

## **FEATURES OF DRILLING AN EXPLORATORY AND PRODUCTION WELL**

*Dnipro University of Technology*

**Dayyabu Abubakar Janmutum**

***Supervisor: Candidate of Science (Engineering), Docent, Valerii Rastsvietaiev***

An exploration well is drilled to a depth of 9,000 feet or more. Wells from 12,000 to 18,000 feet deep are being drilled to study in detail the geological structure of the earth's crust, the productivity of the field and other important parameters. More often, such works are deployed in hard-to-reach, hollow and wetlands. Other drilling technologies are envisaged for the organization of offshore production.

The exploration project is led by drilling foremen who supervise the activities of the team. Exploration sites are most often located in areas with frozen or thawed soils. Rocks in such areas should not be subject to deformations and subsidence, be stable and reliable. The start of work is carried out on the basis of surveys, map data and geological characteristics, which reflect the overall picture of underground soils and underground processes.

The development of the project is carried out by a team that consists of professional drilling foremen and representatives of the geological department. At the first stage of work, a technical and technological plan is drawn up, which will be the basis of the upcoming business.

The organization and development of a well depends on many different factors:

- purpose and depth of the deposit;
- features of technical and personnel equipment of auxiliary and main industrial productions;
- site concreting technology;
- features of the organization of drilling operations;
- location area;
- scope of work.

The production and technical base, led by the chief specialist, deals with engineering problems. A team of professionals develops structures for the exploitation and exploration of the field.

The reliability of the data obtained in the process of research depends on the quality of downhole equipment and the design features of the well. An important step is measuring the pressure. The success of the activity depends on the correspondence between the type of equipment and the pressure set inside the well.

When performing research work, the type of soil, the classification of hydrocarbons and reservoir pressure are determined. An analysis of operational properties is necessary to determine the productivity of a gas well. Some reservoir parameters and fluid type are also determined.

After drilling, tests are carried out with the following objectives:

- classification of hydrodynamic characteristics of reservoirs;
- determining the appropriate mode of using the well;
- assessment of industrial deposits of natural resources;

- compilation of optimal debits;
- drawing up a rational project for the use of the deposit.

In the absence of equipment for the disposal of liquid waste, exploration and testing work cannot be carried out.

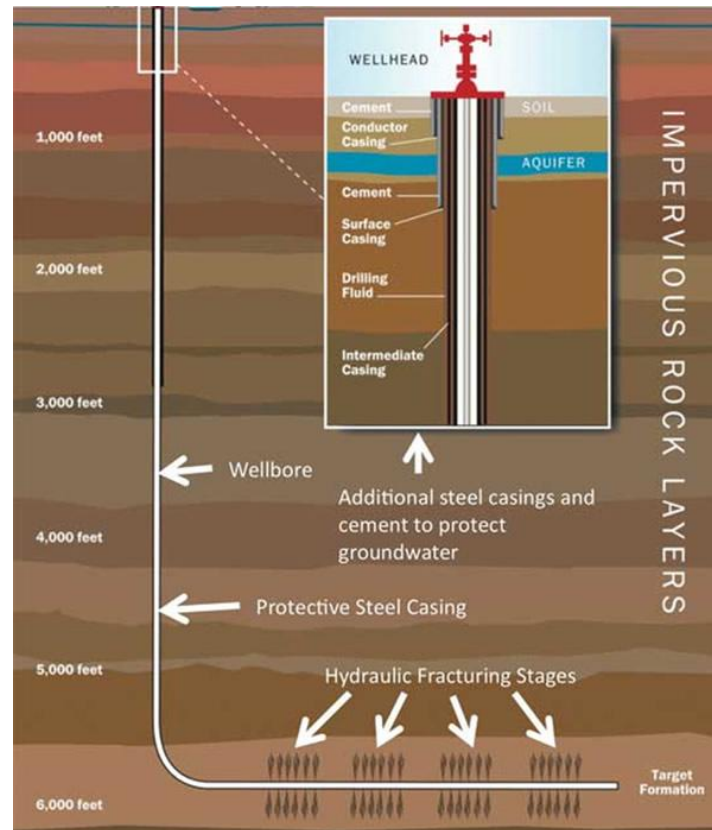


Fig. 1 Impervious rock layers

Often during work, employees have to deal with the problem of foaming working solutions. Such processes lead to a decrease in the density of the drilling fluid and the difficulty of lifting the rock from the depths. The impact of foam on the work process depends on the properties of water, the quality of reagents and the composition of clay rocks. Destroy the foam with special reagents that quickly extinguish it and eliminate the negative effects of exposure.

The essence of the construction of wells for oil production is the use of powerful installations. Such equipment consumes a large amount of energy, so the designers need to choose economical motors adapted to specific operating conditions.

An important stage of work is the setting of the temperature regime. Measurements are taken along the wellbore. The data obtained is valuable information for determining the quantitative interpretation and clarifying other important information about the field. When difficulties arise, they turn to the general geocryological characteristic, which contains data on the largest deposits and their properties.

A production and exploration well requires the use of equipment and technical equipment. In addition, special-purpose rooms should be present on the working area. When designing workshops, they are guided by the features of the main production.

When arranging an underground gas storage facility, the following facilities are required:

- pumping and compressor stations;
- exploration and production wells;
- auxiliary facilities;
- purification plants;
- technical equipment for measuring and drying gas;
- general purpose facilities;
- gas pipelines for connection.

The territory must comply with regulations, generally accepted standards and safety rules.

Regardless of the type of deposit, primary studies are mandatory. Such work seems to be the basis of activity, it allows to determine the main properties of the reservoir and is carried out in full before drilling. Preparation for primary research is a strategically important task, the implementation of which must comply with the requirements and standards.

During the research, the following parameters are set:

- quality and degree of formation opening;
- initial pressure in the reservoir;
- temperature regime;
- relationship between pressure and flow rate;
- productive capabilities of the well;
- performance characteristics;
- field operation mode.

During the construction of special-purpose wells, standardized rules are applied that are typical for other types of work. In the supporting structures, core sampling is carried out in all areas.

With the help of exploration and production wells, category A deposits are studied. The boundaries of these reserves are accurately determined on the basis of ready-made deposit contours.

### **References**

1. Kozhevnykov, A., Khomenko, V., Liu, B., Kamyshatskyi, O., & Pashchenko, O. (2020). The History of Gas Hydrates Studies: From Laboratory Curiosity to a New Fuel Alternative. *Key Engineering Materials*, 844, 49-64.
2. Pashchenko, O.A., Ihnatov, A.O., Vladyko, O.B. (2021). Some Features of Rock Destruction at the Bottom of the Well. *Tooling materials science*, 24, 121-134.
3. Koroviaka, Ye.A., Ihnatov, A.O., Rastsvietaiev, V.O. (2021). Features of Drilling Operations During Engineering Surveys and Preparation of Territories. *Tooling materials science*, 24, 102-113.