TrackMaster Select System Achieves World’s First Single-Run Triple-String Casing Exit

Modular whipstock sidetracking system enables milling multistring casing exit to bring 80-year-old well into production in California’s Inglewood field, USA

CHALLENGE
Sidetrack through three strings of casing to repurpose a challenging well in a soft, shaly, shallow sand formation that was drilled in 1935.

SOLUTION
■ Use the TrackMaster Select* modular whipstock sidetracking system and FasTrack* one-trip mill with expandable anchors to sidetrack out of the original wellbore.
■ Continue drilling with a drilling assembly including a reamer that is part of the Rhino* integrated borehole enlargement system with three PDC cutter blocks below a directional motor.

RESULTS
Performed the world’s first three-string casing exit with a total milling time of less than 5 hours.

Revive an 80-year-old well in soft, shaly sand
An operator drilling in the Inglewood field, California, USA, decided to revive a well that was drilled in 1935 and had since been plugged and abandoned. However, the operator was uncertain about the feasibility of reviving the well mainly because of the soft, shaly sand and the shallow depth. After Schlumberger achieved a successful dual casing exit for the operator on another well, the operator’s interest in reviving the 80-year-old well was rekindled.

The main challenge was to sidetrack through three strings of casing. There were additional challenges to achieving the multistring casing exit required for this operation. One was the shallow depth of 565 ft. Another was the need to underream while drilling to 2,764 ft to open the 6 1/8-in hole to 7 in; this would assist running a 5 1/2-in production liner to the bottom of the well.

Mill through three strings of casing
Although the annular space between the 9 5/8-in and 13 3/8-in casing caused concerns, the plan was to mill through the three strings with a 6 1/4-in TrackMaster Select system and FasTrack mill set up in a bimill configuration. Both eccentric and concentric cases were simulated. A close watch was kept on parameter selection — speed, WOB, and torque — versus depth while progressing down the whip and engaging the second and then the third string on this multistring exit.

The FasTrack mill can be set up in bimill and trimill configurations. The former reduces wear and improves impact resistance with a high-density PDC cutting structure; the latter drills 3- to 15-ft ratholes effectively and provides cost-effective performance with carbide inserts.
CASE STUDY: TrackMaster Select system achieves first single-run triple-string casing exit, California, USA

After the expandable anchor of the TrackMaster Select system was set, the entire whipface was milled—using the FasTrack mill in a bimill configuration—through all three casing strings and 20 ft of rathole. To complete the wellbore departure, a trip was made to pick up a 6¼-in FasTrack mill in a trimill configuration to clean up the window. The window had been milled down the whipface until the watermelon mill reached the toe of the whipstock slide. At that point, the directional assembly with the Rhino system reamer was positioned below the motor, and drilling continued to TD. The Rhino system reamer is designed with aggressive PDC cutter blocks, the ability to simultaneously drill and enlarge the hole, and a short length to limit its hindrance on the effective bit to bend of the motor.

**Achieve multistring exit in one run**
Prejob planning and the advanced whipstock system allowed the project team to adapt a single-string, foot-by-foot parameter playbook to account for two outer strings and to mill through all three strings on the first attempt.

The well was brought back to production with less than 5 hours of milling time. A triple-string exit successfully cut through 7-in, 8½-in, and 13½-in casings in 3.63 hours using a TrackMaster Select system with an expandable anchor and FasTrack one-trip mill in bimill configuration. The successful multistring casing exit was followed by 0.75 hours of cleanup with a 6¼-in FasTrack one-trip mill set in trimill configuration.