

**Case study:** Delaware Basin, Texas

# Lucida service delivered superior wellbore quality and 17% faster ROP, saving \$160,000 USD

A customer operating in Delaware Basin was experiencing performance and reliability issues in 6 $\frac{3}{4}$ -in. slimhole applications drilling the Wolfcamp B formation. Previous conventionally drilled runs suffered problems with severe deflections and a twist-off while rotating, and laterals requiring up to six bottomhole assemblies (BHA) to complete the section.

Baker Hughes recommended the **Lucida™ advanced rotary steerable service** for this challenging application. The Lucida advanced rotary steerable service has a robust integrated BHA with a fully customized drill bit, near-bit dynamics measurements, and multi-chip module electronics to deliver exceptional drilling performance. The customized **Dynamus™ XG-D406TX extended-life drill bit** is specifically designed for this application. The Dynamus XG-D406TX drill bit has advanced directional control features, premium cutters, and a proprietary connection to handle the rigors of the challenging curve and lateral section for this Wolfcamp B application.

Lucida system's automated wellpath trajectory control system integrates both azimuthal and inclination hold modes with continuous proportional steering to automatically correct wellbore trajectory for any formation trends. The automated wellpath trajectory control system, enabled by near-bit directional sensors, checks azimuth and inclination every millisecond. The integrated system automatically adjusts steer forces second-by-second for precise control, even at very high penetration rates.

The integration and automation in these systems reduces wellbore tortuosity, providing a corresponding reduction in torque and drag, to drill better curve sections and longer and faster lateral sections with superior wellbore quality.

Baker Hughes operations and engineering teams worked together to optimize the Lucida service to deliver long laterals with exact well placement and superior wellbore quality. This teamwork resulted in successfully drilling the 9,545 ft (2909 m) lateral in 12.6 days versus an offset well that required 15.3 days. This exceptional drilling performance saved 2.7 days, a 17% increase in drilling efficiency.

The lateral section of the previous benchmark well had an average dogleg severity (DLS) of 1.80°/100 ft (30 m) with a maximum DLS of 12.15°. The Lucida advanced rotary steerable service's BHA delivered an average DLS of 1.13°/100 ft (30 m) and a maximum DLS of 4.63° in the lateral section. This is a 39% reduction in the average DLS and a 62% reduction in the maximum DLS, demonstrating superior wellbore quality.

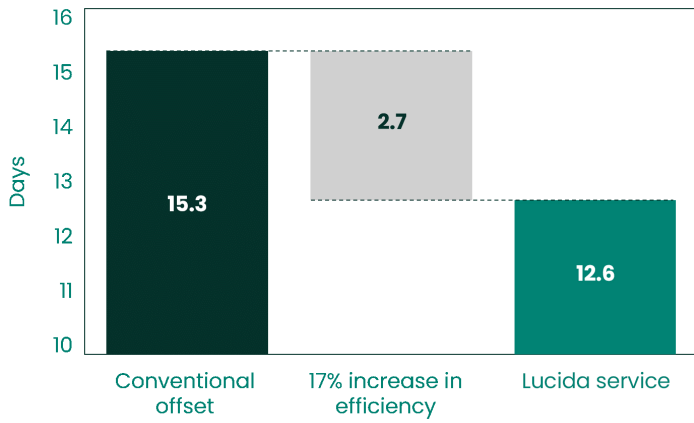
By deploying a fully integrated solution, Baker Hughes helped the customer drill a longer, faster lateral with superior wellbore quality and exceptional drilling performance, saving 2.7 days estimated and \$160,000 USD. The customer recognized Baker Hughes for the superior planning and execution of the difficult lateral section.

## Challenges

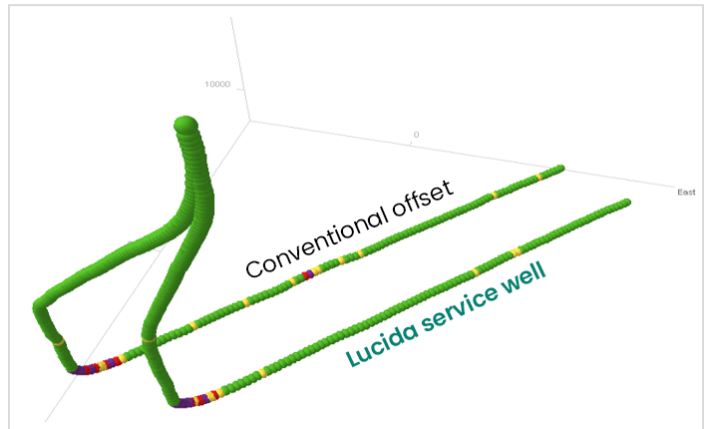
- Maximize penetration rate
- Overcome high DLS and maximum doglegs in the lateral
- Reduce drilling cost

## Results

- Increased rate of penetration (ROP) by 17%
- Reduced average DLS by 39% and maximum dogleg by 62%
- Saved 2.7 days and \$160,000 USD



The lower number of cumulative days in the lateral well demonstrates the exceptional drilling performance of the Lucida service.



The precise trajectory of the Lucida service illustrates superior wellbore quality over a conventional offset well.