GE
Water & Process Technologies

Case Study

Providing Reliable Water Supply for Burgeoning Industrial Requirements

Challenge

The Water and Sewerage Authority (WASA) of Trinidad and Tobago needed to secure both a low cost potable water supply for the general population and reliable high quality water for the Point Lisas Industrial Estate, a large industrial complex on the western shore of Trinidad. The island's potable water supplies are limited and finding a large volume alternative water supply was essential for providing the growing industrial sector with reliable high quality water.

Solution

A 28.8 MGD desalination facility at the Point Lisas Industrial site was the solution to WASA's need for high quality water. Cutting edge SWRO design coupled with proven pretreatment technology are being utilized to desalinate a highly variable and turbid seawater source, the Gulf of Paria, and provide WASA with an affordable and reliable water supply.

The Trinidad desalination plant, the largest SWRO system in the Western Hemisphere, was developed under a long-term design, build, own, operate and transfer (BOOT) arrangement. GE Water & Process Technologies was awarded the EPC contract and the desalination facility is being operated and maintained by Desalcott, a joint venture between GE and a local Trinidadian partner.

Construction of the landmark desalination facility took just 18 months from groundbreaking to production of water. Since the successful startup of the plant in March 2002, this facility has been operating on virtually a 24/7 basis. The plant passed its Phase IV performance test in June 2002. (Figure 1.)

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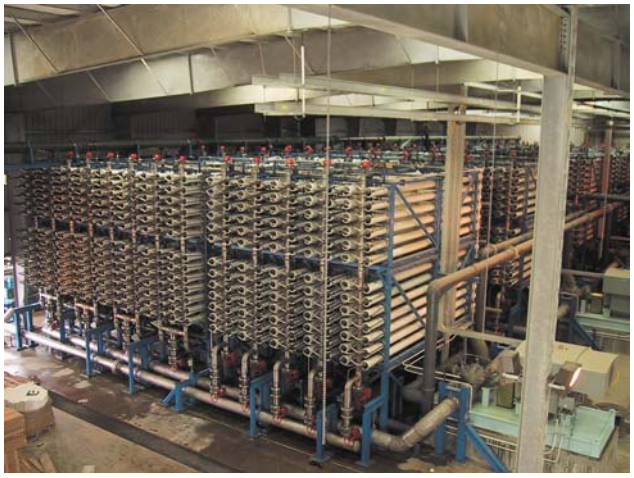

Figure 1: Desalination Facility, Trinidad

End-user:	Water and Sewerage Authority of Trinidad and Tobago
Location:	Point Lisas Industrial Estate, Trinidad
Commissioned:	March 2002
Application:	Desalination for production of high-quality industrial process water
Feedwater source:	Seawater – open seawater intake
Feedwater quality:	35,000 mg/l TDS
Product quality:	85 mg/l TDS
Capacity:	28.8 MGD (110,000 m^3/day)
Technology:	Seawater reverse osmosis (SWRO), brackish water reverse osmosis (BWRO)

System Description

The seawater source for the plant is a large ship turning basin in Trinidad's Gulf of Paria. Raw seawater is taken from a screened basin at the shoreline of the ship turning basin and, due to the high amount of silt in the difficult-to-treat gulf water, enters an intensive pretreatment system consisting of coagulant mixing, clarification, single-stage media filtration and cartridge filters. The heart of the desalination system is the Two Pass RO

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system consisting of six (6) Pass 1 SWRO units and six (6) Pass 2 BWRO units. (See Figure 2 for system diagram.)

First Pass SWRO

The First Pass Seawater RO, consisting of six units, is a two-stage system. The First Pass first-stage configuration, a 7-element pressure vessel design, consists of a total of 1,568 Toray SWHR-380 seawater membrane elements. The first-stage pressure feed pump supplies the pressure required to treat the seawater. This works in conjunction with an ERT which helps boost the SWRO feed pressure by converting the energy from the reject stream back to the feed.

The First Pass second-stage configuration consists of 980 Toray SWHR-380 seawater membrane elements. Due to the high concentration of salts, interstage booster pumps are required to boost the second-stage feed pressure. Permeate is delivered to a clearwell within the RO facility.

The brine or reject is passed through the Pelton ERT and discharged at atmospheric pressure to a below grade drain that flows to a reject basin.

