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Water-Controlled Fracturing with Fuzzy-Ball Fluid in Tight Gas Reservoirs of Deep Coal Measures in Sulige

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Abstract : The deep coal measure tight gas reservoir in Sulige is usually reformed by fracturing, because the reservoir thickness is small, the water layers can be easily communicated during fracturing, which will lead to water production of gas wells and lower production of gas wells. Therefore, it is necessary to control water during fracturing in deep coal measure tight gas reservoir. Using fuzzy-ball fluid to control water fracturing can not only increase the output but also reduce the water output. The fuzzy-ball fluid was prepared indoors to carry out evaluation experiments. The fuzzy ball fluid was mixed in equal volume with the pre-fluid and formation water to test its compatibility. The core displacement device was used to test the gas and water breaking through the matrix and fractured cores blocked by fuzzy-ball fluid. The breakthrough pressure of the plunger tests its water blocking performance. The experimental results show that there is no precipitation after the fuzzy-ball fluid is mixed with the pad fluid and the formation water, respectively. The breakthrough pressure gradients of gas and water after the fuzzy-ball fluid plugged the cracks were 0.02MPa/cm and 0.04MPa/cm, respectively, and the breakthrough pressure gradients of gas and water after the matrix was plugged were 0.03MPa/cm and 0.2MPa/cm, respectively, which meet the requirements of field operation. Two wells A and B in the Sulige Gas Field were used on site to implement water control fracturing. After the pre-fluid was injected into the two wells, 50m3 of fuzzy-ball fluid was pumped to plug the water. The construction went smoothly. After water control and fracturing, the average daily output in 161 days was increased by 13.71% and 6.99% compared with that of adjacent wells in the same layer. The adjacent wells were bubbled for 3 times and 63 times respectively, while there was no effusion in A and B construction wells. The results show that fuzzy-ball fluid is a water plugging material suitable for water control fracturing in tight gas wells, and its water control mechanism can also provide a new idea for the development of water control fracturing materials.

Keywords : coal seam, deep layer, fracking, fuzzy-ball fluid, reservoir reconstruction
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