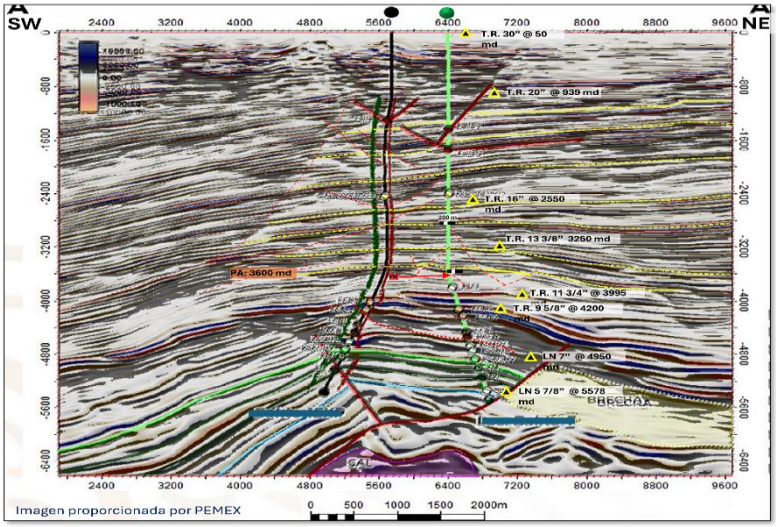
Successful MPD Use in Mexico Enables Drilling HPHT Field With Uncertain Geological Environment Via Geological/Geomechanical Recommendations



Seismic section with identified risk zones and additional interpretation of potential fault planes and unconformities, elaborated for DWOP and prejob meetings with the operator.

Objectives

- Perform managed pressure drilling operations in a harsh geological environment and uncertainty in reservoir conditions and intermediate high-risk zones.
- Exceed operator expectations based on competitors' performance while drilling offset wells.
- Earn further operations within the reservoir for a successful field development.

Our Approach

- Due to the increased risk of total losses, stuck pipe due to differential sticking, and uncertainty in the geopressures within an additional potential reservoir interval in the Tertiary, geomechanics experts from IES and ISP provided recommendations on casing points, well schematic optimization, and mud density at the drill well on paper (DWOP) meeting for each of the four wells. The interpretation of seismic images with clear remarks on potential geological risk features and zones were provided for risk mitigation while drilling.
- Geomechanics experts from IES and ISP applied a deep analysis on the potential risk to be faced while drilling—reservoir conditions and lost-in-hole prevention—and brought in the recommendations from the geosciences team on mud density and equivalent circulating density (ECD) levels for critical and reservoir intervals. Additionally, real-time LWD data and correlations were monitored to alert the Weatherford team and the operator for casing points definition.

LOCATION
Tabasco, Mexico

WELL TYPE
Deviated

FORMATION
Sandstone

HOLE SIZE AND ANGLE
10-5/8 in., 28°

CASING SIZE
9-5/8 in.

TEMPERATURE
338°F (170°C)

PRESSURE
6,900 psi (47.5 MPa)

DEPTH
Intermediate section/depleted zone

PRODUCTS/SERVICES
- Interpretation and Evaluation Services (IES)
- Integrated Services and Projects (ISP)
- Managed pressure drilling

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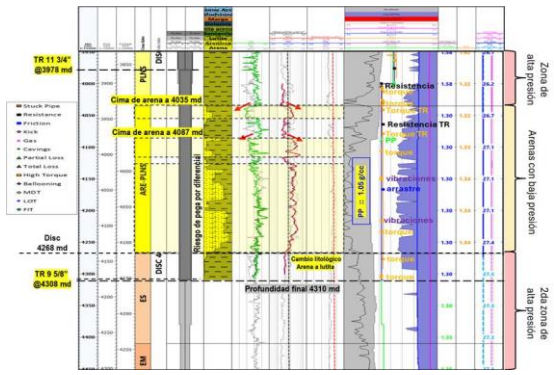
Our Approach

- Use of MPD in the risk zone was established and, after two out of the four wells were drilled, the continuity of MPD was subject only for the reservoir interval were gas-influx events and fluid losses due to highly fractured carbonates were the main issue.
- No lost-in-hole events due to geology/geomechanics was accounted for this job at critical intervals.
- The Weatherford team's performance at high-pressure, high-temperature (HPHT) wells in the Bakte field was recognized and the delivery time ahead of the competitors was proven with efficiently drilling and well completions for four HPHT wells in an uncertain geological environment and specific reservoir conditions.
- The Weatherford performance and lessons learned established new standards for best practices in casing points and well schematic optimization.

Value to Customer

- The Weatherford team showed a safe and quality option in the drilling and completions services for HPHT fields, demonstrating outstanding performance while drilling four wells almost in parallel while the competitors continue drilling their unique assignments and incurring large, accumulated nonproductive time (NPT).
- By drilling the four wells across the field in different flanks and clarifying geological features and uncertainty, Weatherford delivered a better understanding of the field for future development. Reservoir pressures and temperatures were also evaluated for a full characterization.
- Weatherford technology and expertise directly contributed to the operator's overall strategy and added approximately 8,000 bpd of production from the four drilled wells.



Geological/geomechanical follow-up and update for critical and reservoir sections based on mud density and ECD recommendations with MPD tools control to avoid additional events.

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