

Reservoir Architecture Study and Prospect of Different Sedimentary System

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Abstract

Reservoir architecture since has been proposed, the scope of the study from fluvial depositional system gradually extended to the various depositional system. So far, the meandering river sedimentary system, the formation of the abandoned channel positioning, configuration interface regularly, type relationship between the quantitative research ideas; for braided river sedimentary system, and gradually improve the braided river and beach combination relations and heart beach internal configuration mode; for alluvial fan sedimentary system for underground storage reservoir configuration classification and pattern recognition; in delta front sedimentary system, fine water diversion channel internal accretion body, mouth bar interior accreted body configuration element division.

Keywords: *Reservoir Architecture; Meandering River; Braided river*

I. CONFIGURATION ANALYSIS IS PROPOSED AND DEVELOPMENT METHOD OF RESERVOIR

Reservoir essence configuration research is describe the heterogeneity of reservoir within the final for further tapping the potential of remaining oil and gas, improve the recovery of.1985 proposed configuration analysis method has the reservoir of oil and gas, the research content has undergone many changes. One is the underground reservoir from outcrop and modern the deposition, especially in dense well network condition, core, logging, well logging, seismic

and comprehensive use of dynamic data can effectively reveal the underground reservoir configuration characteristics; the second is from the comprehensive application of new means of outcrop measurement of many kinds of new techniques of simple 3D GPR (GPR) used as a typical representative the third is from the river sedimentary system; other sedimentary system, but so far, is the largest use of configuration of fluvial reservoir.

II. MEANDERING RIVER SEDIMENTARY SYSTEM

According to the hierarchical analysis method, the meandering river of fine to level 3 configuration interfaces and control the level 3 configuration body level 5 interfaces is the meandering river rock interface, interface level 4 is abandoned channel and point bar interface, the interface is the point bar lateral accretion shale interface.

(1) The research mainly focused on the architecture of meandering river point bar. At present the formation of abandoned channel positioning, configuration interface regularly, research ideas. The relationship between setting the abandoned channel positioning is through the abandoned channel development site. Recognition of point bar development position of point bar in abandoned channel as the end of signs, in the plane always close to the abandoned channel distribution, and its formation has obvious "pitting increasing convex" process, the internal side laminated tendency of abandoned channel direction. The abandoned channel is divided into sudden abandon and gradually abandoned, when the river was straightened, will occur in rapid deposition in curved river, filling the abandoned channel port. The formation of blocking the river dam, the dam is called straight dam to powder fine sand deposits. The

abandoned channel type determines the type of contact point at the bottom of the dam with the abandoned channel, suddenly abandon the abandoned channel with a mutation point bar sandstone mudstone Contact, gradually abandon abandoned channel at the bottom of the development in some sandy deposits. Logging curve, the process to abandon natural gamma curve is nearly shale baseline small jagged, gradually abandon relative amplitude slightly larger, natural potential, natural gamma curve was pines like positive rhythm response. Recognition of abandoned River on the plane, according to the single well response characteristics, statistical small layer sandstone roof interface and top interface of small layer of the elevation difference, in the plane for contour map. The elevation difference between the large and crescent shaped contour place is abandoned channel development site.

(2) Quantitative prediction of meandering river configuration quantitative prediction points for the unit of a single sand body quantitative calculation (including point bar scale prediction) and single sand body internal configuration elements quantitative calculation for single sand body, basically formed from the thickness of single sand body prediction river bank full depth, from the river bank full depth to predict river bank full width, predicting point bar. Overall, meandering river reservoir set configuration research firstly according to the abandoned channel development location and type prediction point bar location and the pattern of development, to single channel sand body thickness calculated river bank full depth, combined with river bank full width and depth of the relationship between the point bar span calculation. Then the identification of single channel point bar lateral accretion shale layer as well as under the jurisdiction of lateral accretion body, according to the related empirical formula for the prediction of lateral accretion shale angle and side product mudstone extended range and calculation of lateral accretion body in the profile and plane shape and horizontal spacing, the ultimate realization of the meandering river point bar configuration characterized in 3D space.

