CASE STUDY

RESERVOIR FLOW PROFILING BY **STREAM**™ IN DUAL-STRING OIL PRODUCER FOR THE EVALUATION OF PERFORATIONS, RESERVOIR PERFORMANCE & WSO

Location: Asia.

Well type: dual-string deviated oil producer.

Challenge: evaluation of perforations and determination of real reservoir flow zones as well as localization of the water source behind the tubing and casing in dual-string completion.

Objective: assess reservoir performance, identify water inflow intervals, and construct the current production profiles across reservoir sections for each string separately.

Solution: conventional spinner-based methods are not able to evaluate perforations performance and reservoir flow zones behind the tubing. Therefore, the STREAM™ has been proposed as a reliable solution in dual-string completions for quantification of reservoir performance, fluid flow evaluation behind the tubing and casing. The combination of T-FLOW and FIND technologies was applied for the precise localization of main reservoir flow intervals, water source localization, and perforations performance assessment.

STREAM™ (**S**PINNERLESS **T**ECHNOLOGIES for **R**ELIABLE **E**VALUATION, **A**NALYSIS, and **M**ODELING of well-reservoir flow)

A powerful suite of tools and technologies that provide high-resolution and accurate logging capabilities. STREAM is an integration of FIND, TFT, and T-FLOW technologies, working in perfect harmony to unlock unparalleled insights into the processes occurring inside and beyond the wellbore.

T-FLOW (Temperature Modeling)
The math solver allows predicting the heat exchange between the wellbore and the reservoir based on hydro/ thermo-dynamic theory and high-resolution temperature data acquired by the High-Resolution Temperature Tool (HRT). The method provides a detailed reservoir production/injection profile for open/cased hole wells with vertical, deviated, or horizontal trajectories.

FIND (Flow Identifying Noise Detector)
A new-generation spectral noise logging tool records data by four channels with different frequency ranges and amplification to signal. It allows to provide detailed full-spectrum acoustic profile without distortion, including wellbore/reservoir flow intervals detailing, fractures localization, leak detection, and flow behind the casing determination.
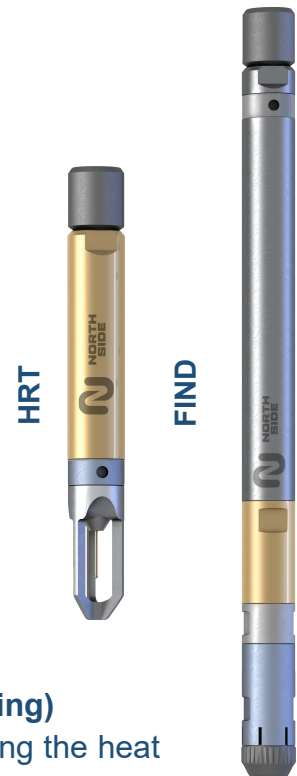
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Results

The log was done in two runs for long and short strings separately.
According to the spinner-based summary profile, three zones of wellbore flow were determined across SSD, perforated tubing joint and lower perforated interval. However, based on the T-FLOW summary profile and FIND spectrum, several intervals of reservoir flow corresponding to perforations were determined.

Based on the T-FLOW profile and FIND data the interval of reservoir flow corresponding to Perf.1 was captured as more extended (11 m wider than Perf.1). Meanwhile, the evaluation of Perf.2 revealed that only the first part of the perforated interval produces.

The lower Perf.3 zone was characterized by a high WC. Despite the fact, that the WSO cement plug was installed on the wellbore, the T-FLOW modeled profile and FIND spectrum confirm the flow behind the casing from below the perforation zone due to water encroachment phenomena.

Major outcomes

- intervals of real reservoir flow behind the pipes were determined

- perforation intervals performance was evaluated

- the flow behind the casing and water source were localized