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# Scheme of the Zone Around the Well

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**Abstract**

**The main elements of the zone around the well are the thickness of the reinforcing steel pipe from the inner surface of the operational column, the cement layer, the mud shell, the clomatization zone, the washed zone, the entrance zone, and then the uncontaminated part of the formation.**

**It can be seen that the filtration-volume characteristics of the zone around the well are significantly different from the rest of the layer. The closer we get to the operating column, the more noticeable this difference is. In addition, the degree of negative filtration-volume property depends on the layer saturated with liquid or gas and how the rock is used. If the formation is saturated with natural hydrocarbon gas and the rock is hydrophilic, then this difference is the largest, and if the rock is hydrophilic and the formation is saturated with water, then the difference is the smallest amount.**

**Keywords:**

**Introduction**

After the perforation works, the structure of the zone around the well becomes significantly more complicated. Perforation channels are formed on the inner surface of which a muddy crust is formed, a clogging zone is formed due to the penetration of filtrate into the part of the layer around the channel. In this way, the flow to the well is sharply reduced due to the effect of the negative filtration-volume characteristic channel around the perforation channels. In this case, the thickness of the zone depends on the exposure time, the properties of the drilling fluid, and the pressure difference between the formation and the bottom of the well. When carrying out technological operations to call the flow, the issues of cleaning the channels from the drilling fluid and breaking up the zone around the formed channel or reducing its influence on the flow to a minimum are set. Various technologies are used to reduce the pressure at the bottom of the well. The reduced pressure spreads along the perforation channels, and after a certain distance from the well, the influence of the perforation channels on the pressure distribution becomes negligible, and the flow takes a flat radial form in the direction of the well axis. We call the formation zone around the well up to this limit the active zone of the formation. Here, the flow has a very complex, localized structure near the perforation channels, the greatest pressure gradient and fluid flow velocity.

It depends on the length of the perforation channels whether the flow covers the area around the well or not. If the channels are on average smaller than the total thickness of the zone around the well, then the flow passes through this zone. In this case, the well productivity of the zone around the well is maximally affected. If the length of the perforation channels is greater than the total

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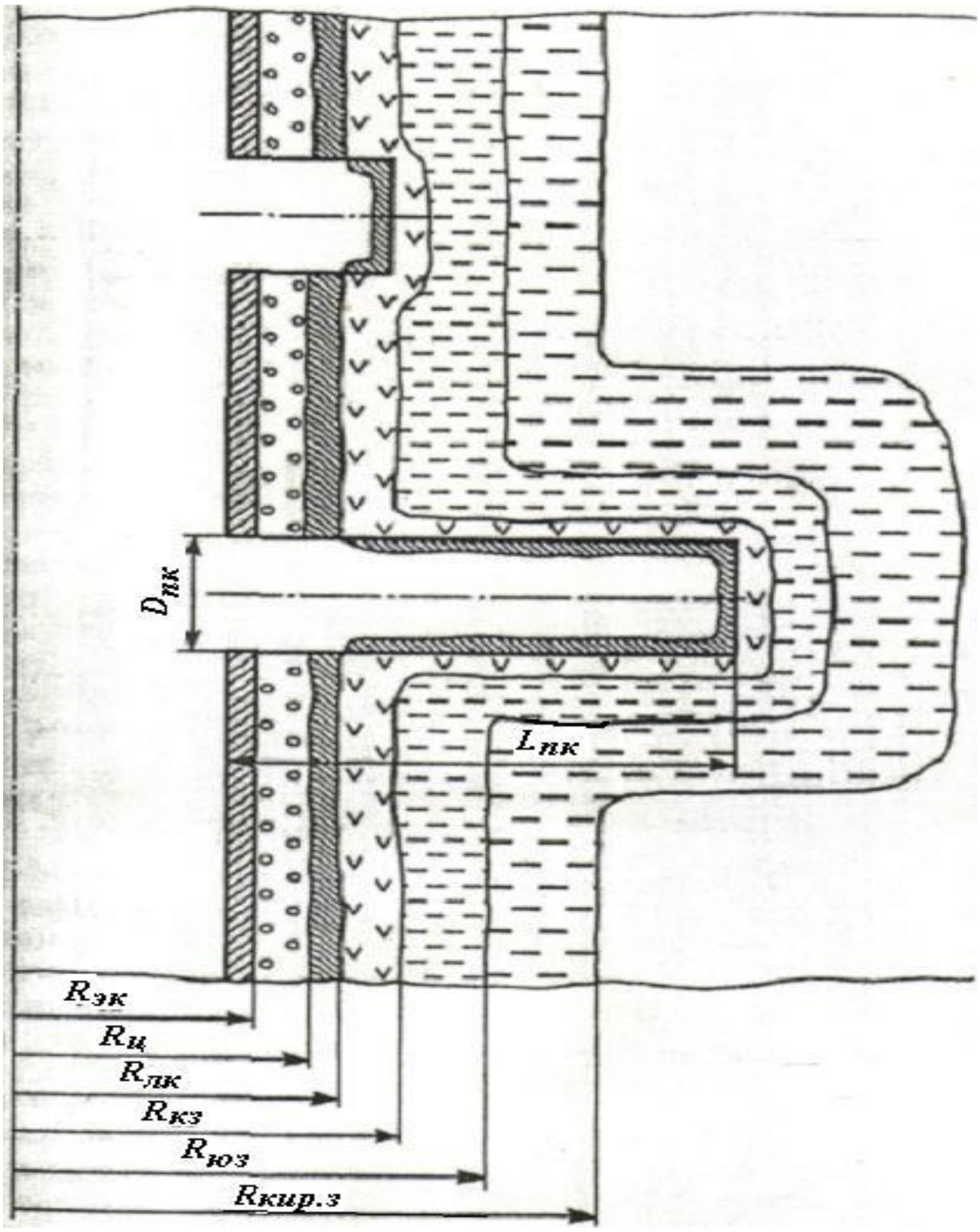
thickness of the zone around the well, this negatively conductive zone of the layer is partially covered, and the productivity of the wells is determined by the length of the perforation channels at the edge of the zone around the well in the clean layer. The flow of the .**1- fig. Scheme of the structure of layer wells and canals.**




