NUMERICAL RESEARCH OF FORMATION OF GAS HYDRATES IN A POROUS MEDIA DUE TO INJECTION OF A GAS

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Topic: The process of gas hydrates formation in the saturated by gas and water porous reservoir of finite length when pumping cold gas (temperatures of this gas below than the initial temperature of the reservoir) is researched in this work.

Method of solution: For the numerical solution we used the method of catching the fronts in the grid point.

Results – features of the process of gas hydrate decomposition in the porous reservoir of finite length which initially saturated by gas and water.

Field of application of the results – technology for underground storage of hydrocarbon gas.

Conclusions: At the numerical research of pumping cold gas (temperatures of this gas below than the initial temperature of the reservoir) to a porous medium with gas and water established the possibility of implementing the regime, when there is a "stop" the front of hydrate formation. Calculations showed that the process of gas hydrate formation occurs in three stages. In the first (self-similar) stage, when the influence of the right border is not essential, in general, formed three zones, namely: near zone, where gas and hydrate are in the pores, an intermediate zone, which contains all three phases (gas, water, and hydrate) and the far zone containing gas and water. The intermediate zone, at the second stage, is degenerates into the frontal surface. The third and longest stage of the time is characterized by the formation of hydrate on the frontal surface only. Thus, over time the transition is occurs an extended region of gas hydrate formation in the frontal surface.

Keywords: gas hydrate, front of hydrate formation, method of catching the fronts in the grid point.