AAPG International Conference
Barcelona, Spain
September 21-24, 2003

Lawrence D. Meckel[1] (1) Shell Exploration & Production Co, New Orleans, LA

Fourth-Order Deepwater Genetic Stratigraphy, Stratigraphic Architecture, and Reservoir Stacking Patterns: Lessons from the Upper Miocene - Lower Pliocene Greater Mars - Ursa Intraslope Basin, Mississippi Canyon, Gulf of Mexico

The greater Mars-Ursa area is a highly prolific intra-slope salt-withdrawal basin located in the deepwater north-central Gulf of Mexico. STOIIP exceeds 4.2 BBOE and more than 500 MMBOE have been produced from stacked late Miocene - early Pliocene reservoirs. Understanding the fourth-order (ca. 0.5 Myr) stratigraphic architecture and stacking patterns of the reservoirs has improved reservoir development and management strategies and provided insights into the basin fill history, contributing to ongoing exploration successes in the area. The stratigraphy comprises recurring, compensationally-stacked couplets of thick, high net-to-gross, areally extensive fan lobes (sheet sands) overlain by thin, variable net-to-gross, laterally restricted channelized or amalgamated systems. The fan lobes are often the best reservoirs, with internally homogeneous reservoir properties and a high degree of correlatability between wells. Channel systems have internally heterogeneous reservoir properties, and a low degree of correlatability between wells. Condensed sections bound the couplets, and act as vertical baffles or seals. They occur in association with faunal abundance and diversity peaks and often correspond to abrupt changes in incremental overpressure. Subtle "transitional" surfaces divide the couplets internally. They record the onset of apparent paleo-bathymetric deepening, and document either intra-basinal avulsion or erosion and sediment bypass. High-frequency variations in accommodation and sediment supply control the fourth-order cycles. Eustatic sea level changes may have affected the supply of sediment from the shelf to the slope, but were not a primary factor in the formation of deepwater sequences or parasequence sets.