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OPERATION OF GAS CONDENSATE FIELDS ACCORDING TO THE PROJECT IN THE SURKHANDARYA OIL AND GAS REGIONS

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Abstract
The article considers all hydrocarbon reservoirs, large or small, which are subject to the influence of various types of energy for the movement of oil and gas towards the wells. The potential capabilities of the layers in this regard depend on the natural energy type of the reservoirs. The importance of the initial layer pressure in the manifestation of the regimes and the pressure movement during operation play a significant role. Therefore, general information and solutions are presented in the form of a fundamentally new type of geological solutions.

Keywords: Piezometric level, reduced water pressure, technological equipment complex, Cenomanian-Albian aquifers, diesel unit, pipeline array, drilling equipment.

Introduction

The dynamics of groundwater in the Mesozoic and Cenozoic deposits of the Surkhandarya depression has been studied to a much lesser extent than in other oil and gas regions of Uzbekistan. According to L. S. Balashov, the movement of groundwater in the Paleogene and Upper Cretaceous strata is directed from the mountainous zone of the depression to the river valley. Amu Darya, where the discharge of groundwater occurs at the lowest point of the water table, where the outcrops of rocks are located on the surface. S. Talipov fully characterized the conditions for the occurrence and movement of groundwater in the Paleogene part of the Surkhandarya water pressure system. In particular, in the Olay-Rishton

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aquifers, a slope of the piezometric level from the Hissar bottom to the southwestern side of the Surkhan-Mazar-i-Sharif depression is observed: reduced water heads vary from 1295 m in Shoambary to 406 and 559.2 m. In the areas of Karakurt and Jayrankhan. Such a picture can only reflect the influence of the Hissar mountainous area in creating an infiltration front. A similar picture, albeit with differences in the absolute value of the reduced water pressure, is also created in the Cenonian-Paleocean water pressure complex. The peculiarities of the hydrodynamics of the complexes considered above are the decrease in pressure gradients with distance from the Hissar zone of pressure formation, as well as the fact that the pressure in the first complex exceeds the pressure in the second.

The following is a very limited amount of information on the hydrodynamics of water complexes.

The water pressure from the Cretaceous strata of the Gaurdak and Aktau fields and the Ariktau and Gajjak fields (located in the anticline zones surrounding the Surkhandarya depression) of the same sediments cannot preserve the elements of elision water exchange in the lower part of the water supply system. This possibility is also indicated by the abnormally high formation pressures in the Cenomanian-Albian water layers relative to the corresponding depths.

