CHAPTER I
INTRODUCTION

1.1 Generals

Petroleum exploration around Gulf of Suez began just over 100 years ago at Ras Gemsa, with commercial scale oil production starting in 1909. The Gulf is now a well established oil province (Fig. 1), presently ranked seventh in terms of production among the major grabens or rift basins of the world ***(Schlumberger, 1995)***.

Gulf of Suez continues to provide a focal point for the development of geological ideas and evolution of oil-related technology. New companies are entering the area and bringing a variety of exploration techniques. Allover the Gulf of Suez, the Miocene sediments seems to have a very important role in oil accumulation especially in the study area (October Field), where the large oil discoveries are located in the tilted fault blocks.

In the present work we are intended to assess and evaluate the hydrocarbon potentiality of the northern parts of October Field.

1.2 Exploration History of October Field

October Field is the third largest field in Egypt. It is structurally trapped in a complex of rotated fault blocks, a common scenario throughout the Gulf of Suez. The main oil reservoirs are the Carboniferous to Lower Cretaceous Nubia sandstone and the Miocene Asl sandstone, ***(Schlumberger, 1995)***.

October Field was discovered in 1977 with the drilling of GS 195-1(OCT-A1) at the site of October "A" platform. This well had an initial production rate of 14.000 BOPD from Nubia oil reservoir ***(Gupco, 1987)***. It was followed by drilling the Nubian producers GS 195-2 (OCT-B1), GS 185-1 (OCT-C1) and the GS 196-2A wells. The Nubian oil/water contact was established at -11670ft subsea depth. In June 1978, GS 173-1 (OCT-D1) was drilled to the north of the GS 185-1 well to

define the northern limits of the proven reservoir of the GS 185-1 well. This well was classified as a Nukhul oil-bearing discovery.

In December 1979, the GS 173-2 well was spudded as a Nubia exploratory well to the east of GS 173-1 to test the Nubia and Nukhul drilling results. In May 1981 the October D-2 development well was drilled to the northwest of the OCT-D1 (GS 173-1) well (Nukhul discovery) to establish production from GS-172 block. This well targets the Lower Senonian to test the possible northern extension of the GS -195A4A.

In October 1981, the October D-3A development well was drilled to test the southern extension of the October D-1 proven reserves and to gain more information about the configuration of the faults in GS-172 and GS-183 blocks. October D- 4 well was drilled on January 1982 as a replacement to the October D-2 dry hole. This well encountered the top of the conglomerates at -9653ft subsea depth. In 1984, the GS 173-3 well was spudded to test the Nubia in the GS-173 block. In June 1987 it was recommended to drill the development well October G-1 to test the updip of the Nubia reservoir extension concept ***(Gupco, 1982)***.

In 1989, the Asl reservoir sand, in the Miocene Asl Formation, was discovered. It is located on the hanging wall of a large normal fault bounding the west of October field. The first drilled well in the Asl reservoir discovery is NO 183-1 (April, 1989). From this date and upgoing a large number of wells were drilled in this newly discovered " J " named platform and around it. Some of these wells were drilled to test the possible extensions of this new reservoir and the others for the purposes of production.

The following are some of the most important drilled wells in the study area, where Asl Formation is represented in all of them:
NO 159-2 (Oct., 1989), NO 159-1, GS 172-2 (Sept., 1990), J2ST1 (Juli, 1990), J4ST2 (Oct., 1990), J5 (March, 1991), Tanka-2 (Aug., 1991), J6A (Nov., 1991), J7A (Jan., 1992) and J3A (Juli, 1994).

