ACTive Cleanout Provides Downhole Access for Perforating Multiple Zones in South China Sea

Case study: Real-time downhole measurement and interpretation enable effective sand cleanout

Challenge
To prevent sand plugging while perforating multiple zones in an injector well.

Solution
ACTive* Cleanout to enable effective wellbore access while ensuring accurate placement and optimal well conditions with ACTive Perf.

Results
Effective wellbore cleanout and accurate pressure management resulting in a water injectivity rate of 8,900 bbl/d, confirming that sand plugging was prevented.

Sand migration after perforation
Talisman Malaysia Ltd. (TML) recently drilled a water injector well in the Malaysian waters of the South China Sea. After the first zone was perforated, sand was produced, plugging the next perforating intervals. Despite efforts to clean out the well using conventional CT methods, the planned intervals could not be accessed. Injecting nitrogen to circulate the fluid and flow the well only produced more sand.

Most coiled tubing (CT) activities in this unconsolidated sandstone formation involve the removal of wellbore fill. Formation sand causes wellbore fill or sanding, which is a problem for all operators drilling in this area. Sanding can occur in both newly drilled and mature wells.

Preventing unconsolidated sand migration
The operator chose ACTive Cleanout and ACTive Perf to obtain real-time downhole measurements, which allowed better control of the cleanout and accurate placement of the perforating guns.

The existing sand in the wellbore was lifted out by keeping the bottomhole condition at balanced or slightly overbalanced conditions using real-time bottomhole pressure data. The designed pumping schedule was then followed with continuous real-time monitoring of pressure and temperature. Before continuing with the planned perforation run, an injectivity test ensured that the tunnels in the existing perforation interval were open.

The perforating operation was then resumed and the guns were successfully conveyed to the target depth and correlated against base depth log. The real-time bottomhole pressure reading showed proper balance to ensure sand would not be produced. Using the real-time
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CCL correlations, the guns were positioned to perforate the interval. The e-Fire® perforating head was activated via nitrogen pulses through CT. Bottomhole pressure and bottomhole temperature increased after the guns fired.

Achieving water injection rates
These services allowed effective cleanout, accurate placement of the guns across the right zones, tuning the downhole pressure to the correct or slightly overbalanced condition, controlling when to fire the perforating guns with the e-Fire system, and receiving feedback at the surface when the guns were fired.

The final water injectivity rate was 8,900 bbl/d at 700-psi surface pressure, confirming that sand was not introduced into the wellbore after the perforation operations were complete.

ACTive live in-well performance
ACTive® Cleanout is part of the ACTive portfolio of CT services that includes ACTive Matrix, ACTive Perf, ACTive Isolation, ACTive Lift, and ACTive Profiling. These services enable live in-well downhole measurements, interpretation, and performance optimization.

You can only improve what you can measure.