Desalination and Water Treatment
www.deswater.com
14 (2010) 265–272
February
1944-3994 / 1944-3986 © 2010 Desalination Publications. All rights reserved.
doi: 10.5004/dwt.2010.1873

Performance evaluation of reverse osmosis desalination plant: A case study of Wadi Ma'in, Zara and Mujib Plant

Mousa S. Mohsen[a], Salem Gammoh[b]

[a]*Department of Mechanical Engineering, Hashemite University, Zarqa 13115 Jordan*
Tel. +962 (5) 390 3333; Fax +962 (5) 390 3333; email: msmohsen@hu.edu.jo
[b]*Water Treatment and Desalination Department, Water Authority, Ministry of Water and Irrigation, Amman, Jordan*

Received 1 May 2009; Accepted 10 February 2010

ABSTRACT

Reverse osmosis (RO) desalination systems are being increasingly used in the world as an efficient, reliable and cost-effective technology. It is widely used for the production of municipal and industrial grade water treating seawater and brackish water. For instance, RO desalination has been widely and successfully used in Middle Eastern oil-producing countries. However, utilization of membrane plants has been spread throughout every region of the world as a viable economic alternative to traditional water treatment. To date, desalination of either seawater or brackish water in Jordan has been limited. In the case of seawater, Jordan has a very short shoreline on the Gulf of Aqaba and this is very distant from the main centers of population. This is further aggravated by the fact that these centers of population are at high elevations (Amman 1000 m above the mean sea level) and would therefore involve high pumping costs. Jordan does have reserves of brackish water, and a small number of brackish water desalination plants have been built. The Wadi Ma'in, Zara and Mujib desalination plant was officially inaugurated on the 18th of November 2007, the water production started on the 22nd of August 2006. Desalination is carried out using the reverse osmosis techniques. This is a Design-Build-Operate contract. The plant includes desalination of 55 MCM per year of water with a salinity of 1500–2000 mg/l. It shall provide Amman with 38 MCM per year with a TDS of 250 mg/l. This paper describes the performance evaluation of this plant so as to bring out the state of the art of its operation and maintenance. Detailed information on the plant design and engineering, water quality, plant personnel, and cost of operation and maintenance will be collected since commissioning of the plant. The performance of the plant is characterized according to the main parameters: quantity of water produced and quality of water.

Keywords: Desalination plant performance evaluation; Brackish water desalination; Jordan

* Corresponding author.