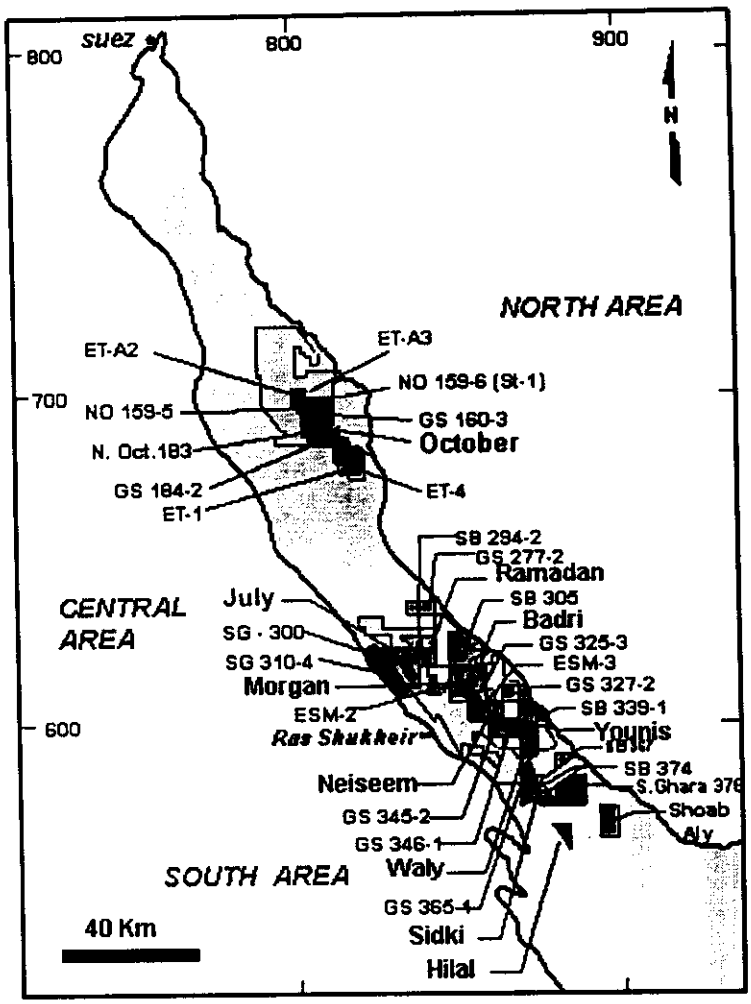

FIG. (1) THE MOST IMPORTANT OIL FIELDS IN GULF OF SUEZ INCLUDING OCTOBER FIELD (AFTER *GUPCO, 1994*).

1.3 October Field and Available Data

October field occurs nearly in the central part of Gulf of Suez, Fig. (2). It lies between Latitudes $28^{\circ}\ 46'\ 40''$ and $28^{\circ}\ 57'\ 10''$ North and Longitudes $32^{\circ}\ 57'\ 33''$ and $33^{\circ}\ 10'\ 00''$ East. The area under study occupies the northern parts of October field in a NW-SE direction as shown in Fig. (3). It is bounded by coordinates 692.000 and 698.000 N and 803.000 and 808.000 E.

Nine wells both vertical and deviated are used in this study (J2ST1, J3A, J4ST2, J5, J6A, J7A, NO 159-1, NO 159-2 and GS 172-2). The choice of these wells is based mainly on the occurrence of the two studied formations, which are well represented in all of them. Complete logging dataset is used in this study. Such data includes the different Electric logs such as; Sonic, Density, Neutron, Gamma Ray, Resistivity, Caliper, Dipmeter logs...etc. Figs. (4 to 12) show the different available logs with respect to the nine studied wells. Some other wells were also used for correlation.

In addition, some geochemical measurements are also included. Some important geochemical parameters were integrated with and involved in the logging analysis, especially those concerning with water resistivity (R_W) and total organic carbon estimation (TOC). Also, some velocity records are used.

1.4 Aim of Work

This work is aiming to evaluate the area north of October Field through the study of two formations (Asl and Hawara) of Lower Miocene age. Asl Formation is subdivided into two zones; upper zone consists mainly of marl (Asl Marl) and lower one of complete sand body (Asl Sand). Asl Sand zone is considered the main oil reservoir in the study area. Meanwhile, Asl Marl zone along with Hawara Formation, which is composed mainly of shales, were tested as possible source rocks.