TG14

3-D Drilling Geomechanics for Drilling Optimization and Long Term Openhole Stability

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SUMMARY

3-D geomechanical model and coupled geomechanics modeling between geomechanical and reservoir simulators are required for investigating and quantifying the full 3-D nature of in-situ stresses, pore pressure and rock properties, and their spatial and temporal variations. Applications of such 3-D geomechanical model and coupled geomechanics modelling include challenging development and infill well drillings, reservoir compaction, overburden movement and fault re-activation which could impact long term openhole stability. The presentation will introduce novel mud weight cubes for analysis of multiple well trajectories and selection between alternative trajectories for a planned well. The mud weight cubes can also be used for field scale drilling optimization including identification of regions in the field which pose high drilling risks, planning of well locations, optimization of well trajectories etc. in field scale, taking wellbore stability into consideration. In addition, geomechanics of depletion, reservoir compaction, subsidence, fault re-activation and overburden movement as well as their effects/consequences on long term openhole stability will be described. Case studies utilizing 3-D drilling geomechanics and coupled reservoir geomechanics modeling, and applications of the technologies to drilling and long term openhole stability will also be presented and discussed.