Predicting Fluid-Flow in Naturally Fractured Reservoirs

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Predicting the flow of fractured reservoir fluids is a key factor in making the right field development decision, such as the placement of future wells. In any field, accurate flow models are difficult to achieve simply because of the scarcity of data from existing wells and outcrops. In fractured reservoirs, the problems are compounded by the highly heterogeneous nature of the rocks. So, predicting fluid flow behavior in naturally fractured reservoirs is a challenging area in petroleum engineering. Successful extraction of hydrocarbons from many remaining domestic exploration and development targets depends on the creation of new approaches to predicting natural fracture attributes. So, we must develop new understanding and new technology for prediction of fracture-pattern attributes related to subsurface fluid flow. In recent years interest has increased considerably on flow and transport in low-permeability fractured rock. Two classes of models used to describe flow and transport phenomena in fracture reservoirs are discrete and continuum (i.e. dual porosity) models. The discrete model is appealing from a modeling point of view, but the huge computational demand and burden in porting the fractures into the computational grid are its shortcomings. On the other hand, the diagonal representation of permeability, which is customarily used in a dual porosity model, is valid only for the cases where fractures are parallel to one of the principal axes. This assumption cannot adequately describe flow characteristics where there is variation in fracture spacing, length, and orientation.