

# **Roles of Migrated hydrocarbon in Improving Unconventional Resources Productivity, case Histories from Abu Dhabi Basin**

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## **Abstract**

The source rock horizons can contain, under certain conditions, a significant volume of migrated hydrocarbon. This potentiality can be found in areas that have no separation between the hydrocarbon carrier beds below and the source rock layers above.

The data used in this evaluation includes petrophysical assessment, source rock data screening, reviewing of maturation and migration direction modeling, in addition to the reservoir properties and seals integrity. In Abu Dhabi, migrated oil was found in the Cenomanian, Shilaf source rock of west onshore Abu Dhabi and in the Aptian Shuaiba basinal facies of east and central Abu Dhabi basin.

The Cenomanian Shilaif source rock is generally immature to early mature over most of Abu Dhabi. The relatively mature Shilaif kitchens are found in the deeper part of the basin, especially at the Ghurab syncline of southwest onshore area with maturity values that can reach up to 1.3 Vitrinite Reflectance (VR). The significant Shilaif generated oil was not migrated into the surrounding structures due to the absence of carrier bed directly over the Ghurab kitchen. The Shilaif highly pressurized generated oil was forced to migrate downward into the Mauddud thin corridor, which acts as an alternative carrier bed. No effective top seal is separating Mauddud formation from Lower Shilaif source rock. This allowed the highly pressurized Mauddud oil to migrate vertically and fill the space between the grains of Lower Shilaf section over most of west onshore areas.

The Aptian Shuaiba basinal facies source rock is mainly mature in the eastern part of Abu Dhabi and Falaha syncline. The Shuaiba generated oil will migrate downward into the Shuaiba-1 (Zone-A) reservoir, which acts as a carrier bed for the oil generated from the Shuaiba and other source rocks in east onshore Abu Dhabi. The Migrated oil into the Shuaiba basinal facies can be found in all fields that were tested oil in Zone-A. In addition, it can be found in the subtler traps that are located along the Upper Thamama migration pathways, which extends from the foreland basin at Al Ain area and continue all the way until the Abu Dhabi central ridge.

The recent unconventional exploration drilling activities has confirmed the presence of high oil productivity from the Lower Shilaif at Ghurab kitchen and adjacent areas. This confirms that the migrated oil into the unconventional areas will play important role in the future unconventional exploration activities.