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Reservoir productivity evaluation reliable technology research

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Abstract: If the stable oil production capacity estimates are too high, it will lead to the failure of oilfield development and severe losses, estimated too low will result in the petroleum resources and exploration investment backlog and waste. Therefore, the establishment of establish a set of reasonable productivity evaluation and prediction method of selecting development block and ensure development benefit is very important, for next exploration of similar reserves is a necessary evaluation parameters.

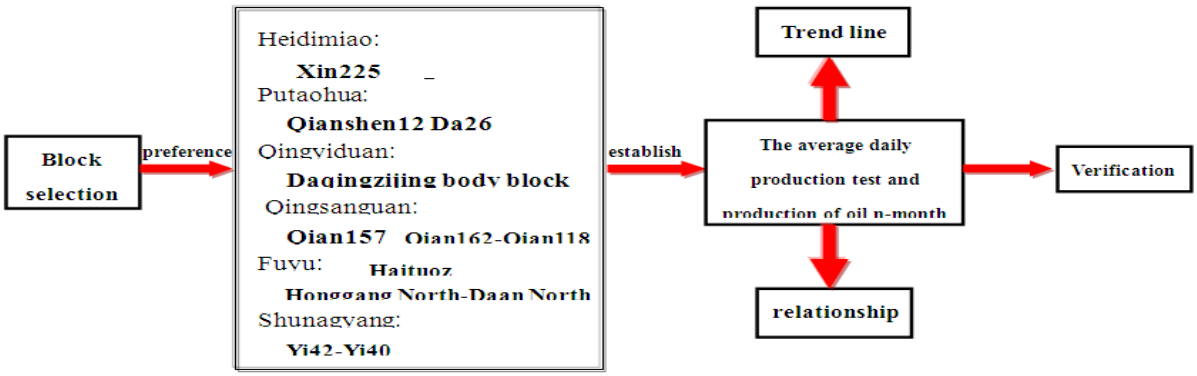
Key words: *Productivity evaluation; Oilfield development; Optimal block; Reserve exploration*

I. CAPACITY EVALUATION METHOD

Jilin Oilfield since 1955 carried out lots of exploration work, found that the cumulative 24 oil and gas fields 199 verified blocks, formed an annual output of 700 x 104t scale. SEC began in January 1, 2010 with "oil and gas" as the title of the report of the modern SEC new standards of oil and gas reserves. The reliable technology application is new guidelines in reserves evaluation method on the main modifications. This change makes except specific fluid test, the comprehensive application of the new technology, earth science and engineering data can be used to determine the proved reserves. Therefore induction and summing up historical assessment example, extracted with consistency and repeatability and reliable technology, to the ascent of the whole Jilin Oilfield reserves evaluation method research level, and effectively increase the level of reserves has very important significance.

According to the characteristics of low permeability reservoir in Jilin Oilfield, Jilin Oilfield low permeability reservoir in the course of the study used single or a number of technology integrated application examples, according to SEC evaluation criteria, carries on the induction and the summary, to extract with consistency and repeatability of the reliable technology (Figure 1).

Fig.1：technical route of productivity evaluation



Mainly for new discoveries and PUD reserves, by PD reserves stable production and test oil yield relationships determined economic limits of the different layers of the test oil yield, PUD, new proved reserves economic evaluation provide the basis. Jilin Oilfield in different layers of the various blocks of the test data and the statistical data analysis and production of the selected test match and commissioning of oil wells (oil testing and production wells in the same layer and around the same time). Each block matching well test average daily oil production and put into operation each month average daily projection in the X-Y plane. In the X-Y plane fitting out a trend line of the origin, the reciprocal value of the slope of the trend line is the test average daily oil production or put into operation the first month average daily and other each month daily average output ratio.

Fracturing technology is the main technology in increasing reserves and production, fracturing control the crack extends forward drop filter to take the sand plug filtration technology; it increased joint front of fracturing fluid made wall, increases the viscous pad fluid, and appropriately increase the amount of pad fluid; fracturing makes full use of the data of development well, of crack extension in the critical state of reservoir take provided a displacement increase fracture net pressure technology. The most layer fracturing success; in some wells with large aperture and high dense hole fracturing technology, reducing of the fracturing fluid shear.

