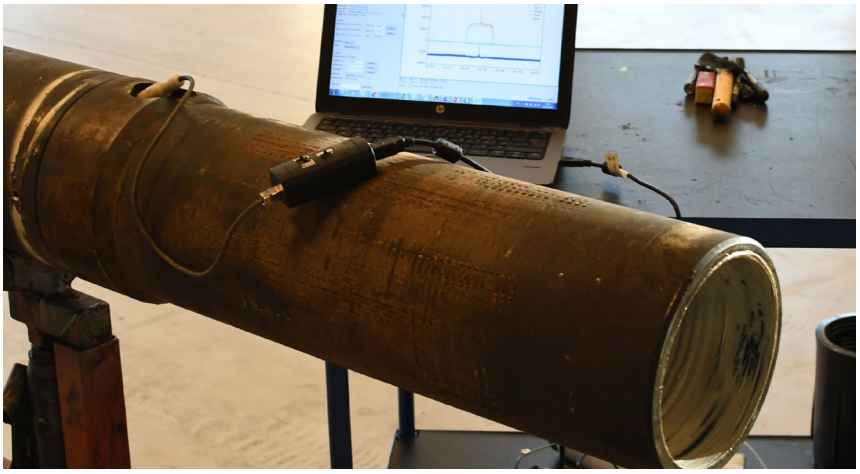
Case Study

i-Con Drill Pipe Logging Tool

Providing valuable intelligence from the deep over three consecutive liner installations



Background

In a field development, all wells were completed with 4½-in. reservoir liners to depth in a 6-in. open hole. The planned completion lengths were for wells A: 1,900 m, B: 1,900 m, and C: 2,100 m. The motivation for deploying the i-Con™ memory tool was to establish a clear understanding of how surface actions acted on the downhole tools, verify torque and drag (T&D) models, and optimize running procedures by comparing the downhole logged data with surface data.

Our i-Con is a robust drill pipe logging tool with a full ID and slick OD and does not require special operational considerations in the well operation's planning and execution. Logging was started before shipment from the workshop. Logging was performed with a 1-Hz sampling rate. Data was recorded every second during the 36 days from the tool activation to when the tool was returned, thus eliminating the need for extra personnel present at the rig site.

Solution

The i-Con was placed in the tool string immediately above the liner hanger running tool. On its way to liner hanger setting depth, the tool logged liner top forces both working through obstructions, rotating and circulating down, and setting the liner hanger and liner top packer. The i-Con logged all relevant data, including temperature, external/internal pressure, tension, compression, and torque. This data was compared with the surface data to analyze impact of surface action on the downhole tools.

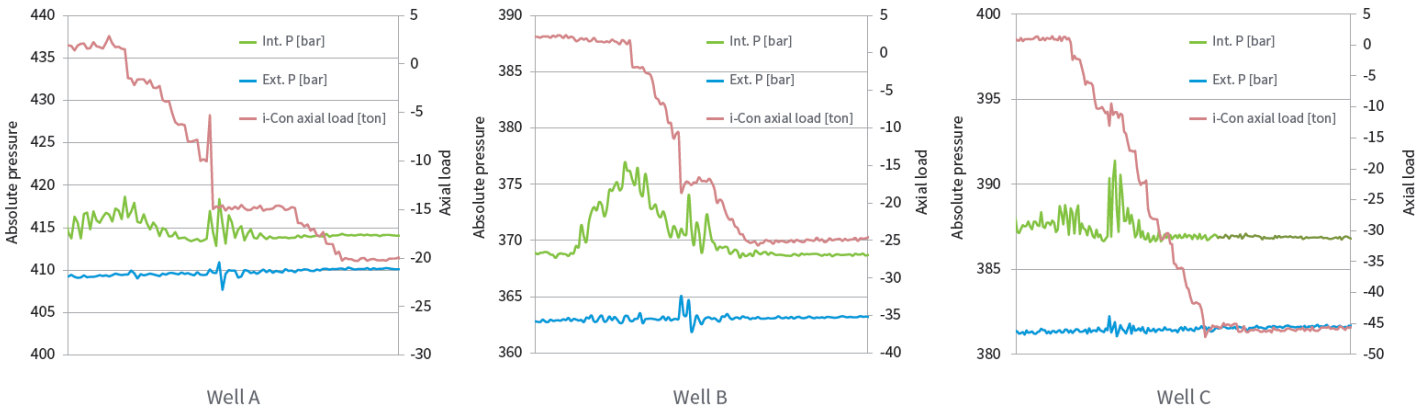
"We managed to **get the liner to TD** in this well by using the i-Con information from the previous one"

– Engineer, Operating Company

Results

- Quantification of pressure, weight, and torque transfer to the liner top
- Good understanding of downhole dynamics during liner installation early in the campaign enabled the operator to utilize the full mechanical capacity of the liner when working it to TD on the third well - while the first well had to set TD early due to the conventional use of T&D models
- Improved understanding of differential pressures across tools when working in a complex pressure regime involving circulating multiple different density fluids through an MPD system
- Established the downhole liner hanger and packer activation signatures of the proper activation process

i-Con drill pipe logging tool



- Tension/compression, internal pressure, and external pressure during the liner top packer activation sequence for the three wells – the liner top packer "ECG" is established. Accurate identification of future potential failures in packer activation can be pinpointed when comparing to the required signature.
- Well A had surface torque limit set at the liner connections torque capacity. TD had to be set early in Well A due to trouble running the liner into the horizontal and what proved to be conservative torque limitations.
- Well C took advantage of learning from Well A for torque transfer from the surface to the liner top. This allowed surface torque limit to be set higher, thus taking advantage of the liner connections capacity during deployment in the horizontal section. This action resulted in reaching TD of the well by allowing rotation of the liner to the last 1,000 ft. This allowed the entire drilled reservoir to be stimulated and produced.