الجوفية لا تحتاج إلى صيانة تذكر مُقارنةً مع صيانة الخزانات السطحيّة، كما أن أكلاف تخزين المياه فيها زهيدة مُقارنةً مع أكلاف بناء الخزانات الضخمة. المياه الجوفية غير قابلة للتبخّر أو التلوّث ممّا يجعل إمكانية استعمالها آمناً طوال أيام السنة. والأهم من ذلك فإن احتمال تهدّم الخزانات السطحيّة أو تشقّقها يُعتبر وارداً بسبب العوامل المناخية أو لأسباب تقنيّة أو لأعمال تخريبيّة.

أدعو جميع البلدان العربيّة وخاصةً الدول الخليجية التي تعتمد على مشاريع التحلية لتأمين حاجاتها من مياه الشرب، إلى إيلاء موضوع تخزين المياه للحالات الطارئة في جوف الأرض الاهتمام اللازم وبذلك تحصل على ما تحتاج إليه من مياه تكفي ليس فقط لمدة ٧ أيام بل لأسابيع وأشهر عديدة.

خبرٌ سار أزفّه الى قرّاء المجلة الكرام. فبتاريخ ٢٠١١/٣/١٠، إجتمع مجلس المدراء التنفيذيّين في البنك الدولي لمناقشة تقرير الأهلية الخاص بمشروع تزويد بيروت الكبرى بالمياه في لبنان. وقد نظر المدراء التنفيذيّون في التقرير الصادر عن هيئة التفتيش بتاريخ ٢٠ كانون الثاني (يناير) ٢٠١١ المتعلّق بمشروع تزويد بيروت الكبرى بالمياه وفي التوصيات الناشئة عنه، وذلك إثر طلب تفتيش مُقدم في شهر تشرين الثاني (نوفمبر) ٢٠١٠. وقد اقترح المدراء خلال الاجتماع توسيع نطاق دراسة قيد الإجراء حول جودة المياه بحيث تشمل كذلك مسألة توفّر المياه وكلفتها. وإذ أقرّ المدراء التنفيذيون بمشروعيّة مخاوف أصحاب طلب التفتيش، دعوا هيئة التفتيش الى زيارة لبنان مجدداً بحلول شهر تموز (يوليو) بعد الأخذ بعين الاعتبار نتائج الدراسة التي طلبها المجلس حول نوعيّة المياه ومدى توفّرها وكلفتها، وذلك من أجل إطلاع المجلس على ضرورة أو عدم ضرورة مواصلة التحقيق، وفي حال الإيجاب، على المجال الذي سيتم التركيز عليه.

وسنوافيكم بنتائج زيارة هيئة التفتيش للبنان فور توفّرها، علماً بأننا سوف نلجأ في الأيام والأسابيع القادمة الى اتخاذ خطوات من شأنها أن تكشف لأهالي وسكان مدينة بيروت وضواحيها الضوء على الأضرار والخسائر التي سوف تصيبهم من جراء جر مياه نهر الليطاني لتأمين احتياجاتهم المائية.

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Iran

China to Help Iran Build World's Tallest Dam

China will join Iran in building the world's tallest dam in the Islamic state, Iran's Energy Minister was quoted as saying in March.

"One of the major events in the water sector of the country is to sign the finance contract with China for execution of Bakhtiari dam," Energy Minister *Majid Namjoo* was quoted as saying by the ministry's website.

The contract was signed between Iran and China on March 14, 2011.

Mohammadreza Rezazadeh, managing director of Iran's Water and Power Resources Development Company, said the Chinese firm Sinohydro Corporation and its Iranian counterpart Farab would be involved in construction of the dam in the western province of Lorestan.

Rezazadeh said the contract was worth US$2 billion. The dam would be 315 meters high and would hold Iran's largest reservoir of about 4.8 billion cubic meters.

Construction will begin in the next Iranian year (which started on March 21). The project will support a 1,500 megawatt hydroelectric power station.

Iraq

Iraq to Start Water Injection Project Soon

Iraq is expected to start the first phase of a multibillion-dollar water injection project to help boost crude production rates from its southern oilfields in a month, an Iraqi oil official said on March 2, 2011.

"Talks with oil firms are focused now at the total cost of first phase of the project, and we expect to reach a deal and start first steps of building after a month," *Abdul-Mahdy al-Ameedi*, head of the Oil Ministry's licensing and contracting office, said.

MENA

Diplomacy Urged to Avert Arab Water Wars

The UN should promote "hydro-diplomacy" to defuse any tensions over water in regions like the Middle East and North Africa where scarce supplies have the potential to spark future conflicts, experts said.

They said the UN Security Council should work out ways to bolster cooperation over water in shared lakes or rivers, from the Mekong to the Nile, that are likely to come under pressure from a rising world population and climate change.

The Middle East and North Africa is the region most at risk of conflict over scarce water supplies, they said, but history shows "water wars" are very rare.

"We think that water is an issue that would be appropriate for the UN Security Council," *Zafar Adeel*, chair of UN-Water, said ahead of a meeting of experts in Canada in late March to discuss water and security.

UN studies project that 30 nations will be "water scarce" in 2025, up from 20 in 1990. Eighteen of them are in the Middle East and North Africa, with Libya and Egypt among those added to the 1990 list.

Water scarcity is when each person has access to 1,000 or fewer cubic meters of water a year.

UN-Water coordinates water-related activities of all UN agencies. March 22 is "World Water Day" in the UN calendar.

Adeel said the UN should try to promote past traditions of rivals cooperating over supplies in a form of "hydro-diplomacy".

"We have a whole history of cases where even countries at war have used water almost as a neutralizing element," he said. India and Pakistan, for instance, cooperated to share supplies in the Indus River even

during conflicts in 1965 and 1971.
Adeel said that stresses on water supplies due to global warming and a rising population - which is set to grow to 9 billion by 2050 from 7 billion in 2011 - could heighten the risk of future conflicts.
Forty percent of the world's population lives within 263 international river basins, from the Amazon to the Jordan.

Saudi Arabia

Saudi Seeks Share of US$100 Billion Climate Fund

Saudi Arabia is a special case in need of climate aid if the world shifts to clean energy, the world's top oil exporter told the United Nations ahead of a February 21, 2011 deadline for proposals about slowing global warming.
Almost 200 nations agreed in Mexico in December to a package of measures including a new fund to help poor nations - due to be worth US$100 billion annually from 2020 - find ways to adapt to climate change and protect tropical forests. That deal set a February 21 deadline for detailed comments. Saudi Arabia said that it would need help to develop solar power and financial aid to diversify, as it was "among the most vulnerable economies", dependent on oil exports whose use may be curbed under a climate deal.
"Impacts are expected to be massive and deep," it said of countries dependent on fossil fuels, noting that oil makes up half Saudi Arabia's gross domestic product and 90% of its export earnings.
Many other developing countries - including the poorest in Africa and Pacific island states at risk of rising sea levels - have expressed irritation that OPEC nations harp on about their vulnerability.
Saudi Arabia's gross national income per capita was about US$25,000 in 2008, similar to that of New Zealand, according to the UN Development Programme.
Countries have squabbled for many years on sharing the cost of carbon emissions cuts and the benefit of funds, making a comprehensive deal increasingly unlikely from 2013 after the present round of the Kyoto Protocol expires.

UAE

Empower Switches to Recycled Water for Plant

Dubai-based Emirates Central Cooling (Empower), the largest district cooling service provider in the region, has switched to recycled sewage water to run its district cooling plant in Dubai Healthcare City (DHCC).
It has chosen the treated sewage effluent (TSE) system of Dubai Municipality to obtain water for its cooling towers in DHCC.
This represents a step forward toward preserving the environment in compliance with the Executive Council Order No. 27 to all district cooling companies on replacing desalinated water with seawater or treated sewage water, a statement said.
Ahmad Bin Shafar, CEO of Empower said: "We have installed a new polishing plant with a capacity to deliver 1000 cubic meters per day of pure water in DHCC district cooling plant based on reverse osmosis technology." "This is designed to purify the water in order to minimize the contamination of the DHCC cooling tower plant equipment and to minimize water wastage."
Empower works on sustainable use of the amount of water in its daily operations without compromising on the quality of the service.

Water Treatment Services Ensure Customers "Stay Cool" (and Healthy) Even When School's Out

Hydro Systems offers the right equipment that will ease the transformation of turning to solid chemicals for water treatment processes

By Bobbi King

Einstein once said: "What does a fish know about the water in which he swims his entire life?" The same can be paraphrased of most aspects of our lives, including the air which we breathe. Each day we send our children to school and go off to work, not giving a second thought about the air quality of the buildings in which we spend most of our time.

We trust others with our health and the health of our children and loved ones. We hope the school is doing its best to maintain a clean, germ-free environment, wiping and disinfecting everything in the path of the common cold and viral infections. We trust that our workplace is clean, comfortable and free of safety hazards.

Maintenance teams work around the clock to provide the safe environment we expect. Janitorial crews work diligently to disinfect the surface areas which our children are in contact, and shine the workspaces we share with our customers each day.

But what about the air we breathe? Besides the desks, doorknobs, floors, and tables that are common sources for bacterial and viral infections, facilities managers and building superintendents are also concerned about the sources of serious airborne illnesses, including Legionnaires' disease. The Center for Disease Control and Prevention (CDC) estimates Legionnaires hospitalizes 8,000 to 18,000 each year. The CDC's website explains: "The *Legionella* bacteria are found naturally in the environment, usually in water. The bacteria grow best in warm water, like the kind found in hot tubs, cooling towers, hot water tanks, large plumbing systems, or parts of the air-conditioning systems of large buildings. They do not seem to grow in car or window air-conditioners."

The site goes on to explain, "People get Legionnaires' disease when they breathe in a mist or vapor (small droplets of water in the air) that has been contaminated with the bacteria."

Because of the ever-increasing cost of energy, cooling towers are one of the most widely used, cost-efficient means of controlling the climate in large buildings. Properly functioning cooling tower systems save the property management – or in the case of a school, the taxpayer – a lot of money. Water is readily available and comparatively inexpensive.

There are many factors that contribute to the proper operation of the system. The quality of the water used to operate the system being of the utmost importance. If the water used to operate the system is pure, the cooling tower will provide several years of service, worry-free.

Unfortunately, pure water does not exist in nature, and impurities can vary widely at each location. Water must be treated to remove the contaminates that can threaten the operation of a cooling tower. Scale and corrosion both form in cooling towers as a result of such contaminates. Both can foul the operation of a cooling system, lessening the efficacy and cost-effectiveness of the system, and possibly creating the opportune condition for microbiological bacteria to form.

Luckily, this is not a responsibility that facility managers have to handle alone. Often, facility management personnel work with water treatment experts to monitor and treat cooling tower water sources within their premises.

Water treatment professionals test the water on-site and develop on-going treatment plans specific to the conditions at the facility to prolong the life of the cooling system and maintain the air and water quality standards patrons expect.

Chad Brown, Vice President, **Water Treatment Services Company (WTS)**, Alexander, Arkansas, USA, is a ten-year veteran of the water treatment industry. "Our customers all have the same goal: A reliable cooling system that provides a healthy, comfortable environment for patrons and years of cost-effective operation. Customers contact us during many different stages. Architects will contact us to design water treatment systems to be incorporated into the design of new buildings, facilities managers contact us to help maintain existing cooling tower water treatment systems, and sometimes, unfortunately, we're called in after a system has lost efficiency or has completely failed," Brown explained. (Scale formation in fouled systems is treatable and most times even reversible, with the assistance of an

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HVAC contractor, but repairing and treating the problem after-the-fact can prove to be a costly endeavor for the facility. Brown estimates that de-scaling, and repairing a system can cost tens of thousands of dollars, depending on the size of the system and the severity of the scaling).

The FBISD Case

The Fort Bend Independent School District (FBISD), Sugar Land, Texas, USA, was introduced to WTS by a satisfied customer's referral. "Our first experience with the district was at Dulles High School. The mechanical services contractor responsible for FBISD contacted me on the recommendation of a colleague, and said that the situation was 'pretty bad out there.' They literally had water pouring out of the cooling tower fill onto the ground, because there was so much scale in the fill."

Upon arrival, WTS confirmed: Things *were* bad at Dulles High School. "With that amount of scale, it was clear the water treatment chemistry was not correct, and the system efficiency was suffering," Brown explained. "Scale acts as insulation between the water, and the metal of the basin which cools the water; the system was working harder than it should to cool the water because there was no contact between the two."

Besides the loss of system efficiency and the flooding caused by the scale build-up, there was a safety concern: The school was utilizing a traditional liquid chemical program that included 208-liter drums of hazardous treatment chemicals. Each drum weighed nearly 225 kilograms. For the people whose job it is to maintain the system, the program posed both chemical exposure, and ergonomic health threats.

"The Fort Bend Mechanical Contractors indicated that they needed a water treatment system that would perform. They needed a system that was safe for the people who maintained it by reducing employees' exposure to safety hazards, and that also reversed existing damage, and inhibited new scale formation. After our initial investigation and series of water tests, we determined a solid chemistry program would be the most effective solution. We installed **Hydro Systems**' solid chemical dissolver systems, teamed with AP Tech chemistry." Brown said.

The Solution

Cincinnati, Ohio-based Hydro Systems Co. is the world's largest independent manufacturer of proportioning, dosing, and dispensing systems for concentrated chemicals. Through its Water Treatment division, Hydro Systems has been providing solid chemical feed systems for the commercial dish machine industry for years and has taken the lead in developing a versatile line of dispensing products for use with *both* solid and liquid water-treatment chemicals in the toughest of applications. Using this expertise and experience, Hydro has developed a series of water treatment systems designed to ensure efficient, safe, and reliable operation of the equipment at many stages of the cooling-tower water treatment process.

AP Tech Group, Inc., also based in Cincinnati, Ohio, USA, manufactures solid water treatment chemicals for cooling tower and boiler system applications.

"Hydro Systems' solid chemical feeders eliminate the personal risk associated with handling the large drums of chemical. Solid chemical chemistry contains less active chemical when dissolved. Also, the solid chemical containers weigh an average of nine to ten pounds (4 to 4.5 kilograms), and can be easily handled by one person, which alleviated many of the safety concerns FBIS had with their previous program," Brown explained.

"The turnaround at FBISD was instantly noticeable. They went from large drums of chemicals to small, wall-mounted dissolvers, and light-weight, easily managed chemical containers. Water was no longer pouring onto the floor." Brown went on to explain: "In our industry, a cooling tower water temperature drop of 2-3 degrees in the first month would be considered a success. Within two weeks of implementing the new treatment program at Dulles, the approach water temperature dropped six degrees! Lower water temperatures mean increased efficiency - the system doesn't have to work as hard to cool the water." Brown noted that since the program switch, WTS has continually monitored the Dulles High School cooling tower, and the results are outstanding. He indicated that the testing has shown the approach water temperature falling even farther, and predicts it will settle around 12 to 15 degrees lower, which will equate to a 12 to 15% reduction in energy required to operate the cooling system.

Looking ahead, Brown is anticipating a long-standing relationship among all involved parties: "The school district has made plans with WTS to switch the remaining 50 cooling towers throughout the district to the solid chemistry water treatment program in 2011. We plan to use the Hydro Systems solid chemical dissolvers in those buildings, as well. They work, and work well. They did exactly what we needed them to do."

There is a lot riding on the quality air in all public buildings, and the quality of water used to cool the building. It's not an issue WTS takes lightly, as Chad explained: "We take the burden off our customers. We test the water, determine the proper treatment regimen, deliver the chemical, and monitor conditions for changes."

The absence of scale and corrosion means the absence of opportunity for troublesome microbiological contaminants, such as Legionella, to form. At the Fort Bend Independent School District, these absences will certainly be excused. ■

www.hydro-watertreatment.com

يتناول هذا المقال كيفيّة نجاح شركة Hydro Systems في تأمين المعدّات اللازمة لتسهيل التحوّل إلى استعمال المواد الكيميائيّة الصلبة في عمليّات مُعالجة المياه في مدرسة Fort Bend في ولاية تكساس الأميركيّة، وذلك لمنع تكوّن القاذورات في أبراج التبريد التي كانت تُسبّب فيضان المياه من الأبراج وغيرها من المعدّات. وكانت شركة WTS المسؤولة عن صيانة معدّات مُعالجة المياه في المدرسة قد استقدمت شركة Hydro Systems لمساعدتها في هذا المشروع الذي يهدف أيضاً إلى القضاء على أي احتمال للتآكل وتراكم القاذورات وتكوّن البكتيريا المضرّة كالـLegionella.

قامت Hydro Systems بالتعاون مع شركة AP Tech Group المُصنّعة للمواد الكيميائيّة المُستعملة في مُعالجة المياه في أبراج التبريد والغلايات، بتركيب أنظمة تذويب المواد الكيميائيّة الصلبة التي تُصنّعها Hydro Systems في المدرسة.

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Bundamba Advanced Water Treatment Plant (AWTP) | Australia

100,000 m³/day [26 mgd]

GWI 2008 Water Reuse Project of the year

Gibson Island AWTP | Australia

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Accu-Tab®: Leading Chlorination Technology from PPG

The Accu-Tab® tablet chlorination system by **PPG Industries** is a leading chlorination system for commercial and industrial water treatment applications. The Accu-Tab system is a total solution for all chlorination needs. From the smallest commercial pool installation to large-scale industrial/municipal applications, PPG's custom-manufactured, high-quality tablet chlorination systems stand up to tough water conditions and rigorous industry and governmental standards - safely, simply, accurately, and with minimal maintenance.

The company's pioneering work in erosion-modified chlorinators and 3-inch hypochlorite tablets has resulted in patented and NSF-listed technology that, when used with PPG's chlorination units, delivers required chlorination levels without the hassles or high costs associated with other chlorination programs.

Precisely engineered yet affordable, the robust Accu-Tab system is a recognized leader in chlorination. Here's why so many are switching to the Accu-Tab system:

• Safer: One person simply places Accu-Tab tablets into the chlorinator. There are no gas leaks or bleach spills and no special containment measures or elaborate safety equipment. In addition, Accu-Tab tablets are manufactured to high standards of chemical purity and physical integrity.

• Simpler: Unlike gas or bleach, Accu-Tab tablets are easy to store and handle. They are shipped in convenient 25-kilogram pails, each of which is nearly equivalent to a 208-liter drum of bleach weighing more than 225 kilograms.

• More Accurate: The Accu-Tab system is as accurate as gas, more consistent than bleach, and easier to maintain than both. The system - chlorinator and tablets - automatically delivers the precise level of chlorine you need.

PPG Industries is a leader in its markets; is a streamlined, efficient manufacturer; and operates on the leading edge of new technologies and solutions. PPG has manufacturing facilities and equity affiliates in more than 60 countries around the globe. ■

Chlorine Gas

New Alternatives Provide Safety and Efficacy

The traditional use of pressurized elemental chlorine gas involves numerous risks and restrictions due to its extreme toxicity and the increased awareness of the local community. Typically stored in compressed gas or liquid forms, its release - whether intentional or inadvertent - poses great threat as it expands rapidly when released to the atmosphere, lying close to the ground and displacing oxygen in its zone of influence. In this state, it embodies all the characteristics of a weapon of mass destruction.

Some applications will allow substitution with a very dilute form of sodium hypochlorite (NaOCl), typically less than 1% concentration. However, this introduces its own issues – tank farms for storage, high electrical and salt consumption, and explosive conditions due to accumulation of hydrogen gas.

However, proven electrochemical technology coupled with advanced integrated processors now allow water treatment operators to retain their disinfection methods utilizing chlorine gas generated at the point of use. Although the concept of on-site chlor-alkali generation may not be new, it's only in the last several years that safe and efficient production of chlorine gas has been available through a proprietary process called Klorigen™, provided by **Electrolytic Technologies Corporation**.

Recently certified by the U.S. Department of Homeland Security as a Designated Anti-Terrorism Technology, Klorigen meets and exceeds ANSI/NSF 60 requirements for drinking water disinfection chemicals. Further, by employing a membrane between its electrodes, the Klorigen process employs green techniques to "reduce, recycle, and reuse" its primary consumable (salt), thus resulting in much lower water, salt, and power consumption than any other on-site electrochemical process and eliminates any possibility of hydrogen explosions. Advanced sensors and integrated processors allow minimally trained personnel to operate and maintain these systems, which range in output capacity sizes from 25 kilograms to 25 tons per day of equivalent chlorine as chlorine gas or concentrated NaOCl. ■

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SWRO just got simpler: Isobaric ERD with integrated flow control

The new iSave™ redefines ERD by integrating an isobaric pressure exchanger, high-pressure positive displacement booster pump and electric motor into a single unit. For the first time ever, isobaric ERD makes high-pressure flow to the RO membrane constant and fail-safe – without the use of separate high-pressure flow meters.

The results? iSave exchanges pressure at up to 95% efficiency, reducing energy consumption by up to 60%. And it saves more than kilowatts: with its breakthrough design, the iSave footprint is the smallest of any isobaric ERD on the market, and total costs of ownership rank among the very best in class.

In a world thirsty for fresh water and eager to reduce carbon emissions, the new iSave brings it all together. *Patent pending.*

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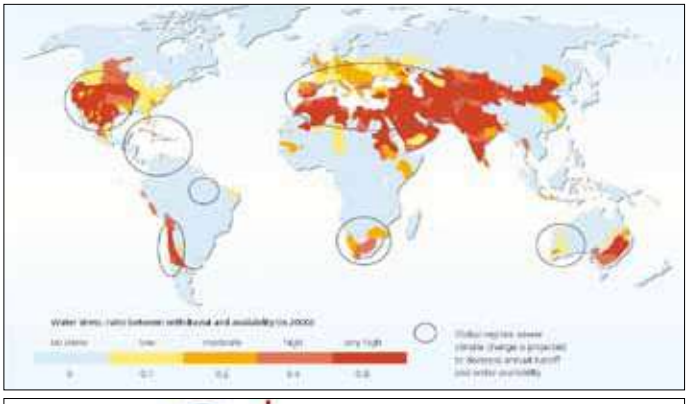
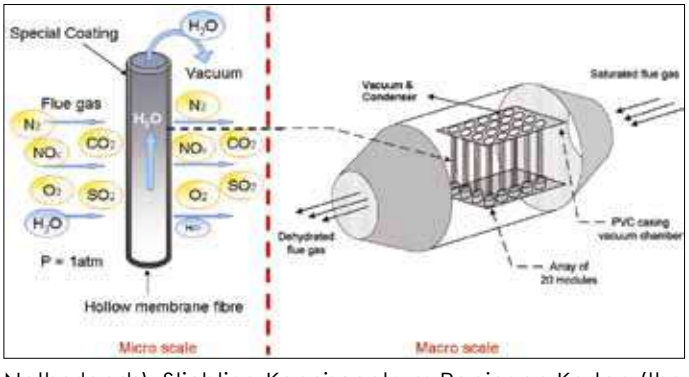
'Smoke' from Factory Chimneys Proves to Be Valuable Water Source

It appears that so much high-grade water can be recovered from flue gases of certain factory chimneys, as a result of strongly improved membrane technology, that industrial plants in arid areas can make a valuable contribution to the world's water shortage. Field tests and ten years of preliminary research have shown that these plants can change from water consumers to water producers. The captured water can be used for both industrial and consumptive use. Besides this, with these results, these plants can save a lot of energy – and thus costs – in several industrial processes. These possibilities present themselves in industries that require much water, e.g. for cooling applications, generating steam, or for drying processes, as in the food, paper, cement, energy, and petrochemical sectors.

Commissioned by the European Union and led by energy services firm **KEMA**, thirteen partners from Europe, the Middle East and Africa are working together on a follow-up to this research.





From Ten Years Preliminary Research to Large-Scale Tests

Ten years' research and testing under the leadership of the energy services firm KEMA, in collaboration with the European Membrane Institute at the University of Twente and a number of Dutch utilities, have resulted in significantly improved gas separation membranes with which water vapor should be captured on a large scale. As a follow-up, KEMA, under contract to the European Union, together with thirteen partners from Europe, the Middle East and Africa, has started with the development of a number of large-scale tests at power stations in Spain and the Middle East, a geothermal well in Tunisia, and paper factories in the Netherlands and South Africa. These tests ought to clear the way for industrial production and large-scale implementation of this new technology.

From Water Consumer to Water Producer

Tests in industrial plants in the Netherlands and Germany have demonstrated that at least 40% of the water in the flue gases can be recovered with the new membrane technology. Beforehand, researchers counted on a recovery of 20%. This means that an average power plant of 400 megawatts can supply twice as much water as it needs for steam generation. The power plant thus changes from water consumer to water producer. The amount of water saved, corresponds to the yearly consumption of about 3,500 Western households or about 9,500 African households The quality of the recovered water is so high that it can be employed not only for demineralized water use for industry but also for consumption purposes. For this reason there are three African partners in the consortium and two from the Middle East. Initial calculations moreover show that hundreds of millions of dollars can be saved annually with this new technology. The new project bears the name CapWa: '**Ca**pture of evaporated **Wa**ter with novel membranes'.

Broad Consortium

Some of the participants in the project are: Brabant Water (the Netherlands), Gas Natural Fenosa (Spain), Consiglio Nazionale delle Ricerche (Institute for Membrane Technology, Italy), Cut GmbH & Co. KG (Germany), École Nationale d'Ingénieurs de Tunis (Tunisia), KEMA (the Netherlands), Kwame Nkrumah University of Science and Technology Kumasi (Ghana), Membrana GmbH (Germany), Papiertechnische Stiftung (Germany), Sappi Ltd. (South Africa & the Netherlands), Stichting Kenniscentrum Papier en Karton (the Netherlands), University of Twente – European Membrane Institute (the Netherlands).

Pier Nabuurs, chairman of KEMA Board of Directors said: "We are delighted that these partners are able to expand on the work done during the last ten years. The consequences of this new technology are far-reaching. Not only in the field of the environment and cost savings, but certainly also in the field of the drinking water issue in arid areas, as in some African countries."

KEMA, set up in 1927, is an independent knowledge provider that is active around the world in the energy value chain. It specializes in high-value services in the area of business & technical consultancy, operational support, measurements & inspections, and testing & certification. As an independent company, KEMA advises and supports government organizations as well as producers, suppliers, and end-users of energy. In addition, the company is testing and certifying electricity transmission and distribution equipment, and other energy related equipment. More than 1,700 professionals work at KEMA, which has offices and representations in more than 20 countries around the world. ■

يُمكن استخلاص كمّيات كبيرة من المياه العالية الجودة من غازات المداخن الصادرة عن المصانع والمعامل، وذلك نتيجة للتطوّر الملحوظ في مجال تقنيّات الأغشية، وهذا قد يمكّن المعامل الصناعية في المناطق القاحلة من أن تساهم بحل مشكلة شح المياه في العالم. أظهرت الاختبارات الميدانية و١٠ سنوات من الأبحاث الأوّليّة أن هذه المعامل بإمكانها التحوّل من مُستهلكة للمياه إلى مُنتجة لها. بالإمكان استعمال هذه المياه المُستخلصة للأغراض الصناعية أو للاستهلاك البشري. ستسمح هذه العملية للمعامل بتوفير الطاقة والتكاليف في عدّة عمليات صناعية تتطلّب كميات كبيرة من المياه كمنشآت التبريد وتوليد البخار وعمليّات التجفيف، مثلاً في قطاعات المأكولات والورق والاسمنت والطاقة والمنشآت البتروكيماويّة.
يقوم الاتحاد الأوروبي بدعم هذا المشروع وقد كُلّفت شركة KEMA لخدمات الطاقة بالإضافة إلى ١٣ شريكاً من أوروبا والشرق الأوسط وأفريقيا بمتابعة الأبحاث المُتعلّقة بهذا المشروع.

Siemens to Supply System to Reuse Wastewater Produced by Natural Gas Drilling in Pennsylvania

Siemens Water Technologies is providing Hydro Recovery LP with a wastewater treatment system to treat natural gas hydraulic fracturing wastewater (flowback) from Marcellus Shale drilling as well as produced water from operating wells in Tioga and surrounding counties in northeastern Pennsylvania. This flowback and produced water waste treatment system will be part of a new wastewater treatment plant in Tioga County and include continuous precipitation and sludge dewatering. By using the Siemens system, the wastewaters will be treated to produce a Hydraulic Stimulation Fluid (HSF) product for reuse, reducing the demand on fresh water sources. The plant is scheduled to go online this month.

Tioga County's system will be comprised of staged precipitation and dewatering technologies to treat 1,090 m^3/day of waters generated from the drilling of natural gas wells. The HSF product produced from the system will reduce hardness by 97%, remove barium by 99% and iron and other metals to less than 1 ppm, reduce hydro fracturing chemical usage, optimize pH for friction reduction, and remove total suspended solids to less than 100 ppm.

The recycled, customized product is used in fracturing shale. Shale gas is natural gas produced from shale rock fields. This gas has become an increasingly important source of natural gas in the United States over the past decade, with interest also spreading to potential gas shales in Canada, Europe, Asia, and Australia. Gas production in commercial quantities in these fields requires fractures to provide well permeability, and modern technology in hydraulic fracturing allows the creation of extensive artificial fractures around well bores. Hydraulic fracturing, however, results in the production of wastewater that must be treated. ■

Aqua-Aerobic Systems Inc Exceeds Performance Expectations with Sand Filter Retrofit Providing 8 AquaDisk® Filters

Aqua-Aerobic Systems Inc has been providing equipment and engineered wastewater applications to the Arab World for more than 20 years. Now with the help of their newest partner, SupplyCore Middle East, based in Riyadh, Saudi Arabia, new plans have developed to offer technology, designs, retrofits, and upgrades to the Middle East wastewater treatment industry. Most immediate plans include the use of pile cloth media filtration technology in the region, a cornerstone of Aqua-Aerobic System's product line, with over 800 installations worldwide.

Operation of the cloth media disk filters can be described as follows: Clarified effluent from the activated sludge system flows by gravity through the cloth media of stationary hollow disks. Filtrate exits through the hollow shaft, which supports the disks, and flows to the effluent channel and then on to chlorine contact tanks. When the tank water rises to a predetermined level, accumulated solids are vacuum-backwashed from the cloth media as the disks rotate. Heavier solids settle to the bottom of the tank and are pumped to a digester or plant headworks.

Clients who have chosen cloth media filtration are very pleased with effluent quality they have achieved, as well as plant outputs that have been reached. This is no exception when looking at the Orange County South Water Reclamation Facility in Florida, USA. Orange County's AquaDisk filters treat an average design daily flow of 112.6 MLD with a peak flow of 225.4 MLD, and will accommodate a future design capacity of 162.7 MLD. Influent TSS as high as 38 mg/l has been reduced to an effluent of 1.0 mg/l.

Orange County began operation in 1957 with a 3.78 MLD trickling filter system and has experienced several upgrades since to accommodate the community's growth and increasingly stringent effluent requirements. ■

German inge watertechnologies AG Reinforces Bond with Distribution Partner LG in Korea

LG Electronics is a subsidiary of the South Korean LG Group and the world's third largest manufacturer of household appliances. The water treatment division that has now been grouped under LG Electronics will initially be focusing on industrial water treatment, followed by the wastewater business sector and drinking water purification. LG has announced that it will be investing some US$400 million over the next decade with the goal of becoming a top 10 global water treatment company.

