

Case study Drilling Losses

Multiple lost-circulation zones identified from within drill pipe allowing quick remediation



Location Global
Well type Open hole

Case benefits

- Multiple lost circulation zones located rapidly, reducing downtime and cost.
- Safe and efficient drilling operations restored enabling well completion.
- Rapid deployment through-drill pipe minimised disruption and cost.
- Potential for future drilling programmes to be optimised to avoid lost circulation and downtime.

Challenge

Drilling fluid losses pose a significant risk to operational safety and can complicate drilling and cementing operations, leading to costly delays.

A customer was experiencing mud losses and gas kicks whilst drilling a well with high hydrogen sulphide concentration. All remediation attempts, including mud weight adjustment, had been unsuccessful and mud losses had persisted for several weeks. Chemical, drilling fluid and rig time costs were spiralling upwards so the customer needed to locate the lost-circulation zones quickly and reliably.

Solution

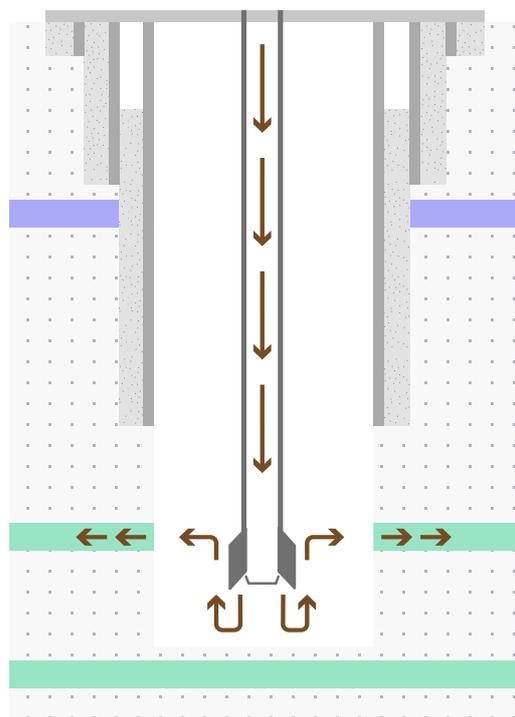
TGT recommended its 'Drilling Losses' product and 'True Integrity' diagnostic system as a reliable means to pinpoint and explain the source of lost circulation.

The True Integrity system utilises methods, measurements and analysis that reveal seal failures throughout the well system, including 'formation seal' failures that tend to be the underlying cause of lost circulation. Key to the operation of the diagnostic system is the Chorus platform. Chorus technology records and displays the acoustic energy created by fluid movement throughout the well system. An appropriate diagnostic programme was developed to reveal lost circulation dynamics and Chorus sensors were deployed through the drillstring to survey the well.

Drilling Losses pinpoints lost circulation zones rapidly and accurately, without pulling the drill string.

Delivered by our True Integrity system with Chorus technology, Drilling Losses provides the precise information needed to target the right remediation approach.

Drilling Losses is used in a targeted fashion to quickly locate the lost circulation zone or zones, so normal drilling operations can resume safely without further delay.



Result

The diagnostic system with Chorus revealed four active lost circulation zones, labeled A1 to A4 in Figure 1. This explains why the operator was having so much trouble solving the issue.

The operator deployed lost circulation material (LCM) to all four zones and the diagnostic programme was repeated.

The second survey showed that fluid loss had been eliminated in A1 and A2, and considerably reduced but not stopped in A3 and A4.

A second treatment was applied using a different LCM to A3 and A4, and a third survey with Chorus showed that A4 had been sealed, and only minor losses were escaping to A3.

