

Identification of Fouling Development of RO System Using Rear Data

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Fouling is one of the most serious problems in seawater desalination using reverse osmosis (SWRO) which is important to lower the production cost of desalinated water. For efficient operation of the RO plant, accurate models are crucial to decide the optimal operating condition and cleaning operation. The model for RO membrane system has been studied by many researchers and the usefulness has been increase as its accuracy has been improved. However, the prediction of the fouling is difficult due to its extremely complicated mechanism of growth involving various foulants. In this study, the development of the fouling is predicted by monitoring the membrane resistance across the membrane and the friction coefficient through spiral-wound membrane from the operation data. Using nonlinear recursive least-squares (NRLS) method, the two properties are identified from the operating data based on the one-dimensional model of the RO system. Through this method, the degree of fouling can be estimated accurately and potential cleaning time can be predicted. It can also assess the effectiveness of membrane cleaning. Using the actual data of an existing plant, the trends of resistance and friction coefficient could be monitored and the results were compared with the cleaning pattern of the real plant.