Faculty of women for
Arts, Science and
Education
Physics department

Study on Decontamination from Contaminated Soil by Technologically Enhanced Naturally Occurring Radioactive Materials in Oil and Gas Production Fields in the western desert

A thesis Submitted

By

RANA ABD EL WAHAB ABD EL MOTALEB

B.Sc. (Physics)
Radiation Protection Department
Nuclear and Radiological Regulatory Authority (ENRRA)

To

Physics Department, Faculty of women for Arts, Science and Education, Ain Shams University

For

Fulfillment of the Master. Degree of Science

In physics

2019

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RANA ABD EL WAHAB ABD EL MOTALEB

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Physical on Radiation Protection Department
Nuclear and Radiological Regulatory Authority (ENRRA)

Board of Scientific Supervision

Prof. Dr.
Amal Mahmoud Farag El Shershabe *Professor of Radiation Physics, Faculty of women for Arts, Science and Education, Ain Shams University*

Prof. Dr.
Mohamed Reda M. Ezz El-Din
Prof. of Radiation Chemistry
Nuclear and Radiological Regulatory Authority

Dr. Ahmed Adel Tahaa
Assistant Prof of Radiation Physics
Nuclear and Radiological Regulatory Authority

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Thesis Supervisors	*Approval*
Prof. Dr. Amal Mahmoud Farag El Shershabe *Prof.of Radiation Physics* *Faculty of women for Arts, Science and Education* *, Ain Shams University*	…….
Prof. Dr. Mohamed Reda M. Ezz El-Din *Prof. of Radiation Chemistry* *Nuclear and Radiological Regulatory Authority*	……
Dr. Ahmed Adel Tahaa *Assistant Prof of Radiation Physics* *Nuclear and Radiological Regulatory Authority*	……

Ain Shams University

Dedicated

To the spirit of Doctor

Ahmed Adel Tahaa

In life. We loved you dearly. In death we love you still. In our hearts you hold a place. No one else will ever fill.

AKNOWLEDGMENT

First, I thank **"ALLAH"**, the **Beneficent**, and the **Merciful**, for the success of me in the completion of this work.

My grateful thanks are due to the many people who have given of their time and assistance towards the completion of this thesis.

I wish to express my sincere thanks and gratitude to ***Prof. Dr. Amal Mahmoud Farag EL Shershabe***, Professor of Radiation Physics, Physics Department, Faculty of women for Arts, Science and Education, Physics department, Ain Shams University, for her supervision, her valuable suggestion, through thesis revision and her valuable support and encouragement.

I would like to express my deep gratitude and sincere thanks to ***Prof. Dr. M. Reda Ezz El-Din***, Radiation Protection Department of ENRRA Atomic Energy Authority (AEA) of Egypt, for his close supervision, scientific discussion of the obtained data and for his help in the final presentation of the thesis. He has guided me into this field and continuously helped and encouraged during the whole work.

Finally, I wish to express my sincere thanks and gratitude to the staff members of Radiation Protection Department, ENRRA , Atomic Energy Authority (AEA), for the help given to me during completion of this thesis.

I wish to express my sincere thanks and gratitude to ***Prof. Dr. Ahmed Adel Taha***, Assistant Professor of Physics, Radiation Protection Department of ENRRA, Atomic Energy Authority (AEA) of Egypt, for suggesting this point of research, his supervision, continuous support, spiritual encouragement,, kind guidance throughout the present work, and eminent help and effort in the practical part of the study.

Special thanks for **prof. Dr. Hanan Gouda**, Head of physics Department, Faculty of women for Arts, Science and Education, Ain Shams University for all helps and fruitful discussions and all support during analyses results.

Last but not least, my deepest thanks and gratitude to all the Staff Members of physics Department, Faculty of women for Arts, Science and Education, Ain Shams University.

Finally, a lot of thanks should be given to my mother and husband for their love and great support.

Dedicated

To

For my loving family

My MOTHER,

My Father,

My HUSBAND(Mahmoud)

My Sweet Daughters Malika & Rahim

And

My Sisters

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Summary and Conclusion

The presence of large quantities of TENORM contaminated soil produced during the extraction and processing of crude oil at oil extraction sites and low cost methods to decontaminate this radioactively contaminated soil.

In this respect, the leaching behavior of the radionuclides from the TENORM contaminated soil samples by different concentration of natural leaching solutions were studied. A series of batch experiments have been conducted to determine leaching behavior of the radionuclides onto the solutions and the different factors affecting the leaching process have been studied.

The aim of the present work is to elucidate the risk of TENORM to the environment and to initiate methods to deal with the resulting contaminated soil by the following methods:
1-Removel of ^{226}Ra from contaminated soil samples by electrodeposition technique using different electrods materials.
2-Remediation of contaminated soil by washing technique using different leaching solutions.

In general, this thesis is divided into four main chapters:

Chapter 1: Introduction

This chapter comprises a review on TENORM generated from oil and gas industries. It specifies the primary sources of TENORM, its characterization, measurements, monitoring and actual hazards. It comprehensively outlines the industries that may include TENORM Radiation and disposal. This chapter also contains a brief account on the national and international standards and regulations concerning TENORM in oil and gas fields. Finally; it contains a short account about nuclear,

chemical and environmental characteristics of the considered radionuclides (Uranium, Thorium and Radium) and **Literature Review** for contains a brief account on the previous literatures deals with the different methods for the decontamination and removal of radionuclides from TENORM wastes.

Chapter 2: Material and Methods

This chapter gives a full description of the chemicals, materials and the instruments that were utilized in this work as well as the experimental procedures that were followed in this study.

The experimental work is divided into two main parts:

The first part deals with the decontamination of the radioactive (TENORM) contaminated soils. The five TENORM contaminated soil samples collected from different locations of oil and gas fields in Egypt.

The second part deals with Remediation of contaminated soil by washing technique using different leaching methods.

Chapter 3: Results and Discussion

This chapter comprises the obtained data of the experimental work. The obtained data was divided into two main parts. **The first part** deals with the decontamination of the TENORM contaminated soils at the oil and gas production fields. **The second part** deals with Remediation of contaminated soil by washing technique using different leaching methods.

The first part: the decontamination of the TENORM contaminated soils at the oil and gas fields.