Republic of Yemen

Sana'a University
Faculty of Petroleum and Natural Resources

الجمهورية اليمنية

جـامعة صنعـاء
كليـــة البترول والموارد الطبيعية

A report on the discussion of the master's thesis submitted by the

researcher Haalah Ali Muhsen Aldomainy

On Saturday, July 15, 2023, a public discussion was held at the Faculty of Petroleum and Natural Resources of the master's thesis submitted to the Department of Earth Sciences by student Hala Ali Mohsen Al-Damini, entitled "A Study of Basin Analysis and Reservoir Modeling in Block 32, Mesila Basin, Yemen." Under the supervision of Dr. Adel Al-Matary.
The discussion committee was composed of:
1. Prof. Dr. Mahyoub Abdel Rahman Saeed, Sana'a University, Chairman, internal examiner
2. Professor Adel Mohammad Al-Matary, Sana'a University, Supervisor, Member
3. Prof. Dr. Muhammad Hail Al-Hakimi, University of Taiz, external examiner

During which the student reviewed the most prominent results included in her study, and highlighted the results of the subsidence analysis of the Messila Basin, as well as the results of modeling using the Petrel program for the Qishn reservoir in the studied Block. Abstract attached.

Basin Analysis and Reservoir Modeling Study of Block 32, Masila Basin, Yemen

ABSTRACT

The Masila area is located in the Hadramaut Governorate in east central Yemen. The Tasour oilfield is one of the most productive block 32 in the Masila Basin, located in the NW sector from the Masila Basin.
(1D and 2D) Basin analysis and structural modeling study is carried out on block 32 in the Masila Basin. It is based on well logs and seismic lines of twenty-three oil wells.
1D backstripping study result show in many curves of the subsidence of the basement during removing the effects of decompaction to the water column and sediment loads of the stratigraphic units. The oil field (block 32) in the Masila Basin exhibited a complex subsidence history over a period of about 100 Ma, and the extensional rifting commenced at 150 Ma. Two stages of subsidence obtained. At the first stage (112−137 Ma) occurred during the deposition of Saar and Qishn Formations (Carbonate and Clastic), formed by the thinning of the curst, during a lithospheric extension. The highest average of deposition rate (8.0096 m/1,000000 years) occur at Saar. The highest average of total subsidence rate during this time is (8.91 m/1,000000 years) occur at Saar Formation, and the highest average of tectonic subsidence rate during this time is (3.06 m/1,000000 years). The second stage of subsidence (70−96 Ma) coupled with deposition of Harshiyat, Fartaq and Mukalla formations, generated by the cooling of lithosphere, the thermal effects and the sediments loading. The highest average of deposition rate (9.7787 m/1,000000 years) occur at Harshiyat

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formation. The highest average of total subsidence rate during this time is (2.2381 m/1,000000 years), and the highest average of tectonic subsidence rate during this time is (2.8 m/1,000000 years), observed west to center of block 32.

Use the FlexDecomp software based to do 2D backstripping by following the top formation in the wells. The depth-converted strata through to via a series of sections that show the subsequent removal of sediment loads above the basement rocks, to produce 2D profile across the block. Three profiles selected, the first profile was (11.099 km) long, the second was (9.002 km) long, and the third was (4.057 km) long. Based on these models, the highest of sedimentation (thickness) were during the deposition of Harshiyat Formation (1.0411 Km).

The geological modeling made by using the Petrel Software. Structural modeling is used for building geological model, and it was based on seismic interpretation data. The Qishn Clastic reservoir structural model shows two horizons (top and base Qishn Clastic) and seven faults. The thickness of study area increases from southwest toward east and west directions, and has been affected by seven normal faults in different oriented growth faults F1 to F7. These faults have divided the area into horst and graben systems. The faults F1, F2 and F3 towards north-west with reactive najd fault trend. The fault F4 towards central-north, the faults (F5 and F6) towards south with reactive najd fault trend during Precambrian and the fault F7 is toward sea with rifts of the Gulf of Aden and red sea in the Tertiary, inside the top and base Qishn Clastic.

KEY WORDS: Basin analysis, Backstripping, Geological Modeling, Structural Modeling, Masila Basin, Yemen

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