

Upside Hydrocarbon Potential of Ratawi Limestone Reservoir, Umm Gudair Field, Kuwait

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¹KOC

Abstract

The Ratawi Formation of the Umm Gudair field of Kuwait belongs to the Early Cretaceous Thamama Group and is divided into two members Ratawi Limestone and Ratawi Shale respectively. The lower Ratawi limestone is a typical combination type carbonate reservoir developed on the Eastern flank of Umm Gudair structure. Out of its three stratigraphic zones (A, B and C), the middle one or zone B is the main reservoir with an average thickness of 50'.

The Ratawi limestone is typically a low permeability reservoir (less than 1 mD on an average with a maximum of 40 mD). Reservoir rocks are mostly peloidal wackestone and packstone deposited within a shallow inner to mid ramp environment. Most of its primary porosity has been occluded due to mechanical compaction and cementation during shallow burial itself. Deep burial diagenesis magnifies the level of mechanical compaction as evidenced by abundant solution seams. However, it has also played an important role in the mesogenetic porosity enhancement. Secondary solution pores developed during this phase are partially filled by cements derived from grain dissolution during simultaneous compaction.

Poor connectivity of pores is the main challenge in reservoir characterization and modelling. It is also the main cause for poor well performance and faster pressure depletion during production. Seven wells are producing from this reservoir with a range of liquid rate between 300-500 blpd.

Substantial upside in oil volume is expected from this reservoir due to the stratigraphic extension of good reservoir facies downdip. According to seismic inversion volume, good porosity pods are developed further east beyond the limit of oil down to established from already drilled wells. Additional prospect is also identified in the lower C zone with improved petrophysical interpretation which will be a good target for oil volume accretion in the majestic Umm Gudair structure of Kuwait.