CASE STUDY

HALLIBURTON

Africa

Foamed spacer application mitigates sustained casing pressure (SCP)

Foamed Tuned® Spacer E+™ cement spacer success becomes operator's top choice for future campaigns in Africa deepwater operation

CHALLENGE

- Mitigate SCP in deepwater campaign that could lead to internal casing collapse, external casing burst, or packoff failure and require costly remediation

SOLUTION

- Deploy foamed Tuned® Spacer E+™ cement spacer

RESULT

- Trapped more than minimum amount of N_2 foamed spacer to mitigate SCP
- Operator plans to use foamed spacer method for future campaigns

Overview

Sustained casing pressure (SCP), or annulus pressure buildup (APB), can challenge well designs. A confined annulus is created when the top of cement (TOC) reaches the previous shoe and the trapped incompressible fluid in the annulus cannot expand with temperature changes. As a result, the annulus pressure increase can lead to internal casing collapse, external casing burst, or packoff failure.

Challenge

An operator in Africa drilling deepwater wells designed the TOC below previous casings to avoid annulus pressure buildup from trapped incompressible fluid. This method worked during previous operations because the sand formations were deeper than the previous shoes for the intermediate and production sections.

However, on the latest drilling campaign, sand formation was close to the previous casings and new regulations required the operator to cover those sands. This meant the TOC had to reach above the previous casing shoe and inside the casing-to-casing annulus. The operator needed a plan to mitigate the risk.

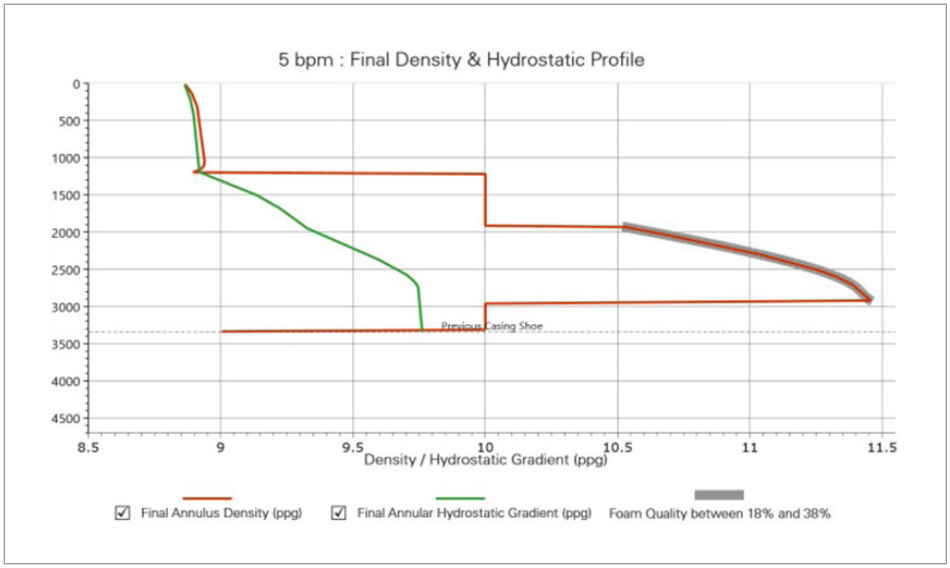
Solution

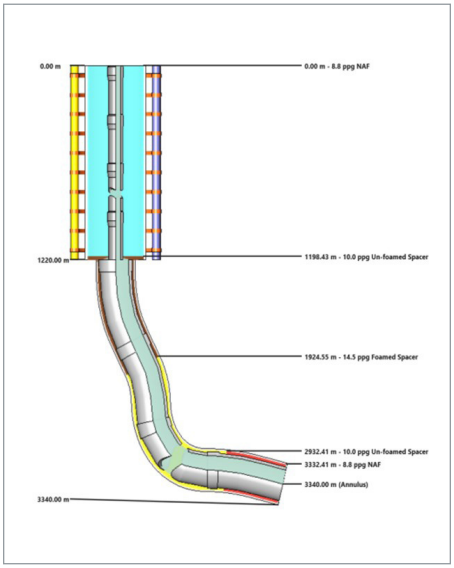
Halliburton identified an optimized solution to mitigate SCP. The proposed solution involved placement of a compressible fluid in the casing-to-casing annulus to manage the pressure increase when the well is placed on production. Halliburton cemented the liner with a VersaFlex® expandable liner hanger (ELH), followed by a combined 10 3/4-in. × 9 5/8-in. tieback in the two wells selected for the trial. A foamed spacer was then placed in the annulus between the tieback and the 13 3/8-in. previous casing.

The operator simulated the required volume of nitrogen to trap in the annulus. iCem® cementing service was used to calculate the liquid volume of foamed cement necessary to trap the predetermined nitrogen volume in each well. Halliburton proposed a 14.5-lbm/gal Tuned® Spacer E+™ cement spacer base density foamed to 10.8 lbm/gal. Unfoamed 10-lbm/gal Tuned Spacer E+ cement spacer was pumped ahead and behind the foamed spacer to separate it from the 8.7-lbm/gal NAF mud.

Result

The operator and Halliburton executed and completed the wells. The foamed spacer was placed in the annulus of the 10 3/4-in. × 9 5/8-in. tieback. The liquid and nitrogen rates were pumped as planned, followed by activation of the tieback hanger seals. The foamed spacer application helped prevent SCP and costly remediation.The operator plans to use this technique for future campaigns.





For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

halliburton.com

HALLIBURTON