Managed Pressure Cementing, Drilling

Successfully Implemented in First Deployment in Deep Jurassic Reservoirs of West Kuwait

The pumping schedule of the managed pressure cementing of the 7 5/8-in. liner as displayed via a screenshot from the Victus simulation.

Objectives

- Use surface backpressure to enable the customer to adjust the bottomhole pressure (BHP) instantly.
- Enhance kick/loss detection capability and manage the BHP while maintaining pipe movement.
- Reduce the potential nonproductive time (NPT) from a kick/loss scenario.
- Minimize losses and influxes while cementing the 7 5/8-in. liner and improve wellbore integrity.

Our Approach

- Weatherford managed pressure drilling (MPD) experts deployed the fully automated MPD system including a rotating control device (RCD) 7875, a fully automated MPD choke manifold controlled by the Victus™ Intelligent MPD System, and a Coriolis mass flowmeter to enable 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 in narrow pressure margin of well losses and gains.

Value to Customer

- The fully automated MPD system used surface backpressure to adjust the BHP and allowed the well to be drilled without any well control issues or stuck pipe events.

LOCATION:
West Kuwait

WELL TYPE:
Onshore development, deviated 42°

FORMATIONS:
Limestone

HOLE SIZE:
9-1/4 in.

PRODUCTION CASING SIZE:
7 5/8-in. liner

MEASURED DEPTH:
16,945 ft (5,164 m)

PRODUCTS/ SERVICES:

- Constant bottomhole pressure (BHP) application
- Victus Intelligent MPD System
- RCD Model 7875
- Coriolis mass flowmeter
- 6-in. HP/4-in. LP flowline
- Remote MPD Engineering service

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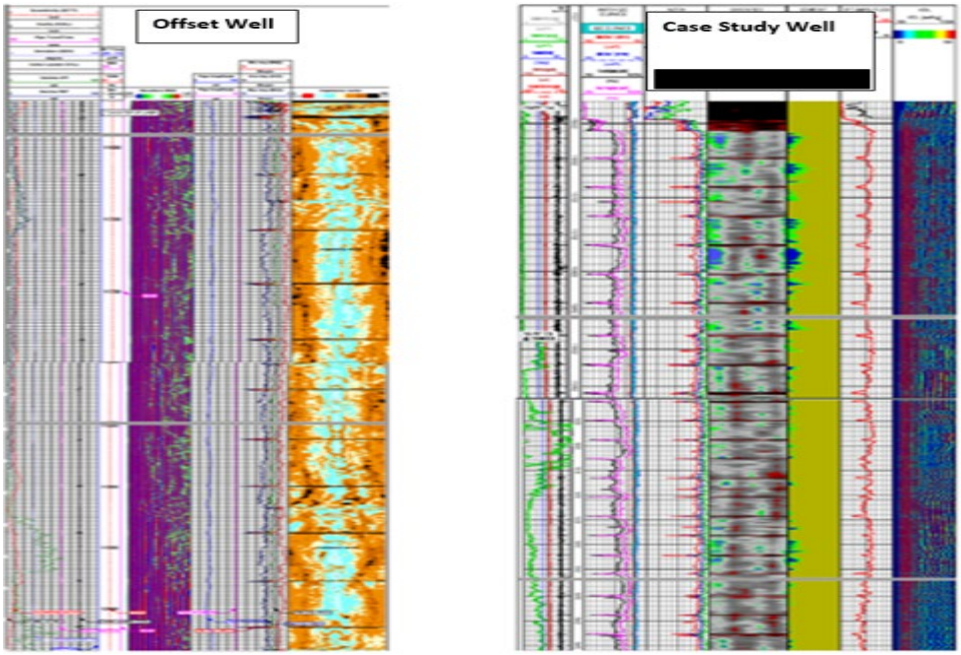
Managed pressure cementing–including the fully automated Victus Intelligent MPD System, Coriolis flowmeter, RCD 7875–successfully cemented the 7 5/8-in. liner.

Value to Customer (continued)

- As a result of the implementation of MPD, constant equivalent circulating density (ECD) was maintained during pumps on and off, enabling the customer to understand the well behavior and operating pressure window. With a constant ECD, field personnel were able to manage the pressure while drilling, stripping the liner in the wellbore, and a successful cementing operation.
- MPC improved zonal isolation by cementing the 7 5/8-in. liner in the narrow downhole pressure margin (PP 17.8 ppg and FP 18.7 ppg).
- The cementing operation was performed without any gain/loss event and the integrity was positively confirmed by the cement bond log requested by the customer and compared to offset wells.
- MPC techniques maintained the original cement slurry density, enabling placement of the cement at the optimal pumping rates and maximizing the cement strength.
- No health, safety, or environment (HSE) incidents were recorded during the MPC job's flawless execution.
- Weatherford's comprehensive solution—customized to this well by a thorough understanding of the downhole conditions and boundaries—translated to a successful drilling and cementing engineering strategy with MPD.



The 7 5/8-in liner cement bond logs from the offset wells cemented conventionally (left) showed moderate-to-poor cement behind the casing and channels within the cement as compared to case study well (right) completed with MPD and MPC techniques.

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