AMERICAN JOURNALS
Open Access, Peer Reviewed Journals

American Journal of Research in Humanities and Social Sciences
ISSN (E): 2832-8019 Volume 24, | May - 2024

SECONDARY OPENING OF THE PRODUCTIVE LAYER AND INCREASE OF ITS EFFICIENCY

Norinov Fakhriyor Kurbonovich
Karshi, Uzbekistan
ORCID: 0009-0001-8143-2897 E-mail: norinov_faxriyor@mail.ru

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

In increasing the scale of oil and gas production, the process of drilling oil and gas wells, the correct selection of drilling method, well structure, type of drill bits, drilling mode and sizes of drilling fluid, with them opening of productive layers, testing them, putting them into operation, studying the geological features of the layer, studying the properties of oil, gas, and water in them, determining the number of wells that should be drilled for rational use of deposits, their excavation and Determining the starting sequence, estimating the energy potential of the formation, protecting underground resources and the environment during the drilling of oil and gas wells are important tasks.

Method and Materials

The main issue of the secondary opening is to create a complete hydrodynamic connection between the well and the productive layer, without adversely affecting the collector properties of the formation in the bottom of the well, without giving a strong deformation to the reinforcement ridge and the cement shell. When solving this problem, the selection of perforation conditions, the perforation medium, the dimensions of the shooting devices for these conditions and the perforation density are carried out.

During the perforation process, the geological-mining characteristics of the heap, the types of collectors and the technical-technological data of the well are taken into account:

- thickness, filtration volumetric properties of the well bottom zone and the far zone of the formation, branching, description of the lithofacies of the formation and oil viscosity;
- distances between SNK (water-oil contact, gas-net contact and gas-water contact);
- pressure and temperature of the layer between perforations;
- the number of reinforcing ridges in the perforation interval, the minimum internal diameter of reinforcing pipes;
- the maximum angle of deviation of the well from the vertical;

- the condition of the reinforcement ridge and its cement shell;
- the properties and composition of the fluid used in the primary opening of the productive layer.

In oil producing wells, the rocks between the perforations are determined by the saturation of formation fluids, and the productive object is opened by the leader of the drilling works and the geological service office during the opening of the formations along the entire thickness.

Only the oil part is perforated in the gas cap and aquifers. In the distance from the lowest hole to and the distance from the topmost for each pile, the presence or absence of impermeable layers in the intervals, the imperfection is determined experimentally.

With shooting perforators, productive formations are opened in repression (the pressure of the bottom of the well is less than the pressure of the formation).

The opening of the productive layer in repression depends on the presence of normal and high anomalous formation pressure, as well as contact zones and presence of decaying components (N_2S, SO_2) in the oil.

When opening productive layers in repression, perforation should be carried out safely and large volumes of liquids should not be allowed to enter the layer from the well.

In the oil production industry, oil and gas wells opening and perforating works are distributed according to the types and volumes (in %) in the following order.

1. Cumulative perforation. 2. From this layer in the depression. 3. Axial perforation. 4. Hydraulic image. 5. Another type.

In wells, most of all types of perforation works are carried out in the productive layer with repression. The value of repression should not be higher than 5-10% (no more than 2.5-3.0 MPa) depending on the depth of the well in relation to the formation pressure.

In the repression of the layer, a closed zone (from 5 mm to 1.5 mm thick) is formed in the bottom zone of the well bottom of the productive layer, and the radius of the infiltration zone is 300 mm. from - 1000 mm. will be up to.

The greater the pressure on the formation (as well as the water permeability of the drilling fluid and its contact time with the productive formation), the thicker the sealing zone is formed when the formation is opened.

In the secondary opening of layers, shooting or "Water-sand-flow" perforators are used. According to the order of movement, firing perforators are divided into bullet, torpedo and cumulative types. Perforators with vertical-curved shafts have appeared in recent years and have the highest punching efficiency. The use of this type of perforators is limited due to some geological and technical conditions.

