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THE RESULTS OF THE FORECAST OF THE MAIN TECHNOLOGICAL INDICATORS OF THE DEVELOPMENT OF THE OIL AND GAS CONDENSATE FIELD EASTREN ISPANLI

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A B S T R A C T

The results of calculation of the main technological indices of the development of Sharqiy Ispanli oil and gas condensate deposit are presented for various options, differing in the sequence of oil and gas sampling. It is shown that during the development of the field with the use of vertical wells and the faces of producing wells, free gas will break through. It is recommended to drill multi-hole wells with horizontal trunks.

K E Y W O R D S

reservoir, operation, fund, reserve, mode, rim, development, system, well, coefficient, extraction, gas cap, selection, efficiency.

In recent years, a number of under-gas oil deposits with small reserves have been discovered in Western Uzbekistan, some of which are in trial operation by a small number of producing wells. For these deposits, it is important to choose an effective development system based on the geological and physical conditions of the deposits.

Usually, the category of small fields includes fields developed with only a few wells (up to 10) and having small recoverable oil reserves (up to 0.5 million tons) [2]. When designing the development of such facilities, the choice of options is significantly limited due to the fact that traditional methods of waterflooding and enhanced oil recovery are not very profitable. In this connection, in the vast majority of cases, fields with small reserves are operated under natural conditions. This category includes the Sharkiy Ispanli field, which was discovered in 2001. The massive domed gas condensate reservoir with an oil rim is confined to the XV-HP and XV-P horizons of the Upper Jurassic carbonate deposits. As is known, under-gas oil deposits in accordance with the "Rules for the development of oil and gas-oil fields" according to the ratio of the volume of the oil-saturated part of the deposit (Vn) to the volume of the entire deposit (Vn + Vr) are divided into various types [2].

- oil fields with a gas cap or a gas condensate cap (Vn >0.75);
- gas or gas condensate oil (0.50 Vn ≤ 0.75);
- oil and gas or gas condensate (0.25 <Vн ≤0.50);
- gas or gas condensate with oil rim (Vн≤0.25).

The volume of the oil-saturated part of the Sharkiy Espanli field is 4025.6•103m3 in total, and C2 is 1629.5•103m3.

The volume of the gas-saturated part of the field is 6439•103m3 in total, including the volume of the gas-saturated part of the reserves category C1-2604.8•103m3, and C2-3834.2•103m3. The ratio of the volume of the oil-saturated part of the deposit to the volume of the entire deposit for reserves of

categories C1, C2, and C1 + C2 is 0.479, respectively; 0.298 and 0.385 i.e. The Sharky Spanish field belongs to the oil and gas condensate type. It should be noted that according to the classification of the All-Russian Research Institute, the field belongs to the type of gas condensate deposits with an oil rim of subordinate industrial significance [2].

The development of deposits with under-gas oil objects is very specific, which is due to the presence in one deposit of actually two non-isolated deposits - an oil zone and a gas cap [5,6].

The conditions of occurrence of oil and combined gas in under-gas oil facilities are usually characterized by:

- the presence in one collector of two accumulations of oil and free gas that are not isolated from each other;
- the proximity of the location of water and gas-oil contacts:
- practically unchanged in the process of development the contours of the deposit (in plan);
- almost uniform distribution of reservoir energy over the reservoir volume;
- equality of the initial reservoir pressure and saturation pressure of oil with gas.

The listed features significantly distinguish the technology for the development of gas oil facilities and methods for its design from the technology for the development of oil deposits.

When designing the technology for the development of gas oil facilities, it becomes necessary to solve the following problems:

selection of the order of extraction of oil and gas reserves;
- selection of the optimal well grid density;
- the size and location of the optimal perforation interval;
- substantiation of optimal drawdown and flow rate of production wells.

The correct solution of these problems will favor the rational development of oil deposits without premature breakthroughs of gas and water to the bottoms of wells.

Below, we will consider the justifications for these tasks for choosing the system for developing the Sharkiy Spanishli field.

Option I provides for advanced development of oil reserves. Oil producing wells will be placed in the oil-bearing zone with category C1 reserves evenly with a grid density of 20 ha/well. Since the conservation of gas cap reserves until the full development of the oil part can be more than 25 years, and during this time part of the gas reserves will be extracted through oil wells, which will practically be lost due to low pressure. Therefore, after the extraction of the main oil reserves, simultaneous extraction of gas from the gas cap will be carried out.

The fund of oil-producing wells at the stage of oil selection will be 0 units: it is planned to introduce 8 oil-producing wells from drilling to the zone of wells No. 1 and 4, also with initial oil flow rates of 10 tons / day. After the extraction of the main oil reserves, 1 well (No. 1) will be transferred to gas production by transferring the extraction interval to the gas-saturated part of the deposit. According to variant II, almost from the beginning of development, it is supposed to carry out controlled extraction of gas from the gas cap. In the first year of development, wells No. 1 and 4 will be in operation. Starting from the second year of development, well No. 1 will be transferred to the gas producing fund, since the gas factor equal to 1944 m3/m3 obtained when testing the interval 2552-2544 m indicates available gas inflow from the gas section. According to this option, with a grid density of 20 ha/well, the stock of oil producing wells will be 9 units (8 new project wells), and the gas well stock will be 1 unit.

According to option III, in order to avoid conservation of the gas cap gas, it is planned to carry out simultaneous extraction of oil and gas from the beginning of development. Research V.M. Shevtsova and A.U. Nazarov [3] substantiated that in the joint development of the oil part and gas condensate deposits of oil and gas condensate fields, high rates of recovery and hydrocarbon recovery rates are achieved by perforating production wells at the gas-oil contact. Therefore, it is planned to perforate the GOC zone at all wells, covering the oil-saturated and gas-saturated parts of the section. The well stock for simultaneous extraction of oil and gas will be 10 units.

As can be seen from the above, the considered options for the development of the oil and gas condensate field Sharkiy Ispanli differ only in the sequence of oil and gas withdrawals at the same density of the well pattern, which will allow a more objective assessment of the effectiveness of the development systems under consideration.

Due to the lack of a set of necessary initial data for the application of hydrodynamic calculation methods, the forecast of development indicators (reservoir pressures, gas factor, water cut of well production, etc.) was carried out on the basis of static dependencies recommended in the methodological guide for calculating recovery factors from the subsoil [1] .

The initial oil production rates of wells and the dynamics of their decline in the development process are substantiated by static processing of well operation data similar in structure, stratigraphy and lithology to the XV-P and XV-HP horizons of the South Kemachi, Umid and Markovskoye fields.

Processing of the results of the operation of many wells of the Umid, South Kemachi, Markovskoye fields, exploiting oil rims with a thickness of up to 6 m, 6-8 m, 8-10 m and more, made it possible to establish a trend in their flow rates depending on the thickness of the drained object. The maximum value of the limiting "gas-free" and "anhydrous" oil flow rate is 10 t/day.

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