

Integrity Challenge:

It is important to have a good cement bond in the annulus, for example by using a multistage packer and having adequate centralization. External coating on the inner pipe will lessen the risk of corrosion migration from the outer pipe to the inner pipe. This is especially key if the outer pipe has poor cement quality or no cement and is exposed to a corrosive aquifer. Multiple barrier failure can lead to catastrophic consequences such as an oil leak to surface which could result in damage to personnel, the environment, the asset and company reputation.

Corrosion Logging Result:

One example when corrosion logging was done in a 3 barrier well (strings) and metal loss on both the casing strings were detected as shown below:

The well is a vertical gas lift oil producer drilled more than 20 years ago. After drilling the well was completed with a 9 5/8" surface casing to 952 m, and 7" production casing with the shoe at 2909 m. The 3.5" completion string was run in hole to 2768 m.

In 2022 a subsurface integrity test (SIT) was conducted, both the A and B annulus failed the leak off tests (LOTs). In addition, communication was observed between the A and B annulus.

After the SIT a decision was taken by the client to run a corrosion log to verify the LOT failure. The logging operation was standalone and the tool was run through the completion. The EMDs log data revealed the presence of two extended intervals of severe corrosion in the 9 5/8" surface casing at the shallow section of the well. In some areas the metal loss was almost 100%. In addition, high gamma ray was recorded across the upper corroded interval indicating probable scale accumulation. Also a few localized intervals of corrosion in the 7" casing were detected. This is probably the main cause of the A to B annulus communication.

The well was then suspended in line with the company integrity guidelines pending remedial action to safely secure the well.

