CASE STUDY

Form-A-Squeeze Pill Cures Losses while Drilling through a Major Fault Zone in Indonesia

"Not only did this technology help to stop losses during backreaming operations at a required flow rate, no special pit preparation, equipment or specialist personnel were required."

Client Representative

Well Information

Location	Offshore Indonesia
Water depth	310 ft (94 m)
Drilling fluid	Paradril* System
Interval drilled	12¼-in. highly deviated section, 1997 to 8465 ft (609 to 2580 m) measured depth
Inclination	69°
Bottomhole temperature at loss zone	210°F (99°C)
Mud density	10.5 lb/gal (1258 kg/m^3)

The Situation

A highly deviated well was drilled into projected major fault zones using 10.5 lb/gal (1258 kg/m^3) Paradril non-aqueous drilling fluid. In addition to the well's remote location, logistics were proving to be an issue. Partial-to-total lost circulation events were also expected, particularly with the planned use of non-aqueous-base mud. No losses were encountered while drilling through three of the faults. Total lost circulation was encountered while drilling through a fourth fault at 8034 ft (2449 m) with 750 gal/min (2839 L/min) flow rate.

The Solution

M-I SWACO* recommended to spot a 40-bbl Form-A-Squeeze* lost-circulation pill to help minimize losses while running 9⅝-in. casing at the recommended running speed. A cost-effective solution to lost circulation in all types of fractures and vugular and matrix formations, this high-fluid loss/high- solids slurry operates by squeezing the slurry during the liquid phase and leaving a solid plug behind.

The Results

The flow rate was reduced to 400 gal/min (1514 L/min) while drilling another 30 ft (9 m), with returns building to 65%. A 50-bbl conventional lost circulation material pill was then spotted, and the bit was pulled above it, letting the losses partially heal. Drilling resumed to well total depth at 8478 ft (2584 m) at 400 to 750 gal/min (1514 to 2839 L/min) with losses between 3 and 50 bbl/hr.

While circulating the hole clean at well TD with 700 gal/min (2650 L/min), losses built to 60 bbl/hr. Due to the nature of highly deviated wells in this area, backreaming most likely would be required while tripping out of the hole with the drilling assembly. Higher loss rates would be expected while backreaming. It was then decided to spot 40 bbl of a Form-A-Squeeze pill. This is a high-fluid-loss slurry lost circulation pill.

The Details

1. Hesitate squeeze FORM A-SQUEEZE pill, held at 150 psi.
2. Initiated circulation at 600 gal/min (227 L/min), washed down to bottom with zero dynamic losses. Calculated equivalent circulating density (ECD) at 11.2 lb/gal (1342 kg/m^3) (10.5 lb/gal [1258 kg/m^3] active mud density).
3. Tripping out the hole with backreaming was required. No further losses were experienced.
4. Performed casing running speed analysis using VIRTUAL HYDRAULICS* advanced hydraulic program. To minimize surge pressure while running 9⅝-in. casing, it was recommended to maintain running speed at 6 min per joint. With 6 min per joint running speed, ECD was 11.25 lb/gal (1348 kg/m^3).
5. While running casing at 6 to 7 min per joint, losses were to 0.3 bbl per joint run.
6. While circulating the casing before cementing, 75% returns were observed. However, the fault healed and full returns were observed during the cement job.

Questions? We'll be glad to answer them.
If you'd like to know more about the FORM-A-SQUEEZE product and how it's performing for our other customers, please call the ALPINE SPECIALTY CHEMICALS or M-I SWACO office nearest you.

ALPINE, a business unit of M-I LLC.

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