TECHNOLOGY OF DRILLING A VERTICAL EXPLORATION AND EVALUATION WELL

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Energy independence is one of the main priorities of modern Ukraine, which requires active work to find and develop its own energy sources. In this context, the country's gas fields are of great value, helping to reduce dependence on imported resources and improve energy security. One of the relevant directions in this process is the drilling of wells for natural gas in promising areas [1, 2, 3].

Drilling a well is a relevant and promising project that will contribute to the development of the energy sector of Ukraine, improvement of the environmental situation and creation of new jobs in the region. The implementation of this project requires the coordination of efforts of relevant bodies, scientific institutions and the private sector in order to optimize the drilling process, ensure safety and maximize the efficiency of mineral extraction. A strategic approach to the implementation of the project, modern technologies and consideration of environmental and social aspects will allow to achieve the desired results and contribute to the sustainable development of the region [4, 5].

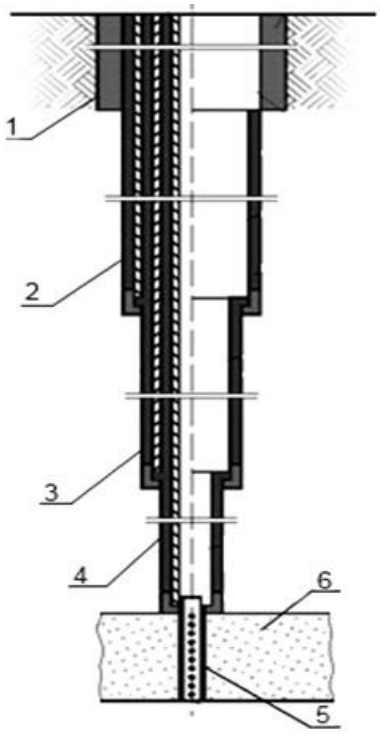

Fig. 1 Well design
1 - referral; 2 - conductor; 3 - intermediate column; 4 - operating column; 5 - filter; 6 - productive layer

Drilling of vertical wells is an important component in geological exploration and oil and gas production processes. This process requires the use of specialized

equipment and technologies to achieve successful results. Here is an overview of some of the key technologies used in vertical well drilling:

Rotary Drilling: This is one of the most common drilling methods where a rotor is used to rotate the drill bit. This method is effective for different depths and types of soil.

Percussion Drilling: This method uses shocks transmitted to the well to disrupt the soil. This method is effective when working with hard soils or performing geological studies.

Hydrodynamic drilling: It uses a stream of fluid flowing through the well to break up the soil. This method is often used when drilling in soft soils.

Hybrid methods: Some modern technologies use a combination of different methods to optimize the efficiency and effectiveness of drilling.

An exploratory well is a key stage in the process of exploration and development of oil and gas fields. Here are some of the needs and goals it addresses:

Field discovery: An exploratory well helps identify potential oil and gas deposits by penetrating underground formations and taking soil samples.

Potential assessment: This well allows to estimate the volume and quality of oil or gas contained in the formations under investigation.

Research of geological conditions: By analyzing the obtained data, it is possible to determine the geological properties of underground formations, their composition, structure and other parameters.

Planning for further actions: The results of the exploratory well are used to develop strategies for further drilling and production of oil or gas.

Financial evaluation of the project: Information obtained during the exploration and evaluation well helps to make financial evaluations of the project and determine its economic feasibility.

Drilling vertical exploratory wells requires a complex of technical solutions and high-tech equipment. Here are some key aspects of this process [6, 7]:

Site selection: Before drilling, it is important to conduct geological studies and analyzes to determine the optimal location for the well.

Equipment Preparation: Drilling begins with the assembly and setup of the rig, including the installation of the derrick, mechanical tools, and control systems.

Choosing a drilling method: Choosing a drilling method depends on geological conditions, the depth of the well and other factors. Methods of rotary drilling or drilling with the use of drill strings are usually used.

Parameter control: During drilling, it is important to constantly monitor parameters such as pressure, temperature, rotation speed and fluid flow to ensure the safety and efficiency of the process.

Data processing and analysis: Information obtained during drilling is subjected to further processing and analysis to evaluate geological conditions, potential deposits and other parameters.

Environmental protection: During drilling, all environmental standards and safety measures must be followed to avoid negative impact on the natural environment.

Environmental factors can significantly affect the process of drilling vertical wells. Some of the most important factors include:

Geological conditions: Different types of soils, rocks and geological formations can complicate the drilling process by increasing resistance and wear resistance.

Hydrogeological conditions: The presence of water during drilling can lead to flooding of the well, loss of stability of clay rocks or clogging of drill strings.

Weather conditions: Extreme weather conditions, such as high winds, rain or cold, can affect the rig's efficiency and worker safety.

Environmental requirements: Environmental requirements restrict the use of certain technologies and materials during drilling, which can affect its efficiency.

Local regulations and safety standards: Different countries and regions may have their own regulations and standards that govern the drilling process in order to ensure the safety of workers and the local environment.

In the process of drilling vertical exploratory wells, it is important to consider various factors that can affect the efficiency and safety of this process. Geological conditions, hydrogeological conditions, climatic conditions, environmental requirements and local regulations and safety standards are key factors to consider when planning and executing drilling operations. Taking these factors into account will ensure the successful completion of the well drilling task and minimize its impact on the environment. Correct planning, use of appropriate technologies and compliance with safety requirements will allow to achieve successful results in drilling vertical exploratory wells.

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