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Numerical simulation on the mechanism of high-pressure air injection (HPAI) process in high water cut reservoirs

Hu Jia
Southwest Petroleum University, China

Abstract
In previous laboratory studies, we have shown that Keke Ya light oil reservoir (Tarim basin, China) has good potential to apply High-Pressure Air Injection (HPAI). However, it should be verified by reservoir simulation approach before pilot test in the oil field. In this paper, we give a comparison study to reveal the performance of HPAI when respectively applied in high water saturation reservoir. The STARS simulator (Computer Modeling Group, CMG) is employed for the HPAI simulations. Keke Ya reservoir petrophysical properties and geological conditions are used as research references for a case study. Simulation targets include the effects of air injection rate and interbedded anisotropic on formation temperature distribution, gas override, gas breakthrough time, and production performance. The obtained results of this study are very promising to broaden the application of HPAI in some complex reservoirs with high water cut and high heterogeneity.