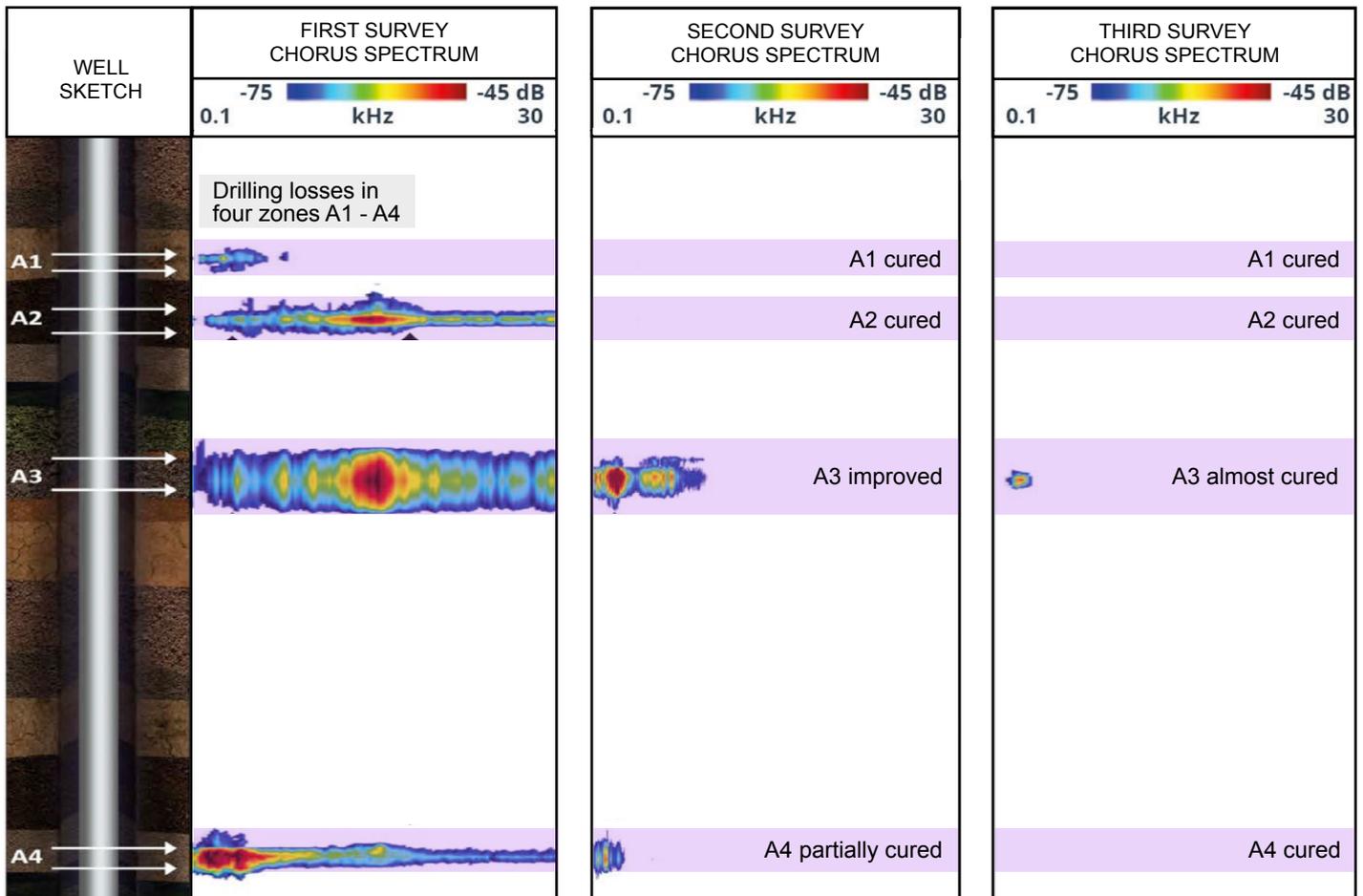


Figure 1. Drilling Losses use the True Integrity system incorporating Chorus technology to detect and locate lost circulation zones from inside the drillpipe. In this example, the acoustic signature recorded by Chorus clearly indicates four lost circulation zones. Subsequent post-treatment surveys show progressively less flow into each zone as the LCM seals the formation.