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鱼骨状分支水平井气水两相产能分析

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Analysis of Productivity of Horizontal Well Pattern with Herringbone-like Laterals While Producing Water

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PDF (PC)

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摘要/Abstract

摘要 :

鱼骨状分支水平井具有与储层接触面积大, 气井产能高的特点, 但在气藏开发后期由于气井见水使得产量急剧降低, 准确预测气水同产鱼骨状分支水平井产量至关重要。基于气水两相渗流规律, 考虑启动压力梯度、应力敏感、分支井与主井眼夹角、滑脱效应、近井地带的高速非达西和表皮效应对产能的影响, 利用保角变换和等值渗流阻力法, 得到了气水同产鱼骨状分支水平井的产能公式。实例分析表明随着分支井与主井眼夹角增大、分支井数目增加, 气井产能增大。随着启动压力梯度、应力敏感系数、水气质量比的增加气井产能降低。研究为气水同产鱼骨状分支水平井产能预测提供了一种新的思路。

**关键词:** 鱼骨状分支水平井, 气水两相流动, 保角变换, 滑脱效应, 应力敏感, 高速非达西

Abstract:

Fishbone shaped multilateral wells have such advantages as large contact area with productive formation and high production. In the lateral period of gas reservoir exploitation, the flow resistance may increase sharply due to water production, so precise prediction of the productivity of wells will be essential. Based on the rule of two-phase flow of gas and water, considering the threshold pressure gradient, stress sensitivity, angle between branch and the main wellbore, slippage effect, the influence of the high speed non-Darcy effect, and skin factor, using conformal mapping and law of equivalence percolation resistance, the formula for calculating productivity of a fishbone multilateral wells has been derived. Through case study, with the increase of angle between branch and the main wellbore, the number of branches, the production will increase. With the increase of the threshold pressure gradient, the factor of stress sensitivity, and WGR, the production will decrease. This study provides a certain extent for predicting the productivity of fishbone shaped multilateral wells while producing water.

**Key words:** Fishbone shaped multilateral wells, Two-phase flow of gas and water, Conformal mapping, Slippage effect, stress sensitivity, High speed non-Darcy effect

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