

**Well pattern infilling adjustment method to enhance recovery rate in tight gas reservoir**

Ning Bo, Jia Ailin, Guo Zhi, Fu Ninghai and Cheng Minhua

Research Institute of Petroleum Exploration and Development, Beijing, P R China

While in the exploitation process, because of its extremely low permeability and limited discharge area, the control of basic well pattern on the reserves is far from enough. How to infill well pattern reasonably to use the reservoir effectively with both high production and economic benefit is the problem urgently needs to be solved in the development process of tight gas reservoir. There are two problems in the process of well spacing density adjustment. First, how to develop the block reserves effectively on the whole by well pattern adjustment? Due to the dramatic change of sand body scale (100~600 meters in width and 300~900 meters in length) and extremely good liquidity of gas, interwell production interference occurs almost inevitably. The second problem is how to evaluate well interference effects on production. For the first question, it is found that the reserves abundance, reservoir thickness, gas saturation are the three major parameters affecting production capacity, which is the key foundation of reservoir classification. The reservoirs can be divided into five categories based on the fine reservoir description result. Then, the first four kinds of reservoirs with commercial value are studied in well spacing density adjustment according to various seepage and production characteristics of each type. For the second question, the optimal well spacing density of each type of reservoir was determined. Interwell interference occurs when well spacing density is above 2 wells per square kilometers, but the gas well interference is not a bad thing totally. Balancing production interference and development cost, with the aim of enhancing recovery rate, the various well pattern of different reservoir types were determined based on the two principals that the economic benefit of whole wells are above industry internal return rate and the single well with lowest production is worth its cost. The result provides a theoretical basis for well pattern infilling adjustment, also is of some practical guidance significance to well pattern infilling adjustment in Sulige tight sandstone gas field, China's biggest gas field.

ningbo07@petrochina.com.cn