

## **Optimization of Operational Parameters for Deep Displacement Involving Polymer Microspheres in Low Permeability Reservoirs of the Changqing Oilfield**

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### **ABSTRACT**

To enhance the application effect of deep displacement with polymer microspheres in low-permeability and heterogeneous reservoirs of the Changqing Oilfield, the lab tests for observing polymer microspheres of different sizes and simulating core flow have been performed on the bases of the pilot test, and optimized microsphere sizes in different stages with low, medium and high water cuts, respectively. The lab tests also determined the operation parameters and slug combinations for deep displacement by polymer microspheres in stages with various water cuts. The innovative technology has been deployed in 43 wells in Ansai, Xifeng, Jing'an, Jiyuan and other oilfields, with average natural productivity decline rates over 3.0 percentage point, average reduction of watercut increase rate of 2.2 percentage point, cumulative oil increment over 16 000 tons, cumulative water production drop of 21 400 m<sup>3</sup>. Indoor and field test showed that deep displacement with polymer microspheres had better adaptability to low permeability reservoirs in the Changqing Oilfield, it has effectively eliminated the problems, including water production in different directions, quick increases in water cuts, low productivity of single wells etc., in development of low permeability reservoirs in the Changqing Oilfield.