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Directions for Increasing the Production of Residual Reserves of the Tashkuduk Deposit

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ABSTRACT: The main task of hydrocarbon field development analysis is to estimate their reserves. Using traditional methods of calculating gas reserves, one can only estimate the errors in calculating gas reserves, presented to him as a known source material.
In this regard, research on revaluation of reserves and selection of development system aimed at increasing the production of residual reserves are relevant. Increasing gas recovery of developed fields and extending the service life of water-producing wells is an important task, the solution of which determines the saving of significant financial resources for drilling new wells instead of those abandoned due to flooding.

KEY WORDS: gas field, reservoir pressure dynamics, geological structure, drainable reserves, gas recovery.

I.INTRODUCTION

The Tashkuduk gas field, discovered in 1953, is located in the Romitan district of the Bukhara region of the Republic of Uzbekistan. Geological exploration work at the field was completed in 1960 with the identification of industrial gas content in the IX horizon of Cretaceous deposits, the reserves of which were approved in 1962.
At the Tashkuduk field, 13 wells have been drilled (Figure 1) and it was put into development in 1972. As of 01.10.2024, 1774.2 million m³ of gas or 85.4% of its approved reserves have been extracted from the horizon IX deposit. Gas was extracted mainly from the horizon IX deposit, located in the northern part of the western dome of the structure (Figure 1). The deposits of the Eastern Block (well 11 area) and the Southern Structure (well 12 area) were excluded from the calculation of gas reserves [1].

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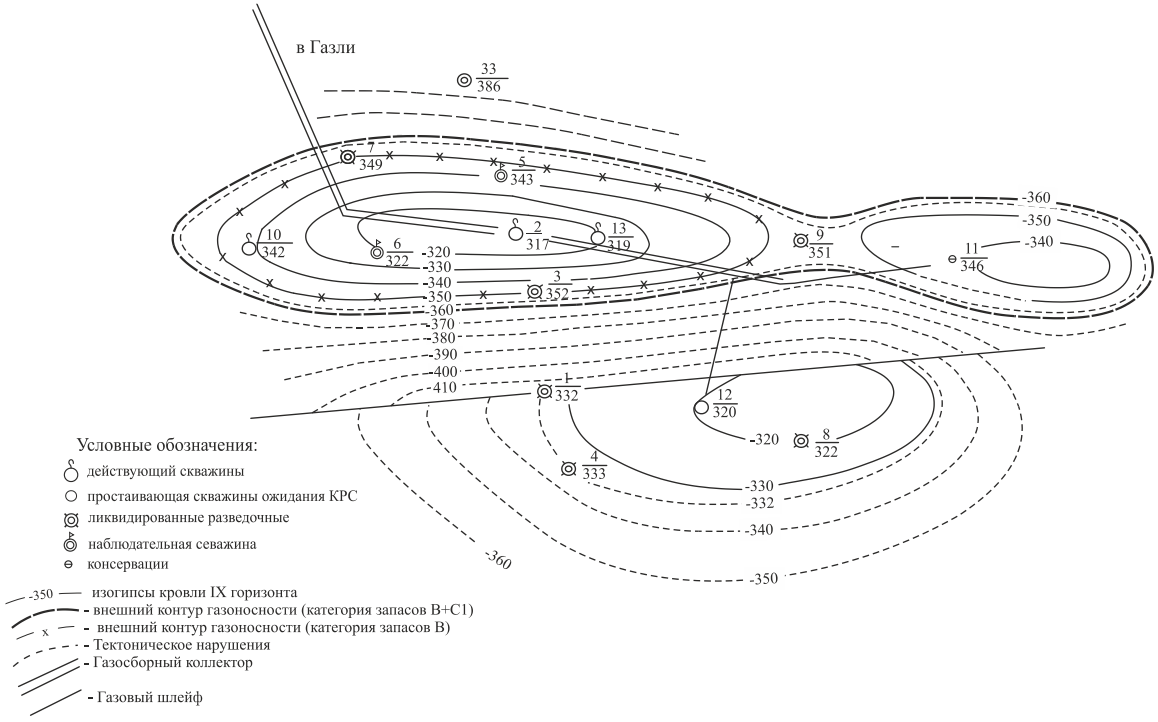

Figure 1 – Structural map of the roof of horizon IX of the Tashkuduk deposit

II.METHODOLOGY

Currently, gas production from the Tashkuduk field is carried out by 4 wells (wells 2, 10, 12, 13) and is supplied to the needs of the city of Gazli.

In order to study the prospects for extracting residual gas reserves from the Tashkuduk field, the work [2] assessed the drained gas reserves of horizon IX using the material balance method [3]. For this purpose, the dynamics of reservoir pressure and gas extraction from horizon IX was compiled. horizon, presented in Table 1 .

