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STUDYİNG THE FEATURES OF THE PROCESS OF "QUM-DƏNİZ" FIELD DEVELOPMENT

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Abstract

The problems that arose when assessing the efficiency of the development processes and new technological measures are especially relevant in offshore fields. Therefore, great attention is currently paid to the methods that can analyze the processes occuring in the formation systems by indirect processing of possible data of discharges, fields, horizons, etc. of individual wells.

Keywords: *process, field, development, wells, dynamics, volume, liquid, oil*

Introduction

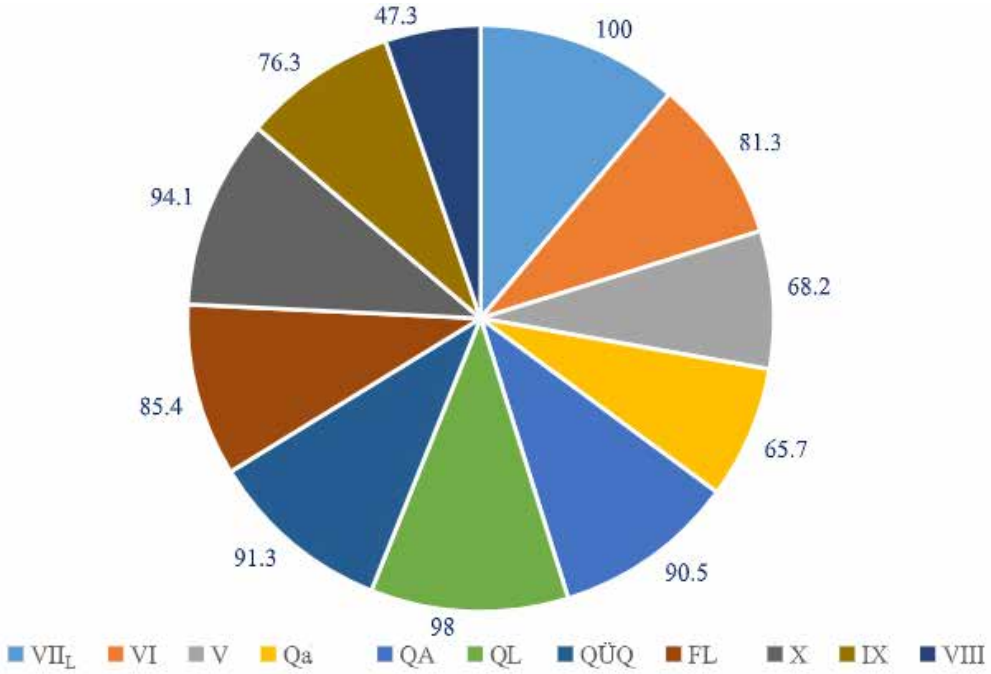
Most of the deposits, which are in the depleted stage of development, have 98% or more diluted, as well as a small initial oil saturation, are characterized by great inhomogeneity. High-permeability zones and fields differ from low-permeability deposits by 100 times or more. This leads to variable compression of the compression process, rapid dilution and less extraction of resources.

Thickeners, sediments and other chemical reagents are used to extract residual resources in 80% watered deposits. To increase oil recovery and compression ratio, as well as to cover the layer by watering, various chemical reagents are used. In most cases, increasing the coverage ratio as dilution increases reduces inhomogeneity, because it does not actively form an oil well but does not lead to significant oil production.

If oil is displaced from certain fields, the hydrophilic can dissipate in a porous medium without forming a stable oil shaft.

In the example of the Qum-dəniz field, it can be seen that in order to significantly increase the oil extraction ratio in the depleted stage of developing 100% watered deposits, methods that increase the oil compression ratio, such as the coverage rate with water injection, should be applied (Figure 1).

