

EquiFlow® AICD Deployment More Than Triples Oil Production for Major Operator in the Middle East

DECREASED WATER CUT LEADS TO 400% INCREASE IN OIL PRODUCTION

MIDDLE EAST

CHALLENGE

Increase production and address a water control issue in a heterogeneous, highly fractured carbonate reservoir

SOLUTION

18 EquiFlow® AICDs with
16 Swellpacker® systems

RESULT

Oil production increased by 400% and water cut decreased from 97% to less than 50%

OVERVIEW

A major operator in the Middle East had a water control issue in a heterogeneous, highly fractured carbonate reservoir, causing high water cut during production and reducing oil recovery.

Several remedial solutions, including chemical placement, were considered. Ultimately, the operator decided to install Halliburton EquiFlow® autonomous inflow control devices (AICDs) with Swellpacker® zonal isolation systems.

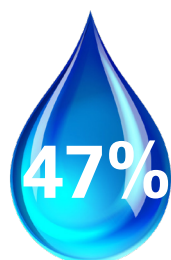
CHALLENGE

The openhole horizontal well was drilled and completed with electrical submersible pumps (ESPs) in early 2011 and showed very high water production and fracture behavior, producing 880 BOPD, with an initial water cut of approximately 65%. In less than one year, the water cut increased sharply to approximately 97% and production decreased to 200 BOPD.

SOLUTION

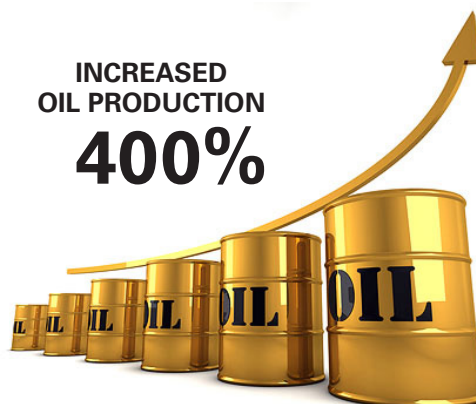
To control water cut and increase oil production, Halliburton installed EquiFlow AICDs with Swellpacker systems in the openhole horizontal well. Sixteen Swellpacker systems provided segmentation in the open hole, and 18 EquiFlow AICDs were placed between the packers, with some segments left blank. The EquiFlow AICDs acted as self-adjusting valves, controlling the flow rate from each segment. High-water-cut segments flowed at a slow rate, while high-oil segments flowed at a high rate. The devices are based on an innovative flow path design that works without any moving parts. More viscous flow (oil) follows a direct path at a high rate similar to an open valve. Lower viscosity (water) induces spinning, which slows the flow rate similar to a choked valve.

DECREASED
WATER CUT



INCREASED
OIL PRODUCTION

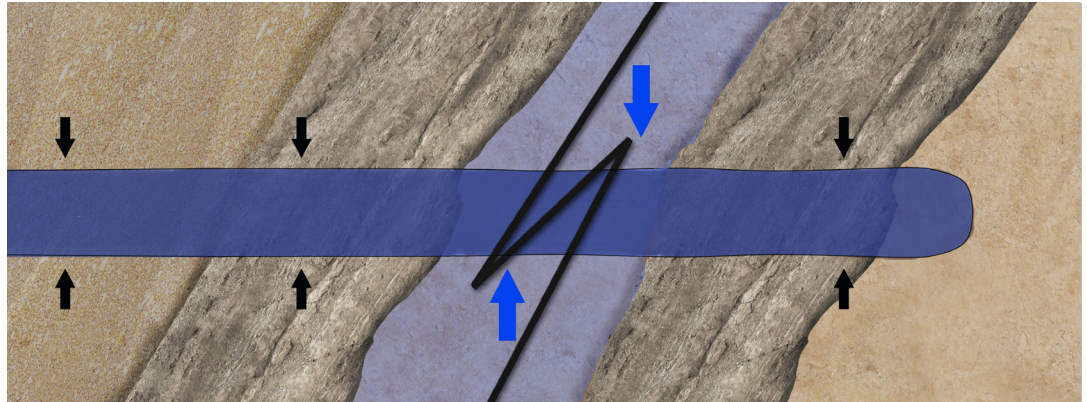
400%



RESULTS

The successful EquiFlow® AICD deployment helped increase oil production by as much as 400%, with a significant decrease in water cut from 97% to less than 50%. The well produced three times more cumulative oil over 21 months compared to the pre-workover cumulative in 2.5 years. This solution overcame the challenges associated with reservoir heterogeneity and helped improve sweep efficiency with a significant gain in ultimate recovery from the well.

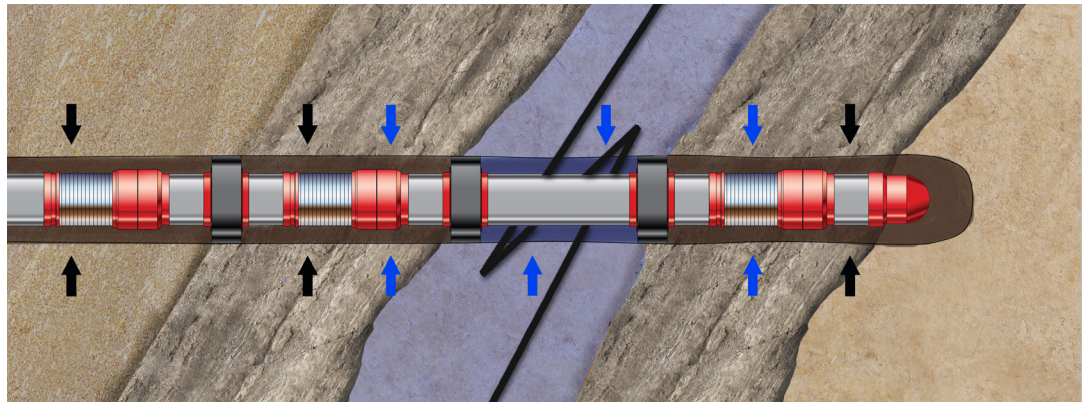
95% water cut to surface



HAL41006

Before installation of the EquiFlow® AICDs, the open hole offered no control of fractures or water breakthrough. High water cut was observed at surface.

< 50% water cut to surface



HAL41007

After installation of the EquiFlow® AICDs, fractures were isolated and the remainder of the well was segmented. The rate of each segment was controlled by the EquiFlow AICDs, which allowed more flow from segments with high-oil content.

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