For its ultrafiltration technology needs, LG will be continuing to rely on its long-established partner **inge watertechnologies AG**. LG is not only a distribution partner of the global technology leader from Germany, but also a good customer: The global corporation has equipped many of its own display manufacturing plants with inge's German-made ultrafiltration technology, an indication of just how important it is for high-tech industrial concerns to have constant access to their own clean water rather than just relying on local water supplies. inge watertechnologies AG has already demonstrated the safety, efficiency, and reliability of its Multibore membranes in several hundred industrial-scale plants all over the world, including plants run by LG.

Bruno Steis, CEO of inge watertechnologies AG, comments: "I am delighted with the excellent relationship we have with our South Korean partner. LG Electronics' strong presence in Korea and the Asian markets – coupled with the quality of our products – opens up enormous potential for both companies. South Korea is one of the most advanced economies in Asia, and as the country's economic growth continues we expect to see major investment in the expansion and modernization of industrial and drinking water treatment plants. We are pleased that we will be playing a part in that thanks to our strategic partnership with LG." ■

Efficiently Removing Particles from Water with the Hubert Micro Filtration Screen

Micro screening is an acknowledged technique for collecting particles efficiently and at low cost from any kind of liquids. The **Hubert** micro screen is specially developed for polishing large quantities of effluent from wastewater treatment plants, for screening surface water for pre-treatment of membrane installations, and for feed water filtration in desalination plants. Hubert has already more than 20 years of experience in micro filtration and applied many micro screens in the market for effluent polishing and pre-treatment of surface water for membrane filter installations.

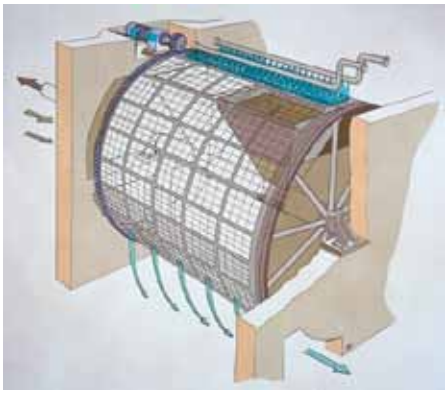
Operation

The micro screen consists of a drum fitted along the circumference with screen panels. The drum is placed in a concrete pit or a stainless steel tank, and rotates on a stationary hollow shaft which is provided with one or more funnel-shaped debris collectors. The water to be filtered enters the drum axially and flows radial through the panels, the dirt particles being trapped in the mesh.

The screen panels are provided with open, synthetic mesh fabrics with mesh openings from 6 microns up to 500 microns. As an alternative Hubert can supply also stainless steel mesh.

As the drum rotates, the rows of screen panels pass under a set of high pressure water jets at the top of the drum. The dirt particles are washed from the screen and discharged through the funnel-shaped debris collector(s) and the hollow shaft. At the end of the hollow shaft Hubert can supply different kind of equipment for handling the filtered particles, such as shaftless screw conveyers, hydraulic dewatering presses, and screw compactors.

The peripheral velocity of the drum can be executed with a two speed or a frequency controlled electrical motor. This enables any variations in water supply and debris load to be met. This variable speed is controlled by a level differential meter.



The "clean" side of the screen compartment is fitted with an overflow weir, which enables the water inside the screening chamber to be kept at a constant level. This ensures that the largest possible screening area is constantly submerged and hence a high yield of solids.

Application

The Hubert micro screen is highly suitable for:

• Effluent polishing of mechanical or biological effluent treatment;
•Pre-treatment of influent water for membrane installations;
•Pre-treatment of surface water for potable water production;
•Improvement of process water recirculation and recovery of product;
•Pre-treatment of industrial effluent;
•Feed water filtration in desalination plants;
•Cooling water filtration.

Design and Construction

Micro screens are available in diameters of 0.8 to 4 meters and widths of 1.2 to 6 meters. The screen mesh varies from 6 microns up to 500 microns at a capacity of 25 to 5,000 m3/h.

The Hubert micro screen consists of a drum frame on which a number of screen panels are clamped.

The screen panels are made of plastic or stainless steel, depending on the application and requirements. A simple clamping mechanism makes the exchange of screen panels an easy job. The stationary hollow shaft with funnel-shaped debris collector(s) is also made of stainless steel and mounted in maintenance-free plastic bearing bushes.

The drum is driven by a weir resistant nylon rim gear and pinion. The composition of the water to be treated determines the type of stainless steel used.

Advantages of the Hubert Micro Filtration Screen:

• Light, stable, and robust construction
• Reliable
• Maintenance free
• Long lifetime (30 years and more)
• No capital spares

Advantages of the Hubert Micro Filtration Screen Compared with Sand Filtration:

• *Small footprint*

Because of the high flux of the micro screen mesh, the water capacities through a micro filter are higher than a sand filter.

• *Low capital cost*

The micro screen runs horizontal on gravity flow. No pumping stations are necessary to bring the water up to a level of more than 6 meters for vertical passing true the sand filter. No air supply is necessary which results in no compressors and air installation. Simple concrete structure for installing the filter drum.

• *Low operation cost*

No air supply necessary. Low back wash water consumption, 3% instead of 10% by sand filtration. No refilling of sand. Automatic operation. Simple installation and maintenance. Less energy cost.

Additional Equipment and Services:

Hubert can supply all the equipment needed for a complete water filtering installation such as:

• Several types of coarse bar screens
• Control equipment
• Cathodic protection systems
• Installation
• Supervision and commissioning ■

Pump Runs for 23,000 Hours
With Almost No Signs of Wear

Mention "The Bahamas" and most people think about sandy beaches on turquoise coves, West Indian hospitality, and laid-back holidays. James Graham, on the other hand, thinks about fresh water – and business.

"Once you move away from the main islands, Nassau and Grand Bahama, infrastructure is much less developed. On the Family Islands, especially the smaller ones, if you want fresh water, you generally have to make it yourself," says James Graham, president of **Reverse Osmosis of South Florida**. "People do use cisterns to gather rain water in the rainy season, but this isn't enough for modern homes. Electricity on the Bahamas is not cheap, so this rules out distillation – although I can also think of lots of other reasons not to go that route. Reverse osmosis is by far the best solution for homes and hotels in this area."

Reverse Osmosis of South Florida, established in 1983, provides fresh water solutions to a wide variety of customers in the US, South and Central America, and the Caribbean islands. The firm is active across a number of segments, including yachting, residential, hospitality, and manufacturing.

Elbow Cay is one of the 700 islands that make up The Bahamas, and is located in the Abacos Islands in the northeastern Out Islands, also known as Family Islands. A charming destination for vacationers and boaters, Elbow Cay and the Abacos are a paradise for island hoppers looking to get off the beaten track.

For much of the island's history, Elbow Cay was an isolated place with little contact with the main islands, and island residents are still a self-reliant group. Although communication with the outside world has much improved with increased tourism, getting a repairman to make a house call can be a complicated affair – and expensive.

Long Lifetime and Low Maintenance Are Key in the Cays

Reverse Osmosis of South Florida has sold a number of **Danfoss** pumps for use in new RO installations on Elbow Cay – and is using more and more of them to retrofit existing installations throughout the Bahamas and the Caribbean. "I've got one customer on Elbow Cay who uses Danfoss pumps wherever he can," explains James Graham. According to James Graham, this is because "He doesn't like changing the oil, he doesn't like oil leaks, and he doesn't like water leaks."

Another Elbow Cay customer, who needed fresh water for his home, just upgraded his Danfoss APP 1.8 pump to a newer model, with bypass. "We installed his old Danfoss APP 1.8 back in 2002. It powered a 1,500-gallon/day (5.67 m^3/day) system for his home and ran for 23,000 hours - without ever having been opened up or looked at - and it was still running fine when he decided to upgrade," says James Graham.

"While we expected good reliability because of the Danfoss warranty, and the customer does a good job with filtration of source water, I have to admit this went way beyond our expectations. We brought it back to our workshop to have a look after replacing it. After we opened it up, we could find only minimal signs of wear," says James Graham.

The 23,000-hour, maintenance-free pump

Low Energy Consumption Clinches the Sale

For bigger RO units, electricity costs play a more important role. Even minor improvements in pump efficiency quickly add up to lower energy bills as well as a reduced carbon footprint. Reverse Osmosis of South Florida uses more and more Danfoss pumps in retrofits, and energy efficiency is an important part of the sales process.

"We often replace other manufacturers' pumps after 1,500-2,000 hours of use," says James Graham. "For these large systems, you can get the customer's attention with Danfoss' long life and low maintenance, but the clincher is lower energy costs. In West St. Barts and the French West Indies, we've converted three 10,000 and one 30,000-gallon/day (37.85 m^3 and 113.56 m^3) systems, replacing pumps from other manufacturers with Danfoss pumps."

"Retrofitting these is a no-brainer from a cost point of view. You're looking at electricity costs of US$0.36-0.39 per kW on the Bahamas and in the Caribbean.

On the 30,000-gallon plant we were using a 60 HP motor to run a pump. With two Danfoss pumps, we're only using 50 HP. If you can save 10 HP an hour, you're saving something like 7.5 kW per hour. That adds up to saving around 3 dollars an hour, 70 dollars a day, and roughly 25,000 dollars a year. Most systems use the Lovejoy coupling, so it's quite simple to fit a Danfoss pump onto them," concludes James Graham.

The 23,000-Hour, Maintenance-Free Pump

Gary Ford, Danfoss sales manager in Florida, sees a lot of

pumps. But he was especially interested in looking at the one that had served for 23,000 hours at a home in the Bahamas – without any maintenance.

"We couldn't wait to get inside and have a look at how the pump stood up to so many hours of use without repairs or maintenance," says Gary Ford. "And we were pleased to discover that the APP 1.8 showed only minimal signs of wear. The pistons are in good shape, and overall corrosion is quite low. This pump is guaranteed to run 8,000 hours, so running for 23,000 really gives outstanding return on investment."

Danfoss high-pressure APP pumps continue to set new standards for small and medium-sized RO applications. APP pumps are light, compact, fixed-displacement pumps with constant flow; their design ensures that the fluid itself lubricates moving parts.

Already installed in more than 15,000 seawater RO systems worldwide, APP pumps build on years of Danfoss experience in developing pumps for critical applications.

The Danfoss APP pumps range from 0.15 to 31 m^3/h (0.7 to 136 gpm) and are used in systems producing up to 7,500 m^3/day. ■

www.ro-solutions.com

تقوم شركة Reverse Osmosis of South Florida بتأمين مضخّات Danfoss لمنشآت تحلية المياه بواسطة التناضح العكسي في Elbow Cay في جزر البهاما. وتلاقي مضخّات APP من Danfoss نجاحاً كبيراً في Elbow Cay، وقد ذكر رئيس شركة Reverse Osmosis of South Florida، James Graham، أن أحد زبائنه في المنطقة قرر استبدال مضخّته الـ APP بنموذج أحدث من هذه المضخّات، واكتشف التقنيّون أن المضخّة التي عملت لأكثر من ٢٣,٠٠٠ ساعة منذ العام ٢٠٠٢ لا تزال تعمل بشكل جيد من دون أي تآكل أو أعطال، وكانت تقوم بتشغيل نظام منزلي بقدرة ٥,٦٧ متر مكعّب من المياه يومياً. تتواجد مضخات APP من Danfoss في أكثر من ١٥,٠٠٠ نظام تحلية بالتناضح العكسي في العالم، مُستفيدةً من خبرة Danfoss الكبيرة في تصنيع المضخّات الخاصة بأحوال التشغيل الحسّاسة والظروف الصعبة.

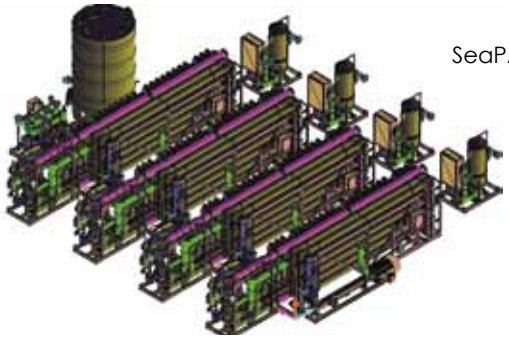
Advanced Pretreatment for Desalination

By Erik Hanson, Global Product Manager, Desalination
GE Water & Process Technologies

Pretreatment for membrane-based desalination systems is critical to delivering consistent quality and quantity product water. Traditional methods of pretreatment, such as sand and cartridge filtration are effective on some feed water sources, but they have limitations. Feed sources with very high suspended solids or organics, intermittent algae blooms and other high organic events present challenges that traditional pretreatment methods cannot consistently address.

Desalination sites with critical uptime requirements have been moving towards more advanced pretreatment methods such as hollow fiber ultrafiltration (UF). This membrane-based pretreatment gives superior protection to spiral wound membranes by removing much higher amounts of suspended solids and organics. The result is higher availability of the SWRO trains and consistently high quality product water.

The number of desalination plants being built with advanced UF pretreatment is growing rapidly, particularly in the Middle East due to challenging feed sources. These plants have incorporated major technologies (UF, SWRO, system design) from multiple technology suppliers, since



SeaPAK

no single supplier could manufacture all the key technologies, and do the system design and integration. This has changed with the introduction of **GE**'s SeaPAK integrated UF and SWRO packaged desalination system.

GE introduced SeaPAK in late 2010. This pre-engineered solution, designed to produce 1,000-20,000 m3/day of desalinated water, features GE pressurized hollow fiber UF elements and GE spiral wound membrane elements optimized for high-product quality and long life. It incorporates one control system and a multi-functional tank that combines the UF CIP, RO CIP and UF backwash tanks. This minimizes equipment and installation costs and footprint.

GE has a long history of providing reliable and fast desalination solutions. The addition of the SeaPAK to GE's strong pre-engineered product line brings an even more reliable solution to the desalination market. ■

INNOVA Provides Automatic RO Desalination System to Kenyan Resort

INNOVA Ltd recently delivered to a touristic resort in Kenya its first automatic seawater reverse osmosis desalinator with a 100 m3/day capacity. The company says that this plant is a very big step towards full automation in small and medium desalinators.

Normal desalinators have a high pressure pump operating from 50 to 70 bars depending on seawater salinity, temperature, turbidity of feed water, and other parameters. A skilled operator is required to run a conventional reverse osmosis desalinator, and must be capable of selecting the right permeated sweet water quantity, selecting the related operating pressure, and controlling all other parameters.

In the new INNOVA plant, all functional parameters are controlled and managed automatically by a PLC installed inside the electric control board. Before delivery, INNOVA inserts inside the PLC all the software for the automatic running. Electronic flow meters and pressure transducers on the feed water line and permeated water line send signals in 4-20 mA to the central PLC (normally a Siemens S7 model).

A modulating valve on the pressure vessels outlet keeps the high pressure automatically rated in order to reach in any condition the preset sweet water desired flow. An inverter is placed inside the electric control boards so as

INNOVA
Innovative membrane water systems

to obtain a soft start and stop automatically, and avoid consequently any mechanical stress inside tubes, vessel, and membranes.

With such a system the plant is very safe and easy to run and even an unqualified person can operate the plant. The software is complete with remote control mode which allows INNOVA technical staff to survey at distance the plant and give continuous assistance and advice to the customer.

INNOVA produces desalinators and deionizers with one or more modules having a capacity ranging from 60 l/h up to 1,800 m3/day each, not larger.

Photo shows the plant with CAT pump and 6 Dow Filmtec 8" diameter membranes. ■

www.innovaitaly.com

Avin Palayesh Niroo Company: Consulting, Design, Construction, Installation, and Operation of Water Treatment Systems

Avin Palayesh Niroo (APNCO) was founded in 2003 as the "Membrane Systems Department" of **Fanniroo Co.** The company has been carefully following technological developments in water and wastewater desalination and treatment systems.

APNCO separated from Fanniroo Co. in 2009 as an independent entity, and now operates on its own. APNCO has dedicated its activities in consulting, design, construction, installation, and operation of water treatment systems such as RO, NF, and UF systems, benefiting from proficient engineers, a special membrane laboratory, and a research and development department.

R&D is one of the most important aspects of the company's strategy. APNCO is a leader in the replacement of traditional pretreatment systems with membrane technologies. Based on its R&D division services, the company provides the optimum design for water and wastewater treatment plants based on new and leading technologies. In this respect, APNCO is proud of the design, construction, start-up, and commissioning of the first Ultra-Nano Filtration (UF-NF) water treatment plant in Iran.

Some of the company's water and wastewater department's projects:

- UF-NF desalination plant with a capacity of 60 m^3/day in Kout-Amir, Ahvaz, Iran
- UF-RO desalination plant with a capacity of 1,000 m^3/day in Ruhubelent, Turkmenistan
- UF-RO desalination plant with a capacity of 480 m^3/day in Iran
- 275 units of small capacity RO packages in Arvand Free Zone, Iran
- SWRO desalination plant with a capacity of 400 m^3/day in Chabahar, Iran
- SWRO desalination plant with a capacity of 500 m^3/day in Qeshm, Iran ■

Membrane: Full Integrated Water Treatments

Thanks to thirty years of core competence in reverse osmosis systems and fluid treatments, **Membrane s.r.l.** just doubled the supply of the full integrated water cycle serving an important offshore oil rig in the Caspian Sea. This is the second artificial island, 200 people operating, created in the same area in the last three years, and Membrane has been awarded once again the seawater desalination and wastewater treatment plants.

In particular, the desalination unit is made by two containerized lines, each including multimedia and ultrafiltration pre-treatment, reverse osmosis water maker with a total production of 60 m3/day of freshwater, and a Cleaning in Place unit and post-treatment with UV disinfection units. The automatic control system has been specially developed for offshore environment and classified areas and can be directly monitored by Membrane's engineers in Italy via a remote control system.

Fluid treatments in oil & gas fields, as well as petrochemical and pharmaceutical applications represent Membrane's core business. Reverse osmosis, nanofiltration, ultrafiltration, microfiltration, electrodeionization, oil separation, nitrogen generation, and wastewater treatment are the main technologies involved in full customized plants presently operating on six continents. ■

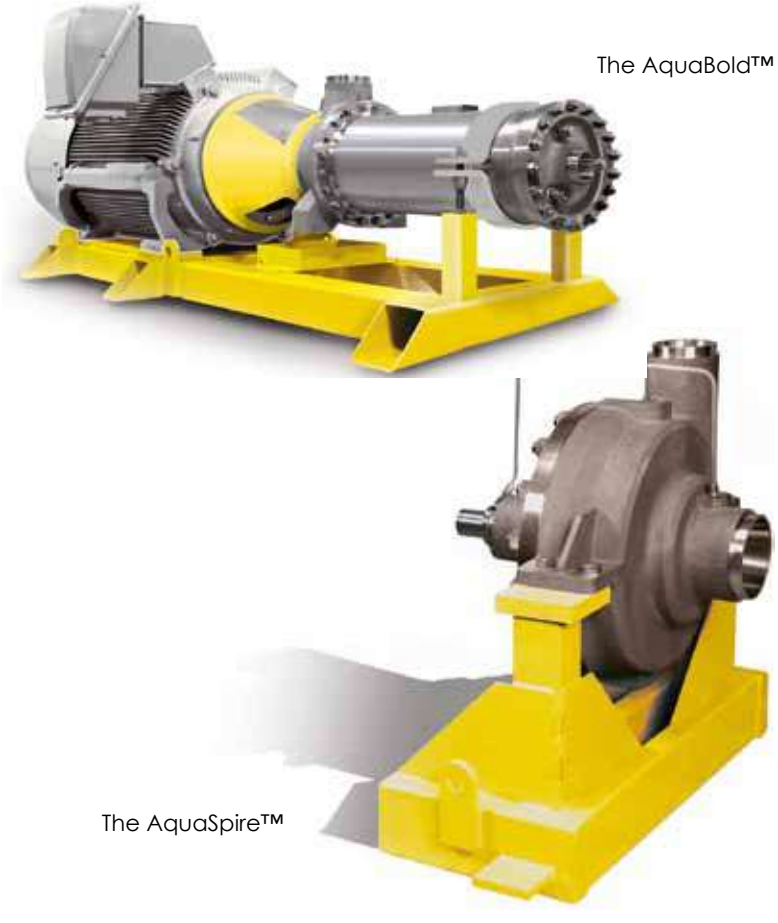
Energy Recovery Inc. Introduces ERI™ AquaBold™ and ERI™ AquaSpire™ High-Pressure Pumps for Desalination

Energy Recovery Inc., a leader in the design and development of energy recovery devices for desalination, launched on February 24, 2011 its new Aqua line of high-pressure desalination pumps – the ERI™ AquaBold™ multi-stage reverse osmosis (RO) high-pressure pump and the ERI™ AquaSpire™ single-stage pumps. The pumps, which ERI obtained with its acquisition of **Pump Engineering, L.L.C.** and re-engineered, offer best-in-class efficiencies (nearly 90%), and complement ERI's product suite of isobaric and centrifugal energy recovery technologies.

"ERI continues to lead the global effort to make seawater desalination affordable, and we are proud to offer our customers easy-to-use products that will provide them with the most savings and best performance possible."

Designed for maximum performance and power savings, the ERI AquaBold and ERI AquaSpire pumps are also easy to operate with no mechanical wear of the components, and are manufactured for a 20+ year service life with little to no scheduled maintenance required. Additionally, when combined, ERI's pumps and energy recovery devices offer the highest efficiency packaged solution with minimum power consumption for desalination plants around the world.

"ERI has always been dedicated to rigorous R&D efforts in order to find new and better ways to improve the desalination process and enhance our product offering. Our new ERI Aqua line of pumps stems from our ongoing product development and is a great complement to our existing energy recovery devices," said *Timothy Dyer*, chief technical officer at ERI. "ERI continues to lead the global effort to make seawater desalination affordable, and we are proud to offer our customers easy-to-use products that will provide them with the most savings and best performance possible."



The AquaBold™

The AquaSpire™

The ERI AquaBold high-pressure seawater pump has been optimized for quality, reliability and durability, and offers enhanced corrosion resistance. A unique new internal component protection system (ICPS) acts as an "anti-crash" feature similar to those found in cars that protect internal components in the event of damage to the pump, offering an elevated level of reliability. Additionally, the new and improved bearing and debris durability increases the lifecycle of the pump and reduces the need for maintenance. The ERI AquaBold and ERI AquaSpire pumps include innovative, process lubricated thrust bearing technology, helping to eliminate efficiency losses.

The ERI AquaSpire high-pressure single-stage seawater or brackish water pump contains ERI's patented Volute Insert Technology™, which allows the custom hydraulics of the pump to be adjusted should the system conditions change in the future, such as plant expansions. Whereas other pumps require completely new casings made of the original pump material, this new feature enables customers to simply change out the lightweight internal volutes to bring the pump back to its Best Efficiency Point (BEP).

ERI acquired the pump product line in December of 2009 from Pump Engineering and has since optimized and enhanced the custom-designed pumps to reduce energy consumption and increase efficiency in specific process conditions. ERI solutions offer simplicity, durability, reliability and small footprint - all hallmarks of ERI products. ■

Water Purification System for High Risk Biohazard Laboratories: Water Quality and Serviceability without Comprise

Challenge

A Biocontainment Level-4 laboratory is designed to work with microorganisms such as Ebola, Marburg, and Congo-Crimean hemorrhagic fever viruses that pose serious health threats, making entrance to these facilities highly restricted. These labs also depend on a reliable source of high purity water for their day to day operations. However, with tightened security and restricted access, Biohazard lab facilities need innovative, ultrapure water treatment systems that can be easily serviced without compromising water quality, human safety or the facility's environment.

Solution

Water used in research at these facilities needs to be extremely pure. Tap water typically contains particulates, dissolved organics, and dissolved inorganics that can impact the results of laboratory testing methods. To remove these contaminants and ensure that the water quality meets ASTM (American Society for Testing and Materials) Type I, 18-megohm quality, the water must be treated with a combination of technologies.

Siemens Water Technologies offers a standard ultrapure water treatment system that includes a pretreatment cartridge to remove chlorine and particulates, a reverse osmosis (RO) system with a storage reservoir, and an ultrapure lab water polishing system.

The system is designed to meet 18.2 megohm quality ultrapure water with < 3ppb Total Organic Carbon (TOC) and < 0.001 EU/ml endotoxin levels. When fitted with an optional bioguard filter, the system further removes biological contamination.

In addition, the system is fully self-contained on a single roller cart that can be easily transported from the biohazard laboratory to a decontamination area and out to a service engineer for servicing, offering mobility,

flexibility, convenience, and safety. Also, the system is designed to be fed from a tap water source, allowing it to be easily moved from one location to another.

Incoming tap water enters the water treatment system through external and internal pre-treatment cartridges to remove chlorine and particulates. The water then flows into the RO membranes, where organics, total dissolved solids, and bacteria are substantially reduced. RO cartridges remove 95% of the monovalent ions, 98% of the divalent ions, and organics with a molecular weight greater than 200. The RO product water is then fed to a storage reservoir. The resulting prepurified water is pumped from the reservoir to the lab polishing unit where it flows through deionization packs, removing oxidized organics and ions.

The water then flows through a dual wavelength (185-nm and 254-nm) ultraviolet sterilizer, which disinfects the water and reduces TOC levels. The water undergoes a final ultrafiltration purification step to remove pyrogens and nucleases. An optional 0.2µm point-of-use bioguard filter can be added for microbial reduction at the dispense point.

When the water treatment system requires scheduled servicing, the Biocontainment facility's lab personnel simply wheel the system out of the lab, decontaminate it and hand it off to a Siemens service technician for service. An identical water treatment system that has been fully sanitized and maintained is given to lab personnel to use until the next scheduled service rotation. The returned water treatment system is delivered to the Siemens service branch for full sanitization and servicing until the next scheduled service rotation.

ASTM Standard Specifications for Reagent Water							
ASTM	Resistivity (megohm-cm @25°)	Total Silica (µg/L)	TOC (ppb)	Endotoxins EU/ml	Bacteria Count (Max)	Chlorides (µg/L)	Sodium (µg/L)
Type I	18	3	50	-	-	1	1
Type A	-	-	-	<0.03	10/1,000mL	-	-

Results

A Level-4 Biocontainment laboratory is ensured a consistent supply of high quality water without the worry of equipment "downtime". The lab also has the convenience of a portable system with scheduled service exchanges, enabling continued workflow without compromising safety.

All water treatment systems are fully maintained by Siemens' certified water system professionals, offering peace of mind that the system will continually perform as expected, and also extending the system's service life. ■

Growing High-Yielding Rice with Pivot Irrigation

Saving Water with Pivot-Irrigated Rice

Brian Protheroe is a fourth-generation Australian farmer who has been growing flood irrigated rice since 1995. Because of water shortages caused by recent dry years in Australia and the bullish price of rice, Protheroe decided to grow rice with center pivot irrigation.

In addition to rice, Protheroe raises wheat, barley, canola, corn, and grain sorghum on his farm near Narrandera, New South Wales, Australia.

Challenge

Protheroe had considerable experience raising traditional flood irrigated rice but had little knowledge of growing rice under pivot irrigation.

Working closely with **Lindsay**'s integrated team of rice irrigation experts, Protheroe planted his first rice crop under pivot irrigation in October 2009. He planted two varieties of rice: Quest, a short-season, short-grain variety, and Amaroo, a long-season, short-grain variety, on 30 hectares of land known locally as the Glen Ayre Farm.

"I wanted to grow two different varieties so I had two different maturities and tried to establish which variety was more suited to pivot irrigation."

Protheroe says several years of drought taught growers in his area of southeast Australia that water was in short supply. Groundwater is the main source for his four Lindsay center pivot irrigation systems, but Protheroe plans to add more pivots and pump stations to access water from a nearby river.

Protheroe used a large 18.3-meter planter to plant the rice, something he had previously not been able to do because of the dikes and berms that are used in flood irrigated rice fields.

Protheroe was particularly interested in learning about controlling weeds in his pivot irrigated rice and about any tracking issues with his pivot. He also wanted to keep detailed records on potential water, energy and labor savings, and the overall profitability of growing pivot irrigated rice. Electronic weather monitoring stations were installed in the field, and Protheroe used yield monitors and field mapping technology to help document return on investment.

Agronomic Solutions

The Lindsay pivot on Protheroe's farm is 302 meters long and includes six towers. The new pivot was equipped with a Nelson S3000 Yellow Plated Spinner sprinkler package, which applied fine droplets of water "like a good steady rain," Protheroe said.

The pivot was outfitted with Lindsay's Z-TRAX tracking system and three-wheel drive tubes for improved traction and flotation. "The tracking systems helped enormously," he said.

Because pivot irrigated rice can be planted on sloped fields of up to 30 degrees and doesn't require costly field-leveling, dikes, and canals, Protheroe was able to plant his rice on ground that had been in wheat the year before.

"Not having to do dikes was key and really convenient, especially for my operation. We have large equipment, and I was able to go right into the field with our large seeder. With dikes and berms, I couldn't do that," Protheroe says.

Fertilizer was applied through the pivot, a tractor spreader, and an airplane. Protheroe used the Lindsay pivot's chemigation system to apply a small amount of insecticide to control army worms in late January.

Protheroe was extremely pleased with weed control in the pivot irrigated rice: "Weed management was very simple. I applied all of the weed control products with a ground spray rig and then lightly watered it in with the pivot. It worked great."

"One of the many benefits of rice production under a pivot is the ability to apply herbicides using existing equipment such as sprayers," says *Bryce Yates*, managing director at Flow Smart, Protheroe's local Lindsay dealer in Australia. "With flood irrigation, this has to be done by airplane, which is much more expensive."

Protheroe says neighbors and agronomists were keeping a close eye on his pivot irrigated rice.

"They kept asking, 'How clean is it?' They expected to see a lot of weeds but there were hardly any weeds; it was a very clean field."

Protheroe attributes part of that to the fact that the field, made up of heavy clay soil, had previously been planted to dryland wheat, as well as the advantage of being able to rotate other crops with pivot irrigated rice.

Results

Protheroe's short-season rice variety yielded 9.84 metric tons dry per hectare, with some sections yielding up to 15 metric tons dry per hectare. The long-season rice variety yielded 5.31 metric tons dry per hectare.

"I planted the short-season rice variety because the nights can get cool in our area around the end of December through mid-January, which can damage yield when the rice is heading. As it turned out, yields on the short-season variety were outstanding. I was very pleased with the yield on the short-season rice."

Protheroe conservatively estimates using 40% less water growing pivot irrigated rice compared to flood irrigated rice. He plans to continue to grow pivot irrigated rice, depending on how dry it is in his area and the market price of rice. ■

www.ecorice.net
www.zimmatic.com

يقوم المزارع الأسترالي Brian Protheroe بزرع الأرز المروي بواسطة فيض المياه منذ العام ١٩٩٥، وقد قرّر مؤخّراً بسبب موجات الجفاف التي بدأت تضرب أستراليا في السنوات القليلة الماضية، وأسعار الأرز المُرتفعة، أن يستعمل نظام ري ذات مركز محوري لري محصوله من الأرز. وهو يقوم بزرع محاصيل أخرى أيضاً كالقمح والشعير والكانولا والذرة وحبوب السورغم بالقرب من بلدة Narrandera في ولاية نيوساوث ويلز الأسترالية.

