A well located in the Cantarell field in the Bay of Campeche offshore Mexico was planned to be drilled to 10,873 ft (3315 m) when the customer began to experience lost circulation problems at 10,223 ft (3117 m) without any drilling progress and with torque as high as 20,000 ft/lb (2765 kg/m). At that point, the customer decided to pull out of the hole with the drilling bottomhole assembly (BHA).

The operator called Baker Hughes for a solution. After discussing the job with the customer, Baker Hughes developed a solution to use the 7\(\frac{5}{8}\)-in. x 8.3-in. x 20-ft (6.096 m) oil-swell REPacker™ reactive-element packer with a 7\(\frac{5}{8}\)-in. x 9\(\frac{5}{8}\)-in. TORXS™ expandable liner hanger system and EZReam™ casing shoe to run the liner to the setting depth with rotation and pumping drilling fluid.

The Baker Hughes REPacker system was selected to isolate the zone above the primary cement job because that area represented partial or complete lost circulation zones. Another reason our packer was selected was to reduce operational risks during the cement process that could jeopardize wellbore integrity if the cement job was of poor quality. Baker Hughes tailored the REPacker system to the customer’s wellbore conditions and job parameters for optimized performance with no risk to the primary cement pumping operations.

**Benefits**

- Mitigated unwanted migration fluids to the surface, reducing risks
- Avoided the use of future remedial cement job
- Eliminated the need for additional running tools to activate the openhole REPacker system
- Reduced operational time, saving rig time

**Background and challenges**

- Cantarell field, offshore Mexico
- Operator planned to drill to 10,873 ft but lost circulation at 10,223 ft
- Operator needed a liner hanger that allowed rotation to reach the liner setting depth with an openhole zonal isolation backup system as support for the primary cement job

**Baker Hughes solution and results**

- The Baker Hughes TORXS expandable liner hanger assembly with EZReam reamer shoe ran the liner to the setting depth with rotation and pumped drilling fluids through the entire liner system to reach the bottom hole
- The Baker Hughes REPacker system isolated the zone above the primary cement job

The Baker Hughes REPacker system prevented annular flow paths through cement and enhanced the cement job by eliminating micro-annulus fractures.
The REPacker packer is a self-actuating, swelling elastomer that eliminates annular flow in either openhole or cased hole applications. The packer was manufactured on a casing joint that matches the specifications of the liner used in the well. A special end ring protects the swell rubber, allowing it to be run through tight holes with rotation or deviated well conditions, or to support high pumping rate applications if required.

Baker Hughes also recommended using the EZReam casing shoe, which allows reaming longer intervals through the most challenging and severely compromised boreholes. It is the industry’s only casing/liner shoe to offer a secondary bypass port that allows normal circulation or cementing to continue when ports plug. The TORXS system has a high-torsion liner hanger capacity capable of performing liner drilling or heavy working liner operations through difficult hole sections. The TORXS system has a better bypass area and has a hydraulically balanced system that eliminates presetting while circulating in the hole or during cementing placement. This represented an advantage in the liner installation process in this well.

The customer picked up the Baker Hughes EZReam casing shoe with the shoe-track system in 7 7/8-in. casing, made up the 7 7/8-in. x 9 1/4-in. TORXS liner hanger system with the 7 7/8-in. x 8.3-in. outside diameter (OD) x 20-ft oil-swell REPacker packer, and ran the system into the wellbore with 5-in. heavyweight drillpipe at 2 to 3 minutes per stand. The operation was stopped at 9,994 ft (3047 m) and parameters were checked with the following results: pump 6 BPM at 700 psi (48.2 bar) and 8 BPM at 1,000 psi (68.9 bar). The operator attempted to take rotation parameters with the top drive. At 16,000 lb/ft (2212 kg/m) torque, it stalled and increased to 20,000 lb/ft (2765 kg/m) torque at 15 RPM while it was at 40 RPM picking the string up. The operators continued going down in the hole, checking weight until reaching the total depth at 10,878 ft (3315 m) without any problems.

The overall results of the operation were that potential flow paths created by channeling were sealed, so the integrity of primary cement job was enhanced and a future remedial cement job was avoided. Because no additional running tools were needed to activate the openhole packers, operational time and rig time were reduced, saving costs.

Afterwards, an element swell test was then performed to ensure the compatibility between the REPacker system and the oil wellbore fluid. The test was performed at a Baker Hughes lab in Mexico and also at the rig during the job.