

eVolve Optimization Service improves spud-to-TD time by 43% in Eagle Ford Shale operation

Innovation in action

An Eagle Ford Shale client needed to significantly improve well economics without sacrificing rigsite safety. The eVolve team worked with the client to improve drilling performance by using an automated drilling control system informed by high-speed downhole dynamics data.

After an initial benchmarking, six wells were drilled with wired drillpipe feeding the automated control system at surface, significantly enhancing performance. The rig crews recognized downhole-controlled, closed-loop drilling automation as an essential tool for increasing performance.

- Maintained rigsite safety
- Reduced spud-to-TD time by 43%—savings of more than USD 250,000 per well

Technology

NOV's eVolve™ Optimization Service equips existing rigs and rig crews with an advanced toolkit that allows improved real-time decision making and enhanced analytics capability. The eVolve team delivered a customized solution from the AUTOMATE tier, a drilling optimization and automation service incorporating our downhole data-driven control systems and innovative software. Through wired drillpipe telemetry, that downhole data drives the rig surface equipment to safely increase drilling performance.

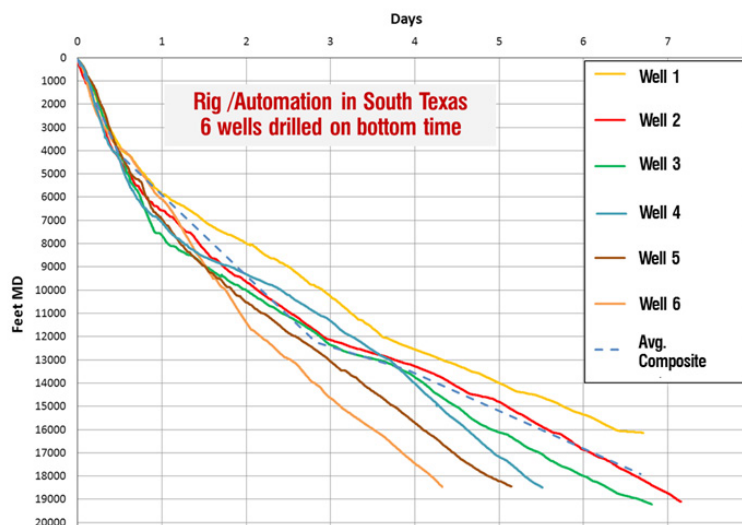
Performance

Our BlackBox™ memory-mode downhole sensors were deployed in the client's first four wells to establish a benchmark. The next six wells were successfully drilled with the AUTOMATE tier using IntelliServ™ wired drillpipe, BlackStream™ downhole sensors, and software. The rig crews, company men, and drilling engineer embraced the system, which surpassed their performance expectations, as a valuable new tool.

Results

The customer set a conservative performance goal of a 10% reduction in spud-to-total-depth (TD) time versus the average of the four benchmark wells. The eVolve team helped the client surpass these expectations by a large margin. The client saw an impressive 43% reduction in spud-to-total depth time, while maintaining an incident-free rigsite. Access to high-speed, real-time downhole data from the AUTOMATE tier enabled the on-site rig crews to operate at higher levels of drilling performance. Assuming a 43% reduction in spud-to-TD time and USD 100,000 spread rate, a customer would reduce drilling cost by more than USD 250,000 per well with this system.

Figure 1 – The “on-bottom only” days-versus-depth curve illustrates a 37% reduction in on-bottom drilling time. The dotted blue line represents the four-well on-bottom average benchmark. When off-bottom bit trip savings are included, a total spud-to-TD time savings of 43% was achieved.



