

## Experiences with pellet reactor softening as pretreatment for inland desalination in the USA

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### ABSTRACT

A high water recovery is important in inland desalination. In the nineteen eighties projects in Saudi Arabia applied a treatment train consisting of pellet softening, rapid filtration, RO, brine concentrators and evaporation ponds to achieve zero liquid discharge. In the past few years AwwaRF sponsored research on Zero Liquid Discharge for Inland Desalination. This research was completed in 2007 and concluded that pellet softening was the preferred treatment process of primary RO concentrate to allow subsequent treatment of this concentrate in a secondary RO. Since then a number of projects have been started based on this treatment principle. Interesting findings are that 1) Softening or desalination of drinking water can significantly reduce the chloride discharge in waste water, because it results in a reduction of the salt usage for self regenerating ion exchange softeners; 2) Pellet softening not only reduces the concentrations of calcium and hydrogen carbonate, but can achieve a significant removal of silica as well. Use of pellet softening can improve the economic and technical feasibility of inland desalination.

*Keywords:* Inland desalination; Softening; Pellet reactor; Pre-treatment; Post-treatment; Zero liquid discharge

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