

# CASE STUDY

## OPTIMISING WELL OPERATION MODE FOR WELLS PRODUCING FROM TWO OR MORE PRODUCTION LAYERS

### Objective

For the development of "new" and "mature" hydrocarbon reservoirs, the need for cost optimisation without jeopardizing production capabilities is an ongoing trend. License holders aim to target simultaneous production from several reservoirs (comingled production) to optimize drilling and operational costs.

This helps boost hydrocarbon production, while reducing the ROI period; at the same time, a number of new technology challenges arise.

In the case of comingled production, one of the key tasks is to monitor production from each reservoir and determine an optimal well operation mode.

Traditional methods available to address these tasks require expensive equipment to measure the inflow from each target zone or suspending production to conduct well interventions.

GEOSPLIT dynamic marker-based production profiling surveillance technology may serve as an easy-to-implement cost efficient tool to address the aforementioned problems.

#### ★ Type of well

gas condensate well with 2-stage hydraulic fracturing

#### ⚠ Special conditions

2 reservoirs with various porosity and permeability

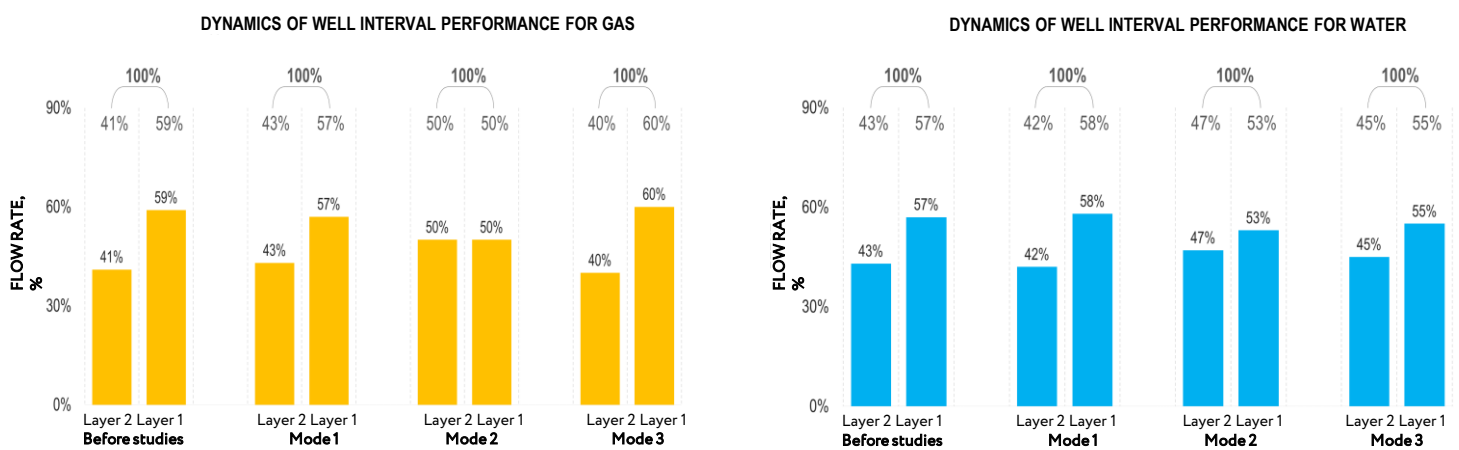


# Solution

The technology of marker-based production profiling surveillance in a producing well with 2-stage massive hydraulic fracturing was used at a site under development in a large field in Western Siberia (over 200 tons of proppant were injected in each interval in the Achimov deposits). The ports are located in different layers of the Achimov deposits, which have different thickness, porosity and permeability, and productivity. To identify the production from each layer, marker-based studies were carried out at 3 production modes with different depressions.

The data obtained was used to build production profiles for each productive interval. The analysis of the results revealed a direct correlation between the bottom-hole pressure and the flow rate of each reservoir:

- As bottom hole pressure decreases, predominant performance is observed in the underlying Layer 1
- As bottom hole pressure increases, the production from both layers equalizes



Though the overlying Layer 2 is characterized by higher porosity and permeability compared to Layer 1 (higher permeability and gross bed thickness), its contribution to the total production drops with the increase in pressure drawdown. This happens due to the difference in the geometric characteristics of hydraulic fractures.

# Conclusion

In the course of the study, different well production modes were analysed at different pressure levels, without well intervention operations and production suspension. The studies conducted confirmed the possibility of using the dynamic marker-based production profiling surveillance technology to select an optimal production mode for wells producing from several producing layers.