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Experience of Combining Pilot Production With Geological Exploration of the USTYURT Hydrocarbons Fields

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I. INTRODUCTION

The high current depletion of gas reserves of the fields under development (67.9% on average), according to the concept of maintaining natural gas production from the fields of Uzbekneftegaz JSC for the medium term [1] implemented by O'ZLITINEFTGAZ JSC, causes a noticeable drop in gas production in this category of fields from 97.5% (actual in 2022) to 43.9% (forecast for 2030) in Uzbekneftegaz JSC as a whole. At the same time, in order to maintain conceptual gas production, it is projected to increase the share of developed, explored and newly discovered fields in the total annual production - from 2.5% (2022) to 56.1% (2030). The main volume of this production (84.6% in 2030) is projected due to the development of the resources of new discovered fields, which necessitates the search for ways to intensify the growth rate of their reserves, most of which is associated with favorable prospects for geological exploration in the Ustyurt region.

II. METHODOLOGY

The number of developed, explored and newly discovered fields not covered by development, the number of which increases annually by 5-7 objects [2], in turn, determines the search for ways to accelerate the development of these fields. The latter circumstance initiated a study to improve the methodology for designing the development of natural gas fields, in order to accelerate the growth rate of reserves and the development of these resources. To achieve this goal, the task was set to identify the effectiveness of combining the initial stage of development or pilot production of fields with the continuation of exploration [3]. The problem was solved on the basis of an analysis of the development of fields in the Ustyurt region [4].

As a result of the studies performed, it was established that the combination under consideration makes it possible to accelerate the start of the development of explored and discovered new fields, while simultaneously fulfilling the tasks of geological exploration to increase reserves and bring them to industrial conditions that meet the requirements of the State Commission on Reserves (GKZ). In addition, it was revealed that it is possible to reduce the duration of the pilot and exploration operations combined with it, due to the use of exploratory wells for production, and the drilling materials of production and/or appraisal wells for additional exploration of the developed deposit [5].

At the same time, the drilling of appraisal wells, planned during the design of the pilot study, is aimed at accelerating the solution of the problems of additional exploration, in terms of the increase in reserves and, in particular, the clarification of the boundaries of commercial oil and gas potential, the parameters of reservoir fluids, the characteristics of the reservoir filtration and capacitive properties and the development mode, which is another positive aspect of the combination of pilot and exploration [5]. Appraisal wells are being drilled in areas of the reservoir under development or being prepared for pilot testing and near the boundary of C2 category reserves, which makes it possible to accelerate the completion of these preliminarily estimated reserves to commercial categories by geological exploration, well logging, gas hydrodynamic (GDI) and gas condensate (GKI) studies.

In the production of commercial hydrocarbon inflows, appraisal wells are used for production, since their design meets the requirements of well operation [5].

According to the studies carried out during the design of the pilot study of the fields of Kuyi Sharkiy Berdak, Kuyi Surgil and West Kuyi Surgil in the Ustyurt region, recommendations were given [4] for the drilling of appraisal wells. At the same time, the wells were placed using 3D digital geological and hydrodynamic modeling [6]. The drilling of the



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recommended appraisal wells made it possible, along with the drilling of production wells during the pilot period, to carry out a significant increase in natural gas reserves.

III.CONCLUSION

In the context of the complex geological structure of the fields of the Ustyurt region, the combination of pilot and exploration was an effective way to accelerate the growth and development of reserves. As a result, the gas reserves of the fields were increased by 3.1 times (Kuyi, Sharki, Berdak gas condensate field) - 7.4 times (Kuyi Surgil gas condensate field) from the initial values of their operating gas reserves.

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