

Compiled by WWD Associate Editor Kate Cline



Harry Seah

# Innovative Solutions

A lack of natural resources inspires new technology

**S**ingapore, a densely populated island country, lacks natural freshwater sources. The country turns this obstacle into an opportunity, dedicating itself to innovation in the water treatment industry. Harry Seah, director of technology and water quality for PUB, Singapore's national water agency, discussed with WWD Associate Editor Kate Cline the country's unique challenges and the technologies it uses to overcome them.

**Kate Cline:** What is PUB's role?

**Harry Seah:** PUB is the national water agency of Singapore and a statutory board under Singapore's Ministry of the Environment and Water Resources. We manage the entire water cycle in an integrated manner, from rainwater collection to the purification and supply of drinking water, to the treatment of used water and its reclamation into NEWater, Singapore's own brand of high-grade reclaimed water.

**Cline:** How does Singapore overcome its lack of natural water sources?

**Seah:** As a densely populated island city state with 5 million people in a land area of about 700 sq km, Singapore's main water challenges stem from its lack of land to collect and store rainwater, as well as natural aquifers and groundwater. In the 1960s and 1970s, Singapore faced all the problems of rapid urbanization—polluted rivers, water shortages and widespread flooding.

By investing in water technology and adopting an integrated approach to water management in the last 40 years, PUB has put in place a robust, diversified and sustainable water supply system. Singapore now has four sources of water supply, known as the Four National Taps—water from local catchment, imported water, NEWater and desalinated water.

**Cline:** What is NEWater? What role does it play in the water supply?

**Seah:** NEWater is the pillar of Singapore's water diversification strategy. NEWater is ultra-clean, high-grade reclaimed water produced from treated used water that is further purified using advanced membrane technologies (microfiltration, reverse osmosis and ultraviolet disinfection).

NEWater has passed more than 65,000 scientific tests and exceeds the Environmental Public Health and U.S. Environmental Protection Agency drinking water standards, as well as the drinking water guidelines established by the World Health Organization.

Introduced in 2003, NEWater is primarily supplied to non-domestic sectors, such as wafer fabrication parks, industrial estates and commercial buildings for industrial and air-cooling purposes. A small percentage of NEWater is also mixed with raw reservoir water before being treated at the waterworks for the drinking water supply.

There are currently five NEWater plants, which can meet 30% of our current water needs. The plan is to expand the NEWater capacity so that it meets 40% of Singapore's water supply by 2020, and the long-term target is to meet 50% of our future water demand by NEWater.

**Cline:** How is PUB trying to increase water sustainability in Singapore?

**Seah:** By adopting an integrated approach to water management and investing in water R&D [research and development], we have overcome Singapore's water challenges and turned our vulnerability into a strategic asset. Moving into the future, we will continue to invest in technology and R&D.

Some new technologies that we are exploring include the membrane bioreactors (MBRs) and variable-salinity plant. The MBR is essentially the coupling of membrane technology with the biological treatment of used water. The result is water for a higher and more consistent quality than that from the conventional treatment process for used water. The variable-salinity plant integrates desalination and NEWater treatment processes to treat water of varying salinity into potable water. It has the potential to increase the water catchment area in Singapore from 67% to 90% by tapping the small rivers and streams. **www**

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News Briefs compiled by WWD Associate Editor Kate Cline

## EPA Plans Regulations for Perchlorate & Toxic Chemicals

The U.S. EPA announced it will move forward with the development of a regulation for perchlorate in drinking water. The creation of this national standard comes after EPA Administrator Lisa P. Jackson ordered scientists to review emerging science on perchlorate.

EPA also is moving toward establishing a drinking water standard for up to 16 toxic chemicals that may pose risks to human health. As part of the Drinking Water Strategy laid out by Jackson in 2010, EPA committed to addressing contaminants as a group rather than one at a time.



## World Water Monitoring Day Participation Increases

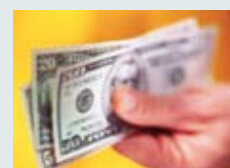
A total of 212,502 people worldwide visited their local water bodies in celebration of World Water Monitoring Day 2010. The 2010 results represent a 73% increase in participation from the previous year. Data was reported from 85 countries, four more than in 2009. The U.S. topped the list with 2,931 monitored sites, followed by Spain, Romania and Malaysia.



## American Water Wins Water Research Foundation Grant

The Water Research Foundation awarded American Water Works Co. Inc. a \$250,000 research grant for its study "An Operational Definition of Biostability in Drinking Water."

The study will examine practical indicators of distribution system biostability. American Water will perform the research in collaboration with Dr. Patrick Evans of CDM. The total value of the project is \$840,992.



## WEF & AWWA Plan Fly-In Event for April

The Water Environment Foundation and the American Water Works Assn. are planning the first-ever "Water Matters" Fly-In, April 4 and 5, 2011, in Washington, D.C. The event will assemble delegations from each state that represents a cross-section of the water community. The organizations contend that there are a number of issues they can take to Congress together. Participants will discuss current issues with Congress the first day and meet with specific state representatives the next.



## Michigan Wastewater Utility Plans Wind Farm

The Muskegon County Wastewater Management System (MCWMS) in Michigan is seeking to install a utility-scale wind farm on 11,000 acres of its property near Lake Michigan. According to the utility, wind speed data suggests that wind resources are compatible with commercial projects. MCWMS is accepting proposals from wind developers through Howard & Howard Attorneys, a firm with expertise in energy and utilities.



## Schenectady, N.Y., & Veolia Win Partnership Award

The city of Schenectady, N.Y., and Veolia Water North America received the 2011 Excellence in Public/Private Partnerships Award from the U.S. Conference of Mayors for the city's biosolids program and wastewater treatment plant. The city and company have worked together to reduce odor complaints and keep the city within its budget. Operating under a long-term contract, Veolia manages and operates the city's facilities.



## Illinois Approves Lake Michigan Water Allocations

The Illinois Department of Natural Resources approved a request for Lake Michigan water allocations for 10 Lake County communities: Antioch, Fox Lake, Lake Villa, Lake Zurich, Lindenhurst, Long Grove, Volo, Wauconda and the unincorporated areas of Fox Lake Hills and Grandwood Park. The communities plan to transition from groundwater to Lake Michigan to meet growing demand, and together they will form a water agency.



## California Senators Introduce Chromium Bill

California Sens. Dianne Feinstein and Barbara Boxer introduced a bill that would require the EPA to set a federal limit for the carcinogen chromium-6. The bill would require EPA to set a new limit for chromium-6 within one year of its passage.



## Networking News

Natgun Corp., Wakefield, Mass., and DYK Inc., El Cajon, Calif., merged to become DN Tanks Inc.

Jim Litchfield joined ESA PWA's Sacramento, Calif., office as environmental hydrology director. **www**

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