Optis Technology

PINPOINTING & ISOLATING WATER ENTRY IN A GAS WELL

EV's real-time camera provides valuable insight and live visual data to assist with water entry detection

THE COST OF HIGH WATER PRODUCTION

Nearly every well producing oil and gas will succumb to water ingress, eventually leading to the end of the productive life of the well. In addition to increased lifting and disposal costs, operators can spend a significant amount on preventing scale build up or effects of corrosion caused by water production.

Excessive water production results in high operating expenses, early shut-in and, eventually, well abandonment when the economic viability for production is breached. In addition, the hydrocarbon-producing capability of a well can be diminished if hydrostatic pressures exceed those of the hydrocarbon bearing reservoirs. Significant reductions in water production and/or achieving water shut off (WSO) can reduce artificial lift requirements, decrease operating costs, extend field life and increase ultimate oil recovery of the reservoir.

REDUCED GAS PRODUCTION

Neptune Energy experienced increasingly high water production in their conventional well. With the well unable to cope with lifting this produced water, and with no clear indication of which zones the water was entering from, the operator had no choice but to shut-in the well.

Initial production logging data suggested water production amongst several zones in the well, however the camera was selected to confirm this and pin-point any visible water entering the wellbore.

Figure 1: Pin-pointing water entry from a perforation

THE CHALLENGE

Neptune Energy, a leading offshore gas producer in The Netherlands, experienced increasingly high water production in their conventional gas well. With the well unable to cope with lifting this produced water, the operator had no choice but to shut-in the well.

THE SOLUTION

EV's Optis R125® camera was deployed on E-Line with downview video footage acquired to provide a visual inspection of well status and detecting zones of water entry. The Optis® R125 camera was provided as the ideal option, as it acquires real-time footage at 25 frames per second.

THE RESULTS

Upon reaching 4600m depth, the camera revealed severe scale build-up, in addition to the presence of water. As the camera continued to descend, the perforations producing water could easily be seen with flow increasing ***(Fig.1)***. By pin-pointing the stages producing water, the operator was able to install a zonal straddle isolation system over the stages producing water, thus shutting off the water producing zones and regaining profitable hydrocarbon production once again ***(Fig.3)***.

Upon reaching 4600m depth, the camera revealed severe scale build-up ***(Fig.2)***, in addition to the presence of water. As the camera continued to descend, the perforations producing water could easily be seen with flow increasing throughout the stage ***(Fig.1)***.

Initial production logging data suggested water production amongst several zones in the well, however the camera was selected to confirm this and pin-point any visible water entering the wellbore.

With this single intervention confirming the presence and pinpointing the location of water entry, the operator was able to install a straddle isolation system over the water producing zone, thus eliminating the water at source and restoring profitable hydrocarbon production once again ***(Fig.3)***.

Figure 2: Scale build-up

HIGH VALUE SOLUTIONS

EV's range of visual diagnostic services provide the pinpoint identification of fluid entry required by well operators to fully understand water production. Through a single intervention, EV's visual diagnostic solutions reveal the location of oil, gas, and water entry in high definition, enabling operators to decide when and how to combat unwanted water production, leading to improved hydrocarbon recovery and better economic performance.

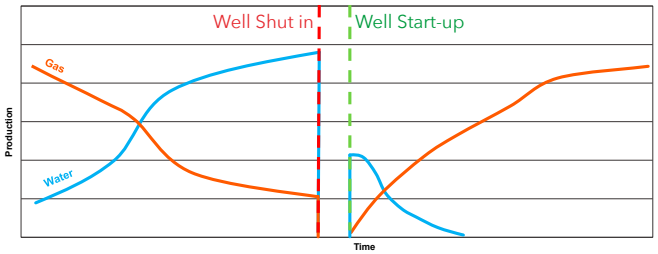

Figure 3: Water vs Gas Production over time