

GEOLOGICAL FEASIBILITY STUDY OF THE FIELD DEVELOPMENT MANAGEMENT USING DYNAMIC MARKER-BASED PRODUCTION PROFILING SURVEILLANCE

OBJECTIVE

To improve the oil field performance dynamics in two reservoir zones of one of the fields in Western Siberia using a comprehensive geological and field analysis, reservoir simulation and data obtained by dynamic marker-based production profiling surveillance in horizontal wells.

SOLUTION

A comprehensive geological feasibility study of the field development management included the following works (Figure):

- definition of the reservoir geological structure;
- analysis of the current resource recovery status;
- analysis of reserve recovery;
- analysis of water-flood pattern performance;
- geological analysis of the results of dynamic marker-based production surveillance;
- development of recommendations for field development control.

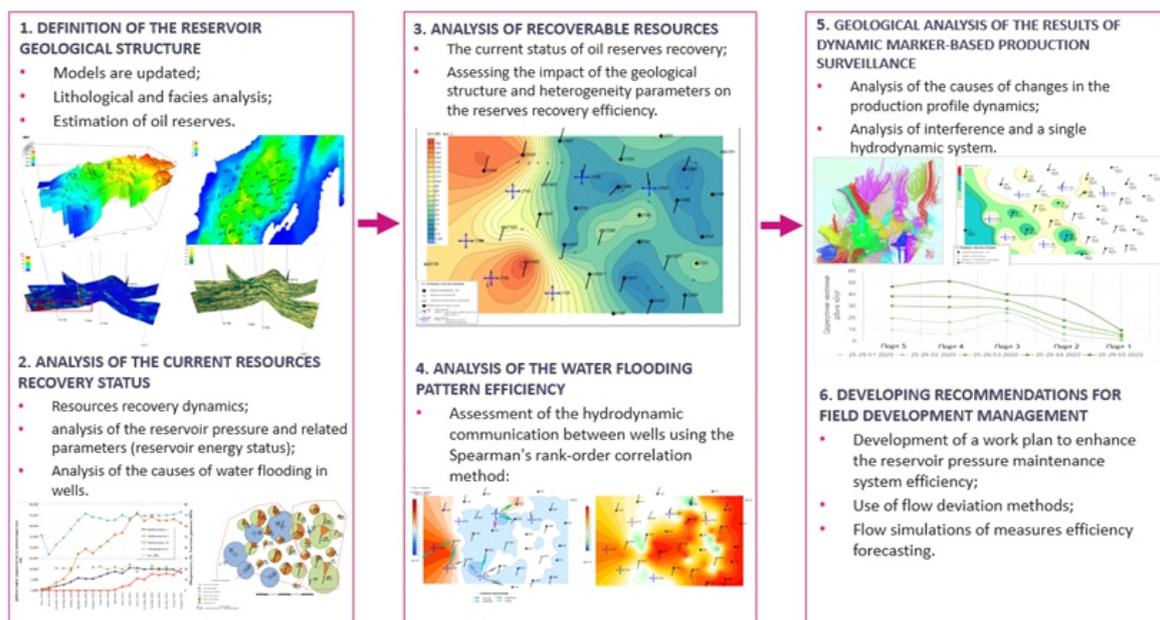
Dynamic marker-based production surveillance was performed in two zones of a large West Siberian oilfield. The first zone with a high water cut was analysed and three types of wells were distinguished:

1) wells with initially high water cut after multi-stage hydraulic fracturing;

- 2) wells showing water cut growth during operation;
- 3) wells with low cumulative oil-water factor values.

The analysis of the current field development status has shown that the reservoir area is characterised by non-uniform reserves recovery, insufficient area and vertical sweep efficiency. A number of measures were proposed and justified for this area aimed at the field development management that require alternation of well operation parameters in production and injection wells; creation of additional water flooding sources; infill drilling to intensify the development of remaining oil in place; and bottom-hole zone treatment to stimulate the oil flow.

The second area can potentially face the challenge of water flooding, so proactive recommendations were proposed to prevent sudden water breakthroughs and ensure uniform reserves recovery.



The methodology of the geological feasibility study of field development management using dynamic marker-based production profiling surveillance

CONCLUSION

The proposed integrated strategy for the geological feasibility study relied on dynamic marker-based logging data demonstrated the possibility of production logging without well interventions for efficient field development management. The justified recommendations will help increase oil production (on average, by 1.9 tons per day) and bring earlier undrained reservoir zones into development (production will grow by at least 1,900 tons).

The proposed list of recommendations for the field development management has been adopted for implementation with the aim to achieve stable dynamics and improve field development performance during 2021.