

Regional Sequence Stratigraphic Framework; Mauddud Formation, Kuwait

Abdulkader H. Youssef¹, Adel N. Al-Saeedi¹, Hamad A. Al-Haggan¹

¹EXPLORATION, KOC, Ahmadi, KUWAIT

ABSTRACT

The investigation of biostratigraphy and sedimentology of 600 core chips have been integrated with wire-line logs from 19 wells to establish a biostratigraphic constrained depositional sequence stratigraphic framework for the Late Albian, Mauddud Formation. Two major regional depositional sequences have been recognized.

Mauddud clastic sequence MaS100, at lower part and subdivided into two 4th order sequences. It is thickest at south and approaches 150ft. A marine transgressive surface overlies the top Burgan SB, is indicated by common occurrence of marine microfossils. The MaS100_TST is composed of sandy, silty shale, while the condensed section (CS) is composed of calcareous shale. It is rich in foraminifera and ostracods at northern area. The MaS100_MFS is indicated by high GR, sonic, neutron and low density. It is evidenced by abundant foraminiferal planktonic species; *Heterohelix* spp and *Guembelitra cenomana*. The MaS100_HST is composed of bioclastic wackstone (WST), and changes into clastics towards the SW. The record of miliolids, high-spired *Trocholina* spp at late HST indicates lagoonal facies. The general paleoenvironment of this sequence is deep inner ramp at NE and shallow inner ramp, shore face towards the SW region. The sandstone reservoir is developed towards the SW, while the carbonate is developed towards the NE. Mauddud carbonate sequence MaS200, involves middle and upper section. It is thickest at north; 300ft. It is composed of thin CS and very thick agg/progradational HST. The MaS200_CS is composed of offshore marine shale and argillaceous mudstone and indicated by high GR, sonic and neutron with low density. The MaS200_MFS is identified within the CS. It is placed in the highly calcareous marine shale with abundant foraminifera, ostracods and nannofossil. The HST is thickest at NE and thins towards SW. Its carbonate facies changes laterally into clastic facies at SW. It is subdivided into six 4th order sequences characterized by thin TSTs and thick HSTs. Each sequence starts at base with MST/WST and changes upwards into porous, skeletal WST, skeletal peloidal grainstone and rudist GST and ends up with a minor lagoonal shale streak. The reservoir facies are diagenetically generated within HSTs and developed on the paleobathymetric highs. The Mauddud and Wara boundary is unconformable. A geological model has been constructed to show the lateral facies and thickness changes in both carbonate and clastic major sequences.