

عنوان مقاله:

An Analytical method to Estimate the Temperature Variation in Drilling Formation Due to Drilling Fluid

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خلاصه مقاله:

Estimation of temperature variation in wellbore and its near region is important. It can be used to calculate the temperature drilling fluid. In gas condensate reservoirs, temperature and controlling it is critical. Wellbore stability in hydrate reservoirs is very challenging and has a direct relation with temperature of formations. In general, temperature variation induces some extra stresses in wellbore. These induced stresses should be studied carefully in order to have a safe and successful drilling operation. The reason of changes in temperature is difference in temperature of drilling fluid and formations. In this article, temperature variations in three cases are studied. Heat may be transferred from drilling fluid and formation using conduction, convection of both of this phenomena. In formations with high permeability, temperature variation in formation occurs mainly due to convection and the effect of conduction can be ignored and the result will be accurate. High permeable sand stones are grouped in this case. In formations such as most of the shales, heat is transferred only by conduction. As these formations have a very poor permeability, fluid cannot flow through them and no convection will occur. In formation of moderate permeability, both convection and conduction phenomena change the temperature of formation. At the first step, equations are driven, the equations are solved for each case analytically. As the solutions are in Laplacian's domain, Fourier's' algorithm is used to convert the results to time domain. At the end, the temperature variation of a real case is obtained using the proposed models

کلمات کلیدی:

Temperature, Formation, Analytical solution, Drilling, Conduction, Convection

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