Scholars Bulletin
(A Multidisciplinary Journal)
An Official Publication of "Scholars Middle East Publishers",
Dubai, United Arab Emirates
Website: http://scholarsbulletin.com/

ISSN 2412-9771 (Print)
ISSN 2412-897X (Online)

Interlayers identification standards and interpertation of Toutai oilfield's Fuyu reservior M10 block

Wang hao[1], Ma shizhong[1], Wang zhao[1]
[1]College of earth science of Northeast Petroleum University, Daqing, Heilongjiang, China.

***Corresponding Author:**
Yasir Nawaz
Email: light50@qq.com

Abstract: Interlayers commonly found in the river sand inside, by studying how it is formed, for the restoration of river sand deposition process, reservoir genetic mechanism has an irreplaceable role. Based on the principle of sedimentology analysis, interlayers and sand body is the product of a certain deposition, both closely integrated into a unified whole, by studying the causes interlayers can be assisted genesis of reservoir sand bodies. Different types of channel sand bodies have different internal configuration, the underground reservoir sands internal structure is difficult to directly study, such as changes in its occurrence is difficult to identify, and interlayer is relatively easy to study. Thus, the sand can be studied by studying the interior configuration thin interlayer. Because of its low permeability or permeable, interlayer flooding on oil displacement agent has a certain shielding effect, interlayer internal fluid reservoir seepage can play spoiler, limiting the role. Channel sand reservoir characteristics can be changed according to their internal Interlayer displacement path, influence displacement efficiency, thereby affecting the inner layer of remaining oil distribution, especially for high water cut stage remaining oil distribution in complicated situations, interlayer study can effectively guide field development.

Keywords: interlayer identification, reservior, internal structure, remaining oil distribution.

INTRODUCTIN

Fuyu reservior in Daqing toutai oilfield is the part of the field - an extension of the delta sedimentary system, belongs to low porosity, low permeability, fractured reservoir. Since 1993, water injection efficiency is poor, the lower the degree of recovery, crack distribution complexity, lack of reservoir sand bodies internal heterogeneity know, restricting oil adjust tapping [1-4]. This area for reservoir evaluation and reservoir sand bodies recognize the difficulties inside, a more detailed description of the basis of logging data closely, logging, testing oil and information on testing, by core analysis data, explore rock matching the corresponding laws of electricity, optimize sensitive parameters to develop a model for reliable interpretation pore mezzanine study area, for the guidance of further field development and oilfield's "increase reserves and build capacity" lay a solid foundation.

Interlayers identification standards established

Interlayer logging response characteristics

Interlayers are acting on the fluid reservoir that could play the role of the rock shelter. Usually people call this small layer between rock as compartment, however, people call this small layer in rock as interlayer. Compartment is locking layer or barrier diffusion layer, which is the non-permeable layer of reservoir that can prevent or control of non-permeable layer of fluid movement, general thickness variation is large, distribution is relatively stable, and which is the important geological basis of reservoir development division layer system. Since exploratory data analysis of the specific lithology data and thorough dissection enough, it did not accurately reflect the characteristics of the sandwich core material. Through the study area 392 exploratory wells is to identify the specific characteristics of the sandwich especially large channel sand body dissection, understanding and summary, the results of three types of mezzanine specific features and differential identification standards [5].

Muddy interlayers: log response primarily reflecting shale characteristics, distribution within a relatively wide range of other layers sandwich, the highest frequency.

Specific identification method

using micro-electrodes, micro-gradient control-oriented, with the natural gamma, the depth of bilateral, acoustictime other comprehensive judgment, muddy interlayer showed the return value of the micro-micro-potential curve gradient position, the higher natural gamma, deep low resistivity, sonic difference is relatively high, generally accompanied expanding.

Calcareous interlayers: distribution with a strong random frequency of occurrence is relatively small. Natural potential curve anomalies, microelectrode curve showed a high value spike-shaped, with the micro-micro-potential curve gradient overlay, spike-like acoustic time low. Specific identification method: with RMG, RMN based, to assist with GR, AC and so on. Interlayers has poor electrical conductivity, high density, low permeability, so the logs showed deep lateral resistivity is higher than or close to the reservoir resistivity curve spike microelectrode small amplitude acoustic time difference and obviously low character.

Physical properties interlayer: higher clay content, complex nature. Articles of curves are between calcareous interlayers and argillaceous interlayers. The frequency of occurrence is not high. Microelectrode curve amplitude is low, there is a certain amplitude difference, acoustic time low. Specific identification method：with RMG, RMN（return value） based, to assist with GR, LLS, LLD, AC and so on, and then get on comprehensive Identification. The clay content of interlayers is also high, but contains sand, gravel or oil spots, so complex in nature. Its log characterized microelectrode curve between mudstone and calcareous layer, there is a certain difference of magnitude lower deep lateral resistivity [6].

