

Case study: West Virginia, United States

# MAX-LOCK reduced NPT, saved \$290K USD in rig time

An operator in West Virginia was unsuccessful in drilling a sidetrack to its target depth due to caving and hydrocarbon influx from the shallower Marcellus formation. The wellbore instability issues while air drilling the 12<sup>3</sup>/<sub>8</sub>-in. section led to the suspension of drilling operations.

Baker Hughes recommended the **MAX-LOCK™ lost circulation material (LCM)** as a technology to stabilize the wellbore by providing zonal isolation due to its compressive strength. The MAX-LOCK LCM is an acid-soluble, magnesia-based, phase-transforming fluid technology that is easy to spot downhole across the formation due to its unique thixotropic properties. The MAX-LOCK LCM is customized to set and form a high compressive strength plug specific to each well's conditions to provide zonal isolation.

A 40 bbl MAX-LOCK LCM was mixed on location at the rig's slug tank and was spotted as a balanced pill at the base of the Marcellus formation through an open-ended drill pipe. The MAX-LOCK LCM was built to cover the theoretical wellbore volume.

The operator tagged the top of the MAX-LOCK plug 12 ft (3.66 m) above the target isolation zone. The plug was drilled with a weight on bit (WOB) of

5 to 10 klb (2.27 to 4.54 tonnes) and an average torque of 5 to 8 klb-ft (0.007 to 0.011 kNm). The MAX-LOCK LCM covered the Marcellus formation and an additional 34 ft (10.36 m) below the target zone. An estimated 24 bbl of MAX-LOCK migrated through the fractured zone and contributed 500 psi (34.47 bar) of compressive strength to the target zone. The unique compressive strength of MAX-LOCK LCM facilitated the drill out of the plug, allowing the operator to resume operations and continue to drill to total depth (TD) with no issues. In addition, casing and cement were run without incident.

The successful placement of the MAX-LOCK LCM eliminated the risks and associated costs of sidetracking, enabling the operator to drill to TD in 8 days, capturing an estimated \$290K USD in rig time reduction savings. The MAX-LOCK LCM proved to be a versatile product that can provide zonal isolation, as well as reduce nonproductive time attributed to sidetracking the well.

## Challenges

- Wellbore instability due to fracturing in the Marcellus formation
- Hydrocarbon influx while air drilling the 12<sup>3</sup>/<sub>8</sub>-in. section
- Uncertain wellbore geometry due to washout

## Results

- Contributed 500 psi (34.5 bar) of compressive strength to the isolation zone
- Achieved zonal isolation in a single application
- Deployed product without requiring specialized equipment
- Reached target depth in 8 days with zero NPT
- Eliminated further sidetracks
  - Captured \$290K USD in rig time reduction savings