

Techno-economic optimization of SWRO desalination using advanced control approaches

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Received 9 May 2009; Accepted in revised form 12 October 2009

ABSTRACT

This paper presents two advanced control techniques that can be used to optimize the operation of seawater reverse osmosis (SWRO) desalination plants to decrease the production cost. The first technique uses the model predictive control (MPC) controller to operate the plant at its optimum operating conditions, while the second technique is based on early detection of membrane fouling. The objective of this work is to compare the SWRO desalination plant optimized performance with the conventional operation and evaluate the optimization effect on the unit production cost as well as conduct adequate economical analysis. Three case studies including three existing SWRO plants were tried and compared using the above technique. The second technique proved to be effective and the results were compared with the existing data and proved to be satisfactory.

Keywords: Desalination; Optimization; Advanced process control; Economic analysis

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