Facies Architecture, Palaeoenvironment and Reservoir Quality of the Mid-Cretaceous Wara Member, Northern Offshore Arabian Gulf

Homoud AlAnzi[1]

[1]Saudi Aramco, Dhahran, SAUDI ARABIA

ABSTRACT

The Mid-Cretaceous Wara Member of the Wasia Formation in the northern Arabian Gulf is composed of fluvio-deltaic to shallow-marine deposits. The aim of this study was, within a sequence stratigraphic framework, to characterize the facies and their distribution in terms of potential reservoir sands using core and wireline log correlations. Detailed core description, well log interpretation and correlation, sequence stratigraphy and palaeoenvironment mapping were integrated to gain a more comprehensive understanding of the potential reservoir qualities and depositional geometries. Seven high frequency chronostratigraphic units are identified. They are composed of up to six depositional facies associations: fluvial and distributary channels, shoreline and lower shoreface sand, coastal plain heterolithics, estuarine-lagoonal deposits, shelfal marine deposits, and prodelta-offshore marine shales.

Lowstand to early-transgressive systems tract, fluvial and distributary channel sands are considered to be potentially the best candidate reservoir units, because of the relatively high proportion of medium-grained sand with low diagenetic overprinting. Early transgressive systems tract units of shoreline sands, coastal plain heterolithics and estuarine-lagoonal deposits, are considered to be potential secondary candidates because of more pervasive diagenetic affects and their finer-grained character. Through the study, a WNW to ESE sand input direction has also been identified and the shoreline projection improved.