

Case study: Colombia

MAX-LOCK isolated production, saved operator \$123K USD

An operator intended to perform a workover operation in a gas condensate well located in the lower Magdalena Valley in Colombia to pull out a production string and perforate a new zone. Due to low formation pressure, the risks of total losses and gas influx made it impossible for the operator to begin the operation.

After unsuccessful attempts to isolate and combat the losses with the use of two conventional lost circulation material (LCM) block pills, the operator was planning to create resin with a batch mixer and pump it through a coiled tubing unit.

To reduce the associated costs, Baker Hughes recommended the **MAX-LOCK™ LCM** to mitigate downhole losses by providing zonal isolation to the unstable zone.

MAX-LOCK is a phase-transformation fluid technology that is easy to spot downhole across the loss zone due to its unique thixotropic characteristics in downhole conditions.

To isolate 102 ft (31 m) of perforations in the reservoir section, 18 bbl of MAX-LOCK LCM was mixed at the rig and 10 bbl were squeezed at the top of the Porquero formation through a production pipe.

MAX-LOCK was injected at a rate of 1 bbl/min. When it reached the first perforation, the standpipe pressure (SPP) was increased from 625 to 816 psi (43 to 56 bar). This pressure was maintained while covering the entire production zone. The estimated total volume of MAX-LOCK injected into the formation was 5 bbl and reached over 1,000 psi (69 bar) of differential pressure in the production zone. It took 1 hour and 40 minutes for MAX-LOCK to set. The entire well was then displaced from 8.4 to 9.8 ppg (1.0 to 1.17 sg) brine for stability.

MAX-LOCK allowed the operator to isolate the production zone, control the well, and proceed with the workover without fluid losses and gas influx, saving the operator \$123K USD in nonproductive time (NPT) and associated costs in using a coiled tubing unit and a batch mixer.

In addition, MAX-LOCK's acid solubility will enable the operator to reopen the isolated zone if the new production zone has lower permeability than that of the actual zone.

Challenges

- Massive losses in the reservoir
- Gas influx

Results

- Isolated 102 ft (31 m) of perforations in the reservoir in a single application and without specialized equipment
- Achieved over 1,000 psi (69 bar) of differential pressure in the production zone
- Displaced the well to brine without losses
- Pulled production pipe without gas influx
- Saved \$123K USD associated with NPT and additional equipment costs