

ROCKit® Pilot Automated Directional Steering Control System and Navigator™ Directional Platform significantly reduces cycle time and improves ROP and tool face control in the lateral section, North East United States, Q4 2019

A high-performing operator was already achieving solid results when using a traditional mud motor, without automation, to drill the lateral section:

- 41.5 hours
- An average of 17 slides
- Average slide ROP of 47 ft/hr.

Challenge

Drill a lateral section to Total Depth (TD) in one run while maintaining planned trajectory, reducing slide time, and consistently executing high quality slides with maximized ROP.

Solution

Utilize the ROCKit® Pilot and Navigator™ systems for automated slide control and directional drilling guidance to improve slide drilling performance and directional control.

Results

- Drilled 8-3/4" section to TD in 33 drilling hours (6.8hr sliding, 19hr rotating), for an 8.5 hour reduction versus the average non-automated offset.
- Achieved an average slide rate* of 41.0 ft/hr versus 32.2 ft/hr for the average non-automated offset well.
- Improved slide scores from 82% to 90% and achieved the highest percentage of tool face values within 20° of target.

*Slide Rate (ft/hr) is defined as slide footage divided by rotate-to-rotate time (ROP inclusive of off-bottom pre- and post-slide time).

To satisfy the demand for automated integration, Nabors has developed a comprehensive suite of systems and put it to the test in Susquehanna County, PA. The ROCKit® Pilot Automated Directional Steering Control System with Navigator™ Directional Platform delivered across-the-board improvements despite the increased wellbore friction due to tangent/curve section geometry.

Table 1. Sliding Performance KPIs

| Well Name | Cycle Time (hrs) | Slide Time (hrs) | Slide ROP (ft/hr) | Slide Score (%) | TF Control (% <20°) | # Slides | Slide Rate (ft/hr) |
|--------------------|------------------|------------------|-------------------|-----------------|---------------------|----------|--------------------|
| Pilot Well | 33.0 | 6.8 | 51.0 | 90% | 62% | 16.0 | 41.0 |
| Avg. Offset | 41.5 | 8.3 | 47.0 | 82% | 54% | 17.0 | 32.2 |

The use of these products enabled the operator to drill the 8-3/4" section to TD at 13,186 ft MD, with improved sliding KPIs and reduced cycle time compared to the non-automated wells (see Table 1). Tool face control precision exceeded all offset wells (see Figure 1). Overall, the Pilot well had a 9% faster ROP compared to an average non-Pilot well.

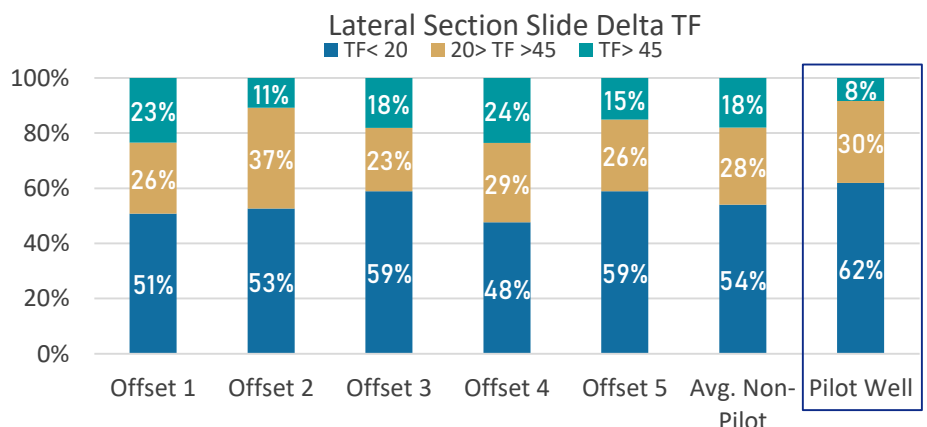


Figure 1. Lateral Section Delta TF shows that the Pilot Well has the best TF control, with 62% of tool faces within 20° of the target target.