



CASE STUDY



Leveraging DFOS for Post-Perforation Production Profiling

China

Project Overview

Analyzing Distributed Fiber Optic Sensing (DFOS) data in a producing well after undergoing hydraulic fracturing can provide valuable information into well performance.

In China, a gas field operator required a non-intrusive approach for analysis of well performance in deviated/horizontal wells. The particular well that was analyzed is characterized by a production rate of 180,000.00 m³/d of gas. To decrease safety risks, logging time, and costs connected with the use of standard Production Logging Tool (PLT), the client decided to use fiber optic sensing to collect temperature and acoustic data for production surveillance.

Solution

The well in this case study was logged using both AP Sensing's DTS N45-Series and DAS N52-

Series integrated into the same coiled tubing. Over a period of approximately 60 hours, DTS and DAS data were acquired at various surface rates and shut-in phases to gain insights into the well's behavior.

Specialized PLATO-DTS software from ISP was employed for quantitative production profiling based on the acquired temperature data. The actual production rates are found by optimizing the well and temperature model. The raw DAS data was processed using specialized ARIANE-SP2S software.

Results

The coiled tubing equipped with fiber optics alongside the interrogator units enabled continuous temperature and acoustic sensing during the various well operations at the gas field. Figure 1 demonstrates the DTS and DAS data acquired in the reservoir section, while Figure 2 illustrates the

Background

- A gas field in China required a non-intrusive approach to analyze well performance
- The operator needed an efficient and accurate way to assess production effectiveness after perforation

Solution & Benefits

- Coiled tubing-enabled optical fibers; 60 hours of data acquired using AP Sensing's DTS and DAS
- Quantified flow profiling using ISP's specialized software
- Reduced HSE risks and reduced costs compared to conventional production logging operations
- Valuable insights for production optimization

results of DFOS data quantitative analysis using PLATO-DTS.

By leveraging the acquired temperature and acoustic data, analyzed using market-leading software solutions from ISP, it was possible to quantify the flow profiling. This information was crucial for evaluating production effectiveness and identifying potential issues such as water breakthrough.

AP Sensing’s collaboration with ISP integrates reliable, robust, and high-quality DTS and DAS technologies with software solutions for DFOS data interpretation, providing valuable insights for production profiling applications.

Benefits

The implementation of DFOS for production monitoring brought several significant benefits to this project. Firstly, it eliminated the

need for invasive production logging operations, reducing the associated HSE risks. The optical fibers used for DTS and DAS were deployed via coiled tubing, minimizing disruption to the wellbore and ensuring the integrity of the operation.

Furthermore, this non-intrusive method resulted in cost savings compared to conventional approaches.

Lastly, continuous data acquisition provided valuable insights over a long period, allowing for better decision-making and production optimization.

Overall, the implementation of distributed fiber optic sensing technology, specifically DTS and DAS, for production monitoring in the gas well in China proved to be a highly effective solution. It offered real-time, non-intrusive monitoring, quantifiable flow profiling, and significant HSE risk reduction.

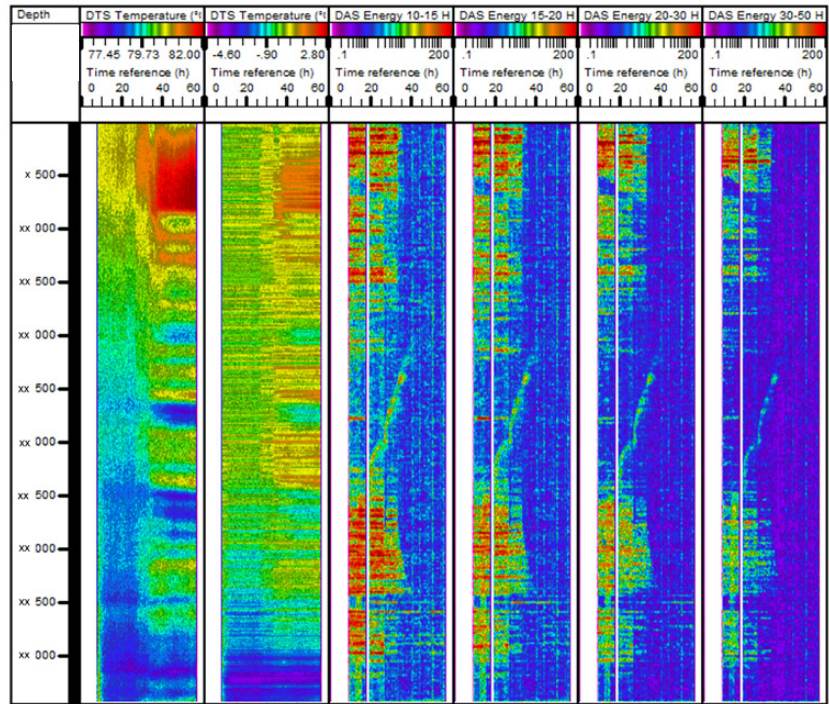


Figure 1: DAS and DTS data. The reservoir section is presented

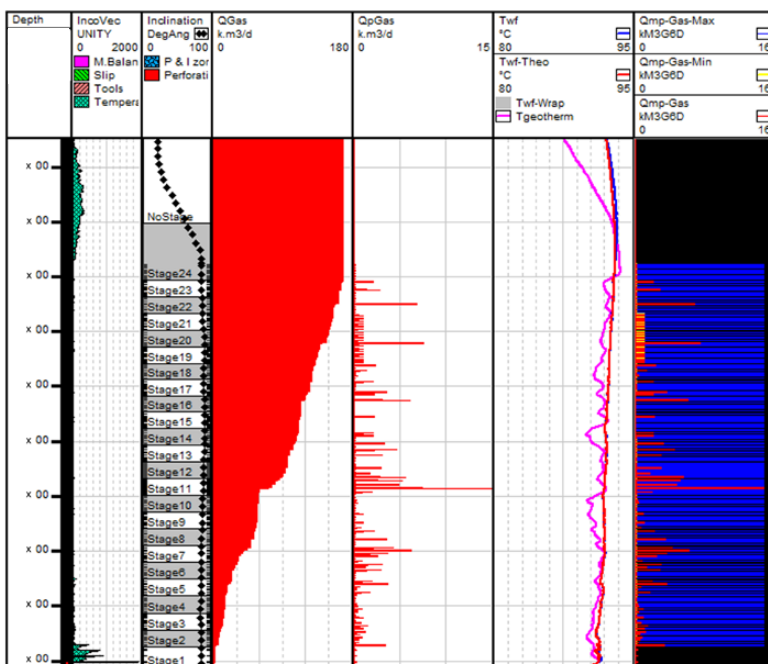


Figure 2: Quantitative results of DFOS data analysis

For more information:

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