Case study: Colorado, United States

Versa-Drive service milled 165 plugs across two wells, saved four days and $355,000 USD

A customer working in the Wattenberg basin in Colorado had fractured two wells using a plug-and-perf style completion and wanted to get production online as soon as possible. However, the large number of plugs and extended lateral sections increased millout risks and threatened to prolong operations.

The first well had a total of 82 composite frac plugs set at regular intervals at depths ranging from 7,582 ft to 17,158 ft (2,311 m to 5,230 m) and the second well had 83 composite plugs installed at depths ranging from 6,968 ft to 17,338 ft (2,124 m to 5,285 m).

Seeking a solution to remove the plugs in a single trip as quickly as possible, the customer contacted Baker Hughes for a solution. After reviewing the well information, Baker Hughes suggested a **Versa-Drive™ plug milling service**, which leverages fit-for-purpose tools and accurate planning to ensure smooth, single-trip plug millouts.

The recommended bottomhole assembly (BHA) included a 2.875-in PH-6 pipe workstring with a 4.625-in **Vanguard™ plug bit**. The BHA would be driven by a 3.375-in **Versa-Drive Ultra workover motor**. The Vanguard plug bit is specifically designed for challenging plug milling operations. Key features include self-sharpening steel teeth with increased tooth count for improved rate of penetration, a high-aspect-ratio seal to maintain bit life when exposed to high revolutions per minute, and proprietary bearing technology with larger ball bearings designed to prevent wear and to reduce the risk of lost cones in the well. The Ultra motor is extremely durable and reliable, and is capable of generating exceptional power for extended milling operations.

The Versa-Drive BHA successfully milled all of the frac plugs in each well in one run. The average pump rate throughout both operations was 4 bbl/min. Post-job inspection of the Vanguard bit confirmed that it maintained it's full outside diameter and that the cones were in good condition. The teeth exhibited minimal wear, but overall the bit was in good condition, with all bearings and seals intact and undamaged.

By delivering single-trip plug millouts in each well, the Versa-Drive service saved the customer a total of four days rig time and an estimated $355,000 USD.

Challenges

- Each well had more than 80 frac plugs
- Customer wanted to mill all plugs in each well in one run
- Wells had long lateral sections measuring 7,582 ft and 10,400 ft, respectively
- Plugs had been set at depths ranging from approximately 7,000 to 17,000 ft (2,134 m to 5,182 m)

Results

- Milled all plugs in each well in a single trip
- Saved a total of four days rig time
- Reduced costs by an estimated $355,000 USD