



Stability Analysis of a Horizontal Gas Well in a Strike-Slip Fault Regime

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Abstract:

Fault regimes have significant effects on oil and gas wells' stability. Although vertical wells have different geo-mechanical behaviors, horizontal wells have more critical conditions when they will be encountered with fault regimes changes. In this case, a horizontal gas well in a specific depth in the South Pars gas field is considered in the strike-slip fault regime with the poroelastic state of the rock mass and anisotropic horizontal stresses which is analyzed with the Finite Element Method by the ABAQUS software. This analysis is processed statically in a certain time period (the total time of geo-static and drilling steps). The well pressure has increased continuously from the formation pore pressure (lower limit of allowable mud pressure window) to fracture pressure limit (tensile failure limit) in the second step of the analysis. The mud pressure optimization has been done based on the stress and plastic strain reduction at the borehole wall. The results showed that, the borehole stability will not be satisfied by the lower limit of well pressure window (formation pressure) or its upper limit and the optimum mud pressure in horizontal gas wells is a little higher than the minimum level of well pressure.

Keyword: Fault regimes, horizontal gas well, pressure optimization, ABAQUS program, stability analysis