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Features of the Development and Design of Sub-Gas Oil Deposits in Uzbekistan

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Abstract
In the process of drilling production wells, it is important to choose the right type and volume of drilling fluids, the correct choice of well bottom design, not to pollute the productive formation and maintain its natural permeability, and to effectively open the productive formation. Methods and drilling of wells Ensuring long-term production is one of the most pressing issues today.

Keywords: Oil, gas, reservoir, well, geological, drilling, deformation, perforation, repression, productivity.

Introduction

Sub-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 (V_H) to the volume of the entire deposit (V_H+V_r)

$$V_H = \frac{V_H}{V_H + V_r}$$

are divided into different types /1,2/:

- oil with a gas cap or gas condensate cap ($V_H>0.75$);
- gas or gas condensate-oil ($0.50<V_H \leq 0.75$);
- oil and gas or gas condensate ($0.25<V_H \leq 0.50$);
- gas or gas condensate with an oil rim ($V_H \leq 0.25$).

As is known, the development of fields with sub-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 /3,4,5/. The conditions for the occurrence of oil and combined gas in sub-gas oil objects are usually characterized by:

- the presence in one reservoir of two non-isolated accumulations of oil and free gas;
- proximity to the location of water and gas-oil contacts;
- practically unchanged during the development process the contours of the deposit (in plan);
- almost uniform distribution of reservoir energy throughout the volume of the deposit;
- equality of the initial reservoir pressure of saturation of oil with gas.

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

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

- choosing the order of extraction of oil and gas reserves;
- selection of optimal well pattern density;
- size and location of the optimal perforation interval;
- justification of the optimal depression and flow rate of production wells.

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

Currently, various systems for developing oil facilities with a gas cap and bottom water are used in practice, which mainly differ in the order of commissioning of the oil and gas zone and the method of influencing the formation:

- advanced development of the oil part without maintaining reservoir pressure with expansion of the gas cap;
- advanced development of the oil part without maintaining reservoir pressure with controlled extraction of gas and gas cap, ensuring a given position of the gas-oil contact;
- simultaneous development of the oil part without maintaining reservoir pressure;
- advanced development of the gas cap with unlimited gas extraction;
- advanced development of the oil part while maintaining reservoir pressure through contour (contour) water injection;
- simultaneous development of the oil part of the gas cap under conditions of boundary (near-contour) flooding;- barrier flooding, which involves displacement of oil and gas by water injected near the oil and gas zone;
- cutting oil and gas deposits into independent development blocks;
- combination of barrier flooding with other methods of influencing the productive reservoir;
- gas injection into the gas cap;
- a combination of gas injection into the gas cap with flooding and other modifications.

In Western Uzbekistan, certain experience has been accumulated in the development of sub-gas oil deposits. Many of the development systems listed above have been implemented and tested on various scales.

The main provisions of development projects for the majority of sub-gas oil facilities in the region are as follows:

- oil zones are developed under natural depletion conditions;
- the density of the well network is within the range of 25-40 hectares per well, which corresponds to the conditional radius of the supply circuit of 280-360 m;
- gas caps are conserved until the main oil reserves are depleted;
- wells are operated with limited drawdown on the reservoir, ensuring their “gas-free” and “water-free” flow rates;
- as measures to intensify oil production, the use of hydrochloric acid treatments was mainly envisaged. The implementation of these design documents at gas-bearing oil facilities in Western Uzbekistan has shown that relatively high results, with an expected final oil recovery factor of up

to 0.3, are observed when introducing a development system with conservation and controlled gas extraction from the gas cap. The worst results are with advanced gas extraction from the gas cap with an expected final oil recovery factor of up to 5%. An intermediate position is occupied by a development system with advanced production of the oil portion followed by unregulated gas extraction from the gas cap. The expected value of the final oil recovery factor is 0.1-0.2.

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