

Crack Obsolete Paradigm: Proven New Petroleum Potential in PINKY Area, Sirikit Oil Field, Thailand.

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ABSTRACT

Sirikit oil field is located in Phitsanulok basin, central Thailand. Phitsanulok basin is rift basin. It was initially opened during late Oligocene to Early Miocene. During this period, the major depositional environment is lacustrine and fluvio-deltaic environment namely Lan Krabu formation (LKU). Thereafter, basin was settled leading to changes in environment of deposition to braided and meandering system also known as Pratu Tao formation (PTO).

The conventional structural play concept was contributed to the first discovery in the area. The success of structural prospecting plays the major role in Sirikit oil field for more than 30 years. PINKY area was initially defined with this concept by limited 2D seismic data. Although the first discovery of PINKY area was dated back to 1984. Apart from geological success, field development was even more challenge, because the location is remote from the main production facilities. The more wells drilled, the less prospective resources were expected.

Starting from novel geological model, the long and narrow sub-compartment of perplexing conjugate fault system on the basin flank along with multi-stage fault activation is introduced. Beyond structural geology point of view, stratigraphic framework is integrated with the uses of seismic attributes and well log correlation. Then, the exploration strategy is moved from structural-oriented to more combination of structural-stratigraphic combination traps. In addition, the rock physics feasibility study and channel width thickness study had been performed to support lithology classification, sand model generation. Furthermore, production data is incorporated in order to cross validate the proposed model. Both static and dynamic points of view express strong conformance.

According to the combination trap exploration concept, two more trap styles are defined: - closing ramp and opening ramp. Closing ramp is defined monoclonal structural dipping away from the fault where dip direction is not perpendicular to dip direction of the fault. While, opening ramp is the closing ramp where the bed dipping toward the fault. Thus, faults compartmentalization and channel orientation are the key of this trap definition. Resulted from the new sub-compartment identification, more number of prospects attached to the faults are depicted. In addition, the main target interval is shifted from LKU formation to PTO formation which is more favourable, due to its nature of fluvial depositional environment.

Three wells were drilled in early 2015 to prove the combination trap concept with outstanding success at average net pay of 71 mTV oil. Since then, the obsolete paradigm has been cracked by seeking an opportunity in the combination trap configuration. As a result, additional 13 development wells were followed-up in late 2015 to early 2016 with oil production potential significantly increased and maintain at around 3,000 STB/d. Additional 44 wells have been planned to be developed from late 2016 onward. The proved STOIIP is increased from 2 to 65 MMbbl and oil reserves were added at 6 MMbbl during 2014 - 2016.

Looking forward to the future, the secondary recovery phase in PINKY area is going to be implemented to enhance hydrocarbon recovery.

This paper will explain an initiative geological & geophysical concepts and integrated strategic development plan. Technical and economic evaluations have been also included. Finally, an innovation in new play type concept will definitely unlock the field potential of the whole Sirikit Field.