Delinate of Middle Devonian Aouinet Ouenine F3 Sand by Using Petrophysical and Sedimetological Analysis in South Wafa Field,Ghadames Basin,Libya

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Abstract

Sedimentology and Wireline log analysis of the Middle Devonian Aouinet Ouenine F3 Sandston Member (main reservoir), in the south part of Wafa Field-, have been carried out on seven wells (A12, A13, A40, A41, A50, A51 & A55), in order to better understand the reservoir potential and distribution quality in the area is not well delineated yet in this region. in-order to understand the reservoir quality and its distribution more accurately, Geophysical, Sedimentology, and Petrophysical analyses have been applied. Data from wells and 3D seismic data were used to create a 3D geology model. Two cores data from these boreholes were also used in this investigation. The integration of the 3D seismic and petrophysics results from both wireline logs and core data; enables a better understanding of F3-sand quality and distribution in the south part region of the Wafa field. Throughout the studied area, the lithology was grading from sandstone in the northern part to shaly sandstone toward the southern part, which might be related to the sea level fluctuation at the time of deposition. 3D geology model and petrophysical model results show that F3-Sand quality is variable throughout the studied area, the Lithofacies described as sandstone body coarsening upward where, the grain size profile possibly produced by seaward progradation indicating a Barrier Island of sandstone that was possibly emerged in the manner of a barrier island which, was interpreted as discontinuous large sandstone body that thins or absent towards the southwest of the study area, where the porosity reached up to 12% and permeability up to several hundred md, net pay thickness ranges from one foot to 101 feet, and average water saturation is 16 %. Our interpretations are that the lithology is mainly of sandstone with minor shale. This observation probably effected the Gas/Water contact of the F3 reservoir which was not defined due to the facies changes.