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Fracture diagnostics of SRV by well testing and micro-seismic method in tight reservoirs, China

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The technology of Stimulated Reservoir Volume (SRV) has been the key technology for unconventional reservoir development, and it can enhance single well productivity and ultimate recovery. Most estimates of SRV are limited to drawing boxes around microseismic event maps, and adding up the 3D volume where microseismic events are observed. However, this method of calculating SRV may be not insufficient. There is lack of evaluation for the effective permeability, the fracture half-lenth, the effective stimulated reservoir volume. This paper will present a method to appraise and diagnostic the fracture parameters of SRV for tight oil reservoirs by well testing and micro-Seismic method. In this paper, based on rock mechanics and seepage mechanics theory, the influence factors of fracture geometry will be analyzed combing with the rock brittleness experiments and rock stress sensitivity experiments. Then complex fracture seepage physical models and mathematical models are built considering complex fracture and stress sensitivity characters. The numerical method will be applied to solve these mathematical models in order to attain the bottom hole pressure and flow calculation models. Finally on the basis of modern well test analysis method and micro seismic interpretation data, a fracture diagnostic method of complex fracture geometry and its parameters after SRV will be established. This method can monitor and evaluate the fracture geometry, the effective fracture parameters and the effective stimulated reservoir volume qualitatively and quantitatively. The method of this paper can not only be used to appraise the effect of SRV in tight oil reservoir, but also can be expanded to volume stimulation effect evaluation in other unconventional reservoirs, such as tight gas, shale gas and so on.

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