5261 New Mishrif Reservoir Extensions to a Mature, Producing Offshore Field in Abu Dhabi

F.Al-Darmaki (ADNOC), T.Hussain (ADNOC), I.Azzam (ADNOC), M. Al-Zaabi (ADNOC), J.Witte (ADNOC), H. Al-Senani (ADNOC) & A. Taher (ADNOC)*

The Mishrif play is defined as Late Cretaceous, post-Nahr Umr reservoirs with hydrocarbons sourced from the Shilaif Formation. It is an oil play, except along the eastern margin near the Oman Mountains where the source rock is gas-mature. The Mishrif carbonates are generally thicker at the western margin of the basin (1400 ft) than at the eastern edge (800 ft). This suggests a strong asymmetry in the basin morphology, with a steep western margin and a low-gradient slope at the eastern margin, or erosion of the Mishrif at the eastern margin.

The Mishrif formation overlies the organic rich source rock of Shilaif and underlies the Tuwayil mixed deposits (clastics and carbonates) in the central part of Abu Dhabi. The Ruwaydha Formation overlies the Tuwayil and Mishrif Formations in central and western Abu Dhabi. The Tuwayil and Ruwaydha Formations are missing in the eastern part of Abu Dhabi and Dubai due to non deposition or erosion. The Mishrif is an excellent hydrocarbon reservoir and host to a few giant oil fields for example our interested area.

The Offshore field was discovered in 1969. It is located approximately 25 km north-west of Abu Dhabi. The water depth in this area is relatively shallow; varying from 30 to 70 ft. The field consists of two separate culminations, the Northern and Southern Culmination and the total reservoir area is approximately 150 sq km. The producing reservoir is the Mishrif Formation which is developed as reefal limestones. Whereas the main recovery driving mechanism in the Northern Area is active water drive, a weaker aquifer is experienced in the southern area.

There is no clear boundary separating Northern and Southern Culminations, however, there is approximately 500 psi difference in pressure between the two culminations.

Based on a new 3D seismic acquired over this mature offshore field, a new Mishrif extension was identified, called the SE Mishrif Prospect. It is an extension of the Southern Culmination of the main field. The current 3D seismic interpretation indicates that the thickness of the Mishrif interval in the SE Mishrif Prospect is similar to the thickness seen in the main field. This increased thickness is related to Rudist mounds that originated on paleo-structural highs. Wells A and B penetrated an oil bearing interval on the flank of the Southern Culmination in a depth range similar to the depth range represented in the SE Prospect. The evaluation confirmed the presence of a valid prospect and justified the drilling of a well to better define the hydrocarbon resources.