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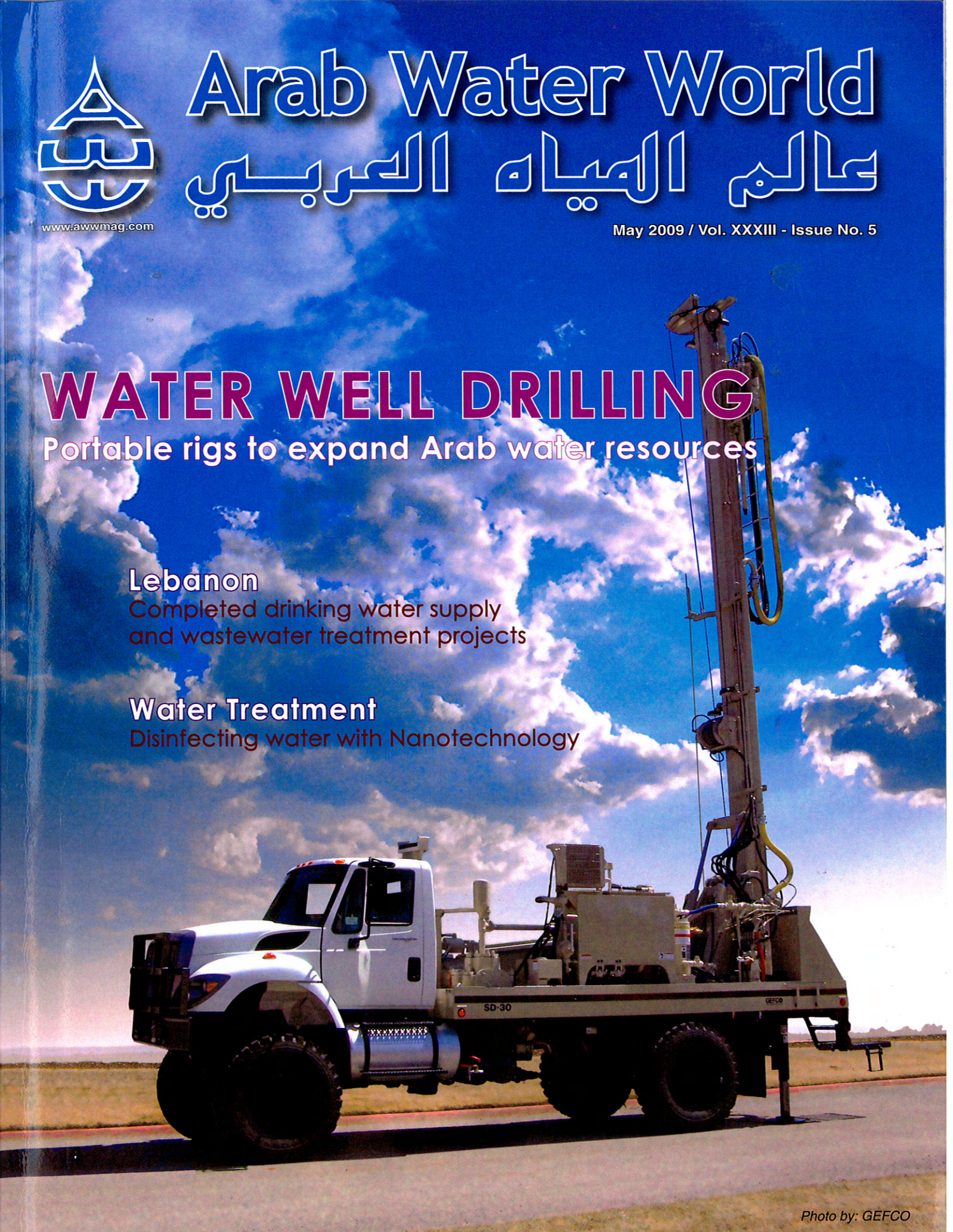
WATER WELL DRILLING
Portable rigs to expand Arab water resources

