Desalination and Water Treatment
www.deswater.com

5 (2009) 74–79
May

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doi: 10.5004/dwt.2009.565

Long-term operating experience of Seaguard UF as pretreatment to SWRO in the Mediterranean region

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Received 29 August 2008; Accepted 22 February 2009

ABSTRACT

Numerous tests around the world have proven that ultrafiltration (UF) provides optimum pretreatment for seawater desalination based on reverse osmosis membranes (SWRO). UF will remove all suspended solids and will provide a substantial reduction in microbiological activities. Plugging of RO spacers is completely eliminated and the RO cleaning frequency can be substantially reduced. The main obstacle against use of UF membranes for SWRO pre-treatment has always been the higher operating cost of UF when compared with conventional pre-treatment. A new membrane has been designed with the aim of achieving the lowest whole-of-life cost while enabling membrane desalination of the most difficult to treat seawater. This paper describes 22 months of operational experience of the new Seaguard UF membranes at the Colakoglu steel mill and 10 months of operational experience at Nuh Cimento. Both plants are fed from the Gulf of Izmit near Istanbul in Turkey. The UF pretreatment to SWRO is a pre-requisite to use of this seawater for membrane desalination. This paper describes the following topics: design and technical specification of the UF pre-treatment systems, technical issues during construction and commissioning, process optimization and long-term operational experience, and lessons learned for future plants operating under similar conditions.

Keywords: Desalination pretreatment; Ultrafiltration; Reverse osmosis; Membrane treatment

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Presented at EuroMed 2008, Desalination for Clean Water and Energy Cooperation among Mediterranean Countries of Europe and the MENA Region, 9–13 November 2008, King Hussein Bin Talal Convention Center, Dead Sea, Jordan.