Application of computer software technology in oilfield geological exploration and development

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Abstract: Computer technology as the representative of the twelfth century advanced technology, in people's life and production play a more and more important role. Especially in this link of energy development, its advantage is increasingly important and obvious. Petroleum is a part of China's energy resources framework. The importance of its exploration work is self-evident. In oilfield geological exploration, the application of computer software technology is an important means to improve the utilization rate of energy resources in China. This article delves into the problem. And the problems it faces, and provide reasonable solutions.

Key words: Oilfield development; Geological exploration; Computer software technology; Problems and Strategies.

1. Preface

Petroleum energy is a very important energy source for all industries in the world. The machinery in the factory runs on the energy of oil. And when he uses petroleum as fuel, he should correctly apply petroleum geological exploration and development technology, constantly innovate and optimize this technology. Only in this way can the technology be guaranteed great advantages in practical applications. From this point of view, it is very necessary to study petroleum geological exploration technology.

2. The necessity of oil field geological exploration and development technology research

2.1 Necessary

At present, oilfield development is becoming more and more difficult. The mixture of oil and water is quite serious, and several problems are encountered in the mining process. Due to the small thickness and rapid change of reservoir and the loose geological conditions, these characteristics cause great difficulties to oilfield development. In today's oil demand is growing, whether it is oil development technology or geological exploration, science and technology support, only in this way, can ensure the normal exploitation of oil fields, geological exploration work orderly, which ensures the demand of the oil market. To improve the economic value of oil fields, it is the most important problem to solve in petroleum exploration and development technology. Science and technology is the first productive forces of human, facing the complexity of oil exploitation, to develop the science and technology, the progress of technology, strengthen scientific research, use of science and technology to support oil exploration and development, in order to overcome various difficulties, ensure recovery efficiency, increase the economic value of oil field, in order to guarantee the normal production of oil field, promote the development of the petroleum industry. Only with the progress of science and technology in oil production, and the continuous in-depth study of petroleum geological exploration and development technology, can the exploitation of crude oil get better development, make full use of underground oil resources, and promote social and economic development based on oil [1].

2.2 Application of computer software technology in petroleum geological exploration

2.2.1 Visualization technique

Visual technology is through the use of advanced computer technology, to collect all kinds of geological data during the exploration, through a special program, into a visual effect of the image, improve the visualization in the exploration.

2.2.2 Basin modeling technique

It is very useful to adopt basin simulation method in oilfield geological exploration in basin area. Traditional basin modeling techniques, which mainly use planar models, have great disadvantages in accuracy, clarity and information. Advanced computer software technology, however, uses 3D modeling technology to improve accuracy and clarity, which lays a foundation for the smooth exploitation of oil fields [2].

2.2.3 Virtual reality technology

Virtual reality technology is a new oil and gas exploration technology. If its owner can simulate the geological structure and condition of the oil area through computer software, a virtual state can be formed in front of the staff with a visual effect. The application of virtual reality technology, in extremely high surveying, allows the personnel to see the condition of the oil field at a glance, it can quickly find the problem within the problem. It is beneficial to form corresponding solutions in the mining process.

2.2.4 Quantitative fluorescence logging technology

This technique should be used in exploration and is generally used to observe and examine samples collected by personnel to determine oil content. The main feature of quantitative fluorescence logging technology is that it can accurately determine the amount of oil in the area. Avoiding drilling not only saves costs, reduces the number of drilling, but also reduces the risk of pollution [3].

3. The function of computer software technology in oilfield geological exploration

3.1 Improved exploration of special fields

In oil exploration, such problems are occasionally encountered. Due to the complex geological structure in this area, and the deep buried layer, it is difficult to find the existence of oil fields using conventional exploration technology, which has a certain negative impact on the geological exploration of oil fields. The application of advanced computer software technology solves this problem. The people who use this technology make it possible to explore for deep oil and gas and improve the accuracy of the survey results.

3.2 The accuracy of exploration results is improved

Generally speaking, the oil field is in the deep place of the formation, and the groundwater vein has the intricate cross connection. Conventional exploration methods lack accurate location, and there is a big problem in accuracy. During exploration, in order to accurately determine the distribution of oil fields and rivers, a vein of water was drilled in the mining process directly, and a large amount of groundwater entered the oil pipeline, which increased the difficulty of mining and had a certain impact on the quality of mining, which also led to a large amount of water resource waste.

3.3 Improved data acquisition and transmission technology

Using conventional oil exploration technology, the whole exploration process is difficult and complex. In particular, there are many technical difficulties in data collection and transmission, which seriously affect the progress of exploration. A lot of time is wasted, which affects the continued production of the field. At the same time, due to poor exploration technology, the results show that the accuracy of these data has been somewhat affected. And the use of advanced computer technology, can solve the problem, improve the accuracy and timeliness of the data. This will improve safety and efficiency in later field development, which is a huge help.

4. Innovation analysis of China's oil field geological exploration technology

4.1 Computer network technology is introduced comprehensively to improve the efficiency of petroleum exploration

With the development of modern information technology, computer network technology has gradually been widely used in petroleum geological exploration. Geophysical exploration technology is an important technology in petroleum geological exploration. At present, with the continuous updating and optimization of remote sensing, GPS and other technologies, the technical level of geophysics has been greatly improved, and the information construction of global logistics technology has also made all-round breakthroughs. With the help of computer technology, a three-dimensional simulation information technology platform suitable for geological exploration is established, and a three-dimensional sampling model of the area to be explored is established. Scientific calculation and analysis are carried out by computer, and various geological exploration data are input into the corresponding simulation system, which can quickly simulate geological conditions. And the introduction of modern communication technology such as GPS, GIS, accurately identify and determine the exploration area, set up a remote monitoring and transmission system, the need to collect data, so that you can comprehensively analysis the survey area, in a timely manner to understand the specific situation and distribution of oil, prospecting efficiency greatly, reduce the burden of employee's work; Compared with the traditional statistical analysis method, the experimental results are more accurate, visual and intuitive by using the results of computer simulation and specific data.