استعان Protheroe بخبراء ري الأرز من شركة Lindsay للري لزراعة أول محصول له من الأرز المروي بواسطة نظام ري ذات مركز محوري في شهر تشرين الأول (أكتوبر) ٢٠٠٩. زرع Protheroe نوعين من الأرز على مساحة ٣٠ هكتار من الأرض، وجاءت نتائج المحصول ممتازة، ويُقدّر Protheroe أنّه قد وفّر ٤٠ بالمئة من كمّية المياه التي كان يستعملها قبيل اعتماد نظام الري ذات المركز المحوري.

Underhill Introduces Sapien™ 2Wire Controller, Handles Up to 63 Stations

Sapien, a dedicated two-wire controller that operates up to 63 stations, is now available from **Underhill International**, the company that pioneered two-wire technology in the USA.

Two-wire allows the contractor to install an entire control system with just two wires (power and signal) running from the controller to decoder/receivers in each valve. The decoders respond to "on-off commands" from the controller.

Sapien, known as a "decoder-based" controller, also uses the same valve decoders that are installed in a **Hunter** ICC two-wire system and in Underhill's Universal 2Wire modules.

Designed for flexibility, Sapien works in multiple applications: New irrigation systems, a multi-wire conversion, or a two-wire (or multi-wire) expansion. No special wiring or field grounding is required. With an easy-to-read backlit display, Sapien features an exclusive LightTouch™ screen that "talks" the user through the set-up with buttons that light up sequentially.

Sapien offers ABCD and manual programs, seasonal adjust by percentage and 12 start times per day. It is radio-control ready and rain/wind/frost sensor compatible. The controller measures just 6.3" high x 7.33" wide x 1.78" deep. Stainless steel wall mounts, water-proof enclosures, and pedestal models are available.

Two-wire systems are typically more cost-effective than multi-wire because they require only two wire runs, saving installation time and materials.

Underhill has more than 150,000 decoders at work in the ground worldwide and has expanded two-wire use in the U.S. The technology has been popular in Europe for decades for residential and large commercial installations, including sports fields, parks, and public areas.

Underhill offers an expanding line of water-efficient irrigation products, including 2Wire field decoders and programmers; AuditMaster sprinkler performance test kits; Pellet Pro and LiquidPro applicators; TurfSpy stress detection glasses; Magnum and Precision hose-end nozzles and more. The company is headquartered in Lake Forest, California, USA, and has been in business for 30 years. ■

The Parameters That Help Monitoring Irrigation Water Quality: How to Keep Them under Control

Generally, two water quality parameters are taken into consideration when assessing irrigation water quality for potential high salinity problems: The EC (Electrical Conductivity) and the SAR (Sodium Adsorption Ratio). The EC is a well-known parameter, the SAR is an indicator of the amount of sodium in the water related to Calcium and Magnesium. The higher the ratio of sodium to calcium plus magnesium is, the higher the SAR. High SAR indicates a high potential of permeability of water infiltration problems, it can cause the dispersion of the soil aggregates that reduces the number of high pores in the soil, responsible for aeration and drainage, causing also soil sealing and crust formation

The presence of high soluble salts in irrigation water is one of the most limiting factors in the production of nursery and greenhouse crops. Although management techniques may be used to deal with some of these problems, certain situations require more drastic actions.

Many producers are now using water treated through reverse osmosis (RO) to remove potentially harmful salts. RO water is cheaper than distilled or deionized water and the overall quality is very high. Hydroponic farmers have been using reverse osmosis to desalinate and purify irrigation water for greenhouses, with the further advantage of lowering the bacteria and nematodes contents, helping to control plant diseases.

Installing reverse osmosis water treatment systems will provide an excellent quality of water for irrigation and at a much lower cost than municipally supplied water.

OSMO SISTEMI have installed more than 200 plants in the irrigation sector only in the past 10 years of its activity, mainly in Italy where the high salinity problems for greenhouse flowers growers, especially in the Southern regions, are constantly increasing. From the company's direct experience, one important issue must be taken into consideration while developing the design of the RO unit destined for irrigation purposes: The growers generally take for granted the micronutrients present in irrigation water. This source of essential elements is extremely important in supplementing a basic fertility program and the presence of these nutrients is fundamental also in the growing medium. All the micronutrients are eliminated from irrigation water through the RO process, therefore as a potential solution to this situation the product water should be properly blended so that by mixing the treated water with the normal source, growers can supply many of the needed nutrients and still reduce soluble salts to an acceptable level. An additional benefit to this approach is that the cost per cubic meter of product water is considerably reduced.

Although the costs associated with treating irrigation water are not irrelevant, increased quality and reduced losses often offset the required investment. If growers are to maintain profitability, they must continue to evaluate improved cultural techniques for production and the control of the water is one of the most relevant issues. ■

New BLUESEAL Sealing System from SAB

BLUESEAL is an exclusive **SAB** patent that will be used in the company's range of compression fittings, especially when it comes to drip irrigation pipes. Its features differ from any other seal, principally in the fact that it is built in one piece and the lip is dovetail-shaped which increases the water tightness as water presses against it. Its blue color makes it unique and distinctive.

BLUESEAL sealing system is the result of a project entirely carried out by the SAB R&D department. It is the result of a three-year study in which, with passion and perseverance, SAB continued to refine all the technical and productive aspects to achieve this unique product.

The company's aim was to innovate the traditional compression fitting (with an o-ring), bringing benefits to the costumer (easy pipe insertion, better grip) and simplifying the production (one piece instead of two means a faster assembly and less components in stock). The result is a single piece sealing system. ■

Excellence in Microirrigation from Irrometer

The objective of microirrigation is to continuously supply each plant with readily available moisture to meet evapotranspiration as it occurs, and to replace the moisture claimed by this process from the soil reservoir shortly after it has occurred.
One of the major problems is poor soil water distribution because a smaller area is wetted. Distribution of the water into the effective crop root zone is dependent on the soil and its ability to transmit water laterally. The frequent, light applications of water are intended to keep the soil moisture reservoir close to field capacity in order to optimize the amount of readily available water.
In areas where salinity is a factor, the outward and downward wetting front serves to push salts away from the root zone. If this process is not continued, salts can readily move back into the root zone resulting in damage.
So there are three basic factors to consider:
1. Lateral distribution of water in the soil.
2. Maintenance of soil moisture at or near field capacity.
3. Outward and downward movement of water to prevent salt accumulation.

IRROMETERS from **Irrometer** are essential to monitor these key factors. IRROMETERS can effectively indicate if your system is accomplishing adequate distribution by their proper placement in areas where normal root development must take place. These instruments will indicate how the lateral movement of water is doing and how the system is operating in terms of number and placement of emitters.

In microirrigation, we really do not use the soil as a "reservoir" for water, as is the case with sprinkler and surface irrigation. The management objective is to never let the soil dry out very far beyond field capacity.
IRROMETERS measure soil water suction directly, and are most accurate in the "wet" end of the soil water range (10-50 cb). ■

NTS® Whiteplus, the Patented Hose for Easy and Pleasant Gardening

With over 40 years of experience, **FITT®**, an Italian Company specialized in PVC hose manufacturing for gardening, DIY and special uses, is deeply committed to the development of new products to offer high quality and vanguard solutions.
NTS® Whiteplus is the patented hose that makes gardening relaxing and enjoyable: Handy and easy to use, Whiteplus leverages the NTS® patent that eliminates all the problems caused by water pressure to standard hoses during watering. No more knots, folds, and twists thanks to the innovative technology that revolutionizes the world of gardening. The helicoidal stitch in fact prevents abnormal behaviors of the hose and keeps the water flow constant.
The NTS® Whiteplus hose, with five layers structure, also guarantees total protection thanks to the film that prevents algae from growing. Available in different diameters, the NTS® Whiteplus is present on the market in the kit version with plastic fittings ready to be used. ■

Changes Bring New Business Opportunities

"The recent changes in the Middle East and North Africa will bring new business opportunities for agriculture," says *Esteve Alfaras*, Managing Director of **AGP**.
Most experts agree with Mr. Alfaras that the recent political and social changes in this area will produce profound changes in industry and agriculture in particular in the next five years.
Recent estimates show that 13.6% in Egypt, 9.6% in Tunis, and 5% in Syria have agriculture as their percentage of each country's GNP in farming according to ICEX, the Spanish Institute of Exports.
AGP believes that according to these figures this amount could grow 15% in the next five years.
Many countries wish to do business in the Middle East and North Africa. However, Spain has been one of the leaders in import-export with this area for many years.
"Our company is very well positioned to help the Arab World continue to rise in agricultural business," commented Mr. Alfaras.
AGP specializes in irrigation valves and filters for agriculture and has been trading with this area for 14 years. ■

SMART Digital: Intelligent Modular Dosing Pumps That Are Easy to Operate

Grundfos is embarking on a new era in dosing technology with a brand new generation of pumps. Intelligent dosing pumps with new drive and adjustment mechanisms represent the ideal solution for increasingly complex dosing applications with concentrated chemicals, some of them viscous, in water treatment and the process industry. They make life easier for users by keeping processes running precisely, reliably, and cost-effectively.

SMART Digital dosing pumps meet these challenges by offering state-of-the-art drive technology, a whole new dimension in user-friendly operation and an intelligent Flow-Control system. These properties ensure extremely precise, reliable, and cost-effective processes combined with the best possible price-performance ratio.

In addition to the established benefits of Digital Dosing, the new SMART Digital offers:

Simplicity – Simple Handling and Perfect Overview and Control Even from the Distance

The system is extremely easy to use thanks to the new click wheel and straightforward, intuitive navigation via a graphic LC display in more than 25 languages. The required flow can be set directly on the display in ml/h, l/h, or gph.

It goes without saying that there are numerous modes of operation, inputs, and outputs, which makes it easy to integrate the pump in any process. A great deal of additional information is also available, such as the current system pressure, service information, or the alarm protocol.

The large LC display, which is clearly visible from some distance, indicates the pump status. If the display is green, the pump is operating and everything is as it should be. In the event of a fault, such as an empty level signal, the display turns yellow (warning). A red background is used for an alarm situation, while white indicates that the pump has stopped.

Modularity – Flexible and Suitable for Any Environment or Situation

The SMART Digital series has a universal mounting plate for all popular mounting methods. What's more, maximum flexibility is ensured by a control cube that can be rotated, a wide range of adjustments and supply voltages (100-240 V, 50/60 Hz), and a hydraulic connection kit. Thanks to the integrated "click-stop" mounting plate, it is quick and easy to fit the pump in three different positions – on the floor, on a tank or, if required, directly on the wall without any additional accessories such as wall brackets. The click function also makes it quick and easy to remove the pump from the mounting plate if necessary. The clever arrangement of the mounting holes enables quick and easy substitution of both small pumps from the old Grundfos series and various other dosing pumps available on the market.

The control cube is delivered mounted at the front as standard. Alternatively, it can be positioned on the right or left on the pump casing simply by lifting and turning. This ensures optimum access to the user interface at all times, even with tricky installation/mounting scenarios.

The new pump family has a turn-down ratio of up to 1:3,000 / 1:1,000. The fact that a single pump can cover dosing rates of 2.5 ml/h to 7.5 l/h significantly reduces the number of different models required.

The optional E-box enables SMART Digital pumps to be integrated –

and even retrofitted – in systems such as complex Profibus networks.

Flow Intelligence – Highest Process Reliability

The maintenance-free FlowControl system is based on a pressure sensor integrated in the dosing head. With this system, Grundfos is setting new standards when it comes to intelligent flow control. The focus is on process reliability. Even with variable process parameters, such as fluctuations in system pressure, it is possible to detect and prevent unwanted interruptions, inadequate or excessive dosing, and even dangerous situations resulting from leaks or line breaks.

Digital drive technology with precisely defined diaphragm positioning uses a pressure sensor in the dosing head to provide an accurate depiction and diagnosis of the pressure profile and thus the dosing profile. Deviations from the norm result in a fault-specific change in the pressure profile.

This enables reliable diagnosis of the most common causes of faults that occur during dosing with diaphragm pumps. These faults are displayed in plain text in the alarm menu. Depending on the fault, the pump either reacts with a warning or an alarm (= stop). For example, if a line break causes the pressure to drop or it exceeds a freely selectable value, the pump automatically switches off. This prevents dangerous situations associated with chemicals escaping.

What's more, the AutoFlowAdapt function ensures that the dosing process continues with the required flow, even when subject to external influences. When dosing outgassing media, for example, motor control is automatically adjusted as soon as air bubbles are detected so that they can escape out of the dosing head. Fluctuating system backpressures no longer impact on the required flow either – deviations are automatically corrected by the stepper motor's speed regulation mechanism.

The integrated flow measurement function makes costly additional measuring equipment unnecessary. The current flow measurement is shown directly on the display and can also be integrated in the control room via the analog output if necessary. ■

www.grundfos.com

تشرع Grundfos في دخول حقبة جديدة في مجال تقنيّات التعيير من خلال تقديم جيل جديد من مضخّات التعيير الذكيّة وهي سلسلة مضخّات SMART Digital. هذه المضخّات مُجهّزة بُمحرّكات جديدة وآليات تعديل مُناسبة لتطبيقات التعيير المُعقّدة التي تُستخدم فيها المواد الكيميائيّة المُركّزة، بعضها لزج، في مجال مُعالجة المياه والمنشآت الصناعية. تُسهّل هذه المضخّات عمل المُستخدمين إذ تسيّر العمليات بشكل دقيق يُمكن الاعتماد عليه وبأكلاف أقل. يسهل ستعمال هذه المضخّات وبالإمكان التحكّم بها عن بعد، وهي مرنة وتُناسب جميع البيئات والأحوال.

Blue-White Presents the CHEM-FEED® Skid System for M Series Pumps

Blue-White is pleased to announce the versatile lightweight CHEM-FEED® Skid System for the ProSeries M3 and M4 Series Metering Pumps. The CHEM-FEED Engineered Skid System was designed and engineered using solid modeling tools for superior quality and easy component maintenance. The strong, lightweight systems can be either floor- or wall-mounted for easy operator access. Custom engineered universal mounting blocks, and pre-assembled component assemblies are easily stocked and field replaceable into pre-machined mounting slots. Each System is rigorously factory tested.

Features of the CHEM-FEED® Skid Systems include: Self-filling calibration cylinder (flooded suction not required); Exclusive flow indicator that visually indicates the pump is delivering solution; Versatile, single and dual pump systems available; Easy access to wiring components from the rear of the system; Drip containment trays that are removable for easy cleaning; Dual side inlets enable connection of multiple skids to the same inlet; Stainless Steel mounting pads; Check valve that protects the operator from backflow during routine maintenance; Efficient, small footprint design; Heavy duty, chemical resistant powder coated 6061-T6 aluminum, welded joint construction. No forklift required.

A few M Series Metering Pump features include: 10,000:1 turndown ratio; five year warranty; NSF Standard 61; Patented Tube Failure Detection (TFD) system; and Brushless DC Motor.

M3 and M4 Series pumps have output rates up to 600 LPH; pressure rating up to 8.6 Bar. ■

Solar Powered Pumping System Feeds Caustic/Acidic Treatment Chemicals

A new weatherable Solar Powered Chemical Dosing System from **Vanton Pump and Equipment Corp.** features a non-metallic, peristaltic pump for corrosion-free transfer of caustic and acidic treatment chemicals from an integral thermoplastic storage tank to water and wastewater containment facilities in remote locations.

The pump, Flex-I-Liner® model 12, utilizes a rotor mounted on an eccentric shaft to push fluid trapped between a flexible elastomer liner and a solid plastic body block. The self-priming design has no seals to leak or valves to clog and can run dry without damage.

The rigid body block is molded of solid polypropylene, UHMW polyethylene or PTFE, and the flexible liner of natural rubber, neoprene, Hypalon, Viton, or Nordel, eliminating corrosion associated with pumps constructed of stainless steel and high alloys, and wicking and delamination associated with fiberglass and plastic-lined metals, according to the company.

Suitable for flows to 7.6 lpm and pressures to 1.72 bar at temperatures to 85°C, the pump is designed to meter a fixed volume of liquid over user-programmed time intervals. A throttling valve on the suction line to the pump allows flow rate adjustment.

A 0.04 kw photo-voltaic solar panel charges a 12 VDC deep cell battery that can power the pump's 0.12 kw DC motor on a single charge for three hours continuously, or cumulatively over several days of intermittent operation during which the pump is started and stopped manually, or automatically according to user-programmed dosing schedules.

All product contact components of Vanton's Solar Powered Chemical Dosing System are of solid, homogeneous thermoplastics and elastomers that are 100% inert to water and wastewater treatment chemicals

Also inert to water and wastewater treatment chemicals are the system's base plate and 76 L tank constructed of solid polypropylene, polyethylene, or PVC. The controls are housed in a fiberglass NEMA IV weatherproof enclosure.

An optional manifold with nozzles is available to spray treatment chemicals such as alum, ferric chloride, hydrofluosilicic acid, polymer, sodium hydroxide, sodium hypochlorite, or sulfuric acid over a desired area for control of odor, insects, or algae in water treatment facilities, recreational areas, farms, deserts, and other remote sites.

The self-contained system measures 813 mm L x 610 mm D x 381 mm H, weighs 102 kilograms and is available mounted on castors. Other Solar Powered Feeding Systems equipped with larger Flex-I-Liner pumps and larger solar panels handle flows to 38 lpm.

The company also manufactures stand-alone peristaltic pumps as well as horizontal centrifugal thermoplastics pumps, vertical centrifugal thermoplastic sump pumps, and integrated non-metallic tank/pump systems with flows to 330 m^3/h at heads to 122 meters. ■

The New Pulse Dosing Pump from Pentair

When designing the Pulse, **Pentair** wanted to develop a resistant dosing pump that is easy to use and able to handle all types of chemicals available on the market.

• Precise and economical: The Pulse dosing pump is of the proportional electromagnetic type: injection of the product is gradually reduced as the target value is approached but without ever exceeding it.

• Practical and simple to use: Its digital or LED display provides a simple and reliable readout on the control panel.

• Robust: The Teflon® body and PVDF head provide excellent resistance in all conditions. Guarantee 2 years.

• Secure: All adjustments are password protected.

• Complete: Pulse is delivered with an analysis probe,

empty reservoir warning, and innovative adhesive pick-up collars.

• Available in two versions: 2 liters/h at 2 bars (LED display) and 10 liters/h at 1 bar (digital display) for pH and redox dosing.

By combining Pulse with the IntelliChlor electrolytic chlorine generator, you gain access to bathing comfort as well as to an exceptional degree of precision and security. ■

Pilot Plant Metering Pumps from Fluid Metering

Valveless, ceramic pumps from **Fluid Metering** are the solution for drift-free fluid control for pilot plants, test stands, and bench-scale process control.

Pilot plants are the intermediate stage between laboratory experiment and full-scale operation. It's here where precision fluid control is critical to ensure that the stage up to full-scale production is successful. FMI's valveless pumps routinely meter monomers, catalysts, food additives, acids, extraction solvents, alternative fuels, water treatment chemicals, even viscous fluids and slurries, just to name a few.

Fluid Metering's valveless, ceramic pumps have proven to be ideal for pilot plant fluid control. The sapphire-hard internal components of Fluid Metering's pumps eliminate accuracy drift typical of pumping systems that rely on valves and elastomers (flexible tubing and diaphragms), to move fluid through the pump.

Fluid Metering's pumps are unique, providing a valveless rotating / reciprocation piston design that eliminates the need for check valves, which can clog, leak, or fail over time. The result is maintenance free, drift-free fluid control that will hold an accuracy of 1% or better for millions of cycles.

In addition, plot plant operations require the ability to easily change process parameters including flow rate. Fluid Metering's pumps easily accommodate that requirement as flow rates can be infinitely controlled either mechanically and/or electronically via standard industrial control protocols. Flow control is viscosity independent for added flow rate stability. Pump models are available to dispense as low as 5 µL per dispense up to 4 L per minute continuous metering.

For over 50 years Fluid Metering pumps have been used in pilot plant operations for chemical, pharmaceutical, mining, fuel cell & alternative energy, water treatment, filtration, environmental monitoring, food processing, and much more. ■

Incitec Pivot and Australian Pump team up for "EASY Pump'N"

Steve Byrne from Pursehouse Rural with the Aussie Poly pump that's recommended for the safe, reliable transfer of the EASY N® fertilizer

Liquid fertilizers, like **Incitec Pivot**'s EASY N®, allow farmers to control nitrogen levels in soils and maximize crop production. Although productive, these liquids are corrosive and the pumps used need to be carefully matched.

Australian Pump, Australia's leading self-priming centrifugal pump specialist, has a range of poly pumps ideal for aggressive liquid transfer and the range is endorsed by Incitec Pivot.

"Incitec Pivot recommends the use of Aussie's 2" self-priming centrifugal poly pumps, with Viton seals to pump EASY Liquids," said Incitec Pivot's Technical Agronomist *Jim Laycock*. "The pumps are resistant to corrosion, and have the right elastomers to handle the medium being pumped," he said.

The Aussie Poly Pump range, developed for ag chem applications like EASY N®, offer 2" and 3" self-priming centrifugal engine drive pumps that are cost-effective, efficient, and reliable. Made from a polycarbon material, the 30% glass-filled polyester pumps are virtually corrosion free.

Viton elastomers that are compatible with most liquid fertilizers, and stainless steel hardware make the Aussie Poly Pumps a low cost but totally reliable solution for handling corrosive ag chemicals.

The 2" pump will handle up to 720 liters per minute, whilst the big 3" version will handle up to 1,100 liters per minute of flow. Both options are available either with gasoline, electric, or diesel drive.

"Spray contractors wanting to refill fast can do so with these handy and reliable pumps," said Laycock. "And for farmers looking for savings by storing EASY N®, these pumps can handle the transfer between on-farm storage tanks," he said.

Australian Pump offers a unique, extended 5-year warranty on the full range of Aussie Poly Pumps. Its ISO9001 quality system ensures the highest standard of assembly and testing.

The Honda-powered pump versions are now offered with a 3-year Honda engine warranty, at no extra charge to clients. The Honda warranty is available from Honda's nationwide dealer network.

Close-coupled electric motor drive versions in either single phase or 3-phase allow simple installation. They're all fitted with the unique Protek system which is sandwiched device between the pump and the electric motor. In the event of a seal failure, the Protek system prevents the escaped liquid from running down the shaft into the electric motor.

Aussie electric drive poly pumps also now come with a tough galvanized steel base easy installation. ■

Valveless Operation for Abrasive, Highly Viscous Media

A highlight from **ProMinent** at the HANNOVER MESSE 2011 in Hall 15, Stand D40, is its process metering pump D15. Its accuracy of 0.5 % significantly helps to improve process stability and the quality of the products.

The valveless operation of the rotary piston metering pump permits the precise metering of highly and ultra-highly viscous media containing some solids. The pump head is made from stainless steel and the cylinder and piston are manufactured with a wear-resistant surface coating. Thanks to its method of operation, the metering pump transports 58 to 200 l/h at an operating pressure of 400 to 4 bar and within a temperature range of - 40 °C to + 400 °C.

The high level of precision demanded in the processing industry can be maintained in the long term with the metering pump DR15 with ceramic piston and cylinder, thanks to its extreme hardness and wear resistance within broad pressure and temperature ranges and with a wide range of media. ■


ProMinent rotary piston metering pump DR for the metering of highly to ultra-highly viscous media containing solids

Geothermal Energy Storage System at the Parliament Buildings in Berlin: Operation, Monitoring, and Rehabilitation of N_2-Charged Groundwater Wells

A description of the operation of the geothermal energy storage wells over a 10-year period, focusing on their maintenance and rehabilitation which is based on intensive monitoring.

The air-conditioning system of the parliament buildings in the German capital Berlin is operated by means of geothermal wells which use 0.6 million m³ of groundwater annually.

During the summer half year groundwater is abstracted from the designated 'cold side', warmed up in the air-conditioning system and injected back into the designated 'warm side' of the aquifer. In turn the groundwater from the warm side is pumped out, cooled in the roof cooling units and stored in the cold side during the winter months.

Geology and Hydrogeology

The geothermal wells at the Reichstag abstract groundwater from the Berlin 'sand-box' which is a typical stratum in Berlin. The sands and gravels of the Saale ice age which underlie the till also form an aquifer. The till which lies between these sands and gravels represents a remarkable aquitard in the investigated area as it hydraulically separates the two aquifers from each other. In the southern field ('cold side') the till was absent in areas. This is of particular importance as it meant that there was no continuous aquitard forming a barrier between these aquifers here.

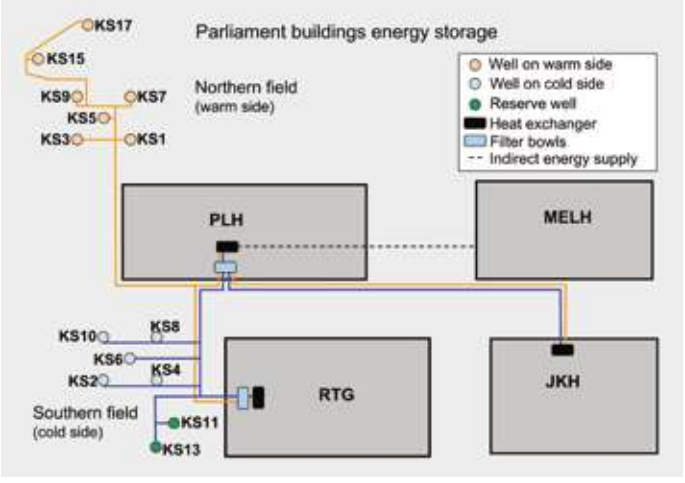
The coefficients of permeability of the various horizons were determined by means of particle size distribution analysis. The groundwater within the aquifer is confined and the piezometric water level lies approximately 2 meters below ground level. In the area of the geothermal energy storage the groundwater flows towards the river Spree, however, the groundwater velocity and the gradient of the aquifer are low.

Construction and Operation of the Geothermal Energy Storage System

As the use of geothermal energy has proved to be an alternative method for obtaining low temperatures with economical and ecological advantages this technology was designed and installed for the air-conditioning of the parliament buildings in Berlin.

A total of 12 boreholes were drilled between 1996 and 1998 for the construction of the geothermal storage system to a depth of 60 meters. The complete system was commissioned in 1999 and extended by two further boreholes in 2009.

Groundwater at a temperature of 6-10°C is abstracted from the southern well-field (the 'cold side') during the summer months. The air-conditioning system of the parliament buildings is operated by passing this cool water through the heat exchangers above ground. The water which has been warmed up to a temperature of 15-30°C



(average of 22°C) after it passes through the system is then injected into the northern well-field ('warm side'). Prior to reaching the heat exchanger the groundwater is cleaned in four filter bowls containing between 8 to 16 filter bags, with a mesh size of 10-20 µm. In the winter the operation mode of the system is reversed. The "warm" water is abstracted from the northern well-field and is cooled down in roof cooling units. Following use this is injected into the wells of the southern well-field at a circulation rate of approximately 300 m³/h. The complete storage system is sealed air-tight and charged with nitrogen gas at a pressure of 0.4-0.9 bar.

Monitoring of the Operation Data

The geothermal wells are monitored by measuring the pressure of the complete system and recording the nitrogen pressure together with the abstraction and injection rates and the water temperature (minute values) in each well. These records, including detailed information on the capacities of individual wells (which decrease over the course of the operation), are crucial for the planning of the maintenance measures.

In addition to the continuously recorded hydraulic data, the lifetime of the filters is also documented. A decrease of filter lifetime during operation can indicate potential problems. Macroscopic and microscopic analysis of the filters can reveal the cause for the reduction of the filter lifetime. An increase in the power consumption of the pumps used for the abstraction of groundwater also signalizes a fall of productivity. Furthermore redox is continually measured and this enables the detection of any sudden leakages in the system.

Geochemical Monitoring

Regular analysis of the water in the system has been car-

ried out since the beginning of the operation. In 2005 the monitoring suite was extended to include both the microbiological activities and the particle loads within the scope of AquiScreen. This program, sponsored by the Federal Ministry of Environment (BMU) aims to develop an economical fast processing monitoring software for the evaluation of microbiological influence on the operational reliability of geothermal systems.

As the sampled water in the filter bowls is a mixture of water from all the wells and is on the operational side of the system, the individual wells are controlled by collecting samples from these wells too. They show differences in both the quantity of solids and also in their chemical consistency.

The samples of the solids have been examined under both reflected-light and scanning electron microscopes (REM/SEM). Under the latter also the percentage composition of the elements has been determined by energy dispersive x-ray spectroscopy (EDX/EDS) which provides information on the included mineral phases.

Since the very beginning of the operation, the mineral phases mainly consist of iron hydroxides which build up a thick crust.

The sand originating from the aquifer found in the filter bags was high up to 2007, exceeding 20% of the total amount. Their percentage decreased to 5% after the rehabilitation of the majority of the wells during the spring of 2007. Nearly 85% of the solids were very fine-grained iron hydroxides with a particle size of 5 µm.

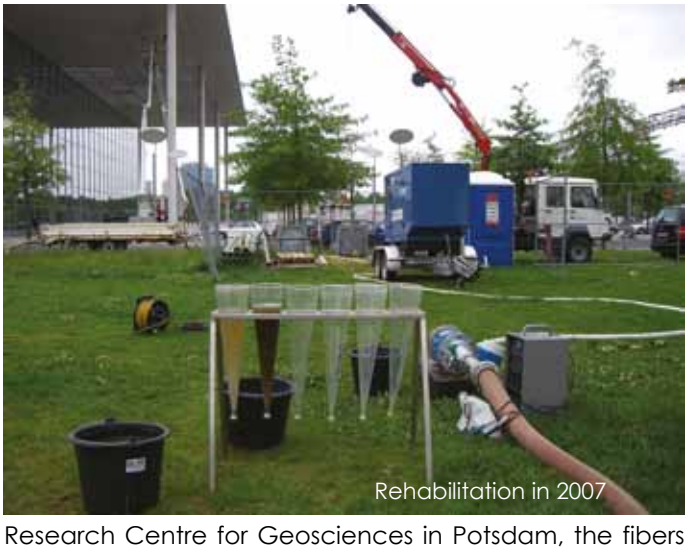
Regular water samples together with those for the microbiological examinations have also been taken to allow early detection of possible causes of changes in the system. Variations in the groundwater composition corresponded with changes to the system's operating mode.

Microbiological Monitoring and Solid Loads

Between August and October 2008 the filter lifetimes decreased from > 2,000 h to less than 100 h, and the solid load of 5 mg/m³ increased to 22 mg/m³ with a mesh size of 25 µm. Particle quantities and compositions of the flow being delivered to them were extremely different in the wells of the southern field.

The portion of the solids > 0.45 µm ranged from 0.2 g per m³ water in the wells KS-8 and KS-10, up to 6.2 g in the well KS-2. Mostly fine-grained iron hydroxides (60%) were discovered in the KS-2, whereas increased amounts of sulfides (60%) were found in the KS-8 and the KS-10. The clay-silt portion (instead of detrital sand) was approximately 20% in all wells. It was striking that the wells with high solid loads also contained a lot of iron hydroxides.

