

Overcoming Challenging Formation Conditions

Managed Pressure Drilling, Cementing Combine to Save \$650,000 USD, 5 Days in West Kazakhstan

Objectives

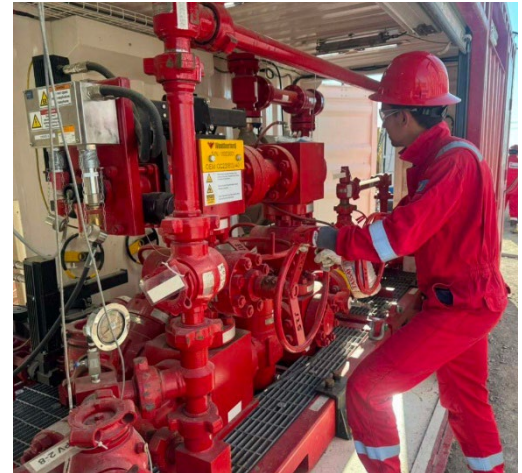
- Maintain consistent and accurate pressure control throughout the drilling of a 12 1/4-in hole section while minimizing salt creeping, fluid losses, brine influx, and wellbore instability in an exploration well.
- Reduce the risk of losses and influxes during cementing of the 9 7/8-in liner and enhance overall wellbore integrity on a 0.2 ppge operating window with zero nonproductive time (NPT).
- Achieve successful zonal isolation by ensuring full 100% returns during the liner cementing operation.

Our Approach

- The section was drilled using managed pressure drilling (MPD) enabling early kick and loss detection mode along with constant bottomhole pressure (CBHP) technique.
- While drilling, several drillstring sticking events caused by salt creeping and wellbore instability were observed that led MPD field personnel to increase the bottomhole equivalent circulating density (ECD) by applying surface backpressure without weighing up the drilling fluid.
- Multiple dynamic pore pressure tests, fracture-injection tests (FIT), and leak-off tests (LOT) were performed to confirm the lower and upper pressure boundaries.
- Weatherford collaborated with the cementing company and the customer during the planning phase to identify the operating parameters, including optimum pump flow rate, the target ECD during cementing at the loss zone/casing shoe, and the required surface backpressure (SBP) to maintain the target pressure profile.
- During the execution phase, the team successfully performed the managed pressure cementing (MPC) operation according to the pumping schedule, effectively navigating the narrow pressure margin conditions.
- A maximum SBP of 600 psi (4.14 MPa) was applied during cement unit stoppages to maintain the target ECD at TD, ensuring a constant bottomhole pressure throughout the operation.

Value to Customer

- Saved more than \$650,000 USD and 5 days of rig time by delivering the 12 1/4-in section and 9-7/8-in liner cementing with zero NPT.
- Provided real-time pressure management within an extremely narrow operating window (0.2 ppge), mitigating salt creep, brine influx, and losses through CBHP drilling and early kick and loss detection.



The Modus managed pressure wells solution enhances operational performance with simple, precise pressure management while capturing data in a digital platform.

LOCATION

West Kazakhstan

WELL TYPE

Onshore, vertical, exploration

FORMATIONS

Salt

HOLE SECTIONS

12-1/4 in

LINER SIZE

9-7/8 in

DEPTH

14,993 ft (4,570 m) MD/TVD

SERVICES/PRODUCTS

- Modus managed pressure wells solution
- RCD 7825 model
- Remote MPD engineering support
- Managed pressure cementing



Overcoming Challenging Formation Conditions

Managed Pressure Drilling, Cementing Combine to Save \$650,000 USD, 5 Days in West Kazakhstan

Value to Customer (continued)

- Maintained operational continuity by using MPD surface backpressure as an active control parameter, applying up to 600 psi (4.14 MPa) during cement unit stoppages to hold constant bottomhole pressure.
- Secured long-term well integrity with 100% returns to surface and zonal isolation confirmed by good cement bond log (CBL) results, establishing an engineering foundation for future MPC planning in salt environments.
- The successful isolation of the salt section ensured long-term well integrity and delivered excellent CBL results. The integrated application of MPD and MPC technologies enabled safe operations within a narrow pressure window, minimized formation-related challenges, and achieved the cementing objectives without NPT.



As part of an overall well integrity system, the Modus solution enables safe drilling in narrow, shifting, and unknown mud-weight windows by managing ECDs, delivering a trusted approach to all wells.



The Modus solution enhances operational performance with simple, precise pressure management while capturing data in a digital platform.

