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Sedimentary system and its effect on sand body of Heidimiao Reservoir of PX Oilfield

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Abstract: Depositional system analysis is an important part of basin analysis,also, it is the foundation of sequence stratigraphic research, and of important significance for understanding the evolution of the basin. It plays an important role in studying distribution of sedimentary facies, reservoir evaluation and hydrocarbon accumulation. According to the well logging data and core data analysis, the sedimentary system is a complete and typical contraction system domain, the sedmentary microfacies it mainly develops are underwater distributary channel, debouch bar and sheet sand. Combined with the north provenance, the northern sedimentary system decided that the sand bodies in the north region of the study area are more developing. Also, the area that river flowed has a great scale.

Keywords: Depositional system, sedimentary facies, reservoir evaluation, hydrocarbon accumulation.

INTRODUCTION

The concept of depositional system was first introduced to sedimentology. in late 1960s by Fisher *et al*. [6]. Sedimentary system is a three-dimensional lithofacies assemblage [6], which is related to the formation of sedimentary environment and sedimentary function. Deposition system consisting of two or more than two related deposition processes is a sedimentary system group. Such as alluvial fan system, river system, delta system, shelf system, it constitutes a complete set of depositional systems from the continental environment, the transitional environment to the shallow water environment. Basic unit is faces and faces suite. As the changes in the vertical, sedimentary system (Group) in a unconformable surface defined stratigraphic system that constitutes a complete sedimentary basin filling block, basin formation, filling and evolution history of the product, it reflects the evolution of basin tectonic background and nature. Therefore, the study of sedimentary system is the base of the study of sequence stratigraphy, which is of great significance to understand the evolution of the basin [1-2].

The N3 period is a continuous process of water withdrawal, and the sedimentary system is a complete and typical shrinkage system. With the declining of sedimentary base level and the capacity of river supplyment increased, the development trend that depositional system changed from sublacustrine fan turbidity sedimentary systems to the delta system,which caused by delta system continuously moved to the middle of the lake expansion formed. The sedimentary environment is also composed of deep lake, semi deep lake, shallow lake and delta plain facies. The lithology is obviously increased from the bottom to the coarse clastic material, and the whole reverse cycle [3].

The sedimentary faces of N3 sections are mainly dominated by delta front sub facies, which can be divided into estuarine sand bar, delta front sheet sand and underwater stream channel.

- Estuary sand dam: estuarine dam monolayer thickness is greater than 3.0m, siltstone and fine sandstone, visible large scale cross bedding, ripple bedding and horizontal bedding and the electric logging curve is part of the Sandy Rock accounted for a larger proportion of the funnel type or box type (Figure 1)

- Delta front sheet sand: with reverse cycle characteristics, the bottom of the sequence is black mudstone, and the top is Sandy Rock. Mat shape sand layer thickness is generally less than 2.0m, visible ripple bedding, horizontal bedding and the electric logging curve is Sandy Rock for little proportion of funnel type (Figure 2).

- Underwater diversion channel: the upper part of the lower part of the river channel, also known as the underwater branch channel. In the process of sea stretching, the river channel is widened, the depth decreases, the bifurcation increases, the velocity of the flow slows down, and the accumulation rate increases. Sediment

to sand, silt based, little mud. Often the development of cross bedding, wavy bedding and scour - filling structure, and tectonic deformation layer. The vertical flow profile is a lens shaped, and the lateral is changed into fine-grained sediments. The electric bell curve for bottom mutation. (Figure 3).

