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Reservoir micro structure amplitude of oilfield development

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Abstract: Traps are places to capture, aggregate and save the hydrocarbon and are also the most basic unit of hydrocarbon accumulation. So traps come to be the main objects of the hydrocarbon exploration. Now the research of remaining oil is hot. There are a lot of research methods. We can expand the study of remaining oil through its distribution, formation mechanism and influencing factors, thus we can evaluate the remaining oil comprehensively and use it to guide the oil field production and development to achieve the purpose of production increasing.
Keywords: Traps; Micro-Relisf Structure; Remaining Oil; Hydrocarbon Accumulation.

Ticro structure amplitude

In the oil field the general tectonic setting, the reservoir itself and shows the structure of the characteristics of small. Reservoir micro amplitude structure of oil-water movement and residual oil distribution have important control action, is located in the forward micro structure of oil well production well, negative micro amplitude on the structure of the relative production to less [1]; In mid and late water flooding, micro amplitude structure formation of remaining oil, more positive negative margin micro structure is often flooded serious high water-cut zone.

Therefore, through the structural study of the reservoir micro range reveals the avoidances ups and downs of the sedimentary sand body unit combination form of underground oil and water movement rule, the influence of the remaining oil distribution and production of oil and water Wells, thus use of remaining oil potential in guidance of micro amplitude structure model and oil water control.

Structural characteristics and classification of micro range

The characteristics of the micro structure amplitude

Micro amplitude structure is characteristic of single sand body top and bottom interface and its internal various spacer layer and slip faults and tectonic relief is less than 5.0 m. Research of single sand body top and bottom interface morphology change and small faults, known as the structure of the research. Including positive negative micro structure, micro structure cant micro structure. Micro structure of the general structure amplitude < 10 meters, the area of < 0.3 m2; Fault long < 300 meters, the slip < 5 meters.

Slightly structure trap area is small, low amplitude structure, so structure mapping is found slightly slightly a key factor. In micro graph structure into four key parameters, the first grid increment, the radius of the grid, the third mesh filter, the fourth contour interval [2].

Micro structure of classification

Micro amplitude structure including positive structure (small high, nose-like structure, broken nose), negative structure (place, groove, groove), slope structure three categories. Micro amplitude structure combination, mainly include: the top end of convex convex double convex, top convex bottom inclined (flat), or inclined plane type, small avoidances are low (or double concave type).

- Small high: refers to the reservoir or rolling form relatively high compared with the surrounding terrain, and closed contour and micro geomorphic unit, its separation is commonly 2 ~ 4 m, normally closed area of 011 ~ 012 square kilometers.
- Nose-like structure: refers to the reservoir system and form a relatively high compared with the surrounding terrain, the contour is not closed geomorphic unit, concomitant with general groove geomorphic unit, area generally is 013 ~ 013 k squared 2.
- Small fault nose: refers to the updip direction were cut fault nose structure. Negative micro structure has a little low, small groove and the groove cut off.
- Small low: refers to the reservoir or rolling shape is relatively low compared with the surrounding terrain, and closed contour and micro geomorphic unit, its separation is commonly 2 ~ 4 m, normally closed area of 012 k squared.

- Small groove: is corresponding to the nose-like structure of geomorphic unit, its shape nose, just in the opposite direction, it is not closed low areas.
- Small groove: refers to the next direction were cut fault nose structure.

The cause of micro structure amplitude

- Has nothing to do with the structure function of micro structure, its formation and the sedimentary environment, the difference between compaction and ancient landform and so on; In general, incised role usually make early sedimentary sand body negatively to the micro structure of the sediment is mainly formed by rivers. Differences between the compaction can form positive micro structure, also can form a negative micro structure [3].
- Influenced by tectonic action, often form a broken nose or breaking groove on both sides along the fault. The causes may be: different parts of the decline in the lower speed, down slowly on the convex part, falling faster part form the concave; Plate on the fault is due to uneven drag force, drag force strength under convex concave, then relative. This kind of micro structure a relatively large scale, covers an area of more than 0.3 square kilometers, is up to several meters to tens of meters, often have great influence on the well production.

Micro amplitude structure recognition method

- Planar contour recognition method
- In the later period of oilfield development, well point increase in the number of subdivided sedimentary unit, in a continuous distribution of reservoir sedimentary unit is top or bottom, the 1-5 m small draw isoline spacing structure plan.

Micro - profile composite profile recognition method

- To the spatial distribution of reservoir sand body and reservoir micro amplitude combining structure and better show sand body and micro structure, the relationship between amplitude for dynamic analysis of oil Wells production, determine the structure of the remaining oil distribution provide more intuitive.

Trend surface residual analysis quantitative identification method

- In the process of research of reservoir micro amplitude structure, special how to delve into the local scope change, is the key to the problem [4]. Trend surface analysis provides a very effective way to solve the above problems; the residual equivalent figure highlights the local reservoir micro structure of high amplitude and place.

The influence of structure on amplitude of the micro residual oil distribution

Eastern oilfields in our country currently in high water-cut stage. Research shows that:

- Micro structure high amplitude is the advantageous area of remaining oil distribution;
- In the reservoir with high water cut stage, reservoir micro amplitude control effects of structure of oil well production, the miniature trap control the distribution of remaining oil is on the edge of the original reservoir, miniature fault trap, sandstone pinchout trap is remaining oil enrichment region[5];
- Within the scope of the original reservoir, the top of the single sand body and microscopic reservoir forming conditions and want to cooperate with ground structure morphology, thickness, controls the distribution of remaining oil.

Avoidances of double concave and convex top bottom concave type miniature trap is remaining oil, while avoidances double concave don't trap conditions, remaining oil potential difference. Xingcheng, this is because the reservoirs are the micro structure of high amplitude of oil and gas enrichment degree than negative micro structure, rely on natural depletion, the amplitude of the height structure is different, lead to the difference between single well tired oil production[6]. After water flooding development, oil and water distribution under neutral differentiation again, foreign language on a little high, little fault nose structure production Wells, all directions are upward displacement, remaining oil to the migration, formation of remaining oil enrichment region. Negative micro structure of small low amplitude are downward displacement in all directions, injected water also to this flow, become a watershed, stripper well[7]. Slope structure displacement and displacement effect can offset each other, the well production dynamic influence factors is bigger, production downs, between positive and negative.

The structural study of the micro range application in oilfield development

- Productions well are mainly distributed in the positive amplitude tectonic zone.
- Reservoir micro structure amplitude control of the remaining oil distribution plays an important role.
- Through micro structure study clarified the amplitude block reservoir oil-water movement rule, can provide geological basis for late oilfield injection-production pump adjustment.

- Through the study of reservoir micro amplitude structure to implement the fault size, at the same time fill hole mining closed block wellblock of remaining oil, achieved good effect [8].
- To deepen the understanding of reservoir micro structure amplitude, optimizing fracturing measures well.
- According to the research of the reservoir micro amplitude structure for water plugging exploration and achieved good results.

CONCLUSION

Micro amplitude structure is one of the main form of remaining oil distribution; Under the action of gravity differentiation, positive micro structure is the remaining oil enrichment region; High structure parts are favorable oil and gas accumulation zone [9]. Micro structure amplitude discrimination, to a great extent, dependent on the quality of original seismic data, but also depends on the purpose of the research by layer properties, and the tectonic style. Should make full use of collected seismic data body, more comprehensive analyze the objective layer, with the development of micro amplitude construction technology and improvement of the remaining oil mining will have a big leap[10].

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