IMPLEMENTATION OF A PILOT SIDETRACK TECHNOLOGY PROGRAM

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Sidetracking is to drill a secondary wellbore away from an original wellbore. It is possible to have multiple sidetracks, each of which might be drilled for a different reason. Such specialists and scientists as Basarygin Yu.M., Budnikov V.F., Bulatov A.I., Geraskin V.G. and others have been studying this particular technology.

Verkhnechonskoye field has a complex geological structure and reservoir compartmentalization with layers with different permeability. Such issues as uniform reserves development, an increase in oil recovery factor, a decrease in the associated gas production rate and a reduction in the risk of water breakthrough in highly permeable interlayers have become relevant for the field. [2]

The sidetrack technology was chosen as one of the solutions to the above-mentioned problems. This technology is one of the most effective technologies that allows us to increase oil production and increase the oil recovery rate, give oil wells second chance that could not be given by other methods. Previously undeveloped reservoir sections, as well as hard-to-recover oil reserves, the production of which was previously not possible, can be developed by the sidetrack drilling. Technical and economic calculations confirm the efficiency of sidetracking for all types of reserves The cost of additionally extracted oil from second wellbore is usually lower than its average value for the fields, and the expenses of their construction is more cost efficient than the cost of drilling new wells.

The objective of this article is to analyze the implementation of a pilot program for drilling sidetracks and evaluate the effectiveness of sidetrack technology in order to engage in the development of areas with a high density of mobile rock, based on an analysis of data obtained experimentally during the implementation of the sidetracking program.

Four wells were selected from the well stock to use the sidetrack technology. The choice of the candidate well for sidetracking was carried out based on the productivity, poor injection capacity response or high water cut.

The choice of the Part of the target formation was based on the following criteria:

1) Proper reservoir properties:

a. Effective formation thickness is more than 3 meters;

b. The average porosity factor at least 0.1 units;

c. The average permeability is not less than 100 mD;

2) The density of movable oil reserves is 0.3 or more t /m^2;

3) Good pressure communication of the part of the target formation with the injection well stock;

4) The reservoir pressure in the target area is higher than in the bottomhole zone of the surrounding producing wells. [1]

Based on these criteria two wells were selected for the sidetracking: 383, 808.

Well 383 of multiple well platform No. 14 was selected as the first well for the sidetracking. It was characterized by low productivity due to the high ruggedness of relief and poor reservoir properties.