Second Pass BWRO

The Second Pass RO treats permeate from the SWRO to meet the final product quality specification of the water supply agreement. All of the first pass permeate is treated and the number of units corresponds to the number of seawater units. The BWRO, which uses a total of 690 Toray SUL-G20F brackish water membrane elements, is also a two-stage system with a feed pump and interstage booster pumps for each unit. Permeate from the BWRO is delivered to a 10 million gallon storage tank located within the facility grounds. Reject is returned back to the clearwell and reintroduced as feed to the First Pass RO.

Post Treatment

Post treatment involves only pH adjustment, minimal remineralization and disinfection. This is in accordance with standard potable water practices because, although the primary end users are the industrial clients within the Point Lisas Industrial Estate, WASA wanted to have the option of diverting the water supply to their residential customers as required.

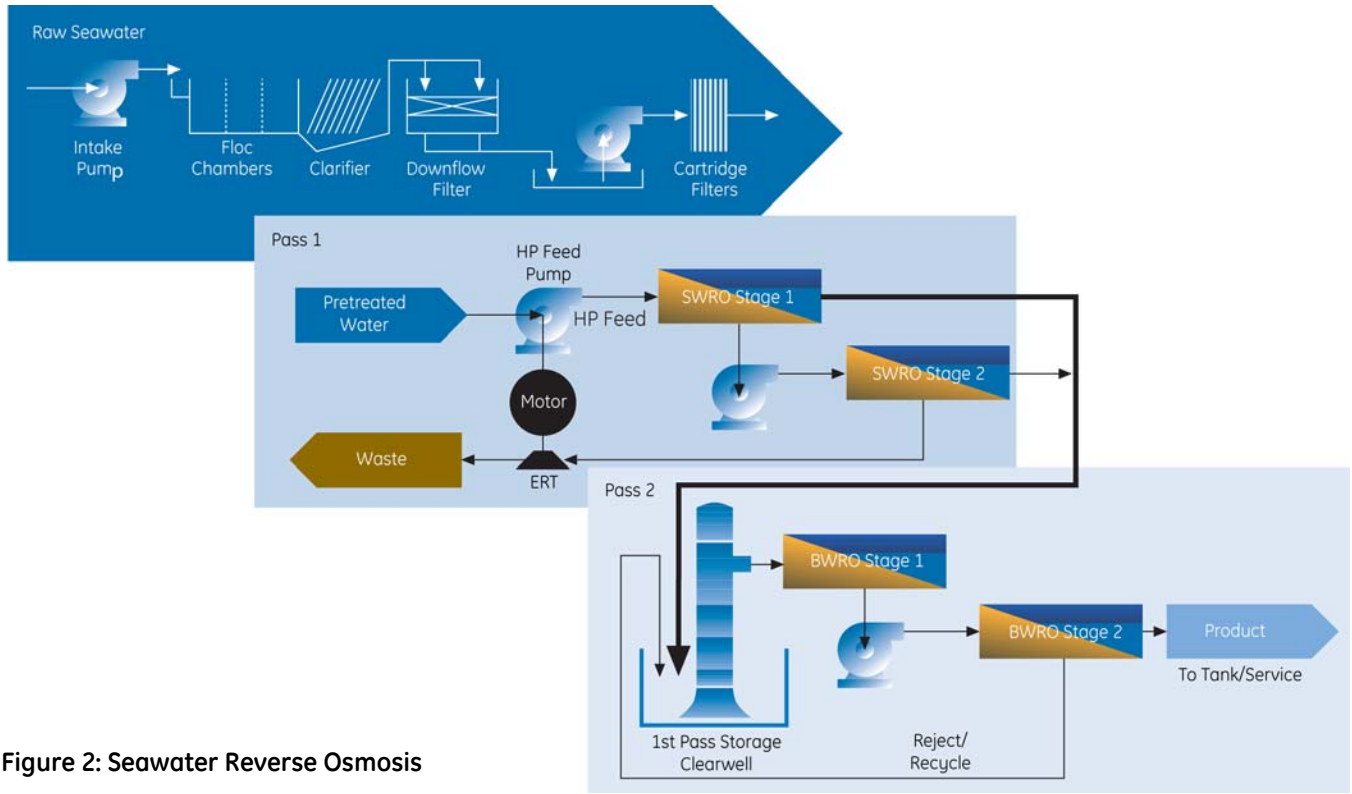

Figure 2: Seawater Reverse Osmosis