Case History

TORXS System Greatly Reduced Lost Circulation in Depleted Formation
Liner drilling job in a deviated well reduced cost to deploy liner on bottom

Benefits
- Saved money by avoiding expensive formation drilling using liner drilling and greatly reducing lost circulation
- Lowered operating costs and risk by keeping the well configuration, drilling at a 64° angle through a shallow window in a highly deviated well and long liner
- Reduced operating time because there was no stuck pipe or need for fishing

Background and challenges
- Deviated well with unstable formations in GoM offshore Mexico
- Operator expected some but hoped to avert complete lost circulation during the liner drilling liner operation
- The well trajectory of 64° needed to be maintained

Baker Hughes solution and results
- Successfully deployed Baker Hughes TORXS expandable liner hanger with EZ Case™ casing bit
- Ran 8,860 ft liner drilling job through a window at 2,625 ft and drilled down through 66 ft of transition zone (mudstone waxstone)
- Drilled 243 ft through a seal rock with partial and total lost circulation

An operator in the Gulf of Mexico (GoM) offshore Mexico expected complete lost circulation during the drilling liner operation phase of their project, primarily because of their well configuration: a deviated wellbore with a 64° trajectory surrounded by unstable formations. Seeing a chance to avert complete lost circulation, the customer asked Baker Hughes to run their liner drilling system composed of TORXS™ expandable liner hanger system and EZ Case™ casing bit.

The customer cited the reputation this system has for higher torque capabilities and an improved bypass area resulting from the unique Baker Hughes TORXS hanger. The TORXS system offers maximum circulation bypass areas across the hanger in the unset and set positions, an area up to 40% greater than other expandable liner hangers or conventional liner equipment. The customer hoped to drill the trouble zone with a lost circulation rate that was better than the rate of other drilling systems.
When the Baker Hughes systems were used, the customer’s hopes were realized. After passing through the window located at 2,625 ft (800 m), hanging one of the longest liners in the industry (8,860 ft [2700 m]), reaching bottom, and drilling 243 ft (74 m), Baker Hughes systems resulted in only 76 ft (23 m) being drilled with partial lost circulation. This was followed by setting the TORXS hanger, pumping the cement, and setting the top packer, all at a 64° angle.

The operation was completed with no stuck pipe or need for fishing. There was a lower-pore-pressure-transition zone, and drilling conventionally nearly always results in losses over this zone unless an intermediate liner is set. This pore pressure change created a high probability of the bottomhole assembly (BHA) getting stuck, resulting in it being lost in hole and some very expensive fishing operations. Drilling with the TORXS system and its larger bypass area meant the equivalent circulating density (ECD) could be used to help drill through this complex interval, minimizing the risk of losing some tools or even having to abandon the well.

After this operation was completed, the customer tested the well with excellent results. After running a directional survey to verify well trajectory, the customer found that that the liner followed the same direction—a 64° angle—as the previous hole, reducing operational cost and risk on the project.