At the same time small quantities of solids in the examined filter bags caused remarkable pressure differences as well. Instead of 200 g, a filter bag could only absorb 20 g. The discovered solids were far finer grained than normal with particle sizes around 5 µm and mainly consisted of red-brown iron hydroxides. In addition, larger round "iron hydroxide lumps" were often found wrapped with thin, loose fibers which in turn contained approximately 1 µm high density thick beads. According to microbiological examinations by the project partners at GFZ German


Rehabilitation in 2007

Research Centre for Geosciences in Potsdam, the fibers originated from bacteria called Thiothrix. These bacteria were responsible for slime development in the filter bags and the massive reduction of their capacity.

A disinfection program of all the wells and system components of the geothermal system in November 2008 brought back the normal filter life times and since then they have even exceeded the 2,000 h. The solid load also reduced back to 0.02 mg/m³ with a mesh size of 25 µm in the course of the operation, indicating that microbiological processes have a great influence on the development of solids.

Mechanical Cleaning and Hydraulic Rehabilitation of the Wells

The detailed monitoring data enables a prognostic and an individually planned maintenance strategy to be developed for each well. The rehabilitation of wells is carried out in regular intervals, however some wells require additional maintenance measures.

A number of different mechanical and hydraulic methods of rehabilitation have been applied and their efficiency with respect to the injection capacity / productivity has been tested and analyzed in detail over the past 10 years:

- Mechanical rehabilitation with well brushes and intense pumping (2002, 2006, 2007, 2008)
- Hydraulic rehabilitation with jetting (2002, 2006)
- Chemical rehabilitation with gravel washer, i.e. multi-chamber equipment (2007, 2008)
- Hydromechanical rehabilitation with pressure impulses (2007, 2008)
- Chemical rehabilitation by pressure impulses (2007, 2008)

Chemical Rehabilitation

Despite the limited oxygen in the wells, clogging with iron hydroxides takes place continually. Three major groups of particles have been identified in the flow delivered from the wells and in the system components above ground:

(1) Sand particles, plastic and GRP fibers originating from the filters can be found in the filter bags together with ran-

dom rust particles. (< 1%)
(2) Detrital particles are transferred from the aquifer through the gravel pack and the screen due to the strongly varying abstraction / injection rates. (~20%)
(3) The majority of the recorded particles consist of iron hydroxides and sulfides which grow in the thermal storage plant representing approximately 80 to 85% of all the identified particles.

In line with the mineralogical content of the analyzed well incrustations, a pH-neutral reducing agent suitable for the dissolution of iron and manganese hydroxides is used for the chemical rehabilitation.
The concentration of iron (II) in water increases significantly due to the efficiency of the reducing agent. The total quantity removed from the well can easily be calculated by continuously measuring the iron (II) concentration, the pumping rate, and the time during which abstraction of the fluid takes place after the reaction time.
Determination of Well Capacity and Verification of Results
The exact determination of the capacity of the individual wells is only possible to a limited extent due to the simultaneous operation of a number of them. There is also a great difference between their yields ranging from 30 to 90 m³/h/m because of the geological heterogeneity. The respective pump tests have shown however that the primary capacities of the wells have been reduced to 40% before the rehabilitation program took place.
The drawdown of 3.4 m before the rehabilitation decreased to 1.9 m after the treatment which means that the productivity of the well nearly doubled from 17.6 m³/h/m to 33.1 m³/h/m.
The efficiency of the hydraulic rehabilitation program and possible damages caused by the treatment have been documented by CCTV camera inspections. All wells have also been measured with a focused gamma log.
During the chemical rehabilitations of the wells KS-1 and KS-9, two different quantities of the rehabilitation agent were applied in 2008. The dosage for the KS-9 was 150 kg while the KS-1 was treated with 75 kg only. These amounts correlated with the amount of dissolved iron (II) in the used working solution including the reaction products, i.e. they were much higher in the KS-9 than in the KS-1.

Summary
The uninterrupted stability of the production / injection capacities of the geothermal wells is based on timely rehabilitation programs and the applied technical measures for avoiding iron-hydroxide precipitation. The results of the different rehabilitation methods have proved that only a combined hydraulic-chemical treatment can secure the well operation in the long term. Although a chemical well rehabilitation program always requires more time, cost, and technical complexity, both the increase of the well capacity and the sustainability of the final outcome more than justify the costs.


German Parliament buildings

The well KS-6 was tested before rehabilitation, after the hydraulic and again after the chemical treatment in 2006. The pressure impulses improved the well's ability to inject water by 50 % which was doubled by the chemical rehabilitation with the pH-neutral reducing solution. A total amount of 1.5 kg iron (II), i.e. 2.4 kg of iron hydroxide was removed out of the well KS-9 together with 200 kg solids during the rehabilitation in November 2008.
The systematic monitoring of the geochemical and microbiological data has not only secured the functionality of the complete air-conditioning system of the parliament buildings during the past ten years, but also provided for the development of a well-timed maintenance strategy according to the individual characteristics of each well.
Above all it has enabled the identification and the elimination of possible interruptions to the system in advance. These would otherwise have developed unnoticed during the routine operation of the system until the problem occurred and caused a breakdown. ■

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يتناول هذا المقال وصفاً لعمليّة تشغيل آبار تخزين الطاقة الحراريّة الأرضيّة لمُدّة ١٠ سنوات، مُركّزاً على صيانة وإعادة تأهيل هذه الآبار بفضل المراقبة المُكثّفة لها. تُستعمل هذه الآبار في مباني البرلمان في العاصمة الألمانية برلين، وهي تقوم بتشغيل نظام تكييف الهواء في هذه المباني. تستعمل هذه الآبار ٠,٦ مليون متر مُكعّب من المياه الجوفية سنويّاً. يتم استخراج المياه الجوفية في فصل الصيف من «الجهة الباردة» قبل تدفئتها بواسطة نظام التكييف وإعادتها إلى «الجهة الدافئة» من مستودع المياه الجوفية، والعكس يحصل في فصل الشتاء، إذ تُستخرج المياه من الجهة الدافئة قبل تبريدها في وحدات التبريد الكائنة على السطح ومن ثم تُخزّن في الجهة الباردة.
أمّنت عملية المراقبة المنهجيّة للمعلومات الجيوكيميائيّة والميكربيولوجيّة التشغيل المنتظم لنظام التكييف في السنوات العشر الأخيرة بالإضافة إلى تأمينها تطوير استراتيجيّة صيانة حسنة التوقيت بحسب المميّزات الفردية لكل بئر. كما يُساهم النظام بإعادة تأهيل المياه الجوفيّة المُشبعة بغاز النيتروجين.

Berstlining Protects Schloss Neuhaus

Could you imagine the town of Schloss (Castle) Neuhaus in Germany without the castle, which gave the place its name? In the settings where the rivers Alme and Pader flow into the River Lippe, the castle provides a beautiful central landmark in the surroundings.

The castle, close to Paderborn, was built in the 14th century and was used as a second residence for Bishop *Clemens August* from Bavaria. In 1964 the council bought the castle and since then it has been converted into a museum, a festivity hall for special school festivities with space for 700 school children.

The constructors seem to have had Venice in mind when they decided to build the castle foundations on oak stakes. In order not to endanger the load capacity of these stakes the wood must be protected against decay and deterioration. That is why there is a water trench surrounding the castle and the water provides an airtight protection, so that the "hazardous" oxygen cannot penetrate into the oak stakes.


Preparing the pipe installation – castle in the background

But what has all this got to do with Berstlining?

The water to the trench is provided from the Pader River via a stoneware pipe ND 175. The bore path runs over a distance of 239 m through Neuhaus and also the strongly frequented road crossing on the town's border. If the natural flow via this pipeline is insufficient, then water must be pumped out of the river Lippe, which runs close by. Any water surplus to requirements flows back to the river Wehr via a weir.

The open slope pipeline had to be renewed due to strong ingrowing tree roots, tears and breakages. "Too much water is leaking through and not enough water is flowing", according to the caretaker Mr. *Mertens*, whom one of his tasks is to check the water level inside the water trench. Additionally a stronger influx should influence the water circulation and prevent any algae building up inside still water, especially in the Summer months. Therefore it was planned to replace the 1.65-meter deep stoneware pipe with a PP-HM pipe ND 200 from the manufacturer Schöngen.

Right from the beginning the open trench method was never an option, due to the very strong traffic flow in the jobsite area and due to the expected hindrances and also in view of the tree protection aspect, old block pavements and partially very tight roads with maximum widths of 4.5 meters. The council drainage works Paderborn decided to carry out the renewal using the trenchless method and specifically the Berstlining method.

During the Berstlining process the old pipe, which can be made of various pipe materials, is destroyed and displaced into the surrounding soil. At the same time the new pipe made of plastic, grey cast iron, steel or even stoneware, with the same diameter, is pulled into the bore path. The cost saving in comparison to the open trench method can reach up to 30%, depending on the jobsite conditions.

The company Roers GmbH from Münster was awarded the contract and they have been using since 1998 a Grundoburst Type 400 G manufactured by **Tracto-Technik**.

The bore path was split up into 5 lengths of 63, 68, 48, 32, and 28 meters, and the machine pits were excavated in sections at corner points and connection points. The old bore path consisted of 7 sections of 30.5, 34.7, 33.6, 49.3, 38.7, and 18.2 meters. The first 4 lengths were compiled into two bursting lengths and the middle manholes were driven through. Also a 400mm main water pipe in a cross-area was crossed at a distance of only 15 cm.

The Grunodburst 400 G was applied. After installing the machine rig the

The sketch shows the bore path from the castle to the river Pader (water access)

Quicklock bursting rods were quickly pushed through the old pipe. Small resistance was only caused by laying out the long length of pipe, which had to be butt-welded beforehand, and installing the bursting head and an OD 320 mm expander in preparation for the installation and connection to the bursting rods, situated inside the old pipe.

During the first length the pipe length had to be laid out in the water trench. For the second length the pipe length had to be pulled in under very tight space conditions and in a tight radius. Over the last 3 lengths it meant that only short pipes with 1-meter lengths could be applied to ensure a secure connection with a multi-socket connection. The installation of the plastic pipes was, in itself, a simple task without any problems whatsoever. Only in one position in front of the castle wall there was a sudden halt, which made it impossible to carry on any further. The excavation then showed that there were massive old fundaments in this area, where the pipe with the diameter of the new larger pipes could not penetrate.

With this modern time technology a castle built in the middle-ages was prevented from decaying and the name Schloss Neuhaus remains not only in the town name, but also as a sight. ■

www.tracto-technik.de

يتم استعمال آلة حفر Grundoburst من شركة Tracto-Technik لتنفيذ مشروع حفر من دون شق بواسطة طريقة الـ Berstlining لاستبدال خط أنابيب في بلدة Schloss Neuhaus الألمانية يقع في خندق يحيط بالقلعة الأثرية الكائنة في المدينة.

يتم خلال عملية Berstlining تدمير الأنبوب القديم وبعثرته في التربة المحيطة، وفي الوقت عينه يتم إدخال أنبوب جديد بنفس القطر مكان الأنبوب القديم. تؤمّن هذه الطريقة نسبة توفير بالكلفة تصل إلى ٣٠ بالمئة، بالمقارنة مع عمليات الحفر بواسطة الشق التقليديّة، بحسب الأحوال المُحيطة بموقع المشروع.

Competency Standards
for a Changing Business Environment

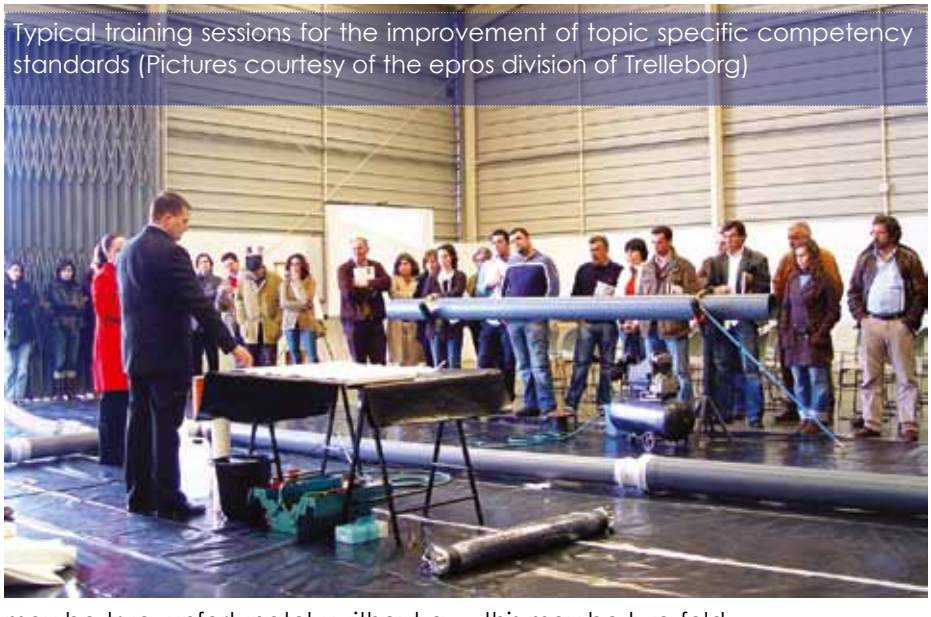
A quick look at the utility and buried service industry, even to the uninitiated, shows that there is a significant and fairly wide-ranging mandatory requirement for training, minimum competency levels and approved certification of operators/installers/contractors, particularly where health & safety issues are concerned. For example confined space workers need to hold the relevant documentation/certificates and certain types of machinery may not be used by untrained and certificated personnel and CCTV surveyors need to meet a certain reporting standard etc. This situation, whilst to some a burden is seen by most to be totally necessary to ensure the safety of the workforce and the public that may pass near to a work site.

The United Kingdom Society for Trenchless Technology (UKSTT) has always prided itself that one of its main aims is to promote the safe implementation of trenchless technologies across the buried services industries in the UK. As part of this drive towards high health and safety (H&S) and operational standards UKSTT has implemented an arrangement with one of the UK's leading training providers, Develop, to provide City & Guilds recognized and approved training across various aspects of the trenchless family of technologies.

These courses not only cover the mandatory H&S requirements that operate in various sectors of the utilities and buried service sectors but also offer basic training in some specific technologies such as Cured-In-Place Pipe (CIPP) lining for example.

Whilst the mandatory health & safety related courses are normally well-attended, those relating to specific technologies are less so. Why is this? It would seem that the general opinion is that unless a certification is mandated by law or is a specific requirement called for by client companies there is no real need for contractors to expend the cost of such a course, the cost of which would ultimately has to be passed on to the client through project fees. This could make one contractor holding such certification uncompetitive compared to one that does not.

The other side of the coin is that whilst clients understand the need for contractors with the mandated certifications there is something of an assumption that a contractor offering to utilize a specific technology has had all its operatives trained in that technology. Whilst at a basic level this may be true, unfortunately without a specified minimum standard there is nothing to say that the training undertaken by the operatives of one contractor is to the same standard as that of another. So does the client always get what it thinks it is paying for? Some readers of this article will look at it and think 'we don't need to worry about this we know how well our workforce is trained'. However, at present in some aspects of the industry there is no set minimum standard with which to compare different companies and their competency levels. So it appears that until industry regulators or the clients themselves call for such a comparative set of standards none will be pro-actively provided by the contracting fraternity.


Typical training sessions for the improvement of topic specific competency standards (Pictures courtesy of the epros division of Trelleborg)

Reasons to Look Again

This of course begs the question 'does this really matter provided the client has made sufficient investigation of its contractor to ensure it meets the standards it requires'? The answer to this may be two-fold.

Currently clients tend to be working with contractors they know and trust and with whom they have long-term relationships, so the contractors know what is expected and work to meet these 'internal' standards.

However, the situation is about to take what some are expecting to be a somewhat 'drastic' turn with the implementation in October 2011 of the Private Sewer Transfer Initiative.

Various meetings and seminars have highlighted that whilst current 'main' contractors are expecting their workload to increase with the transfer they themselves have little capacity to complete the new workload in-house. This means that they will be looking to the smaller contractor community to take on this work.

There is however very little by way of 'across-the board' certification that could be used to compare these contractors in terms of competence and ability other than the smaller contractor's 'manufacturers' training

which would have been given when taking on any given technology.

The current situation means that there is little control, monitoring, etc. of individual technologies such as for example CIPP installation in that little final testing is undertaken, methods of installation vary from contractor to contractor with perhaps too much emphasis being placed on the supplier's training by the client companies and word-of-mouth 'reputation' (where in the future the 'client' companies may simply be the ultimate utility owner's main contractor, which will ultimately carry the can for any shortfall in subcontractor performance).

Does this therefore add weight to the argument that topic-specific training and certification should be considered by client companies as a way forward in an industry where such major change is imminent?

As an example of how this situation is dealt with in other areas of Europe, Germany for example operates the DIBT scheme which looks at not just final product quality but also the method and practices involved in the installation and the level of competency of individual operators. Should the UK industry be asking the question 'is this a format that needs to be considered here'? If it is then it should be looked at sooner rather than later and before the sewer transfer initiative becomes reality and potentially projects are compromised by substandard workmanship and lack of minimum standards training. If so, who should oversee, set, and monitor such standards.

The courses currently on offer through organizations such as UKSTT/Develop have already gained City & Guilds approval and so make an excellent starting point for spreading this type of competency training and certification across the UK. The types of courses that may be considered in this category include: Confined spaces – City & Guilds Medium or High Risk; and CCTV – OS 19: Manual of sewer condition classification (BS EN 13508-2) which applies to pipe sewers 22 5mm diameter and above or City & Guilds OS22: Private drainage systems which applies to 100 mm and 150 mm domestic drains and sewers.

Perhaps it is time for client/main contractor partnerships to think again about what will be needed to maintain high standards in the very near future. ■

www.ukstt.org.uk

تُظهر نظرة سريعة إلى قطاع الخدمات المُتعلّقة بالمنافع وعمليّات حفر الأنفاق ومد الأنابيب، أنّه هناك حاجة ملموسة إلى التدريب وما يلزم من الكفاءة والشهادات المُعتمدة لمُشغّلي المعدّات ومركّبيها والمقاولين، ولا سيما حيثما تكون الصحة والسلامة القضايا المعنية. فعلى سبيل المثال، يتوجّب على العاملين في الأماكن المُغلقة الحصول على الوثائق ذات الصلة والشهادات وأنواع معيّنة من الآليات لا يُمكن استخدامها من قبل الأفراد غير المُدرّبين، كما يتوجّب على الموظّفين ذوي الشهادات وجامعي المعلومات التحتيّة المُتلفزة امتلاك مستوى معيّن من المهارات للاستقصاء والتحقيق، وما إلى ذلك من أمور. إن هذا السياق، وفي الوقت الذي يعتبره البعض عبئاً، إلا أنّه ضروري في مُعظم الأحيان لضمان سلامة العاملين في موقع العمل والعامة المارة بالقرب منه. وتقوم مُنظّمة الحفر من دون شق في المملكة المُتّحدة، UKSTT، بتوفير التدريب اللازم في هذا المجال بالتعاون مع شركات رائدة في هذا المجال.

GRUNDOMAT Success in Oman

Oman Fiber Optic Company was formed in 1996 by a group of Omani & Emirati (UAE) investors and commenced cable production in early 1999. Situated in Muscat, the capital of the Sultanate of Oman, OFO uses state-of-the-art technology to draw fiber and manufacture world-class fiber cable products. OFO manufactures cables for long haul backbone communication links, LAN networks, video transmission & Cable TV, traffic signaling, FTTH solutions, security systems, defense, and specialty applications.

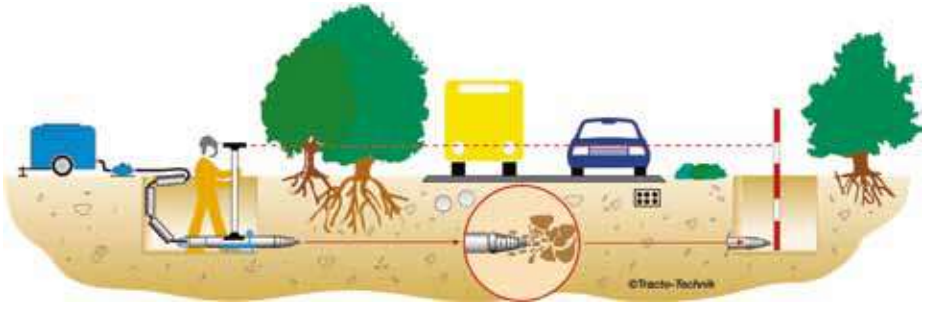
The driving force at Oman Fiber Optic Company is its people. OFO employs people of various nationalities and provides the ideal environment for the blending of cultures as well as an atmosphere where people can share experiences, discuss ideas and grow together. Avenues are provided for enhancement of technical skills, keeping abreast with changes in world markets and for bringing innovative ideas to the workplace

Due to the increased demand for Broadband Telecommunications and Internet access, the Oman Fiber Optic Company has been challenged with the task of laying a fiber optic cable network into the major cities of Muscat and Sohar and the entire Batinah Region

In order not to disrupt the flow of traffic the Oman Fiber Optic Company decided that wherever possible a Trenchless Technology No-Dig policy would be adopted.

Cable distribution engineers and Mr. *R Gunaseelan*, Manager – Services Department of Oman Fiber Optic Co. were given the task of sourcing a suitable product and company to supply and carry out the best installation method. Having reviewed all alternative Trenchless methods/ products the reliable and accurate GRUNDOMAT mole soil displacement technique supplied by **TT-UK/TT Middle East** was the ideal choice to carry out this high profile project.

This new machine generation GRUNDOMAT was developed to meet the customers' requests for easier reversing and even higher dynamic impact efficiency. One main feature of the GRUNDOMAT-P-Generation is the improved chisel head system. First, the percussion piston, running ahead in advance to produce a pilot bore in the first cycle, strikes the chisel. This allows the GRUNDOMAT to work with extreme boring underground accuracy, even in the most challenging grounds, compacted sands, gravels and small rocks. Immediately after the stroke on the chisel, the piston also strikes the protective casing directly, which is then pulled in together with the cable ducts or pipes attached. Even resistance peaks e.g. stones and boulders and casing friction from compacted sand are easily overcome - therefore the propulsion speed is greatly increased.



Switching the GRUNDOMAT models 130P over from forward to backward motion, and vice versa, is performed with a lever of the control unit outside the pit and no longer with the twisting of the compressed air hose. Recommended accessories: Grundoscope aiming frame and starting cradle, tensioning plate for simultaneous duct/pipe installations. Using ram cone attachments, the GRUNDOMAT soil displacement hammers can also act as rammers for larger steel pipe installations.

Therefore to deal with the changing and often difficult soil conditions varying from running sand, clay and compacted gravels, and to enable the PE110mm (SDR11) cable ducts to be installed in just one pass, the highly powerful and accurate GRUNDOMAT 130P, with its remote reversing control, was selected by the Oman Fiber Optic Company. This easily reversible GRUNDOMAT impact moling machine is particularly useful when operating in confined exit trenches near or beside cable connection properties.

TT-UK/TT Middle East prides itself on after sales service, operational training and technical support sent their Customer Services Manager, *Jim Albarella*, to visit Oman to show the management and workforce how to operate the GRUNDOMAT on various jobsite locations, at the same time instructing the operators how to bore successfully in the variable soil conditions.

Following many successful underroad crossings, it was felt beneficial that the operating companies received the correct instruction in the service and maintenance of the GRUNDOMAT product thus offering reliable and cost-effective trenchless cable and duct installations for many years to come.

This early project was so successful that Oman Fiber Optic Company went on to purchase a GRUNDOMAT 180 to add to their Trenchless technology equipment base. ■

www.ttmiddleeast.com
www.tt-uk.com

WaterGEMS Helps Sharjah Electricity & Water Authority Deliver a Sustainable Water Supply

Rapid Development Strains Water Resources

The Emirate of Sharjah in the United Arab Emirates continues to experience rapid development that's evidenced in its many new major industrial, commercial, construction, and agricultural projects. This growth has resulted in a huge demand for water in a region where surface water resources are nearly nonexistent. To help manage this demand, as well as model water supply patterns, plan maintenance projects, and reduce water leakage in its 2,800-km water distribution network, the emirate needed efficient and integrated water network management software. Sharjah Electricity & Water Authority (SEWA) engineers chose WaterGEMS, **Bentley**'s water distribution analysis and modeling software product, to successfully address each of these challenges and are currently using it to effectively manage its water network.

Improved Workflows

SEWA's geospatial and water professionals work with a variety of data, including data from a geographic information system (GIS), digital elevation models (DEMs), parcel information, billing data for node demand calculation, and CAD data for infrastructure information. When SEWA's engineers receive GIS or CAD data from outside contractors, they can easily import it into their new WaterGEMS model using Shapefile import or polyline-to-pipe conversion tools. These improved workflows enable other Sharjah government departments to easily access the same data, accelerating information sharing and communication across project teams.

WaterGEMS Analysis and Engineering

The following five land-use-designation zones had been identified: Industrial areas, low-density residential areas, the old Sharjah City network, high-density residential areas, and the new Sharjah City network. WaterGEMS was used for criticality analysis in each of the zones to identify not only the impact of outages, but also critical segments and pressure zones. Next, the hydraulic properties of network elements were calculated and the results were visualized in longitudinal profiles for easier graphical visualization of calculated properties such as pressure or hydraulic grade line, and element characteristics such as elevations.

This enabled SEWA to create a network improvement and development program for its engineering teams. These engineering teams used it to help plan and execute projects ranging from the replacement of critical segments and valves, to changes in the direction of flow, to a reduction in pipes. The latter project enabled SEWA to redistribute water from areas of the city in which water flowed adequately to areas in which water flow was insufficient to meet demand.

Additionally, it enabled the engineering teams to address issues with a particularly troublesome segment of the network that's about 40 years old. In this segment, water loss from underground leakage was an ongoing concern, while high pressures in the system also caused occasional breaks in the transmission lines – particularly in portions close to pumping stations where the pressure is necessarily high. Regular replacement programs as well as the criticality study done in WaterGEMS enabled SEWA to reduce water loss, ultimately conserving more of the potable water pumped into the network.

By deploying WaterGEMS for this network improvement and management program, SEWA was able to achieve continuous water supply without complaints from residents about water shortages, even with

water production below the estimated demand of 105 MIGD (477.3 million liters).

Benefits Gained by Using WaterGEMS

Among the many benefits SEWA achieved through its use of WaterGEMS are:

- A dramatic reduction in the number of complaints it receives – from 343 in 2007 to just 13 in 2009, which translates to a 98% customer satisfaction rating;
- The ability to supply water at 22% below the calculated water demand without customer complaints;
- A steady reduction in water leakage – from 18.7% to 11.6% to 8.9% of the supply;
- Substantial savings in man-hours required for maintenance processes;
- Improved engineering workflows empowered by the ability to locate the critical segments in the network, which facilitated rapid execution of projects by the engineering teams (for example, teams would know in advance what valves to close for each broken pipe);
- The ability to maintain stable pressure in the supply network for the five zones of Sharjah City.

In short, WaterGEMS helped Sharjah City engineers optimize the use of natural resources, supplying water in a safe and sustainable manner for future generations of the UAE. ■

www.bentley.com/WTR

تشهد إمارة الشارقة في دولة الإمارات العربيّة المتّحدة نموّاً مُتسارعاً كما نرى من خلال المشاريع الصناعيّة والتجاريّة والزراعيّة ومشاريع الإنشاءات. نتج عن هذا النمو طلب متزايد على المياه في منطقة تكاد تكون معدومة فيها موارد المياه السطحيّة. عمدت SEWA، سلطة الكهرباء والمياه في الإمارة، بهدف ملاقاة هذا الطلب على المياه وتشكيل نماذج افتراضية لتأمين المياه وتخطيط مشاريع صيانة وتخفيض نسبة تسرّب المياه من شبكة التوزيع البالغ طولها ٢،٨٠٠ كلم، إلى اعتماد برنامج فعّال ومُتكامل لإدارة شبكة المياه. إختار المهندسون في SEWA برنامج WaterGEMS من Bentley المُتخصّص في مجال تشكيل ونمذجة وتحليل عمليّة توزيع المياه، وذلك للتمكّن من مواجهة هذه التحدّيات بنجاح.

Schlumberger Water Services Launches Diver-Office Premium v.2011.1

Schlumberger Water Services (SWS) announced on March 4, 2011 the release of Diver-Office Premium v.2011.1 comprehensive groundwater monitoring software.

Diver-Office Premium is a data management, analysis, and reporting tool designed for groundwater monitoring data. Based on SQL Server database technology, Diver-Office Premium is ideal for medium-sized monitoring networks and projects that require multi-user collaboration. Monitoring data can be shared securely over a network and accessed by all team members and stakeholders in a project. The built-in QA/QC dashboard ensures that data are free of errors and that it meets known quality acceptance standards. Powerful reporting capabilities enable the quick generation of time series plots and reports for effective communication and presentation of your monitoring data.

Diver-Office Premium capabilities include:

• Diver Data - The embedded version of Diver-Office allows the programming of Diver dataloggers, start/stop Divers and download Diver data to a database.

• Time series visualization - Plot time series data using the fully flexible plotting module.

• Monitoring Well Data Management - Create, modify, and display X, Y location data, borehole lithology and well construction details.

• Expanded Data Options - Capture a full range of environmental variables affecting groundwater recharge including precipitation, evaporation, and discharge data.

Store manual measurements for comparison with Diver time series.

• QA/QC and Statistics - Apply essential QA/QC checks to raw data, identify and correct data anomalies, and gain confidence in your data assessments.

• Reporting Automation - Quickly create reports that incorporate logo and company details, site photos, well completion, and lithology profiles. Create personalized reports of time series data.

• Data Flexibility - Export location profiles to an image file, export time-series data to MS Excel™, import location data from MS Excel™/Access™.

Schlumberger Water Services, a water-centric group within Schlumberger, operates globally and specializes in the development, management, and environmental protection of water resources. ■

AutoLog ControlMan

Wireless Monitoring & Controlling as Web-service

FF-Automation's AutoLog ControlMan is an ultra-modern and cost-effective solution for remote monitoring and controlling. It is suitable for remote monitoring and controlling almost anything: Machines, devices, processes, pipelines, tanks, street lights, GSM base stations, pumps, valves, real estates, unmanned stations, cold rooms, cargoes, environment, flood detection, etc. If you have many targets which are hard to reach and you want to have a way to monitor and control them, then AutoLog ControlMan is most likely what you are searching for - and most likely it's more!

AutoLog ControlMan is a complete solution which includes both programmable GSM control units and hosted internet application service. Programmable control units (AutoLog GSM-RTUs) are installed along the remote targets to perform measurement and control tasks. Control units are communicating wirelessly through GSM network. ControlMan web service is used with web browser through Internet.

GSM base stations have many measurements and controls to be analyzed remotely like power grid and diesel generator status, A/C, burglar detection, temperature etc. These measurements can be sent to the ControlMan server through the GSM network to the CM server. The AutoLog GSM control unit can also control the A/C according to temperature and switch on/off the generator(s) according to power grid voltage measurements.

The AutoLog GSM control unit can also analyze its measurements automatically and detect if there's some failure in the GSM base station. Failure alarm is sent wirelessly through the GSM network to the CM server. From the server the alarm is then automatically forwarded to the on-duty service man's GSM phone. The service man has a laptop with wireless Internet connection so he just logs in to ControlMan service and checks the situation.