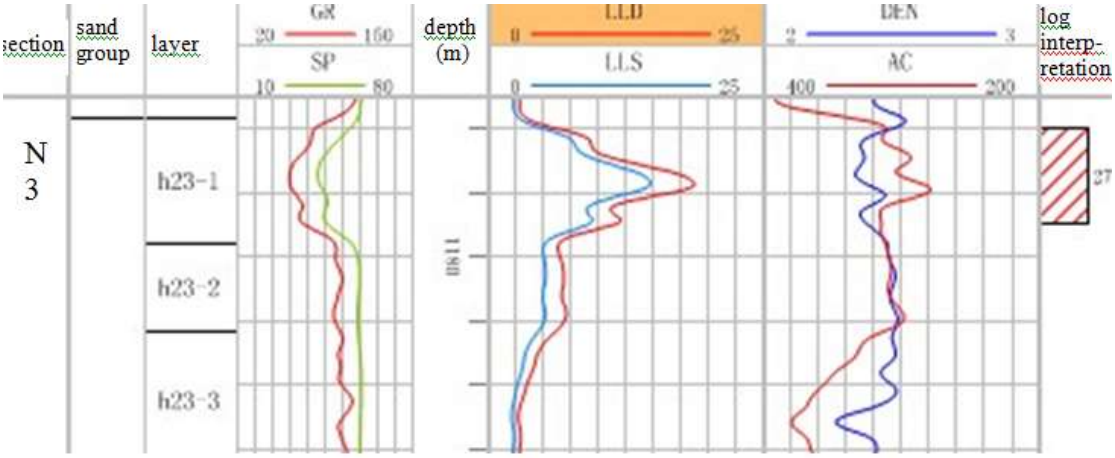

Fig-1:Typical curve of estuary sand dam

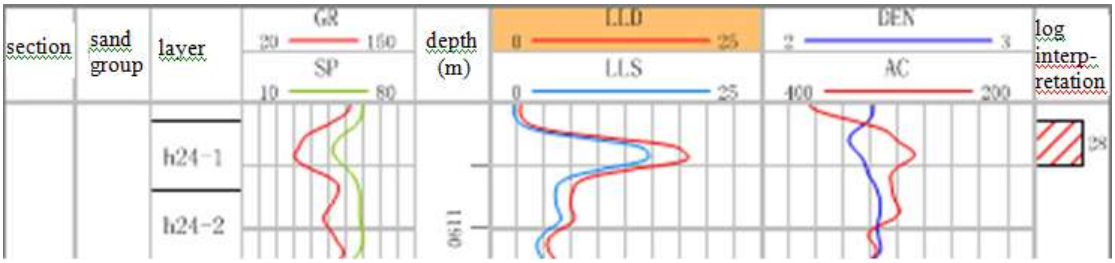

Fig-2: Typical curve of delta front sheet sand

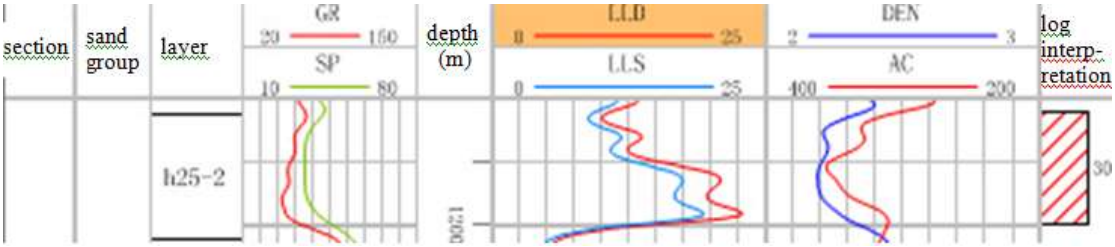

Fig-3: Typical curve of underwater diversion channel

Single well facies analysis

The H2 group of Heidimiao Reservoir belongs to the third member of Nenjiang Formation, it has three obvious reverse cycle that formed bythe black, gray and black siltstone and silty mudstone, argillaceous siltstone, silty sandstone, fine sandstone constitute. The electric logging curve is composed of several funnel type curve, its top boundary is a "small triangle" type curve, the bottom is tender the second paragraph at the top of the toothbrush top or the third anti cycle which is black mudstone .(Figure 4)

