عنوان مقاله:

Developing a Novel Temperature Model in Gas Lifted Wells to Enhance the Gas Lift Design

محل انتشار:

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خلاصه مقاله:

In the continuous gas lift operation, compressed gas is injected into the lower section of tubing through annulus. The produced liquid flow rate is a function of gas injection rate and injection depth. All the equations to determine depth of injection assumes constant density for gas based on an average temperature of surface and bottomhole that decreases the accuracy of gas lift design. Also gas-lift valve design requires exact temperature at each valve depth. Hence, enhanced gas lift design can be achieved by more accurate prediction of temperature profile in annulus and tubing. Existing temperature models for gas lifted wells have been roughly and inaccurately estimated for they ignore temperature variation due to phase changes as well as cooling the effect of injected gas inflow to the wellbore. Also, they find temperature profile from a known injection depth obtained from unreal previous assumptions. In this paper a novel model is developed to obtain the temperature profile in annulus and tubing of gas lifted well and injection depth simultaneously. This new model considers all the real conditions such as heat transfer between triple systems of liquid slug, injected gas and formation, cooling effect of gas inflow, joule-Thomson effect, potential energy, and phase changes in both conduits. The model was applied on Iran's Aghajary oil field wells. Results showed how ignoring temperature variations caused substantial errors in gas lift design. From our experience and according to results of this simulator, it can be concluded that the calculated injection depth from classic method and developed model had a difference between ۲۰۰ and ۴۰۰m for Aghajary field wells, as the total depth varied from ۳۰۰۰ to ۴۲۰۰m. The comparison made between temperature profile resulted from developed simulator and previous temperature models .using temperature survey data of Aghajary wells showed much better matching for developed simulator

کلمات کلیدی:

Gas Lift Design, Joule-Thomson Effect, Temperature Profile, Pressure Profile, Joule, Thomson Effect, Modeling