ControlMan has versatile Graphical User Interface, including dynamic maps, measurement trends, alarm views, animated process views, reports, etc. The service man can get a clearer picture regarding the cause of this alarm by checking the pump's daily operating times, efficiency histories, etc. He can plan the needed repair work beforehand. ■

SOFREL LS: Solutions to Improve Water Networks Efficiency

Acknowledged as a leading company in the field of telemetry for water networks, **LACROIX SOFREL** offers a new range of District Metering Area Data Loggers: SOFREL LS. Crucial tools in the leakage detection and in network monitoring, the SOFREL LS was developed to meet specific installation constraints existing in metering manholes. Besides searching for anomalies through recording metering and flow data, it allows remote metering, both for network water meters and those of "heavy-use" customers.
Easy to install and easy to use, this range of district metering units offers multiple benefits:

- A battery power supply, giving it up to 10 years' operating autonomy, and making this kind of equipment ideal for deployment in sites that have no power supply.
- A GSM/GPRS communication mode via SMS, using a highly efficient built-in antenna specifically designed for underground installation inside a manhole.
- Guaranteed water-tightness (IP 68) using a secure locking design and military-grade connections, thus ensuring operation even when immersed.
- A Bluetooth communication interface and an operation diagnosis via LEDs to facilitate installation and product commissioning. This can help bypass any would-be accessibility problems within the water metering manholes.
- The possibility for users to access the SIM card and the battery to facilitate commissioning and replacements. This avoids having to send the equipment back to the manufacturer.

A genuine GSM/GPRS data logger, SOFREL LS permanently monitors and records data coming from water meters, flow meters and pressure sensors. Night-time average flow rates are monitored, which allows fast detection of any would-be leaks within the network, as well as improved efficiency. The SOFREL LS range completes the modular, scalable SOFREL S500 range of telemetry Remote Terminal Units, which has helped in making LACROIX SOFREL successful by providing innovative solutions that fully meet the demands of water network operators. ■

DcR Engineering Uses VTScada Software for Automated Fire Station Alerting System

DcR Engineering Services has designed a state-of-the-art fire station alerting system that reduces emergency response times by automating the E9-1-1 emergency fire response process. Eighty-six fire stations have adopted this system which utilizes the latest technology in wireless data communications, intelligent process control equipment, and VTScada HMI software from **Trihedral**.

According to the National Fire Protection Agency (NFPA), there were over 1.3 million fires reported in the United States in 2009. These resulted in over 3,000 civilian deaths, 17,000 injuries, and US$12.5 billion in property damage. "The most critical factor in the fight to save lives and structures is response time to the fire scene," says *Clark Crain* of DCR Engineering. "This system significantly reduces that time by getting firefighters and apparatus out of the station and on their way to the emergency as quickly as possible."

VTScada software is the core human machine interface that provides mission-critical fire station dispatching for the DcR system. "This is a NFPA 1221 requirement," says Crain. "Our system has, by far, the best backup alerting system in the industry. If the E9-1-1 call center is unable to send the alerting information to the fire stations, the backup VTScada dispatch system is always on-line allowing dispatchers to manually alert the stations saving valuable time."

At the fire station, the system automatically alerts the proper fire units, initiates audio voice announcements, pages volunteers, prints out information about the call, shows incident information on large display boards, opens the

proper bay doors and, very importantly, turns off appliances. By rapidly alerting stations simultaneously and automating chores that firefighters would normally have to deal with, response times are dramatically reduced.

VTScada also allows the system to maintain logs of all alerting events, notify key personnel cell phones of alerts and alarm conditions, provide a means of dispatching from secondary locations, monitor the alerting system and send an alarm if there is an equipment failure. ■

WMS – Web Map Services for TOPKAPI SCADA

To meet the needs related to the use of increasingly widespread geographic information systems (GIS), **AREAL** implemented on its SCADA software, TOPKAPI, the support of WMS functions (Web Map Services), complying to the standard published by the OGC, Open Geographical Consortium.

In all applications involving remote devices geographically dispersed, technical information acquired through SCADA systems combine with map information. Map information change permanently and, rather than updating repeatedly the SCADA system (TOPKAPI supports import of DXF and MID / MIF file type), it is more beneficial to obtain them directly in real time by a request to a referent geographic information system (GIS).

With its new WMS functions, TOPKAPI displays onto a graphical view both the animated items featuring the data acquired and a map or a network view obtained from a GIS. This applies to all applications monitoring distribution networks (electricity, gas, water, sanitation, telecommunications, and so on), but also - in conjunction with the automatic acquisition of GPS position - to the management of mobile fleet and operators on duty (for example DATI, alarm devices for isolated workers).

The WMS standard can be used with most major GIS products such as Arc GIS, Autodesk, Map Info, Star Apic, etc.

TOPKAPI can select in a WMS server the layers to be displayed, and superimposes on the image provided its own objects with conventional control / command features. When creating applications, TOPKAPI allows the automatic generation of the related devices and their associated variables processing thanks to its SOFTLINK wizard and / or by importing the parameters of blocks provided by DXF files. ■

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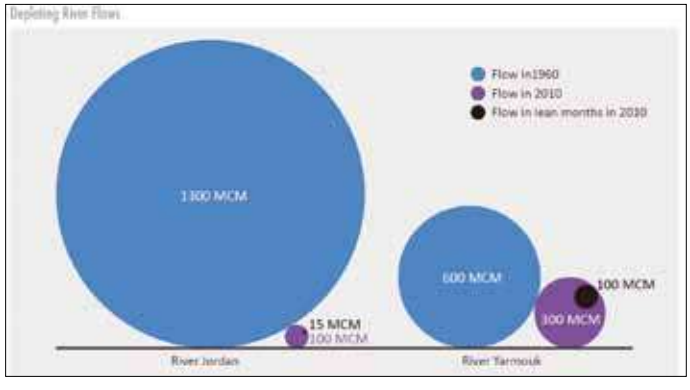
The Blue Peace
Rethinking Middle East Water - Highlights

The water crisis in the Middle East can be transformed into an opportunity for a new form of peace – the blue peace where any two countries with access to adequate, clean, and sustainable water resources do not feel motivated to engage in a military conflict. This is possible with new policy instruments, some of which would be acceptable to the governments in the region in the near future, while others could be adapted in the long run. In the process, the River Jordan and Barada, Mountain Aquifer, and the Dead Sea, which are currently depleting at a fast rate, would be rejuvenated. The Euphrates, Tigris, Litani, Orontes, El Kabir Rivers and Lake Kinneret (Tiberias), which face threats from climate change and drought, would be made sustainable. These are the conclusions of an international report on long term assessment and policy options for water security in seven countries in the Middle East: Turkey, Syria, Iraq, Lebanon, Jordan, the Palestinian Territories, and Israel.

The Strategic Foresight Group report, *The Blue Peace: Rethinking Middle East Water*, was prepared with input from almost 100 leaders, serving and former ministers, senior officials, and experts in the seven countries. The input was obtained through political consultations, research papers, an Internet forum, and three workshops held at Montreux, Switzerland (February 2010), Amman, Jordan (May 2010), and Sanliurfa, Turkey (September 2010). The project was supported by the Swedish International Development Cooperation Agency of the Government of Sweden and the Swiss Agency for Development and Cooperation and Political Affairs Division IV of the Federal Department of Foreign Affairs of the Government of Switzerland. Some of the workshops were supported by A K Party and the State Hydraulic Works (DSI) of Turkey and El Majlis El Hassan of Jordan.

• The river flows in Turkey, Syria, Iraq, Lebanon and Jordan have depleted by 50% to 90% from 1960 to 2010. For instance, the Yarmouk River declined from 600 MCM to about 250-300 MCM per year while the Jordan River from 1,300 MCM to 100 MCM. The water level in Barada River Basin in Syria has dropped from 50 meters below ground in 1990 to 200 meters at present.



is often 30:70 for lean and wet months. In other words, six or seven lean months have only 30% of the annual flow and the leanest months can have only 3-5% per month of the annual flow. The lean period flow of Lower Jordan River is less than 10% of the annual flow or monthly 1-3% of the annual average in some of the leanest months. The river almost does not exist for almost six out of 12 months of a year. The average flow in the leanest month can be only 1 MCM per month. With regards to Yarmouk, Euphrates, and Tigris, upper and lower riparian countries continue to disagree about the actual amount of flow of the rivers across boundaries. The report proposes a Cooperation Council for Water Resources for Turkey, Syria, Iraq, Lebanon, and Jordan as a political mechanism to establish common standards for measuring water flow and quality, set goals for sustainable management of water resources, and adapt regional strategies to combat climate change and drought. The establishment of a Cooperation Council can also facilitate basin level cooperation in each river basin.

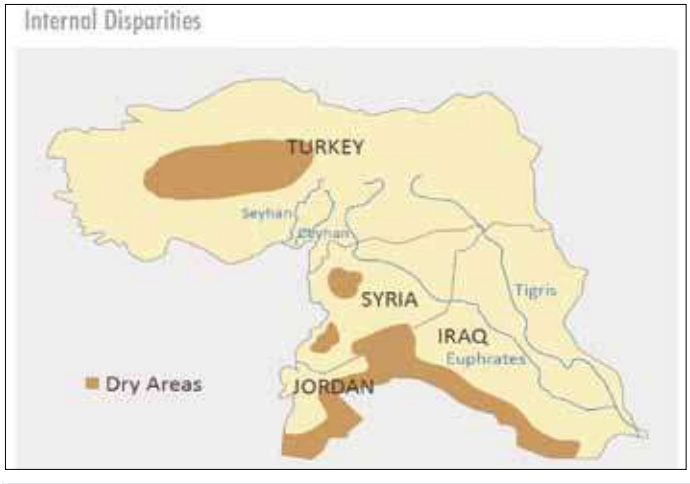
• Several national climate change reports and international experts predict that the summer temperatures will rise by 2.5-3.7˚ Celsius and the winter temperatures will rise by 2.0-3.1˚ Celsius, over the next 50-70 years, resulting in faster evaporation of surface water in the Middle East. As a result, patterns of rainfall will change, though there is a debate and lack of consensus about impact on overall amount of annual rainfall. Desertification is expected to affect Syria, Turkey, Iraq, and Jordan - approximately 60% of the land in Syria faces the threat of desertification. In the Koyna basin in Turkey, about 80% of the depletion has occurred over the last decade, and the basin faces complete desertification by 2030. Iraq faces the threat of desertification at an average rate of 0.5% per year. Dust storms have worsened over the last few years due to the drought and decrease in vegetation. The report calls for a regional climate change model and joint strategies to combat climate change, desertification, and drought, and underlines the urgency of installing regionally developed climate change models for 2010-2100, that take into account the specific requirements, nature, and nuances of the countries in the region.

• The renewable freshwater resources in the Mountain Aquifer, shared by the Palestinian Territories and Israel, have been reduced by 7% from 1993 to 2010, and in the Western Galilee Aquifer by 15-20%. This is assuming full recharge in a normal rainy year. The availability of water is substantially reduced in drought years. As a result, the calculations made at the time of Oslo Accords and hitherto used by most international organizations need to be revised downwards to provide a realistic formula for water sharing between Israel and the Palestinian Territories (or a future Palestinian State). The report calls for a confidence-building initiative between the heads of water authorities of Israel and PA, with support of political leaders and under observation of representatives of Quartet or major donor countries, to assess the real situation with regards to the state of freshwater resources in the aquifers along with coordinated water management. Such a process should be carried out at high political level, authorized by the respective Prime Ministers, and should complement technical level interaction through the Joint Water Committee, as well as the trilateral Israel-PA-US forum. The report also calls for strengthening of the wastewater management capacity of the Palestinian Territories, possibly using small sized decentralized plants, which can benefit the poor population, provided a monitoring system is put in place to control the sewage discharge from such facilities.

• The water level in the Dead Sea dropped from 390 meters below sea level in the 1960s down to 420 meters below sea level at present, and will be 450 meters below sea level by 2040. The water surface area has shrunk by a third, from 950 square kilometers to 637 square kilometers. If the surface water level in the Dead Sea continues to erode, it will be reduced to a lake in 50 years, and will eventually disappear altogether.

The marshlands in Iraq have shrunk by 90%. Lake Kinneret (Tiberias) reaches the lower red line of 212 meters below sea level in drought years. The deterioration of these water resources not only results in economic crisis but also undermines people's culture. The report recommends that critical water bodies should be declared as regional commons and all riparian countries should work together to set common goals for their rejuvenation and sustenance.

• Most of the countries in the region experience unequal distribution of water internally due to their topography and geography. In Iraq, consecutive years of drought, war, and the lack of adequate governance has hindered overall development in the water sector, and the country is simply unable to provide the required water to its population. Amman-Al Zarqa, located in north central Jordan with the highest population density, is at the edge of the Badia Desert. Important Syrian cities – particularly Damascus, Homs, Hama – are in the western part of the country, while the Euphrates flows in the eastern part. In Turkey, the most fertile region is around the Euphrates-Tigris Basin in the east and the Seyhan-Ceyhan rivers in the south. The central parts of the country have few rivers and receive less than 250 mm of rainfall annually. Turkey's capital city, Ankara is located there and has no natural water body or groundwater source located close to it. Izmir and Adana also face water shortages as the potential of nearby basins is not fully harnessed. The report recommends that it is most essential to address internal disequilibrium on an urgent basis. Any plans for cooperation between countries would not be politically attractive unless and until internal needs of all countries, including relatively water surplus countries, are satisfied.



• In the past 20 years, Turkey has examined the possibilities of exporting water from its national rivers. In the future, Turkey will only consider exporting water from its national rivers such as Manavgat, Ceyhan, Seyhan, and others. It will not export water from trans-boundary rivers such the Tigris and Euphrates. Turkey will have an exportable surplus of 2-4 BCM from national rivers during 2010-2030, though it would be uneven throughout the year. In the lean season of 8-9 months, it can be as low as 100 MCM per month. During such a period, Turkey will require water for its domestic use. It will still be able to export at least 1-1.5 BCM water in the wet and average months to Jordan Valley countries if the latter work out a mutually acceptable formula for water to be utilized by all of them and if Turkey finds it politically feasible to undertake this endeavor. The report recommends an expert study to examine the long term prospects of the supply capacity of the Turkish national rivers, taking into account the potential impact of climate change, snow melt, domestic demand, economic needs, and seasonal variations.

The Blue Peace essentially requires a comprehensive approach. It is necessary to act on several fronts at the same time, and yet it is possible to choose different entry points of intervention as per social and political dynamics. The report presents a roadmap for action beginning with efficient internal management, storage and distribution; the establishment of Cooperation Council for Water Resources for Iraq, Jordan, Lebanon, Syria, and Turkey; and separately launching of a high level Confidence Building Initiative between Israel and the Palestinian Authority. ■

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أزمة المياه في الشرق الأوسط يُمكن أن تتحوّل إلى فرصة لشكل جديد من السلام، السلام الأزرق حيث لا يشعر أي بلدين يُمكنهما الوصول إلى موارد مائية كافية ونظيفة ومُستدامة بدافع للدخول في صراع عسكري. وهذا أمر مُمكن بأدوات جديدة للسياسة العامة، سيكون بعضها مقبولاً لدى حكومات المنطقة في المُستقبل القريب، في حين يمكن تكييف سياسات أخرى في المدى الطويل. وفي سياق هذه العمليّة، فإن عدّو مستوعبات للمياه كنهر الأردن ونهر بردى وطبقة المياه الجوفيّة الجبليّة، والبحر الميت، التي تُستنزف حالياً بمعدّلات سريعة، سوف تتجدّد. وسيكون بالإمكان جعل أنهار الفرات ودجلة والليطاني والعاصي ونهرا الكبير الشمالي والجنوبي وبحيرة طبرية، التي تواجه تهديدات بسبب تغيّر المناخ والجفاف، مُستدامة. هذه هي النتائج التي توصل إليها تقرير دولي بعنوان «السلام الأزرق: إعادة النظر في مياه الشرق الأوسط»، الصادر عن"The Strategic Foresight Group"، بشأن تقييم خيارات السياسة العامة للأمن المائي على المدى الطويل في سبعة بلدان في الشرق الأوسط هي تركيا وسورية والعراق ولبنان والأردن والأراضي الفلسطينية وإسرائيل.

Towards a Lake Nasser Management Plan: Results of a Pilot Test on Integrated Water Resources Management

By S. S. Zaghloul[1], N. Pacini[2], Karl Schwaiger[3], Pierre Henry de Villeneuve[4]

Lake Nasser is of key strategic importance for sustaining Egypt's water demand, and it is essential that its water quality is protected from pollution. Rapid development is taking place in all parts of the catchment and may spread equally to Lake Nasser area in the near future, as foreseen by the Aswan Governorate "Lake Nasser Development Plan" (2002). In 2009-2010, a Pilot Test was performed to implement integrated water resources management (IWRM) approaches and methodologies based on the EU Water Framework Directive (Directive 2000/60 EC) through the definition of reasoned objectives, applied methodologies, and standard procedural planning steps inspired to the main principles of the Directive. The IWRM Pilot Test was conducted in the frame of a EU-Twinning Project on Water Quality Management.

This paper provided a unique opportunity to test on the ground in Egypt the implementation of methodologies recently developed in Europe; water resources management made important progress since the introduction of specific requirements concerning IWRM made by the European Water Framework Directive (2000). Testing the IWRM approach under Egyptian situation also aimed at stimulating Egyptian authorities and stakeholders to work more closely together and to develop opportunities that only integrated management approach can produce, in terms of better informed and more generally shared resource planning.

The specific objectives of the IWRM Pilot Test are:

- To provide legal and organizational support for an improved water governance framework for Lake Nasser;
- To promote stakeholder participation;
- To establish potential impacts on water quality by providing estimates of pollutant loading;
- To design a draft Program of Measures to provide suggestions on how to reduce the potential impact of major pressures identified in proximity of the reservoir.

Characterization

To achieve an adequate site-specific perspective, some key characteristics relating to the main legislation, the institutional set-up, the physical setting, and some key water quality parameters were collected and analyzed.

Environmental Setting

Lake Nasser is the second largest man-made lake in the world (480 km long), situated in a desert area with extremely low precipitation and very high evaporation. In the Egyptian portion of the Lake Nasser basin population is low, human activities are strictly regulated and their impact is not expected to be cause of concern for the water quality.

Protected Areas

A "buffer zone" of 2 km is established around the reservoir by Decree 203/2002, where no agricultural, touristic and industrial activities are allowed to take place. Under Law 102/1983, Wadi Alaqi is recognized as a Biosphere Reserve of international importance that should remain free of any development, disturbance and changes in land-use or activity that may degrade the natural interest of the site.

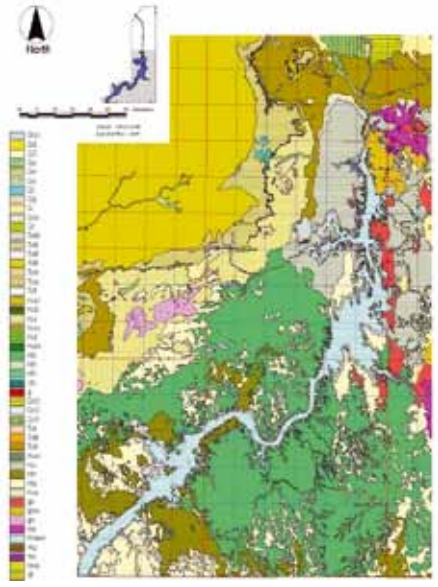

Figure 1: Lake Nasser Area and Aswan Governorate – Geological Formation

The Pilot Test provided a general framework and also recommendations on how these estimates could be refined further [4].

For the quantification of activities, characteristic figures/indicators were employed (See Table 1).

Table 1: Impact Indicators Based Upon a Quantification of Pressure

Sector	Characteristic figure used
Domestic wastewater	Number of inhabitants
Agriculture	Number and type of cattle
	Surrounded cultivated area "feddans"
Fishery practices	Number of fishermen
	Weight of fish production in cages "t"
Navigation	Number of passenger vessels "day"
Aquaculture	Area of surface aquatic plants and percentage of submerged & suspended

PRESSURE & IMPACT ASSESSMENT

Definition of Potential Pollution Coefficients

This model-based approach was applied to the current situation and to 'Scenario 2022' to estimate the load of pollution generated following the development estimates described in the Aswan Governorate's LNDP [1].

Calculating "In-Lake" Concentrations

The sum of the individual loads generated by the different sectors can be divided by the theoretical outflow of the reservoir at Aswan (150,000,000 m^3 d–1). This calculation implies that no pollutant abatement takes place in the reservoir. The estimates presented in Table 2 represent the contribution, in terms of nutrient and pollutant loads, derived from anthropogenic activities in the immediate proximity of the reservoir. The Table illustrates the theoretical effect that pollution loads could have on "in-lake" concentrations.

Estimating the Contribution of Local Nutrient Sources in Relation to the Overall Load

The relative importance of local pressures must be assessed in relation to the overall nutrient loading in the reservoir. No precisely quantified estimates exist at the moment. However by applying the Vollenweider Model (Table 3) to the average measured total phosphorus concentration it is possible to obtain an approximate estimate of the total phosphorus loading coming into Lake Nasser. No simple model can be applied to estimate nitrogen loading, due to the complex biogeochemical interactions that characterize the behavior of this nutrient.

Considering the data provided mainly in [6], it could be estimated that the average total phosphorus concentration during the overturn period (desertification) could be approximated to 20 µg L^{-1}. The application of the Vollenweider Model provides the results illustrated in Table 4.

This calculation indicates that even if the ambitious Development Plan illustrated in Aswan Governorate's document [1] will come true, the contribution of local phosphorus sources to the overall phosphorus loading will reach at most 18% of the total.

Table 2: Pollutant loads and Estimated "In-Lake" Concentrations

Pollutant	Pollution load (kg d–1)		Concentration (mg L–1)	
	Today	2022	Today	2022
Suspended solids	1,701	4,611	0.011	0.03
Organic matter **BOD**	999 2,259	2,755 6,068	0.006 0.015	0.018 0.04
Nitrogen	3,837	30,698	0.025	0.2
Phosphorus	1,015	2,411	0.0067	0.016

Table 3: The Vollenweider Model Equations

Parameter	Equation
Hydraulic residence time (T) " days"	$T=\frac{VOL}{Q}$
Surface overflow rate (QS) "m^3/d"	$QS=\frac{Z}{T}$
Areal phosphorus load (LP) "mg/l"	$LP=\frac{LOAD\_TP}{SUR}$
Mean depth (Z) in m	$Z=\frac{VOL}{SUR}$
Phosphorus concentration prediction (TP) "mg/l"	$TP=\left(\frac{Lp}{QS}\right)\left(\frac{1}{1+\sqrt{\left(\frac{Z}{QS}\right)}}\right)$

Assessment of the Effect of Increased Nutrient Loading

By calculating the Vollenweider formula backwards, it is possible to estimate the "in-lake" total phosphorus concentration that will result from the increased loading estimated for 2022. The calculation indicates this to be comprised between 21 and 22 µg L^{-1}. The difference between the current (20 µg L^{-1}) and the future average in-lake phosphorus concentration (21-22 µg L^{-1}) is below the detection limits for the analysis of total phosphorus, therefore this increase will not be detectable by standard monitoring procedures.

Program of Measures

To keep under control the potential impact of local human activities on reservoir eutrophication, targeted policy lines and measures, specific to each sector were suggested. The following list resumes the principal sectors under which measures were proposed:

- Urban/rural wastewater management
- Agriculture

Table 4: Phosphorus Loading From Local Sources and Total Phosphorus Loading

Current status "2010"	phosphorus load	12,000 kg d^{-1}
	load due to local pressures	1,015 kg d^{-1} (= 8% of total)
Estimated status "2022"	load due to local pressures	2,411 kg d^{-1}
	total phosphorus load	13,396 kg d^{-1} (= 18% of total)

- Navigation
- Fishery sector

Conclusions

Despite the paucity of reliable data, the application of IWRM principles and methods to the Lake Nasser situation is useful to highlight critical issues and draw some general conclusions about the likely evolution of the reservoir's ecology.

- It cannot be over-emphasized that trends of change in nutrient loading should be followed with particular care by the managing authorities.
- Potential increase in nutrient loading regarded as more or less insignificant for water quality in rivers, may trigger the development of eutrophication in a reservoir such as Lake Nasser, due to its very large drainage basin.
- These concerns should be carefully considered within the context of the ongoing extension of irrigated areas, the ongoing urbanization, industrialization, and intensification of agriculture in the catchment around the reservoir and also further upstream of Lake Nasser.
- Experiences made in Europe with regard to fighting eutrophication in Lake Constance, in the North Sea, in the Baltic Sea and in the Danube Delta indicate that it is never too soon for taking adequate precautions to prevent water quality deterioration.
- The results of the assessment presented here indicate that local human activities bear a limited influence on the overall transfer of nutrient loading into the reservoir.
- It should be stressed that more consistent data need to be produced, collected and ordered in a validated water quality database, to improve the reliability of the results that are presented here.
- A number of implementation measures should nevertheless be introduced to control the potential impact of different human activities at local (Egyptian) level and to guide further development on the shores of Lake Nasser towards sustainable resource management.
- To provide these operational measures, it is paramount that local management authorities as well as central ministries may define specific agreements, and share information concerning their activities in relation to water quality monitoring as well as to the monitoring of the evolution of human activities around the reservoir.
- Special care should be dedicated to assess localized effects of pollution; depending on their individual location.
- Lower current flow, low depth, higher temperatures and more intense nutrient exchanges fueling higher primary production contribute to create ideal conditions in the *khors* for fish spawning. This in turn attracts a lot of bird life and fishermen can exploit this resource.
- *Khors* represent the most accessible portion of the lake for a range of human activities (fishing, washing, pumping water for irrigation, extraction of sediment for land reclamation) and are therefore increasingly threatened by local pollution sources. Some of the more exposed *khors* should thus be object of more regular monitoring.
- The current good water quality status of Lake Nasser and the low impact due to local (Egyptian) sources indicate that the future water quality status of the reservoir is dependent mainly on potential impacts that could come from the Nile inflow upstream.
- A targeted monitoring scheme should be put in place to follow more closely incoming loads as well as their evolution over time, taking into account the large variations in nutrient concentrations that accompany seasonal changes triggered by the Nile floods. ■

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إن النمو السكّاني المتزايد في مصر بالإضافة إلى تزايد كل من الأنشطة الصناعية والزراعية قد أدّى إلى زيادة استهلاك المياه والطلب عليها. كما أن هناك تطوّر سريع في كافة أنحاء مصر على الصعيد المحلّي، بما في ذلك منطقة بحيرة ناصر، وممّا لا شك فيه أن الضغوط على موارد المياه سوف تتزايد، فالضغوط الناجمة عن القيود المحلية ربما تتحسّن نتيجة للتطورات المحتملة أمام السد – جنوب الحدود المصرية، وقد يكون هذا التطوّر ناتجاً عن الزياده المُحتملة لاستهلاك الأراضي في الجنوب وتكثيف الزراعة وزيادة صرف النفايات الحضرية ومياه النفايات الصناعية، هذا بالإضافة إلى التغيّرات الناتجة عن تغيّر المناخ. إن أهداف الإدارة المُتكاملة لموارد المياه في بحيرة ناصر – كموقع تجريبي، هي نقل المعرفة والمهارات، لاختبار تطبيق المنهجيات التي تم وضعها من قبل الإتحاد الأوربي والقائمة على إطار العمل التوجيهي للمياه بدول الإتحاد الأوربي .الهدف الأساسي في هذا الإطار هو الحفاظ على جودة المياه كماً ونوعاً من خلال الرصد البيئي ومن ثم فإن خطط الإدارة تُركّز على الحفاظ على جودة المياه في بحيرة ناصر في المستقبل على الأقل بنفس جودتها الحالية، أخذاً في الإعتبار إنه بالنسبة إلى المياه فإن الجودة والكم شقّان لا ينفصلان. وفقاً للسياسات والخطوط الإرشادية، فضلاً عن التدابير المتوخّاة، فإن الخطة لها دورة طبيعية ومُراجعة لإدارة الخطط المستقبليّة من قبل إطار العمل التوجيهي للمياه، ومن ثم تُساهم الخطط الإدارية تلك في إرشاد القطاعين العام والخاص كما تُشجّع على مزيد من الإستثمارات في المُستقبل لضمان الإدارة المُثلى للمياه والتي تعود بالفائدة ليس فقط على الأفراد بل على المُجتمع بأكمله.

Greater Cairo Water Authority Relies on Cummins G-Drive Engines in Flood Prone Areas

Flash floods in Egypt last year killed at least a dozen people and forced hundreds to leave their homes. In the Sinai Peninsula, Upper Egypt, and Aswan, where the rain-induced flooding reached record levels, over 1,100 homes were washed away and the authorities estimated damages amounting to US$75 million.

This year, the Greater Cairo Water Authority is ready for any such emergencies thanks to a fleet of four mobile response units that carry water pumps powered by **Cummins** G-Drive engines. The pumps are mounted onto trucks for mobility, and after successfully completing rigorous testing, are standing by to be deployed to the emergency areas. When heavy rains are forecast, the water authority can move the vehicles to the designated area so that they are ready to tackle any flooding before it reaches danger levels.

Engineers at Almohandes Co., a Cairo-based Original Equipment Manufacturer (OEM), chose Cummins G-Drive model 6CTA8.3-G2 and 12-volt DC engines. Designed to be fuel-efficient, these high-performance diesel engines provide the best solution for the specific requirements of this project.

Aly Khamis of Almohandes said: "We know this particular Cummins engine series extremely well. And, as testament to the quality and durability of its products, we have forged and maintained an excellent relationship with

Cummins and have enjoyed a good experience with their products during the 25 years that we have been working with them."

Cairo Water Authority did not specify its actual power requirement. Therefore Almohandes team of engineers based its calculations on average efficiency before specifying the engines that would exceed the project's likely power requirements by a 20% margin of safety.

Khamis added: "The Greater Cairo Water Authority is so pleased with the success of the project that they are already talking to us about their next pump installation project, which will involve four mobile response units in Northern Egypt and Delta area and a further four in the South of Egypt." ■

Koch Membrane Systems to Provide PURON® MBR Modules for Egyptian Resorts

TAM Environmental Services has chosen the **Koch Membrane Systems** trading division of Koch Chemical Technology Group Ltd. to provide PURON® membrane bioreactor (MBR) modules for the wastewater treatment plant at new tourist resorts in Sharm El Sheikh, Egypt. The MBR will be used to treat municipal wastewater, which will allow effluent to be reused for irrigation and conserve the region's scarce water resources.

Al Montazah Company for Tourism and Investment is developing the infrastructure for new holiday resorts in an arid area with limited drinking water supplies located on the Sinai Peninsula's southern tip along the Red Sea coastal strip. TAM Environmental Services from Cairo was assigned to build an on-site wastewater treatment plant that has a small footprint, is less visible, provides effluent water suitable for reuse, and is modular to accommodate future expansion. While other technologies were reviewed to meet the requirements, MBR was the most feasible solution.

The plant's first phase is designed for an annual average flow of 5,000 m^3/day. Start-up of the MBR with the PURON PSH 1500 modules is scheduled for the end of 2011.

