

Development of a package model for process simulation and cost estimation of seawater reverse osmosis desalination plant

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Received 13 November 2008; revised 17 December 2008; accepted 24 December 2008

Abstract

Seawater reverse osmosis (SWRO) desalination is rising as an alternative solution for the water shortage problem which is more severe than before. In this study, a package of process models was developed and tested by four-year SWRO plant operation data obtained from Fujairah in UAE, as a tool not only for simulating the performance of SWRO desalination process but for estimating the total profits of the plant operation. The simulation results based on the developed process models were reasonably satisfied to predict the SWRO desalination plant performance in terms of permeate water concentration and flow rate. And the results of cost estimation show a possibility that the models can successfully predict total annual profits (TAP) within the order of magnitude of USD/year, according to operating date, feed water concentration, and permeate water condition. Consequently, the developed package model is applicable to support design criteria and efficient operation of SWRO desalination plant as references.

Keywords: SWRO desalination; Process simulation; Cost estimation

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Presented at the First IWA Asia Pacific Young Water Professionals Conference, Gwangju, South Korea, December 8–10, 2008.