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The current situation and prospects of remaining oil distribution

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Abstract: The study of remaining oil distribution is always an important and challenging work, accurate evaluation of remaining oil. And the degree of the middle and later periods of the oilfield development adjustment tapping and the implementation of the tertiary oil recovery scheme is very important. On the basis of related literature is to study the distribution of the remaining oil method according to the professional is divided into four categories: geology, seismic method; Reservoir engineering, well test and numerical simulation method; Indoor experimental technology and process technology. This paper expounds the current situation of the development of all kinds of research methods at home and abroad, and points out the main direction of residual oil distribution study.
Keywords: Remaining oil distribution, the status quo, expectation.

INTRODUCTION

Most domestic oilfield after decades of development has entered into high water cut, high recovery degree of "combination" stage, the current average. Water rate is more than 80%, decreasing trend of crude oil output is obvious, Recovery efficiency of about 29% [1], but is, there are about 50% of the reservoir. Mining reserves, these residues in the underground remaining oil reserves to increase. Recoverable reserves and improve oil recovery is a huge potential. The root, according to the existing data, residual oil saturation has 11 kinds of [2], and a method for determining. According to the geological, seismic method are the major professional division; Reservoir engineering and try Wells and numerical simulation method; Indoor experimental technology and process technology Kinds of methods, each have advantages and disadvantages of these methods, the research should be according to the oil. Choose hide specific geological characteristics and development history

The geological method

Development geology method

The development of geology is the study of residual oil formation and distribution. And one of the main methods. This method mainly studies the structure, sedimentary Microfacies, reservoir heterogeneity and the use of pressure coring data calculation. Remaining oil saturation, mainly focus on the indirect, qualitative and static the research.

Method of sequence stratigraphy

The main content of the high resolution sequence stratigraphy research is zoned. Points such as comparison, high-frequency formed different cycle unit, sedimentary strata in the layer Sequence division is to build a framework on the basis of reservoir distribution. China's oil fields Mostly terrestrial facies reservoir, formation to the phase change fast [3], so well. Formation of an accurate comparison and time and space distribution of sand body has always been a continental reservoir. A big problem in the study Conventional contrast methods are often not small layer barriers of time and space distribution research. High resolution sequence Learn from genetic stratigraphy, can more on crosswell formation. Comparison of accurate is crosswell reservoir research analysis of seepage in the screen. The barrier and time and space distribution of sand body of important method and means at present the main. There are two research approaches, one is the key to identify and contrast of the interface, Secondly, high frequency datum transformation cycle analysis.

Earthquake technology

Industry particularity and can make the data with other. The resolution of seismic data can't compare with, is to solve reservoir characterization, Production dynamic monitoring and the remaining oil distribution to determine the ideal Method. Its function mainly reflects in two aspects: (1) to solve reservoir Sex description problem in the process of crosswell seismic data can provide more accurate Indeed reservoir morphology and the internal characteristics of the test results, help to optimize the oil Model, to improve the precision of reservoir description, thus improve the reservoir The accuracy of geological modeling and numerical simulation, and modify the development project Infill well pattern design to provide reliable basis [4]; (2) the reservoir production period Between earthquake monitoring method can detect a high-precision repeated many times quantity, and maintain

the consistency of the process, so that according to the change over time seismic response, determine the movements of reservoir stimulation effect, To understand the stimulation of the longitudinal and lateral spreading the reservoir.

Reservoir numerical simulation method

Reservoir numerical simulation is designed for oil field development forecasting. State change and effective mechanism research methods [5]. At the moment, the most oil fields are conducted using this method the distribution of remaining oil. Quantitative study, practice has proved that left determined by the numerical simulation technology. Residual oil saturation distribution was not fully reflected the researchers expected use value. This is due to the numerical simulation technology from the model itself. Speak more perfect, but the accuracy depends largely on research. The accuracy of geological modeling Reservoir geological model is in reservoir description. Based on, and reservoir description are difficult to be precise [6]. Therefore, must fully test when using numerical simulation method. About reservoir heterogeneity, truly achieve fine geologic modeling with oil Tibetan integration between simulation model, improve the accuracy of numerical simulation.

Indoor experimental technology

Indoor simulation technology is usually with the aid of modern means of science and technology (such as nuclear Magnetic resonance (NMR), etc.) using cores and oil from the actual flow in indoor test, the experiment under the simulated reservoir conditions to determine or infer that residual oil saturation. Convection imbibitions test, capillary pressure and dynamic relative permeability experiments have residual oil saturation data. But is that the index can't correspond with real reservoir recovery, etc, of this, many foreign scholars believe that the results can only be as a reference [7].

The micro seepage simulation

Micro seepage simulation technology is through the micro physical model (light - chemical etching of sandstone microscopic simulation model of glass and reality Model) on the microscopic oil displacement experiments to study microcosmic oil displacement mechanism of water flooding experiment process of the image can be either by image analysis system input in the computer for calculation, the results and the experimental process can be the entire video and dynamic analysis. Through these images of qualitative analysis and quantitative calculation, can learn more about water drive oil and other oil displacement method under different conditions of microscopic percolation mechanism, water flooding residual oil characteristics and displacement effect, thus for oilfield water injection development and eor studies provide important means.

Core analysis

Core analysis technique is used oil sheet to determine the remaining oil saturation method, is the only direct measurement method and fluid properties of reservoir rock parameters, to watered-out extent for coring Wells in areas and residual oil saturation evaluation, provide indirectly predict microscopic remaining oil saturation with the necessary parameters [8]. The technology is the key to coring inspection Wells should be sealed, the holding that can keep the real appearance of core in the ground [9]. Although it is hard to be totally sealed pressure coring operations, but is a very important data, core analysis results with the data of remaining oil saturation profile can be used as a calibration standard profile, the field research of remaining oil saturation distribution indispensable important information.

Remaining oil distribution research development direction

The distribution of remaining oil is not only affected by the formation heterogeneity factors, also affected by the flooding process, only a single subject research on formation and distribution of remaining oil has great limitation, so must be applied multidisciplinary technology, as much as possible to collect data, make a careful analysis and interpretation. Multidisciplinary integration (such as the exploration and development integration, integration development test, etc.), usually can achieve more satisfactory results and is widely used in the petroleum exploration and development, its main practice is a multi-disciplinary staff collaboration, to "high speed" passing information[10], strengthen the communication between various disciplines, close coordination, collaborative research. In liaohe oilfield in recent years the production of research using the integration method has obtained the good effect, stable oil field oil water control and sustained high and stable yield has played a very important role.

Integration of geological modeling and numerical simulation study will be the most promising technology. Determine remaining oil saturation is the core of precision, the prediction method used by, is directly related to accuracy of engineering project and cost. Economically, usually over five saturation error may not be accepted for tertiary oil recovery, while the numerical simulation technology can achieve all-around dynamic description and predict reservoir, reservoir overall solutions.

Conclusion and Suggestions

To carry out the new theories, new methods, new technology research and exploration. Various professionals to the existing on the basis of traditional theory, method and technology innovation. Development and introduction, using the latest

equipment (such as high resolution logging tool, instruments, etc.) [11] and processing technology, research and test the quality and process improvement, improve the interpretation precision. Remaining oil distribution and degree of saturation change law research, is the most important in remaining oil research is also the most difficult work, contents and more miscellaneous[12].So, analyzing the specific issues to different reservoir geological characteristics, should choose reasonable remaining oil method is determined.

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