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

# Environmental Nuclear Studies of Natural and Manmade Radioactivity at Nugrus and Sikeit Areas, South Eastern Desert. Egypt.

**Thesis**
**Submitted in the partial Fulfillment**
**for M. Sc. Degree in Physics**
**To**
**Physics Department**
**Faculty of Girls for Art, Science and Education,**
**Ain Shams University**
**By**

**Neveen Ali Abo El-Fetoh Abo El-Safa**

**B. Sc. in physics, 2001**

**Supervisors**

**Prof. Dr. Samia.M. El-Bahi**
**Prof. of nuclear physics**
**Faculty of Girls for Arts,**
**Science and Education.**
**Ain shams University**

**Prof. Dr.M.A.Ibrahim**
**Prof. of geology**
**Nuclear Materials Authority**
**Egypt.**

**Prof. Dr.Amal .M. El-Shershaby**
**Prof. of nuclear physics**
**Faculty of Girls for Arts,**
**Science and Education.**
**Ain shams University**

**Dr.Amany Taha Sroor**
**Ass. Prof. of nuclear physics**
**Faculty of Girls for Arts,**
**Science and Education.**
**Ain shams University**

**2006**

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**A Thesis for M.Sc in Physics**

Neveen Ali Abo El-Fetoh Abo El-Safa

**Title of thesis**

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**Ass. Prof. of nuclear physics**
**Faculty of Girls for Arts, Science and Education.**
**Ain shams University**

Date of Research: / / **2006** Date of Approval: / /**2006**

Approval Stamp:

Approval of Faculty Council: / /**2006**

Approval of University Council: / / **2006**

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

Student name: **Neveen Ali Abo El-Fetoh Abo El-Safa**

Scientific degree: master in Physics

Department: Physics Department

Faculty: Faculty of Girls, for Arts, Science and Education

University: Ain Shams University

Date of graduate: Bachelor Science in Physics 2001.

Date of granted: M.Sc in Physics 2006.

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

# Acknowledgements

First of all, I am greatly indebted in all this work and my success to our **Merciful GOD.**

I wish to express my deepest appreciation to **Prof**. **Dr. Samia.M. El-Bahi,** Professor of Nuclear physics**,** Ain Shams University, Faculty of Girls for Arts, Science and Education, for her help and support during the course of this study.

I wish to express my deepest gratitude and grateful thanks to **Prof Dr.M.A.Ibrahim**, Professor of Geology, Nuclear Materials Authority, for his supervision and planning the work, fruitful discussion and careful guidance and valuable discussion.

Particular gratitude and heartily thanks to **Dr.Amany Taha Sroor,** Associate Professor of Nuclear physics**,** Ain Shams University, Faculty of Girls for Arts, Science and Education, for her help and advice during the practical work.

Wording is not enough to express my sincere respect and cordial gratitude to **Prof Dr.Amal. M. El-Shershaby**, Professor of Nuclear physics**,** Ain Shams University, Faculty of Girls for Arts, Science and Education, for her kind supervision, sincere help, faithful guidance, valuable suggestions, encouragement and assistance during the course of research.

Special thanks for **Prof. Dr. A.Sofia,** Professor of Geochemistry, Nuclear Materials Authority and **Prof. Dr. El-Menshawy.G.A**, Professor of Geochemistry, Nuclear Materials

Authority 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 Girls for Arts, Science and Education, Ain Shams University.

Finally, I want to express my best thanks to all those who helped me to finish this work.


بسم الله الرحمن الرحيم
سبحانه وتعالى
الله
الله اكبر
جل جلاله

# Abstract

This work aims to study an area which is characterized by abnormal radioactivity and has several archeological sites (Sikait Temple) along historic trade routes linking the Red Sea with the Nile Valley. Emerald mining is a wide spread activity since ancient times at Sikait-Nugrus area.

The concentration of the natural radionuclides are measured in all the rocks samples to find the specific radioactivity of $^{238}$U-series, $^{232}$Th-series and $^{40}$K by using two techniques (a high resolution gamma ray spectrometer based on coaxial HpGe detector and shielded by cylinders of lead, copper and cadmium and NaI (Tl) detector). The analysis of data is completed by computerized multichannel analyzer with high level software programs. The radionuclides concentration in the different samples is compared with the exempt levels proposed by the International Atomic Energy Agency (IAEA) which is of scientific interest to health physics.

It was found that the specific activities of $^{238}$U, $^{232}$Th, and $^{40}$K in the samples from Wadi Sikeit are higher than that from Wadi Nugrus.

The results obtained are higher than the permissible international radioactivity levels. The area under investigation is classified of high-level natural uranium concentration, so it can be considered as an area of uranium resources potentiality and uranium production field area used with economic value in different purpose. This may be discussed by the hydrothermal solutions, which played the most important rule in the uranium enrichment as well as the alteration of rocks.

# Abstract

At Wadi Sikeit most the samples are in disequilibrium state (eU/Ra) >1 (Uranium gain) except two samples has (eU/Ra) = 1 (equilibrium). Only in one sample the ratio is less than one (Uranium loss).

At Wadi Nugrus all the samples show disequilibrium state with eU/Ra ratios >1 (Uranium gain) except one sample shows eU/Ra ratios < 1 (Uranium loss).

For that reason, strong safety considerations are recommended for protection of the working personal in the Nugrus area.

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