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Compaction of the Production Grid of Wells as a Factor in Improving the Efficiency of Development of Complex Hydrocarbon Fields

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I. INTRODUCTION

The distinctive geological features of the Ustyurt natural gas fields are the extremely uneven distribution over the area and section of the reservoirs, the lenticular nature of the occurrence, as a result of which the communication of their various sections is limited. The latter circumstance complicates the drainage of the entire gas-saturated volume of the deposits and, accordingly, limits the gas and condensate recovery of the reservoir.

This study was carried out in order to identify approaches to increasing gas and condensate recovery of the Ustyurt gas condensate fields (GCF) in the context of their complex geological structure, which limits the drainage of the gas-saturated volume of the deposit.

II. METHODOLOGY

The study was carried out on the basis of the results of the pilot production design of the West Kuyi Surgil field [1] and consisted in studying the effect of the density of the production grid of wells on the drainage of the gas-saturated volume of the deposit. Forecasting of the development indicators of the West Kuyi Surgil gas condensate field was carried out using 3D geological and hydrodynamic modeling, which makes it possible to most accurately determine the dynamics and completeness drainage of the gas-saturated volume of the deposit, as well as the phase state of its reservoir multicomponent system [2, 3].

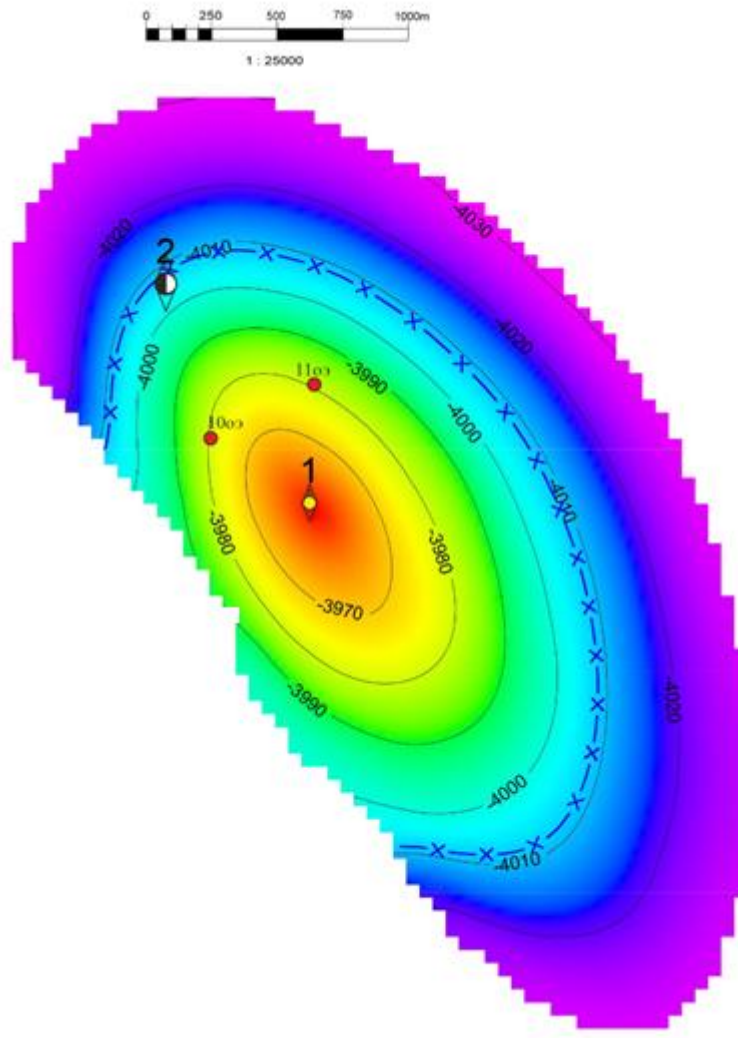


Figure 1 – Plan of the location of project wells of the West Kuyi Surgil gas condensate field

An analysis of the forecast of the indicators of the two options for the development of the West Kuyi Surgil gas condensate field showed [1] that due to the compaction of the production grid in option 2, there is a greater predicted withdrawal of gas (CIG = 0.85) and condensate (CFC = 0.60) from the deposit, achieved during the considered development period (52 years). This period is limited in both options by the time of reducing the working wellhead pressure to 10 kgf/cm². Deeper development of reservoir reserves will require the development of the field with a low-pressure booster compressor station (BCS), which will allow the continuation of production of wells with low wellhead pressure [4].

As the results of forecasting the technical and economic indicators (TEP) of the considered options for the development of the West Kuyi Surgil gas condensate field show, the compaction of the production grid of wells in option 2 not only determines the achievement of large predicted values of gas and condensate recovery, but also determines a higher economic efficiency of its development [1].

III.CONCLUSION

Compaction of the production grid of wells with simultaneous arrangement with low-pressure compressors is an effective approach to the design of effective development of gas condensate fields in the conditions of their complex geological structure, which limits the drainage of the gas-saturated volume of the reservoir.



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