Water Intrusion Characterization in Naturally Fractured Gas Reservoir Based on Spatial DFN Connectivity Analysis

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Abstract

The non-intrusive EDFM (embedded discrete fracture model) in combination with Oda method are employed to characterize natural fracture networks. Initially, full field model, and the pressure and water breakthrough of all the producing wells were matched to evaluate production forecasts. As presented, wellbore connectivity to the fracture network has a considerable effect on characterizing the water intrusion in fractured gas reservoir. Also, dominant water flow paths within the fracture network aid to understand and predict the water intrusion phenomena. Therefore, fracture clustering as shortest paths from the water contacts to the wellbore endorses the results of the numerical simulation. Finally, matching the breakthrough time depends on merging responses from multiple dominant water flow paths within the distributions of fracture network. This study is crucial to field modeling and the decision-making process of wells operation by anticipating water intrusion behavior through probable flow paths within the fracture networks.

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