P10

Sequence Stratigraphy and Sedimentology of the Upper Jurassic Arab and Hith Formations, Abu Dhabi, United Arab Emirates

A. Al-Mansoori* (Abu Dhabi Company for Onshore Oil Operations) & C. J. Strohmenger (ExxonMobil Research Qatar)

For abstract, PTO
No full paper available

15171 Sequence stratigraphy and sedimentology of the Upper Jurassic Arab and Hith formations, Abu Dhabi, United Arab Emirates

Abdulla Al-Mansoori (Abu Dhabi Company for Onshore Oil Operations <amansoori@adco.ae>) and Christian J. Strohmenger (ExxonMobil Research Qatar <christian.j.strohmenger@exxonmobil.com>)

The Kimmeridgian–Tithonian Arab and Hith formations are part of the highstand sequence set of a second-order supersequence, built by five third-order composite sequences: (1) J70 Sequence, Jubaila/Arab-D; (2) J80 Sequence, Arab-C; (3) J90 Sequence, Arab-B; (4) J100 Sequence, Arab-A/Lower Asab Oolite; and (5) J105 Sequence, Upper Asab Oolite/Hith), bounded on top by sequence boundary J110_SB. The J70 to J105 sequences belong to the highstand sequence set of the Upper Jurassic second-order supersequence and show progradation of the facies belts towards the east. Through time, the lagoon behind the barrier bar complex became increasingly evaporitic being dominated by salina-type deposits during Hith deposition (J105 Sequence).

The overall depositional environment envisaged for the Arab Formation is that of a barrier-shoal complex with open-marine, offshore sedimentation to the east and a protected, evaporitic, platform interior (lagoon) to the west. A barrier-shoal complex was developed along the platform margin and deposition was dominated by oolitic grainstones. Concomitant deposition of sabkha, tidal-flat, salina, and lagoonal sediments occurred westwards, and open-marine mudstones and wackestones were deposited eastwards of the barrier-shoal complex.

Reservoir quality is strongly controlled by the depositional environment and the lithofacies types. The best reservoir is present within grain-dominated lithofacies types of the barrier shoal complex. Relatively poor reservoir quality is characteristic of mud-dominated lithofacies types that occur in open-marine environments. In the platform interior, the dominantly dolomitized lithofacies types show quite good reservoir qualities within thin intercalated packstone to grainstone layers, interpreted as tidal-channel or washover deposits. During Hith time, the restriction of the platform interior increased, and predominantly salina-type, anhydrite-after-gypsum was deposited.

The focus of this study is on the depositional environment of the anhydrite sediments, as it is important to distinguish between salina-type (saltern) and sabkha-type evaporites. In contrast to sabkha-type deposits, where evaporites form within the host rock (sediment-dominated: late highstand and lowstand systems tracts), salina-type deposits represent subaqueous evaporite precipitations (evaporite-dominated: late lowstand and transgressive systems tracts deposits). Distinguishing between the different anhydrite depositional environments is crucial for the correct sequence-stratigraphic interpretation of the Arab and Hith carbonate-evaporite successions.