well depends on the number of perforation channels, their length and diameter, the method of perforation, the density and thickness of the mud crust on the inner surface of the channels, the characteristics and thickness of the zone around the channel, the occurrence of capillary conditions, and many other factors and aspects. Figure 1 shows the structure diagram of the zone around the formation well and the zone around the channel.Radiuses: Rec – operational column; Rts-cement ring; Rlq-clay crust; Rkz - the colmatization zone; Ryuz- washed zone; Rkir.z-entry zone; Dpk, Lpk- diameter and length of the perforation channel.

Contamination of perforation channels with solid particles, hydrocarbon components plays a significant role in this. The surface of the column is also contaminated by the deposition of heavy hydrocarbons and salts, the accumulation of solid deposits, etc. In receiving wells, channels are contaminated by the formation, and in driving wells, by the well. Therefore, treatment of the bottom of driving wells with a high-pressure water jet is more effective than that of production wells.

At the edges of the active zone of the formation, the pressure gradient is not large and decreases steadily as it moves away from the well. This zone of the formation continues until the boundary of the formation or until the intersection of the depression funnel with the funnel of the adjacent wells. At the intersection of the funnels, the pressure gradient is zero and it is considered neutral, i.e., a sink. The area of the formation from the border of the active zone to the neutral line is called the area of influence of the well. If the fluid is a Newtonian fluid under formation conditions, it will be affected by the entire area of influence of the well, in the direction of production wells, and in the case of driving wells, it will leak in the opposite direction. If the fluid has an initial excitation gradient, then in some parts of the area of influence of the well, where the pressure gradient is greater than the initial excitation gradient, a fluid immobilization zone of the layer is formed in which the fluid does not move in tension or dissolved gas regimes. In the rest of the layer, the flow rate in the direction of the well is greater than zero, and we call this part of the layer the area of filtration influence of the well.

In such cases, it allows solving a number of issues related to cleaning the zone around the well and accelerating oil production.

For example: oil-water, oil-gas, water-rock, oil-rock and other surfaces due to a decrease in surface tension force, and due to the reduction of the volume of water droplets in the pore channels and oil, it becomes effective to squeeze the product with less external energy.

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