



Water Membrane Filtration

Client
Public Utilities Board

Location
Singapore

Microfiltration (MF) and reverse osmosis (RO) followed by ultraviolet (UV) disinfection processes, or dual-membrane treatment, produce high quality water from secondary treated effluent

Bedok and Kranji NEWater Factory Plants and Visitor Centre

Project Highlights

- Advanced water reclamation demonstration plant with 10,000 m³/d treatment capacity and two full scale (32,000 and 40,000 cmd) high-grade water plants provide an alternative water resource for potable and non-potable uses
- Microfiltration (MF) and reverse osmosis (RO) followed by ultraviolet (UV) disinfection processes, or dual-membrane treatment, produce high quality water from secondary treated effluent
- Interactive Visitor Centre and public education program are integrated with the reclamation plant



Project Description

Singapore's Public Utilities Board engaged CH2M HILL to develop detailed plant design, prepare tender documents, and manage construction of a 32,000 m³/d combined high-grade water reclamation plant and visitor center at Bedok and a 40,000 m³/d high-grade water reclamation facility at Kranji. We designed the NEWater Program plants using the latest membrane and UV technologies of microfiltration followed by reverse osmosis to produce continuous and reliable product water from reclaimed secondary effluent. The resulting NEWater provides a reliable source that meets high quality drinking water standards. However to accommodate psychological barriers and reintroduce necessary minerals that affect taste, NEWater is blended with other potable water sources, such as reservoir water, for drinking water. The plants were designed and constructed for future augmentation to 88,000 m³/d and 72,000 m³/d, respectively.

Prior to the current projects, CH2M HILL led the design of the NEWater Factory Demonstration Plant, a fully automated 10,000 m³/d multiple barrier, dual-membrane water reclamation plant. Secondary effluent is collected from Bedok STW (sewage treatment works) and continuously pumped to the demonstration plant for treatment. Prior to direct feed to the continuous microfiltration units, the secondary effluent is screened using automatic self-cleaning screens.

The MF product water (filtrate) provides a consistent feed quality for further treatment through the RO system. The RO product (permeate) is finally treated with UV radiation as a further barrier to pathogens. The plant is fully automated and controlled using the latest PLC and SCADA technologies and software, which allow around-the-clock operation and monitoring through online instrumentation and analysis. The demonstration plant has been operating successfully since 2000.

CH2M HILL also developed the conceptual plan for content and messaging for the Visitor Center at Bedok, which was designed using the latest technologies. The state-of-the-art Visitor Center showcases the technology and promotes a heightened awareness and appreciation of water.



Multi-media presentations and interactive computer demonstrations educate the visitors on NEWater. In addition, visitors can view the advanced membrane NEWater factory in operation within the Visitor Centre. The center opened to the public in February 2003.