

WELL COMMISSIONER Makes Drilling Cement, Shoe Tack on Inflow Test Run Routine in Saudi Arabia

“Over a 14- month period, the WELL COMMISSIONER* tool has performed nearly 100 inflow tests in the Kingdom of Saudi Arabia. The technology successfully drilled out both the liner and shoe track along with several hundred feet of cement in a single clean-up trip. The one-trip clean-up reduced rig time considerably.”

Todd Adams, M-I SWACO Manager Specialized Tool

Well Information

Location	Saudi Arabia
Dates	October 2008 to December 2009
Tool types	7-in. Heavy-Duty RAZOR BACK*, 7-in. MAGNOSTAR*, 9 ⁵ / ₈ -in. WELL COMMISSIONER
Application	Inflow testing 7-in liner lap on drill-out and clean-up trip
Mud types	Some OBM, mostly WBM (polymer)
Mud weights	70-148 pcf (9.36-19.78 lb/gal)
Well Depths	10,400-16,500 ft (3,170-5,029 m)
WELL COMMISSIONER setting depths	6,200-15,200 ft (1890-4633 m)
Hole Angles at WELL COMMISSIONER setting depth	0-76°
Inflow test differential pressure range	1,000-4,100 psi
Underbalancing fluid	Water (some diesel)
Drill Pipe sizes	5-in., 3 ¹ / ₂ -in., 4-in
Maximum bottom hole temperatures	165°-340° F (74°-171°C)
Maximum lengths of cement drilled inside 7-in. liners	300-600 ft (91-183 m) Max 2,700 ft (823 m)
Rotating Speeds drilling cement	30-80 RPM
Number of wells	94

The Situation

After setting and cementing the 7-in. liner, the operator’s standard procedure would be to make two trips into the well. The first would be to drill the shoe track and the hard cement left behind after the liner was cemented. The second trip typically would be for running a retrievable packer to perform an inflow test on the 7-in liner lap.

The Solution

The operator selected the M-I SWACO WELL COMMISSIONER tool, Heavy-Duty RAZOR BACK* CCT and MAGNOSWEEP* or MAGNOSTAR string magnet tools as a one-trip system was designed to clean the liner to total depth. The WELL COMMISSIONER liner testing tool is especially engineered to allow inflow and negative tests to be carried out on a liner overlap and the liner shoe track simultaneous with the wellbore clean-up trip. For this application, the technology would be used to drill out the remaining cement on the top cement plug, in order to avoid a “muddy” shoe, in addition to drilling the shoe track. Furthermore, it also was designed so the 7-in liner lap could be inflow tested.

Certain modifications in equipment and procedures evolved during the course of this campaign to allow routine drilling of significant quantities of cement, along with the shoe track, as planned on the inflow test and clean-up run.

The Details

Before initiating the job and to save both time and money, M-I SWACO Specialized Tools personnel collaborated closely with the client to optimize their liner inflow testing process. A special sleeve was designed to actively protect the WELL COMMISSIONER tool while drilling cement and liner accessories, including those comprising PDC-drillable aluminium and cast iron. The drilling fluid also had to be re-engineered to ensure no solid settling would occur during the four-to-five- hour inflow test. This viscous pill was devised to complement the drilling fluid system. Prior to conducting the inflow test, this pill was pumped ahead of the underbalanced fluid.

The WELL COMMISSIONER was landed on the liner top with the bit on bottom. The required liner inflow test was completed to specification. After drilling the shoe track and with the bit hard on bottom during the 4-5 hour inflow testing of the liners, it became practice to spot a viscous pill 200 feet (61 m) above the bit, around the bit and 200 feet (61 m) inside the drillpipe to stabilize the static mud while monitoring the inflow test. During the course of the project, a number of equipment and procedural modifications were implemented.

Typical Tool String Configuration

- 5 $\frac{7}{8}$ -in. Bit
- HWDP
- X Over NC38 Box by XT39 Pin
- 7-in. Heavy-Duty RAZOR BACK tool
- 7-in. MAGNOSWEEP Magnet or MAGNOSTAR* Magnet
- Drill Pipe to Top of Liner
- 9 $\frac{5}{8}$ -in modified WELL COMMISSIONER liner top test tool
- 5-in DP to surface

The Results

With this new solution, the 7-in. liner cement/shoe tracks typically have been drilled just prior to a four-to-five-hour inflow test and cleaned out successfully; all on a single trip. This saved, on average, more than 30 hours of rig time per job, compared to the previous procedure using two separate runs. At the end of 2009, a total of 94 consecutive jobs had been completed with no recordable non productive time (NPT).



WELL COMMISSIONER tool emerging from Inflow Test and clean-up in Saudi Arabia, after the cement and shoe track had been drilled on the same trip

Questions? We'll be glad to answer them.

If you'd like to know more about the WELL COMMISSIONER tool and how it's performing for our other customers, please call the M-I SWACO office nearest you.



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P.O. Box 42842
Houston, Texas 77242-2842
www.miswaco.slb.com
Email: questions@miswaco.slb.com