

ONE-TROL Additive Saves 17.5 Hours of Rig Time in HPHT Logging Operation, Gulf of Thailand

Filtration control additive eliminates mud conditioning trips between logging runs

CHALLENGE

- Mitigate filtrate loss in a high-temperature well.
- Acquire extensive logging data.

SOLUTION

- Use the RHADIANT* oil-based ultrahigh-temperature drilling fluid system with the ONE-TROL* filtration-control additive and ECOTROL HT* high-temperature filtration-control additive to achieve a stable system at extreme temperatures and gain control of fluid properties.

RESULTS

- Made two successful logging runs in a high-temperature well.
- Maintained filtrate loss and filtercake within specifications.
- Saved 17.5 hours of rig time by eliminating mud conditioning trips between logging runs.
- Reduced time to lower and land the 2 $\frac{7}{8}$ -in tubing by 4.8 hours compared with plan due to stable fluid and no high-temperature gelation.



Mitigate fluid loss in an HPHT well to facilitate well logging

An operator in the Gulf of Thailand required a nonaqueous fluid to drill a high-temperature development well with an estimated static bottomhole temperature of 210 degC [410 degF]. The main objective of the well was to acquire wellbore data through extensive logging. A VERSACLEAN* mineral oil-based drilling fluid system performed as expected to 3,274-m MD [10,742 ft-MD], where the bottomhole circulating temperature (BHCT) was already higher than 160 degC [320 degF].

Use ONE-TROL agent to provide high-temperature filtration control

For high-temperature drilling, M-I SWACO, a Schlumberger company, proposed using the RHADIANT system. The system combining the MUL XT* high-temperature emulsifier, VERSAGEL HT* high-temperature viscosifier, and a fluid loss control package comprising the ECOTROL HT additive and ONE-TROL additive would be added to the system after the BHCT reached 170 degC [338 degF].

The fluid provided a stable emulsion at the extreme temperatures encountered, nonprogressive gel strengths with reduced yield points, and low-end rheology as well as low filtrate and firm filtercake, both at 175 degC [347 degF] and 200 degC [392 degF].

Very good fluid stability was observed on a bottoms-up sample. All tests showed low fluid loss and good quality for the high-temperature cake. A fluid loss of 2.0 cm³ per 30 minutes and a filtercake thickness of 0.79 mm [$\frac{1}{32}$ in] were achieved, which were both within the specifications of 2.0-cm³ fluid loss and 1.59-mm [$\frac{2}{32}$ -in] thickness, respectively. All fluid properties were easy to control, including rheology and gel strengths. The inclusion of the ONE-TROL additive increased confidence in the performance of the drilling fluid system.

Saved 17.5 hours of rig time

The well was drilled and logged successfully. Two openhole wireline logging runs were performed at bottomhole static temperature of 205.6 degC [402.1 degF]. The wellbore was open while logging for 42 hours without any reported problems.

The high performance of the system in filtration and fluid property control eliminated the need to make mud conditioning trips between the two logging runs, which saved at least 17.5 hours of rig time.

The operator was able to reduce the time to lower and land the 2 $\frac{7}{8}$ -in tubing by 4.8 hours compared with plan, due to the stable fluid and no high-temperature gelation.

Stable Logging Environment with ONE-TROL Filtration-Control Additive

Property	Initial Measurement	Measurement After Logging at 3,748 m [12,297 ft]
Density, sg	1.66	1.66
Rheology at 600/300 rpm	155/90	161/92
Rheology at 200/100 rpm	71/48	71/46
Rheology at 6/3 rpm	65	69
Plastic viscosity, cP	65	69
Yield point, kPa [lbf/100 ft ²]	11.97 [25]	11.01 [23]
Gel strength at 10 s/10 min/30 min, kPa [lbf/100 ft ²]	8.6/13.4/14.4 [18/28/30]	8.1/11.0/11.5 [17/23/24]
Fluid loss at 200 degC, cm ³ /30 min	2	2
Filtercake, in	$\frac{1}{32}$	$\frac{1}{32}$

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