Identification and Characterization of Producing Fractures in Naturally Fractured Reservoirs Using PIWD

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ABSTRACT

Early recognition of a fractured reservoir and an estimation of its rock characteristics, such as porosity and permeability, will influence the location and number of subsequent development wells and, therefore, is of major economic significance on the future development of the field.

Underbalanced drilling provides an unprecedented opportunity to examine a reservoir as it is being drilled. With proper data acquisition and engineering interpretation, underbalanced drilling allows us to measure and calculate the Productivity Index while Drilling – PIWD. This data helps us locate and identify geologic anomalies such as fractures, tight zones, pinch outs, discontinuities, and water zones. A better understanding of the fracture networks and their impact on the production is critical to optimize infill drilling and produce the remaining reserves in any reservoir. Also, PIWD graph is a good indicator of reservoir productivity characterization. The real time data obtained using this graph can clearly show what kind of reservoir is being drilled and what kind of production can be expected.

This paper reviews and analyzes oil production while Underbalanced Drilling of two wells in Hassi Messaoud field, Algeria. The interpretation of PIWD graphs demonstrates the existence of producing fractures. The results were confirmed during the Build-up test interpretation. Also, the image logs were correlated with production data to make sure they are in agreement. Every point on the image logs where signs of fractures were observed were studied and compared to the PIWD profile to establish a correlation type. This review is an attempt to examine the ability to predict the presence of fractures in future UBD wells in Hassi Messaoud field based on the production while drilling profile where image logs can not be run.