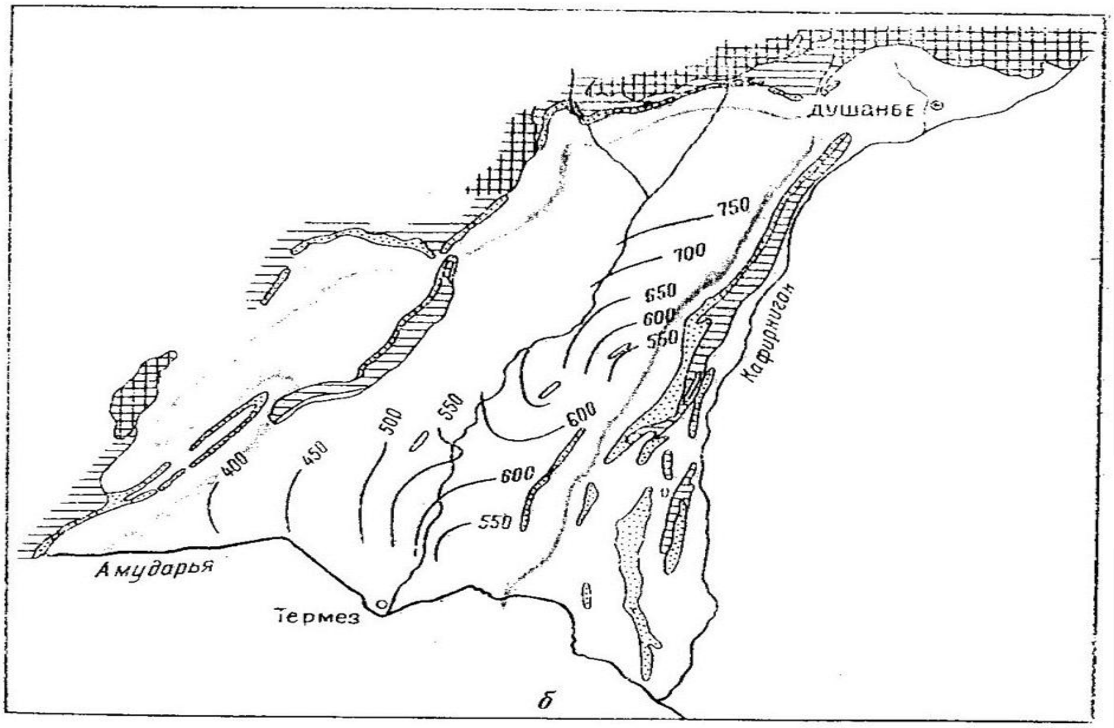

Figure 1. Waterproofing scheme of the Cenonian-Paleogene sediments of the Surkhandarya oil and gas region

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1. In all water systems, there are clear areas of pressure formation limited by mountain ranges (Hissar ridge and its ridges, Zarafshan, Turkestan ridges). This indicates a clear infiltration type of water supply systems, the level of development of infiltration water exchange lags behind the level of development of pressure redistribution processes. Infiltration water exchange is the most developed in the Cenomanian-Albian reservoir complex of the Bukhara stage.
2. In all water systems, one or more signs of Elysion water exchange are observed, which are most clearly expressed in the form of a zone of frontal piezomins in the Eocene reservoir complex of the Fergana Valley, as well as in the form of an AVPD zone in the upper water-permeable horizons of the Charzhou stage.
3. The regional inclination of the piezometric surface gradually moves away from the pressure-generating mountainous areas and is complicated by the protection of underground flows (lithological, tectonic or deposits).
4. The main features of the modern underground hydrodynamics of the water supply systems of Uzbekistan are due to the transition stage in their hydrogeological development from the Elysion water exchange regime to the infiltration final hydrogeological feature.

All hydrocarbon reservoirs have large or small reserves and are subject to the influence of various types of energy for the movement of oil and gas towards the wells. The potential capabilities of the layers in this regard depend on the natural energy type of the reservoirs. The importance of the initial layer pressure in the manifestation of the regimes and the pressure movement during operation play a large role.

Natural water systems are divided into infiltration and elysion, which differ in the mutual location of these zones, the conditions of their formation and the initial dimensions. Accordingly, hydrocarbon reservoirs confined to this type of water system typically have a value of initial formation pressure at that depth at the surface of productive layers.

In infiltration systems, the vertical layer pressure gradient of oil and gas reservoirs, even taking into account the overpressure, is usually 0.008-0.013 MPa / m, the upper limit is common for gas fields at high altitudes. Sometimes the gradient value in the free part of the gas part corresponding to the infiltration system may exceed the above limit, in the aggregate parts of the infiltration water

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systems of the reservoirs the upper layer pressure should not be confused with the hydrostatic pressure.

The compliance or non-compliance of the hydrostatic pressure layer (i.e. the depth of formation of the layer) should be assessed based on the pressure value in the liquid part of the layer, measured directly from the boundaries of the reservoirs or, in the absence of pressure measurements, according to the pressure value corresponding to the average mark of the SNTYU or GNTYU measured in the layer and brought to horizontal planes.

In water layers, the initial layer pressure, as well as the values of this indicator corresponding to the vertical gradient hydrostatic layer pressure, are called the average hydrostatic pressure of the layers at the boundaries of the SNTYU and GNTYU. In this case, the upper layer hydrostatic pressure is usually greater than Pgq > 0.013, and the lower layer hydrostatic pressure is less than Pgq <0.008.

