

Application of a Geomechanical Model to Justify the Exploitation of Bazhenov-Abalak Formation, Western Siberia

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Abstract : The object of this work is Bazhenov-Abalak unconventional formation (BAUF) of Western Siberia. On the base of the Geomechanical model (GMM), a methodology was developed for sweet spot intervals and zones for drilling horizontal wells with hydraulic fracturing. Based on mechanical rock typification, eight mechanical rock types (MRT) have been identified. Sweet spot intervals are represented by siliceous-carbonate (2), siliceous (5) and carbonate (8) MRT that have the greatest brittleness index (BRIT). A correlation has been established between the thickness of brittle intervals and the initial well production rates, which makes it possible to identify sweet spot zones for drilling horizontal wells with hydraulic fracturing. Brittle and ductile intervals are separated by a BRIT cut-off of 0.4 since wells located at points with BRIT < 0.4 have insignificant rates (less than 2 m³/day). Wells with an average BRIT in BAUF of more than 0.4 reach industrial production rates. The next application of GMM is associated with the instability of the overburdened clay formation above the top of the BAUF. According to the wellbore stability analysis, the recommended mud weight for this formation must be not less than 1.53-1.55 g/cc. The optimal direction for horizontal wells corresponds to the azimuth of Shmin equal to 70-80°.

Keywords : unconventional reservoirs, geomechanics, sweet spot zones, borehole stability

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