OPTIMUM ENVIRONMENTAL SOLUTION FOR INDUSTRIAL WASTEWATER MANAGEMENT

IN EGYPTIAN INDUSTRIAL ZONES

Submitted By

Maysara Fouad Abd-Allah Ahmed

B.Sc. of Chemical Engineering, Higher Technological Institute,

10th of Ramadan City, 2004

A Thesis Submitted in Partial Fulfillment

of

The Requirement for the Master Degree

in

Environmental Sciences

Department of Environmental Engineering Sciences

Institute of Environmental Studies and Research

Ain Shams University

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APPROVAL SHEET

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This Thesis Towards a Master Degree in Environmental Sciences

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2019

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَعَلَّمَ آدَمَ الْأَسْمَاءَ كُلَّهَا ثُمَّ عَرَضَهُمْ عَلَى الْمَلَائِكَةِ فَقَالَ أَنبِئُونِي بِأَسْمَاءِ هَٰؤُلَاءِ إِن كُنتُمْ صَادِقِينَ (٣١)

سورة البقرة

وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ (٣٠)

سورة الأنبياء

صدق الله العظيم

DEDICATION

This thesis work is dedicated to my

beloved big family,

who have been a source of support and encouragement during the challenges of graduate school and life. I am truly thankful for having them in my life.

This work is special dedicated to

my Mother, my Father,

my Sister,

my Wife &

***my Son ADAM** (My Sweet Heart)*

who have always loved me.

Finally, this piece of work is dedicated to the spirit of

Grandmother (Mama Hafsa),

who never stopped sharing her wisdom, tutelage, support and encouragement to me.

Mayasara Fouad Abd ALLA Ahmed

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Mayasara Fouad Abd ALLA Ahmed

ABSTRACT

The industrial wastewater management in Egypt is one of the main goals for sustainable development. The water crisis in Egypt has led the industrial sector to search for resource efficiency and cleaner production technologies through a proper management of water, energy, and raw materials. As a result, the aim of this study is to choose the optimum environmental solution for industrial wastewater management in Egyptian industrial zones. Quesna industrial zone in Monofeya governorate was chosen as a case study where different scenarios for industrial wastewater management are proposed in this study to choose the optimum environmental solution. Industrial wastewater samples were taken from ten factories representing the ten main industrial sectors in the study area and sixteen parameters were measured in each sample. Results achieved from different applied scenarios showed variation in flow rates, industrial wastewater loads, treatment methods, removal efficiencies, capital and operation costs of the applied scenarios. Finally, these scenarios were compared technically and financially to determine the optimum environmental solution for industrial wastewater management. This study could be applied for all industrial zones using the same methodologies as a first one to discuss the industrial wastewater management in Egypt.

Key words:

Industrial Wastewater Management, Quesna Industrial Zone, Industrial Sectors in Egypt, Industrial Wastewater Treatment, Optimum Environmental Solution, Removal Efficiency, Industrial Wastewater Load.

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