Petroleum potential analyses for the completed but not producing wells in reservoir P, S sag

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Abstract: At the end of 2020, the P oil layer in area B had proved geological reserves * million tons, developable geological reserves * million tons, and proved developable reserves * million tons. It is estimated that by the end of 2022, the developable reserves will be * million tons, the remaining developable reserves * million tons, of which * million tons are to be written off, and the undeveloped reserves after written off will be * million tons, and the developable rate of P oil reservoir reserves will reach 96.7%. In the absence of large-scale development in the Fuyu oil layer, it is a problem that must be solved to find the potential of infrastructure in the P oil layer. Completed-nonproducing wells mainly refer to those have not been put into production after completion of drilling. The potential of not constructed after completion of drilling mainly starts from the nature of the oil and water developed in a single well and the thickness of the reservoir, combined with the position relationship of the well and the relationship between injection and production, to analysis the development potential as oil- water wells or lifting wells.

Keywords: Undeveloped reserves; Succession potential; Completed-nonproducing wells; Potential

1. Statement of problem

At the end of 2020, the P oil layer in area B had proved geological reserves * million tons, developable geological reserves * million tons, and proved undevelopable reserves * million tons. It is estimated that by the end of 2022, reserves will be used * million tons, and the remaining used reserves will be 10 million tons, of which * million tons will be written off, and the remaining * million tons of unused reserves will be deducted after write-off. The development rate of P oil reservoir reserves will reach 96.7%. In the absence of large-scale development in the Fuyu oil layer, it is a problem that must be solved to find the potential of infrastructure in the P oil layer.

As of the end of August, there were 1028 completed wells in the P oil layer in B area. Looking for wells in these wells as scattered infrastructure wells, as a productivity replacement, to a certain extent can solve the contradiction of insufficient productivity replacement in the P oil layer.

2. Analysis of the Status Quo of Drilling and Unbuilt Wells

Wells completed but not constructed mainly refer to wells that have not been put into production after completion of drilling, including wells that have not been put into production after completion of drilling in previous years and development wells that have not been put into production that year.

The analysis potential mainly analyzes wells that have not been put into production in previous years. In order to avoid duplication of workload, the analysis area does not include evaluation wells and development first wells in production blocks in 2018 and 2019.

Table 1 Category statistics table of unbuilt wells after drilling

Category		Exploratory wells	Evaluation wells	First drilling wells	Productivity wells	Total
Finished drilling in previous years but not built	No plan	110	236	76	164	586
	Plan	6	54	31		91
	Subtotal	116	290	107	164	677
Plan infrastructure for the current and previous years		6	42	10	293	351
Total		122	332	117	457	1028

3. Fine interpretation of reservoir oil and water

Under the guidance of the theory of accumulation, analyze the types of oil reservoirs, combine the structure map, oil-water identification chart and dynamic data, and finely analyze the oil-water properties of the reservoir.

3.1 Reinterpret oil and water with sub-regional plates

The main target layer for the development of S sag is P oil layer. Through several years of drilling and development, the P oil reservoir in the oilfield has been basically used, and the development of the reservoir and the distribution of oil and water in the used block have also been more clearly understood. However, in the lower part of the main structure or syncline area, due to thin reservoirs and poor physical properties, the lithology and pore structure of the reservoir are complex and changeable, and the "four-character relationship" does not match, which makes the oil-water distribution in the block more complicated and there are Low resistance oil layer and high water resistance layer. In recent years, the development test data has been used to establish identification plates for high-resistance water layers and low-resistance oil layers, and the plates have been used to perform fine oil-water interpretation of wells in complex oil-water

