

Automated Continuous Circulation Mitigates Downhole Losses While Running Liner in Offshore Well

E-CD™ DEVICE PROVIDES CONTINUOUS CIRCULATION AND HOLE CLEANING DURING DRILLPIPE CONNECTION PROCESS

SOUTHEAST ASIA

CHALLENGE

- » Prevent severe losses experienced in offset well
- » Improve hole cleaning and cuttings movement
- » Drill through narrow operational window formation
- » Maintain wellbore stability for running liner to bottom

SOLUTION

- » e-cd continuous circulation system – for constant equivalent circulating density and constant hole cleaning
- » e-cd electric system – for automated diversion process via remote control station

RESULT

- » Reached all planned section TDs
- » Maintained hole cleaning and continuous circulation during connections
- » Eliminated wellbore stress cycling due to pumps on/off
- » Achieved 100% success rate of e-cd connections

OVERVIEW

An operator wanting to run a liner through a narrow operational window formation offshore in Southeast Asia had suffered severe losses drilling a near-by well. To achieve a positive outcome, it was necessary to improve circulation techniques and find a novel engineered solution for accomplishing several downhole operations, including cementing and coring. Halliburton had already used the e-cd™ continuous circulating system in other scenarios with this client—and even discussed pumping darts through the e-cd subs—but had not implemented the advanced procedure to date.

CHALLENGE

Ongoing hole cleaning and cuttings movement was crucial to safely and seamlessly reach total depth (TD) for running the liner in hole without any pack-off or stuck liner incidents. This would require maintaining circulation during pumps-off events, in particular. Also, in order to drill through a narrow operational window formation, constant bottomhole pressure would have to be maintained during drillpipe connections. All this while maintaining wellbore stability and hole cleaning for successfully running liner to bottom in extended reach sections was crucial.

SOLUTION

The Halliburton e-cd circulating device was utilized in the drillstring to provide continuous circulation and hole cleaning during the drillpipe connection process. In this case, the e-cd electric equipment was also implemented to allow remotely controlled operations that not only increased efficiency and cost effectiveness by minimizing connection time, but also assured safe unmanned operations. Finally, the use of a liner activation dart was employed, along with a guide sleeve to ease the dart pumping process.

PROJECT DETAILS

Near balance mud was used for drilling to minimize downhole losses and extend section TD. The liner was run first using the e-cd subs to provide continuous circulation. Then, the darts



e-cd™ Continuous Circulation System



were dropped through the drillstring, followed by cementing the liner with the e-cd subs still in place. The e-cd continuous circulation was deployed over three sections, performing 130 e-cd connections during drilling, coring, tripping, and running liner operations.

RESULT

In total, 16 e-cd connections were made while running the liner. This represents Halliburton's first ever e-cd application in which darts were pumped through e-cd subs or a liner was run using e-cd continuous circulation methods.

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