REVERSE OSMOSIS DESALINATION PLANTS PERFORMANCE AND IMPROVEMENT: REVIEW

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Abstract

Reverse osmosis (RO) technology has emerged as a leading desalination and wastewater treatment solution to partially solve this worldwide shortage of fresh water. The present review is a critical appraisal of performance limitations and prospects for improvement in RO plants. The primary factors affecting RO performance include membrane properties, biofouling treatment and prevention, energy recovery devices (ERDs), membrane modifications like surface texturing functionalization and renewable integration. Water permeable and salt rejection properties of membranes are critical to accessing quality water output. Breakthroughs in thin polyamide layers have significantly increased the efficiency of desalination, allowing for greater water flux rates and salt rejection. With the efficiency implications that can result from it, biofouling management is essential in both sustaining and optimizing RO performance. These efforts include the use of pressure exchangers, energy recovery devices and membrane modifications which improve system performance while reducing overall power consumption. In addition research to develop pre-treatment technologies and optimize operational conditions has been performed in order to succeed against changes in feed water salinity and prevent membrane fouling. Therefore, this review article provides a comprehensive and synthetic overview of these problems as well as strategies, progress in improving the performance efficiency of RO plants to produce clean water for various end-uses which is intended towards achieving sustainable supply.

***Keywords**: Reverse Osmosis, Performance, Operation Conditions, Optimizing Technologies, Enhancement, Desalination*.