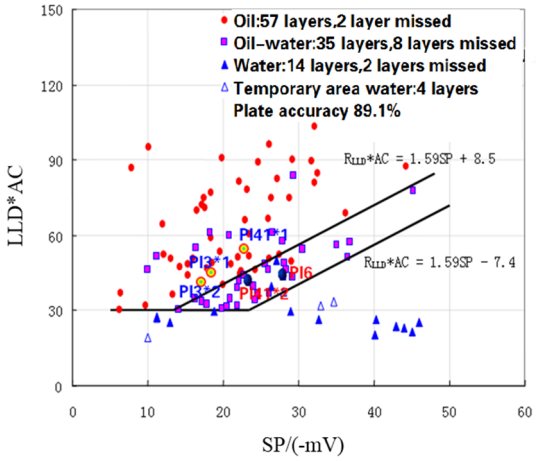

Fig. 1 A detailed interpretation of oil

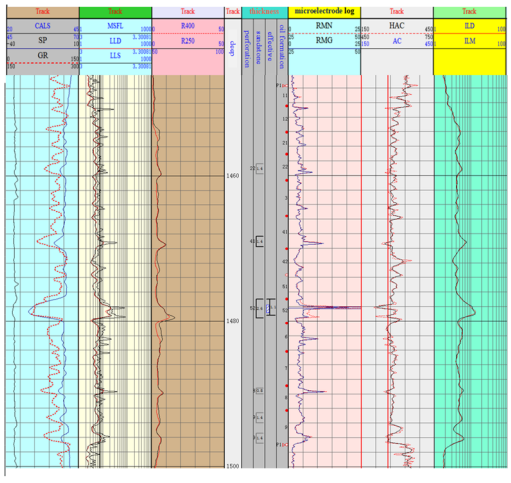

Fig. 2 Logging results of Well B and water in the chart of Well A

Well A is located in Block Q. Use the wells that have been put into production in Block Q to establish an oil-water layer identification chart, and reinterpret Well A before completion of the drilling (Fig. 1), and determine that the PI41*1 layer and above are oil layers. The lower part is the same layer, which can be used as oil well infrastructure.

3.2 Dynamic and static analysis of oil and water properties

Well B is a productivity well in Block H in 2010. As the number of completed wells is more than that of infrastructure wells, some wells have not been put into production in combination with the injection-production relationship. This well only develops the PI52 layer in the same layer. Combined with the perforation conditions and production effects of wells C and D in the same structure, the PI52 layer developed in Well B is considered to be an oil layer. Considering the thickness and the relationship between injection and production, it is recommended as Oil well infrastructure.

4. Potential analysis of unbuilt wells after drilling

Taking the 600m distance from the developed area as the boundary, it is divided into close and far away from the development area. The statistics of the completion of drilling in previous years have not built wells, of which 307 wells are far away from the developed area, 279 are close to the developed area, and the well deployment potential is analyzed far away from the developed area. , Analysis of its infrastructure potential close to the developed blocks.

4.1 Potential analysis far away from developed areas

There are a total of 307 wells far away from the developed blocks. Through analysis of reservoir development and oil testing, 55 wells with potential wells, 11 potential wells for extraction, 15 potential wells for oil testing, and 226 potential wells are finally determined .

Table 2 Potential classification of completed wells far away from developed areas

Category	Number of wells	Sandstone thickness (m)	Effectivity of oil layer (m)	Effectivity of same layer(m)
(layout-well) Potential wells	55	11.7	1.9	0.6
(lifting)Potential wells	11	9.8	0.1	1.6
(oil test)Potential wells	15	13.4	0.8	1
No potential wells	226	11.8	0.2	0.5
Total	307	11.8	0.6	0.7

4.2 Analysis of the potential of being close to the developed area

The unbuilt potential of wells close to the developed area is mainly based on the oil-water properties and reservoir thickness developed in a single well, considering the injection-production relationship, and analyzing its potential as an oil-water well.

4.2.1 Determining oil and water wells

Oil and water wells are determined as oil production wells or water injection wells based on the thickness of the well and the relationship between injection and production in the developed area. Through analysis, 101 oil wells and 25 water wells were finally determined.

Table 3 Statistics table of potential well classification of oil wells

Category	Output (t/d)	Number of wells	Oil layer (m)	Same layer (m)	Prediction oil (t/d)
Class 1	>2	21	3.2	2.2	3.2
Class 2	1-2	26	1.1	1.9	1.4
Class 3	0.5-1	30	0.6	1.0	0.7
Class 4	<0.5	24	0.2	0.5	0.3
Total		101	1.2	1.4	1.4

4.2.2 Timing and method of production

The timing of commissioning is mainly based on the potential classification of the completed well but not constructed, the development horizon and the status quo of the developed block, and the timing of its commissioning is determined.

Principle: The drilling and unbuilt wells that have been infilled at the mining horizon are P, and the infrastructure is selected according to the potential level; the drilling and unbuilt wells with the mining horizon being P but the infilling has not been completed. In recent years, there is an infill plan. Consider carrying out infrastructure construction along with the infill; wells in the Fuyu test area and wells that have not been built in the P oil layer. The timing of commissioning shall be determined according to the test conditions; the distribution of scattered or overall relationships, the overall infrastructure or scattered infrastructure should be selected; the completion of the wells close to the development well If you drill an unbuilt well, if you test the oil, it is recommended to fish; if it is close to the developed area, if the well has not been built without injection-production relationship, it is recommended to perforate to fish or build the infrastructure after the injection-production relationship is perfected.

Table 4 Potential classification of unbuilt wells close to the developed area

Potential wells				Non-potential wells	Total
Oil wells/ lifting	Water wells	Test area	Subtotal		
101/21	25	43	190	89	279

The production method is mainly based on the development of the reservoir after the drilling has not been constructed, to determine whether to start production with perforation or fracturing, and to determine its mechanical production method.

5. Conclusion and understanding

Through the analysis of completed wells and unbuilt wells, 271 potential wells and 315 non-potential wells were finally identified. At present, these analyses are only based on geological analysis. In the actual operation process, ground conditions and economic evaluations need to be considered. In the end, Determine the potential of the unbuilt well after drilling.

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