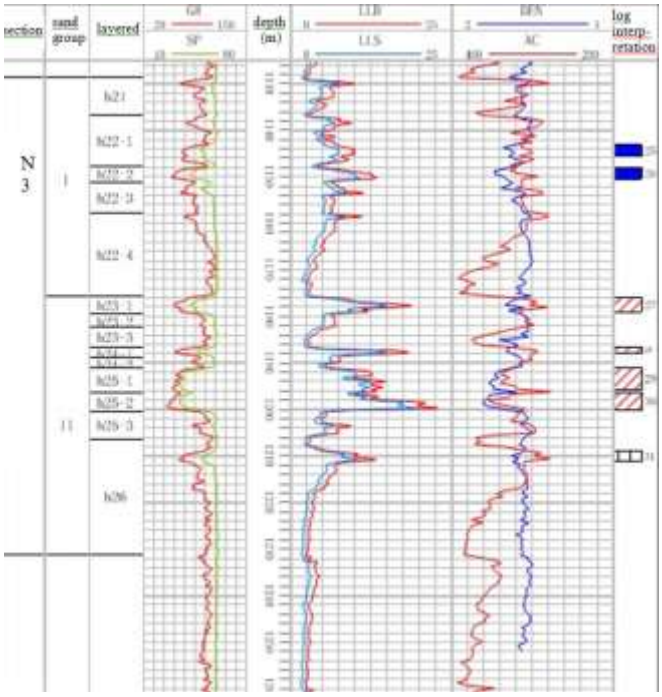

Fig-4: Comprehensive histogram of Heidimiao reservoir

The control effect of sedimentary system on sand body

Combine with the north provenance, the supplyment of the sand body in the study area is from the northern part, and there is no phenomenon of sand body formation due to the direction of sediment from different sources. The source of sediment is north, so close to the source of the place, the water load capacity is strong, so the thickness of the sedimentary sandstone is great [4-5].

Study area mainly developed delta front sedimentary system, divided into shunt channel sand body types for the estuary sand dam, triangle delta front sheet sand and water, estuary sand dam with high sand content, deposition thickness of the sand body is relatively large, sheet distribution wide and small thickness. (Figure5)

CONCLUSIONS

- Comprehending the drilling data and logging data based on that study area, it mainly developed delta depositional system: N3 sections dominate delta front sub facies. According to different sedimentary characteristics. It can be divided as the estuary sand bar, triangle delta front sheet sand and underwater diversion channel.
- In combination with the characteristics of the sediments from the north, the northern part of the study area is more development.
- In the study area, channel face has the most developed sand bodies, and the second is the mouth bar.

REFERENCE

1. Jianxin, X., Fenjin, S., & Naixiang, H. (2008). Permian Shanxi Formation and Member 8 of Xiashihezi Formation in Ordos Basin: Palaeogeography and catchment area for sediments derived from north and south provenances. *Journal of Palaeogeography*, *10*(4), 341-354.
2. Chaoyong, W., Mengjin, C., & Zecheng, W. (2007). Sedimentary facies of the Shanxi Formation and Member-8 of Xiashihezi Formation of Permian in southern Ordos Basin. *Journal of Palaeogeography*, *9*(4), 369-378.
3. Yulin, S., Yinghai, G., & Zhuangfu, L. (2006). Sedimentary facies of the Shanxi Formation and Member 8 of Xiashihezi Formation of Permian in Suligemiao area, Ordos Basin. *Journal of Palaeogeography*, *8*(1), 53-62.
4. Cao, J., Tan, X. C., & Chen, J. S. (2004). Sedimentary facies and their evolution characteristics in Jialingjiang Formation of Jianwei Area, Southwest Sichuan Basin. *Geol J China Univ*, *10*, 429-439.
5. Zhen-kui, J. I. N., Xiao-zhang, S. H. I., & Miao, H. (2010). Identification methods for single-channel sand body. *Xinjiang Petroleum Geology*, *31*(6), 572-575.
6. Fisher, W. L., Brown Jr, L. F., Scott, A. J., & McGowen, J. H. (1969). Delta systems in the exploration for oil and gas.