IDENTIFICATION AND DETERMINATION OF VARIOUS HYDROCARBON PRODUCTS IN THE VICINITY OF EL-RAZZAK FIELD,WESTERN DESERT-EGYPT,USING WELL LOGGING ANALYSIS

A THESIS

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN GEOPHYSICS

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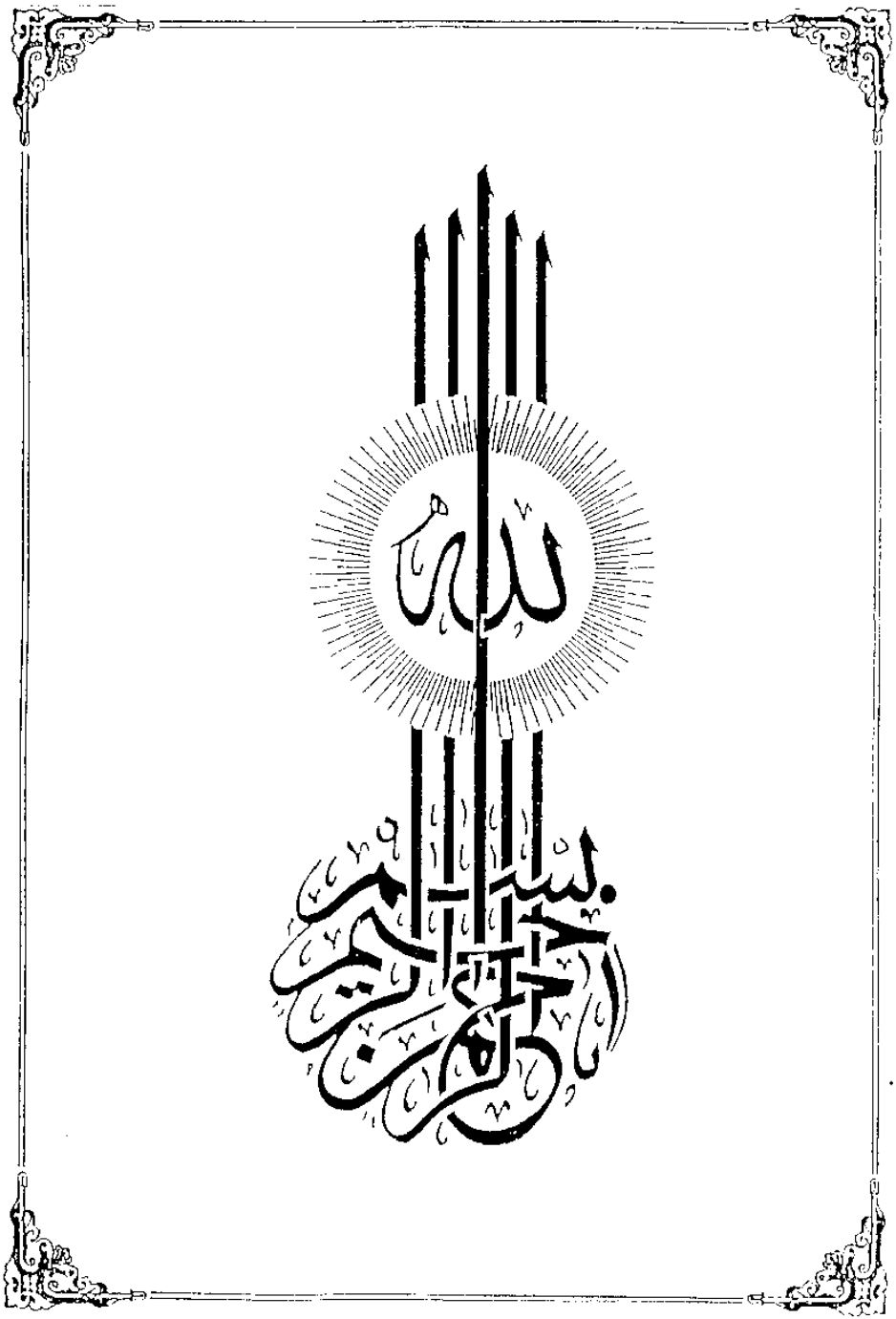
CAIRO 1997



ACKNOWLEDGMENT

In the first place, praise be to **Allah** and gratitude is due to almighty Allah who guided me to bring forth this thesis to light.