PURON® membrane bioreactor (MBR) module

"We have been using RO membranes from Koch Membrane Systems for many projects in the region," says *Said Mohamed el-Said*, General Manager of TAM Environmental Service. "Besides the high quality of the products, we are always extremely happy with the first-class service and engineering support that they provide. When we learned about the robust PURON membrane system with its unique features, it became clear that it would be the first choice for this type of application."

The demand for PURON MBR technology in the Middle East and North Africa region continues to increase steadily. A 2,000 m^3/day installation had just been commissioned at the end of 2010, treating the municipal wastewaters of a Saudi Arabia refinery. ■

Syria: Targeting the Improvement of Water Resources

By Dr. Eng. Darwish Yousef and Caroline Yousef

The Syrian Government aims at gradually improving the quantity and the quality of water resources across the whole country to compete with the challenges of high population growth with its implications of higher demand for drinking and irrigation water (for food production), ever fast industrial development with special high demand industrial process as dying and tanning with the adverse impact of heavy polluted industrial wastewater, the modern trends toward huge tourism projects with relevant high water demands, and shifting rainfall patterns due to climate change.

The sixteen rivers and tributaries running in Syria provide about three quarters of the available surface water resources in the country and nearly half of the total. As a response to different water difficulties, Syria has, like most MENA countries, heavily invested in technology and infrastructure to store and divert water resources and to deliver water services to farmers, industries, and households. In the past decades Syria has experienced this period of water storage development, resulting in a total storage capacity of 19 billion m^3 in 164 reservoirs, which equals 120% of the actual annual renewable water resources of around 16 billion m^3. Three large dams in the Euphrates basin were completed in the 1980s, which together account for almost 16 billion m3 of potential storage volume. The actual storage volume depends of course on the climatic variability over the years and the management of the reservoirs. The current scope for large-scale expansion of storage capacity seems limited and would also come at a high cost. However, small dams and rainwater harvesting techniques do have potential as alternatives for further water resources development.

However, Syria is looking toward sustainable water resources management as the final and real target for water crisis. The government, through the Ministry of Housing and Construction (MHC), is seeking this target through the following methodologies:

Providing Non-Traditional Water Resources

Syria has a population of 23 million. Considering the average wastewater production per capita of 100 liters daily, the annual wastewater production

Compact WWTP (Modallaleh, Hama)

is up to 840. With national wastewater collection service percentage of 80, the actual annual volume of wastewater disposed of in the public sewers is 670 million m^3. Treating this flow could mitigate the health and socio-economic impact of disposing of this polluted water on lands or in water bodies. Furthermore, the wastewater treatment process, by meeting the Syrian standard for application of treated wastewater in irrigation, could provide non-traditional water sources that could satisfy considerable ratio of Syrian demand for irrigation water. Referring to the average irrigation requirement of 5,000 m^3/hectare, the abovementioned volume of wastewater (670 million m^3) could supply irrigation requirement for more than 130,000 hectares. According to the statistics, the average agriculture land holding per family is 2 hectares. Thus, total treated wastewater could develop the agricultural production for about 65,000 families across the country, in addition to enhancing the health and social-economic situation for these societies. In fact, there are many operating municipal wastewater treatment plants in major Syrian cities (Damascus, Aleppo, Homs, Hama) and through the rural areas of these governorates. The most prominent mark in this field is the "Aleppo Rural Water and Wastewater Project", funded by the European Investment Bank (EIB), and performed by well-known international consulting consortium IGIP- IPP: Germany. The international consultant has prepared a conceptual study for rural areas of the Aleppo Governorate dealing with the assessment of present and future water supply and wastewater collection and treatment (and reuse) service demands. This high-quality study attracted local, national, and international attention observers and highly valued by the local partners, beneficiaries, and stakeholders. The second phase of the study will produce Environmental Impact Assessments (EIAs) and Feasibility Studies for defined WWTPs that serve many major cities (regional capitals) in rural Aleppo, and finally, tender documents. For the future success operation of these WWTPs, the consultant has confirmed the importance of qualified staff and the cost recovery of O&M through a proper tariff system.

Reducing Water Loss

During the last five-year plan, the Ministry of Housing and Construction (MHC) has prepared investment projects to improve water supply. The central drinking water system serves 95% of urban residences and 75% of rural residences. In general, the average indi-

vidual, in both rural and urban areas, consumes between 100 and 150 liters per day. However, Water establishments in 14 governorates across Syria, are facing technical, administrative, and financial constraints. They don't generate enough income to operate and maintain the systems in a sustainable way due to the low prices of the tariff system, thus, the reported physical losses are at least 30% and unaccounted for water (UFW) in the range of 40%. Therefore, the Syrian Government has decided, as a part of an overall Syrian reform process in the water sector, to take the following actions: (1) Supply and exchange of water meters allowing reading and billing of water quantities consumed; (2) Supply of bulk water meters and water meter test benches allowing the establishment of section wise water balances and an improved water loss control; (3) Supply of laboratory equipment for water quality testing; (4) Supply of repair tools, equipment, and leak detection equipment; and (5) Supply and implementation of appropriate hardware and software needed for the new process of customer registration, and also required for a transparent and efficient process of billing and collection. To overcome the nonexistence of customer addresses, the customer's register shall be established through a comprehensive subscribers' survey (CSS) applying Geographical Information Systems (GIS). A notable milestone in this direction was established through the project of "Water Loss Reduction Program in Aleppo: Service B", funded by the German Development Bank (KFW), and performed by international consulting consortium CES-SW: Germany, which mainly seeks to:

- Develop and implement an operation and maintenance concept;
- Develop and implement a leakage control program;
- Develop and implement a Water Safety Plan according to WHO standards;
- Support in procurement, tendering, and contract management;
- Support in finance and accounting;
- Support in customer management;
- Support in organization of the water supply in areas without or with deficient supply network.

It is expected that the high-quality activities and long and international experience of this consultant will lead to a very successful outcomes for Water Supply in Aleppo.

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يُعالج الدكتور المُهندس درويش يوسف، الاستشاري الدولي في المياه والصرف الصحّي، سعي سورية إلى زيادة مواردها المائيّة وفق منهج الاستدامة عن طريق مُعالجة مياه الصرف لتأمين جزء من مُتطلّبات الري وعبر تخفيف الفاقد المائي في شبكات مياه الشرب. ويجري تعزيز هذه الجهود عن طريق التعاون مع الشركات الاستشارية الدولية التي لها خبرات طويلة في هذا المجال. وتتركّز الجهود بشكلٍ خاص على محافظات دمشق، ريف دمشق، وحلب، بسبب أهمّية قضيّة المياه فيها، وتمتد الجهود مع الوقت لتشمل المُحافظات الأخرى. ويود الدكتور أن يُنوّه بجهود الخبرات المحليّة المُبدعة العاملة في هذه المشاريع وخصوصاً المُهَندِسَين أحمد السفراني وفيصل رز.

Syria: More Than 21,000 People Receive Drinking Water in Drought-Affected North-East

The International Committee of the Red Cross (ICRC) and the Syrian Arab Red Crescent have begun to distribute clean drinking water to vulnerable people in the drought-stricken Al-Hassakah governorate and in the neighboring Deir Al-Zor and Al-Raqah governorates.

"More than 21,000 people are receiving monthly deliveries of water," announced Syrian Arab Red Crescent president Dr. *Abdelrahman al-Attar*. "Thanks to this joint effort by the Syrian Arab Red Crescent, the ICRC, and the authorities, their quality of life will improve considerably."

In recent years, drought has forced many people to leave the north-east of the country and settle in cities such as Damascus, Aleppo, or Homs. "Providing clean drinking water to people living in the areas most affected helps them maintain their livelihoods and remain where they are," said *Marianne Gasser*, head of the ICRC delegation in Damascus. "People in or near the remote village of Um Madf'a are now receiving water from a treatment unit installed by the ICRC and the Syrian Arab Red Crescent. Similar units set up in the villages of Mastur and Abu Hamdah are expected to be operating soon."

"Getting clean water for free means a lot to me and my family," said *Abu Hassan*, one of the beneficiaries. "My children are drinking safe water now. And I am less strained financially, as I had to pay for drinking water in the past."

Because the water currently available in boreholes is saline, it has to be treated to be made drinkable. The General Commission for the Management and Development of Al-Badia will be responsible for operating and maintaining treatment

units. The Syrian Arab Red Crescent, using five tanker trucks donated by the ICRC, is distributing drinking water from six treatment plants installed by the General Commission and by the General Establishment for Drinking and Waste Water. ■

Borouge to Renew Water Supply Systems Destroyed by Floods in Pakistan

At the Arabplast Exhibition held in Dubai from January 8 to 11, 2011, **Borouge**, a leading provider of innovative, value creating plastics solutions, confirmed that it is cooperating with Pakistan NGO HEED Association and local polyethylene (PE) pipe and fittings producer, Sun International, to replace the water distribution networks in four villages in Northern Pakistan that were destroyed by the recent floods. The floods which occurred following the heavy monsoon rains in July this year were the worst seen in 80 years and at their peak covered one-fifth of Pakistan's total land area and forced ten million people to rely on unsafe water sources.

As part of the Water for the World™ program, Borouge leverages its partnerships and innovative plastic solutions to support the construction work which will be managed by the HEED Association in the villages of Mattoo, Thoniyan, Matteiyan, and Daba in the Neelum Valley in Northern Pakistan. Sun International will manufacture the PE pipes and fittings from BorSafe™ HE3490-LS PE100 material from Borouge. BorSafe™ HE3490-LS was selected for its outstanding strength, flexibility and long life at extremely low temperatures. The lighter weight of PE 100 Pipes also makes transportation easier in the inaccessible mountain ranges. With their inherent flexibility and strength, welded pipe systems constructed from high quality PE materials are the best choice for withstanding major disasters such as earthquakes and floods and will also help the local villagers resume their normal daily life and reduce the threat of disease from drinking contaminated water.

Water for the World™, an initiative of Borouge and Borealis launched in 2007, is part of the company's long-term commitment to sustainability and towards addressing the global water challenge. In 2009, Borouge was working with NGO Lien Aid and the Singapore Water Association to provide clean drinking water to 10,000 victims of the earthquake in Sichuan, China, and more recently Borouge once again worked with Lien Aid to provide new drinking water systems for two hospitals in Vietnam. In addition, working as active members of the Water and Sanitation for the Urban Poor (WSUP) team, Borouge and Borealis have helped a further 300,000 poor people living in urban communities gain access to water and sanitation, mainly in Africa.

Water for the World Program

Today, more than one billion people have no access to clean water and more than double that number lack proper sanitation facility. This prompted the United Nations to set as one of their Millennium Development Goals to halve the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015. This challenge is not about finding more water; it is about better managing and preserving the resources we have.

In 2007 Borouge and Borealis created the Water for the World initiative, a global program that fosters local knowledge and partnerships to provide sustainable solutions for the availability of safe water and sanitation.

By bringing its expertise to community field projects, advancing science and best practices, engaging stakeholders, leveraging its leadership in innovative plastics solutions and promoting water efficiency in its operations, Borouge can make a difference.

Here are some examples of activities in Asia:

- Providing drinking water to the Sichuan earthquake resettlement camp in China
- Upgraded water supply facilities at Hanoi Children's Hospital in Vietnam
- Providing continuous water supply to residents of Bhaktapur in Nepal
- Building a sustainable water system for Swami Maheshwaranande Ashram Centre in Rajasthan, India
- Providing clean drinking water to Ho Phong and Gai Rai in Southern Vietnam
- Reducing water losses by relining ageing water mains in Beijing
- Delivering fresh water on tap to 3,000 homes in Malkapur in Maharashtra, India
- Bringing fresh water from mainland China to the Quemoy Islands
- Protecting the Whanganui River in New Zealand with a new sewerage system
- Securing fresh water access to 450 villages in Andhra Pradesh, India
- Providing inhabitants of Mangalore and Pattur in Bangalore, India with safe drinking water
- Pioneering the first plastics pipe academy in the Middle East
- Sponsoring of the global Stockholm Water prize and creating the Borouge Water Prize in India
- Working with 'Water and Sanitation for the Urban Poor' on their global projects ■

The Most Innovative and Cost-Effective Treatment for Recycled Wastewater in Prato (Italy)

One of the Largest Industrial Aqueduct in Europe

Prato WWTP demonstrated the technical and economic performance of innovative Ozonia ozone generators for a recycling system to successfully clean wastewater. With the MODIPAC™ (Modular Power Supply Unit) equipment, the total ozone capacity production grew up by 25% with the same energy consumption.

Prato WWTP: From Wastewater Treatment to the Reuse of Treated Water

The Prato WWTP treats urban effluents as well as the greater part of the industrial waste generated by the many textile factories in the Prato region (about 270 production facilities). The first treatment line of the purification plant was built in 1978 and a second line was built in 1987.

At the beginning of the 1990s, international low-wage competition and increasing energy costs were creating high pressures on local textile businesses. Thus, they were forced to identify innovative possibilities to enhance cost effectiveness and thereby their competiveness.

Moreover, the city realized that natural resources alone were no longer able to satisfy domestic and industrial requirements (domestic uses: 13 million m^3/year - industrial uses: 15 million m^3/year).

Therefore, Prato decided to reuse a part of the other most important source of water coming out just from the WWTP (130,000 m^3/day) and to build a whole plant for the post-treatment, saving the aquifer for drinking water and solving the emergency of lack of water.

The typical substances which have to be eliminated are: Detergents (anionic and non-anionic surfactants), textile lubricants (emulsifying oil), dyes of various kinds, and suspended solids (mainly lint).

Ozonia: Combining High Performance and Low Production Costs

Disinfection is a major treatment step in the direct reuse of reclaimed wastewater to ensure environmental and public health protection. Because of its high oxidation potential, Ozone has been considered as the most economical and effective solution to disinfect and recycle wastewater (killing bacteria, inactivating viruses and protozoa).

Ozone allows the production of an effluent with no microorganisms, no color, no odor, low COD (Chemical Oxygen Demand) level, and suitable for discharge into the environment, use in agriculture, or return to the process. Moreover, there is a total destruction with a small production of biological sludge.

The treatment in Prato WWP is based on an effluent recycling system composed of a sequence of treatments that are particularly suitable for removing certain pollutants or classes of undesirable compounds.

<u>The treatment processes involved are:</u>

• Homogenization of the wastewaters to be treated with the help of a balance tank;

• Clarification (coagulation + lamellar sedimentation or coagulation + flotation) and filtration with sand allowing a solid-liquid separation to reduce the pollution load;

• Cross-flow filtration with flat membranes for the complete removal of suspended solids and turbidity;

• Advanced chemical oxidation with ozone, allowing the oxidation of the residual dyestuffs and a disinfection of the water.

The main innovative part of the plant was the combination of cross-filtration and ozonation.

OZONIA undertook to design, manufacture, supply, and install the ozone plant and all of the associated mechanical, electrical, and instrumentation equipment to provide a fully automatic plant. Four ozone generators were installed to remove surface active agents from the water coming out of the existing treatment line.

In 2008, the 4 ozone generators have been equipped with the MODIPAC™ (Modular Power Supply Unit), the latest Ozonia generation of power supply units allowing a substantial reduction of electrical energy consumption.

The total ozone capacity production grew up by 25% to 200 kg O3/h with the same energy consumption.

Moreover, the ozone is dosed as a function of the process water flow. The duty Vent Ozone Destructor (VOD) is of the thermal type with a heat recovery system to economize on electrical power and a safe and easy maintenance environment.

The destructors reduce the ozone emission levels to well below the required limits. The vent gases are exhausted to atmosphere.

Total Fresh Water Consumption Reduced by 40% on an Industrial Scale

After the ozone treatment, the recycled water is used as process water in many textile industries, like dyeing and finishing, or as thermal medium in refreshing or heating plants. It is also used in car washing plants, antifire networks, irrigation, washing streets, etc.

A large number of repeat tests were carried out and demonstrated that the plant consistently achieved highly satisfactory results, particularly for high pollution removal efficiencies:

• 62% of total surfactants were removed against a target of 50%.

• 98% of color was removed which was significantly higher than the 85% target.

All other results were perfectly in line with the original targets:

• 60% removal of chemical oxygen demand (COD);

• 92% turbidity removal;

• 95% removal of total suspended solids (TSS).

A percentage of the ozonized water treated in the Prato WWTP (3.5 million m^3/y) is refined in a post-treatment plant. This water is then mixed with water coming from the river (30% of the total quantity) to reduce the saline content.

The project showed that by mixing this recycled liquid with fresh water, total fresh water consumption could be reduced by 40% on an industrial scale. In some finishing and washing processes this increased by 100%.

Assuming a partial reuse of 40% by 500 textile industries with a total effluent production of 1,000 m^3/day, the experts estimate that their innovative treatment system could result in a saving of 44 million m^3 of fresh water a year.

As a recognized leader in disinfection – oxidation solutions, Ozonia (**Degrémont**) designs and manufactures a wide range of ozone and UV products which incorporate some of the most sophisticated electronics available. These systems are designed for a wide range of applications in the industrial and municipal markets and have unique technical features to simplify installation, reduce operator intervention, and ensure ease of maintenance. ■

www.degremont-technologies.com

أظهرت محطّة مُعالجة مياه الصرف الصحّي في مدينة براتو الإيطالية الأداء التقني والإقتصادي لمولّدات الأوزون المُستحدثة من شركة Ozonia التابعة لـ Degrémont ، وذلك لصالح نظام إعادة تدوير يُنظّف مياه الصرف الصحّي بنجاح. وزادت نسبة توليد الأوزون بـ٢٥ بالمئة، وبنفس نسبة إستهلاك الطاقة، مع إستعمال معدّات MODIPAC، وهي عبارة عن وحدات توليد طاقة. ويقدّر الخبراء أن نظام المُعالجة المُستحدث هذا سيُمكّن المحطّة من توفير ٤٤ مليون متر مُكعّب من المياه العذبة سنوياً.

EBARA Introduces Large Range of Domestic and Industrial Submersible Pumps

Within the different kind of products produced by **EBARA Pumps Europe**, there is a large range of submersible pumps suitable for the domestic and industrial markets, and built both in stainless steel and cast iron.

EBARA PERLA, submersible pumps in technopolymer, OPTIMA, BEST ONE /BEST ONE VOX, BEST 2-5, drainage pumps for domestic applications, made of AISI 304 stainless steel, they are mainly used for draining wheels, garages, cellars or places subject to flooding, handling seepage water, draining small and medium size building sites.

RIGHT and DW sewage pumps, made completely in AISI 304 stainless steel, are particularly suitable for handling liquids containing solid and/or filamentary substances in suspension. They are used for handling sewage sanitary fixtures, draining cesspits, and discharging into the sewer.

The new D SERIES (including DS, DVS, DL-DL W/C and DML-DMLV models) is a comprehensive range of submersible pumps made of cast iron for sump, effluent, wastewater and sewage treatment. They are mainly used for handling contaminated liquid in general, including those containing solid and filamentary substances in suspension. They are available up to 45kW power and they have a capacity up to 780 m3/h and a total head up to 48 meters.

EBARA Pumps Europe S.p.A., located in Veneto and Trentino, in North-Eastern of Italy, represents in Europe an important center for the industrial and domestic pumps market thanks to the high quality of its products. It started its

activity in Italy over 20 years ago. EBARA Pumps Europe S.p.A. is the European branch of EBARA CORPORATION in Tokyo, a Japanese multinational company, which has been operating in the pump business since 1912 with over 70 associated worldwide companies. ■

Atlas Filtri: More than 35 Years in Water Treatment and Filter Production

Italy's **Atlas Filtri** specializes in the production of filters and equipment for the treatment of primary waters; a leader in the domestic sector since more than 35 years, marketed in more than 80 countries, it provides solutions, services, and products specially designed for the purification of water in the industrial, civil, and medical sectors.

Throughout the use of innovative designs and technologies, the application of severe standards in production, and its commitment to total quality, Atlas Filtri has always been devoted to research and development to produce durable and reliable products; in addition it is operating with the highest environmental commitment by the implementation of energy-saving productive processes and manufacturing products with objective ecological characteristics.

Atlas Filtri offers a wide range of products for water filtration and treatment: Housings and cartridges, self-cleaning filters, anti-scale systems, softeners, media filters, UV sterilization units, dosing systems and chemical products, reverse osmosis units, and fully equipped potabilization units.

In 2009, Atlas Filtri created the Atlas Filtri Engineering division, which can respond to every requirement in process water filtration and treatment.

In 2010, proceeding with the program of innovation and improvement of its range of products, Atlas Filtri introduced the new series of CPP melt-blown polypropylene cartridges, with and without inner-core.

The new CPP cartridges are manufactured in different heights and micron rates, with the most recent Atlas Filtri technology.

The most common applications of melt-blown CPP cartridges are in the pre-filtration of:

- Reverse Osmosis plants.
- Micro, Ultra, Nano filtration.
- Oil industry.
- Chemical and pharmaceutical industry.
- Food and beverage industry.
- Hydropower plants.
- Household, hotels, hospitals. ■

The Smallest, Smartest Valve Actuators from Biffi

Biffi has been a leading manufacturer of valve actuators for more than 50 years. What has to be noted is that Biffi is the only actuator manufacturer which can offer customers worldwide a comprehensive selection of standard, as well as specially designed actuation products, including: Electric, pneumatic, hydraulic, gas-hydraulic, and subsea actuators, all available with a full complement of accessories suitable for a wide range of applications while maintaining expert engineering and production capabilities to support a broad range of Customer specifications.

F02 - New Quarter-Turn Electric Actuators for Small Part-Turn Valves and Dampers

With the F02 series, Biffi introduces a compact (up to 2,000 Nm) quarter-turn electric actuator for the operation of low-torque part-turn valves and dampers with the highest innovative actuation technology.

The biggest new idea for the smallest, smartest actuators: With its 8 kilos, the F02 is the most innovative all-in-one actuator available on the market. Not only does it include a whole range of essential design features such as "ICON" intelligence, but can also incorporate "BluetoothTM" Wireless connectivity.

Key Features

- One single version to cover the whole range of power supply (24 to 240V DC or AC single phase input voltages at 50 and 60 Hz).
- One single version to cover the whole range of operating times (10 to 400 seconds), with the possibility of different stroking times in the opening and the closing maneuvers.
- One single version with interchangeable base plate for connection to various types of valves.
- As an option, BluetoothTM technology allows your PDA or PC to have direct access to the F02 for non-intrusive operation, configuration, and diagnostics. ■

The New EXTREME Pump Series from Rovatti: Pumps You Can Always Rely On

Since 1953, the name "**Rovatti Pompe**" has been synonymous with the production of high quality water pumps. Over the years the company has diversified its activity from the production of pumps for agricultural applications to include pumps for industry, drainage, and sewage.

Rovatti has always been engaged in an active program of research and development with particular attention to technological innovations, manufacturing processes, and new materials. Among the latest and most significant achievements resulting from this corporate commitment, the company highlights the development of the EXTREME pump series (pumps and electric pumps manufactured in AISI 316 casted stainless steel and designed for extreme applications) and the innovative SNE high efficiency pumps range, complying with EN-733 norms.

It is Rovatti's philosophy to produce innovatively designed pumps that have a long life, are environmentally friendly, and have a reduced energy requirement. Combining this with the vast technological experience, severe operating tests, and continuous investment, ensures that Rovatti remains in the far front of pump technology.

Every Rovatti pump is produced, tested, and manufactured by skilled engineers working together to guarantee only the highest levels of reliability, safety, and ease of use. ■

Drillmec G-Series Water Well Rigs Foray into Africa and the Middle East

Drillmec G-Series water well rigs have been remarkably successful in the drilling industry especially with medium-range rigs like the G-50. In the last two years, several units have been sold in Ethiopia, the UAE, and Syria.

In Syria, the G-50 has been delivered in September 2010. This rig is designed to operate in harsh environments, maintaining its excellent performance even with though ground formations. Thanks to its pioneering hydraulic system and its flexible design, the rig performs both rotary drilling and Down the Hole Drilling with hammers. The mast is designed for handling range 2 drill pipes and casing 12m long.

In order to perform both abovementioned operations in a most economical and fastest way, the rig is equipped with a 36 m3/min – 25 bar compressor from Atlas Copco, a 7" ½ x 10" duplex Drillmec mud pump,

and foam pump. A deck mounted Deutz engine powers the rig and optimizes fuel consumption and maintenance cost. The G-50 mounted on a heavy duty 8 x 8 four axles Astra Truck is highly mobile and can reach difficult-to-access sites. ■

ARGAL Updates the KGK Vertical Pump Series

ARGAL has increased the "KGK" vertical pump series with size 3 having a capacity up to 270 m3/h and a delivery head up to 80 meters.

The length of the vertical pump varies from 500 mm up to 4,000 mm. They are built with thermoplastic polymers as molded PP (polypropylene) and PVDF. The casing can be with single or double impeller. The casing construction creates a semi-axial flow ideal for liquids with solids in suspension reducing the radial strengths and vibration of the submersed column.

ARGAL can supply the submersed column in FRP (fiber reinforced polyester), which has a higher mechanical resistance than any other thermoplastic material, similar to metallic material, and does not change dimensions with temperatures.

The "KGK" series, to reduce the length of the unit, has a new short close coupling device that includes a ball bearing and a flexible coupling. The "KGK" has 3 options of vapor seal. The pump shaft is aligned in the lower part by a ball bearing, supplied in different materials depending on the pumped liquid. ■

Operator Self-Monitoring Can Lower Costs

*Wastewater represents a cost to business. In the following article, **HACH LANGE**'s Emma Brown explains how correct monitoring procedures can help reduce these costs and even boost profit.*

Background

The Environment Agency of England and Wales (EA) and the Scottish Environmental Protection Agency (SEPA) are responsible for environmental protection and improvement. Much of the environmental legislation that these organizations enforce is derived from European Directives such as the Urban Waste Water Treatment Directive and the Water Framework Directive.

Process operators are regulated through permits, authorizations, and consents which specify compliance requirements to protect the environment and monitoring is required to ensure compliance with consents.

When Is a Trade Effluent Consent Required?

- Waste from toilet flushing, hand wash basins, showers, and canteens, does not require a consent
- Minimal discharges (a few liters per day) may not need a formal consent as long as they are non-hazardous
- Discharges above 1 m^3/day require full consent
- Short-term discharges (e.g. one week) need to gain prior authorization from the water company

Polluter Pays

There are a number of ways in which discharges incur costs. For example, if the discharge is treated at a water company treatment works, the water company will impose a fee.

Water companies calculate wastewater charges (in pence per m^3) using the Mogden formula which combines operational costs that are specific to the water company with various measures of the wastewater 'strength'. These include Chemical Oxygen Demand (COD) and suspended solids.

If a process operator is responsible for a discharge to surface water (river, stream, estuary, or the sea), or to groundwater (including via an infiltration system), the EA will apply a charge based on the category of waste (e.g. higher rates for metals or pesticides), the volume of the discharge and the type of receiving water. If the operator fails to comply with the conditions of the discharge consent, the company may be fined in the courts and clean-up costs may apply. Furthermore, such activity can seriously affect the public perception of a company, significantly damaging the brand.

Operator Self-Monitoring (OSM)

The EA has moved to a more risk-based approach to monitoring, which has resulted in a move to OSM. Under OSM, water companies and other businesses will monitor their own discharges and report the results to the EA. These results will determine how well the operator complies with its consent conditions. The frequency of monitoring will be dictated by the risk posed by the discharge and the operator's performance. The EA will check that operators comply with the monitoring requirements through site inspections and audits, and the Agency will continue to monitor the quality of receiving waters and assess the impact of discharge quality upon them.

HQD meter and 6 probes full size

To Test, or Not to Test?

Clearly, OSM presents responsible operators with an opportunity to reduce costs. However, it is also important to note that wastewater charges are often based on an infrequent spot check which may not accurately represent the true value. So, operators have a choice: They can either hope that the spot checks are accurate, or they can conduct their own monitoring to make sure that it is.

Self-monitoring can deliver much more than an accurate charge for wastewater; it can create a better understanding of a process and thereby improve efficiency and reduce the risk of discharge consent failure.

Testing Options

In order to demonstrate compliance with a discharge consent, it is normally necessary to send a small number of samples to a UKAS certified laboratory. However, most operators also conduct their own testing and monitoring to ensure that the process remains within consent and to help manage the process efficiently.

Process operators that measure flow continuously are able to provide their wastewater treatment provider with accurate data from which the treatment charge can be calculated. A further advantage of flow measurement is the cost-saving opportunities that it provides. For example, an operator may discover that certain parts of the process generate high levels of discharge, such as washdown, so that the process can be adjusted to reduce discharge costs.

A wide range of flow monitors are available, employing a number of technologies to suit a variety of applications. The choice of technology is often dictated by the application or physical constraints.

Qualitative measurements can be performed on collected samples or alternatively, continuous water quality monitors can be installed. A wide range of options exist for qualitative measurements. HACH LANGE manufactures all of these instruments and the company's technical staff is able to offer advice on the best solution for every application.

Sampling

Samples can be collected from the waste stream either manually or automatically. However, manual sampling is generally less favored for a number of reasons. Firstly, manual samples do not usually provide a representative sample because they are taken at one moment in (usually day) time – a spot check. Secondly, manual sampling may suffer from sampling errors of sampling variability between staff, and finally, manual sampling represents an ongoing operational cost.

Automatic samplers are able to take samples at various times throughout the process cycle in order to deliver a representative sample. The collected samples can even be refrigerated so that they do not change prior to analysis. However, some samplers offer more sophisticated options. For example, they can monitor flow rates and adjust the sampling frequency accordingly. Alternatively, some samplers are able to monitor water quality in the waste stream and take samples when readings reach specified limits or alarm levels.

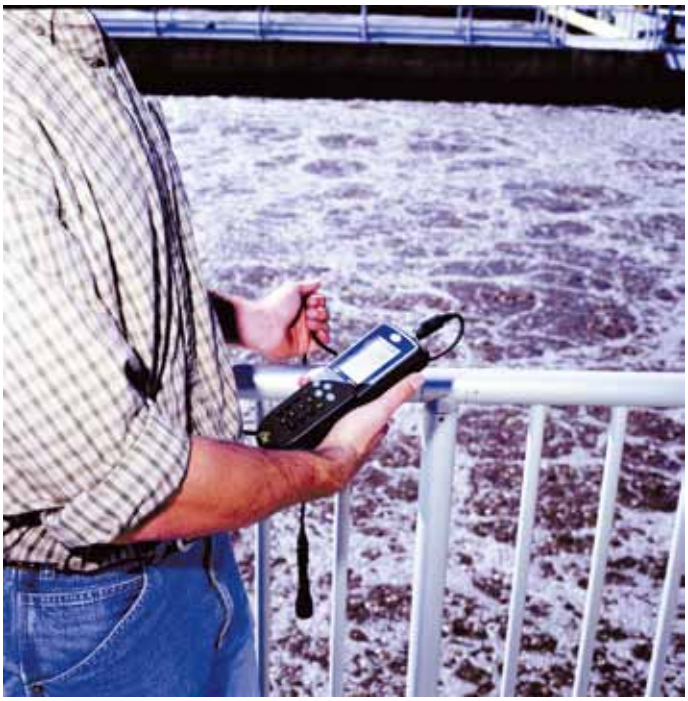
Qualitative Measurements

BS 1427 describes methods for the analysis of industrial and other waters. These methods can be undertaken outside of the laboratory, for example on-site tests. This guide is for testing when the purpose of the test is to characterize the water under test for quality or process control purposes. A range of options exist for analysis on-site.

