AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

Franz O. Meyer[1], G.W. Hughes[1] (1) Saudi Aramco, Dhahran, Saudi Arabia

Applied High Resolution Sequence Stratigraphy in Defining Khuff Reservoir Facies Partitioning, Uthmaniyah Area Ghawar Field, Saudi Arabia

The Khuff C and B reservoirs, of Upper Permian to Lower Triassic age, are composite sequences (CS) that display major depositional facies changes vertically and laterally on a kilometer scale in the Uthmaniyah area of Ghawar Field. A total of 3,200 feet of core, 5,914 core plugs, and 3,200 thin sections from 11 wells define the depositional model, internal facies architecture and chronostratigraphy on the basis of an Integrated sedimentologic, micropaleontologic, and petrophysical analysis. The Upper Permian Khuff C reservoir encompasses two composite sequences (CS). Skeletal-pelletoid-dominated grainstone cycles with tidal-flat cycle caps characterize the lower part of the TST. The overlying TST cycles below the maximum flooding surface (mfs) and HST cycles above it have unfilled accommodation space, and are characterized by thick skeletal grainstone deposits. A shift to mud-dominated restricted lagoon sedimentation starts half way through and gives way to tidal flat deposition in the upper third of the HST. The stratigraphically higher Khuff B reservoir includes Upper Permian and Lower Triassic CS. The Upper Permian CS is thin (17 feet) with erosional truncation down to skeletal-pelletoid-dominated grainstone cycles of the TST. The Lower Triassic CS has a retrogradational cycle stack below and strongly progradational cycle stack above the mfs. Major grainstone deposition and a turnaround in the facies and cycle stack takes place above the maximum flooding surface. An abrupt shift to restricted lagoon and tidal flat sedimentation occurs toward the upper part of the HST.