High hydrostatic pressure is characteristic of Elysion water systems. In such water systems, the saturated pressure is formed under the influence of increasing geostatic pressure due to precipitation and the formation of sedimentary rocks in the reservoirs and partly the reservoir itself (geostatic Elysion systems) or as a result of geodynamic pressure due to tectonic faults (geodynamic Elysion systems).

In the Elysion system, the supply area is formed in the deepest part of the reservoir. Therefore, the water entering it moves towards the boundaries of the reservoir.

The natural regime of the reservoir is mainly determined by geological factors: the specific nature of the aquifers and their location relative to the productive zone of the deposits in this system; geological and physical conditions of the reservoir, pressure and thermal properties, the state of the hydrocarbon phase. The presence and properties of the reservoir factors; the degree of hydrodynamic connection of the water supply system with the rocks. When using the reservoir, the natural regime determines the efficiency of using the reservoirs. In this case, the annual oil (gas) production rate, the dynamics of other important development indicators, the level of final extraction of oil (gas) reserves from the subsoil are determined. The duration of the use of wells by various methods, the choice of the order of exploitation of deposits and the characteristics of technological devices for the preparation of oil and gas largely depend on the mode of operation

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of the heap. The value of the natural mode allows us to justify a rational system of development of oil and gas condensate deposits: it is necessary to use natural energy resources.

These types of energy can be manifested together in the stack, oil, water, and rock tension energy are always observed. In oil and gas stacks, in the compressed water part, the energy of the gas cap, the tension or energy of the formation water around the contour play an active role. Depending on the increase in oil recovery rates, wells are located closer to the outside of the oil and gas contour, thus creating a shielding effect, due to which the center of the stack is affected by the expansion energy of the dissolved gas, and the outer surface is affected by the tension or pressure energy of the formation water. The effective use of formation energy depends on the amount of oil to be extracted per unit of its depletion, the initial energy reserve and type, the rate and method of oil recovery. Based on the above, it can be said that the formation energy depends on the formation pressure, the tension of the fluid and rock, the presence of gas, the volume of gas and water, and the use of the oil stack. Energy is supplied to the formation by artificially pumping water, gas, steam, and various solutions through pilot wells. The formation's energy is used to overcome various types of resistance, and when pressure drops and oil movement slows down, the depression pressure is expressed by gravitational and tension energies.

