CASE STUDY

HALLIBURTON

Ecuador

Cement bond improvement in high-permeability, high-pressure sandstones

Cement solution leads to excellent sonic and ultrasonic log results in less than 72 hours

CHALLENGE

- Isolate high-permeability, high-pressure sandstone reservoirs
- Address historically poor CBL results
- Mitigate risk from high-pressure aquifers below reservoir

SOLUTION

- Deploy Tuned® Defense™ cement spacer to prepare wellbore with multiple formations to receive cement and minimize seepage losses
- Use NeoCem™ slurry to manage ECD and reduce shrinkage

RESULT

- Achieved optimum CBL results in less than 72 hours
- Confirmed uniform cement distribution with ultrasonic logs
- Enabled confident well completion across multiple formations

Oveview

In Ecuador's Oriente Basin, mature wells often require a single production string to cover all Napo formations. This design exposes high-pressure, high-permeability reservoirs, making zonal isolation critical to prevent crossflow and water production. Satisfactory cement bonding in front of the sandstones is important to prevent water production attributed to the presence of high-pressure aquifers.

Challenge

The operator required isolation of multiple reservoirs in a single production string, which included a diverse lithology of intercalated sandstone, limestone, and shale formations. The sandstone zones are characterized by high permeability and oil-water contact with active high-pressure aquifers, which often resulted in poor cement bond log (CBL) results and debonding issues. These conditions required a cementing solution capable of managing variable pore pressures and formation characteristics.

Solution

Halliburton designed and deployed a tailored fluid train to condition the wellbore before cementing. The Tuned® Defense™ spacer was selected for its rheological hierarchy and ability to minimize fluid losses in permeable zones. For the cement job, the 14.5-lbm/gal NeoCem™ system was used to manage equivalent circulating density (ECD) and reduce shrinkage associated with conventional Portland cement. This combination provided a dependable barrier across diverse lithologies.

Result

Cement bond logs (CBLs) were run after 70 hours of wait-on-cement (WOC) time. Sonic logs showed low amplitude, strong formation arrivals, and no pipe

arrivals, which indicated excellent bonding. On the same run, ultrasonic logs confirmed high impedance and uniform cement distribution throughout the cemented interval. The successful deployment of Tuned® Defense™ spacer and NeoCem™ system supported the operator in completing the well with verified zonal isolation.