



CASE STUDY

TUBING INTEGRITY EVALUATION BY STT IN A VERTICAL OIL PRODUCER WITH HIGH H₂S ENVIRONMENTS

Location: Middle East

Well type: vertical oil producer

Challenge:

The integrity of 3 1/2" tubing in a high H₂S environment raised concerns due to the corrosive nature of the gas, which could lead to severe corrosion and potential rupture during replacement operations.

Objectives:

To evaluate the structural integrity of the tubing and localized corrosion with the highest accuracy and precision, ensuring operational safety and minimizing risks during the replacement process.

Solution:

STT was proposed as the optimal solution for assessing tubing conditions in a high H₂S setting. In addition, a client requested to run a conventional corrosion logging tool for comparison.

Segmented Thickness Tool (STT):

- Employs electromagnetic field decay analysis to detect localized corrosion and metal loss.
- Equipped with 8 high-resolution miniature sensors distributed around the tool's circumference.
- Provides 360° segmented evaluation of the tubing, with each sensor covering a 45° segment for a detailed assessment.

Advantages:

- Precise identification of localized areas of severe metal loss.
- Higher accuracy and resolution using advanced segmentation capability compared to conventional corrosion evaluation tools providing only average circumferential metal loss.

STT tool ensures a thorough and reliable analysis of the tubing, safeguarding against rupture during the replacement process. This minimizes risks while meeting integrity assessment requirements in challenging corrosive environments.





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Results

Based on MBTT data two major corroded areas were localized at 1358.0-1361.0 m and 1395.0-1399.0 m with 13% and 26% of an average circumferential metal loss respectively. The STT results confirmed the MBTT results, however, the area at 1358.0-1361.0 m was identified as a localized corrosion zone with a maximum metal loss level of 27%, while the area at 1395.0-1399.0 m showed a more uniform distribution of corrosion around the circumference with a slight increase of metal loss up to 29%.

Major outcomes

- Localized zone of circumferential corrosion was discovered at 1395.0-1399.0 m
- This zone should be considered as a major weak point during the tubing retrieving operations