4.2 Constantly learn and draw lessons from foreign advanced exploration technology and management experience

According to the actual situation of China's oil, targeted design and development. It is necessary to construct a geological exploration technology system in line with the reality of petroleum production in China. At the same time of strengthening geological exploration technology, realize the importance of strengthening geological exploration technology, draw lessons from foreign advanced geological exploration technology, and introduce the domestic actual situation, to improve the current geological prospecting technology and optimization, at the same time, to continue the introduction of high-level technical personnel, increase the intensity of research and development, further optimize and upgrade the geological exploration technology. On the other hand, we should focus on the efficiency, output and cost control of geological exploration. All kinds of technology are organically combined together, so that the petroleum geological exploration technology is further optimized and promoted.

4.3 We need to increase financial input to improve our capacity for technological innovation

To strengthen the understanding of petroleum geological exploration work, the comprehensive analysis of the existing technology and equipment, and made some specific reform measures, timely understanding of foreign advanced technology, and according to the specific situation of our country, has carried on the innovation and transformation, therefore, to explore the targeted oil and gas exploration technology solutions, to strengthen the exploration of an efficient, safe.

4.4 Build a sound technology application management platform

Petroleum geological exploration technology to fully ensure the continuous innovation and practical application, this requires comprehensive analysis of the present geological exploration technology, found defects, establish and improve the technical management system, to ensure the smooth progress of oil exploration work, at the same time, to increase the cultivation of technical personnel, familiar with all kinds of geological exploration technology, and the dynamic timely adjustment and optimization.

4.5 Combined with the specific situation to select targeted geological exploration technology

Now, China's geological exploration technology has been increasingly mature, become more perfect, but not all technology has universality, must be combined with a specific working target, for a specific site collection, building the petroleum geological prospecting technology plan and service system, according to the traffic conditions and terrain conditions, choose appropriate geological exploration technology, therefore, Its use efficiency and use value have been improved.

5. Countermeasures to ensure effective application of new technology in oilfield geological development

5.1 Combine modern information technology with computer technology

Now it seems that our country has made great progress in oil exploration, but in this respect, we must combine geological exploration technology, information technology and computer technology. Like 3D technology, like GPS, and so on. In the process of geological exploration, the ability of obtaining information is effectively improved, so as to effectively improve the utilization of geological resources, continue to innovate geological development technology, and provide more accurate and efficient geological data for petroleum exploration and development. In addition, in order to further detect the distribution of oil and gas, information management technology must be correctly used to manage the transformation and accumulation of oil and gas in a unified manner, which makes detection more convenient [4].

5.2 Accelerate the integration of new technologies and practices

Although the research of new technologies has made great progress, there are still many new technologies that remain theoretical. There is still a certain distance from the actual geological exploration work, and some even appear out of control. Therefore, it is very necessary to accelerate the combination of new technology and practice. This is very valuable, the effective combination of new technology and new method, can make the new technology in geological exploration to get the maximum application. The quality and benefit of oilfield geological exploration have been continuously improved. In the selection of technology, the realistic environment should be taken into account to adapt the technology to the actual work and maximize the role of the new technology [5]。

Enhance staff capacity

In oil exploration, no matter how advanced the technology is, someone has to do it, so long as he can skillfully use the technology, so that the role of technology can be brought into play. Therefore, we must strengthen the training of geological exploration talents, strengthen the training of this kind of talents, also must absorb a large number of technical personnel, if necessary, can also organize the cooperation between enterprises and schools, so as to produce more specialized talents, for oil field geological exploration work into new vitality. Also need to existing technical personnel for appropriate professional training, and constantly improve their own professional technology, master more sophisticated science and technology, in the actual geological exploration work, improve the efficiency of work.

5.3 Further improve the expansion casing exploration technology

Expandable casing exploration is a new technique for geological exploration, in which if drilling is not possible, the irregular pipe is expanded between the circle and the wall to seal off water and debris. That way, the bit can continue drilling. New materials are emerging in the upper end of the market, and in the near future, new slotted expanders will be used more for expansion casing exploration. Expansion casing exploration technology needs to be improved to better prevent material diffusion. It has improved the efficiency of geological exploration.

5.4 Innovation and application of oilfield seismic exploration technology

Seismic exploration technology of oil field can be divided into two categories, namely logging technology and drilling technology. In logging technology, modern information technology is mainly relied on at present, the introduction of advanced, intelligent, automatic electronic instruments, so that the image display of logging can be realized, in particular logging technology, logging efficiency has been greatly improved, data collection and analysis is also very complete, accurate. With the development of petroleum exploration technology and the expansion of petroleum exploitation field, the application of logging technology in nuclear magnetic resonance, logging while drilling, cased hole and other aspects will be more and more widely, thus greatly reducing the cost of exploration, improving the quality of exploration work and improving the work efficiency. The latter is a new technology to reduce the drilling costs in the early stage of mining. China has developed 3d drilling, ultra-deep drilling and other technologies, improving the comprehensive and standardized level of petroleum geological exploration [6].

6. Conclusion

Oil field exploration is the key to oil and gas exploration and development. This will directly affect the production and production of oil fields. The rational application of advanced computer software technology in petroleum exploration is of great significance to improve the discovery rate of petroleum resources in China. To the continuous development of China's economy, favorable energy sources to ensure.

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