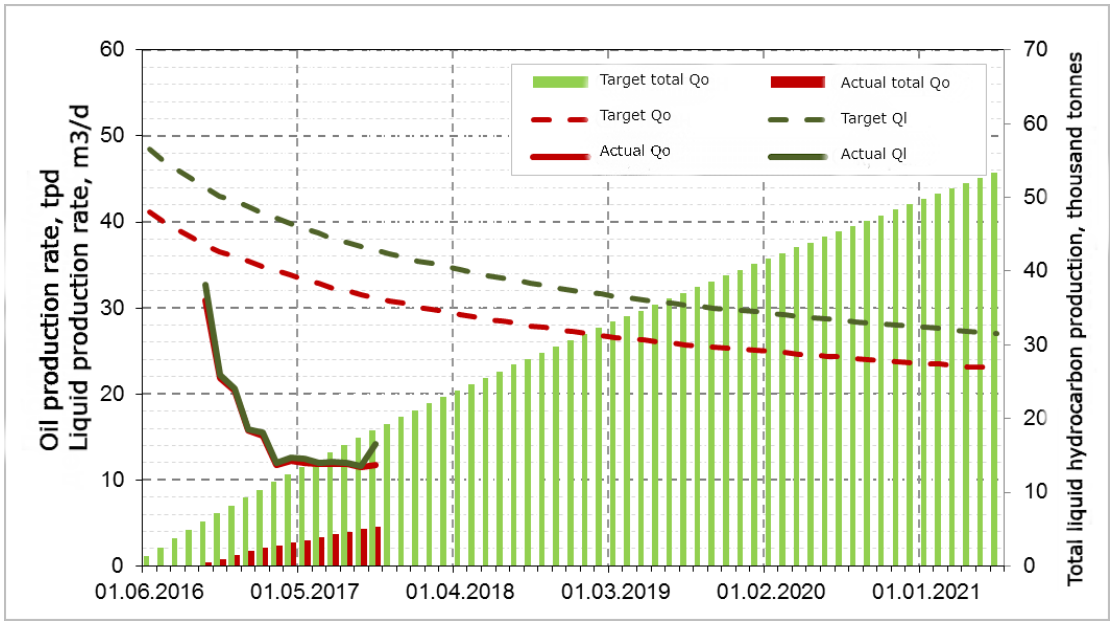

Fig. 1 Comparison of target and actual oil production indicators of the well 383

Well 383 was launched with an oil flow rate of 33 tpd (Fig.1), although target was 41 tpd.

The failure to achieve planned indicators is associated with a high ruggedness of relief and deteriorated even bad reservoir properties after drilling a sidetrack.

Well 808 of multiple well platform No. 9 was considered as second candidate for sidetracking. Well 808 was characterized by low productivity due to degraded reservoir properties.

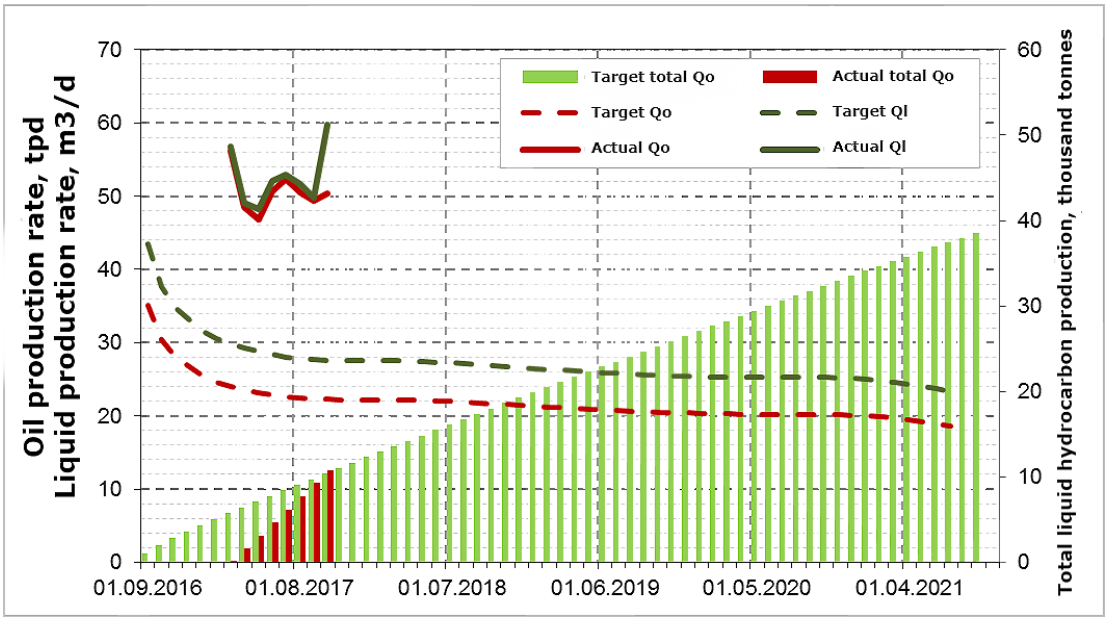

Fig. 2 - Comparison of target and actual oil production indicators of the well 808

Well 808 was launched with an oil flow rate of 56 tpd, that is more than target indicator of (35 tpd) (Fig.2). Exceeding targets is due to the lack of starting water-cut and a higher starting depression (+ 13%).

While the sidetracking process progressed, technological problems were identified. Mostly they were related to the formation exposing with subsidence reservoir pressure, which leads to collapse of mudstones above the target interval. Considering the elimination of complications, significant funds were spent, which led to an increase in the cost of sidetracking by 1.5–2 times. Based on the results, it was concluded that it is better to replace the sidetracking technology with infill drilling.

References

1. "Supervision of the implementation of design decisions of the technological scheme for the development of the Verkhnechonskoye oil and gas condensate field." Tyumen, 2008
2. Technological scheme for the development of the Verkhnechonskoye oil and gas-condensate deposit. Tyumen, 2014