

## **Depositional Architecture of Tight Gas Reservoirs in Delta System: Example from the Ordovician Barik Formation, Central Oman**

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### **ABSTRACT**

The sandstone intervals of Barik Formation are considered as large tight gas reservoir in Oman. The sandstone-body geometry and distribution are still poorly understood due to variations in lateral continuity and lithofacies heterogeneity. This study aims to describe the Barik Formation in Huqf area with special emphasis on depositional architecture and stratigraphic contacts. The detailed field based study of well-exposed Barik Formation in the Huqf area revealed that the lower contact is conformable with Al-Bashair Formation, but direct upper contact is not exposed in Huqf area. The contact with Al-Bashair Formation is marked by the presence of up to 1 m thick fluvial sandstones on the top of exposed Al-Bashair Formation. Four facies association have been recognized in Barik Formation, related to following depositional environments: (i) delta front, including lenticular bedded fine-grained sandstone and siltstone with wave ripples and load casts and red/green mudstone, bioturbation by Diplocretarion, Skolithos, Chondrites, Trilobites, (ii) distributary mouth bar, including amalgamated sheet-like sandstone bodies wedging out laterally, formed by horizontally parallel laminated white and grey fine-grained sandstone with current ripples and mud drapes, (iii) lateral and vertical accretions of distributary channels, including amalgamated lateral extension of channelized bodies including trough cross-bedded and planar cross-bedded white (fresh surface) and brownish-grey (weathered surface) fine-grained sandstone with erosive lower contact, mud-rip-up clasts at the base and convolute structures, (iv) flood plain, which is characterized by the presence of wavy bedded sandstone with current and wave ripples interbedded with bioturbated mudstone and rare peaty mudstone. Accordingly, the suggested depositional environment interpretation of Barik Formation is tidal-influenced delta system, altering from coarsening-upward delta front, distributary mouth bar, lateral and vertical accretions of distributary channels and flood plain environments.