Figure 1. *Watering percentage of the "Qum-dəniz" field by horizons*

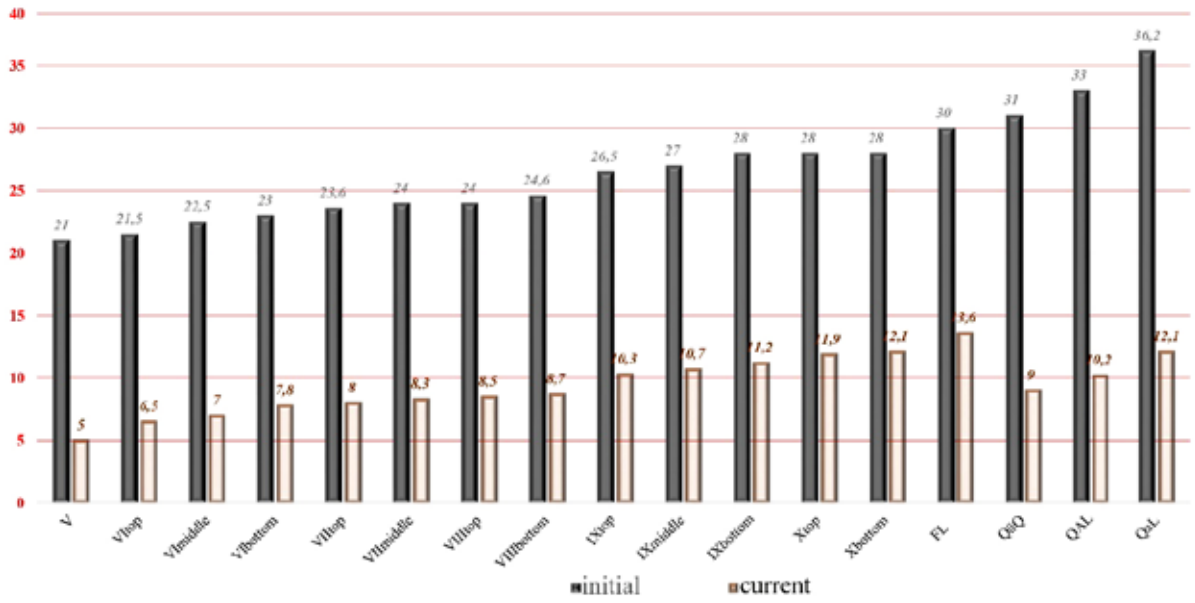


Saturated effective thicknesses, determined as a result of interpretation of materials from complex geophysical research materials carried out in drilled wells after calculating reserves and included in the report, fluctuate in the following interval.: oil saturated: 2,8 (VI_L) – 28,0 m (IX_m) and gas saturated 5,0 (VI_{up}) – 37,5 ($VIII_{up}$).

The porosity coefficients of productive horizons and layers were determined based on the results of data obtained as a result of laboratory studies of rock samples and interpretation of mining geophysical materials from wells.

After determining the amount of associated water in the pores of the collectors, this amount was subtracted from the unit to determine the oil and gas saturation coefficient for productive horizons. The associated amount of water was determined by calculation and centrifuge methods, considering the porosity (0,18–0,22), permeability, carbonate and clay coefficients of the reservoir rocks.

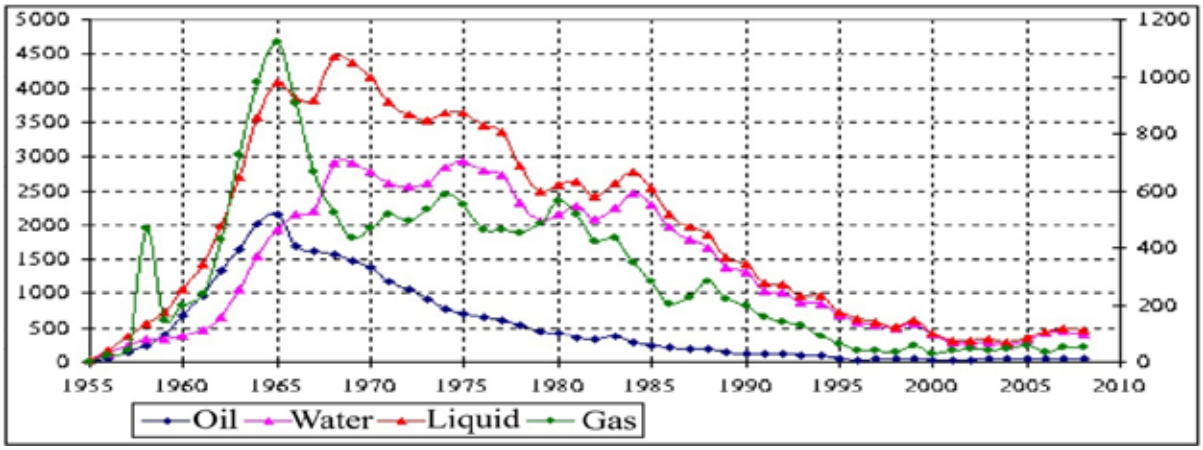
Figure 2. *Dynamics of initial and current formation pressures*



