

## **Evaluation of Drilling and Completion Damage in Deep Medium-to-High Permeability Sandstone Reservoir in Tarim Basin**

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### **ABSTRACT**

Targeting the serious reservoir damage during drilling & completion processes of deep medium porosity, medium-high permeability sandstone reservoirs in Block A of Tarim Basin, potential reservoir damage factors were analyzed based on the reservoir's geological characteristics. By virtue of damage evaluation tests in the lab and numerical simulation of the drilling fluid invasion depth, the degree of reservoir damage was evaluated, the reservoir damage mechanism was analyzed, and the reservoir damage control principles were discussed. The results are as follows: the damage rate of reservoir fluid sensitivity overall was weak, 11%-34% on average. The damage by the drilling fluid was serious, where the permeability recovery rate of rock samples with drilling fluid dynamic damage was 35%-70%, the damage rate of rock samples with drilling fluid static damage was 28%-47%. The invasion depth of drilling fluid filtrating into the reservoir could be up to tens of meters during a drilling cycle. The study results showed that drilling fluid with small particle size solids combined with the degradation of abrasive particle size of the shield temporary plugging material under deep layer/high temperature would lead to insufficient shield temporary plugging capacity and insufficient pressure bearing capacity of the filter cake. Under these circumstances, solid phase plugging and incompatibility between drilling fluid and formation fluid would occur, which might further damage the deep medium-high permeability sandstone reservoirs in Block A. The research results could provide references for formulating the control principles and supporting technical measures of deep medium porosity, medium-high permeability sandstone reservoirs.