

Practice and Understanding of Fracturing Renovation for Risk Exploration Wells in Xujiahe Formation Tight Sandstone Gas Reservoir

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Abstract : The tight sandstone gas reservoir in the Xujiahe Formation of the Sichuan Basin has huge reserves, but its utilization rate is low. Fracturing and stimulation are indispensable technologies to unlock their potential and achieve commercial exploitation. Slickwater is the most widely used fracturing fluid system in the fracturing and renovation of tight reservoirs. However, its viscosity is low, its sand-carrying performance is poor, and the risk of sand blockage is high. Increasing the sand carrying capacity by increasing the displacement will increase the frictional resistance of the pipe string, affecting the resistance reduction performance. The variable viscosity slickwater can flexibly switch between different viscosities in real-time online, effectively overcoming problems such as sand carrying and resistance reduction. Based on a self-developed indoor loop friction testing system, a visualization device for proppant transport, and a HAAKE MARS III rheometer, a comprehensive evaluation was conducted on the performance of variable viscosity slickwater, including resistance reduction, rheology, and sand carrying. The indoor experimental results show that: 1. by changing the concentration of drag-reducing agents, the viscosity of the slippery water can be changed between 2~30mPa. s; 2. the drag reduction rate of the variable viscosity slickwater is above 80%, and the shear rate will not reduce the drag reduction rate of the liquid; under indoor experimental conditions, 15mPa. s of variable viscosity and slickwater can basically achieve effective carrying and uniform placement of proppant. The layered fracturing effect of the JiangX well in the dense sandstone of the Xujiahe Formation shows that the drag reduction rate of the variable viscosity slickwater is 80.42%, and the daily production of the single layer after fracturing is over 50000 cubic meters. This study provides theoretical support and on-site experience for promoting the application of variable viscosity slickwater in tight sandstone gas reservoirs.

Keywords : slickwater, hydraulic fracturing, dynamic sand laying, drag reduction rate, rheological properties

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