GEOPHYSICAL & SUBSURFACE GEOLOGICAL STUDIES AT MAGHARA AREA [NORTHERN SINAI] USING WELL – LOGGING ANALYSIS

THESIS

SUBMITTED FOR THE Ph.D. DEGREE

GEOLOGY (APPLIED GEOPHYSICS)

BY

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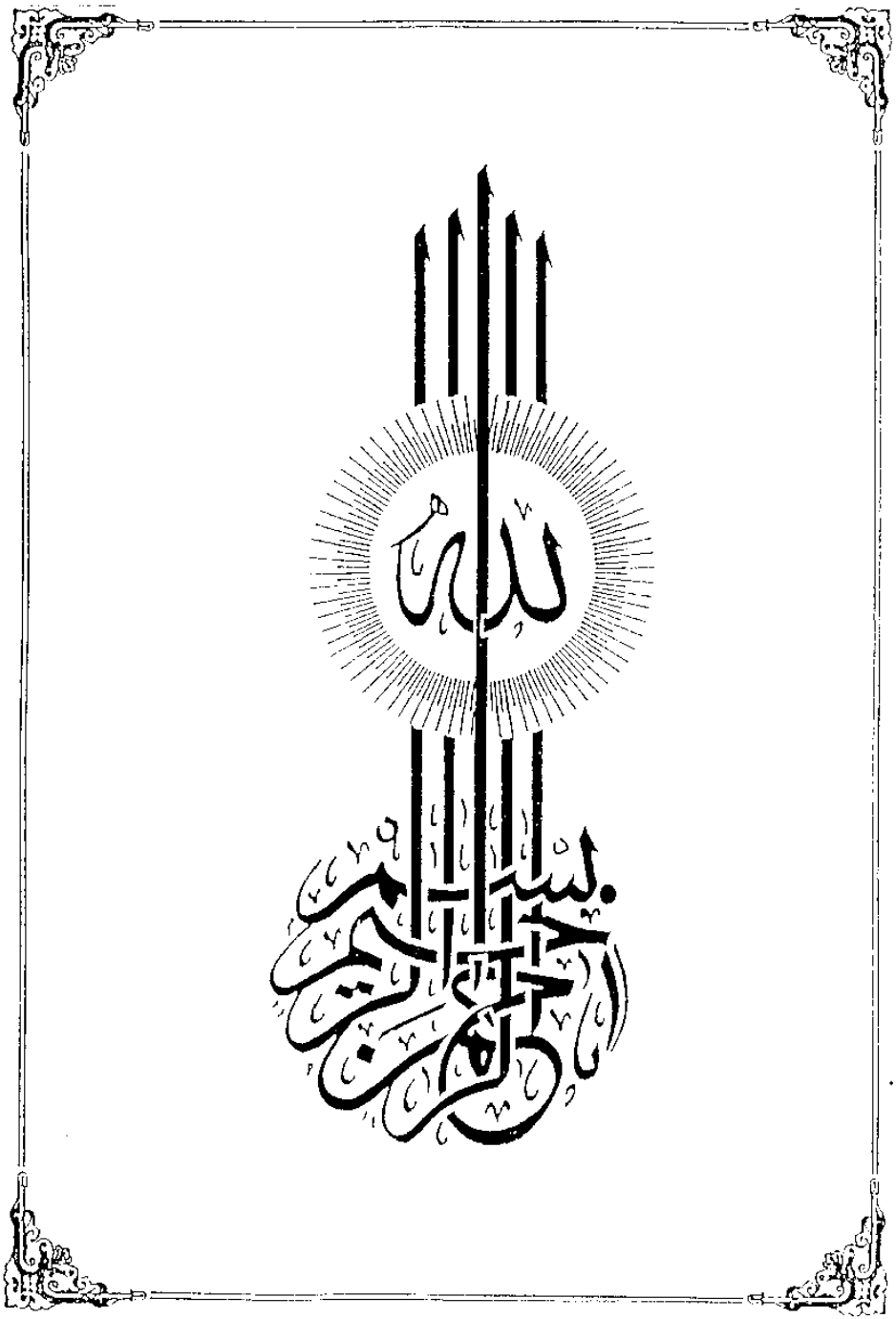

ABSTRACT

Maghara area gets its importantce after the discovery of coal in it by El-Far of the Egyptian Geological Survey in April, 1959.

Need for coal appreciably increased after the high increase in petroleum prices after 1973 war; to replace petroleum in some industries and in production of electric power.

The Egyptian Geological Survey condensed its exploration programs for coal deposits in Sinai after the discovery of coal in Ayun Musa area in Jurassic deposits.

The program included the study of Jurassic deposits at Maghara area in the period from 1958 to 1967 which led to the discovery of coal at Maghara area in 1959. Further study was done on the discovered coal deposits in Maghara area from 1980 to 1985.

The author participated in the geophysical studies on coal deposits that took place from 1980 to 1988 by conducting borehole geophysical measurements inside the drilled exploratory coal and water wells during this period (23 coal wells and 11 water wells).

In the present thesis, the results of the borehole

geophysical investigation carried out in Maghara area at Wadi El-Rakb and Wadi El-Safa, together with some geological and geochemical studies are presented.

After a general discussion of the general geology of El-Maghara area (chapter I), an outline of the borehole geophyisical methods used and the field procedures adopted (chapter II) is given.

In chapter III, the subsurface geology of Maghara area is explained by constructing different types of subsurface maps based on the data obtained from the used borehole geophysical measurements. A comperhensive well-logging analysis of different formations and coal seams were carried out in chapter IV.

In chapter V, the petrophysical properties of the penetrated rock units encountered within the studied wells are interpreted from the geophysical measurements inside these boreholes. The relations between these petrophysical properties are established.

Petrophysical and petrochemical analysis are done. Some imperical linear relations were established between petrophysical properties of Maghara coal and its petrochemical properties and between components of chemical analysis of Maghara coal.

Some geological problems in El-Maghara area were solved by the application of geophysical studies in chapter VI.

In chapter VII, coal reserves in Wadi El-Safa and Wadi El-Rakb at Maghara area are reviewed, also reserves in Ayun Musa and Thora-bedaa area in Sinai are studied.

The main results achieved and the conclusions reached are summerized.

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