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CASE HISTORY BRIEF 2013 • 03S

Newpark's X-Prima Success Application as Alternative to Cement Plug in Severe Losses in Campos Basin Brazil



Petrobras has performed X-Prima pill in the Marlim field (9-MRL-229D-RJS) in Campos Basin avoiding cement plug operation

Challenge

Marlim is located at Campos Basin, 110 km off the coast of the Rio de Janeiro state. The main objective is the Marlim Sandstone located at 2599 m (TVD).

The program for this well was drilling through 5 intervals with WBM due environmental restrictions. For the intermediate, sections were predicted presence of high reactive shales with layers of sandstone. The ECD should be monitored and controlled considering the risk of fracture induction due the formation pressure range expected. The challenge was to drill the high reactive shale with presence of sand intercalation from intermediate sections avoiding factures induced by high ECD or surge effects with no wellbore instability events.

The DeepDrill System was proposed to drill the 16" and 12 1/4" intermediate sections in order to prevent formation instability and minimizes solids incorporation, enabling to set the casing at the shale formation above the reservoir sandstone.

Recommendation/Plan

Due the possibility of severe losses, a contingency of LCM material was available. The contingency of X-Prima necessary to build 100bbl of squeeze pill is already a standard practice adopted by Petrobras in Campos Basin and Santos Basin. The X-Prima pill is used as alternative once the regular LCM pills (calcium carbonates and fibrous materials) are not effective. Cement plugs only would be used as a third option. A bath mix was sent to prepare the pills.

Execution

Drilled 16" interval until TD with no incidents. Conditioned well and started running casing according program. During running casing, at 445 m (still inside the riser), it's found loss of circulation. Performed flow check (losses 350 bbl/h), closed BOP and filled up well using kill line each 15 min at rate of 12 bph. Pulled casing and run BHA with PBL and bit without jets to displace fluid DeepDrill 9,6 ppg by DeepDrill 9,4 ppg and condition the well. Performed displacement and observed losses of 240 bbl/h. Pump Calcium Carbonate pills with no success. Decided to build and pump X-Prima pill.

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X-Prima pill was built in bath mix with the formulation bellow:

Material	Concentration, ppb
Drill water	279,8
New X-Prima	112,5
New Bridge	10

Pill formulation programmed

Procedure:

1- Position bit at 10 m above the casing shoe;
2- Pump 60 bbl of X-PRIMA pill with cement unit and displace with DeepDrill 9,4 ppg through bit without jets spotting it in well annular.
3- Close BOP annular
4- Squeeze by kill line using cementing unit limiting surface pressure at 90 psi.
- Pump 10.0 bbl @ 0.5 bpm (active tank) and waited for one hour.
- Pump 5.0 bbl @ 0.25 bpm and waited for one hour.
- Pump 1.5 bbl @ 0.25 bpm and waited for 30 minutes.
- Repeated step above 8 times monitoring pressure until stand 90 psi at surface with 0,6 bbl pumped. Total volume pumped 27,6 bbl.
5- Opened BOP Annular.
6- Performed 30 minutes of flow check without losses.
7- Pulled out 2 stands and circulate with 800 gpm without losses.

Results

Well	9-MRL-229D-RJS
OH Diameter	16" / 17,4" (caliper logging)
Water Depth (m)	763 m
MD (m)	1840 m
TVD (m)	1840 m
Litology	UBATUBA
Formation Characteristics	Miocênico sandstone (porous)
PP (ppg)	8,6
FLUID	DeepDrill
MW (ppg)	9,4 ppg
Over Balance PSI	250 psi
Pill Volume (bbl)	60 bbl
Before bbl/h (static)	240 bbl/h
Before bbl/h (Dynamic)	> 720 bbl/h (Perda Total)
After bbl/h (static)	0 bbl / h
After bbl/h (Dynamic)	0 bbl / h (with flow rate at 800 gpm)

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Summary/Operator Benefits

After pump the Newpark's X-Prima pill the losses was completely extinguished. The success of X-Prima pill avoided the necessity to pump cement plug and reduced NPT.

The New X-Prima had your efficiency proved in the Petrobras wells and nowadays has been adopted as the main squeeze alternative for severe losses, independently of the service company that provide fluids services.