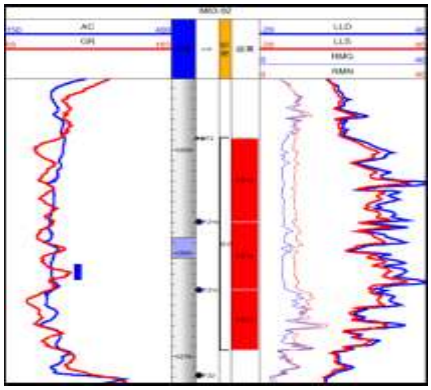

Fig-1: Muddy interlayer of well Z63-921

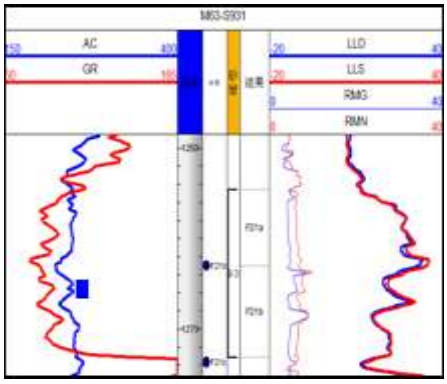

Fig-2: Calcareous interlayer of well Z63-S931

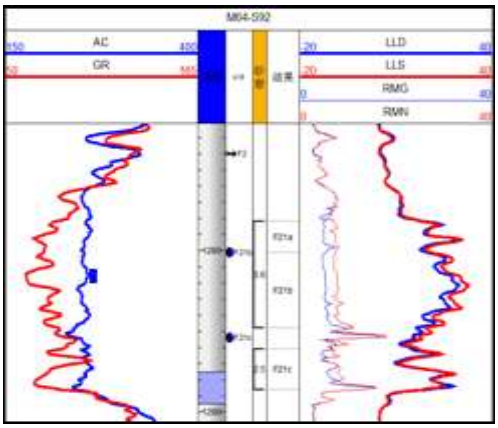

Fig-3: Physical interlayer of well Z64-953

Curve value return and take the measure of the thickness of the interlayer

The extent of the rate of return is the return of the curve, which is the reaction of the lithology change, it's the size of the reaction of the lithology mutation degree, identification of reservoir heterogeneity and reservoir identify differences in the internal structure of dissection geologists process, the degree of accuracy of the results return performance ease of interpretation [7]. According to the region's fine study compared 392 exploratory wells to draw sandwich thickness and curve return relationship:

- Microelectrode return or rising curve display, you need to deduct, from the point deduction is the microelectrode log turning point; if microelectrode response is not obvious, there is a marked increase in the lateral curve or return, but also to be deducted;
- Microelectrode (sideways) curve degree returnees reach 1/3 of the amplitude difference deducted, top and bottom boundary determined by the inflection point;
- 3.Abnormal calcium sandwich on microelectrode curve, according to the inflection point of the curve of deduction;
- Natural gamma curve has obvious mezzanine display, but the return of magnitude less than 1/3, the other curves corresponding display no obvious, think that this is due to changes in permeability, without deduction;
- Top (bottom) graded layer, laminated on the ramp from the deduction at the interface slightly potential (lateral) under demi-point or turning point (on) 0.1 ~ 0.2m place;
- Mutation bottom layer, laminated from deduction at micro potential turning point [8].

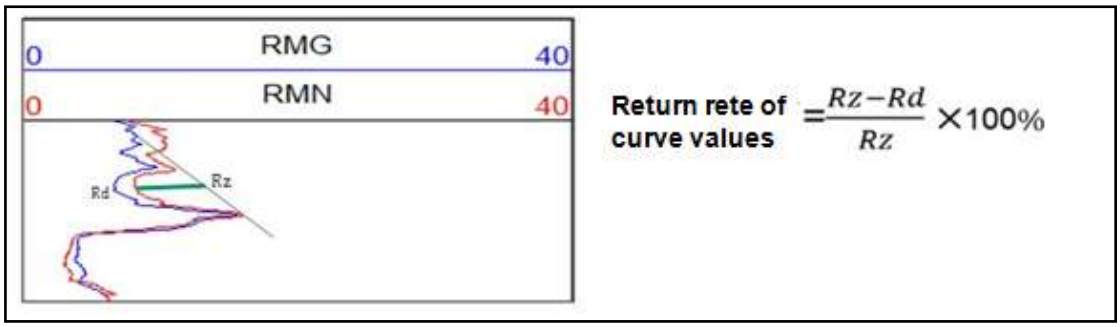

Fig-4: Solving principle of return rete of curve values

Establishment of the interlayers identification standards

Through the identification of cores accurate lithology in the study area with exploratory wells Z61-S89 reservoir water availability comprehensive statistical histogram, combined with logging's measuring response, for different lithologies interlayer, mainly the measure of interlayers in single sand body. (Formula: returnees degree = Rz-Rd / Rz × 100%) [9]. Comprehensive identification of silty mudstone and muddy siltstone interlayer sandwich altogether with six points. Core values interlayer degree of return is up to 44% and the smallest return degree of the interlayer is muddy siltstone interlayer which is 17%. According to the vertical distribution of the sandwich and the sandwich concrete barrier effect of a single sand body of water inside, ultimately determine the extent of the return of the sandwich interpretation standard is 17%, and explain 392 wells of full research area [10].