Table 1 – Dynamics of reservoir pressure and gas extraction during the development of horizon IX of the Tashkuduk field

Date	Reservoir pressure, (P) kgf/cm²	Gas compressibility coefficient (Z)	Reduced reservoir pressure (P/Z), kgf/cm²	Total gas extraction, million m³	Drainable gas reserves, million m³
started.	55.6	0.914	60.8	0	0
1972	54.1	0.917	59.0	37.5	1245
1980	43.9	0.931	47.2	691.1	3074
1990	28.8	0.954	30.2	1244.5	2471
2000	23.4	0.962	24.3	1544.8	2574
2010	20.9	0.967	21.6	1634.8	2533
2020	24.5	0.960	25.5	1730,1	2980
01.10.2024	20.8	0.967	21.5	1777.2	2750

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Due to the long development period (more than 50 years), the indicators in Table 1 are presented at 10-year intervals. According to the information, Table 1 contains a graph of the dependence of the reduced reservoir pressure on gas extraction from IX horizon, shown in Figure 2 .

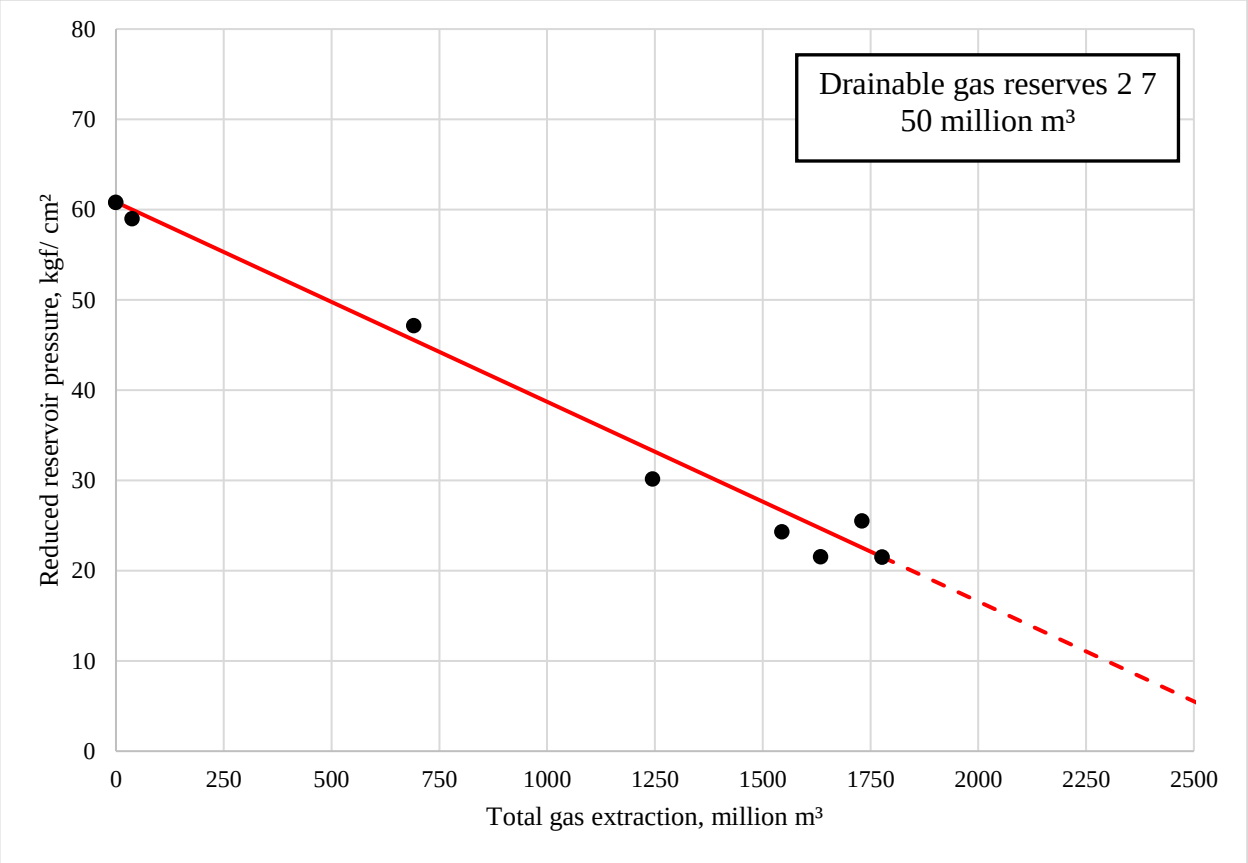

Figure 2 - Graph of the dependence of the reduced reservoir pressure on gas extraction along horizon IX of the Tashkuduk field

As follows from this graph, the drained gas reserves of horizon IX of the Tashkuduk field are estimated at 2,750 million m³, which is 32.1% higher than its approved reserves.

Given the current low wellhead operating pressure (14 kgf/cm²) [4], the prospects for further gas production from the Tashkuduk field are seen in the development of a low-input pressure booster compressor station (LIPS). The introduction of this LIPS will allow gas production wells to be operated with an operating wellhead pressure of up to 1 kgf/cm². This means that the possibility of deeper development of the remaining reserves of the Tashkuduk field is presented. At the same time, it is necessary to observe the appropriate technological operating mode of gas production wells, established based on the results of gas-hydrodynamic studies, in order to minimize the water content of their products.

III.CONCLUSION

1. Long-term operation of wells at the Tashkuduk field, due to low depression on the formation (up to 0.1 kgf/cm²), made it possible to achieve a relatively high depletion of reserves in horizon IX (KIG = 0.854).
2. The prospects for deepening the depletion of the remaining gas reserves of the Tashkuduk field are associated with the transfer of gas production wells to compressor operation through the installation of a NDCS.

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