

Integrity Challenge:

Drilling a zone with losses can lead to poor cement quality or in severe cases a total absence of cement behind the casing resulting in 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. The use of multi staged cementing tools is one technique to optimize cement placement. Also installing heavy walled casing joints i.e. sacrificial joints across corrosive intervals will protect the well from failure due to corrosion.

Corrosion Logging Result:

One example when corrosion logging was done in a well as shown below:
 The well is a horizontal barefoot electrical submersible pump (ESP) oil producer drilled in 2002. The well was completed with a 13 3/8" surface casing, a 9 5/8" intermediate casing and a 7" production casing. As the upper section of the well was drilled with losses, to improve casing cementing, it was decided to place a multi-stage inflatable packer collar (MSIPC) in the 13 3/8" casing. This allows for a staged cement job. During the first stage the top of cement (TOC) was identified at 340 m and during the second stage the cement was to surface. Additionally, it was decided to install a heavy weight joint below the MSIPC to increase the life of the casing.

The first EMDs corrosion log was done in 2013 and a repeat log run 2021. Both logs did not reveal noticeable metal loss on the pipes. Corrosion log data identified all completion accessories including surface casing shoe at 444 m. The data shows that the surface casing had joints with different weights: 5 joints at an interval 368-303 m had a greater amplitude which relates to a greater nominal wall thickness. In addition, the heavy weight joint installed below the MSIPC was identified. The temperature curve indicated upward crossflow from the 13 3/8" casing shoe to the top of the MISPC. The gamma ray curve indirectly confirmed crossflow since high gamma ray counts were recorded at an interval below the packer which may correspond to the end of the crossflow.

The log data confirmed that the completion design for this well is suitable for the well conditions and therefore will protect the well from failure due to corrosion.

