

Analysis of Petroleum Geological Exploration Technology in a New Era

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Abstract: In a new era, as an important energy source, oil has an increasingly important impact on China's economy and people's livelihoods, and the continuous innovation of oil exploration technology is a "ballast stone" to ensure China's energy security. Petroleum geological exploration technology is of great importance for locating oil and gas, finding favorable stratigraphic traps, and ensuring efficient expansion and stable production of oil and gas in China. As a relevant researcher, the author has made a brief summary of the analysis of petroleum geological research techniques in a new era through a number of literary reviews and field exercises in school and work, in the hope of bringing more help to future work and making more contributions to oil and gas research and development in China.

Keywords: Petroleum geology; Oil and gas research and development; Physical detection technology; Computer

Introduction

With the development of a scientific and technological economy, petroleum's geological exploration techniques have evolved by leaps and bounds. Petroleum geological exploration is identifying and exploring oil and gas resources, using various exploration techniques to achieve various underground conditions, such as underground oil storage, oil production, oil and gas transportation, conservation, aggregation, etc., exploring the regions of oil and gas fields, determining favorable areas for oil and gas accumulation, understanding the state of oil and gas deposits and oil and gas production capacity, carrying out a thorough assessment of oil and gas prospects, and conducting data preparation for national Crude oil reserves and manufacture of related oil and gas products. At present, China's oil status, recuperable oil and gas reserves are small, western and marine carbonate exploration and other regions have not achieved revolutionary progress, geological exploration of petroleum is facing greater pressure, so in order to better promote social and economic development, in the current severe international form and resource shortage, it is very important to strengthen innovative research on petroleum geological exploration technology.

1. Raising awareness of the importance of petroleum geological exploration techniques

Improving petroleum geological research technology and innovations in exploration methods play an important role in China's oil development. With the advancement of China's technology, foreign technology in oil geological research is no longer needed, and with independent research and development, the monopoly of exploration technology market is eroded and the dependence on foreign advanced technology is reduced to a certain extent, so China's international competitiveness has been constantly improved. In addition, the application of petroleum geological research technology has effectively improved the efficiency of China's oil development. In today's era, China's economy is in a period of high-quality development, and due to the influence of the international market, oil prices have changed drastically. In this case, the cost of purchasing oil in our country will increase. However, the application of petroleum geological exploration techniques can increase oil production and reduce costs. Improving petroleum geological exploration technology promotes China's strategic resource utilization, enabling oil to meet the needs of the market, enabling related areas of China to achieve stable development and China's economy to achieve sustainable development.

2. Comparison of common petroleum geological survey methods

2.1 Geophysical techniques

From current developments, in the process of petroleum geological research, geophysical techniques are widely used. The principle of application of this technique is to use physical exploration techniques to classify oil and gas resources and the resource distribution of the generating reserves, so as to refer to data on regional utilization in an orderly manner. Currently, more physical exploration techniques are being used, including heavy magnetic and geological radar detection technology, seismic wave detection technology, temporary ground reconnaissance technology, etc. Take seismic wave detection technology as an example, the survey rule of such search techniques in the application of this type of search technology lies in the placing of seismic wave release devices in a search position, or explosives are installed in a fixed position, after the equipment has been activated or ignited the explosives, the resulting seismic waves will spread to the depths of the formation and different wavelengths will be fed back when they land in different media, and with the help of computer software, The amplified response wavelength, error correction and other processing, according to peak and low response wavelength data, after comparison of standard data, the distribution of rock formations in the region can be successfully determined. The nature of rock formations and the fossil potential of rock formations can be used to scientifically assess whether there are oil and gas resources in the area and also scientifically assess the state of the oil field's gas production, which also provides reliable guarantees for the strategic strengthening of oil field development activities.

