

## Pilot study for reclamation of the secondary effluent at Changi Water Reclamation Plant

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### ABSTRACT

The objective of this study was to use an ultrafiltration (UF)–reverse osmosis (RO) pilot plant to assess the RO permeate quality using the secondary effluent as feedstock on a continuous basis at Changi Water Reclamation Plant (CWRP) in Singapore. Pilot trials were conducted over three months. The RO plant was in 2:1 configuration with two stages and was operated at 75% recovery during the study. The RO plant was also operated at different membrane fluxes to study the effect of RO membrane flux on permeate quality. An on-line total organic carbon (TOC) analyzer was installed to monitor the TOC of RO permeate. The results of the pilot study showed that TOC of RO permeate with G3 effluent as raw feed generally ranged from 65 to 95 µg/L at membrane flux of 8.5 L/m<sup>2</sup>/h (LMH) or 5 gal/ft<sup>2</sup>/d (gfd). TOC of RO permeate at 17 LMH or 10 gfd was 45–60 µg/L which was about 30% lower than that at 8.5 LMH on the same days. Feed conductivity normally varied between 600 and 850 µS/cm and was around 1000 µS/cm during the week of 8–12 March 2008. Permeate conductivity was less than 40 µS/cm, most of the time. It was concluded that most parameters of RO permeate met the requirement of NEWater quality. UF cleaning regime was generally effective to recover the membrane flux and the selected anti-scalant F for RO process was potentially suitable for the specific wastewater containing fluoride.

*Keywords:* Secondary effluent; Reclamation; Reverse osmosis; Total organic carbon; NEWater

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