CASE STUDY

MIDDLE EAST

HALLIBURTON

Tailored well control solutions to help the operator regain access to the wellbore

Successful back pressure valve recovery with a 125 mm annular cutter

CHALLENGE

- Regain access to the wellbore
- Remove milling debris under sustained pressure
- Control fluid loss

SOLUTION

- Bullhead 150-pcf OBM to kill well during milling operation
- Deploy GDVU with 125-mm annular cutter to mill BPV
- Use constant circulation system to flow kill-weight mud and monitor fluid loss
- Remove debris using compressed air jetting tool

RESULT

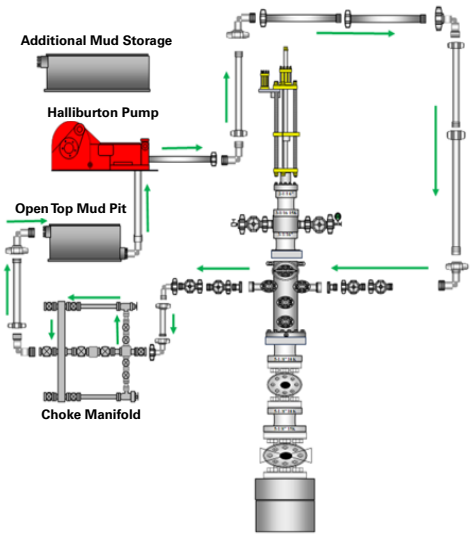
- Maintained zero psi wellhead pressure
- Milled and recovered BPV
- Enabled completion of intervention

Overview

An operator in the Middle East achieved uninterrupted multi-stage fracturing by partnering with Halliburton Boots & Coots® to implement a tailored well control solution. After drilling and completing a horizontal gas producer well, the operator performed a 46-stage hydraulic fracturing operation and installed a 5-in. Cameron Type H back pressure valve (BPV) for well control. Each stage required milling perforating plugs, but high wellbore pressure and exposed upper perforations caused repeated BPV removal failures. The challenge threatened operational continuity and increased risk for personnel and equipment.

Challenge

Operations in the Middle East often involve gas extraction from high-pressure, tight reservoir rock. During this campaign, the operator faced 2,000 psi of wellbore pressure beneath a 5-in. Cameron Type H BPV after bullhead injection of 111 pfc (14.7 ppg) brine. The operator struggled to retrieve the BPV before deploying coiled tubing to mill the plugs. Persistent well pressure also restricted debris removal and raised concerns about maintaining safe conditions for milling operations.



Surface equipment prepared for pressure control operations in challenging offshore conditions

Solution

Halliburton Boots & Coots® proposed a customized well control strategy tailored to the well's conditions. The plan called for bullhead injection of 150-pcf oil-based mud (OBM) into the 5½-in. production casing with a constant circulation system to distribute kill-weight mud evenly across the wellhead. This approach helped the keep the well full of kill fluid and facilitated real-time monitoring of fluid loss rates.

To remove the BPV, the team deployed a 125-mm annular cutter mounted on the gate valve drilling unit (GVDU). The process was designed to maintain a maximum loss rate of 3 bbl/hr for safety. The team killed the well by bullheading a total of 350 bbls of 150 pcf OBM to overcome the recorded bullhead pressure of 3,400 psi. When the loss rate exceeded the 3 bbl/hr. threshold, personnel monitored the well for two hours and pumped additional kill mud until pressure stabilized at zero psi. To keep the well dead, the team bullheaded 10 bbls of 150 pcf OBM every three hours.

To operate the GDVU safely from the work platform, the team removed one wellhead valve to lower the tree top. This step was approved through the management of change (MoC) process, and two mechanical barrier policies remained in place throughout milling. Compressed air jetting was selected for debris removal, and the BPV coupon was recovered with a retrieval tool on a dry rod.

Successful BPV plug recovery after milling

Result

Halliburton's solution allowed the operator to mill perforating plugs to a target depth of 3⅛-in. using three 125-mm annular cutters. Bullhead injection of OBM and constant circulation methods provided effective well control and allowed accurate monitoring throughout the operation. The operator reported satisfaction with the incident-free outcome. This operation enabled uninterrupted multi-stage fracturing and protected onsite personnel, equipment, and the environment.

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