Nabors' SmartDRILL™ process automation delivers reduced shock and vibration and shorter connection times in the Bakken

Challenge

Deploy the SmartDRILL machine task sequencer to mitigate connection inconsistency and high shock and vibrations measured by the downhole tools.

To measure performance, it was decided that two wells on the pad would be drilled manually and three wells with the SmartDRILL process automation system.

Solution

Utilize the SmartDRILL system to deploy *proven* basin-specific best practices to drive procedural adherence and reduce shock and vibrations experienced by the downhole tools.

Results

- 2.84-minute reduction in average weight-to-weight time (Table 1)
- 2.32-minute reduction in the automation aggregate* time (Figure 1)
- 45% reduction in weight-to-weight connections from the offset wells to the wells drilled with the SmartDRILL system (Table 1)
- Instances of maximum RPMs > 300RPM decreased by 65% versus the non-automated offset wells (Figure 2)
- Instances of severe lateral vibrations decreased by 50% versus the average non-automated offset (Figure 2)

Case Study Facts

LOCATION: McKenzie County, ND

CUSTOMER: Confidential Operator

TIMEFRAME: 09/2020 -10/2020

CUSTOMER VALUE:

The successful use of SmartDRILL process automation during the trial saved 8.15 hours per well, or **40.8 hours per pad**, in drilling connection time and reduced shock and vibration by 50%

FOOTNOTES:

**Automation Aggregate is defined as the accumulation of Slips to Weight and Weight to Slips times. This is measured and tracked to observed to monitor the automated portion of the connection.*

1091-MKT-2.1

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Drilling Performance KPIs

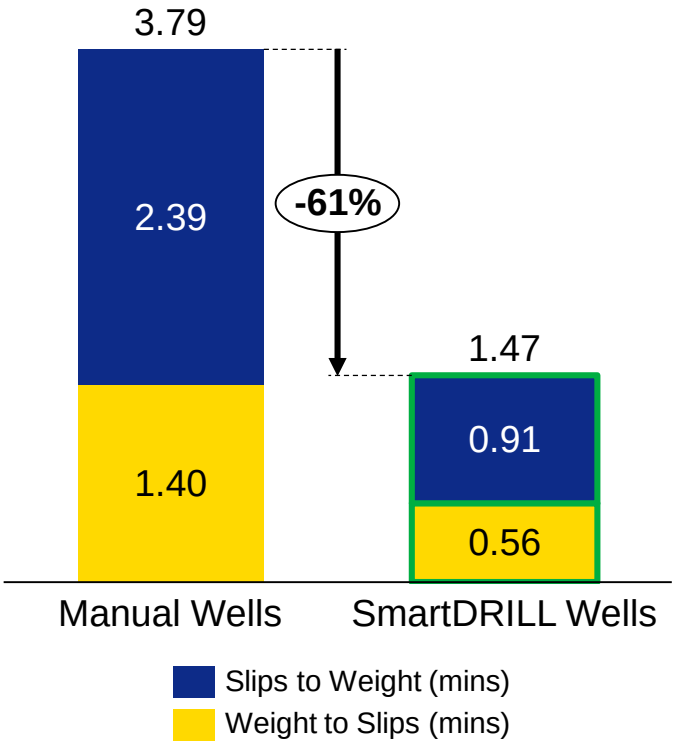
Table 1

Well Name	Weight to Weight Time (mins)	Automation Aggregate (mins)	Drilling Connection Time per Well (hrs)	Instances of Severe Lateral Vibrations per Well	Instances of Moderate to Severe Max RPM per Well (>300RPM)
Manual Wells	6.28	3.79	19.36	4	11.5
SmartDRILL Wells	3.44	1.47	11.21	2	4

The use of the SmartDRILL system enabled the operator to save 8.2 hours per well due to improved performance and consistency during drilling connections. Throughout the automated runs, max RPM and lateral vibrations decreased significantly by controlling on/off bottom practices. Overall, the SmartDRILL wells reduced overall well time and damage to downhole tools.

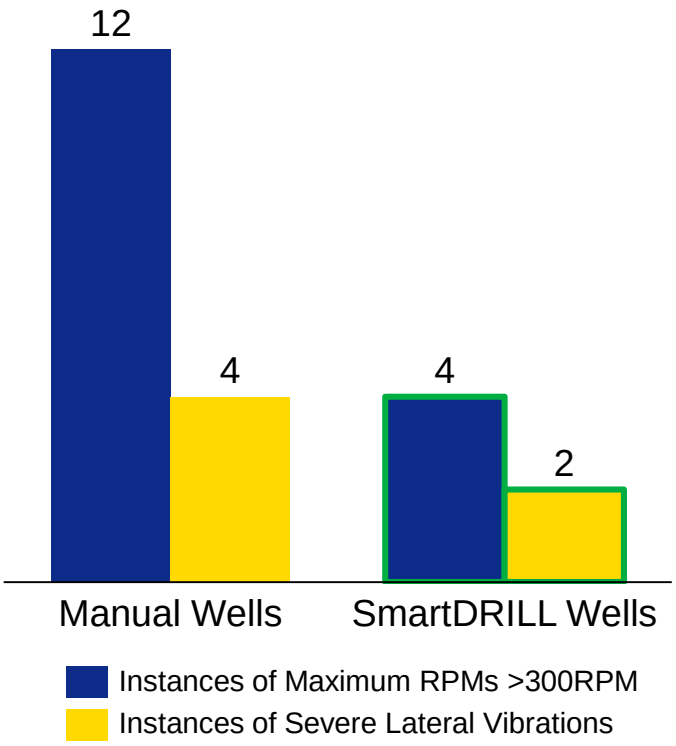
Reduction in Automation Aggregate*

Figure 1



Reduction in Downhole Vibrations

Figure 2



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