RestrictionVA

DIAGNOSING WELLBORE ACCESS PROBLEMS

Combined with EV's Visual Analytics, the Memory HD Camera offers an efficient and definitive method to identify the root cause of restricted wellbore access

MAINTAINING WELLBORE ACCESS

Maintaining an unrestricted path between the wellhead and the reservoir plays a key role in flow efficiency as well as providing unobstructed reservoir access to intervention equipment throughout the life cycle of a well. The ability to access the reservoir is vital for data gathering, well integrity and production optimisation purposes. Having recently acquired the field, the operator planned a re-perforation campaign on a selection of wells to increase production. In preparation for this work, routine slickline drift runs were scheduled to confirm clear access through the upper completion.

HITTING A ROADBLOCK

What should have been an uncomplicated tubing drift evolved into multiple runs, of varying size, in an attempt to pass restrictions encountered in the upper completion. When performing an initial drift on one of the primary candidates, the slickline crew encountered an unknown restriction within the completion. Multiple drift and lead impression block runs were attempted but failed to move beyond the restriction or yield any information as to its cause.

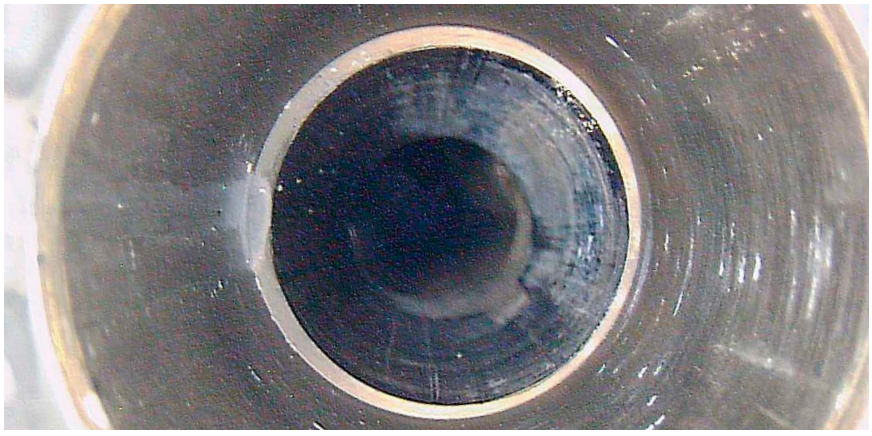

Figure 1: Step decrease in ID at pup joint and impact marks on low side

THE CHALLENGE

An operator in South East Asia encountered problems when performing a routine slickline drift to confirm reservoir access prior to a CT reperforation operation. Multiple slickline drifts stopped shallow in the upper completion and lead impression block (LIB) investigative runs failed to yield any meaningful answers.

THE SOLUTION

To minimise any further mechanical interventions and determine the root cause of the problem, the customer opted to run EV's Optis® M125 camera. Deployed on slickline, the memory camera offers full colour, high definition video at 30 frames per second. Up to 5 hours of video can be recorded over multiple programmable intervals.

THE RESULTS

The first issue was found to be an unexpected change in diameter in the upper part of the assembly. Impact marks on the low side of the wellbore indicate where the drift tools have contacted restriction. ***(Figure 1)*** With the side pocket mandrel found to be oriented at low-side ***(Figure 2)***, it became clear that it was not possible to secure safe passage for the perforating guns. Armed with the definitive, quantified information provided by EV's RestrictionVA service, the operator decided to defer activity on the well until a work-over unit was available to complete the perforating operation with the upper completion removed.

VISION IS KNOWLEDGE

Images from the Optis® M125 camera clearly show the hold-up depth of the first slickline runs ***(Figure 1)***. The root cause of the shallow holdup is determined to be an apparent, but unexpected, step change in pipe diameter at a pup joint. Impact marks on the low side of the wellbore indicate where the toolstring movement has been restricted due a combination of a wellbore ID change and deviation.

VISUAL ANALYTICS

EV's integrated visualisation and dimensioning software enabled accurate in-situ measurements of the inner diameter of the pup joint and the step change in diameter encountered by the drift tool strings. ***(Figure 4)***. These measurements provided the customer a more detailed understanding of the restriction and further evidence to support why certain drift designs would not pass this point.

Slickline runs of reduced diameter and varied design succeeded in passing the pup joint, seen in Figure 1, only for progress to be halted at a side pocket mandrel (SPM) just below. Figure 2 shows a impact damage at the SPM which is most likely due to tool impact. Figure 3 also shows the condition and orientation of the gas lift valve and mandrel. With the pocket found to be oriented at low-side, and seeing the impact marks from the previous drift runs, it became clear that it was not possible to secure safe passage for the perforating guns.

Armed with the definitive, quantified information provided by EV's RestrictionVA service, the operator decided to defer activity on the well until a work-over unit was available to complete the perforating operation with the upper completion removed.

As a result, the operator was able to move on to the next well in the sequence and maximize the efficiency of the campaign.

Figure 2: Impact damage identified from tool impact at SPM

Figure 3: Condition and orientation of GLV and SPM (low-side)

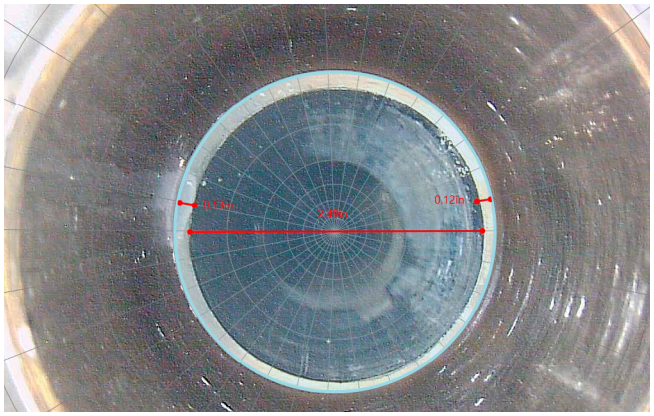

Figure 4: EV's Dimensioning software used to measure an unexpected reduction in ID at a pup joint