7 year operation of a BWRO plant with raw water from a coastal aquifer for agricultural irrigation

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Received 13 June 2010; Accepted in revised form 24 March 2011

ABSTRACT

This paper will show the most relevant aspects in the 7 year operation period in the management of the O&M (operation and maintenance) at a BWRO (brackish water reverse osmosis) plant at Cuevas de Almanzora, Almeria, Spain. This plant has a current capacity of water production of 25,000 m³/d and it was built to supplying agricultural consumers in the proximity of the plant. Cuevas de Almanzora BWRO plant is an exceptional plant in many aspects: 1) It is a plant working with brackish water but it was designed to be able to working with seawater with regards to materials, qualities and pressures (except the high pressure pump), and it could even be converted easily into a seawater plant; 2) Extensive hydrogeological studies have been completed allowing the control of aquifer exploitation and water extraction in the seawater-brackish water interface; 3) Water is distributed to different agricultural users with different water quality requirements (it produces “a la carte” water); 4) RO trains include inter stage energy recovery device to improve the hydraulic equilibrium between stages and reducing the energy consumption. This paper will present the following aspects: BWRO plant description; Results of the aquifer hydrogeological studies for the determination of saline intrusion. Conclusions and operation guidelines; Operation of the plant, results, operational problems arising from increasing salinity and specifically from sulphates; Description of the planned changes at the plant to allowing a possible future conversion into an SWRO plant; O&M costs.

Keywords: Brackish water; Reverse osmosis; Operation; Maintenance; Agriculture; Sulphates; Aquifer

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