BRIDGEFORM provided innovative alternative for wellbore strengthening

The Tsimin-Xux oil field off the coast of Mexico presents a number of technical challenges due to its complex formations and high-pressure, high-temperature (HP/HT) environment (more than 10,000 psi [68,947 kPa] and 340°F [171°C]). The narrow mud window through the wellbore and the low-pressure, high-permeability sandstone and shale layers required help to reduce pore pressure, improve lubricity, and maintain borehole stability.

In the initial stage of the project, a 26-in. section of the Tsimin 74 well was drilled from 656 to 3,609 ft (200 to 1100 m) with a potassium chloride polymer water-based mud (WBM). The last 492 ft (150 m) of the section crossed a low-pressure, high-permeability sandstone that caused significant problems. The overbalances ranged from 350 to 3200 psi. The operator increased the weight of the WBM used, added an oil-based lubricant, and used calcium carbonate to bridge, provide borehole stability, reduce torque and drag, and reduce differential pressure in the formations. The results, however, were poor. Several 20-in. casings became stuck, and the increase in mud weight increased pressure, resulting in fluid losses.

Baker Hughes, a GE company (BHGE), delivered its BRIDGEFORM™ single-sack wellbore strengthening system as an innovative alternative to provide lubricity, reduce pore pressure, and reduce mud losses. The BRIDGEFORM pill was placed from 2,953 to 3609 ft (900 to 1100 m) before successfully running 20-in. casing in record time. The cementing was accomplished according to the original program and the low-pressure zone was isolated without problems. The BRIDGEFORM system addressed the issues associated with pore-pressure transmission and borehole instability and provided significant technical, logistical, and economic advantages.

Challenges
- Offshore field included complex formations and a narrow mud window
- Low-pressure, high-permeability sandstone that caused
  - Bad quality cementing due mud losses
  - Casing differential sticking problems
  - Poor shoe integrity

Results
- Cemented casing at total depth as planned
- Sealed low-pressure sands successfully
- Avoided fluid losses during cementing
- Improved offshore logistics