

Very High Overbalanced, HPHT Offshore Well Drilled Successfully with FLC 2000® Low-Invasion Additive in South China Sea

Asia

CHALLENGE:

- ▶ HPHT offshore drilling, 310°F bottomhole temperature in the deep exploratory section below a producing reservoir
- ▶ 14,000 psi pore pressure
- ▶ 6,800 psi high overbalance pressure
- ▶ 18.4-lb/gal drilling fluid

SOLUTION:

- ▶ HPHT drilling fluid formulated with FLC 2000 low-invasion additive
- ▶ Specialized fluid testing apparatus used in the field to fine tune mud formulation

RESULT:

- ▶ Successfully drilled through challenging downhole conditions with no wellbore instability issues
- ▶ Ability to appraise deep 8½-in. HPHT section

CHALLENGE

HPHT drilling operations in exploratory areas with high differential pore pressures are an ongoing challenge. One operator used an unconventional drilling fluid formulation to successfully drill their highest overbalanced well to date. The high-pressure, high-temperature (HPHT) section exhibited pore pressures up to 14,000 psi with 310°F bottomhole temperature. The challenge was further compounded by the very high overbalance pressure – approximately 6,800 psi observed while drilling with an 18.4-lb/gal drilling fluid.

SOLUTION

In the deeper section, where wellbore pressure control was critical with approximately a 1.5-lb/gal drilling window, the HPHT drilling fluid formulation and rheology were optimized to minimize the equivalent circulating density. To minimize risk of wellbore losses and differential sticking, a HPHT low-invasion fluid system with FLC 2000 technology was selected to provide wellbore shielding. Monitoring in the lab and with unconventional test equipment in the field provided further fine tuning of the mud formulation.

RESULT

The challenging 8½-in. HPHT hole section was successfully drilled with no issues with mud losses, drag during tripping, or differential sticking. The superior HPHT drilling fluid system enabled the well to meet its objectives of producing from shallow intervals while further appraising the deeper 8½-in. HPHT section.

