

Glyphaloy-dressed mill and Navi-Drill X-treme motor milled 72 plugs in a single trip, saved operator 30 hours

After drilling the deviated horizontal wellbore in an unconventional oil well in the Permian basin, the operator ran 4-½ in., 13.5 lb/ft casing to depth and prepared the wellbore for fracturing. A plug and perf-style completion method was used to complete the well.

As part of the completion process, 72 composite plugs were set in the well to isolate various zones in the casing. The plugs were installed at regular intervals at depths ranging from 8,585 ft (2617 m) to 17,903 ft (6383 m).

After the well was successfully fractured, the plugs needed to be removed as efficiently as possible so the well could be brought online without delay. Milling out this number of plugs would normally require redressing the mills and replacing the downhole motors, resulting in multiple trips.

To mill out all 72 plugs in one trip, Baker Hughes, a GE company (BHGE), deployed a **through-tubing milling bottomhole assembly (BHA)** consisting of a 3.75-in. outside diameter (OD) butterfly mill dressed with **Glyphaloy™ advanced milling technology carbide cutting structures**. Glyphaloy carbide was chosen because it

has a highly wear resistant cutting surface that enhances cutting efficiency and extends mill life.

The mill was positioned at the bottom of a BHA that also included a 2.8 in. OD **Navi-Drill™ X-treme™ air drill mud motor**, a 2.875 in. extended-reach tool to remove the plugs, 2.875 in. OD hydraulic disconnect, and 2.875 in. OD dual-flapper back pressure valve.

The job was completed with a single bottomhole milling assembly, with all 72 plugs milled efficiently and with small sized cuttings. The success saved the customer approximately 30 hours in rig time.



Condition of Glyphaloy-dressed mill after milling 72 composite frac plugs in a single run.

Challenges

- Improve millout efficiency on well with 72 composite frac plugs set across a 9,000-ft lateral

Results

- Milled 72 plugs in a single trip
- Saved 30 hours of rig time and extra BHA charges by eliminating a second trip to replace BHA components
- Maintained an average milling time of 20 minutes per plug
- Generated small-sized cuttings for more effective debris management and cleaning
- Executed the job with zero HSE incidents

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