Mo P005

Computer Modelling of Non-isothermal, Multiphase and Multicomponent Flow by Using Combined EOR Technologies

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SUMMARY

Development of new highly efficient oil production technologies require a deep analysis of complex mechanisms in real reservoir processes. To improve existing methods of enhanced oil recovery (EOR), including chemical, microbial (MEOR) and thermal methods, it is necessary to study the processes that are accompanied by phase state change of reservoir fluids. In the development of oil and gas fields using various EOR methods occurs complex three-phase flow of multicomponent mixtures with intensive phase transformations. Using known simplified models, which are not takes into account the phase transitions, to describe such processes can lead to significant quantitative errors and qualitative distortion of real process nature in reservoir. Similar changes in reservoir flow can occur when using thermal methods.

This paper presents a numerical study of EOR methods by chemical (polymer or surfactant, polymer and surfactant) injection, MEOR and thermal methods, which considers, that flow is multiphase and fluids are multicomponent. Developed numerical algorithm to solve the problem using a fully implicit method. Considered different flooding system, different sequence of injection agents in combined flooding case and different temperature of injected water. Distributions of main technological parameters are obtained and efficiency of methods mentioned before is shown. The main results of numerical experiments are compared with calculations of reservoir simulator Eclipse 300 (PVTi).