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(137-Oral) Seismically constrained integrated reservoir modeling of the Al Huwaisah field, North Oman

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The billion barrel STOIIP Al Huwaisah field is a large, low-relief, faulted dip closure with a thin oil column. It produces from the Aptian (Lower Cretaceous) Shu'aiba Formation, which consists of complex, rudist bearing, shelf margin deposits. Matrix heterogeneity is locally compounded by faulting and fracturing giving rise to highly variable production behavior. Integrated study of the field was driven by a need to understand and improve production performance and plan for future field development. The field is covered by 3-D seismic of 1990-2001 vintage. Volume interpretation and image processing techniques enable a new interpretation of key horizons and faults. A new structural framework, velocity model and depth model for the field have been developed. Seismic inversion was also used to constrain porosity modeling. Seismic facies, attribute analysis and inversion help to identify gross depositional environments (large channels, shoal, lagoon) and determine reservoir/non-reservoir. Faulting and fracturing have a major impact on fluid movement through the reservoir and are important for well targeting and completion. Seismic attributes were integrated with abundant well data (approximately 60 km Borehole Image log) to provide multiple fracture realizations for reservoir modeling. Integrated reservoir modeling allowed the historical performance of the field to be matched for the first time. A number of wells have been drilled to realize opportunities in newly mapped structural highs and reservoir sweet spots based on the current study. These were also picked to avoid seismic discontinuities. Successful wells show high production rates (increase in net oil of about 300 cubic meters/day) and have opened new areas of the field. All wells are now targeted with reference to seismic attribute volumes to minimize drilling losses and maximize production by avoiding potential water bearing features.