Ain Shams University
Faculty of Science
Geology Department

Structural Evolution and Hydrocarbon Potential of the North Ramadan Field, Central Gulf of Suez, Egypt

A Thesis Submitted to

Ain Shams University, Faculty of Science,
Geology Department

In Partial Fulfillment of the Requirements for the Degree of Master of Science in

GEOLOGY

By

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Approval Sheet

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Note

The present thesis is submitted to the Faculty of Science, Ain Shams University in partial fulfillment for the requirements of the degree of Master of Science in geology. Besides the research work materialized in this thesis, the candidate has attended ten post-graduate courses for one year in the following topics

1. Advanced Structural Geology
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3. Advanced lithostratigraphy
4. Biostratigraphy
5. Photogeology
6. Geomorphology
7. Sedimentation
8. Sedimentary Petrology
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10. Geostatistics

He successfully passed the final examination in these courses.

In fulfillment of the language requirement of the degree, he also passed the final examination of a course in the English language.

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VITA

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ABSTRACT

The North Ramadan concession is located in the south-central part of the Gulf of Suez to the southeast of Ras Gharib field. The concession is about 290 Km^2. The area selected for the present detailed subsurface study includes the southern part of the concession. The study area has an aerial extent of about 23 km^2. The study is concerned with the structural and stratigraphic settings and the hydrocarbon potential of the study area.

The aim of the study is to use the available seismic and well data to study the stratigraphy, structures, and the hydrocarbon potential of the North Ramadan field.

These objectives were carried out by creating a synthetic seismogram for well-seismic ties, followed by fault and horizon interpretation of the area. These two steps were performed using the Schlumberger Petrel^{TM} software.

Structural deformation in the field is represented by a half-graben structure dominated with a series of NNW to SSE-trending normal faults. Some of these faults are dipping to the ENE, whereas other faults are dipping to the WSW with fault blocks tilted to the NE. The faults interpreted in the area affect the pre-rift and syn-rift rocks.

Due to the lack of data, the hydrocarbon potential of North Ramadan field was evaluated based on previous work in nearby fields in the south part of the Gulf of Suez. The study describes and categorizes the penetrated rocks according to their potential towards being source,

or reservoir rock units. The source rocks were evaluated through vitrinite reflectance maps, and burial history diagrams in some fields located to the south. The reservoir rocks were evaluated through quantitative analysis of the petrophysical parameters in nearby fields.
Keywords: North Ramadan field, Gulf of Suez, Half-graben, Syn-rift, Hydrocarbon Potential.

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INTRODUCTION

1.1 Location of the Study Area

North Ramadan concession has an area of about 290 km^2 and is geologically located in the southern central part of the Gulf of Suez. It is bounded by Morgan accommodation zone from south (Figures 1.1 and 3.1 A). The study area comprises the North Ramadan field in the southern part of the concession and has an area of about 23 km^2 (Figure 1.2).

1.2 Objectives of the study

The aim of the study is to use the available seismic and well data to describe the stratigraphy and the structural setting of the North Ramadan field. The field has an area of about 23 Km^2 and is surrounded by the most prolific producing oil fields in the Gulf of Suez.

1.3 Database

- Seventeen seismic reflection cross-lines (SEGY files) starting from cross-line 2670 to cross-line 2500 perpendicular to the Gulf of Suez coast. They are arranged from the NW to the SE with 150 meters spacing. Also, a fifteen seismic reflection in-lines (SEGY files). They are also arranged from in-line 370 to in-line 500 parallel to the Gulf of Suez with 250 meters spacing (Figure 1.2).
- The area is covered by 3 wells (NR-1) and its side track (NR-1AST1) and EG-2 and KK85-1. Each well is provided with its deviation data file and its formation tops. KK85-1well is the only one that contains