2.2 Rock pyrolysis logging techniques

In petroleum geological research, metal pyrolysis logging technology also has good usability. From the perspective of current application, this technique has the following application values: First, a reasonable estimation of source rocks, in the estimation and analysis of source rocks, if the rock thermal cracking technique is chosen, then the richness and type of organic matter in the source rock can be estimated in many aspects, to obtain external hydrocarbon emissions and hydrocarbon formation of the rock layer, and calculate the total hydrocarbon emissions and total oil production that the formation can get. Secondly, the scientific assessment of the oil and gas content of the reservoir, the use of previous drilling techniques for maintenance and collection, there will be a certain amount of hydrocarbon losses, and when the drill bit is washed and releases the pressure of the drill bit, it will also result in problems with hydrocarbon loss. Therefore, when calculating the oil and gas content of rock tanks, it is necessary to calculate the hydrocarbon recovery factor. In particular, some high suspended rock samples will use this technique to calculate oil saturation and porosity in the oil layer to achieve crude oil properties and scientifically assess the capacity to produce oil and gas.

2.3 Rock pyrolysis gas chromatography technology

Petroleum geology studies will also use gas chromatography techniques for stone heat, and its research principle is to analyse the chromatographic peaks on the map with the help of obtained chromatographic images, to judge the reliability of oil and gas display data. This also requires that standard chromatograms be produced at an early stage; In the case of a mixture of oils and gases and additives, the peaks of the obtained chromatogram overlap which also requires a scientific assessment of the presence of true and counterfeit oil and gas against the standard spectrum. At the same time, according to the obtained reservoir diagram, the properties can also be judged to determine the total amount and classification of hydrocarbons in the reservoir, under normal circumstances oil and gas can be divided into heavy fuel oil, medium oil, light oil, petroleum, condensate, etc.

3. Development of the development of petroleum geological exploration technology

3.1 Application of computer simulation technology

In the future development process, the application of computer simulation technology will also be constantly expanded, to form a digital, virtual comprehensive oil exploration technology development platform, all obtained search data can be visually detected on the screen, where relevant data is entered, the system can automatically simulate the oil utilization forecasting process, which also accelerates the accuracy of oil exploration activities, reduces the overall cost of early exploration and improves the utilization efficiency of existing resources. In addition, in the process of geological exploration, it is also necessary to continuously integrate GPS technology, 5G technology, GIS technology, big data technology, and cloud computing technology to improve the quality and working efficiency of petroleum earth exploration.

3.2 Introduction to expandable pipe technology

In drilling and construction, expandable shielding technology has good usability and has been applied to many large oil fields. During drilling, the pipe cable will be lowered directly to the bottom of the hole and the expansion cone will be used to deform the

tube, to increase the internal diameter of the casing and save the size of the borehole. In the future development, the maturity of the technology will improve even further and the application costs will also show a tendency towards reduction, which creates a good environment for the constant penetration of the technology to meet the requirements for oil and gas exploration and production under different conditions.

3.3 Tendency towards multidimensional development

In the future development, oil exploration technology will also evolve towards multidimensional to meet exploration requirements for more topography and geomorphology. Based on previous exploration experience, it can be known that petroleum geological research in China often encounters loess plateaus, mountains and thin layers, and other geology, which is difficult to explore and utilize, and requires the use of scientific exploration systems to obtain more accurate geological data. This also requires the integration of survey technology and interbranch development, improved survey data integrity, and multi-perspective survey data analysis to lay the foundation for survey forecasting.

Conclusion

With the growth rate of China's economic development, the demand for crude oil increases year by year, oil resources are decreasing, oil exploration faces increasing pressure, and the task of improving the accountability of oil and gas resources is difficult. R&D and application of petroleum exploration technology is a favorable guarantee of China's economic and social development, and the stable supply of petroleum resources, and understanding the current state and development development of petroleum exploration technology is of great importance for the innovation and development of petroleum exploration technology. Therefore, the state should continuously increase investment in R&D, strengthen petroleum exploration technology research, do good work in the use of manpower and material resources and talent reserves, better secure China's development capacity in the field of oil and gas resources, and promote the healthy and stable development of economic development.

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