



Geomechanics for Secured Drilling Operation

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Abstract:

Drilling operations is one of the most costly events in oil and gas exploration and development. The capital investment needed throughout this process is very demanding and can quickly intensify if drilling problems occur during the operation. Wellbore collapse, stuck pipe or lost circulation are three key events to avoid while drilling as they can lead to lost time and unforeseen incurred costs. To reduce drilling problems and drilling operation costs, a geomechanics orientated workflow for a secure drilling process will be presented. This workflow includes: 1) basic mud weight window, which is generated from geomechanics study based on available data before drilling operation; 2) manage pressures through flow control for drilling operations according to the basic mud weight window, in which the bottomhole pressures are controlled with flow management between the wellbore collapse pressure and formation fracture pressure to reduce potential drilling problems; 3) formation in-situ geomechanical data collection during drilling process, in which in-situ formation properties are gathered, from both various logging while drilling (LWD) and testing during drilling operations, and in-situ formation geomechanical parameters are analyzed based on the collected in-situ formation data; 4) update mud weight window, in which the basic mud weight window generated from pre-drilling data is updated according to the constrained in-situ geomechanical parameters; 5) this updated mud weight window is then used for managed pressure drilling (MPD) to prevent drilling operations from drilling problems of wellbore collapse, pipe-stuck, and lost-circulation, which can result in considerable costs.