

Integrity Challenge:

Drilling across a loss zone leads to a high probability of poor cement quality and free pipe. If there is a corrosive aquifer, the possibility of external corrosion is increased drastically. It is critical to understand the integrity of the pipe across these areas. Regular logging is recommended to identify when corrosion will migrate from the outer to inner pipes. This will enable a remedial program such as installing a scab liner to be planned before a catastrophic failure.

Corrosion Logging Result:

One example when corrosion logging was conducted and multi barrier metal loss on the outer casing and inner casing was detected is shown below:

The well is a vertical oil producer drilled more than 40 years ago. After drilling the well was completed with a 20" conductor, a 13 3/8" surface casing and a 9 5/8" production casing. A 3.5" progressive cavity pump (PCP) completion string was run.

In 2013 during a workover, the 9 5/8" casing pressure test failed. A 7" scab liner was run in hole to 1000 m. A 3.5" PCP completion string was run.

In 2021 EMDs corrosion logging was conducted.

The recorded log data indicated the presence of two corroded intervals in the 13 3/8" casing:

- In the upper section of the well an extended interval of severe metal loss in the 13 3/8" casing below the 18 5/8" conductor with a maximum metal loss of 90%.
- In the middle section of the well there was a maximum metal loss of 30%.

From the EMDs log data the 9 5/8" casing had 2 intervals of metal loss:

- In the upper section of the well with maximum metal loss of 45%. It appeared that corrosion had migrated from the 13 3/8" casing.
- In the middle section of the well with maximum metal loss of 13% which was possibly caused by corrosion migration from the surface casing.

It is likely that the upper interval of corrosion in the 9 5/8" casing was the main root cause of the failed casing pressure test.

In addition, the EMDs gamma ray showed much greater counts in comparison with the open hole gamma ray curve. The shape of the EMDs gamma ray curve indicated scale accumulation on the internal tubing wall across the pipe body.

