

## **Sequence Stratigraphy, and Hydrocarbon Potential of the Upper Shuaiba Formation, Giant Carbonate Field, Abu Dhabi, UAE**

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### **ABSTRACT**

The stratigraphic framework in Giant Field has been correlated regionally and placed in the context of the sequence stratigraphy framework for the Bab intra-shelf basin that has been established during the Aptian time. This implementation demonstrates that the strata of the Upper Shuaiba Formation (Th. IB & Th. IC Reservoirs) are the basinal equivalents of a set of clinoform packages that prograded to the west-southwest into the Giant Field area. The Th.IC Reservoir is the youngest of these clinoforms; and the remnants of the Bab intra-shelf basin were filled by the overlying Nahr Umr Shale. The underlying Th.IB. was deposited at a distance from the basin margin and is a tabular unit with more uniform reservoir properties ( $\phi$  and K) than the potential reservoirs in the Th.IC. Both Th. IB and Th. IC are subdivided into three sub-reservoirs named from base to top Lower, Middle and Upper; while Th. IC Upper and Th. IB Middle sub-reservoirs have been further divided into three units.

A comprehensive core and thin section descriptions have been carried out from 16 wells to enable discrimination of depositional environments and construction of a depositional model. This data was developed into a depositional model based on sequence stratigraphic principles; and the layer tops were tied to well logs and correlated throughout the field in approximately 170 wells, thereby constructing a three-dimensional stratigraphic framework. The depositional model and the three-dimensional stratigraphic framework show that most of the Th.IC Lower Unit lies outside the field limits and below the OWC. Reservoir properties from conventional core analysis and values calculated from logs have been estimated and distributed within property maps for the potential reservoirs Th.IC Upper, Th.IC Middle, and Th. IB Middle.

The prospective areas for each sub-reservoir were identified based on the Hydrocarbon Pore Volume (HCPV) maps. Ranking of these prospects was based on the following factors: credible well test results, HCPV maps and reservoir characteristics. Prospect P1 (Th.IC Middle) is ranked highest due to two credible well tests and better depositional textures. P1 (Th.IC Upper) is ranked second due to depositional textures and high OIIP values. These are followed by prospects P2 (Th.IC Upper) and P3 (Th.IC Upper). The prospects for Th.IB Middle are ranked lowest due to lack of credible well test results and the poor depositional textures.