Chemical elements of brine discharge from operational Tajoura reverse osmosis desalination plant

Bashir Brika*, Abdul Aziz Omran, Obiyda Dia Addien

Water Desalination Research Section, Water Desalination Department, Tajoura Nuclear Research Center (TNRC), Tripoli, Libya, Tel. +218 92 5411305; Fax: +218 21 3614142; emails: bashirforlibya@gmail.com (B. Brika), azize2515@yahoo.com (A.A. Omran), hitweich@yahoo.com (O. Dia Addien)

Received 14 April 2014; Accepted 20 December 2014

ABSTRACT

Despite the fact that desalination is an important technology for providing desalted water, it has some disadvantages that have not been taken seriously into consideration. Such technology can have undesirable effect on the environment. Environmental related impact could occur from the early days of plant construction and, subsequently, when the plant is in operation. Tajoura reverse osmosis desalination plant is the largest desalination plant of its kind in Libya. It has been under operation for nearly three decades without serious consideration of its impact on the environment. This paper is the first attempt in that direction. The main objective of this study is to measure the chemical components of brine concentrate discharged from Tajoura plant, and to highlight their impact on the environment. This study was conducted in the Water Desalination Department in Tajoura Nuclear Research Center. Samples were collected from feed source (seawater), and from reject stream (brine discharge point). Samples were analyzed at water department’s facility using suitable instrument. The obtained results show differences in most of the measured chemical components between seawater and brine discharge which was highly expected. It was found that brine discharge contained traces of metals such as chromium and none of some other metals such as iron. Therefore, contamination with metals is below a critical level. This can be attributed to the fact that metal equipment is not used in Tajoura RO plant. The major concern of brine discharged from Tajoura plant is represented by its high salinity as its increase from feedwater exceeds by far 1 psu.

Keywords: Desalination technology; Environmental impact; Brine disposal; Water treatment

*Corresponding author.

1944-3994/1944-3986 © 2015 Balaban Desalination Publications. All rights reserved.