Managed Pressure Drilling Saves $18 Million in Challenging Deepwater Clastic Formation

Objectives

- Design a managed pressure drilling (MPD) system for a multiwell campaign.
- Drill through a clastic formation with a narrow mud-weight window while safely diverting gas to reach the target depth.
- Increase operational efficiency by using a mud weight less than the pore-pressure gradient during drilling and a bottomhole pressure higher than the equivalent circulating density (ECD) during connections.

Our Approach

- Weatherford engineered and installed an MPD system on a moored, deepwater rig.
- The MPD system left existing flowlines intact and allowed reverting to conventional methods.
- The MPD control system enabled efficient drilling with a synthetic-based mud (SBM) weighing 8.5 lb/gal (1,019 kg/m³), which was less than the pore-pressure gradient. The system used surface backpressure to maintain a bottomhole pressure higher than the ECD of 0.2 lb/gal (24 kg/m³) during connection makeup, which helped avert influxes.
- Compared to a diverter, the RCD and MPD manifold enhanced safety when managing riser gas by immediately detecting and subsequently exerting pressure and processing the gas in a controlled manner. This capability is not available with conventional diverter systems.
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Our Approach (continued)

• When ballooning was encountered during drilling, the MPD seal mimicked the closure of subsea blowout preventers used in the Gulf of Mexico to eliminate the risk of wear.

• The planned depth was reached at approximately 20,000 ft (6,096 m).

Value to Customer

• Installing MPD on the first well in the campaign saved 5 days and reduced drilling costs by approximately US $18 million compared to the authorized amount.

• MPD helped the customer navigate narrow mud-weight windows, maintain control of gas influxes, and reach the target depth according to the planned casing program, which would have been impossible using conventional methods.