Lebanon
Completed drinking water supply and wastewater treatment projects

Water Treatment
Disinfecting water with Nanotechnology



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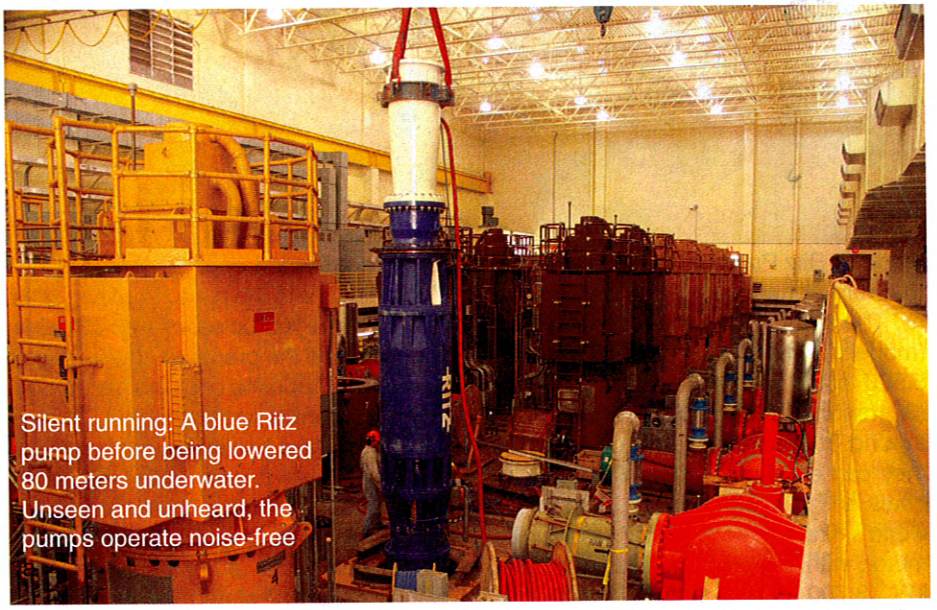
Serving the Water, Wastewater, Desalination & Energy Sectors in the Middle East & North Africa - Since 1977

Ocean's 22* – Water for Las Vegas

*A persistent drought and consequent lowering of Lake Mead levels – both pressing reasons why the desert city of Las Vegas needed an improved water supply and distribution system. In 2008, **Ritz Pumps'** patented HDM technology was used for the first time for water supply in the US. Thanks to a patented double-suction design, long service life, and incredible efficiency, these pumps have remained unsurpassed for years. The South Nevada Water Authority (SNWA) now uses three of these giant submersible water pumps to recover water from the depths of Lake Mead. The excellent life-cycle costs and efficient performance were reason enough to convince the water authorities to try out new technology. The city's water is now pumped from a depth of over 80 meters at over 11,000 hp.*

"When we installed the new Ritz HDM pumps in June 2008, the SNWA staff kept touching them to check they were working – they couldn't believe how quiet the pumps ran. The old pumps were as loud as a jet engine", reports *Rainer Schöller*, managing director of Ritz Pumps. Now, instead of the near 85 dBA of days past, silence prevails as the gigantic 50-inch pipes pump the city's water from 80 meters below the surface of Lake Mead. Why so quiet? Ritz's HDM (heavy duty mining) technology, patented in 1930, employs an underwater motor located directly at the suction point, sucking the water upwards in two separate flows. The water is pumped to the surface smoothly and efficiently – with no multi-bearing shaft and no axial thrust. This size of the submersible pumps for this application was completely new to the SNWA.



Silent running: A blue Ritz pump before being lowered 80 meters underwater. Unseen and unheard, the pumps operate noise-free

Designing the future of Las Vegas

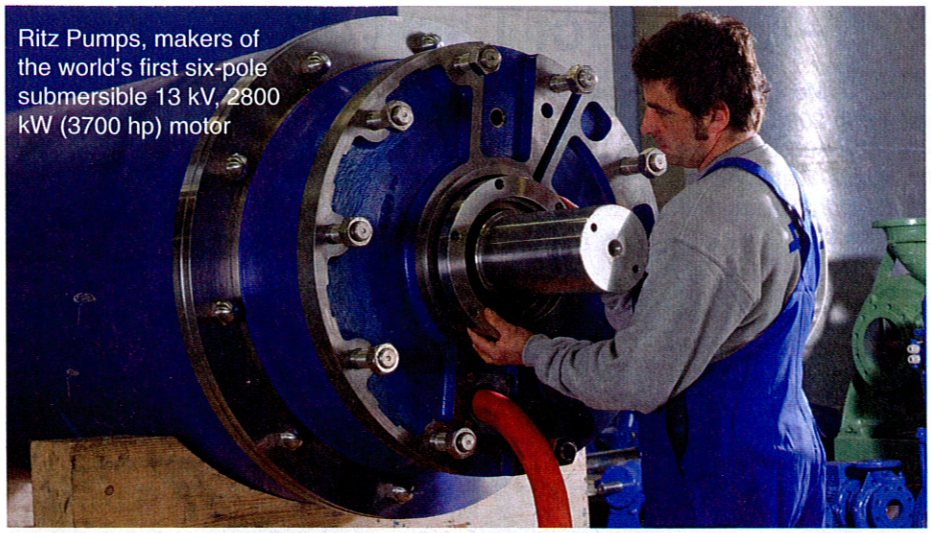
Founded in 1905, Las Vegas has been the fastest growing metropolitan area in the US for a number of years. As recently as 1930, however, the city had as few as 5,165 inhabitants. Nevada's legalization of gambling the following year brought rapid change, triggering an unanticipated population explosion. Two million residents and around 35 million annual tourists regularly rely on the city's water supply. Ten of the world's 15 largest hotels are in Las Vegas – all packed with guests expecting to shower, bathe, and swim day after day. Thanks to award-winning water reuse, recycling, and conservation efforts, hotel water features create a perception of extravagant water usage when in reality, usage is comparatively minimal. "Lake Bellagio" alone, in front of the 4,000-room hotel of the same name, measures three hectares, and uses reclaimed water in its dancing fountains that the hotel claims "entertain visitors evening after evening, with an artistic display of water, music and light every fifteen minutes." Hollywood aficionados worldwide will recognize the hotel fountains from their turn in the star-studded crime caper *Ocean's 11*.