III. BRAIDED RIVER SEDIMENTARY SYSTEM

Braided river reservoir set configuration research have made some progress, but is still in qualitative to semiquantitative mode stage. Most of the scholars study concentrated in the heart beach development mode, the heart beach internal falling silt layer distribution, the heart beach and river connectivity aspects. According to the study of the Yongding River, summarizes the braided river sedimentary model (Figure 2):

A by vertical aggradation control coarse lithology (sand, gravel) as the main body, few fine silty clay layer, bedding structure development, horizontal transformation large vertical sequences to thin, spatially extensive distribution of positive cycle "stack pan coated sand body". The author thinks that the river and the beach is a pan even quintana, heart shoal development silting layer, different heart beach body is near horizontal flow pattern of superimposed.

At present, the braided river reservoir structure research mainly adopts a hierarchical analysis method of interface.5 configuration is braided channel with rock interface, the 5 level is the whole body configuration of braided channel interface; 4 architecture is the heart of the beach, river, river deposited, the interface between the flood plain, 4 is the heart beach body configuration configuration unit corresponding to the 3 level; interface configuration is diara internal silting layer or between the integrated interface, 3 architecture is integrated with the internal diara. At present the most used is the "vertical accretion type subhorizontal silting layer configuration mode. Ma Shizhong (2011) study of modern sedimentary heart beach Songhua River with 66 km section, summed up the different microfacies and single sand body plane combination mode. It is considered that the braided river is divided into river and heart beach 2 kinds of sedimentary micro environment, further subdivided into activities (including the heart beach gully, ridge, trough), river

activities (including the main river Steep slow beach gentle heart and retention, river, stream, cutting, early channel, abandoned channel, abandoned beach heart bottom. According to the modern geomorphology the heart beach into in-situ beach, migration of beach, beach, beach cutting and abandoned beach heart, the heart beach progradation stacking pattern (Figure 3), the same of braided river ancient outcrop studies proposed overall steep angle progradational stacking mode peace progradational stacking mode, the beach as a whole steep angle progradational superposition model is completely different from the past nearly horizontal stacking mode. Believe that the existence of the anti - "s" type downstream product, the dip gently or 2 kind of possibilities.

Although in braided river reservoirs set configuration research has made great progress in recent years, but of braided river and beach space combination style, inside the heart beach fall silt layer distribution range still needs further exploration. For quantitative prediction, braided channel width and depth and no good correlation and quantitative predictions of the heart beach scale there is no correlation model is proposed. But many scholars still tries to from the river width, heart beach width, average river width, average heart width of the beach and river bifurcation coefficient, the river and the volatility parameters of correlation research, expect to be able to achieve the architecture elements of quantitative prediction.

IV. CONCLUSION

Since 1986 the reservoir architecture analysis method has been introduced into China for more than 20 years, configuration analysis method has made a great development in the domestic reservoir, formed by the analytical hierarchy process as the main line, comprehensive utilization of various data, reservoir architecture by using research methods of new technology and new means of storage. China's continental reservoir rocks however, for different continental sedimentary system reservoir structure research is developed. The formation of meandering

river and gradually improve, further exploration of braided river sedimentary system, other succeed development trend. The meandering river is the most perfect depositional system, mainly focuses on the point of dam. Although it can point bar and inner side layer the scale of quantitative prediction, but a lot of work is to put forward the level echelon model based on the lateral accretion layer. In addition to lateral profile and spatial distribution range of mudstone prediction needs further work. Different from the meandering river, braided The braided river sedimentary system, exploring the process is still in qualitative to quantitative. Although many scholars have proposed to study the reservoir architecture model to guide underground braided river reservoir, but the braided stream plane development position accurately predicted, diara and braided channel combination relations, the heart beach in tribal and layer distribution range. The problem with integrated internal diara scale prediction are still worthy of exploration. The alluvial fan sedimentary system is due to gravity flow and traction mechanism coexist, it is difficult to identify the configuration of the interface itself, how to put forward better guidance on classification and pattern recognition of configuration is an urgent task. The front delta system configuration mode is relatively simple, of 3 3 level interface identification and configuration distribution and scale issues are not perfect. Different sedimentary system based reservoir research trend is mainly reflected as follows:

(1) The implementation of the use of new techniques, including the use of ground penetrating radar in outcrop on the application of high precision 3D seismic and borehole seismic in the reservoir;

(2) Study on the relationship between the residual oil layer with the configuration of the reservoir, especially from the form of different configuration mode reasonable wells;

(3) Different configurations in the development process of the dynamic response characteristics of especially large development measures (fracturing, acidizing, etc.) on the interface configuration dynamic transformation. China's continental reservoir layer

type diversity, refine each type of storage configuration model and explore the configuration method of set is still the main tasks of today after a long period of time.

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