

عنوان مقاله:

Foam Application in Fractured Carbonate Reservoirs: A Simulation Study

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خلاصه مقاله:

Fractured carbonate reservoirs account for 25% of world's total oil resources and for 90% of Iranian oil reserves. Since calcite and dolomite minerals are oil wet, gas oil gravity drainage (GOGD) is known as the most influencing production mechanism. The most important issue within gas injection into fractured media is the channeling problem which makes the efficiency of gas injection process extremely low. As a solution, foam is used to change the mobility ratio, to increase volumetric sweep efficiency, and to overcome the fingering problem. In this work, we inspected three main influencing mechanisms that affect oil extraction from matrix, namely foam/oil gravity drainage, viscous pressure drop due to foam flow in fractures, and foaming agent diffusion from fractures into the matrixes. Foam injection simulations were performed using CMG STARS 2015, on a single matrix unit model and on some vertical cross section models. A number of sensitivity analyses were performed on foam strength, injection rate, fracture and matrix properties, matrix heights, and the initial oil saturation within matrixes. The results show that the roles of the mass transfer of the foaming agent and viscous pressure drop are significant, especially when matrix average heights are small. Moreover, the mechanism for viscous pressure drop remains unchanged, which continues to aid oil extraction from matrixes while the other two mechanisms weaken with time.

کلمات کلیدی:

Foam, Fractured Reservoir, Gravity Drainage, Gas Invaded Zone, CMG STARS

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