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Rigless Well Intervention Reduces Water Cut, Increases Oil Production by 843 bbl/d

Production-logging and reservoir-saturation tool deployment optimizes productivity in >90% water-cut well, Libya

CHALLENGE
Pinpoint the well interval that produced with a high water cut and identify opportunities for remedial intervention.

SOLUTION
Perform petrophysical evaluation of integrated data measured by the RSTPro* reservoir saturation tool and production-logging tools (PLTs).

RESULTS
Isolated the proper perforation interval, increasing oil production by 843 bbl/d and reducing water cut by 25%.

"We identified the current saturation and inflow profiles, which led to the decision to shut off the watered-out zone. This successfully reduced water cut and increased oil production rate. The freed-up gas lift volume was reallocated to other oil producers as part of our continuous production optimization."

Emad Kaawan
Senior Reservoir Engineer
Wintershall Holding GmbH

Pinpoint water-producing interval

Wintershall Holding GmbH drilled a well in Libya that produced with a water cut higher than 90%. Previous reservoir-saturation and production-logging testing results showed that the water rose to reach the top perforation; as much as 70% of the total water production was found to come from the lower perforation. Moveable oil was detected at the upper perforation interval, and production logging proved that the oil did not significantly contribute to the flow due to the high water cut.

The operator sought a solution that could be used to

- estimate the propagation of the oil/water contact, monitor bypassed movable oil, and define the zonal contribution
- identify within the perforated zone the interval that produced the high water cut
- distinguish opportunities for remedial intervention to increase oil production and decrease water cut.

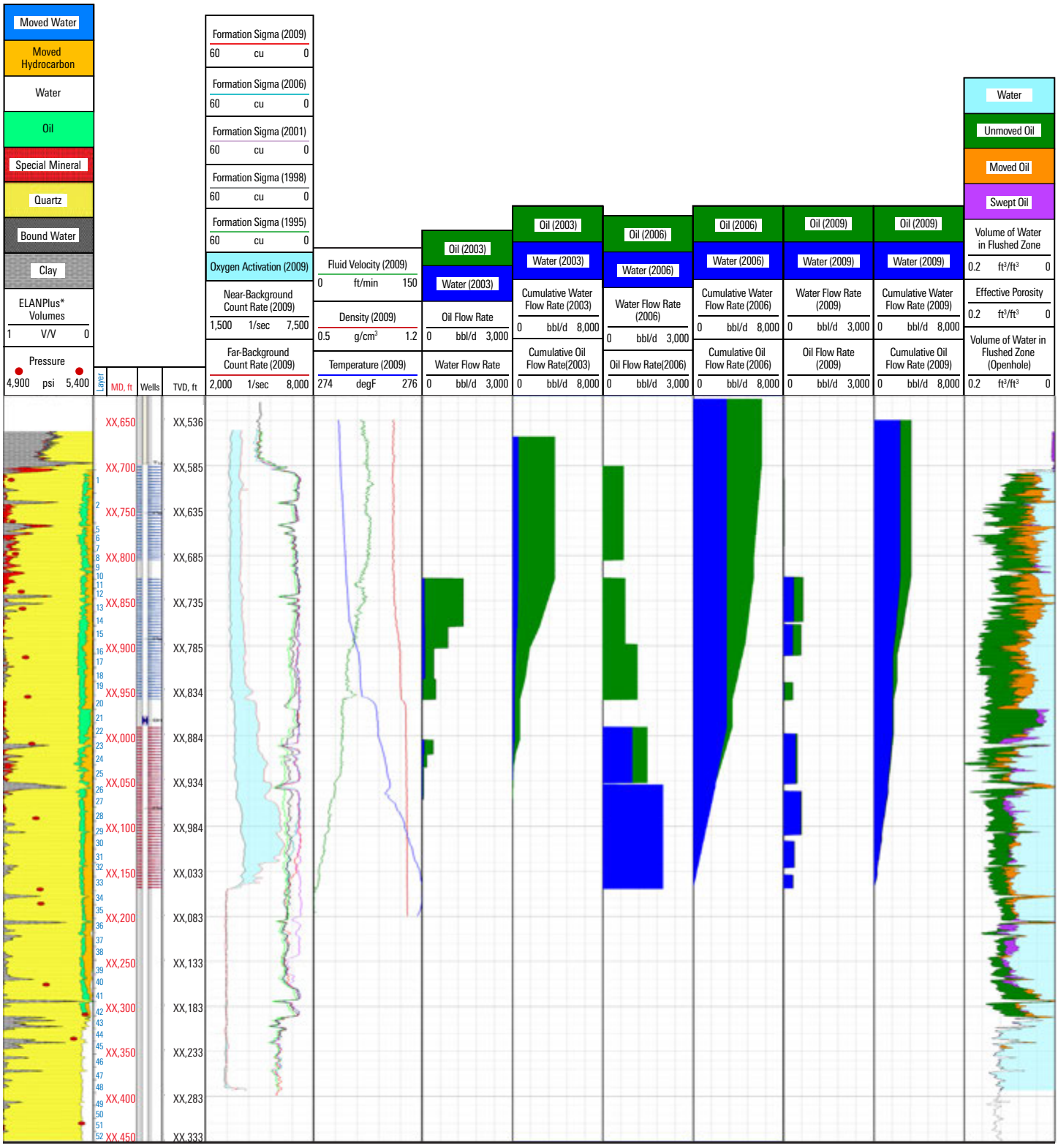
Ensure optimal remediation with data integration

Schlumberger proposed combining the RSTPro reservoir saturation tool and PLT data to select the optimal remedial action. Using reservoir saturation measurements along with the production logging data helped ensure data consistency and reliability. This helped Wintershall be certain that no moveable oil was left in the formation, enabling them to confidently plug back the water-entry zone. Integrating the information obtained during reservoir and borehole monitoring would be helpful to selecting the proper remedial strategy and improving well production.

Improve oil production by 843 bbl/d with decreased water cut

Wintershall isolated the lower perforation to optimize oil production and reduce water cut. Doing so increased oil production by 843 bbl/d and reduced water cut by 25%. To ensure isolation of the wellbore and its vicinity, a mechanical plug-back tool (MPBT) was set across the tar mat, which proved effective in improving production from the remaining perforations. Additionally, the reduced water cut improved vertical-lift performance, optimizing gas-lift allocation at both well and field scales.

CASE STUDY: Rigless well intervention increases oil production For Wintershall in Libya



Time-lapse plot of PLT and RSTPro tool data. Before setting the MPBT, oil produced at a rate of 307 bbl/d, and water cut was 93%. After setting the MPBT, production improved to 1,150 bbl/d, and water cut decreased to 68%.

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