Simple colorimetric tests (test strips, sticks, or comparators) provide quick, low-cost results albeit with limited accuracy and resolution. Alternatively portable photometers can provide much better levels of accuracy and remove many of the causes of error.

Portable test kits can be used by non-chemists and offer a number of advantages. They enable simple, rapid results, so the frequency of testing can increase; no chemical preparation is required and waste chemicals are recycled by responsible providers (such as HACH LANGE). It is important to note however, that analysis by test kit is simply indicative and does not match the level of accuracy and reliability that can be achieved in a UKAS certified laboratory.

Portable photometers are available for individual parameters or multiple parameters. The main advantage of photometers is that, following the addition of the reagents, they measure the color of the solution digitally and are



able to remove the effects of background color. Multiple parameter analysis is made possible through the employment of multiple filters, which in some units, are selected automatically.

Laboratory photometers add even further levels of sophistication. Standard methods are pre-programmed into the units and they are able to recognize specific cuvettes that are supplied with exactly the correct quantities of reagents for specific tests. Results can be stored on these photometers or exported to a printer or PC.

Continuous monitors log recorded data and provide constant access to live readings. This enables the rapid detection of alarm conditions and the easy identification of process trends. Continuous monitors can also be connected to controllers that are able to feedback into the wastewater treatment system in order to optimize the treatment process. For example, HACH LANGE has been involved in numerous trials that have demonstrated substantial cost savings in the energy costs of wastewater treatment through the continuous monitoring of dissolved oxygen and ammonium.

Summary

Wastewater monitoring can deliver substantial savings for a number of reasons: It can ensure that a process complies with its discharge consent; it can ensure that treatment charges are accurate; it enables rapid response to pollution incidents; it identifies abnormal concentrations and peaks and provides an accurate picture of the process so that efficiency opportunities can be identified, such as reduced waste and recycling. ■

www.hach-lange.co.uk

تُقوم Emma Brown من شركة HACH LANGE في هذا المقال بشرح كيفيّة قيام إجراءات مُراقبة صحيحة بالمُساعدة في تخفيض تكاليف مُعالجة مياه الصرف الصحّي وحتّى كيفيّة زيادة الأرباح. بإمكان مراقبة مياه الصرف الصحّي أن تؤمّن توفير بالأكلاف لعدّة أسباب هي: بإمكانها ضمان أن عمليّة المُعالجة تمتثل لنسبة التفريغ المسموح بها، أن تكاليف المُعالجة دقيقة، تؤمّن ردّة فعل واستجابة سريعين لحوادث التلوّث، تُحدّد التركيزات غير الطبيعية وتؤمّن صورة دقيقة للعمليّة لتحديد فرص الفعاليّة كتخفيض نسبة الصادرات وإعادة التدوير.

First Foundation Installed at London Array

DONG Energy, **E.ON**, and Masdar announced on March 8, 2011 that the first of 177 foundations has been installed at the London Array Offshore Wind Farm, in the Thames Estuary in the UK.

The monopile, weighing 268 tons - the equivalent of around 35 double decker buses - was supplied and installed by joint venture company Per Arsleff Bilfinger Berger Ingeniurbeu GmBH using A2SEA's jack-up barge, Seaworker. The transition piece was then lifted into place, completing the project's first full foundation installation.

Anders Eldrup, CEO of DONG Energy, said: "This is a significant milestone for London Array, off the shore and into the water. Soon we'll be seeing the turbines going up and the wind farm starting to generate low carbon electricity. DONG Energy is proud to be the major shareholder, investing in the UK's biggest offshore wind farm."

Dr. *Frank Mastiaux*, Chief Executive of E.ON Climate & Renewables, said: "Installing the first foundation on schedule marks another major milestone in the construction of the world's largest offshore wind farm. It's a great moment for the team now that all the detailed and diligent planning and preparation over years can finally be seen out in the water."

Dr. *Sultan Al Jaber*, CEO of Masdar, said: "The installation of the first foundation is demonstrative of the commitment and collective desire to make London Array a reality, and is a strong testament to the industry-leading resources and experience exemplified by this strategic partnership. Masdar is proud to be at the heart of this ambitious effort which will not only catalyze the wired scale-up of offshore wind power, but also act as an important contributor to the economic vision of Abu Dhabi and the governments and companies with whom we are collaborating."

Each foundation consists of a tubular steel monopile, driven 20 to 50 meters into the seabed, and a large yellow transition piece, which is fixed over the top of the monopile to provide the base for the wind turbine. The monopiles are between 33 and 65 meters long and weigh between 200 to 650 tons, while the transition pieces are between 20 to 28 meters high and weigh between 245 to 345 tons.

The piles were lifted off the deck of the vessel using a 60 meter crane and driven into the seabed with a 225-ton anvil and hydraulic ram.

In the summer, the Seaworker will have been joined by the MPI Adventure, a new self-propelled jack-up vessel. Over the next nine months both vessels will continue to install the remaining 176 foundations in preparation for the installation of the two offshore substations in the summer and the start of installation of the 175 wind turbines towards the end of the year.

The monopiles and transition pieces were brought to the site from Germany and Denmark on ABJV's transportation barges.

The foundations will now begin to arrive and be installed in a pre-determined pattern, each one having been designed and built specifically for its installation location.

London Array is being built around 20 kilometers off the coasts of Kent and Essex. The wind farm will be installed on a 245 km2 site and will be built in two phases. Phase One will cover 90 km2 and include 175 turbines with a combined capacity of 630MW. The consortium plans to complete the first phase by the end of 2012. If approved, the second phase will add enough capacity to bring the total to 1,000MW.

The project consortium partners have the following shareholdings: DONG Energy owns 50%, E.ON has 30%, and Masdar has a 20% stake. ■

Palintest Grows with Acquisition of Wagtech Water Technology Division

Leading water analysis technology company, UK-based **Palintest Ltd.** has now expanded its global reach and operations with the acquisition of the Water Technology Division of Wagtech International Ltd., as of March 1, 2011.

The Wagtech Water Technology Division will operate as a newly-formed standalone business unit within the Palintest organization. It will continue to focus on the manufacture and supply of a wide range of portable water testing kits and products for field use. The new Wagtech WTD business unit will be headed up by *Neil Wrigglesworth*, who together with *Tom Aylward* has transferred across from Wagtech International. Their knowledge and expertise of the product ranges and markets will ensure a smooth transition of the business, ensuring customers will continue to receive the high levels of service provision they have come to expect.

Palintest Ltd. is known throughout the world as the leading manufacturer of a wide range of formulated reagents and advanced instruments for water and environmental analysis.

This acquisition brings together the technical strength of the Palintest product range with the extensive knowledge that Wagtech WTD has of bespoke field testing kits, especially for the developing areas of the world. Through the new, combined distribution network it will considerably strengthen Palintest's reach into global markets, especially in Africa and Asia, providing those regions with greater access to the company's large and growing range of analytical equipment.

Palintest is a world-leading manufacturer of water testing and environmental products for water quality, drinking water, and swimming pool testing. The company supplies a wide range of photometer and comparator instruments, test kits, and reagent systems for the detection of many elements, and leads the way in technology for the domestic, industrial, and commercial water and soil management markets. Palintest is a Halma company; Halma makes products for hazard detection and life protection and is a market leader in specialist electronic, safety, and environmental technologies. ■

Swagelining Limited Resurrects Aging Water Pipes in Innovative Trial

Swagelining™ a semi-structural liner into a 39" diameter cast iron potable water main

Swagelining Limited, the pipeline rehabilitation and life extending specialist, has used its cutting edge technology to transform aging water pipes during a trial for a UK utility giant.

United Utilities commissioned the project to allow it to compare various technologies available on the market before refurbishing an 80-km long aqueduct, which transports drinking water from Oswestry in Shropshire to Liverpool. The pipeline is a key water source supplying over 900,000 people in Cheshire and Merseyside.

Using their innovative patented Swagelining™ technology, developed from an old concept originally created by United Utilities and British Gas, Swagelining Ltd installed a thin polymer lining into a 1.35-km stretch of the 100-year-old 39"-diameter cast iron pipeline.

Stephen Barnes, Managing Director of Swagelining Limited says: "The scope of the trial was to specify, design, and insert a semi-structural liner into the large diameter pipeline. This trial allowed us to prove the effectiveness of our unique technology and highlight the benefits which it offers, as well as our extensive expertise. "We use a bespoke designed software prediction package as a foundation that supports lining system designs to be tailored for clients. The software enables the optimum liner size to be selected to achieve maximum pull length whilst not compromising on the pipeline volume capacity. For this trial we were able to design a thin liner which meant the overall flow capacity was maintained.

"One of the main advantages of our unique technology is that it provides the ability to achieve long pulls of polymer liner with minimum excavation, which can lead to considerable cost savings. This trial saw us Swageline the section of the pipeline in two pulls – one being 750 m and the other 600 m, although pulls of over 1 km can be achieved."

Swagelining™ is becoming a widely recognized technique for the rehabilitation of pipelines within the water, mining and slurry, and oil and gas industry. The technology, with its ease and simplicity of operation, delivers a cost-effective method of rehabilitating pipes and can overcome the problem of failing pipes in inaccessible or inconvenient areas, such as beneath busy high streets.

Swagelining™ technology was developed in the 1980s as a trenchless technology rehabilitation solution providing an effective method of overcoming the problem of failing pipes in inaccessible or inconvenient areas, such as beneath busy main streets. This technology was further developed in the 1990s for the protection of new pipelines in the subsea industry complemented by a new connection system the WeldLink™, for use in high pressure, carbon steel, and water injection applications.

In November 2009, Glasgow-based Swagelining Limited acquired the intellectual property rights to the established Swagelining™ technology. ■

YSI Launches New Marine Division at Ocean Business 2011

Product Demonstration

Combining expertise from the company's water quality, bathymetry, and integrated systems activities, **YSI Hydrodata** will launch a new Marine Division at this year's Ocean Business event.

Offering monitoring solutions from portable instruments and AUVs to complete networked ocean buoys, the new division will build on YSI and SonTek's massive installed base of marine instruments and systems to provide customers with both off-the-shelf and bespoke solutions to marine monitoring requirements.

Taking place at the National Oceanography Centre in Southampton, UK (April 5-7), the event will provide an ideal opportunity for visitors to see the latest water monitoring instrumentation such as new sensors, the Castaway CTD and the EcoMapper, an autonomous underwater vehicle.

In addition to the exhibition, YSI Hydrodata will also run three demonstrations:

1 'Castaway CTD' profiling demonstration at the dockside area; Tuesday, April 5, 2pm.

2 'Monitoring coastal water quality' demonstration at the dockside area; Wednesday, April 6, 4:30pm.

3 'Multiparameter monitoring system with integrated crude oil, refined oil and CDOM sensors' in the Ray Beverton (Level 4) room 044/11; Thursday, April 7, 1:30pm. ■

Anglian Water Awards Contract for Smart Water Meters to Elster

Elster announced in December that it has been awarded a contract from Anglian Water for the supply of V200 and V210 volumetric polymer hybrid Smart Meters.

A key advantage of the V200 and V210 polymer hybrid meters is that they comprise a fully integrated, tamperproof, advanced meter reading (AMR) unit, alongside Smart Metering features to enable water providers to manage their resources more effectively.

Using advanced electronic register technology, the V200 and V210 hybrids are volumetric water meters which set new standards in automated meter reading. Easy to install with no complex commissioning, the V200 and V210 hybrids use intelligence within the electronic register to turn simple data into valuable metering information such as back flow, no flow, and leakage detection.

The V200 and V210 hybrids have been designed to form an integral part of Elster's advanced metering infrastructure (AMI) system, ensuring water utilities are able to meet their targets for resource management and customer service.

"Anglian Water looks forward to the imminent installation of the V200 and V210 polymer hybrid meters from Elster as part of Anglian Water's extended trial of radio meters. The signs to date are encouraging on ease of installation, set up and use," said *Paul Glass*, project manager for Anglian Water. With world-class design and manufacturing facilities based in the UK, we can see major benefits in being able to work with Elster. We can influence them in terms of designing products to meet our future needs and Elster can support us with a high volume supply of water meters," Glass added.

"We are delighted to have received the tender award from Anglian Water. The innovative V200 and V210 polymer hybrid water meters with integrated radios represent the latest technology in smart water meters," commented *Jerry Lauzze*, executive vice president of Elster's global water business.

Elster is one of the world's largest electricity, gas, and water measurement and control providers. The company's offerings include distribution monitoring and control, advanced smart metering, demand response, networking and software solutions, and numerous related communications and services – key components for enabling consumer choice, operational efficiency and conservation. Elster's products and solutions are widely used by utilities in the traditional and emerging Smart Grid markets.

Elster has one of the most extensive installed revenue measurement bases in the world, with more than 200 million metering devices deployed over the course of the last 10 years. ■

Waste Management Specialist ENVAR Announces New MD


Arthur Ready

Leading organic waste and recycling company **ENVAR** is delighted to announce the appointment of *Arthur Ready* as Managing Director.

Based at ENVAR's head office near St Ives in Cambridgeshire, UK, Mr. Ready will be responsible for driving future growth in the company's recycling and composting businesses. He joins the business following a long and distinguished career in the waste management industry.

Prior to joining ENVAR he was Group Commercial Manager at Greenstar Environmental, which he joined in 2006 following the sale of R U Recycling Ltd, a business that he started in 2002.

With additional experience working for Roseberry Recycling, Wastelink and Northumbrian Environmental Management, Mr. Ready has considerable knowledge across the waste processing chain from curbside collection, through transfer, transport and sorting, to the marketing of materials for recycling and reuse.

Commenting on his appointment, Mr. Ready said: "I am delighted to be joining ENVAR and excited about the potential for growth in this business which incorporates a unique blend of technical expertise and innovation, augmented by a culture of excellence in service delivery." ■

Fluidra Acquires the Aqua Products Group and Makes a Strong Appearance in the US Market

Fluidra has signed a definitive agreement to acquire Aqua Products, a privately-held US-based group, with a view to strengthening its core business. This is a strategic move as it allows the company to compete in the US, a high volume market, and gain a foothold in the residential swimming pool market. Fluidra strengthens its position with an innovative technology company, a leading manufacturer of electronic pool cleaners, which is a key product in a high growth market aimed at a potential base of over 16 million swimming pools across the world.

The acquisition of Aqua Products by the Fluidra Group as of March allows the Spanish multinational to start the year with a successful project in one of the areas it knows best: International expansion. With this acquisition, Fluidra, which distributes its products to over 170 countries, opens up new distribution channels for its products, while increasing the diversification of its portfolio. This positions Fluidra as one of the most important manufacturing groups in the water management industry.

Fluidra believes that this strategic acquisition valued at US$44 million – which represents 4.2 times 2010 EBITDA - will provide strong returns for the group, as it involves a high-tech, innovative company operating in a high growth sector. In addition, it will allow Fluidra to introduce its range of products into the US market.

"This announcement is good news for our customers and shareholders. There is a very important value generation in this operation. It makes Fluidra become world leader in robotic cleaner technology for pools, whilst opening the door to the residential market in US," says *Eloi Planes*, Fluidra's Managing Director (CEO).

Eloi Planes and Gerry Erlich

With some 300 employees, the Aqua Products group operates in 40 countries and turns over US$46 million. The company specializes in the design, manufacture, and distribution of electronic pool cleaners, and is one of the world's largest manufacturers. ■

Ray Agua Produces Water from the Air: Production Is Possible Anywhere and It Has Multiple Applications

Ray Agua is the first company to have obtained pure low mineralization drinking water that can be used for anything.

Minutes after starting the machines Ray Agua's units produce pure fresh drinking water even in the most demanding climates.

As Ray Agua's units are very versatile they can be equally used in natural catastrophe areas, in intensive farming productions and for domestic use. Their characteristics allow them to produce water in very dry or desert climates. Also, there is no contamination or residual emissions if renewable energies are used.

Safety and Quality

The water produced by the Aquair units is registered in the Spanish Health Ministry Registry. The units' efficiency has been proven. The Autonomous Organism "National Parks" uses Ray Agua's technology to supply drinking water and also uses it for scientific uses in the Biological Station in the Chafarinas Islands situated in front of Morocco in the Mediterranean Sea where the use of desalination plants is not recommended due to the damaging brine effect on the vital cultivations of Posidonia and other various species of sea fauna being recovered.

A desirable implantation policy would allow the extensive use of Ray Agua's units in different non civil installation in the area.

A Solution for Agricultural and Animal Farming

Ray Agua's units are ideal to fulfill the necessities of agricultural and animal farming on a constant basis regardless of climatology. No more worrying about anticyclones or low pressures. Aquair provides tailored water at the right moment not being it necessary any special knowledge to use the units.

This way, being able to enjoy a plantation anywhere, no matter how harsh the ambient condition is, is at hand if you have one of Ray Agua's products. ■


Aquair 200
Blue acid

AGRONIC 2000: The Best Seller Fertigation Controller in Spain and Portugal

Since 1985, **Progrés** is dedicated to design and manufacture electronic controllers for agricultural fertigation and irrigation telemanagement systems. After 26 years, its portfolio is one of the most advanced and some of its models have been pioneers worldwide in several of their features.

Most controllers have been extraordinarily accepted, especially Agronic 2000, which is the top selling controller for conventional fertigation in Spain and Portugal, with more than 32,000 units already sold.

Agronic 2000 can control the irrigation, fertilization, fertilizer mixing, pumping and filters cleaning, with detection of malfunctions and display of data:

- There are models with 6, 12, 18, and 26 independent outputs, configurable for irrigation sectors, 9 filters, 4 fertilizers, 4 agitators, 1 injector, and 1 pump; plus 5 signal inputs.
- It has capacity for 31 independent or sequential programs.
- Programming can be set up for daily or weekly action or with several activations every certain period of time on program number one.
- Time or volume programmable.
- The fertilizers can be applied in "series" (one after the other with only one injector, and only one meter if it is working by volume), or in "parallel" (several fertilizers at once, with one injector for everyone, and always by time).
- It offers the possibility of receiving SMS messages from Agronic 2000 with alarms, incidents and periodic messages of pre-established values, and the possibility of sending commands via the user's mobile phone to start or stop a program, set the operation in "Stop" mode, modify a program, etc.
- It is possible to manage the Agronic 2000 using a computer with the Agronic PC program.
- Versions for 220 Vac, 115 Vac, 12 Vdc and for latch solenoids (two- or three-wire). ■

Electronic Water Coolers with Sparkling Water, the Latest Market Launching of Canaletas

Spanish company **Canaletas** focuses its activity on the design and manufacture of all type of water coolers and drinking fountains. To be pioneer in the sector is one of the main principles of Canaletas' business model. Canaletas has recently launched to the market a new product: An electronic water cooler that offers cold, heat, room temperature, and sparkling water. The novelty in comparison with other models of the market is that it incorporates larger water sparkling autonomy thanks to the fact that admits CO2 bottles of greater capacity and to the electronic control system that assures that at any time the water is in optimal conditions.

The company manufactures a large range of products. On one hand, it offers an extensive catalogue of drinking fountains in different designs: Wall-mounted, with pedal, garden fountains, with high capacity for large number of users, etc.; on the other hand, it offers water coolers with direct water connection also in a large variety of models like free standing, tabletop, or undercounted models.

In addition, Canaletas offers bottled water coolers for offices or domestic consumption; models with the greater refrigeration capacity of the market able to supply to more than 50 users or small tabletop coolers for small offices or kitchens.

In its innovating personality, Canaletas has been the first company in the market to offer a sanitation system for its water coolers and drinking fountains. It consists in applying steam so that in a few seconds it reaches a temperature of around 85°C inside the tank. It is a system certified by independent laboratories and as it does not use chemical agents, it is totally safe for the end-user. ■

Water Quality Engineering Application Development and Numerical Libraries White Paper Now Available

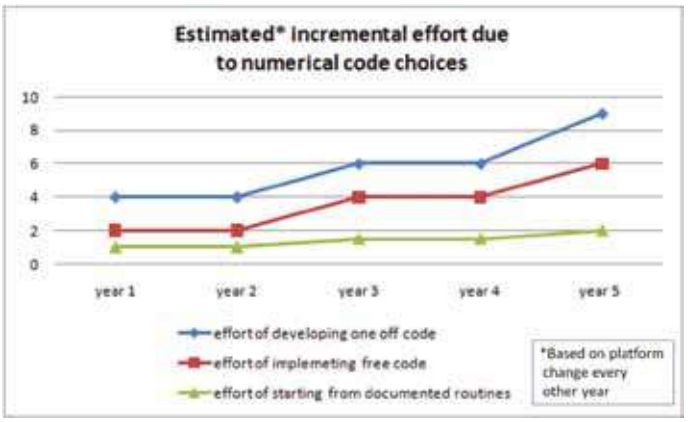
Water quality researchers and engineers, many of whom are already contending with slower performance of legacy applications originally developed for 32-bit processors that are now operating in 64-bit systems or supercomputer-level resources, can now obtain a white paper tailored for the concerns of environmental researchers - "The Benefits of Using Rigorously Tested Routines from Numerical Libraries—Water Engineering Edition" - by writing to NAGWWWaterQuality@nag.com.

The white paper is geared to help water quality researchers and engineers to understand how and why to incorporate use of extensively documented numerical libraries into their application development practices.

The subject matter discussed in the NAG Library Guide white paper is of growing importance to a wide range of finance, industrial, business, scientific research, and engineering applications because of recent multicore processor developments and the emergence of GPU chips and/or widespread access to high performance computing (HPC) resources.

Rob Meyer, NAG CEO and author of this white paper explains: "This white paper speaks to computationally-intensive water and wastewater management methods for optimizing efficiency that rely heavily on mathematical and statistical algorithms."

Meyer continues: "The Numerical Algorithms Group (NAG), a global not-for-profit numerical software development organization that collaborates with world-leading researchers and practitioners in academia and



industry, devotes considerable resources to ongoing development of what is arguably the world's most extensive and rigorously tested numerical library — the NAG Library — available to application developers in C+, C#, F#, FORTRAN, MATLAB, R, Maple, and other environment including routines tuned for multi-core and parallel hardware configurations. In recent years, it became clear that many researchers in a wide range of disciplines have yet to grasp that we have entered a period where investments in software, not hardware, matter most. We penned this white paper to help educate a wide range of technical application developers on how they can use numerical libraries to develop software on par with the processing capabilities of multicore systems and HPC computing environments." ■

Water Market USA 2011

The American water market is facing a daunting challenge. Decades of underinvestment in municipal infrastructure means that drastic changes are urgently needed. Yet this is a time when public finances are stretched more than ever before. It is now crucial to set long term strategic goals to overcome the obstacles of this new environment – and getting your strategy right is key to unlocking the vast opportunities on the other side.

Water Market USA 2011 from **Global Water Intelligence** is your indispensible companion to the US water market, with all the strategic information you need to make the most of opportunities in 2011 and beyond. The company's research offers fresh and unique insight into the issues affecting growth in the US water and wastewater market. The data and analysis will revolutionize your ability to make the right decisions for your business, so you can be confident about future recovery.

Detailed commentaries on key themes will give you an expert understanding of the US water market as a whole – these essays explain the procurement methods that are used in the USA, particularly the Design-Build and Design-Build-Operate models, how the equipment sector and supply chain works, and how the water industry is financed.

Individual chapters on all ten EPA regions will show you the key local issues that affect water policy and utility management in each area. The report outlines how the water and wastewater sector is organized in each region, and explain procurement models and growth forecasts up to 2016 for each locality.

It also includes special chapters on California, Texas, and Florida, the three largest markets in the USA. These three States combined make up one-third of the total US market, and are a hotbed of growth potential for your business. Environmental regulations and policy vary greatly across the US, so the local knowledge available in this report is crucial if you are seeking to negotiate new markets successfully. ■

Emerson's Water Measurement and Management Technologies Thrive in the Middle East

__Arab Water World__ magazine, in an exclusive interview with Mr. Keven Dunphy, Business Director, Flow Middle East & Africa, __Emerson Process Management__, sheds light from his Dubai, UAE office on Emerson's recent activities and projects in the MENA region and worldwide.

Can you provide us with a general overview regarding the history of Emerson Process Management, and where are your company and its global/regional offices located?
Emerson Process Management (EPM) has been established in the ME region for more than 25 years. Initially, EPM served and supported its MEA customers from Dubai; in 2007, we decided to regionalize, so we initiated new entities and positioned teams in Saudi Arabia and Qatar to get closer to the customer and leverage pre- and post-sales support, as well as to provide excellence in sales, service, and training.

Do you have an activity for the company's water measurement and management technologies?
We have a lot of activity centered on the water/wastewater market in the Middle East region and Emerson Process Technology has developed dedicated products and solutions to serve these markets. In addition, we support these markets with a group of global industry experts who continuously help us to understand the current industry needs, so that we can develop our solutions and products to meet customer needs.

What is your analysis of the current market for water flow meters, especially in the Middle East & North Africa?
The potential of the water markets represents more than 40% of the overall market for flow meters. The market is growing, in line with the significant increase in demand for water in the MEA region.

What were your contributions to the sector and the innovations you've witnessed taking place in this field?
Due to the lack of natural resources in the region, the cost of producing drinking water through different desalination processes is very expensive, so high accuracy, reliability, availability, and on-line diagnostics/verification of the flow meters become highly requested options. That's why we have focused much of our product development throughout the past decade to serve that need; we have the best proven accuracy and reliability for flow metering in the market. This is true for all our flow meters, as well as the advanced capabilities we have to diagnose and verify flow meters online, without the need to interrupt the process.

What new products have you launched on the market?
There have been more than 40 new innovations/products launched by Emerson Process Management throughout the past few years, ensuring we can better serve a wide variety of applications in different industries, including Oil & Gas, Chemical/Petrochemicals, and Water/Wastewater.

What does Emerson Process Management have in store for the GCC water markets in the future?
We are continuously developing our solutions and launching new products to serve increasing customer demands in the Middle East water sector. We will concentrate more on the solutions and products which give the customer the best performance, in addition to the best possible return on investment and economic operational levels.


Keven Dunphy

What are the exhibitions (local or international) in which you have participated recently, or expect to participate in soon?
Emerson Process Management is a key participant at all the reputable exhibitions within the Middle East region. In addition, we have our own dedicated customer events and seminars, which are used to generate high level of interest and participation from a large proportion of our customers in the region. For example, the recent launch of our new US$3 million Middle East Flow Service Center in Abu Dhabi attracted key customers from throughout the region. ■

Triveni Engineering & Industries Ltd. Wins the Frost & Sullivan 2010 Growth Excellence Award in the Indian Water and Wastewater Treatment Market

Frost & Sullivan honored **Triveni Engineering & Industries Ltd.** with the 2010 Growth Excellence Award in the Indian Water and Wastewater Treatment Market. The Award was presented in recognition of Triveni's exemplary achievements in water and wastewater treatment projects. Frost & Sullivan, through its study on the Indian Water and Wastewater Treatment Market, identified Triveni Engineering & Industries Ltd. as an emerging player in the market. Triveni has executed unique projects for raw water treatment, as well as wastewater recycling and reuse. It has a gamut of technologies, from traditional systems like Anaerobic Digestion, to advanced systems such as Membrane Bioreactors (MBR) and Zero Liquid Discharge Systems (ZLD), which cater to diverse industrial, municipal, and commercial end-users. Triveni has also successfully executed projects aimed at converting treated sewage into cooling tower make-up water with high degree of consistency in treated water quality.

India is a growing market for advanced recycle and reuse systems, estimated to be 10% of the overall US$1.3 billion-market for water and wastewater treatment equipment. Some of the key challenges that cripple companies offering recycle and reuse solutions are negative perceptions about the use of recycled water and the need for strong domain expertise with qualified personnel for efficient servicing and maintenance. As the Indian economy expands, water consumption by industries is expected to touch 70-80 billion cubic meters in the next 10 years, seriously affecting the water requirement of the agricultural and domestic sectors. This has led the government to highlight incentivizing of water recycle and reuse as a key strategy in its National Water Mission.

Triveni is well positioned to leverage this opportunity, as low availability of freshwater sources and initiatives to reduce the water footprint would encourage end-users to reuse equipment and adopt recycling methods. ■

AEROMIX Announces New Western Regional Sales Manager

AEROMIX is pleased to welcome *Timothy ("Tim") Rees* to the role of Western Regional Sales Manager. In his position, he will be responsible for the management of the company's sales organizations in the American states of Washington, Oregon, Idaho, Utah, Colorado, Montana, Alaska, Arizona, New Mexico, Nevada, Wyoming, and California, and will focus on building and maintaining relations with clients in the power generation and oil & gas national market segments.

Tim brings over 30 years of experience in utilities and engineering planning, industrial and engineering consulting, municipal, facilities and utilities plant operations, and business development. His extensive knowledge and expertise will make him instrumental in expanding the reach of AEROMIX equipment such as packaged Wastewater Treatment Plants, Aeration equipment, and RO/UF membrane systems.

Most recently, Tim was a Business Development Manager for AECOM and has been employed with various companies including Arcadis, Saudi Aramco, GE Water, and Allied Chemical. "Tim offers a wealth of knowledge to AEROMIX and will be prominent in helping us expand our products and services. We are excited to have him join our team," said *Peter Gross*, President of AEROMIX.

AEROMIX, a subsidiary of RWL Group is a world leader in the design, manufacturing and support of water and wastewater treatment equipment. Many AEROMIX products are patented, offering unique high performing and proprietary solutions in water treatment, aeration equipment, solar powered treatment systems, and complete wastewater treatment plants. AEROMIX aerators have acquired world leadership positions at municipal and industrial wastewater treatment plants with packaged wastewater treatment plants at military installations, commercial buildings, and institutions around the world. AEROMIX compact water treatment plants produce drinking water for hundreds of thousands of people and their solar powered circulator utilizes green technology to treat water and wastewater. ■


Timothy Rees

CST Industries Announces New President & CEO

The Board of Directors of **CST Industries, Inc.** is pleased to announce that *Declan McLaughlin* has been named President and CEO of CST industries, Inc. Declan joined CST in late 2009 as President of Columbian TecTank. He recently was named to lead the combination of Columbian TecTank and another CST portfolio company Engineered Storage Products into the new company CST Storage, the global leader in complete storage solutions. Prior to joining CST, he served as Vice President and General Manager for SPX Corporation's Global Package Products, where he focused on building business, increasing profitability and opening new international markets.

"I am excited with getting the opportunity to lead this dynamic organization. We have a unique portfolio of products that positions us for growth throughout North America and the rest of the world. Having already been a part of the CST Team, I will have the opportunity to hit the ground running. I look forward to working with everyone to make our company a great success," said McLaughlin, who is succeeding *Brian Bauerbach* who will be leaving the company to become CEO of a separate venture.

"Declan is an ideal choice to assume this important role. He has a great understanding of our business and the markets we serve. Additionally, his career experience, both domestically and internationally, will be extremely beneficial as he leads the future growth of our company," commented *Dave Abbott*, Chairman of the Board of Directors of CST Industries, who will work closely with the CST management team during the transition.