II. THE ESTABLISHMENT WITHIN BLOCKS OF EACH RESERVOIR PRODUCTIVITY EVALUATION RELATIONS

New 225 blocks in New Taipei - the new legislation in the central and western regions, the Songliao Basin in the southern central depression District of Fuxin uplift zone of Xinli structure north wing. The three member of the river is deposited in the delta front sub facies environment. The main microfacies of the delta are the underwater branch channel. Average reservoir porosity 27%, average permeability is 242.3 x 10-3 g m2; reservoir type lithologic structural reservoir; therefore the test wells a few. Therefore, selecting 29 production wells production data corresponding capacity evaluation. Ji 13 block in New Taipei - new legislation in the eastern region, Songliao Basin in the southern central depression area of Fuxin uplift zone of Xinli structure north wing. The three member of the river is deposited in the delta front sub facies environment. The main microfacies of the delta are the underwater branch channel. Average reservoir porosity is 24.6%, average permeability is 28.31 x 10-3 g m2; reservoir type for lithologic structural reservoir; therefore the selected 25 production wells production data corresponding capacity evaluation and so on. Finally, it is concluded that table 1:

Table 1: Each block test average daily production and production of oil n-month average daily production relations

		the average daily production relational graph between the first month and the third months		the average daily production relational graph between the first month and the sixth months		the average daily production relational graph between the first month and the ninth months		the average daily production relational graph between the first month and the twelfth months	
		relationship	ratio	relationship	ratio	relationship	ratio	relationship	ratio
Heidimiao	Xin225	y=0.6813x	1.5	y=0.555x	1.8	y=0.4806x	2.1	y=0.4344x	2.3
	Ji13	y=0.712x	1.4	y=0.5701x	1.8	y=0.4954x	2.0	y=0.4569x	2.2
Putaohua	Qianshen12	y=0.7074x	1.4	y=0.5487x	1.8	y=0.444x	2.3	y=0.3752x	2.7
	Da26	y=0. 2373x	4.2	y=0.1784x	5.6	y=0.1511x	6.6	y=0.1268x	7.9
Qingyiduan	Daqingzijing body block	y=0.4555x	2.2	y=0.3717x	2.7	y=0.2979x	3.4	y=0.2425x	4.1
Qingsanduan	Qian162-Qian118	y=0.2054x	4.9	y=0.1162x	8.6	y=0.0955x	10.5	y=0.776x	12.9
	Qian157	y=0.7445x	1.3	y=0.6331x	1.6	y=0.5803x	1.7	y=0.5413x	1.9
Fuyu	Haituozi	y=0.1875x	5.3	y=0.1347x	7.4	y=0.1103x	9.1	y=0.0923x	10.8
	Honggang North-Daan North	y=0.1786x	5.6	y=0.1437x	7.0	y=0.1121x	8.9	y=0.091x	11.0
Shuangyang	Yi42-Yi40	y=0.4409x	2.3	y=0.3649x	2.7	y=0.3267x	3.1	y=0.2942x	3.4

III. RELIABILITY VERIFICATION

Haituozi oilfield of Fuyu oil layer is similar to North Honggang - North Ann, the black Emperor Temple Reservoir new 225 blocks and Ji 13 block reservoir geological characteristics. The productivity evaluation and comparison of the relationship between figure, we can see whether by trial and oil data or production data to make the first month productivity evaluation diagram. By data fitting of the trend line has a high degree of similarity, illustrates the capacity evaluation method can be used to make analogies between the reservoir geological characteristics similar to that of the block, with high precision and reliability.

IV. THE CONCLUSION

1. The the productivity evaluation method more intuitively reflect the test and commissioning of oil between the quantitative relationship, with strong practicability and reliability, for reservoir geological features similar to the block capacity evaluation and preparation of new block development planning scheme, PUD, new proved reserves economic evaluation provide the basis.

2. The technology can be used for reservoir geological features similar to the block capacity evaluation and preparation of new block development planning scheme for PUD, new proved reserves economic evaluation provide the basis. The relationship between oil test and stable production is determined.

3. In study on productivity evaluation to meet research well number less, and for different blocks, different periods of wells, the fracturing is not the same, so if they have the same and similar geological characteristics of the area, the test oil and capacity of the trend of the relation can be use for reference, but not enough to as reliable technology popularization and application, pending further research and feasibility studies.

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