



# Geological Reassessment and Development Policies for Tankou Area Reservoirs

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## INTRODUCTION

This selection comes from one of the 2022 postdoctoral research station topics of SINOPEC Jiangnan Oilfield, 'Research on the development technology policy of Complex Fault Block oil reservoir in Jiangnan Salt Lake in the middle and high water-containing period'. Study area: Tankou area in the northern part of Qianjiang depression in the Jiangnan Basin, the study area includes the Tankou oilfield Tan 34, 62, 63, 70 and 71 well zones. Research stratum: q4 section of the lower tertiary Qianjiang formation.

## DESCRIPTION

This study addresses the difficulties in the geological understanding of the study area of the Tankou oil field, the unclear seepage characteristics, the poor effect of water drive in the development, and the big difference in the development of different blocks, etc. Under the guidance of lithostratigraphy, structural geology, sedimentology, seepage mechanics, oilfield development and reservoir engineering, uses the combination of "indoor flat physical model experiment+field dynamic analysis", Petrel geological modeling and petrel reservoir numerical simulation methods. Comprehensive use of seismic, drilling, logging, cores, thin sections and analysis and testing data, the geological re-understanding of complex fault-block reservoirs in Tankou research area of Jiangnan Salt Lake Basin, such as structure, sedimentation and reservoir, the seepage law of water flooding in different fault-block reservoirs, development technical policies and development modes of complex fault-block reservoirs, are carried out, and a reasonable development adjustment scheme is put forward. The results of the research show that: the boundaries of oil groups and small layers in the q4 have been clarified and unified: The interface at the top of q41 is 14 rhythmites in the lower section of q3; q41-q41X have 3 sets of small sands, and q40 is a set of thick sands with antirhythmites; the amplitude of the gamma curves is not big in q40, and there are 4 or 5 resistive high points; there is a set of sandstone on the top of q40X, and gypsiferous mudstone is at the bottom; q42 is developed with sandstone, and there are 6-7

sand layers. sandstones, with a set of stable mudstones at the bottom; q42X is mainly gypsiferous mudstones, interspersed with salt rocks; q43 has two sets of sandstones. Summarised four kinds of seismic identification signs of low-order faults: slight twisting of the syncline axis; little misalignment of the syncline axis; sudden change of the energy of the syncline axis; merging of the syncline axis (bifurcation); the fault combination styles are mainly stepped, Y-shaped and flower-shaped [1-3]. The types of sedimentary phases and sand body distribution characteristics are clarified: The types of sedimentary phases are mainly classified into fan delta front, coastal shallow lake saltlake sub-phase, sedimentary microphases are fan delta front underwater diversion channel, tributary interbay, estuarine dams, far sand dams, and mat sands. The sandstones are extended from the northwestern to southeastern direction, and in the Tan 71 well area the sandstone thickens to form a slope-folded sand body. q40 sandstone is the most developed, the thickness is generally greater than 30 m, longitudinal upward and downward sand thickness are thinning [4]. The seepage law of different fracture block types has been clarified: The time of seeing water and oil in the closed type is much less than that in the half-open type and the open type, and the closed type is favourable to the extraction of crude oil, while the open type has the best effect on oil extraction and the half-open type has the worst effect on oil extraction. The oil production rate in different types of fracture blocks all show an increasing and decreasing pattern, when the rate of extraction starts to increase in the farther distance from the wellhead, the oil production rate starts to decrease in the rest of the wellhead. The cumulative oil production is positively correlated with the distance from the wellhead, the farther the distance, the more the production [5]. Optimized the development technology policy and put forward the development adjustment plan:

- Developing layer system according to the fracture blocks with reserves >300,000 tonnes, area >0.15 km<sup>2</sup> and abundance >1 million tonnes/km<sup>2</sup> adopting subdivided layer system development, and fracture blocks with small scale are developed according to one set of layer system.
- Open roof-like fracture blocks adopting intermediate oil recovery and corner well injection well network form.

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- Semi-open strip-like fracture blocks adopting ‘zigzag’ shape, nuclear extraction and wing injection well network.
- Closed-type quadrilateral fracture block adopts rows of staggered well network, and the direction of well rows is parallel to the direction of the maximum principal stress.
- Reasonable well spacing is recommended to be between 150-250 m.
- For the strata with large deficits and serious shortage of fluid supply, injection and extraction support and continuous water injection are adopted, for the sea side water or injection water injection and extraction sensitive, use unstable water injection.

The scheme deploys 7 new wells with a new production capacity of 0.69 million tonnes [6].

## CONCLUSION

Formed the development mode of complex fault block reservoir: development mode is divided into three categories, namely, cycle liquid extraction mode, cycle water injection mode and cycle oil extraction mode; quantitatively determined the cycle boundaries of cycle water injection and cycle oil extraction development, and the cycle water injection system with short injection and long stop, and the cycle oil extraction system with long extraction and short stop are more suitable for the development of the oilfield.

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## CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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