Lake Mead, the nation's largest man-made lake and reservoir, has formed the cornerstone of the city's water supply since its creation in 1936 when the Hoover Dam was built on the Colorado River. Covering 650 square kilometers, the lake is around 100 square kilometers larger than Lake Constance, Germany's largest body of water. The two pumping stations constructed in 1970 and 2000 can pump up to 900 million gallons (3.4 million cubic meters) of water per day to Las Vegas, sourced from the lake at two separate locations. Despite this, America's casino capital has been challenged to meet demand for water for years. In the last few years of drought, the water level of Lake Mead has fallen by 30.5 meters. The island home to the pumping stations is no longer an island – a bridge of land connects it to the shore. Because the operation of one of the pumping stations is in jeopardy, SNWA is currently constructing a third intake that will draw water from a deeper elevation in the lake. This is no easy task: First, a tunnel six meters across will be dug to a deeper point of the lake to draw water through a new intake. Water will be delivered to a new pumping station through a tunnel under the lake bed, then pumped to the surface by 20 new pumps installed 80 meters underwater. During construction of the third intake, the new Ritz pumps were installed in one of the existing pumping stations to ensure its operation and delivery of water during the ongoing drought.

The world's first 13 kV motor – draining the equivalent of four Olympic swimming pools per hour

Since June 2008, the SNWA has been using three double-suction HDM pumps

Ritz's pump testing facility in Schwäbisch Gmund certainly impressed the visiting US delegation


Ritz Pumps, makers of the world's first six-pole submersible 13 kV, 2800 kW (3700 hp) motor

made by Ritz Pumpenfabrik GmbH & Co. KG from Schwäbisch Gmünd in Germany. The 6-stage, 11.5-meter high pumps (model: HDM 6760/3) can pump over 5,500 cubic meters of water per hour (32 million gallons a day) through pipes around 30 inches wide. In other words, they can empty four Olympic swimming pools an hour. The pump's motor is the world's first six-pole 13 kV underwater motor, with a maximum power of 2,800 kW (3,700 hp) at around 1,200 rpm, featuring a specially designed electric coil with custom-made, extra-strong insulation. "The coupling technology is impressive – nothing new mechanically, of course, but a real innovation in electrical terms", emphasizes *Dirk Wulf*, an independent pump consultant and advocate of Ritz products. The pumps are equipped for a maximum pumping height of 150 meters. "They're the most powerful pumps Ritz has ever built", adds Schöller.

Founded in 1877, Ritz is a German company steeped in tradition. It has also used HDM technology – first patented in the 1930s – to build a pump that features counterbalanced axial thrust. This means that only the impeller's weight affects the motor thrust bearing. Double-suction technology dictates that impellers are arranged opposite one another. Water flows into the pump from two sides and is conveyed upwards with sufficient power. Since the precision cast impellers are placed opposite one another, the axial forces cancel each other out. This arrangement also halves the intake speed, helping preserve well walls around intake openings and minimize the amount of incoming solids and silt. "One of the reasons why our pumps have such a long service life," stated Rainer Schöller, managing director of Ritz. Standard, single-suction pumps offer none of these benefits. These kinds of pumps use motors located above the water's surface, with a long, multi-bearing shaft through which water is pumped, from the lake all the way up to the rotors. Here, the shafts on the impellers conveying the water are subjected to great pressure, causing damage to the bearings at regular intervals. As a result, the impellers must be routinely serviced or replaced.

