DOI: 10.36347/sjebm.2017.v04i04.006

Scholars Journal of Economics, Business and Management e-ISSN 2348-5302

Sch J Econ Bus Manag, 2017; 4(4):269-272 p-ISSN 2348-8875

(An International Publisher for Academic and Scientific Resources)

Stratigraphic Division and Comparative Study of Yanchang Formation in Pingbei Exploration Area

SHI Hao, LIANG Shun

College of Petroleum Engineering Institute, Northeast Petroleum University, Daqing 163318, China

*Corresponding Author
SHI Hao
Email: 806511672@qq.com

Abstract: The extension of the Pingbei exploration area is an important oil and gas replacement area of Xingzichuan oil production plant. The drilling and logging, logging and logging analysis are used to select the Shijiazhuang shale and Zhangjiatan shale as the stratigraphic contrast mark layer, The comparison and division of the strata of the extension group in Pingbei exploration area were carried out by using the method of cyclic rotation.

Keywords: Stratigraphic division; Stratigraphic contrast; Yanchang formation; Pingbei exploration area

INTRODUCTION

For a long time, the main development level of the Xingzichuan oil production plant are Chang 2 and Chang 6 oil layer groups. With the deepening of the development, the oil production is decreasing year by year, and it is very important to find the oil and gas replacement area [1]. The Chang 8 and Chang 9 reservoirs in Pingbei Exploration Area of the oil field have good exploration yield in recent years and are expected to be an important supplementary reservoir. Therefore, it is of great significance to carry out comprehensive geological research in this area. The stratigraphic division is the basic content of geological comprehensive research. In this paper, the stratigraphic division and comparative study are carried out by selecting the regional marker layer, using the cyclic contrast method, combined with the core, logging and logging, and provide the geological basis for the reasonable and effective development of the oilfield.

GEOLOGICAL BACKGROUND

The structural location of the Pingbei exploration area of the Xingzichuan Oil Production Plant is located in the middle of the northern slope of the Ordos Basin. The slopes are in the east and west, with a very low inclination of less than 1o and an average slope of about 8 ~ 10m / km, Due to the role of different compaction, local nasal uplift. In this study, the characteristics of the regional tectonics are basically inherited from the east to the west, and the strata are gentle and slightly raised from the east to the west. The strata are easy to compare with each other [2].

BASIC FEATURES OF FORMATION

The study shows that the extension area of the study area can be divided into five groups (Chang10 ~ Chang1), and the main target layer in Pingbei area is Chang 8 and Chang 9. The stratigraphic specific division is shown in Table 1, and the main reservoir characteristics of the area are described as follows:

Chang7：The thickness is between 70 ~ 90m, the lithology is mainly mudstone, silty mudstone and argillaceous siltstone, local and gray fine sandstone was uneven layers. The section of the development of thick 5 ~ 10m mark layer "Zhangjiatan shale", electrical characteristics of the gamma, sound waves and natural high value, while the resistivity is low.

Chang8：The thickness is between 80 and 100 m, and the lithology is mainly gray sandstone, which is the interbed of fine sandstone and mudstone. Because of the delta front facies, the thickness of the sand body is small, the electrical performance is the natural potential deviation, Gamma is pointer-like.

Chang9：The top of the oil group is "LiJiaPan shale", the thickness of 70 ~ 90m between the lithology to black shale, oil shale-based, the bottom of the development of gray sandstone, local green, purple. Electrical performance on the high gamma, the natural potential deviation of mudstone baseline, more straight.

Chang10：The oil group is composed of coarse sandstone and gravelly sandstone. The sedimentary facies are fluvial facies, the lithology is magenta, and the visible lens is sandstone, parallel bedding and interlaced bedding. The bottom of the oil group see "massive sandstone", the electrical characteristics of the natural potential for the performance of large bell-shaped, box-shaped, resistivity was pointed high value.

Table 1: Pingbei area stratigraphic table

system	series	group	section	Reservoir group	Reservoir subgroup	Logo layer and number
Fourth series Jurassic						Loess layer
Triassic	Upper series	Yanchang group	Fifth section （T3y5）	Chang1		WaYaoBao Coal Stratum（B3）
			Fourth section （T3y4）	Chang 2	Chang 21	Each layer boundaries are： High natural potential High gamma mudstone
					Chang 22	
					Chang 23	
				Chang 3		
			Third section （T3y3）	Chang 4+5		XiBoZi section（B2）
				Chang 6	Chang 61	Mudstone（S1）
					Chang 62	Porphyry（S2）
					Chang 63	Porphyry（S3）
					Chang 64	Porphyry（S4）
				Chang 7		Zhangjiatan shale（B1）
			Second section （T3y2）	Chang 8		
				Chang 9		LiJiaPan shale（B0）
			First section （T3y1）	Chang 10		

STRATIGRAPHIC DIVISION AND COMPARISON

Stratigraphic contrast method

The stratigraphic contrast mainly uses the marker layer control, the deposition cycle to divide, the thickness map and the structural map test method. The "ZhangJiaTan Shale" and the "LiJiaPan Shale" in the Chang 9 oil group were studied as the good regional marker layer, and the backbone profile of the marker layer was compared with the stratigraphic comparison. In the process of partitioning, it is necessary to consider the characteristics of lithology and electrical properties, and then compute the stratigraphic map and stratigraphic thickness map, and repeat the stratigraphic division [3].

Logo layer

This comparison of the logo layer used mainly B0, B1, B2 three marker layer, its characteristics are as follows:

B0 marker layer is Chang9 "Lijiapan shale", the lithology is mainly dark, black shale, oil shale, local sandy siltstone, its first discovered in Lijiapan area, hence the name. The stratigraphy has a certain change in color and lithology in the transverse direction, but the overall performance is low resistance. It is the sedimentary strata of the largest lake in Chang9 oil group. It usually includes 3 to 5 thin layer shales with low electrical characteristics Resistance, high gamma and sound waves (Figure 1).

