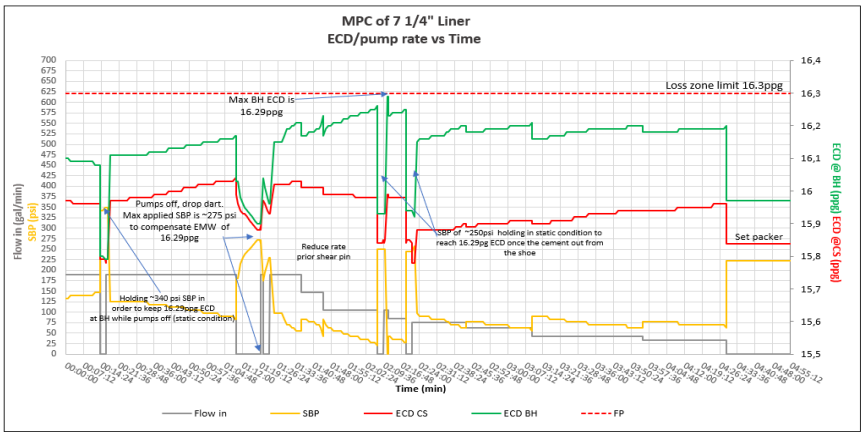
Managed Pressure Drilling Techniques

Cemented Liner Through High-Pressure Salt Section With Narrow Pressure Window, Mitigated Losses



The chart shows the managed pressure cementing process for the 7 1/4-in. liner.

Objectives

- Manage well pressure during the entire well program, including drilling, tripping, and running the liner with a narrow operating window, and eliminating losses/influxes through a high-pressured salt section.
- Minimize losses and influxes while cementing the 7 1/4-in. liner and improve wellbore integrity.

Our Approach

- The Weatherford team deployed the PressurePro system, using a set-point choke, Coriolis flowmeter, and Model 7100 rotating control device (RCD) to enable managed pressure drilling (MPD) and managed pressure cementing (MPC) techniques.
- The team was able to develop and execute the first full MPC operation in this field while following the pumping schedule throughout the cement job to navigate between a 0.2 ppg margin of well losses and gains.
- Mud weight (MW) was reduced below the normal salt section MW, losses were managed, and adequate surface backpressure was applied to avoid being underbalanced, which can result in salt creep and/or an influx in this section.

LOCATION
West Kazakhstan

WELL TYPE
Onshore, J-type, producer well

FORMATION
Salt

HOLE SIZE
8-1/2 in.

PRODUCTION LINER SIZE
7-1/4 in.

MEASURED DEPTH
14,809 ft (4,514 m)

PRODUCTS/SERVICES
- Constant bottomhole pressure (CBHP) application
- Model 7100 rotating control device
- PressurePro® set-point choke
- Coriolis mass flowmeter
- 4-in. HP/LP flowline
- Remote MPD engineering service

Weatherford®

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The pumping schedule of managed pressure cementing of 7 1/4-in. liner as displayed via a screenshot from the Victus™ Intelligent MPD service.

Value to Customer

- Managed pressure cementing provided the ability to improve zonal isolation by cementing the 7 1/4 –in. liner in an extremely narrow downhole window with a pressure margin of approximately 0.2 ppg.
- Application of MPD techniques allowed Weatherford to handle and mitigate significant losses while drilling and cementing, and to obtain a strong shoe for further drilling to total depth (TD).
- This technology will be an enabler for the customer in the future, ensuring wells meet specific objectives and minimizing nonproductive time (NPT) events.