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Petroleum Play Fairway Analysis of the Middle Paleocene Lower Beda Formation, Concession 71, South-Central Sirt Basin, Libya

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Abstract : The Middle Paleocene Lower Beda Formation was deposited in a ramp system with local shoaling. The main constituent is limestone, with subordinate dolomites and Shales. Reservoir quality is largely influenced by depositional environments and diagenesis processes. Generally the reservoir quality of Lower Beda Formation is low risk on the Inferred Horst and in the Southern Shelf where the Lower Beda formation comprises mainly of calcarenties. In the vicinity of the well GG1 the Lower Beda comprise mainly of argillaceous calcilutites and shale. The reservoir quality gradually improves from high risk to moderate risk towards KK1, LL1 and NN1 wells. The average gross thickness of Lower Beda Formation is about 300 ft. The net thickness varies from about 270 ft. in the E1-71 well to about 30 ft. in the vicinity of GG1-71 well. The net thickest of Lower Beda form a NNW-SSW trend with an average of 250 ft. the change in facies is due to change in the depositional environment, from lagoonal to shoal barrier to open marine affected the reservoir quality. The Upper Cretaceous Sirte Shale is the main source rock. It is developed within the three troughs surrounding the study area. S-Marada Trough to the N- E, Gerad Trough to the N N-W, and Abu Tummym Sub-basin to the S-W of the Inferred Horst. Sirte shale reaches 1000ft, of organically rich section. It has good organic contents over large area 2% to 3%. Hydrocarbon shows were encountered in several wells in Beda Formation this is an indication of vertical and lateral migration of hydrocarbon. The overlying Upper Paleocene Khalifa Formation is a transgressive shale, it is an effective regional top seal. Lithofacies variations in Khalifa Shale, from shales to limestones in the southern shelf in R1-71 well approximately 50-75% of the secession is limestone. About 47 million barrel of hydrocarbon recoverable reserves is expected to be trapped in structural and stratigraphic traps in Beda Formation in the study area.

Keywords : Sirte basin, Beda formation, concession 71, petroleum play fairway analysis
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