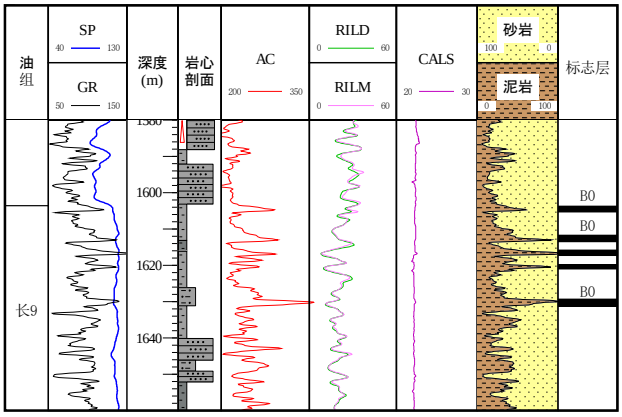

Fig-1: B0 marker layer

The B1 mark layer is Chang7 "Zhangjiatan shale", which is the typical marker layer of the Ordos Basin. The extension of the oil field through the unified stratification, the "Zhangjiatan shale" development location has a clear description, that is, the southwest is at the bottom of Chang7, the middle is located in the middle of Chang7, Pingbei area is the middle of t Chang7. The sedimentary facies are mainly deep lake facies and shallow lake facies, and the delta development range is smaller. Deep lake phase oil rock quality is the best, are partial muddy mud type, shallow lake phase oil shale oil content is low. The logo layer in the area of development in general, but the thickness of stability, usually about 5m. In the electrical performance of the typical "three high and one low" features, namely, high gamma, high sound waves, high natural potential and low resistivity (Figure 2).

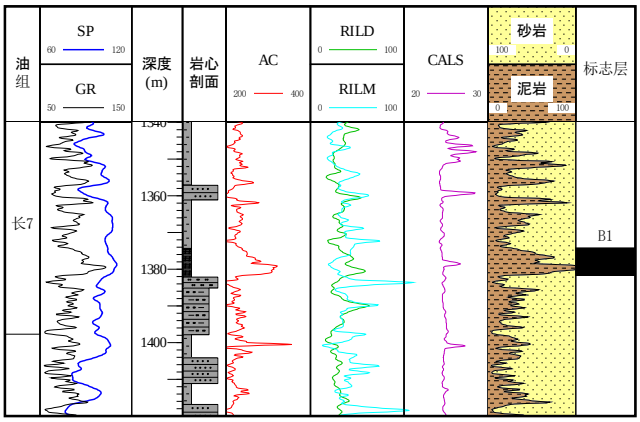

Fig-2: B1 marker layer

In addition, this time also selected in this area is more developed B2 mark layer, the sign layer lithology for the point of rock, the distribution of the region is stable, generally in the B1 mark above the 50m range, by a few thin spots off Rock composition, electrical properties show high acoustic time difference, high natural gamma, medium to low resistivity characteristics, often transitional mudstone, silty mudstone.

Stratigraphic boundaries

The purpose of stratigraphic comparison and division is to determine the geological boundaries of different strata and oil groups. By selecting the marker layer and performing the cycle comparison, the boundaries of different strata in this area are obtained.

Chang6, Chang7: Chang6 and Chang7 oil geological boundaries for the B2 mark layer, that is under the symbol layer Chang7, the upper part of Chang6.

Chang7，Chang8: Chang7: Chang7 and Chang8, the boundary of the reservoir is mainly B1 mark layer, the sandstone bottom under the mark layer is the boundary, the lower part is Chang8 and the upper part is Chang7, which is about 20 ~ 30m away from the B1 mark layer.

Chang81, Chang82: Chang8 reservoir is divided into two sub-layers of Chang81 and Chang82. The internal electrical curves of Chang8 reservoir are characterized by two characteristics, namely, the upper and upper mudstones are high gamma and acoustic time difference, so it is divided into Chang81, Chang82.

Chang82, Chang91: Chang82, Chang91 mainly to B0 mark layer as the boundary, this will be above the B0 logo layer is divided into Chang82, and the logo layer as Chang91.

Chang91, Chang10：The study shows that at the bottom of the Chang 9 oil reservoir, a stable Hupoian mudstone is developed, which is the first large-scale lake flood event in this area after the decline of the base plane. Therefore, the mudstone is set as the boundary of length 10 and length 9. The study shows that the upper and lower layers of the interface show different lithological and electrical characteristics, and the stratigraphic structure and sedimentary environment are different.

CONCLUSION

The B0, B1 and B2 marker layers were selected and the stratigraphic strata of the extension of the Pingbei exploration area in the apricot seed oil extraction plant were divided by the sedimentary cycle. The geological boundaries of the different reservoirs were determined and the reliability of the comparative results was confirmed by reciprocal verification. The rational and effective development of reservoirs provides an accurate geological basis.

REFERENCES

1. Mingcheng L. Oil and Gas Migration (3rd Edition) [M]. Beijing: Petroleum Industry Press, 2004; 157-160.
2. Wenzheng Z, Hua Y, Jianfeng L. Al Study on the dominant role of high - quality oil - source rocks in the accumulation of high - permeability oil and gas in the Chang 7 segment of Ordos Basin - analysis of the characteristics and mechanism of strong hydrocarbon expulsion. Petroleum Exploration and Development. 2006; 33(3): 289-293.
3. Wenzheng Z, Hua Y, Tang FJ. Development mechanism of high - grade source rocks of Chang - 91 lake in Ordos Basin. Chinese Science Series D (Earth Science). 2007; 37 (S): 33-38.