

Iron and manganese fouling in microfiltration as a pretreatment of seawater reverse osmosis processes

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Received 30 November 2010; Accepted in revised form 27 March 2011

ABSTRACT

Two sets of pilot test were carried out to investigate the fouling behaviours of microfiltration (MF) system as a pretreatment for seawater reverse osmosis (SWRO) processes for about two years. One set used clean seawater as feed water while the other adopted surface water with lower quality than the seawater. Both systems introduced commercial hollow fiber MF modules from the same manufacturer. During the operation period, raw water quality parameters related to reverse osmosis (RO) performance were collected and analyzed. Regardless of raw water quality, the product water of both MF systems without coagulation exhibited high water quality as RO feed water. The MF system for SWRO pretreatment underwent more severe fouling than the MF system for surface water treatment although the tested seawater quality is much better than the tested surface water quality in terms of fouling potentials. Iron and manganese turned out to be main foulants through water analysis for discharged water from the chemical cleaning procedure. The sources of these ions were stainless steel corroded by seawater. As a conclusion, the metal corrosion by seawater does not only affect leakage in water treatment systems but also induces iron and manganese fouling.

Keywords: Seawater reverse osmosis (SWRO); Pretreatment; Fouling; iron; Manganese; Corrosion

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