

Oatar : FORM-A-SQUEEZE AND FORM-A-SET AK tandem step in to reduce severe losses

"By utilizing a FORM-A-SQUEEZE" pill followed by a FORM-A-SET" AK pill allowed the National Oil Company operator to run and cement a liner. This tandem pill approach represents a step forward in curing lost circulation in faults." Mark Dick, Operations Manager – Qatar M-I SWACO

Well Information

Location	Onshore, State of Qatar
Spud Date	July 2010
Location	DK-685, Dukhan Field, West Qatar
Mud Type	
Casing Design	
Inclination	65° at casing shoe, 85° at bottom of fault
Open Hole Length	
Open Hole Interval	6,385 to 9,815 ft (1,946-2,992 m)
Fault location	6,408 to 6,696 ft (1,953-2,041 m)
Formation Type	Fractured dolomite and limestone
Estimated BHT	160° F (71° C) @ 9,815 ft MD / 6,265 ft TVD (2992 m MD/1910 m TVD)

The Situation

The Qatar National Oil Company drilled with severe losses after encountering a fault located directly below the casing shoe. The fault, including the rubble zone, was estimated to be ~280 ft (~85 m) in length. At TD the losses were ~120 bbl/hr at 270 gpm and 65 bbl/hr static losses. The operator's goal was to reduce the losses sufficiently to allow a liner to be run and cemented in place. After the operator pulled out of the hole (POOH) with the directional BHA and positioned the open jet bit near the fault, a competitor's solids-laden borate cross linked pill was pumped unsuccessfully to slow down the losses down. The operator sought an alternative to reduce the severe losses.

The Solution

M-I SWACO Qatar recommended the operator pump a 50 bbl FORM-A-SQUEEZE pill followed immediately afterwards with a 50- bbl FORM-A-SET AK pill. The operator accepted the recommendations and the tandem pills were mixed in a batch blender and pumped with no spacers.

The Results

The tandem FORM-A-SQUEEZE/FORM-A-SET AK pills were positioned successfully in the fault with losses ultimately reduced significantly to the point the operator was able to run and cement a liner.

The Details

The operator monitored the well on the trip tank while building a 50 bbl pill FORM-A-SQUEEZE and a 50 bbl FORM-A-SET AK pill using two batch mixers.

The first pill was un-weighted comprising:

Fresh water	46 bbl
Form-A-Squeeze	80 sacks

The second pill consisted of water and the following products in their order of addition:

Fresh Water	46 bbl
FORM-A-SET RET	6 pails
FLO-VIS PLUS	3 sacks
FORM-A-SET AK	23 sacks
Calcium Carbonate Fine	8.9 lb/gal density
FORM-A-SET AK	23 sacks
FLO-VIS PLUS	2 sacks
FORM-A-SET XL	5 sacks (added just prior to pumping)

The FORM-A-SQUEEZE pill was pumped into the drill-pipe followed immediately by the FORM-A-SET AK pill. No spacers were used. The cementing pumps were used to pump the pills to the bit. When the FORM-A-SQUEEZE pill reached the bit the well was shut in and the pills were displaced out of the drill-pipe using the cementing pump at a flow rate of 1.0 bbl/min.

The initial injection pressure was 310 psi at 2 bbl/minute injection rate. The pressure increased gradually to 1290 psi. The operator reduced the pump rate to maintain pumping pressure not greater than 1200 psi. The cementing pump was used to perform a series of hesitation squeezes until both pills were displaced from the drill pipe. After pumping 25 bbl the squeeze pressure decreased to 859 psi. The hesitation squeeze continued by pumping 0.5 bbl/ min. and observing the pressures until a total of 45 bbl was squeezed. The final squeeze pressure was 657 psi. The pump was shut down and the pressure bled off. The total volume of material squeezed into the formation was 100 bbl. The operator pulled drill pipe two stands out and the well remained shut in for 4 hours to give time for the FORM-A-SET AK to set up.

The well was opened up and the pipe was worked with no problems. The pumps were started and bottoms up was circulated at 25 spm and 1850 psi pump pressure with no mud losses. Once bottoms-up was pumped the pump rate was increased to 33 spm and no losses were observed. The hole was washed and reamed to find the top of the LCM pills. The plugs were reamed and washed down to previous TD. The well was circulated for 30 minutes at which time the pumps were shut down and the well was checked for flow. The well was taking fluid at a rate of 20 bbls/hr static, the dynamic losses was recorded less than 50 bbls/hr. The tandem pills of FORM-A-SQUEEZE and FORM-A-SET were successful in curing losses allowing the operator to resume operations on the well

Questions? We'll be glad to answer them.

If you'd like to know more about the FORM-A-SET or FORM-A-SQUEEZE products and how it's performing for our other customers, please call the M-I SWACO office nearest you.



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