

Feasibility Study of Hybrid Electrodialysis, Crystallization and Reverse Osmosis Dual-Desalination and Salt Production Unit

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Faced by the worldwide copious difficulties in the discard of saline effluent from desalination plants, and other relating industries, and also taking into consideration the concept of total commodity utilization as well as difficulties of inland desalination effluent discharging, the feasibility of a dual hybrid system to produce both fresh drinking water along with an in process salt production made up of Electrodialysis – Crystallization – Reverse Osmosis is investigated. With complements of the pre-treatments cost reduction of ED, required operating temperature of an evaporative crystallizer and ED's usage for both concentration of seawater for salt production and the alternate production of a water with a lower TDS and osmotic pressure for an RO unit, thereby improving the recovery of both products and the energy consumption for the dual hybrid system relative to the standalone desalination and salt production units. In this study the modelling of the total hybrid system, selection of an ED membrane to concentrate the brine to the utmost possible degree while reducing the energy requirements to the lowest level possible, as well as cost analysis and performance efficiency of the dual-unit are investigated.