



## CASE STUDY

# FLOW BEHIND THE CASING EVALUATION IN VERTICAL OIL PRODUCER BY **STREAM™** ALLOWED THE OPERATOR TO INCREASE PRODUCTION

**Location:** Middle East

**Well type:** vertical oil producer

**Average production rate:** 1500 bpd

**Challenge:** naturally flowing oil producer exhibits a lower production rate than it was expected. The operator suspects partial performance of the formation through perfs.

**Objectives:** evaluate the production performance of perforation zones 1 and 2 as well as the whole reservoir interval behind the casing to optimize the production.

**Solution:** a highly sensitive Full-Bore Spinner (FBS) tool was proposed in order to assess the wellbore flow across the perforation zones and differentiate the contribution of each zone precisely. The reservoir flow performance evaluation was proposed to be done by the **STREAM™** including T-FLOW and FIND technologies. Such an approach allows for constructing the detailed reservoir production profile and localizing the main potential reservoir flow zones behind the casing.

**STREAM™** (SPINNERLESS TECHNOLOGIES for **RELIABLE EVALUATION, ANALYSIS, and MODELING** of well-reservoir flow)

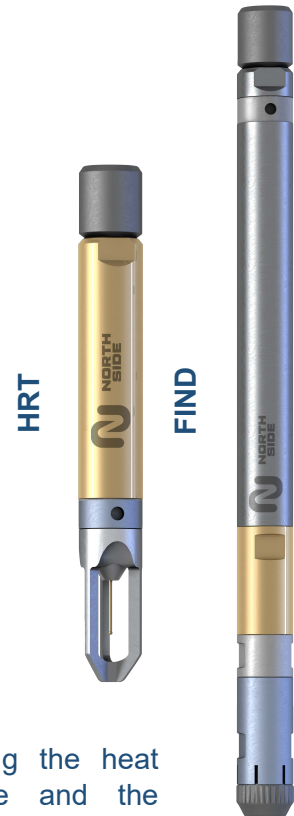
A powerful suite of tools and technologies that provide high-resolution and accurate logging capabilities. **STREAM** is an integration of **FIND**, **TFT**, and **T-FLOW** technologies, working in perfect harmony to unlock unparalleled insights into the processes occurring inside and beyond the wellbore.

### **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 spinner-based profile shows the major production interval across the perforation interval of Zone 2 only. However, the T-FLOW temperature modeled profile revealed the major reservoir flow from the interval below the perforation Zone 2. Such a conclusion was also supported by a contrast warmback response shown on the color map as well as an explicit high-frequency noise anomalies on FIND Channels 1&4 related to the vertical reservoir flow.

The **STREAM™** results supported the operator's decision to add the perforations below Zone 2 to unlock the well potential. As a result, the production rate has been increased from 1500 bpd to 2850 bpd.

### Major outcomes

- domination of reservoir flow behind the casing from below the perforation intervals
- FBS revealed 100% flow from Zone 2 where the **STREAM™** shows minor reservoir contribution across the same interval and major contribution interval below
- the length of the reservoir contribution zone behind the casing for additional perforations was provided

