

Sedimentary Facies Research of Combination of Well Logging and Seismic

Zhong Dan¹, Shi Dan¹, Ren Jieping²

¹College of earth science of Northeast Petroleum University, Daqing, Hei Longjiang, China

²Southwest Petroleum Engineering Branch Company Linpan drilling, Linyi, Shandong, China

*Corresponding Author:

Zhong Dan

Email: zhongdan920114@126.com

Abstract: Based on the sedimentary facies map with well data, the prediction accuracy can not accurately describe the exact location of the sand bodies. Inoue information has a high vertical resolution, seismic information can reflect the distribution of geological information in the plane, with a certain horizontal resolution, well seismic combination of sedimentary facies fine description of the sand body distribution and river distribution patterns, and combined with well data to verify the relationship between the wells sand body, so as to obtain more accurate geological information, more effective to achieve the plane sedimentary facies characterization, to provide the basis for further production and development.

Keywords: Sedimentary facies belts graph; well seismic combination; Sand body distribution; Oil field development.

INTRODUCTION

The study area mainly developed river controlled shallow water delta plain subfacies, microfacies distributary channel, crevasse channel, inter distributary bay, flood plain mud etc., so well and seismic data combined with the main goal is identification of the channel.

PRINCIPLE OF WELL SEISMIC COMBINATION

The guiding principle mainly includes the following points:

1. Well data is the key of the work as hard data with high reliability and accuracy [1]. Well when combined, to give full play to the function of the data in the "hard data", the seismic data is only a supplementary role, mainly in the inter well regions to give guidance and prediction, seismic well work should be combined with sedimentary microfacies argument in well based on the basis of sedimentary microfacies plan.

2. The upper delta plain mainly delta sequence, there are mainly land distributary channel sand body, the bay between distributary inter channel, crevasse channel microfacies composition and so on; At the same time the development of underwater distributary channel, also water distributary channel, underwater distributary inter channel can appear in same between bay microfacies such as [2]. If local well purpose layer deposition is mudstone, but in this big background, the underwater distributary channel microfacies is understandable. Therefore, reflect on seismic information for low-value display area can also be developed sand bodies.

3. Earthquake information uncertainty, the impact factor is more, need to comprehensive analysis and consideration.

Fault development in the study area, affected by fault shielding effect near the faults development regional seismic reflection characteristics exist uncertainty, lead to sand body prediction effect exist error; Part of the horizon in the study area relatively thin sand body, when the earthquake information extraction, the window size is difficult to grasp, it is easy to appear when wear phenomenon, cause lack of geological information [3].

Sand bodies of this difference makes use of seismic information on channel sand body has certain uncertainty, when the seismic attributes to some extent, can reflect layer sand body development, but on the whole characteristics of river channel sand body distribution, seismic attribute analysis, as a kind of qualitative forecast method, multiple solution resistance, can be predicted to a certain extent, plane distribution of sand body characteristics, needs and matching using quantitative seismic inversion sand body prediction method.

PREPARATION METHOD OF WELL SEISMIC COMBINED SEDIMENTARY FACIES DIAGRAM

Well shock combined with sedimentary microfacies and argues the main method is "image stack legitimate", is based on the well sedimentary microfacies and seismic information chart are superimposed, in view of the composite river area development zone, by identifying the weak reflection on the overlay area, to set split and merge the location

of the compound channel; In view of the river area development zone, identify the composite not covered by the river of strong reflection on the drawing area, in view of the strong reflection area of further research.

Because the factors that affect earthquake information very much, in addition to related to lithology, and physical properties such as porosity, permeability, shale content, there is a close relationship between oil saturation and so on, so in the application of seismic information to guide the inter well sand body prediction, we carefully judge, identify due to the lower sandstone thickness thicker on the seismic information highlighted area, avoid shock misled when combined with the well [4]. According to the well combined with the thinking of planning of sedimentary facies, and utilization of information inoue, inversion and attribute information of objective interval display information more detailed research; finally determine the purpose of sedimentary facies sandstone groups.

ANALYSIS OF SEDIMENTARY FACIES DESCRIPTION RESULTS

During the sedimentary period of Fuyu reservoir in the study area, the basin has experienced the filling process of the progressive accumulation and rapid accumulation and stable accumulation. The depositional environment has experienced the evolution process of shallow lake delta plain, front delta front and shore shallow lacustrine facies [5]. Regional perspective, provenance from the southwest, Southeast and north 3 directions, the study area is mainly affected by the southwest provenance effect. The sand body reservoir in distributary channel and crevasse splay facies deposition, the sandstone sedimentary microfacies characteristics.

Second rotary formation in the lower part: with the progradation intensifies, phenomenon of surface and underwater alternate deposition, located in the south of Changchunling anticlinal zone, Yumin and mint sets, and to turn the Tun in most parts of the water, developed delta plain water distributary channel, flood plain and must export channel [6]. In the southwest of the development of the two main river, north, North East direction;

In the upper part of the two groups, the accumulation is further aggravated. The majority of the study area is located in the water, the sedimentary environment is the delta plain facies, the main development diversion channel and flood plain sedimentary microfacies. The river channel is in the direction of the north and South or the north east direction.

Help a group of lower reservoir: progradation reached its peak and begin to retrogradation and lake transgression range began to expand, research area is still in the water, development of water distributary channel, crevasse channel and flood plain, river in Northeast strike mainly to the north-east direction, the

size of channel to start small.

Helped a group of middle part of formation: inherited the sedimentary characteristics of the lower part of the back deposition increase, shoreline southward migration, in the northern part of the area for further expansion, the development of underwater distributary inter distributary channel and bay, local recurrence in small sand sheet; South to shunt channel, crevasse channel and flood plain microfacies mainly, the river to the North East and north-south direction.

In the upper part of a group of reservoirs: the further expansion of the lake water, the end of the stage reached its peak, the sedimentary microfacies of the delta front of the underwater diversion channel, the flow of the gulf between the main, the thickness of the sandstone is thin, and the plane distribution is not stable, the river channel is small, the direction of the North east.

CONCLUSION

1. Based on the sedimentary facies map with well data, the prediction accuracy can not accurately describe the exact location of the sand bodies. Inoue information has a high vertical resolution; seismic information can reflect the distribution of geological information in the plane, with a certain horizontal resolution.

2. Well seismic combination of sedimentary facies fine description of the sand body distribution and river distribution patterns, and combined with well data to verify the relationship between the wells sand body.

3. Obtain more accurate geological information, more effective to achieve the plane sedimentary facies characterization, to provide the basis for further production and development.

REFERENCES

1. Jishun, L. (2011). The application of seismic sedimentology in Xingshugang oilfield Fuyu oil layer. *Science, Science technology and engineering*, 11(11): 2569-2574.
2. Yanlei, D. (2008). Seismic sedimentology study of the Qinan sag in huanghua depression Paleogene sand sequence. *Journal of sedimentary*, 26(2): 234-240.
3. Zhen, L. (1997). The reservoir seismic stratigraphy. *Beijing: geological publishing house*, 6-14.
4. Meihou, Y., & Wei. (2005). New understanding of seismic resolution. *Journal of petroleum geophysical prospecting*, 40(5): 603-608.
5. Jun, C. (2001). Application of seismic attribute analysis in reservoir prediction. *Petroleum exploration*, 40(3): 94-99.
6. Lingyun. (2003).The application research of basic seismic attributes in sedimentary environment interpretation. *Oil geophysical prospecting*, 38(6): 642-653.