Advanced Managed Pressure Drilling

Reaches Target Depth in Challenging High-Gas Reservoir 9.3 Days Ahead of AFE

Objectives

- Mitigate drilling risk: Implement the right drilling strategies to address drilling risks associated with extremely narrow or non-existent drilling windows.
- Achieve target depth: Reach the target depth in the reservoir section by integrating two-hole sections with varying pressure gradients.
- Accelerate well delivery: Expedite well delivery in this field, which has faced stagnation due to the limitations in the number of casing strings.

Our Approach

- Upon conducting an engineering analysis of the offset wells in the field, it became evident that the subject well required managed pressure drilling (MPD) with a pressurized mud cap drilling (PMCD) contingency to address the drilling challenges arising from the narrow drilling window and the uncertainty in the floater formation pressure.
- The Weatherford MPD system was selected to drill the reservoir section safely and efficiently by monitoring the wellbore for influxes and losses as well as maintaining constant bottomhole pressure (CBHP) during drilling pump-off events as needed. BHP was maintained constant by holding surface back pressure (SBP) through the Weatherford fully automated choke manifold as determined by the well behavior.
- The rotating control device (RCD) and MPD choke manifold improved safety for the drilling personnel through the containment and safe diversion of return fluid from the well.
- A uniform mud weight of 20.5 kPa/m was used to drill the 8 3/8-in. hole section with different combinations of SBP in static and dynamic conditions to achieve a constant equivalent mud weight (EMW) of 21.5 kPa/m.
- Weatherford experts conducted dynamic pore pressure tests and dynamic formation integrity tests to determine the drilling window.

Value to Customer

- The MPD approach utilized in this well allowed for reaching the total depth in the reservoir formation without the need for additional casing or liner, resulting in significant cost savings for the operator.
- The closed-loop drilling system completely isolated the wellbore from the rig floor and crews, resulting in zero well process safety incidents.

The Victus MPD system integrates rig equipment for machine-to-machine communication, real-time analysis of downhole conditions, and rapid automated responses from a central location, helping to achieve all drilling objectives with unmatched safety and cost savings.

LOCATION
Middle East

WELL TYPE
Onshore, development

FORMATION
Ara salt

HOLE SIZE AND ANGLE
8-3/8 in., vertical

CASING SIZE
9-5/8 in.

TEMPERATURE
160°F (71°C)

PRESSURE
18.28 to 18.36 ppg (21.5 to 21.6 KPa/m)

DEPTH
10,875 to 14,583 ft (3,315 to 4,444 m)

PRODUCTS/SERVICES
- Managed pressure drilling
- RCD Model 7825
- Victus™ Intelligent MPD control system

Weatherford®

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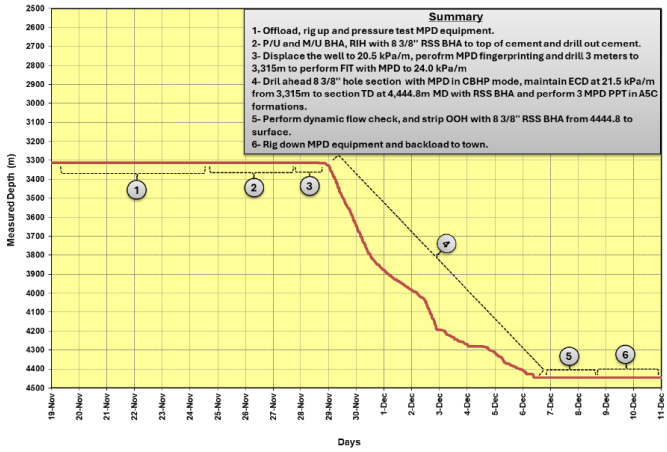
Value to Customer (continued)

- Effective management of the ECD enabled the drilling to proceed through a narrow window without any losses or kicks.
- The MPD approach instilled confidence in the drilling crew, allowing them to drill faster compared to offset wells, which were drilled with a slower, controlled rate of penetration (ROP).
- The MPD system was successfully implemented in this well without any well process safety (WPS) issues, resulting in the completion of the section 9.3 days ahead of the Authorized for Expenditure (AFE) schedule.



The time-depth drilling curve of the 8 3/8-in. wellbore.