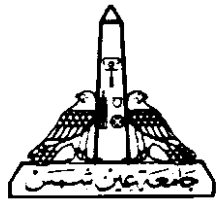

The use of electrical energy in brackish water desalination

A Thesis
Submitted to the Public Works Department
Faculty of Engineering
Ain Shams University
For the Fulfillment of the Requirements of M. Sc. Degree
in Civil Engineering (Sanitary and Environmental)

Prepared by

Ayat allah Shrief Mohamed Mahmoud

B.Sc. in Civil Engineering, July 2016
Faculty of Engineering, Ain Shams University

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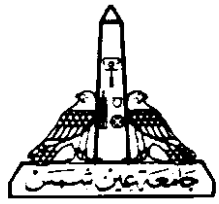

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THESIS APPROVAL

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Date:…../…../ 2019

DEDICATION

This work took a part of my life. I wish to dedicate it to who suffered to educate, prepare and help me to be as I am,
TO MY MOTHER AND MY FATHER

Also, I wish to dedicate my thesis
to my sister and my colleagues
for their encouragement and help to complete this work.

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Statement

This dissertation is submitted to Ain Shams University, Faculty of Engineering, Public works department for the degree of M. Sc. in Civil Engineering (Sanitary and Environmental).

The work included in this thesis was carried out by the author in the department of Public Works, Faculty of Engineering, Ain Shams University from 2018 to 2019.

No part of the thesis has been submitted for a degree or a qualification at any other University or Institution.

The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

Date: …./…./2019

Signature: ……..

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Abstract

For the shortage of water resources in Egypt and Arab countries, A need to develop low cost technology to deal with Brackish water as water resource are increased. The objective of this study is to investigate the possibility of producing potable water from brackish water using low cost technique depending on electrical energy. The study was applied on desalination system with the aid of electrical energy, pilot plant was erected in sanitary lab, faculty of engineering, Ain shams university, Cairo, Egypt.

This study was carried out in a batch mode over four months covered spring and winter seasons. The pilot plant consisted of glass tank with a capacity of 6.0 L, aluminum cathode and anode, and direct current supply. The influent water was synthetic water from tap water with TDS concentration of 7000 ppm. TDS, temperature, and pH were measured for the influent and effluent waters. The results of this study showed that by using electrical energy with 1.2 volt for 1hour, the system managed to achieve high TDS removal efficiency of 87.6% and water recovery of 60%. The energy consumption is 2.3kwh/m^3.

Keywords: Water Treatment, Brackish Water Desalination, Electro-Dialysis, Capacitive Deionization, Electrical Analysis.

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