Case study: Gulf of Mexico, United States

FoamSet prevented wellbore breaching at seafloor

A deepwater exploration well in the Gulf of Mexico had a water depth of 2,162 ft (659 m), and was being drilled to a conductor casing setting depth at 3,410 ft (1,039 m). Gumbo carrying the shallow gas was observed at static conditions. In an attempt to maintain wellbore stability, the operator decided to increase the mud weight in the pump and dump (PAD) mud. This resulted in higher equivalent circulating density (ECD) in the wellbore breaching to mudline prior to the cementing operation. The operator asked Baker Hughes to provide a solution.

The Baker Hughes FoamSet™ liquid foaming system was used due to its improved compressive strength and rapid static gel strength development.

This gas-tight FoamSet slurry was designed to maintain density and rheological hierarchy, enhance openhole displacement of residual mud and gumbo, as well as maintain sufficient well control in tight ECD margins.

Baker Hughes successfully executed the FoamSet operation with cement returns visually verified at the mud line with a pH meter and no post flow issues after cement was in place. The FoamSet operation allowed the operator to drill ahead without any loss circulation issues and achieve the setting depth for the subsequent riserless surface casing.

The Baker Hughes FoamSet liquid foaming system.

Challenges

- Narrow pore pressure and frac gradient margins, with high pore pressure
- Visual indication of shallow gas flow
- Operator could see wellbore breaching at seafloor

Results

- Verify visual and pH of spacer and FoamSet cement return at mudline
- Ensured there was no flow after cementing operation
- Confirmed lead and tail cement density at 99.1% and 92.4% within ±0.2-ppg
- Deployed FoamSet cementing system
- Designed nitrogen rate to allow range of foam cement density pending change in wellbore parameter