

Case study: South Texas, United States

Versa-Drive service milled 157 plugs across four 11,000-ft laterals, saved \$120,000 USD

A customer in the Eagle Ford shale play in south Texas had drilled four 20,000-ft (6,096-m) total measured depth (TMD) wells and installed 5.50 in, 23 lb/ft casing to bottom. The wells contained 36, 37, 30, and 30 plugs (respectively) set at regular intervals to provide zonal isolation across the 11,000 ft (3,353 m) laterals. The lower six plugs in each well were disintegrating plugs, and the rest were conventional composite plugs.

In order to reduce costs, the customer wanted to mill out all of the plugs in each well in a single trip, as well as use the same milling fluid across all four wells. Adding to the challenge was the extreme depth and lateral length of the wells. Most service providers would need to make several trips to get to total depth (TD) in each well, resulting in higher coiled tubing (CT) charges.

To help the customer achieve their goals, Baker Hughes recommended a **Versa-Drive™ plug milling service**, which leverages a full kit of fit-for-purpose tools backed by accurate planning to help customers get to TD in smooth, single-trip runs.

The bottomhole assembly (BHA) design for the wells consisted of a 4.50 in tricone bit, a 3.38 in **Versa-Drive Ultra workover motor**, and a 3.38 in **HydroPull™ extended reach tool***.

The performance of the Ultra workover motor on the four-well pad was exceptional. It operated efficiently at a flow rate of 5.50 bbl/min while generating significant torque to quickly mill through the plugs.

The mill time for each plug ranged from six to nine minutes, delivering an overall average of 7.5 minutes. Zero motor stalls were recorded and zero short trips were required to circulate the debris out of the well. The HydroPull extended-reach tool worked flawlessly on all four runs, maintaining constant weight-on-bit to ensure a high rate of penetration all the way to the toe of each 20,000 ft well.

With the Versa-Drive service, the customer was able to successfully mill out all 157 plugs quickly and efficiently, saving an estimated \$30,000 per well in CT costs—a total savings of \$120,000.



The stator elastomer in the Versa-Drive Ultra workover motor showed minimal wear.

Challenges

- Customer needed to remove a total of 157 frac plugs from four wells as efficiently as possible
- Each well had a 20,000 ft TMD and a 11,000 ft lateral section
- 265°F (129°C) bottomhole temperature
- Customer wanted to eliminate short trips

Results

- Enabled higher torque and flow rates to improve milling performance
- Milled all plugs in each well in a single run
- Experienced zero motor stalls
- Required no short trips
- Achieved an average millout time of 7.5 minutes per plug
- Saved the customer more than \$30,000 USD per well in CT time and footage charges

*The HydroPull extended-reach tool is a registered product of Tempress Technologies, Inc.