

DrillView® Data Analysis Improves BHA Reliability and Performance

Downhole DrillView data at continuous high-resolution frequency identify the pattern of slide-rotary forces and vibration that act on the BHA as it passes through the deflection after each slide. (SPE-212520-MS)

Overview

An operator shifted from oil-based mud to water-based mud and started seeing drilling dysfunction causing BHA failures, specifically mud motors and MWD, due to downhole drilling mechanic forces. The higher friction becomes a challenge with the type of well design due to the open hole exposure and results in higher torque and drilling vibration. This increases the difficulty of drilling extended reach lateral sections.

The DrillView® tool was run with two types of rigs within 2 miles of each other in 3-mile lateral sections to identify rig automation recipes and drilling mechanics processes leading to BHA fatigue. The tool ran continuously at high resolution data sampling of 1,000 Hz shock & vibrate and 100 Hz drilling mechanics forces (WOB, TOB, BOB, Internal, and Annular Pressure). The drilling team used their experience to identify the pattern of slide-rotary forces and vibration acting on the mud motor as it passes through each slide interval.

Solution

Continuous high-frequency drilling dynamics data from Nabors' DrillView® tool enabled the detection of cyclical bending moment and downhole erratic torque as the root cause of the fatigue. These drilling patterns accelerated the stress cycles of the BHA resulting in downhole failures. A new post-slide drilling process was used within SmartDRILL® for the drill a stand-down to improve BHA reliability and build the body of knowledge for the basin with the type of well and the new drilling environment of water-based mud.

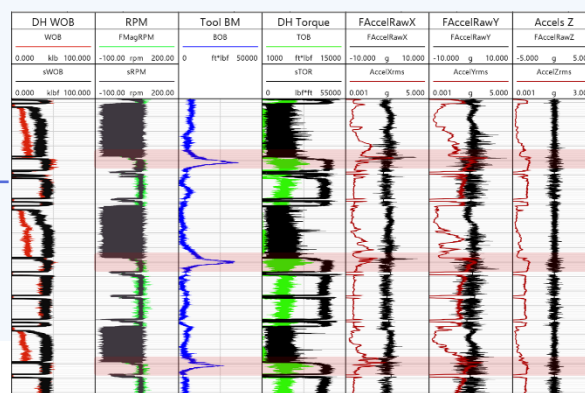
DrillView®



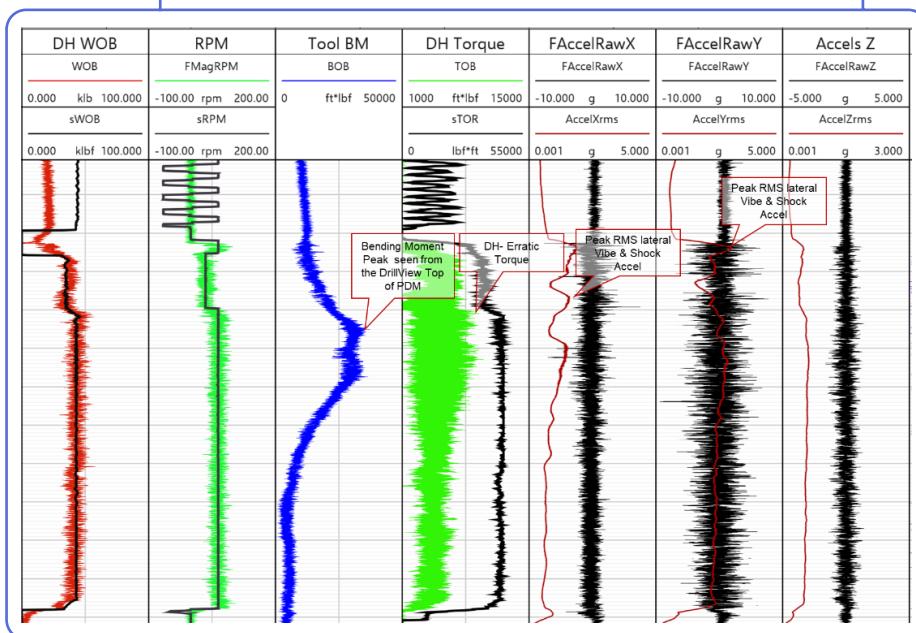
Results

DeepView® software and downhole data analysis expertise revealed inconsistencies in the drilling processes from drilling a stand-down in the slide to a rotary transition which, in turn, helped develop best drilling practices integrated through SmartDRILL®. Mitigating the BHA stress reduced drilling cycle time and saved one trip in the lateral section and more than 24 hours.

DeepView® Software Zoom-Out



DeepView® Software Zoom-In



Nomenclature:

DH WOB. Downhole Weight on Bit, Tool BM: Bending Moment, TOB; Torque on Bit. FAccelRaw X; Fast Acceleration X Lateral, Y Lateral, Z Axial vibrations. rms; root mean square