开发工程

川中地区上三叠统须家河组气藏开发有利区评价与优选技术

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摘要：

四川盆地中部上三叠统须家河组气藏储层致密、高含水、非均质性强、连续性差，气井自然产能低、控制范围小、普遍产水，规模效益开发面临诸多认识难题和技术障碍。为此，建立以"两步法"储层对比技术、多级相控建模技术为主的致密砂岩储层描述技术，解决了"砂包砂"致密储层精细对比与预测技术难题；基于微观孔喉结构与渗流机理实验，将气藏可动水划分为不同于常规气藏边、底水的小孔喉可动水、局部滞留水和高含水层3种气水赋存模式，采用物性和毛细管力约束建立了气藏流体分布模型，形成气水交织非常规气藏可动水描述技术，基本解决了气水交织非常规气藏气水赋存模式与流体建模技术难题；结合气藏动静态特征和效益评价参数，选择有效储层厚度、储量丰度、有效地层系数等参数，建立了储层分级分类评价标准，并在此基础上筛选出气藏开发有利区，解决了致密高含水气藏开发部署和储量有效动用的地质目标选择难题，奠定了该类气藏规模效益开发的基础。

关键词： 四川盆地中部　晚三叠世　气藏　低渗透率　高含水　开发有利区　评价　优选

Assessment and optimization of the gas play fairways in the upper Triassic Xujiahe Formation of the Central Sichuan Basin

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Abstract:

The gas reservoir at the upper Triassic Xujiahe formation in the central Sichuan Basin is with very complex characteristics, such as tight sandstones, high water cut, severe non homogeneous porous medium, poor continuity, low deliverability, small control area, and widespread produced water, which makes its development significantly difficult. In view of this, a technology of tight sand gas reservoir description is developed mainly on the basis of "two step approach" reservoir correlation and multiple facies controlled modeling, which overcomes the difficulty in "sand in sand" tight reservoir correlation and prediction. Moreover, based on microscopic pore structures and flow mechanism, movable water is classified by three kinds of occurrence models, including little pore throat movable water different from the traditional edge water or bottom water, local resident water, and high aquifer formation. According to the petrophysical properties and capillary force, the distribution model of fluid flows in the gas reservoir is established, from which the movable water description technique of gas water intersection is thus developed for unconventional gas reservoirs. This can basically solve the bottlenecking problem in the modeling for such type of gas reservoirs. Combined with the dynamic and static characteristics of the gas reservoir and evaluation factor on the benefit, effective thickness, reserves abundance, and formation conductivity are selected to form the evaluation rules on classification and categorization of different level gas reservoirs. Based on the above, favorable exploration zones are chosen, which not only solves the problem of how to make good development schemes and find the target zones for achieving more producing reserves in high water cut tight gas reservoirs, but lays a foundation for the beneficial development of similar gas reservoirs.

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