According to some authors, water-sand-flow perforation does not have practical advantages compared to cumulative perforation, according to the data of mining experience. According to these reasons and due to great difficulties, "water-sand-flow" perforation is not allowed to be widely used.

PVT 73 differs from others in its two-barrel perforator design, in which bullets are fired in two opposite directions through two channels.

In the single-channel multi-section PVC 70 perforator, the barrel passes along the axis of the perforator, in which the reinforced diameters and mass of the axes are used.The penetration depth of medium-strength rocks is shown below.

Penetration depth of perforators.

Table 1

Perforator type	PVN 90, PVN 90 t	PVT 73	PVK 70
Crack depth, mm.	140	180	200

The formation of perforation channels in the layer obtained with the help of cumulative charges has the following characteristics. Only 10% of the mass of the cumulative current passes through when the charge detonates and explodes upon hitting the metal coating. The remaining part moves in a cigarette-like shape in the stern at a speed of 1000 m/sec. In this case, the flow has a large diameter and a small kinetic energy compared to the head of the flow, gets into the formed perforation holes and partially or completely closes it. Channel expansion occurs under the influence of side pressures of the flow that breaks through the barrier. Therefore, the diameter of the channel is usually larger than the diameter of the stream.

Results. The technology of carrying out the process of filling the well with a special liquid has been studied and recommended.

If the above requirements are met during the secondary opening of the productive layer based on the geological conditions, the primary oil output of the wells will be high and the well will serve for a long time. The cost of eliminating complexities in calling the flow is saved.

When opening the productive layer, perforators with vertical-sloping shafts (percussion) acting PVN90, PVN90 T, PVT73, PVK70 (transverse dimensions 90.73 and 70 mm) are used, with a diameter of 117.5 and 98 mm is lowered into the reinforcement ridges.

In perforators of the PVN type, four barrels are placed in pairs in two mutually perpendicular planes, to give mutually balanced forces, the paired barrels go to meet each other in a common powder chamber, and the common impact forces are added.

The construction of the well should ensure its high-quality construction, ensure the prevention of accidents and difficulties during drilling, reduce the construction period and use less material and technical tools during drilling, ensure the opening of the productive layer by effective methods, environmental protection. providing a solution to the problems of less damage to the environment.

Conclusion

The quality of the drilling fluid plays an important role in the process of opening a productive layer. The solid phase of drilling fluids can reduce seepage channels in the formation, while the liquid phase (water) of the drilling fluid can cause formation porosity and permeability to decrease due to suffocation and swelling of clay minerals.

In addition, five methods of drilling a productive pile were studied and their advantages and disadvantages were analyzed.

Selection of the composition and properties of the washing fluid for opening the productive formation, methods of testing the formation, types of formation testers and working principles are fully studied.

In the process of drilling and strengthening the well, the productive layer may be contaminated, and in some cases it may be completely closed. Therefore, it is necessary to prevent its contamination during the process of opening the formation before releasing the flux. In most cases, after the primary opening

of the formation, the operation of the well is fully reinforced with casing, and the interval behind the pipe is cemented. In such wells, it is necessary to create a protective ridge, a cement stone, and a large number of holes passing through the capping shell in order to obtain formation fluid. The process of creating such holes is called secondary opening of productive layers.

The choice of which group of perforators for secondary opening is made taking into account the character of the preparation of the well for perforation and the volume of work, the duration of perforation and the number of flights, the efficiency of the secondary opening, as well as the damage caused to the strength of the well during the drilling operations.

References

1. Басарыгин Ю.М., Булатов А.И., Проселов Ю.М. “Бурение нефтяных и газовых скважин” Учебник пособие для ВУЗов. Москва, ООО “Недра-Бизнесцентр”, 2002 г.
2. Norinov F.K. Oil and gas well drilling. Textbook. №540271, Intellekt Karshi 2024.