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عنوان مقاله:

IN-SITU STRESS DETERMINATION USING HTPF METHOD IN INCLINED WELLBORES

محل انتشار:

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خلاصه مقاله:

Hydraulic fracturing (HF) is routinely performed in petroleum engineering to enhance the production of oil and gas from underground reservoirs. Hydro-fracturing consists in initiating, then propagating, a fracture from a wellbore using the pressure of a fluid as source of energy. Use of this technique in the petroleum industry began more than fifty years ago. In addition to the above, hydro-fracturing has been also used for in-situ stress determination. It has been successfully applied for measuring stresses at deep and very deep boreholes. These wellbores do not have to be assumed vertical and oriented perpendicular to principal in situ stress components. The Hydraulic Test on Pre-existing Fractures (HTPF) method, sometimes referred to as the Joint Jacking method, is a generalization of the classical hydraulic fracturing method. In practice a pre-existing natural fracture is isolated from the remaining part of the borehole with a straddle packer. Then, water injection tests (quasi-static reopening tests together with shut-in tests) are conducted in order to measure the normal stress incurred by the fracture. This research work presents a new method, based on precise principles of classic mechanics, for determining the in-situ rock stress field based on HTPF data. In-situ stress field can be obtained from a single data set which includes reopening pressure of natural fracture plane, shut-in pressure, wellbore inclination, fracture plane dip and trace angle by solving a system of equations in three variables (magnitude and orientation of maximum and minimum horizontal in-situ stress).This method was validated by solving a system of equations which was formed using a single data set. Due to complexity of calculations, computations were conducted by a Matlab program code.

کلمات کلیدی:

Hydraulic fracturing, HTPF method, Inclined wellbore, In-situ stress

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