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## Production characteristics and productivity evaluation of horizontal wells in Sulige tight gas reservoir

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rorizontal well technology is an effective means to develop tight sandstone gas reservoirs. While horizontal wells development have achieved excellent performance in Sulige gas field, there exists practical problems including difficulty in production characteristics and productivity evaluation. For this, the gas field geology and horizontal well production characteristics were studied firstly. Then, the new method (productivity chart) was established to evaluate the absolute open flow rate of gas well. The time of horizontal well flow to achieve stationary was determined and the well-controlled reserves of the early horizontal wells were calculated by rate transient analysis. Finally, the relationships of reasonable production rate, absolute open flow rate and well-controlled reserves were analyzed. Results showed that initial production of horizontal well is much higher after fracturing, which mainly reflects the gas capacity of well nearby high permeable fractures. However, the subsequent production and pressure are continuously decreased with the extension of production time and generally there is no obvious stable production period. It takes 100 to 600 days for horizontal wells to enter the boundary controlled flow period due to poor properties and strong heterogeneity of Sulige tight gas field. Horizontal well production decline is depleted, early decline is dramatic and late decline is gradually slow. The relationship of reasonable horizontal well production and absolute open flow rate is power function. Reasonable production proration is gradually decreases with the increase of absolute open flow. The relationship of reasonable horizontal well production and well-controlled reserves is linear relation. This result is consistent with the actual production of data, which is benefit for production proration determination of fractured horizontal wells and production capacity building of tight gas reservoirs.



Fig: Cross-section profile showing the reservoir dual-texture characteristics in the pilot infill development block in Sulige gas field

### **Recent Publications**

- Qunming LIU, Haifa TANG and Zhikai LV, et al. (2017) Well deployment technique for composite subwater distributary 1. channel sand body reservoir architecture of Edong tight gas. Journal of China University of Mining & Technology; 855-876.
- 2. Bo LI, Ailin JIA, Dongbo HE and Zhikai LV, et al. (2015) Productivity evaluation of horizontal wells in Sulige tight gas reservoir with strong heterogeneity. Natural Gas Geoscience; 2325-2334.
- 3. Ailin Jia, Zhikai Lv. (2014) Dynamic Effect of Capillary Pressure in Tight Gas Reservoir. The Open Petroleum Engineering Journal: 71-79.
- Zhikai Lv, et al. (2014) The Effect of Gas Slippage on Laboratory Results and Gas Well Production. Theory and practice of 4. natural gas development Petroleum Industry Press: 200-206.
- Zhikai LV, et al (2013). Factors Affecting the Productivity of a Multi-fractured Horizontal Well. Petroleum Science and 5. Technology: 2325-2334.

### **Biography**

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Zhikai LV has her expertise in oil and gas production in evaluating gas well productivity. According to the one point method, his productivity chart was drawn. With horizontal wells test data, the chart can be used to estimate the absolute open flow rate of horizontal wells to obtain the reference index of reasonable gas production rate quickly and intuitively. Through the analysis of the actual production data of 63 wells which product 3 years, the relationship between the average daily production and absolute open flow rate was regressed. So the initial production rate equation is obtained to determine initial production. The results show that the productivity chart can be used to estimate the absolute open flow rate of horizontal wells to obtain the reference index of reasonable gas production rate guickly and intuitively for Sulige gas field and error range is within 10%.