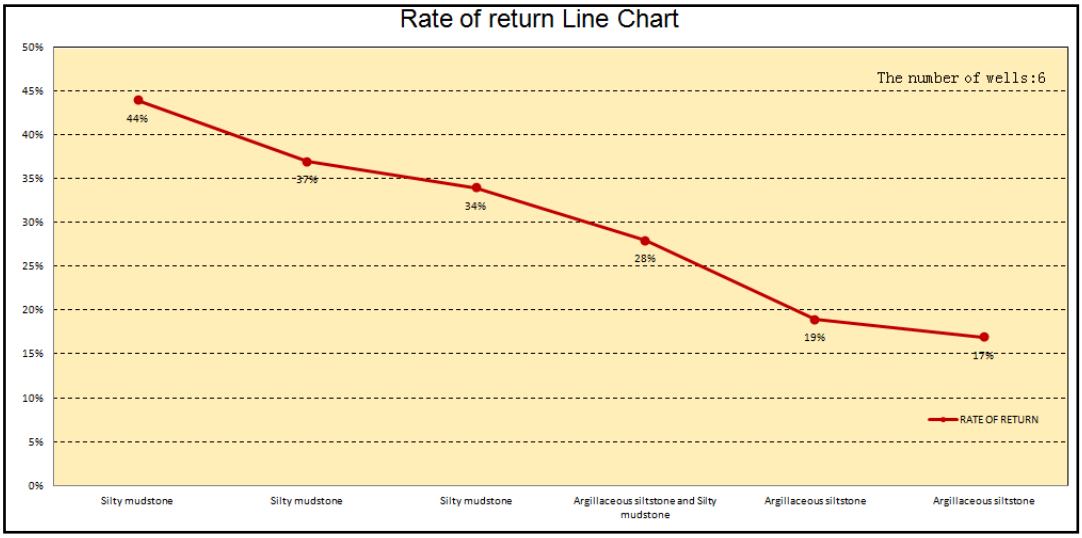

Fig.5 The same thickness (0.2m) corresponding to different lithologies interlayer rate of return statistical line chart

Conclusion

- Multiple division of thick interlayer is based on muddy strip and lower oil production like siltstone. You can take advantage of the return of the degree of cross-plot method to make qualitative and quantitative identification or deduction. The interlayer that draw less of thin oil layer is mainly about siltstone in the dry layer and the poor lithology and oil silstone which is difficult to identify with elcetrical measurement, by the return degree of deep laterlog and msfl and so on and pther value determination method we can get on supplement division.
- Some interlayer that has specific lithology or characteristics of well logging has shielding effect. By logging response characteristics curve analysis,and to identify the interlayer lithology, carry relatively high accuracy requirements shielding evaluation.
- By exact division of thick reservoir sandwich can explain the reduce of the effective thickness of driling well in Fuyu reservior, excluding these interlayer can effectively recover the reduction in the effective thickness and accurate calculation of geological reserves.

REFERENCE

1. Chongyun, Xueshu, Hao., (1993). Chinese petroleum sedimentary basins Beijing: Petroleum Industry Press. 48-55.
2. Wang, Zhang. (1999). stone representing the modern reservoir description technology

Beijing: Petroleum Industry Press, 179-185.
3. Zhang, Ji., Zhang, Liehui, Hu. (2003). Shudong continental clastic reservoir interlayers causes, characteristics and identification logging technology, 27 (3), 221-224.
4. Liu, Jianmin, X.U., Shou-Yu. (2003). sedimentary model of fluvial reservoir and control distribution of remaining oil petroleum Sinica, 24 (1), 58-62
5. Beam, Q. G. (2006). Oilfield Guantao fluvial reservoir interbeds genesis Petroeum, 27(3), 100-103.
6. Fan, Z. S. (2011). Oilfield micro sedimentary facies and remaining oil distribution in three sections. Science Technology and Engineering,11(5), 943-946.
7. Tian, J. (2009). Henan Oilfield Jinglou a three-stage nuclear zone Ⅲ5-6-Ⅳ1-3 small layer of oil-bearing sedimentary microfacies relationships. Modern Geology, 23(2), 319-325.
8. Wang, G., He, G. (1995). Within Shuanghe Oilfield Distribution of thick oil layer sandwich. Petroleum Exploration and Development, 22(2), 55-57.
9. Xue, C., CHENG, Lin-song., Zhang, J. (2010). Sandwich bottom water reservoir research and development and distribution on the remaining oil on the Southwest Petroleum University (Natural Science), 32(3), 101-106.
10. Rao, L., Wu, Xiang-hong., LI, Xiang-ling., (2013). mezzanine impact mechanism different rhythm bottom water reservoir development effect. Geology And Recovery, 20 (1), 96-99.