

DwC System Drills Through Loss Zones, Unstable Formation To Reach TD Without Using Top Drive

Objectives

- Simultaneously drill and case a 2,737-ft (834-m) well section to total depth (TD) in an unstable formation with total loss zones. When drilling the 12 1/4-in. hole section in the same well, the client had used conventional drilling techniques and had experienced severe losses.

Our Approach

- Weatherford and Khalda Petroleum Company collaborated in brainstorming sessions and engineering analyses, after which Weatherford proposed drilling with casing (DwC) technology to reduce fluid losses, improve hole cleaning, and reach TD. DwC techniques plaster cuttings to the borehole wall and create an impermeable mud cake that can curtail fluid losses. The techniques also result in a smaller annulus that increases the wellbore fluid velocity and improves hole cleaning compared to conventional drilling methods.
- The Weatherford crew deployed the DwC system (including a 12- × 9 5/8-in. Defyer® DPA 6413 drillable casing bit), two single-valve float collars, and a drive sub. The operation required the use of a kelly driver to rotate the casing string because the rig was not equipped with a top drive.
- The zones were drilled with dynamic and static losses ranging from 10 to 100 bbl/hr (1.6 and 15.9 m³/hr), average weight on bit from 0 to 13 kips, rpm from 51 to 117, stand rate of penetration (ROP) from 30 to 150 ft/hr (9.1 to 45.7 m/hr), flow rates from 164 to 615 gal/min (621 to 2,328 L/min), and pressures from 94 to 600 psi (648 to 4,137 kPa).
- The crew drilled 2,443 ft (745 m) to reach TD without losing all the drilling fluids, completed the entire DwC operation in 79 hours, and achieved an average on-bottom ROP of 48 ft/hr (14.6 m/hr).
- After the string was cemented, the crew used a conventional tungsten-carbide-insert bit to drill out 68 ft (20.7 m) of cement, two float collars, and the Defyer casing bit in 6 hours.
- The job fulfilled all objectives with no operational incidents or health, safety, or environmental issues.

Value to Client

- The DwC system enabled drilling and casing a problematic zone to TD. By comparison, conventional techniques in the unstable formation had presented time-consuming hole problems.



Using Weatherford DwC technology with the Defyer DPA drillable casing bit helped to overcome the challenges of the onshore drilling environment to reach TD in one trip.

CLIENT

Khaldia Petroleum Company

LOCATION

Egypt

WELL TYPE

Onshore, oil

FORMATION

Clay, limestone, shale, and sand

HOLE SIZE AND ANGLE

12 in., vertical

CASING SIZE AND TYPE

9 5/8-in., 36-lb/ft K55

DEPTH

- In: 294 ft (90 m)
- Out: 2,737 ft (834 m)

PRODUCTS/SERVICES

- DwC technology
- Defyer DPA 6413 drillable casing bit



* Defyer is a registered trademark of Weatherford in the U.S.