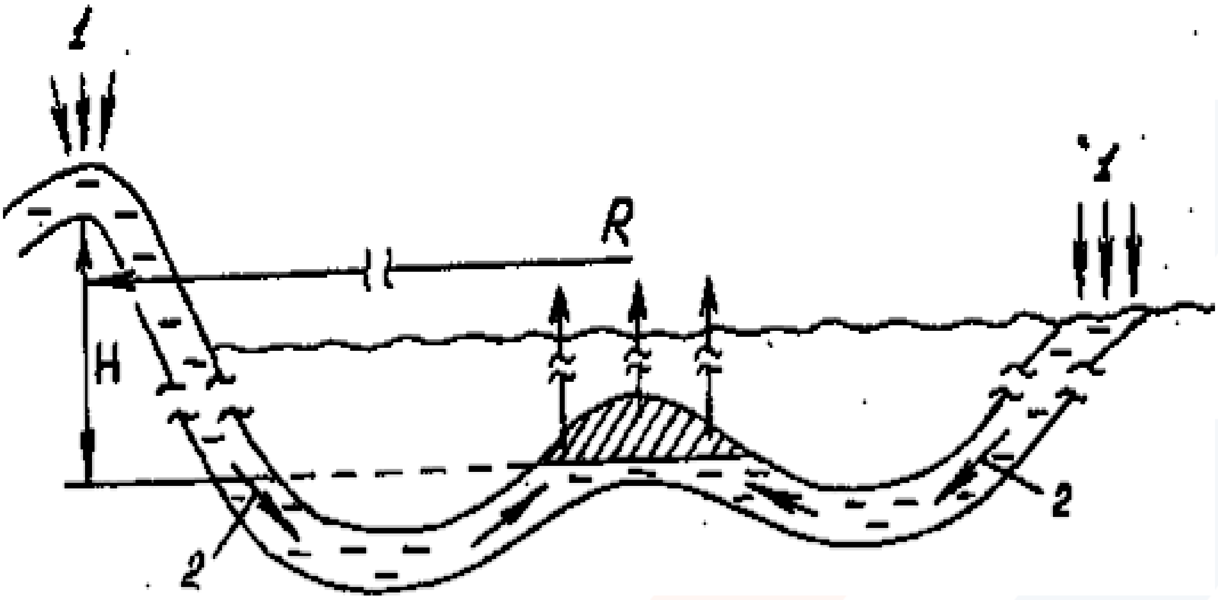

Figure 2. Illustration of the pressure movement of layer edge waters
1 – natural precipitation; 2 – layer edge water movement.

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The distance from the surface of the formation to the well is called the pressure supply limit R in the surface part of the earth.
When oil is squeezed out with water, the oil droplets become stationary when the capillary pressure difference between the phases is greater than the hydrodynamic gradient pressure.
$P_{k2} - P_{k1} = 2\sigma cos\theta(1/r_2 - 1/r_1) > \Delta P/l.$

Gas cap expansion. When oil is pumped through wells in gas-capped oil reservoirs, a decrease in formation pressure is observed mainly due to the expansion of gas in the reservoir cap. The expansion of the gas cap varies over a wide range depending on permeability, formation heterogeneity, oil layer thickness, layer bedding, oil viscosity, pressure drop, etc.
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As a result of the pressure at the bottom of the well being lower than the formation pressure, a pressure difference arises. As a result, the large amount of dissolved gas bubbles in the oil expand and begin to move down the well. During this movement, the gas bubbles also carry oil droplets with them. These forces are one of the main factors in the movement of oil down the well. (Figure 3)

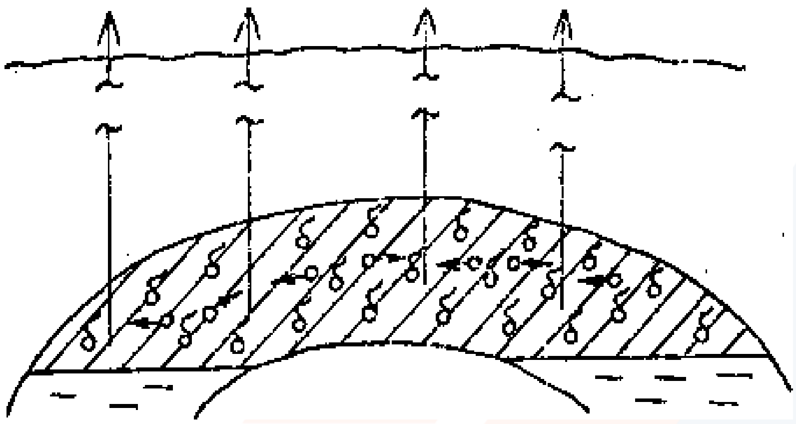

Figure 3. Illustration of dissolved gas pressure behavior.

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In some oil fields, these forces are considered the only energy for the movement of oil. As mentioned in the previous sections, a certain amount of additional product is extracted from the well under the influence of the tension force of the rock, the compressibility of liquids and gases. The mechanism of this phenomenon can be understood as follows: after the path for the movement of oil and gas is opened, during this movement, the oil and gas in the formation pores expand, and the pores themselves narrow under the influence of the weight of the rocks located from the formation to the surface.

In the process of working gas fields, methods involving water, gas pressure, and mixed methods are used.

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