MATURE FIELDS

CASE STUDY

EquiFlow® AICD Boosts Oil Production and Reduces Significant Water Production in Mature Oil Field

FIRST EQUIFLOW AICD COMPLETION PROVES SUCCESSFUL

OMAN

CHALLENGES

- Increase ultimate oil recovery and restrict water production in mature heavy-oil sandstone reservoir
- Maximize asset value with installation of innovative solution

SOLUTION

Install EquiFlow® AICD to restrict early water breakthrough and enhance oil production

RESULTS

- Successfully installed first EquiFlow AICD completion without any NPT or service quality issues
- Exceeded customer's expectations in significantly enhancing oil recovery and reducing water production

Water Production Down

OVERVIEW

A major operator in Oman was having early water breakthrough challenges in one of its heavy oil (19° API) faulted sandstone reservoirs. In these mature brownfields, typical well production starts with medium water cut and can ramp up quickly above 90 percent. As a result, this will reduce the ultimate recovery from the fields. After consulting with Halliburton, the operator decided to install the EquiFlow® autonomous inflow control device (AICD), along with Swellpacker® systems, in one of its wells to restrict early water breakthrough and enhance oil production.

RESERVOIR-CENTRIC COMPLETIONS FOR DEPLETED RESERVOIR

The Halliburton Completion Tools team in Oman collaborated with the customer's asset team to select the suitable well candidate and assess the benefit from deploying the EquiFlow AICD technology. There were many challenges from a reservoir perspective, such as thin heterogeneous sand and early water encroachment due to faults, as well as mobility contrasts of heavy oil and formation water. The well was put on production with artificial lift systems due to lower reservoir pressure.

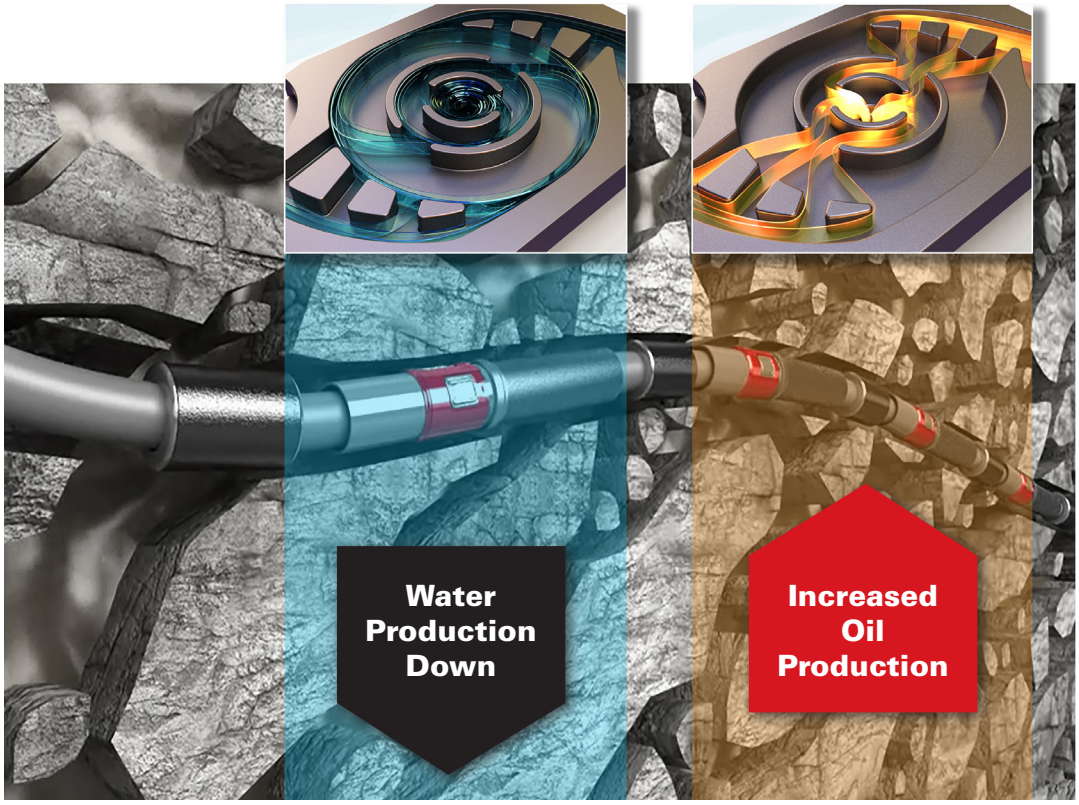
The Halliburton team offered a combination of EquiFlow AICDs with Swellpacker systems to mitigate the reservoir's challenges. Based on the final well logs, nearby reservoir properties, and well simulation, the EquiFlow AICD completion was modeled, designed, and installed successfully. Well test results showed a significant reduction in water production compared to the nearby offset wells. As the EquiFlow AICD acts like a self-adjusting device, it chokes back high-water producing zones, while allowing other healthy oil-saturated zones to produce more from the well. Also, the completion was designed to reduce the drawdown from the heel and to stimulate production from the toe side of the well, thus maximizing ultimate recovery from the well.

FIRST EQUIFLOW AICD COMPLETION IN OMAN MAXIMIZES ASSET VALUE

As a result of the collaborative efforts between the operator and Halliburton, the first EquiFlow AICD completion was successfully installed without any non-productive time (NPT) or service quality challenges.

Based on surrounding geological conditions and offset well data without EquiFlow AICD installed, the well was expected to have high water cut starting initially around 45 percent and more than 70 percent over a period of three months. Thanks to EquiFlow AICD technology, the well improved significantly starting with only 15.9 percent initial water cut and reaching 23 percent over the same period, dramatically reducing water production by over 65 percent. The well is stable, producing more oil and significantly less water, resulting in higher expected ultimate recovery (EUR).

Following this successful installation, the operator has chosen to screen many other wells with similar reservoir conditions and fluid properties to be completed with the EquiFlow AICD technology and Swellpacker isolation systems.



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