ANALYSIS OF DYNAMICAL HEAT CONDUCTIVITY OF THE RESERVOIR AND FLUID EVACUATION ZONE ON THE GAS CONDENSATE WELL FLOW RATE

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The equation of the inflow of the gas condensate mixture from the production formation to the wellbore is recorded using the filtration coefficients A, B and constant C, which generally determine the volume of natural gas extraction for a certain period [1], after input by according to our offer K_{ng}:=(1-:-2), in SI unit

$$\left(\frac{P_{pl}}{10^6}\right)^{K_{ng}} - \left(\frac{P_{bh}}{10^6}\right)^{K_{ng}} = A \cdot \left(\frac{M_q \cdot 24 \cdot 360o}{\rho \cdot 100o}\right) + B \cdot \left(\frac{M_q \cdot 24 \cdot 360o}{\rho \cdot 100o}\right)^2 + C, \qquad (1)$$

Where: $$A = \frac{z \cdot \mu \cdot P_{at} \cdot T_{rav}}{\pi \cdot k \cdot h \cdot T_{at}} \cdot \left(\ln\left(\frac{R_k}{R_c}\right) + S_1\right);$$

$$B = \frac{z \cdot \beta \cdot P_{at}^2 \cdot T_{rav}}{2\pi^2 \cdot \sqrt{k} \cdot h^2 \cdot T_{at}^2 \cdot z_{st} \cdot R} \cdot \left(\ln\left(\frac{1}{R_c} - \frac{1}{R_k}\right) + S_2\right).$$

Comparison of the results of the heat flux values, using thermal conductivity [2], shows that the failure to take into account the influence of reservoir average pressures $P_{rav} = f(P_{pl}, P_{bh})$ and average temperatures $T_{rav} = f(T_{pl}, T_{bh})$ on the thermal conductivity of sedimentary rocks leads to an overestimation or undervaluation of the heat flow Q=f(ΔT_{he}) by

$$T_{pl} - T_{bh} = D_j\left(P_{rav}, T_{rav}, \Delta P\right) \cdot \left(P_{pl} - P_{bh}\right) + \Delta T_{he}\left(P_{rav}, T_{rav}, \Delta T\right). \qquad (2)$$

Light oil well extraction required less heat exchange surface, and guaranty a more intense heat transfer during production. An increase in the percentage of hydrocarbon condensates (in a gas-liquid mixture - well production) requires an even closer examination of the dynamical heat conductivity of the reservoir rock on the gas condensate flow rate.

References

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