CASE STUDY

CASING LEAK DETECTION IN ESP OIL PRODUCER BY **FIND** (SNL) & **MBTT** CORROSION LOGGING

Location: Middle East

Well type: ESP oil producer

Challenge: accumulation of gassy fluid in cellar during ESP production in high GOR well.

Objective: leak detection in well tubulars and localization of possible intervals of annular and behind the casing flow.

Solution: a combination of SNL (FIND) and High-Resolution Temperature (HRT) tools was proposed as an industry-proven approach for leak detection. A new generation FIND tool allows to capture of leak points behind several barriers, to localize the flow intervals in tubing, annuluses, and behind the casing.

The MBTT corrosion logging was proposed for quantitative conformation of leak points and localization of corrosion distribution across them.

The survey was proposed to be done in three runs: the first two runs during the static shut-in conditions to obtain the baseline for temperature and noise as well as to record the MBTT log, the third run was done post-ESP production.

Multi Barrier Thickness Tool (MBTT)

Multi Barrier Thickness Tool (MBTT) is designed to evaluate the metal loss of the tubing and casings up to 3rd barrier based on emission and measurement of an electromagnetic field with the following data processing. The tool provides a qualitative evaluation of tubulars thickness with an accuracy of 0.1 inches.

Flow Identifying Noise Detector (FIND)

A new-generation spectral noise logging tool FIND has split-channel architecture. The tool records data by four channels with different frequency ranges and amplification to signal. It allows the precise localization and differentiation between the wellbore flow, annulus flow, and flow behind the casing intervals.

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Results

FIND Channel 3 from active pass recorded a narrow horizontal noise anomaly of a wide frequency range located close to the surface which is related to the casing leak point. It was confirmed by a negative spiky anomaly on the active pass HRT curve. In addition, the MBTT data analysis revealed a zone of severe 9 5/8" casing corrosion across the leak point area.

There is an explicit vertically oriented noise anomaly in the low/mid-frequency noise domain recorded by FIND Channel 1 indicating the A-annulus upward gas flow.

FIND Channel 3 in high-frequency noise domain presented vertically oriented noise anomaly confirming the gas flow behind the casing across the leak point up to the surface.

Major outcomes

- Casing leak point
- Corrosion zone around casing leak point
- Interval of A-annulus gas flow
- Interval of behind-the-casing gas flow