CST Industries, Inc., a portfolio company of Sterling Group L.P., is the global leader in the manufacture and erection of factory coated metal storage tanks, aluminum domes, and specialty covers. CST's existing company portfolio consists of CST Storage (Formerly Columbian TecTank & Engineered Storage Products), Temcor-Conservatek, Weaver Reclaimer Systems, and Vulcan Tanks. ■

MWH Global Chairman and CEO Robert B. Uhler Announces Succession Plan


Alan Krause


Bob Uhler

Robert B. Uhler, chairman and CEO of **MWH Global, Inc.**, announced a planned transition of the company's CEO role. In November 2011 Uhler will be the company's executive chairman of the board, and *Alan J. Krause*, currently president and chief operating officer of MWH Global, will be nominated to succeed Uhler in the CEO role. Uhler, 64, made the announcement at the company's first quarter board meeting.

"On behalf of the entire board of directors, I would like to express our gratitude to Bob for his successful leadership at MWH," said *Alan Fohrer*, lead director and chairman of the executive compensation and executive personnel committee for MWH Global. "During his time as CEO, he has been instrumental in developing a very strong global engineering and construction firm, and the market leader in wet infrastructure. Under his leadership, MWH increased its revenue 66% and now employs more than 7,000 people. We are pleased Bob has agreed to continue his involvement in the company to focus on corporate governance and client relations, and we are confident Alan Krause has the talent and leadership to take on this new role of CEO in addition to his current responsibilities as MWH president."

"It has long been the heritage of our company to build the resources internally to provide company succession, and for this reason, Alan Krause has been my principal business partner for the last five years," Uhler said. "I believe he is well-prepared to be CEO. He has a wide knowledge of MWH, our clients, services and geographies. In addition to his cultural sensitivity, having worked on six continents, Alan has the business acumen, guiding principles and people skills to take MWH to a new level. Together with the senior leaders and board of directors of MWH, we will continue to carry out the MWH vision and strategies for growth. I look forward to an exciting year." ■

New KSB Products at the "Wasser Berlin International" Trade Fair

At the Berlin water trade fair held from May 2 to 5 this year, pumps and valves manufacturer **KSB**'s central topic will be the improvement of energy efficiency of pump systems. With its "Fluid Future" campaign, KSB will show the savings potential hidden in hydraulic systems.

Taking water transport and the respective well measurements as an example, KSB Frankenthal specialists will demonstrate how such potential can be uncovered. Huge potential for energy savings can often be identified when measuring the actual flow rate, head, and power input of an installed well pump and comparing these values with the original design data.

To date, KSB's specialists have carried out more than 4,000 measurements. They have ascertained that one third of all submersible borehole pumps operate uneconomically and with much higher energy consumption than necessary. For owners/operators, high operating costs are the logical consequence. A new pump operating for some thousand hours per year at an efficiency improved by just a few percentage points pays for itself within a short time. As early as the planning and construction phase of a pump system, engineering contractors and consultants can keep energy consumption of the new installation low by matching the hydraulic components and the drive to the operating conditions.

The new pump monitoring unit PumpMeter will also be showcased at "Wasser Berlin International". The product comprises pressure sensors and an analyzing and display

unit fitted to the pump. It measures suction pressure, discharge pressure, differential pressure and head. A typical pump curve illustrates in which range the pump is operating at a particular point of time. This means that the pump user can see at a glance if the pump is operating in an efficient and cost-saving manner.

The German pumps and valves manufacturer will of course exhibit several models from its impressive range of valves for water applications; among them the Hera BD knife gate valve with bi-directional seal. ■

Outokumpu High-End Stainless Steel Grade Challenges Nickel Alloys and Titanium

Outokumpu, one of the world's leading stainless steel producers, has relaunched its high-performance stainless steel grade Outokumpu 654 SMO®. The grade, which offers superior corrosion resistance and mechanical properties, is set to move the boundaries of stainless steel by offering a cost-effective alternative for a host of applications where nickel alloys and titanium are presently employed.

654 SMO® is a superaustenitic grade that offers a level of pitting and crevice corrosion resistance beyond that of other stainless steels. It is also nearly twice as strong as common austenitic stainless steels and is characterized by excellent ductility and toughness as well as good fabricability.

654 SMO® provides a combination of excellent corrosion resistance and superior mechanical properties that makes the stainless steel grade a very interesting alternative to nickel-base alloys and titanium, paving the way for the use of the grade in a wide range of applications involving really harsh environments. The grade also offers a distinct cost advantage given that it contains significantly lower levels of costly nickel and molybdenum than common nickel alloys such as C-276. As such, it can be characterised as a "lean Ni-base alloy".

Plate heat exchanger manufacturers are a typical example of a customer group that can benefit greatly from 654 SMO®.

Another interesting example is condenser tubing for nu-

Heat Exchanger

clear power plants, where titanium can suffer so-called "droplet erosion." The higher erosion resistance and superior stiffness of 654 SMO® can allow for thinner tubing walls and increased reliability over titanium. The grade has successfully replaced titanium in the most aggressive areas of Swedish and Finnish nuclear power plant condensers.

Other application areas where 654 SMO® can offer a distinct cost advantage include flowlines, seawater cooling systems, filters for off-gas handling, as well as other flue gas cleaning equipment.

The relaunch fits into Outokumpu's strategy to grow special grades and Outokumpu's established reputation as the leading producer of special grades in the world. ■

ITT Analytics' OI Analytical and WTW Instrumentation Selected by NASA for Discovery's Final Flight

ITT Corporation announced that its OI Analytical branded total organic carbon analyzer (TOCA) and WTW branded VARIO® conductivity temperature meter have been selected by NASA for inclusion on the final flight of the space shuttle Discovery. The instruments will be used by the crew of the International Space Station (ISS) to measure conductivity and analyze water quality. ITT Corporation formed ITT Analytics in March 2010 following the company's acquisition of Nova Analytics, to provide customers with high quality, superior performance analytical instrumentation for measurement and analysis. The OI Analytical TOCA from ITT Analytics was developed in collaboration with NASA specifically for use on the ISS. The TOCA will be used on-board to analyze the organic carbon level in water that has been processed and purified ensuring it is safe for human consumption in line with SSP 50260, International Space Station Medical Operations Requirements Document. Possessing innovative electrochemical-oxidation technology the TOCA maintains excellent long-term calibration stability providing accurate and dependable data with minimal maintenance. The instrument's color touch screen display with Windows® CE-based user interface simplifies instrument set-up and access to data, trending and diagnostic screens.

The ISS crew will also use the WTW VARIO conductivity temperature meter from ITT Analytics to measure conductivity of water within the ISS oxygen Generation Assembly (OGA) to ensure the continued operation of the station's oxygen generation system. The instrument's robust and ergonomic design makes it particularly suited for this demanding application while its innovative touch screen enables all functions to be performed single-handedly. In addition to offering a high level of precision when measuring conductivity, temperature, specific resistance, salinity or TDS (total dissolved solids) of a solution, the meter's pure water conductivity cell with flow-through vessel enables users to make rapid and easily controlled measurements.

Discovery lifted off for its final mission on Thursday, February 24, 2011. ■

Emerson Expands FIELDVUE™ Digital Valve Controllers to Include FDT/DTM System Interface

Emerson's Fisher® FIELDVUE digital valve controllers with HART and FOUNDATION fieldbus communications can now be integrated into any process control system that supports FDT/DTM technology. Using ValveLink DTM software, users can communicate with any FIELDVUE digital valve controller, to perform startup, commissioning, and diagnostic activities.

ValveLink software has been certified by the FDT Group for compliance with FDT standards. It has also been tested and certified for use with FDT compliant host system manufacturers including Honeywell, Invensys, and Yokogawa. FIELDVUE digital valve controllers have a long history of using the AMS ValveLink SNAP-ON to integrate into HART and FOUNDATION fieldbus host systems, such as Emerson's DeltaV™ and Ovation digital automation systems. The addition of DTM support provides another avenue to continue this strong integration tradition for FIELDFVUE instrument customers.

Performance and reliability are the foundation for the FIELDVUE family of digital valve controllers. Their role is to maintain control valve performance, diagnose the assembly, and enable predictive maintenance. FIELDVUE digital valve controllers have logged millions of operating hours and have earned high praise from companies that em-

ploy their technology to improve plant availability. Built for extreme conditions, they have proven themselves by surviving difficult process environments in refining, chemical, nuclear, oil & gas, power, and pulp and paper industries.

Emerson Process Management, an Emerson business, is a leader in helping businesses automate their production, processing and distribution in the chemical, oil and gas, refining, pulp and paper, power, water and wastewater treatment, mining and metals, food and beverage, life sciences, and other industries. The company combines superior products and technology with industry-specific engineering, consulting, project management and maintenance services. Its brands include PlantWeb™, Syncade™, DeltaV™, Fisher®, Micro Motion®, Rosemount®, Daniel®, Ovation™, and AMS Suite. ■

Flowserve ValveSight Predictive Diagnostics Available for Flowserve Limitorque MX and QX Electric Actuators

Flowserve Corporation, a leading provider of flow control products and services for the global infrastructure markets, announced on March 2, 2011 the release of Flowserve ValveSight™ for the Limitorque MX/QX family of smart electric actuators. ValveSight for Limitorque provides enhanced diagnostic and graphical user interface features for facilities using the Foundation Fieldbus protocol for their digital communication networks.

The Limitorque MX and QX use ValveSight to monitor the status, alarms, and health of the valve actuator. Embedded predictive diagnostics provide advanced warning of pending problems, helping reduce operational costs associated with unscheduled plant shutdowns and loss of productivity. Additional value is realized by a reduction in commissioning time and a greater visibility into overall valve performance.

"Industrial Foundation Fieldbus applications gain the flexibility of using standard function blocks, linked within various manufacturers' field devices to incorporate a distributed control strategy uniquely tailored to the user," said *Scott Wilkerson*, product portfolio manager, host integration, Flowserve Flow Control Division. "ValveSight for Limitorque actuators embraces our customer's distributed control strategy by providing an enriched graphical user interface so plant operators can continually monitor the actuator's health by way of its Built-In-Self-Test feature."

With ValveSight for the Limitorque MX/QX, plant operators can fine tune their process control through the use

of a Proportional-Integral-Derivative function block. Plant maintenance personnel also benefit from a graphical diagnostic tool set that offers a proactive service approach to Partial Stroke Testing, Travel Histogram, Data/Operational Logging, and LimiGard TM circuit protection.

Flowserve Corp. is one of the world's leading providers of fluid motion and control products and services. Operating in more than 55 countries, the company produces engineered and industrial pumps, seals and valves, as well as a range of related flow management services. ■

REW ISTANBUL 2011

Exhibitors and Visitors Counting Down the Days!

REW ISTANBUL is one of the biggest international events in the region, which gathers experts from the solid waste, wastewater, waste gas, and green sectors. Gathering all the subfields of Environmental Technologies in the same place together since 2005; the event follows suit in its 7th edition on the international level in 2011. REW ISTANBUL will be held at the Tüyap Fair & Congress Center in İstanbul from June 8 to 11, 2011. Turkey has a big population of more than 70 million people. All the subbranches of Environmental Technologies are gaining importance and volume as years go by and Turkey is tending to be one of the biggest and attractive markets worldwide.

With around 10,000 visitors from the players of the market, REW Istanbul offers both visitors and exhibitors a clear picture of the Turkish Environmental Technologies market, enabling them to contact decision makers, buyers, and appliers from the region.

With the 'Environmental Chapter' opened up in late 2009 within the EU Harmonization process Turkey is going through, the amount of investment planned for Environmental Technologies has been announced as US$82.4 billion. The distribution of the mentioned total to different areas were also clarified and announced at the starting date of the Environmental Chapter. Water / Wastewater Treatment receive the biggest portion with about 58%. The rest includes: Waste, air, industrial waste, and nature protection.

The developments in the Turkish Market will affect the region and a big area will be much more active in the mentioned fields as well.

The stir in wastewater recycling and recovery areas was reflected in the Exhibition as an increased number of exhibitors in this business line and consequently an increased interest in the visitors oriented towards this field.

According to the figures, 54% growth was realized in 2010 at REW ISTANBUL which is happening in three halls for the first time with a growth objective of 67% in 2011, which will strengthen its position on the international level.

It is needed to draw attention to the 50% participation rate of foreign exhibitors. While there is shrinkage in conventional industries, the new company potential of the Environmental Technologies industry is increasing every day.

Its location is an additional effect that stirs visitors' interest as well. REW ISTANBUL 2011, the 7th International Recycling, Environmental Technologies and Waste Management Trade Fair, is the only instrument of its kind to have access not only to the booming Turkish Market but also to the markets of neighboring countries.

Istanbul is a gate to commerce and business on the investment roads of the market comprised of Europe, Russia, the Commonwealth of Independent States (CIS), the Middle Asia and Turkic Republic States, and African countries. It provides the exhibitors, participants, and visitors from all over the world with sector updates, technologic innovations through workshops and meetings held within the scope of the exhibition.

Besides, the Turkish Market of Environmental Technologies, also traced in many other areas, acts as a bridge between East and West. Technology providers from European Companies and international visitors from Balkan States, the Middle East and North Africa, together with representatives from Central Asia enjoy meeting each other. This also creates a bigger market for not only a country but a region.

Decision Makers Meet Key Players

Having been opened in two different halls in 2010 for the first time, REW ISTANBUL gathered together 281 companies and agencies with 9,673 visitors from 25 countries. In 2011, REW ISTANBUL expects to provide 3 halls to meet a 15,000-square-meter area for 350 companies from 35 countries.

In addition to providing the occasion to present the products/services scale of your companies, REW ISTANBUL also offers a big advantage to check the developments in the system and the innovations in technologies used. REW Istanbul visitors will enjoy the good weather of June in Istanbul, besides the historical and visual values which no other city can match. ■

UAE Prepares to Host 2nd Clean Energy Ministerial

In preparation for the **2nd Clean Energy Ministerial (CEM 2)**, taking place in Abu Dhabi on April 6 and 7, The United Arab Emirates, in cooperation with the United States Department of Energy and the United Kingdom's Department of Energy and Climate Change, has chaired a two-day Preparatory meeting in London, UK.

CEM 2 will bring Ministers from the world's largest economies to the UAE, to discuss the progress made under the 11 initiatives launched at the first Clean Energy Ministerial in Washington DC last July.

The CEM initiatives were built upon the Technology Action Plans that were released by the Major Economies Forum Global Partnership in December 2009, which laid out best practice blueprints for action in key technology areas.

In the preparatory meeting in London, the participants of the CEM discussed the progress of the initiatives and set the agenda for the upcoming Ministerial meeting in Abu Dhabi. The UAE is participating in select initiatives that span all three of the global climate and energy policy goals of CEM, which aims to improve energy efficiency worldwide through the Global Energy Efficiency Challenge, enhance clean energy supply, and expand clean energy access.


Dr. Sultan Ahmed Al Jaber, addressing the CEM 2 prep meeting in London

Dr. Sultan Ahmed Al Jaber, United Arab Emirates Special Envoy for Energy and Climate Change and Chief Executive Officer of Masdar said: "Given the UAE's leadership in developing and deploying clean energy technologies and its innovative and leading position in advancing renewable energy policies, the UAE was invited by these major economies to actively participate in the CEM meetings. We see this as a natural progression in realizing the vision of our forward thinking leadership towards fostering a transition to a global clean energy economy." ■

WATEX 2011: The 4th International Exhibition for Water Technology

For the fourth year, the **WATEX** Exhibition will be held in Damascus Fairground from April, 13 to 17, 2011, concurrently with CLIMATECH 2011, The 4th International Exhibition for H.V.A.C & R.

The exhibition has proven itself as one of the most important specialized exhibitions which attracts the latest technologies and solutions in the field of water technologies and sewage systems, and has become a reliable platform by attracting the largest international companies working in this sector and introducing them to the Syrian market.

WATEX not only represents technologies, but also adopts and supports the issues and topics in the field of sustainable development and conservation of the environment. The Exhibition's agenda includes discussion of issues and topics over five days focusing on water technologies, sewage networks, and other related and critical issues such as: Energy Conservation, Water and Electricity, including environmental protection and preservation, the latest standards of environmental conservation for the visitors and participants. It will also discuss ways of using "green" technology to mitigate the impact of global warming.

Mr. *Mouafak Tayara*, General Manager of Syrian International Marketing Association – SIMA, said: "The show will be held under the patronage of H. E. Mr. *Omar Ghalawnji*, Minister of Housing & Construction in Syria, where National participations from France, Germany, Egypt, Italy, China and Turkey are exhibiting in this event, and this strong participation proves that Syria is the new destination for businessmen, specialists, importers and exporters, traders, and decision makers."

WATEX 2011 invites all specialists to visit this exhibition, providing them with the opportunity to have a look at the latest technologies and solution in the field of Water, Renewable energies, and sewage networks. ■

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- *Project Snapshots*
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- South Africa water sector – current situation
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WETEX 2011 Concludes on High Note; 47% Space Booked for Next Year's Show

Shaikh *Hamdan bin Rashid Al Maktoum*, Deputy Ruler of Dubai, and UAE Minister of Finance and President of the Dubai Electricity and Water Authority (DEWA) inaugurated the 13th **Water, Energy, & Environment Exhibition 2011 (WETEX 2011)** on March 8.

The opening ceremony was attended by Shaikh *Ahmed bin Saeed Al Maktoum*, President of Dubai's Supreme Council of Energy; *Ahmed Humaid Al Tayer*, Governor of the Dubai International Financial Centre (DIFC); *Matar Humaid Al Tayer*, Chairman of the DEWA; *Saeed Mohammed Al Tayer* MD & CEO of DEWA; *Matar Mohammed Al Tayer*, Chairman & CEO of the Road & Transport Authority; *Saeed Mohammed Al Kindi*, Chairman of Lease Committee — Dubai Municipality; *Hussain Nasser Lootah*, Director-General of the Dubai Municipality, *Hilal Al Marri*, Executive Director of the Dubai International Convention Centre; *Abdullah Al Karam*, Director-General of the Knowledge and Human Development Authority; *Ali Rashid Lootah*, Chairman of Nakheel; *Fahd Hamad Al Mohannadi*, Director-General of Qatar Electricity & Water Company; as well as senior officials of Dubai Departments, senior DEWA staff, and representatives of big companies.

After the opening ceremony, Shaikh Hamdan bin Rashid Al Maktoum, accompanied by Matar Humaid Al Tayer, Saeed Mohammed Al Tayer, and top officials of DEWA made a tour all over the exhibition to look at the displays, exhibits, and equipment shown by different participating authorities from 25 countries all over the world. Shaikh Hamdan bin Rashid Al Maktoum listened to a presentation by Saeed Al Tayer on the Exhibition, DEWA's projects and achievements through the year 2010. "This occasion also coincides with DEWA's celebrations of its 50th Anniversary — Golden Jubilee. Also, this year's edition of the Exhibition is characterized by the continuation of the country's blessed march towards development," Al Tayer said.

Within the context, Smartech Exhibition, which is regarded as the first gathering of its kind in the region, was also held during WETEX 2011. "Smartech aims to promote communications between business sector and customers through showcasing technologies which can provide energy supporting the concept of products and eco-friendly services," Al Tayer added.

The Dubai Global Energy Forum (DGEF), which will be held from April 17 to 19, participated in the exhibition with its own pavilion, for the first time.

WETEX 2011 concluded on March 10, with 47% of space already booked for next year's show to be held from March 13 to 15, 2012.

The three-day show attracted a large number of visitors, while participants exceeded 720 organizations from 25 countries from all over the world, compared to 500 last year. Also the number of the international pavilions reached 8.

Mr. Abdul Rahman Hallak, CPH's Administrative Manager, at AWW's stand

Saeed Mohammed Al Tayer said that the show has achieved its goals of enhancing interaction between industry players and people. He said that the exhibition will increase remarkably in display area in the 2012 edition.

Al Tayer added: "WETEX played a vital role for international companies to showcase their new technologies and to make strategic transactions."

DEWA participated at the Exhibition through a big pavilion in addition to its "Green Buildings" environment-compatible pavilion which hosted various activities to enhance awareness of the importance of conserving natural resources.

Al Tayer said that WETEX garnered wide participation from national pavilions including Gulf countries, Egypt, Jordan, Morocco, the USA, Australia, the United Kingdom, Germany, Italy, Bosnia, Croatia, France, Switzerland, Norway, Poland, Spain, Malaysia, Turkey, China, Taiwan, Japan, India, and Sri Lanka.

The number of sponsors increased this year to 13 sponsors and 7 co-sponsors.

DEWA held a gala dinner on the second day of WETEX at the Grand Hyatt where it congratulated the 13 sponsors and 7 co-sponsors. Mr. Al Tayer also honored 22 government and public organizations that participated in the show.

The Exhibition hosted symposia and lectures related to the topics of electricity, water, and energy, as well as the worldwide developments in these fields. The visitors, engineers, and technicians at different government sectors were briefed on modern technologies and developments.

The Exhibition showcased the best solutions including agricultural equipment as well as desalination systems and modern systems of irrigation, water pumping equipment, boilers, cables, electric transformers, conductors, energy-saving products, pipes, valves, generators, energy and water distributing equipment. ■

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Coming Events

April 2011

UK

Water & Environment 2011
CIWEM's Annual Conference
6-7, Olympia Conference Centre, London, United Kingdom
Info:
The Chartered Institution of Water and Environmental Management (CIWEM)
Contact Person: Lauren Goozee
Events Officer
15 John Street, London, WC1N 2EB
Tel: +44 (0) 20 7831 3110
Fax: +44 (0) 20 7405 4967
Email: Lauren@ciwem.com
Http: www.ciwem.org/events/annual-conference.aspx

Germany

The Global Water Summit 2011
18-19, The Intercontinental Hotel, Berlin, Germany
Info:
Global Water Intelligence
Contact Person: Ruth Newcombe
Tel: +44 1865 204 208
Email: rn@globalwaterintel.com
Http: www.watermeetsmoney.com

UAE

Water Tech 2011
24-27, Abu Dhabi, UAE
Info:
IQPC
Contact Person: Eileen Espelita
Tel: +971 4 364 2975
Fax: +971 4 363 1925
Email: eileen.espelita@iqpc.com
Http: www.watertechme.com

May 2011

USA

GEFCO's 15th Annual Resource Drilling Fundamentals Training Seminar
9-13, USA
Info:
GEFCO
Contact Person: Daphine Schmidt
Tel: +1 580 234 4141 Ext. 214
Email: intsales@gefco.com
Http: www.gefco.com

FRANCE

SWAN 2011
The Annual Smart Water Networks Conference
17-18, Schneider Electric Headquarters, Paris, France
Info:
SWAN Forum
Contact:
Thames House
Portsmouth Road
Esher, Surrey KT10 9AD, United Kingdom
Tel: +44 (0) 77 0003 3929
Fax: +44 (0) 84 4774 3632
Email: swan2011@swan-forum.com
Http: www.swan-forum.com/events.html

HYDROGAIA
The International Water Exhibition
25 – 27, Montpellier, France
Info:
Medevents
Contact Person: Rita Kebbé
Tel: +961 3 413554
Email: medeventslb@gmail.com
Http: www.hydrogaia.com

MALAYSIA

Produced Water Treatment 2011
May 31 – June 1, Prince Hotel & Residence, Kuala Lumpur, Malaysia
Info:
International Quality & Productivity Center (IQPC)
Contact Person: Linda Randall
Tel: +65 6722 9388
Email: enquiry@iqpc.com.sg
Http: www.producedwaterevent.com

June 2011

SOUTH AFRICA

Pumps, Valves & Pipes Africa 2011
7 - 9, Gallagher Convention Center, Midrand, Johannesburg, South Africa
Info:
Exhibition Management Services
Contact Person: Ms. Serean Thomson
Tel: +27 (0)11 783 7250
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marketing@exhibitionsafrica.com
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July 2011

SINGAPORE

Singapore International Water Week (SIWW)
Sustainable Water Solutions for a Changing Urban Environment
4 – 8, Suntec Singapore International Convention & Exhibition Centre
Info:
SIWW
Contact Person: Michael Toh – Managing Director
Tel: +65 6731 3160 / 6731 3169
Fax: +65 6731 3055
Email: info@siww.com.sg
Http: www.siww.com.sg

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http: www.agpvalvulas.com
Contact Person: Mr. Esteve Alfaras - General Manager
E-mail: esteve@agpvalvulas.com
AGP produces hydraulic valves and distributes all kinds of irrigation products.

Drip Irrigation Systems, Ltd.
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Contact Person: Mr. Eran Eckstein - Director
E-mail: info@dripsys.com
Manufacturer of equipment (Inserting/Perforating devices) for the production of drip irrigation pipe.

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http: www.fitcoirrigation.com
Contact Person: Mr. Jim Haynes - General Manager – Irrigation Division
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Fax: +27 21 9814473
http: www.irrigator.co.za
Contact Person: Mr. John Starke - Sales & Marketing Manager
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Advertisers' Index

فهرس المعلنين

Advertisers	Websites	Page #
American Manufacturing	www.american-manufacturing.com	63
AquaMaster	www.aquamasterfountains.com	82
ARWADEX 2011	www.arwadex.net	79
AXEON Water Technologies	www.axeonwater.com	9
Bio-Microbics Incorporated	www.biomicrobics.com	82
Blue-White Industries	www.bluwhite.com	16
Castflow Valves S/L	www.castflow.com	IBC, 82
Danfoss A/S	www.isave.danfoss.com	13
Exhibition Management Services - Pumps, Valves, & Pipes 2011	www.exhibitionsafrica.com	77
Faggiolati Pumps SPA	www.faggiolatipumps.com	5
FF - Automation Ly	www.ff-automation.com	82
The Gorman-Rupp Company	www.GRpumps.com	82
Hengtai International Co Ltd	www.ht-pump.com	82
Hydrogaia 2011	www.hydrogaia-expo.com	45
Lacroix SOFREL	www.ls-leak-detection.com	43
Lutz Jesco	www.Jescome.com	37, 82
Microfiler Co. Ltd.	www.filtercompany.co.kr	82
Neptune Chemical Pumps	www.neptune1.com	31
NWWC	www.nwwc.com.sa	73
Pancera Tubi E Filtri Srl	www.panceratubi.it	19
Pure Aqua Inc.	www.pure-aqua.com	83
RITMO SpA	www.ritmo.it	39
ROPV	www.ropv.com.cn	11
ROVATTI A. & F. LLI Pompe SpA	www.rovatti.it	IFC
Severn Trent Services	www.severntrentservices.com	OBC
St. Pioneer Corporation	www.stpioneer-filter.com	83
Sun Machinery Corp.	www.sunmachinery.com	83
TECOFI	www.tecofi.fr	21
The Syria International Marketing Association (SIMA) - WATEX 2011	www.climatech-sy.com	47
VAF Filtration Systems	www.ValveAndFilter.com	83
Woongjin Chemical Co. Ltd.	www.csmfilter.com	3

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تمت الطباعة عند شمص – للطباعة والنشر

RIT Scientists: Let Algae Do the Dirty Work

Researchers at Rochester Institute of Technology (RIT) are developing biodiesel from microalgae grown in wastewater. The project is doubly "green" because algae consume nitrates and phosphates and reduce bacteria and toxins in the water. The end result: Clean wastewater and stock for a promising biofuel.

The purified wastewater can be channeled back into receiving bodies of water at treatment plants, while the biodiesel can fuel buses, construction vehicles, and farm equipment. Algae could replace diesel's telltale black puffs of exhaust with cleaner emissions low in the sulfur and particulates that accompany fossil fuels.

Algae have a lot of advantages. They are cheaper and faster to grow than corn, which requires nutrient-rich soil, fertilizer, and insecticide. Factor in the fuel used to harvest and transport corn and ethanol starts to look complicated.

In contrast, algae are much simpler organisms. They use photosynthesis to convert sunlight into energy. They need only water — ponds or tanks to grow in — sunlight and carbon dioxide.

"Algae — as a renewable feedstock — grow a lot quicker than crops of corn or soybeans," *says Eric Lannan*, who is working on his master's degree in mechanical engineering at RIT. "We can start a new batch of algae about every seven days. It's a more continuous source that could offset 50% of our total gas use for equipment that uses diesel."

"The one big drawback is that biodiesel does freeze at a higher temperature," says *Jeff Lodge*, associate professor of biological sciences at RIT. "It doesn't matter what kind of diesel fuel you have, if it gets too cold, the engine's not starting. It gels up. It's possible to blend various types of biodiesel — algae derived with soybeans or some other type — to generate a biodiesel with a more favorable pour point that flows easily."

Professor Jeff Lodge and graduate student Eric Lannan explore algae as a biodiesel fuel (Photo by A. Sue Weisler/RIT)

Lannan's graduate research in biofuels led him to Lodge's biology lab. With the help of chemistry major *Emily Young*, they isolated and extracted valuable fats, or lipids, algae produce and yielded tiny amounts of a golden-colored biodiesel. They are growing the alga strain Scenedesmus, a single-cell organism, using wastewater from the Frank E. Van Lare Wastewater Treatment Plant in Irondequoit, New York, USA.

"It's key to what we're doing here," Lodge says. "Algae will take out all the ammonia — 99% — 88% of the nitrate and 99% of the phosphate from the wastewater — all those nutrients you worry about dumping into the receiving water. In three to five days, pathogens are gone. We've got data to show that the coliform counts are dramatically reduced below the level that's allowed to go out into Lake Ontario."

Assemblyman *Joseph Morelle*, whose district includes Irondequoit, applauds RIT's initiative. "Innovations developed at great academic institutions such as RIT will be key to solving many of the challenges we face, from revitalizing the upstate economy to the creation of clean, renewable energy sources for the future. Professor Lodge and Eric Lannan's research bridges the gap between cost efficiency and environmental conservation and is a perfect example of how old problems can yield to new and creative solutions."

Lodge and Lannan ramped up their algae production from 30 gallons (113.5 liters) of wastewater in a lab at RIT to 100 gallons (378.5 liters) in a 4-foot-by-7-foot long (1.2m x 2.1m) tank at Environmental Energy Technologies, an RIT spinoff. Lannan's graduate thesis advisor *Ali Ogut*, professor of mechanical engineering, is the company's president and CTO. In the spring, the researchers will build a mobile greenhouse at the Irondequoit wastewater treatment plant and scale up production to as much as 1,000 gallons (3,785 liters) of wastewater.

Northern Biodiesel, located in Wayne County, will purify the lipids from the algae and convert them into biodiesel for the RIT researchers. ■

Source: www.rit.edu

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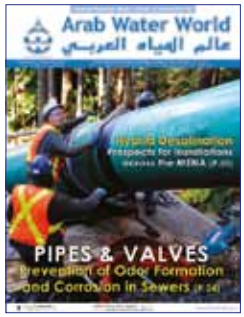

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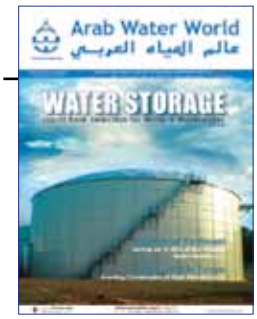

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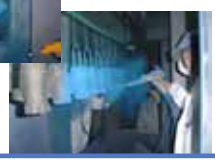

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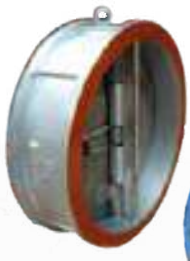

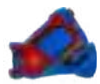

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