

How Drilling Induced Formation Damage and Acid Stimulation Affects Carbonates Productivity in Highly Deviated Wells.

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ABSTRACT

The development of a complex carbonate green field requires an integrated data approach to characterize the reservoir and to build a robust dynamic model. The model will allow evaluating different development scenarios. Nevertheless, the predicted productivity of highly deviated wells is usually different from the actual values. This problem can lead to poor well completions and reservoir development choice.

Open hole logs from recently drilled development wells in this green field showed severe washouts across several reservoir zones. The hole condition was evaluated using mechanical calipers with wireline logging directly after drilling and again after acid stimulation. The conventional and special core analysis integrated into the production logging (PLT) flow profile results were incorporated to define possible fractures or high productive zones corresponding to drilling damages.

The results clearly show the expanding borehole diameter caused by acid, which was linked directly to sub-zone production contribution. The high wash outs zones in the brittle and tight formations were inconsistent and showed minor to very poor production. However, when the same zones had conductive fracture network, the borehole diameter showed large increment. The results confirm that petrophysical and logging analysis can be used to define the reason of wash outs caused by drilling and to clarify the productivity across the reservoir zones.

This paper describes the approach of evaluating drilling and acid workover parameters and their effects on production. The described technique leads to better choices of well completions and field development options, particularly in the early stages of green field development.