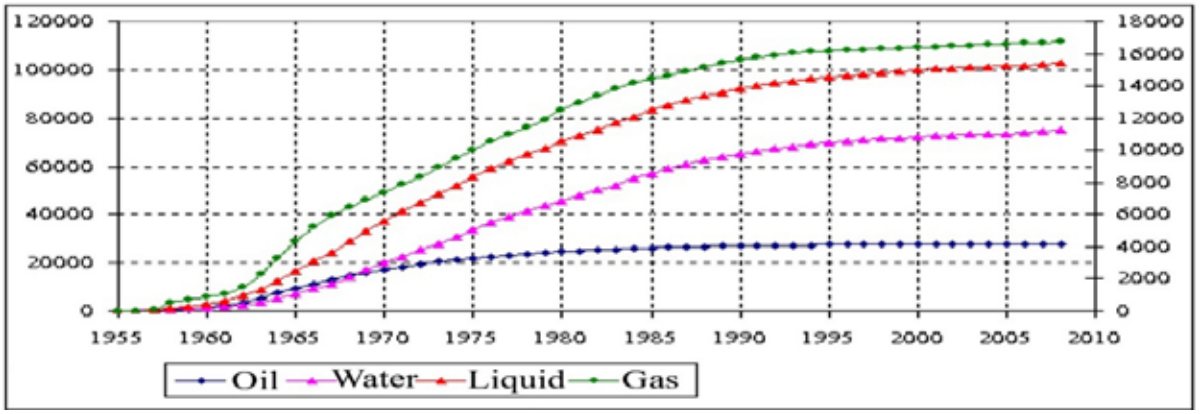
The density and volume coefficient of oil under standard conditions was studied based on the results of laboratory studies on oil samples taken from 74 wells located in different parts of the structure on the productive horizon and layer groups (РД 153–39.0–110–01. Methodical guidelines for geological and industrial analysis of development of oil and gas oil fields).

Figure 3. *The dynamics of technological indicators of development*

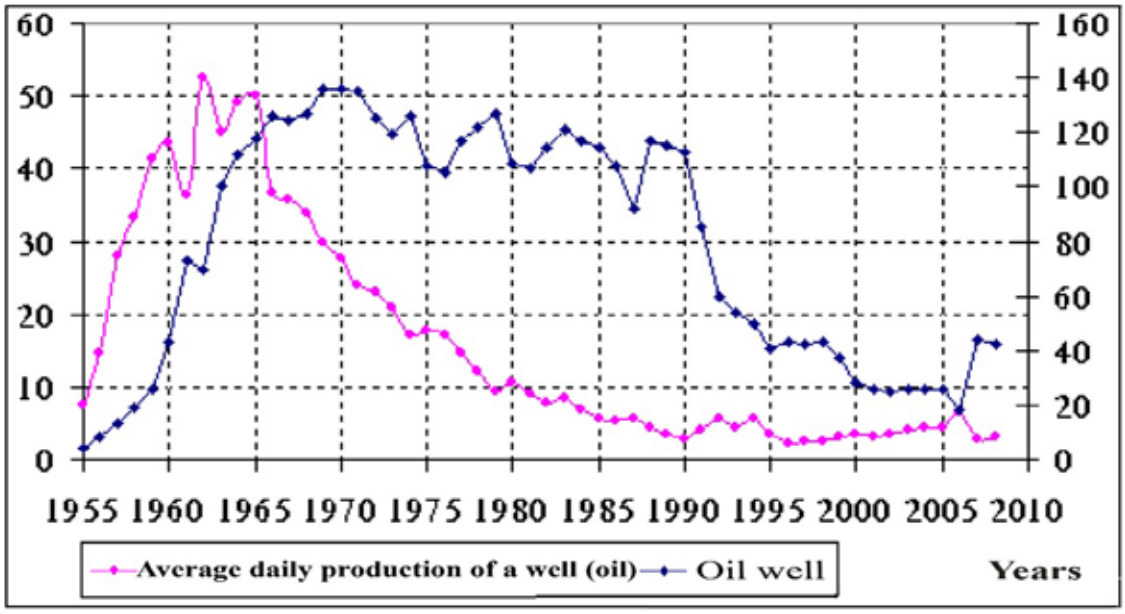
a)



