CASE STUDY

First Halliburton Dynamic Underbalance Perforating Job in Cameroon Achieves Customer's Goals

SUCCESSFUL PERFORMANCE CLEARS OUT DEBRIS AND IMPROVES PRODUCTION

OFFSHORE CAMEROON, WEST AFRICA

CHALLENGES

- Clean perforation tunnel in heavy fluid overbalanced condition efficiently
- Perform first dynamic underbalance (DUB) perforating project in Cameroon

SOLUTION

- Perform SurgePro™ modeling options to predict the effects of pressure transients during perforating
- Customize the bottomhole assembly (BHA) to achieve the benefits of dynamic underbalance
- Perform extensive job planning and prejob meetings to ensure flawless job execution

RESULTS

- Completed job in with zero nonproductive time (NPT)
- Successfully cleaned out the perforation interval, achieving a good skin result as predicted by the model and meeting the client's objective
- First successful Halliburton DUB project in Cameroon

OVERVIEW

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An enhanced technique known as dynamic underbalanced (DUB) perforating creates a negative pressure differential or underbalance, causing fluid to move toward the wellbore, even in an initial overbalanced static condition. DUB is important to create open, undamaged perforations and optimize well productively. A DUB condition can be controlled by understanding and carefully managing the dynamic pressure transients. The objective is to allow the large differential pressure to flush back perforating debris and crushed rock to clean the newly formed perforating tunnel. Halliburton SurgePro™ software can model the effects of these transient pressures to engineer DUB perforating operations. These capabilities were harnessed when Halliburton performed its first DUB perforating project in Cameroon, West Africa.

CHALLENGE

An offshore operator in Cameroon needed to ensure a clean perforation tunnel in heavy fluid overbalanced condition. The client had chosen to use heavy fluid to save intervention costs, but if not properly handled, the perforation event could cause debris to flow back into the tunnel or bottom of the well, eventually impacting production.

SOLUTION

After gathering well data from client through various discussions, Halliburton recommended performing its SurgePro™ modeling options to accurately predict the effects of pressure transients during perforating. SurgePro modeling estimated 90% of cleanup during the perforating event with the agreed surge chambers. The bottomhole assembly (BHA) was customized to achieve the benefits of dynamic underbalance with the surge chambers in overbalanced condition. Extensive job planning and prejob meetings with the area technical team were held to ensure flawless job execution.

RESULT

The Halliburton team successfully performed its first DUB job in Cameroon with zero nonproductive time (NPT). The engineered DUB solution was successfully executed, reducing the skin as predicted by the SurgePro model. During the dynamic surge event, the crush zone debris was removed from the perforation tunnel and captured within the surge chamber, allowing retrieval to the surface. This enabled analytics to be performed on the debris for better reservoir understanding and characterization. The results exceeded customer expectations, and the client recognizes the advantages of restored production and reduced intervention costs provided by an engineered DUB solution.

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