Fractures Characterization of Najmah-Sargelu Tmight Carbonate Reservoirs Using Geoechanical Attribute in Minagish Field, Kuwait

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ABSTRACT

The Minagish field is located in the Southern part of Kuwait with a complex structure that includes two culminations separated by gentle synclinal low. The Eastern flank is N-S trending while the Western flank is WNW-ESE trending structure. The area is divided into two compartments (northern & southern) by a major E-W trending transverse fault. Najmah Formation has been informally subdivided into three main members Upper, Middle, and Lower, while Sargelu is divided into two sub-units. These formations constitutes tight organic rich carbonate rocks mainly limestones interbedded with thin shaly units. Majority of oil production is from Upper Sargelu reservoir & tight Upper Najmah limestone reservoir It is commonly admitted that fracture can have a drastic impact on fluid flow within fractured reservoir. In the case of Minagish Najmah/Sargelu tight carbonates, the porosity and permeability of the reservoir in mainly provided by fractures. Among different challenges encountered in fractured reservoirs, the spatial repartition of the fracture network is a key parameter to assess. This paper demonstrates the added value of combining structural & geomechanical attributes in assessing the spatial repartition of tectonic fractures within the full Najmah/Sargelu reservoir volume by integrating 1)the stratigraphic column, 2) the fault throws and 3) the UVT transform. The UVT transform technology gives access to the total strain tensor in each cell of the geologic grid which results from all the deformations effecting the field and that is the key information in view of tectonic fracture characterization. Ultimately, after building the structural model and fracture facies, the geologic grid is being simulated. From the strain based model and the geomechanical parameters defined for each facies, a geomechanical attribute: the fracture probability has been computed. The fracture probability takes into account the intensity of the deformation to assess the zone where probability of occurrence of tectonic fractures is higher.