

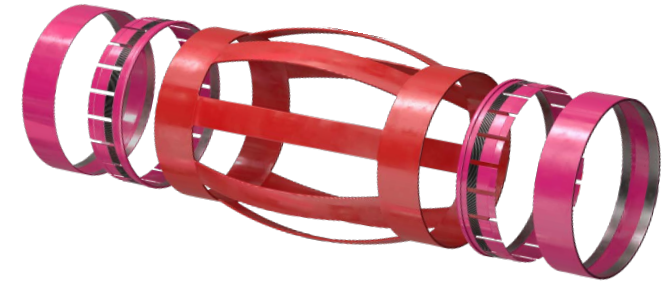


DENMARK, HARALD EAST

TUR-CT EXCELS IN HIGHLY DEVIATED, TIGHT TOLERANCE LINER CEMENT JOB

Region: Offshore Denmark
Location: Harald East

Country: Denmark



THE CHALLENGE

TotalEnergies designed a tight tolerance cement job for a high-angle exploration well, requiring an 11 3/4-in. liner to run inside a 13 5/8-in. casing. Challenges included:

- **Restricted clearances:** The minimum restriction was 12 3/8 in., with a drift diameter of 12 1/4 in.
- **Complex geometry:** The well featured a 14 3/4-in. open hole with a 64° inclination and a total depth (TD) of 10,859 ft.
- **Uncertain hole conditions:** After running the liner and beginning circulation, the stability and cleanliness of the hole remained unknown, posing risks for proper mud displacement and cementing.

THE SOLUTION

A total of 28 close tolerance and flexible TUR-CT (11 3/4 in. x 14 3/4 in.) centralizers and 56 slim stop collars (11 3/4 in.) were installed by Halliburton, with one centralizer per joint to optimize standoff and minimize casing drag.

Simulations were performed to predict torque and drag forces during liner deployment, ensuring it could be safely run to the target depth without excessive resistance.

Halliburton conducted a 3D fluid flow simulation using iCem® Service to model displacement efficiency, ensuring proper mud removal and cement placement. The analysis confirmed that the cement coverage would exceed 80% across the cemented interval, supporting zonal isolation and well integrity.

THE RESULT

- **Smooth liner deployment.** The liner was run in hole (RIH) within the simulated parameters. No unexpected drag or excessive resistance was encountered, validating the torque and drag analysis.
- **Effective cementing and well integrity.** A successful Formation Integrity Test (FIT), confirmed the cemented interval's ability to withstand expected downhole pressures. A positive casing pressure test, verified well integrity and cement bond quality.

“ We successfully mitigated risks, ensured proper liner deployment, and achieved effective zonal isolation.

Senior Engineer, Halliburton ”