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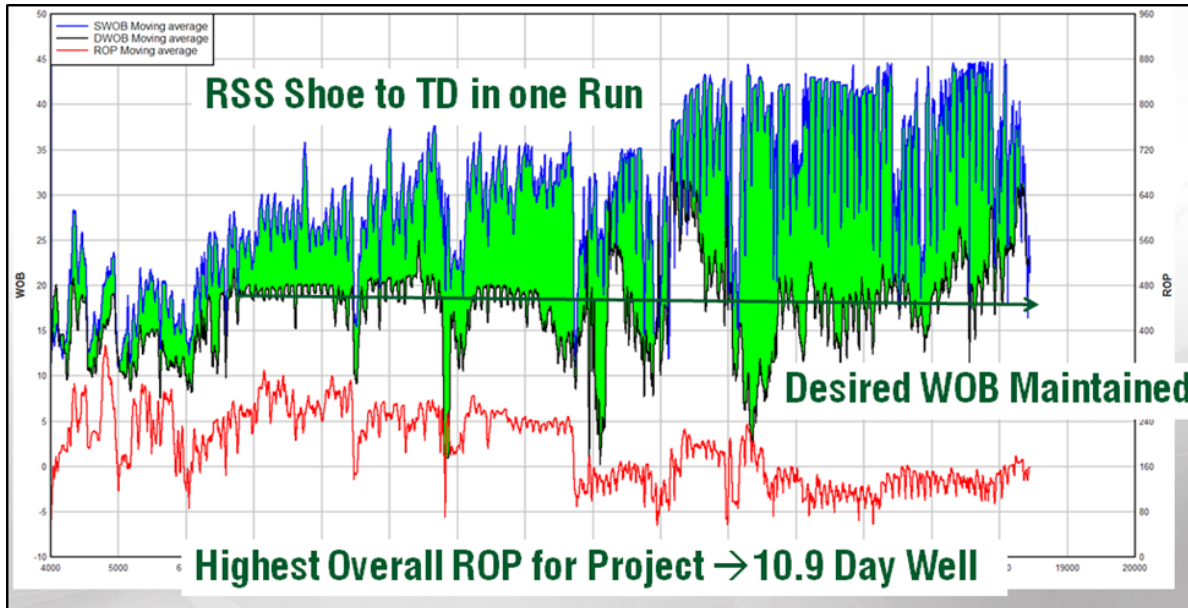


Figure 2 – Using the TrueDrill™ downhole weight-on-bit software application, the drawworks was able to precisely manage the downhole loading environment within the bottomhole assembly, ensuring a dynamically stable environment for obtaining desired drilling parameters.

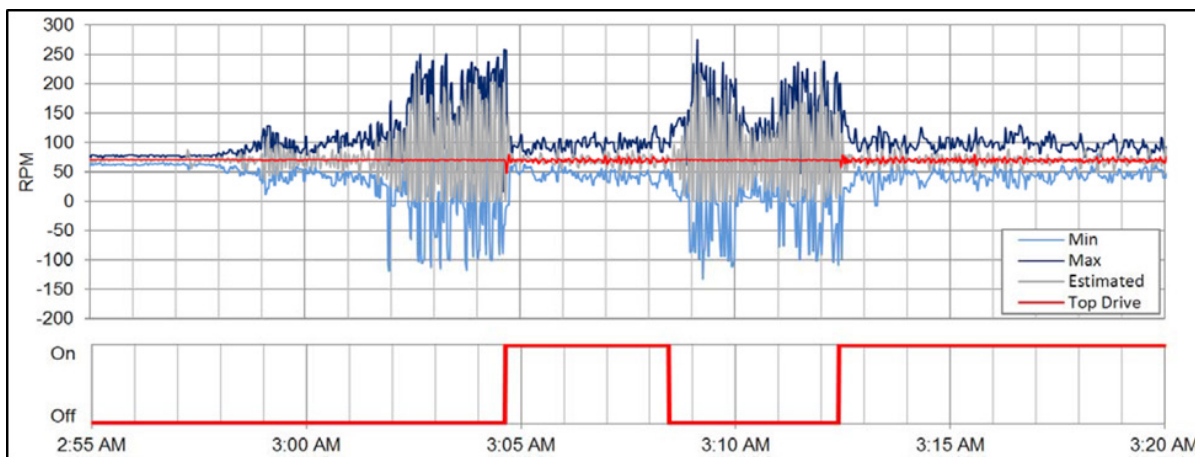


Figure 3 – The SoftSpeed™ II software application provided closed-loop control of torsional vibration (at any topdrive setpoint above 35 RPM). Downhole vibration was actively mitigated to acceptable levels in less than 30 seconds, even at measured depths greater than 12,000 ft (3658 m).