TG18

3-D Coupled Reservoir Geomechanics for Optimal Hydraulic Fracture Design and Completion Integrity

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SUMMARY

Coupled geomechanical modeling capability has been developed specifically for investigating and quantifying the full 3-D nature of the in-situ stresses, pore pressure and rock properties, and their spatial and temporal variations throughout life of the field. This enables complex subsurface conditions and properties through the overburden and reservoir to be modeled and evaluated, and used in subsequent geomechanical analyses, hydraulic fracture design and completion integrity.

The presentation will introduce geomechanics of hydraulic fracture and a new workflow to simulate stress distributions in both well-centric and field scales. The stress distributions will help to understand hydraulic fracture behavior, design optimum hydraulic fracture job, both openhole and cased and perforated hole, and forecast the performance of the stimulated well. In addition, depletion, reservoir compaction, subsidence, fault re-activation and overburden movement as well as their effects/consequences on completion integrity will be described. Case studies on applications of the technologies to optimise hydraulic fracture design and completion integrity will be presented and discussed.