

## **Water Production Diagnostic Plots in Horizontal wells**

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### **Abstract**

Excessive water production from oil fields is a major problem facing oil companies. Causes of this problem are mainly attributed to the presence of fractures/channels and strong aquifer support. The presence of this problem in vertical wells and production behaviours from such wells has been investigated by many people. To be able to tackle such problem, it is of prime importance to identify the source of the problem. It has been shown that it is possible to identify the water source from the water oil ratio and its derivative. Excessive water trend behaviours in horizontal wells have not been investigated yet. As such, this was investigated in this study using a simple numerical simulation model. Rock and fluid properties of an oil field from south of Oman were used as input for the model. The model was used to verify results obtained for vertical wells before simulating the horizontal well case. The problem of excessive water production in horizontal wells related to coning or channelling/fractures was investigated. Comparison of simulated data with published and field data revealed a good match for both vertical and horizontal wells. Furthermore, another approach based on WaR trend behaviour alone to differentiate between coning and channeling/fractures is presented. A second approach using Excel build-in function to distinguish between coning and channeling/fractures is also presented. Each approach is verified with the previous findings using the same data for the same wells. Good agreement was found for each approach