

CASE HISTORY

DUAL-TECHNOLOGY APPROACH TO LEAK DETECTION

APPLICATION

Well Integrity

TECHNOLOGY

Vulcan MFT-24
Standard FLS

LOCATION

Asia Pacific

CLIENT CHALLENGE

An operator's injector well was compromised by sustained annulus pressure (SAP). The source of SAP was suspected to be communication between the tubing and casing. To help understand the issue, the operator consulted with Scientific Drilling, the premier memory logging provider in the region. The objectives of the data collection were two-pronged: determine the location of the tubing leaks and to evaluate the integrity of the tubing in the area of the leaks for tubing patch/straddle setting purposes.

SCIENTIFIC SOLUTION

Scientific Drilling advised a dual-technology approach, deploying a Memory PLT to assess the flow dynamics inside the tubing and a high-accuracy memory multi-finger caliper to attempt to identify 100% penetrations in the tubing wall.

On the first run, the MPLT was conveyed and log passes were performed across the suspect area in shut-in and injection conditions. The data positively revealed leaks at X087.2m and X953.0m as shown in figure 1. On the subsequent run, the Vulcan MFT-24 memory caliper was run to the bottom of the interval of interest and data was collected at a frequency of 0.01 seconds while logging at a speed of 15/min, reducing velocity to 5m/min across the leaks identified by the MPLT data. The processed data showed that the caliper detected a maximum penetration of 91.1% of nominal wall thickness at X087.2m and a penetration of 26.6% at X953.0m (figure 2). These anomalies are consistent with the MPLT leak detection results as seen in the spinner and temperature data. When a caliper finger crosses a hole, it will not usually detect 100% maximum penetration; this would require the finger to cross over the center of the hole and for the size of the hole to be large enough for the full pivot of the finger to enter it. While the maximum penetration at X087.2m and X953.0m MD is less than 100%, they can still be holes because of this phenomenon.

Figure 1
Leak # 1: MPLT shows leak in 3.5" tubing at X087.2m and X953.0m MD

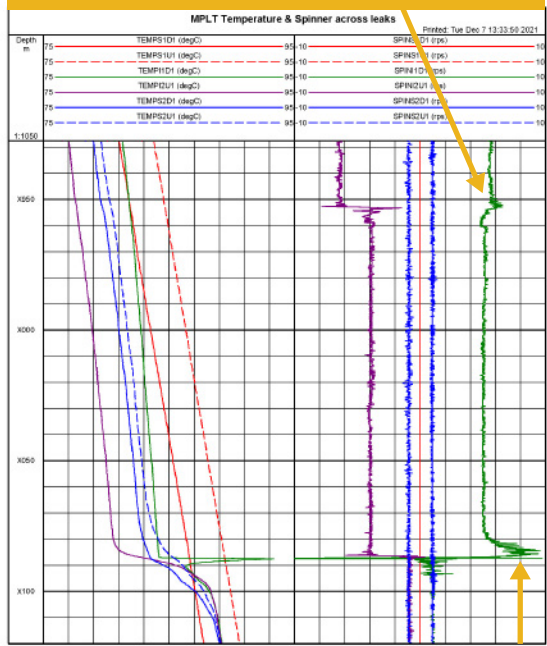
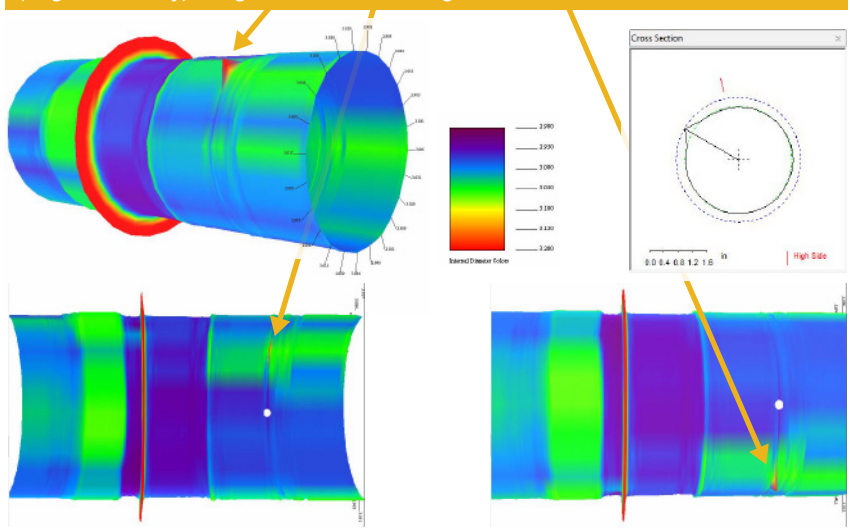


Figure 2
Leak # 1: Max Penetration 3.455" (91.1% of Nominal Wall Thickness), 15mm long (finger # 21 only). Finger # 21 on 312.3 deg HTF Orientation



CLIENT VALUE

The customer received a clear answer to their compromised well integrity issue in an efficient and cost-effective manner thanks to Scientific Drilling's memory logging expertise, proprietary technologies, and highly responsive log analysis service.