Traditional Geological Model, Humma Marrat Reservoir, Divided Zone Between Kuwait and Saudi Arabia

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Humma Marrat Field discovered in 1998 is located in south-western part of the Divided Zone between Kuwait and Saudi-Arabia. Six wells drilled on the long linear NNW-SSE trending doubly plunging anticline are producing more than 8000 bbls of 20^0 - 33^0 API BOPD from Jurassic carbonate reservoir. The study involves sequence stratigraphic interpretation, reservoir layering, petrophysical interpretation, 3D-Seismic interpretation, building a faulted fine grid static model and shares experiences in over coming data limitations.

High resolution sequence stratigraphic frame-work provides a good control for reservoir layering, environment of deposition & porosity distribution. The five informal reservoir units Marrat A, B, C, D and E are related to the sequence strtaigraphic frame work. Porosity development in Marrat-A & Marrat-E is controlled by Highstand (HST) and Late Highstand (LHST) higher energy carbonates deposited in a protected inner ramp environment and dolomitized inner ramp packstone/wackstone respectively. Marrat-C deposited in middle-outer ramp environment has chalky porosity and is minor contributor.

Faulted static fine grid model built in Gocad has 25 million cells and 681 layers. Data limitation is over come by biasing population of properties with regional depositional strike & depositional model understanding using SGS & SGS with collocated co-krigging. Pore-Perm transforms show a fairly good relationship. P10, P50 and P90 volume estimates are based upon OWC/LKO ranges. Study also contributes to the modeling practices in a difficult carbonate settings when well control is limited.