

Characterization of the Overburden: The Neglected Child

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ABSTRACT

Geomechanics analysis for carbonate fields has traditionally focused on compaction and subsidence with regards to reservoir pressure management, either production or injection. With field development plans of these large offshore carbonate reservoirs, challenges from overburden drilling are now at the forefront. Drilling challenges in the overburden formations are amplified when attempting to place highly deviated wellbores for extended reach wells in the reservoir. This is especially true in offshore Abu Dhabi where fluid losses are common in the shallow carbonate formations and borehole collapse is common in the deeper shale units. Repeated drilling difficulties and borehole instability issues have driven a re-examination of the shallower formations. Mitigation of both drilling losses and wellbore instability can be addressed through a combination of drilling practices, mud weight selection and trajectory optimization.

Characterization of the overburden into mechanical stratigraphic units was done through integration of acoustics, geochemical, image and standard Petrophysical logs and drilling data. Prior information available was limited to only mud logs, density and compressional sonic, using 1980's technology. Lithology varied from silica rich to mixed dolomite / limestone packages. Very little clay was found with the exception of Laffan and Nahr Umr shales. Natural fractures, often assumed responsible for drilling mud losses were sparse. High borehole acoustic attenuation intervals were identified, which correlated well with zones of high secondary porosity and connectedness, which are probable mud loss intervals. This is one of the first times that a complete overburden characterization analysis has been done to address drilling challenges in the UAE.