Case Study

Project Snapshot

SCNP, Singapore

Capacity

228,000 m^3/day [60 mgd]

Installed Units

10 trains of R80S 8" Series Pressure vessels

198 units per train [total 1,980]

Start-up Date May 2009

WINNER – Global Water Intelligence Award

The Sembcorp Changi NEWater Plant (SCNP) is the winner of the 2010 Global Water Intelligence Award for Water Reuse Project of the year.

Sembcorp Changi NEWater Plant [SCNP]

BACKGROUND AND CHALLENGES

Singapore is a water stressed country faced with a combination of challenges - possessing a small amount of land and territory, while having a large urban population. And without natural freshwater lakes, the primary domestic source of water is rainfall, collected in reservoirs or storm water collection ponds. In 1965 the PUB was formed to oversee Singapore's water needs, which historically has relied on Malaysia for up to 50% of its daily fresh water consumption. However the water supply provisions from Malaysia has always been regulated by agreements greatly underpinned by uncertainties due to political tensions between the two countries. This long-standing dispute has been ongoing for several decades now, ever since Singapore's independence from Malaysia in 1965. It was only as recent as 2009 that Singapore has managed to reduce its water import reliance from Malaysia down to 40% of total consumption. Due to this continuing tension between the two countries, Singapore is left vulnerable to the risk of cut-off, whether announced or not, of water supply from Malaysia. And with Singapore's water demand increasing at a rate of about 4% over the past decade due to the increase in population and economic development, the Singapore government has proactively engaged in the development of several water related projects to guarantee their self-reliance and sustainability.

TECHNOLOGY

Singapore's latest water project is a very innovative *"plant-on-plant"* design conceptualized by the PUB that reduces land use and minimizes construction cost. The Sembcorp Changi NEWater Plant (SCNP) is comprised of two sections. The main process facilities of the SCNP were built on the rooftop of the Changi Water Reclamation Plant while the storage tanks were built on land. The PUB

ROPV manufactures pressure vessels in a wide range of sizes for all major industry systems and applications. We are the largest pressure vessel manufacturer in the Asia/Pacific region with headquarters in Harbin, China, manufacturing facility in Dezhou, Shandong Province and global sales office in San Francisco, California, USA.

Our commitment to quality and innovation has led to successful development of original equipment configurations with various industry partners for UF, EDI, large diameter membranes, and emerging water treatment technologies.

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awarded the contract to Sembcorp, a leading utilities and marine group, based on a Design-Build-Own-Operate agreement to supply NEWater to Singapore over a 25-year period (2010-2035). Black & Veatch a leading global engineering company provided full design engineering services for the plant along with construction support and commissioning services. While the joint venture between Biwater AEWT and Biwater Malaysia was sub-contracted to supply the Reverse Osmosis treatment plant. The plant consists of four RO trains with three stages at a total of 85% recovery.

Although budgetary costs were an important consideration, quality was never an issue. Every supplier needed to meet the plant's most stringent quality requirements. When Biwater made a decision on the choice of pressure vessel manufacturer, they turned to the largest FRP pressure vessel in the Asia Pacific region – ROPV of Harbin, China. The combination of ROPV's highly competitive operational cost, bulk buying power of raw material resources and unmatched manufacturing experience in the region made the decision easy. Mr. Li Youqing, ROPV CEO said, *"ROPV was born out of the experts from the Chinese government's highly reputed and respected Harbin FRP Design Institute. During its infancy in 1984, the institute's designers and researchers worked on advanced polymer materials to develop space age component parts working in cooperation with the country's national space and aviation industry. With this knowledge, Biwater is assured that they receive performance engineered pressure vessels from the engineering craftsmen of ROPV."*

ROPV supplied Biwater with close to 2,000 units of R80S 8" x 40" high pressure seawater pressure vessels which were developed as part of 10 trains with 198 units each for a total of 1,980 units that produces a capacity of 228,000 m^3 per day [60 mgd] - this is equivalent to 60 million one-gallon bottles and will supply 15% of Singapore's water needs.

Together, the five NEWater projects meet 30% of Singapore's water needs. And in a further move towards self-reliance the PUB plan to expand the NEWater network of pipelines by up to 87 km (54 miles), a project worth over S$400 million. When completed, the pipeline will extend from Changi NEWater Plant to Jurong, Tuas, Jurong Island and Sentosa. It will also be linked to existing NEWater pipelines in the Bedok, Seletar, Kranji and Ulu Pandan clusters.

The quality of NEWater consistently exceeds the requirements set by United States EPA and WHO guidelines and is, in fact, cleaner than all current sources of Singapore's water.

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