

Hydrocarbon Potential of the Lower Eocene Formations in Sabratah Basin, North West Offshore Libya

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ABSTRACT

The Lower Eocene Farwah Group (Jdeir and Bilal formations) represents potential petroleum system in western part of Sabratah Basin, Offshore North West Libya, many oil and gas fields were discovered in this area example Bouri and Bar El Salam, recently some dry exploration wells were drilled in eastern part of the basin. In order to better understand the petroleum potential of the whole basin, geological and geochemical data from 40 wells were used, five exploration wells intersect the basin were selected for detailed petrophysical analysis (B3-30-NC41, E-001-NC35A, A1-18-ST2, L-001-NC41 and C3-NC41). The results suggested that the best reservoir quality is within Eocene shallow platform Jdeir nummulitic shoals with average porosity 20%, reaches thickness of 600 feet in the northwest at Bouri Field area, a good reservoir quality notes for back barrier lagoon Jirani dolomite Member with average porosity 23%, reaches thickness of 400 feet at Bar El Salam Field area, mainly localized in the north western part of the basin. Reservoir quality of Eocene is controlled by diagenetic factors, with local variations in degree of calcite cementation and secondary porosity created by leaching of bioclasts and cements. Isopach maps generated show that thinning and thickening is controlled by paleotopography of the basin. The geochemical analysis of the Lower Eocene (Ypresian) show that Bilal Formation is the principle source rock ,at the northwestern part of the basin have TOC contents ranging from 2% to 4% , with average hydrogen indices values (300) mg HC/ g TOC indicates that organic matter is type II/III oil pron, average Tmax 450 oC. The TOC values decreases to the east and southern parts of the basin, an average TOC of 0.8 % , S₂ values less than 1 mg HC / g rock, hydrogen indices values (100) mg HC/ g TOC indicates that organic matter is type III/IV poor potential. Few samples were analyzed for biomarker, the results suggested that the Ypresian source rock deposited in lagoonal anoxic depositional environment.