

SPIRO-TORQ® CASE HISTORY #3

Sidetrack Development Well

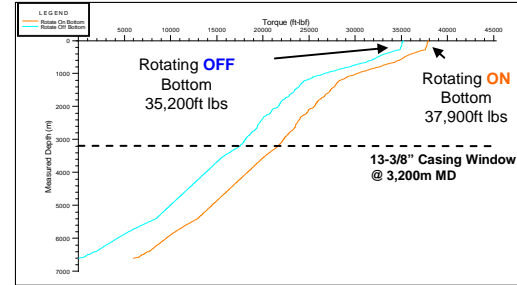
Location : North Sea

This sidetrack was drilled from a nineteen year old platform in a mature North Sea field. The drilling unit had available a top drive limited to a maximum torque output of around 34,000ft lbs. Computer modeling predicted torques well above this maximum limit may be encountered. Drilltech's NRST Spiro-Torq®s were selected to address this concern, not just for their effective torque reduction capabilities but also for their ability to withstand extremes of side loading. Tripping out side forces in excess of 24,000lbs per stand were anticipated ! The 100% metal construction of the Spiro-Torq®s ensured their survivability in such conditions.

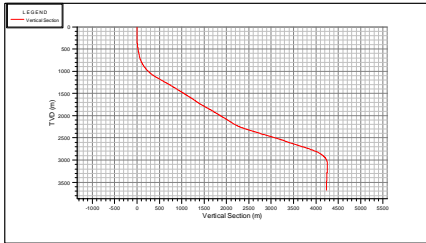
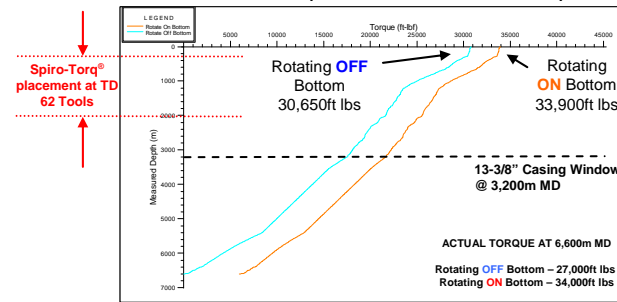
The OFF Bottom torque analysis proved the efficacy of the torque reduction regime. Both prior to, and immediately after the addition of Spiro-Torq®s to the string, the actual torque values should follow the predicted trends, and they did. During the gradual installation of tools in the string, the actual torque deviated from the predicted trends, indicating torque was being influenced by the addition of Spiro-Torq®s into the wellbore.

At well TD, the Actual ON bottom torque value was in close agreement with the computer model prediction. Surface torque remained within the top drive capability throughout the drilling campaign. A total of 62 Non Rotating Sleeve Type Spiro-Torq®s, equipped with XT-57 connections, were used for this very successful project,

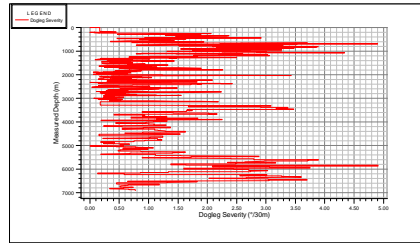
PREDICTED Torque Distribution **WITHOUT** Spiro-Torq®s



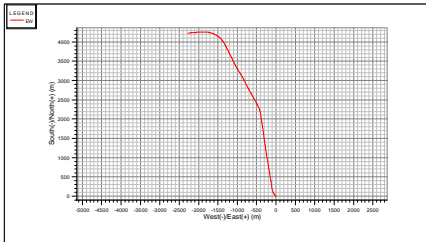
PREDICTED Torque Distribution **WITH** Spiro-Torq®s



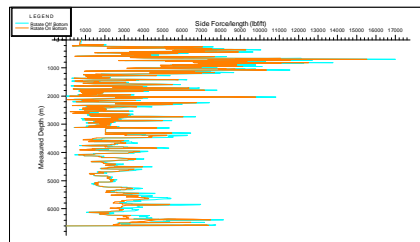
Vertical Section



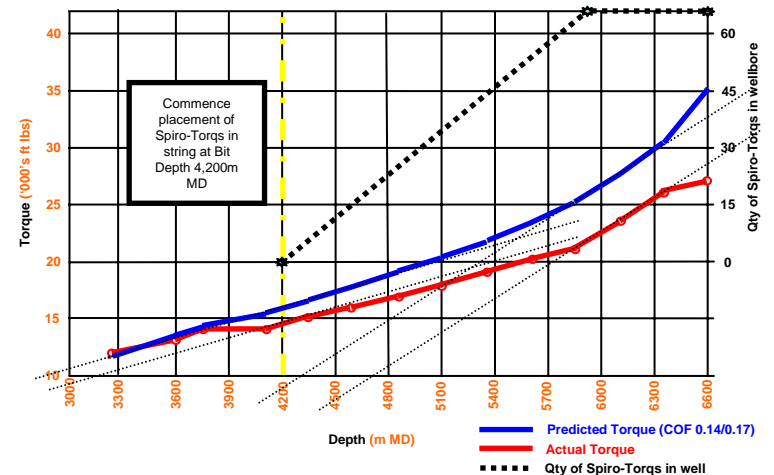
Dogleg Severity



Plan View



Side Forces



Depth (m MD) — Predicted Torque (COF 0.14/0.17)
 — Actual Torque
 ••••• Qty of Spiro-Torqs in well