CYBERCOIL

Powered by AKOS

Case Study

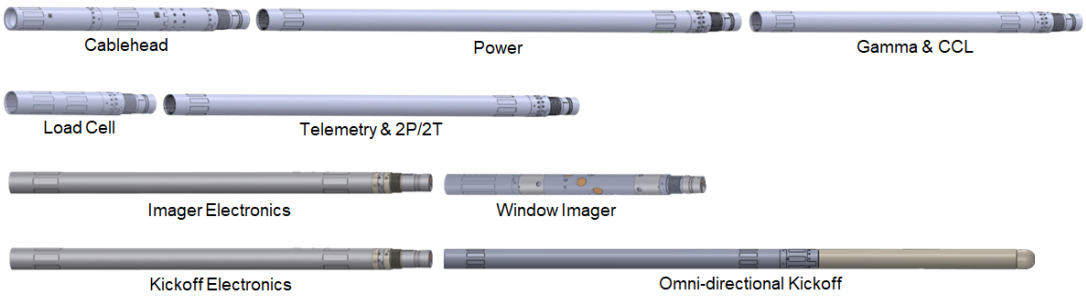
Slave Lake, Alberta, Canada

Multilateral Well

Lateral Characterization & Mild Wash – 4 Laterals

An operating company in Alberta, Canada required lateral characterization and a mild wash service in a horizontal multilateral oil well. The job was to characterize the three lateral junctions, enter all open laterals, and advance coil to TD or Lockup with mild water jetting. The main bore and the laterals were open hole completions.

Base Tool + MLT



The BHA included a proprietary cablehead, a base tool with a range of sensors, and an all-electric, flow through MLT. The BHA was deployed using a 2 7/8" coil with a 7/32" armored monoconductor cable. Depth encoder data was read directly from the CT unit.

- Used precise depth correlation from the casing's end to precisely identify window locations.
- Generated a data map to characterize the "natural" bore that the tool followed in the straight position.
- Identified the "natural" lateral using the drilling log.
- Returned the tool to the lateral window and kicked off the tool in the direction which centered the wand in the lateral window according to the drilling log.
- Characterized the lateral window using wand deflection angle vs. wand force data.
- Lightly cleaned the lateral window, when necessary, with the steerable water jetting head.
- Pushed downhole, monitoring the toolface orientation for any signs of coil rotation, to enter the lateral.
- Compared the data map generated in the lateral to the "natural" path data map to confirm entry in the lateral.

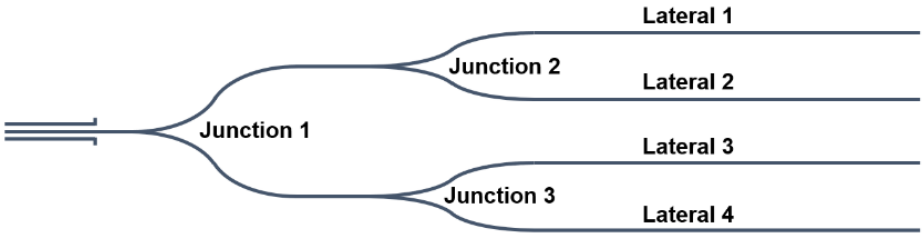


Figure 1

The well was drilled with an initial junction which joined two legs that also contained junctions as shown above in Figure 1. This resulted in two lateral windows having to be successfully navigated in order to reach any targeted lateral.

The well was assessed using the AKOS multilateral navigation tool in conjunction with the company's proprietary tool status and steering software shown in Figure 2. The results were as follows:

- Two laterals were unobstructed (2 & 3)
- One lateral had significant debris in the entry window (1)
- One lateral's window (4) was fully collapsed with material significantly reducing the diameter of the junction's natural bore path.

The decision was made to first enter the two open lateral windows and proceed to MD or coil lockup. The tool was advanced into Lateral 3 (the well's natural lateral) and a low-pressure wash was started. Upon reaching lockup, the tool was returned to a position near the casing exit point.

The tool was then steered through Junction 1 and Junction 2 to reach Lateral 2. This lateral was washed to lockup in the same manner as Lateral 3. After reaching lockup, the tool was returned to a position between Junction 1 and Junction 2.

The tool's washing head was oriented to spray water directly into Lateral 1's entry window, and the flow rate was slowly ramped up over multiple passes past the entry window. After four passes, the tool was able to enter Lateral 1. Lateral 1 was characterized in the same manner as Laterals 3 and 2 and returned to just outside the casing.

Next, the tool was run to Junction 3 in an attempt to clean the entry window for Lateral 4. After six cleaning passes, it was concluded that jetting alone was insufficient to clear the window. AKOS was instructed to characterize the obstruction and made multiple passes touching the kickoff wand against the window obstruction and measuring the diameter of the natural bore passing by the window. The natural bore diameter was reduced by ~40% over a significant distance along Lateral 4's entry window.

Lastly, the tool was returned to Lateral 3 for a second run to verify that the data from a second trip to lockup would match that collected on the first pass. The operator was impressed with the agreement between the characterization data sets from Lateral 3's two passes.

Figure 2

Publicly available production data from the well is shown in Figure 3. Monthly oil production more than doubled following the conclusion of the job. Most likely this increase is due to the successful re-opening of the window at Lateral 1.

About Us

Cybercoil Inc. is headquartered in Edmonton, Alberta, Canada and holds the country-wide exclusive license to provide well intervention services using AKOS' proprietary technology - leveraging more than a decade of experience developing and operating leading-edge coiled tubing deployed well intervention tools. Cybercoil is committed to bringing Canadian well operators the highest possible service quality.

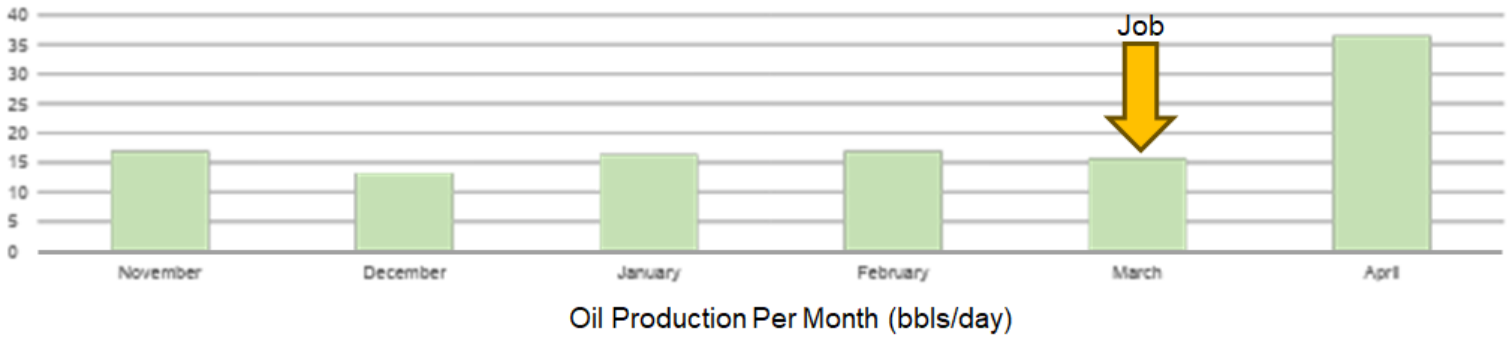


Figure 3