

eVolve Optimization Service delivers integrated solution to reduce spud-to-TD time more than 15% in Bakken Shale drilling operation

Innovation in action

A client operating in the Bakken Shale was using the eVolve service for data collection and monitoring services as part of a long-term R&D initiative. After drilling dysfunctions began to cause performance decreases, we were called upon to optimize the project using an integrated suite of tools and software on the entire five-well pad.

We used a combination of our BlackBox tools, StringSense system, and SoftSpeed II software to obtain a comprehensive understanding of the client's issues, then developed a solution and a drilling roadmap for future application. We recommended BHA design and drilling parameter changes to drive further performance increases, which yielded impressive results, including:

- A reduction in spud-to-TD time of more than 25% versus the offset average on the highest performing well
- A decrease in average drilling days per well of 15% (3.2 days per well), which eliminated almost 16 drilling days for the pad
- Savings of almost USD 1.3 million assuming a USD 80,000 spread rate

Technology

NOV's innovative eVolve™ Optimization Service delivers complete, integrated drilling technologies to solve our clients' complex drilling problems. The eVolve team delivered a solution from the ADVISE tier, a data-driven optimization service, that incorporated our BlackBox™ memory-mode logging tools, StringSense™ integrated drillstring measurement system, and SoftSpeed™ II stick-slip prevention software.

Performance

The project initially began with data collection and monitoring for the client as part of an ongoing research and development (R&D) initiative. As the campaign progressed, we noticed that drilling dysfunctions, including wellbore tortuosity, torsional vibration, and suboptimal energy/weight transfer, were causing problematic performance decreases.

The client then called upon us to use an integrated suite of tools and software on their five-well pad to determine a possible solution. Our BlackBox tools offered better insight into what was happening downhole, the SoftSpeed II software enabled stick-slip mitigation, and the StringSense system provided enhanced drillstring measurements. Additionally, we made recommendations to optimize bottomhole assembly (BHA) design and drilling parameters.

Results

After implementing our recommendations and optimizing parameters the client was able to significantly increase performance. On the best well, the client saw a spud-to-total depth (TD) reduction of more than 25% versus the offset average, reducing time drilling from 21.4 days to 15 days. Assuming a USD 80,000 spread rate, cost savings at peak performance were approximately USD 512,000 per well. On average, spud-to-TD time was reduced by 15%, or 3.2 days per well. Assuming the same spread rate as noted above, these performance improvements eliminated almost 16 days of drilling for the pad and enabled savings of almost USD 1.3 million.

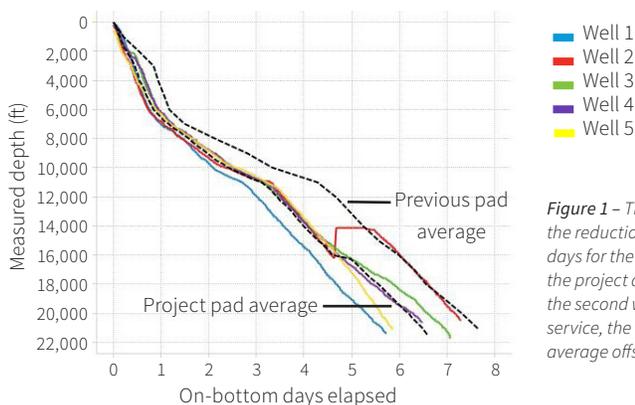


Figure 1 - The graph above demonstrates the reduction in on-bottom time from 7.67 days for the average offset to 6.52 days for the project average. Despite a sidetrack on the second well that was unrelated to our service, the client still drilled faster than the average offset.