GEOSPLIT DIGITAL

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CASE STUDY

HYBRID DIGITAL MODELING

TO ENHANCE THE EFFICIENCY OF AN OIL FIELD DEVELOPMENT MANAGEMENT

Objective

The evaluation of the hydrodynamic well interference is an important part of the oil production process. When a reservoir pressure maintenance (waterflooding) system is used, understanding the connection between injection and production wells is of fundamental importance for increasing the field development efficiency in terms of injection control, which, in turn, affects the reservoir system energy and watering rate.

In this regard, the choice of optimal operating parameters should be underpinned by the consideration of a group of wells. The application of hybrid digital modeling provides a rational approach to reserves recovery and makes it possible to evaluate well interference.

Customer value

Optimizing the development of a field area under study to enhance the waterflooding system efficiency and maximize the oil production

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Solution

The well interference degree was evaluated at an oil field area located in Western Siberia. The field under consideration has an impressive number of production and injection wells, as well as a long waterflooding period and high water cut of the producing well stock.

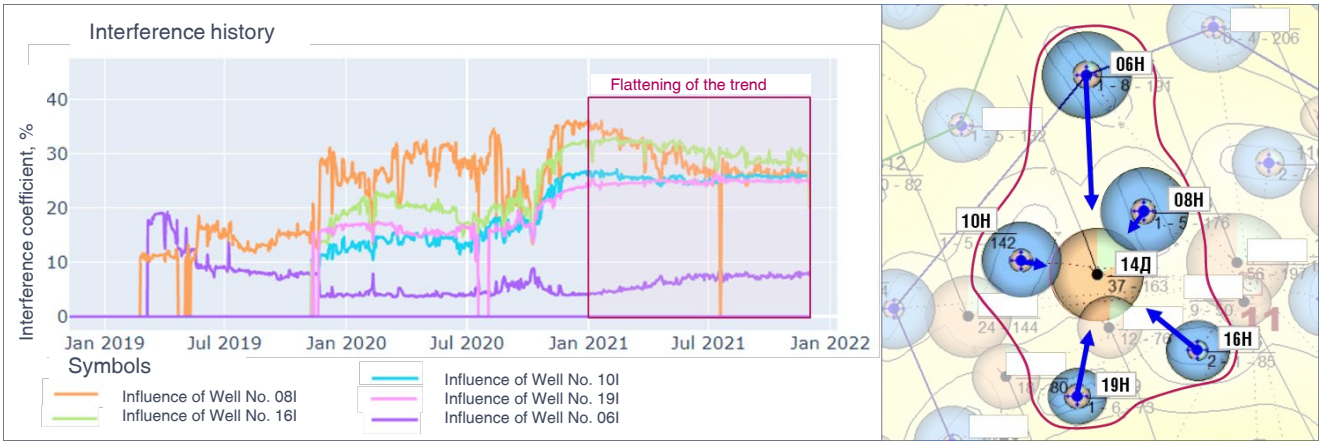
During the implementation of this project, using a hybrid digital material balance model created in GeoExpert, the nature of the distribution of productive layers across the area was studied; well interference was evaluated, and connectivity between the wells was confirmed.

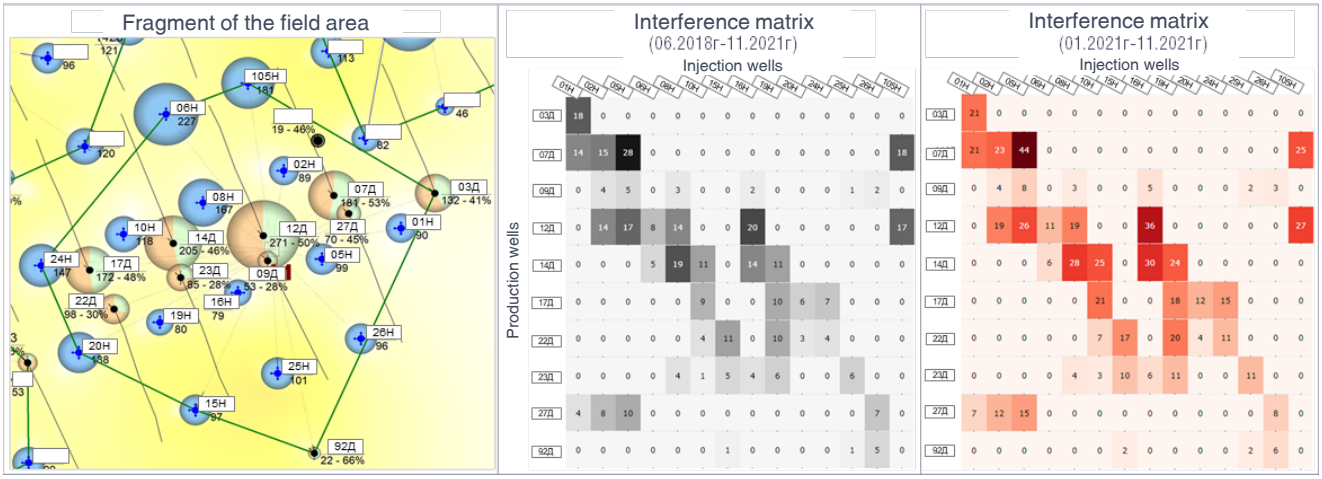
Based on the analysis of the well interference and the reservoir pressure maintenance system efficiency, the degree of injection influence on recovery rates in certain waterflooding areas was determined, areas and wells for conformance control activities were selected in order to drive up vertical sweep efficiency at waterflooding and decrease the water cut of the production wells.

Location
Western Siberia

Field
Oil field

Incremental production
up to 30%





Summary

The application of a hybrid digital model made it possible to determine which wells from the injection stock are hydrodynamically connected to the production wells, identify the degree of their influence on the production performance of the latter, and monitor the influence of each well over time. The resultant calculations made it possible to suggest practical recommendations (re-fracturing; high-volume bottomhole treatments; physical & chemical EOR treatments, conformance control, etc.), which can raise the oil recovery factor in the field areas and drive costs down. The expected incremental oil production in the area can reach 30%.

The well interference evaluation demonstrates high reliability coefficients obtained by comparing the model and actual data.