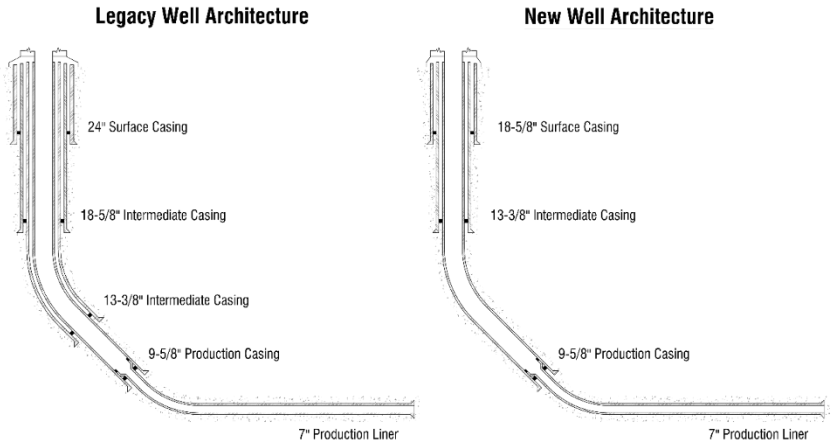
Integrated MPD and Directional Drilling

Revolutionize Well Design, Enable Removal of a Casing String, Deliver $650,000 in Savings



Casing design comparison: Existing vs new slim casing design.

Objectives

- Create an alternative well plan for managed pressure drilling (MPD) and directional drilling that challenges the existing field architecture and transitions from a five-string to a four-string design.
- Eliminate the 24-in. surface casing and reduce the 18 5/8-in. casing by 3,800 ft (1,158 m) and the 13 3/8-in. casing by 1,600 ft (487 m).
- Overcome drilling hazards across formations with different pressure regimes.
- Improve zonal isolation and cementing quality for all strings of the well.

Our Approach

- The team developed an integrated engineering approach for using MPD and directional drilling to enable safe comingling of seven formations with different pore pressure profiles, mitigating borehole instability, and allowing real-time response to downhole conditions.
- Geomechanics support augmented the MPD pressure planning while navigating through the challenging reservoirs.
- Weatherford geosteering experts collaborated with the MPD team to determine the optimal approach for reservoir placement considering the pressure-related challenges.
- Applied managed-pressure cementing methods tailored for stacked reservoirs such as Mishrif, Ahmadi, and Wara to improve cement placement reliability and strengthen long-term zonal isolation.

LOCATION
Middle East

WELL TYPE
Development

HOLE SIZE AND ANGLE
12 1/4 in. HS, 72°

INTERMEDIATE CASING SIZE
13-5/8 in.

LINER SIZE
Production casing: 9-5/8 in.

MEASURED DEPTH
First well:
5,257 to 7,256 ft (1,602 to 2,211 m)

Second well:
5,167 to 7,041 ft (1,574 to 2,146 m)

PRODUCTS/SERVICES
- Managed pressure drilling
- Victus™ intelligent MPD system
- Magnus® rotary steerable system
- Rotating control device, Model 7875
- MPD 9 5/8-in. casing adapter

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Our Approach

- The Coriolis flow meter provided early detection of fluid losses in fractured zones, and the closed-loop system enhanced well control and operational safety.
- MPD-constant bottomhole pressure (CBHP) reduced wellbore pressure, preventing fatigue cycling, connection gas at the surface, and differential sticking issues.

Value to Customer

- The integrated MPD and directional drilling planning approach enabled a more efficient well design, helping the operator reduce total well construction cost by $325,700 USD per well and delivering $651,400 USD in savings across two wells.
- The streamlined well construction and more stable execution helped the operator save 2 rig days per well, reducing operational exposure and improving schedule reliability.
- Early collaboration between MPD and directional drilling engineering supported a revised well architecture that eliminated the 24-in. casing, shortened the 18 5/8-in. and 13 3/8-in. strings, and enabled a smaller wellhead, delivering significant material and logistics savings across the entire construction phase.

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