Bringing new technology to the US

Equipping the pump station with powerful new pumps dramatically changed the way the US made decisions down the line. Back in Germany, Ritz sees the three pumps as a sign of how open Americans can be to new technology. "The most important thing was to establish the decision-makers' trust in technology they weren't familiar with," Schöller points out. "We assured them they wouldn't have to service the pump so often." Dirk Wulf agrees: "The decision makers at SNWA saw quickly that the extremely low maintenance costs could mean a rapid return on the investment." Aside from the pump's exceptional capacity, the long service life, incredible efficiency, and affordable life cycle costs made an excellent impression on the US team.

Pump ready for use after only two days of installation

The Ritz HDM pump was installed in June 2008, following a brief 13 months of development and production. Anticipation was running high. Wulf recalls the installation: "SNWA couldn't believe the Ritz pump was operational after just two days. They were used to installations that took several weeks." The US team was suitably impressed – at first, no one believed the pump could be replaced in a single day, or that there were no bearings or parts requiring lubrication. Continues Wulf: "They were impressed that pump ran smooth and silently."

One reason behind the smooth installation: Ritz pre-tests its pumps at the company's pump testing facility in Germany. A US delegation came to observe the tests of their new pump in April. Since the local energy supplier declined involvement due to the 60 Hz technology and the large amount of electricity required, seven giant diesel generators were used to generate electricity for the tests. Eight flat-bed trucks with 12-meter containers brought the equipment all the way from the Netherlands. "The test run was the most memorable moment for our friends from the Nevada desert," says Wulf with a smile, "...that and the snowball fight!" ■

**Title refers to the film* Ocean's 11, *set in the Bellagio Hotel in Las Vegas*

www.ritz.de

قامت السلطات في مدينة لاس فيغاس الأميركيّة بوضع خطّة لتحسين وضع أنظمة تأمين وتوزيع المياه وذلك مع تفاقم حالات الجفاف في المنطقة وإنخفاض مستوى المياه في بحيرة Mead الإصطناعية وهي أكبر بحيرة تخزين للمياه في الولايات المتّحدة الأميركيّة. إستُخدمت العام الماضي لهذه الغاية مضخّات غاطسة من سلسلة HDM تُصنّعها شركة Ritz الألمانية. إستقدمت سلطة المياه في جنوب ولاية نيفادا ثلاث مضخّات HDM لإستخراج المياه من أعماق بحيرة Mead (حتى ٨٠ متراً) بقوّة ١١,٠٠٠ حصان. تمتاز هذه المضخّات بتصميمها ذات الإمتصاص المزدوج وبمتانتها وفترة خدمة طويلة بالإضافة إلى فعاليتها الفائقة المبرهنة على مدى عدّة سنوات. هذه المضخّات لا تُصدر أي ضجيج، لدرجة لا تسمح للمستخدمين بالتكهّن إن كانت هذه المضخّات تعمل أم لا. رُكّبت المضخّات وأصبحت جاهزة للتشغيل في غضون يومين فقط، وذلك بعد ١٣ شهراً من التحضيرات التطويرية في الموقع، ممّا لاقى إستحساناً لدى سلطة المياه. ترجع هذه السرعة والسهولة في التركيب إلى الإختبارات المُسبقة التي تُجريها Ritz على مضخّاتها في مرفق الإختبار الخاص بالشركة في ألمانيا. يبلغ إرتفاع هذه المضخّات ١١,٥ متراً وبإمكانها ضخ ٥,٥٠٠ متر مكعّب من المياه في الساعة من خلال أنابيب بقطر ٣٠ إنش تقريباً، وهذا ما يتناسب مع قدرة تفريغ أربعة أحواض سباحة أولمبيّة في غضون ساعة. المضخّات مُزوّدة بمحرّك بقوّة قُصوى تبلغ ٢,٨٠٠ كيلوواط. بدأت Ritz بإستعمال تقنية HDM منذ الثلاثينات من القرن الماضي، وهي تستخدم هذه التقنية لبناء مضخّة ذات دفع محوري متوازن، وذلك يُخفّض نسبة تلقّي المياه إلى النصف ممّا يسمح بالمحافظة على جدار الآبار حول منافذ تلقّي المياه، ويُخفّف من نسبة الوحول والمواد الصلبة المُتلقّاة.

REFER TO **RIN 41** ON PAGE 88