بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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MONA MAGHRABY

APPLICATION OF RISK MANAGEMENT CONCEPTS ON SEWAGE SLUDGE DIGESTION

By

Hazem Abdelaziz Mohamed Hassan Elnaggar

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
Interdisciplinary Masters- Master of Science
in
Risk Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:
Application of Risk Management Concepts on Sewage Sludge Digestion

Key Words:
Power Generation from Biogas; Properties of Sludge; Risk Management; Sludge Digestion; Stages of Sludge Treatment

Summary:
The main objective of this work is to apply the risk management approach from the engineering and management perspectives in the sewage sludge digestion. The work in this thesis shows how applying the risk management can enhance the overall project situation, by getting a global look for the project and analyzing all of the potential positive and negative events. In the path of performing this approach, the sludge system is scientifically explored, in the light of collected field data to verifying the theoretical parameters by some of the field cases from a well-known Wastewater Treatment Plant (WWTP)s.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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Dedication

I dedicate my thesis work to God Almighty my creator, whom directed us to learn with the pen. I also dedicate my work to my family for their continuous support, I couldn't reach this point in my life without you.

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In the beginning, I would like to express my endless thanks to **ALLAH** for giving me the ability to perform this research.

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Table of Content

List of Tables

List of Figures

Nomenclature

Symbols

CH_4	Methane
CO_2	Carbon Dioxide
H_2S	Hydrogen Sulfide
m_1	Mass Amount Number 1
m_2	Mass Amount Number 2
tCO_2e	Ton of Equivalent Carbon Dioxide
$FeCl_3$	Ferric Chloride
X	Volatile Solids by Digestion

Abbreviations

AD	Anaerobic Digestion
ATEX	Atmospheres Explosible
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CAPW	The Construction Authority for Potable Water and Wastewater
DS	Dry Solid
EEA	Egyptian Electricity Authority
ETS	Emission Trading System
FOG	Fats, Oil and Grease
FMEA	Failure Modes and Effects Analysis
HAZOP	Hazard and Operability Study
HCWW	Holding Company for Water and Wastewater
GEA	Gabal El Asfar
GHG	Greenhouse Gases
GIZ	Gesundheits Informations Zentrum