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TDT and CHFR logs can diagnose bypassed oil zones and water zones in matured sandstone reservoirs

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Reservoir saturation monitoring through cased wells usually is the main key factor for proper reservoir management and recovery optimization in the cases of developed and mature oil fields. Thermal decay time tool (TDT) has been the main technique used for monitoring the inter wells water saturations in developed reservoir. One of the main problems that encountered while using TDT log is the reservoirs with low formation water salinity, this problem may also appear in reservoirs that are supported by water injection projects in which the formation water is diluted by the injected water. This problem has been solved by combining TDT technique and cased-hole formation resistivity tool (CHFR). The ability to detect and evaluate bypassed hydrocarbon and monitor fluid movement in sandstone reservoir is a vital question to improve production and increase recovery. It is difficult to interpret the TDT data in reservoirs with low-salinity sandstone formation water. This problem cannot be solved because TDT measurements depend on the salt content in formation brine. Instead the cased-hole formation resistivity tool (CHFR) is proposed to overcome the limitations associated with pulsed-neutron tools. This paper presents case studies of pay zones-saturation monitoring obtained from TDT and CHFR logs recorded in wells in matured sandstone oil field CHFR and TDT results are referenced to open-hole resistivity logs. It was found that water saturations calculated from CHFR logs are more accurate than TDT log in most cases. Water shut-off remedial action to manage water production from producing sections in the studied wells has been much more successful based on CHFR/TDT logs than the proposed remedial action based only on TDT data interpretation.

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