Thanks **Allah**

The author wishes to express his gratitude to Prof. Dr. **Ahmed Said Abu El-Ata**, Prof. of Geophysics, Department of Geophysics, Faculty of Science, Ain Shams University, for his stimulating supervision of this work, the unlimited assistance in interpreting the results, criticizing the final manuscript, and for the valuable computational facilities kindly offered by him.

Special thanks are due to Prof. Dr. **Samira Hassan Abdel Baki**, Prof. of Geophysics and Head of Exploration Sector, Petroleum Research Institute, for her great help and continuous encouragement.

Deep thank are due to Dr. **Maher Ali El-Azoni**, Assist. Prof. of Geophysics, Exploration Department, Petroleum Research Institute, for valuable discussions, reading of the entire manuscript and for generous advice offered by him at various stages of the work

Deep thanks are also due to my colleagues for their great help and continuous encouragement.

Finally, from all my heart, I feel indebted to my family for their great help and permanent care

ABSTRACT

Mohamed Abd El-Fattah Mohamed Ramadan . Identification and Determination of Various Hydrocarbon Products in the Vicinity of El-Razzak Field, Western Desert-Egypt, Using Well Logging Analysis. A Thesis Submitted to the Faculty of Science, Ain Shams University for the Degree of M. Sc. of Science in Geophysics, 1997.

The objective of the present logging evaluation is the identification and determination of the various hydrocarbon products of the Abu Roash Formation in the vicinity of El-Razzak Field, northern Western Desert, Egypt. The area of study is bounded by Long. 27° 50' and 28° 40' E. and Lat. 30° 25' and 30° 55' N. Nine wells (IJ 30-1, IG 30-1, IG 33-1, IH 35-2, IG 34-1, IF 32-1, IF 34-2, IE 34-6 and IE 36-1) were utilized for accomplishing this assessment. Such a study is performed using the different types of open-hole well logs, such as : Resistivity, Neutron, Density, Sonic, Self-potential and Gamma-Ray for the determination of the included petrophysical parameters and the evaluation of the inherited source rocks.

Such a work is conducted through several stages, started by reviewing the geologic setting of the study area through the previous geologic works and literatures, to shed lights on the geomorphology, surface geology, subsurface stratigraphy, structures, tectonics and geologic history.

From these wells, the source rock indicators were defined through the calculation of the organic content (ORG, Vol. %), the total organic carbon (TOC, wt %) and discriminant function to differentiate between the source rocks and the non-source rocks of the shales and shaly rocks of the Abu Roash Formation in the investigated area. Their results were presented in organo-source

logs and gradient maps to show the distribution of the implicated organic materials vertically and laterally. Added, the reservoir formation porosities (total and effective) were determined from the available porosity tools (density, sonic and neutron). Moreover, the cap rocks are recognized over the reservoir rocks.

Transformation cycle of hydrocarbons was started by studying the hydrocarbon maturation of the area through burial history curves of the studied wells and thermal maturation of the implied rock unit, from which the Time-Temperature Index (TTI) and Vitrinite Reflectance (Ro %) were estimated. From these it can be deduced that, the area of maturation is located around IF 34-2 well. Moreover, the times of onset, peak and end of oil generations were detected for the studied wells. Also, the migration characteristics of the synthesized hydrocarbons were studied through the migration types (primary and secondary), direction and mechanisms for transporting the hydrocarbons to the final accumulation places.

Hydrocarbon differentiation and hydrocarbon saturations for the various types of hydrocarbon products (heavy tar, liquid oil and gas) were defined through logging analysis in the form of iso-parametric maps. The hydrocarbons of Abu Roash Formation show an increase from the southwestern to northeastern parts. Besides, the comparison between the trends of variation of the movable and residual hydrocarbons indicates that, most of the initiated hydrocarbons are from the movable type. Added, the heavy tar (resins) increases toward the southern part. Moreover, the gas is not encountered in the Abu Roash Formation of the studied wells.

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