b)



c)



The values of the density (0,798–0,874), of oil under standard conditions, the volume coefficient (1,290–1,440) of oil and the corresponding calculation coefficients for horizons and formations, as well as the amount of gas dissolved in oil, were determined based on the data of laboratory studies of oil samples taken from wells in the first days of the field's operation.

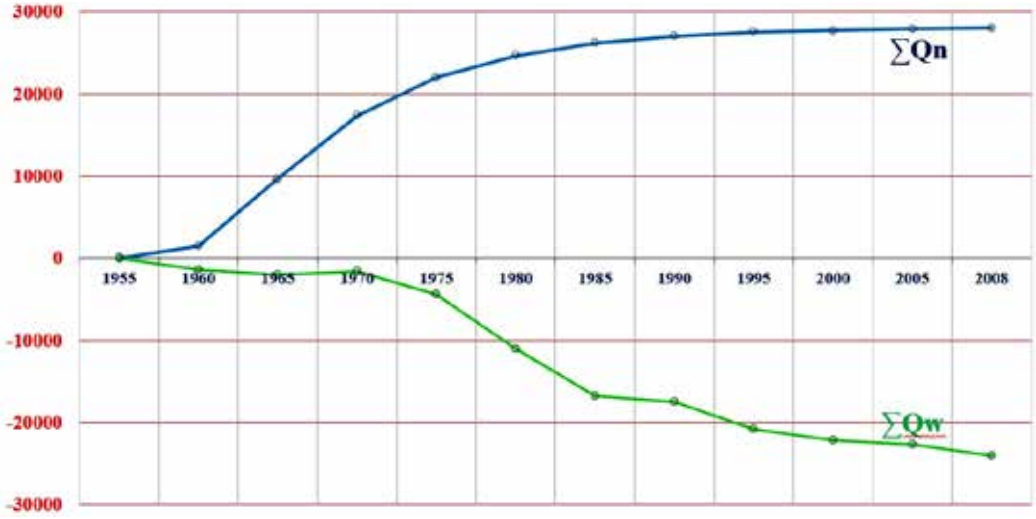
When studying the content of gas dissolved in oil based on thermodynamic studies of gas samples taken from wells, it was found that the content of gas is mainly methane (up to 96%).

The measurement of the initial and current layer pressures in the sand and sea deposit was also performed based on the hydrodynamic analysis of the wells. The dynamics are shown in figure 2.

The dynamics of the technological indicators of the development by years is given in figure 3.

Due to the reduction of formation pressure in the field and the activity of the contour area, a part of the water has moved to the boundaries of the oil part of the field. In the following years, the deposit was influenced by water, the collected "mobile" water ($\sum Q_w$) decreased in absolute quantity within the deposit during the last 15–20 years (Figure 4). This indicates that the volume of water inside the deposit is not enough, that is, the field development system is irrational.

Figure 4. *Change in accumulated oil production and "mobile" water by field*



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