

Horizontal Reservoir Value Increased by Enhanced Geological Knowledge

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Abstract

Horizontal wells can offer unexpectedly complex reservoir exploitation problems. Although well characterized by surrounding legacy wells; orientation, bedding dip, and thickness may vary in unexpected ways. These variations can create varying geomechanical and poro-perm properties in a single well. These changes may be barriers which can alter the flow path of any hydraulic treatment that may be introduced to the well and reservoir. In this project, geosteering services were not routinely employed because a well-defined understanding of the reservoir had already been established. Regional and local dip were well known and the impact on both drilling, evaluation, and production had for the most part been consistent. Execution issues became apparent in the drilling of a horizontal well drilled between two legacy vertical fields. Midway through the lateral, the gas and cutting shows diminished abruptly. Mud log evidence indicated that the pre-drill structural interpretation was in error and that the lateral had traversed updip back into tighter top seal rock. Using LWD GR data, the existing wells were steered and a new more complex geological model was derived that matched all available drilling and production results. As a result of adding real time geosteering to all new wells, average IP rates improved by over 400%.