

## **A New Concept for New Oil Exploration in the Mature Field, Sirikit Main Area**

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### **ABSTRACT**

Sirikit oil field (S1) is a mature oil field located in Phitsanulok Basin, 400 km north of Bangkok Thailand. The field has produced hydrocarbons to serve the energy demands of the country since 1982. In the past few years, S1 oil production has been maintained around 28,000 – 30,000 STB/d. Important factors that influence S1 oil production plateau are waterflood, effective artificial lift system, and new oil potentials from new play types. In the last two years, Oil production from the new stratigraphic play type accounts for 1,800 STB/d. Key challenges is how to find new hidden oil potentials to maintain production of the 35-year-old oil field.

The target of this study focuses on new oil potential in thin-bedded reservoir of which depositional environment is mouth bar in lacustrine delta. The key challenge of constructing model for new oil potential is its difficulty to track these thin-bedded reservoirs relied on single method. To achieve our goal, fully understanding of regional geology and integrated study of geological data, geophysical interpretation, and reservoir analysis are required. This study shows the successful discovery of new play type in thin-bedded formation.

The study was firstly initiated after reviewing petrophysical interpretation, pressure data, and production data that guided the possibility of new hydrocarbon potential (Formation A) in the thin-bedded reservoir. Previously, Formation A was defined as pinched out formation developed only in a certain part of the field. In order to know the boundary of sand distribution for further field development plan, firstly, regional seismic and well data were reviewed. Petrography study (XRD) was then performed to determine source of sediments and to support sand model, which leads to further geophysical study in hydrocarbon potential area. Quick-view rock physics highlighted new thin-bedded reservoir from well data then seismic attributes and seismic sequence stratigraphy were analyzed to extend the scope of new combination plays to cover entire field including undrilled blocks without well data, of which hydrocarbon potential in the thin-bedded reservoir has never been discovered before. This model has been proven to be successful along with a successful appraisal campaign.

As a result of the study, boundary of Formation A could be defined. In early 2016, This model has been proven to be successful along with a successful appraisal campaign leading to paradigm shift of field development strategy. Discovery of Formation A adds reserves of 3.5 MMSTB and prospective resources of undrilled prospects of 30 MMSTB. In addition, Formation A has good reservoir properties indicated by initial production rate at 800 STB/d (PI = 0.2 STB/d/psi). There are 10 appraisal wells planned in the next few years to further appraise Formation A. As far as the discovered block is concerned, waterflood facility including planned injectors and water lines were planned in order to maximize production and recovery of Formation A.

The success of Formation A discovery proves that there is always a chance to unlock hidden hydrocarbon potentials even in a mature oil field. The key to success is efficient integration of subsurface working teams, subsurface data, and actual production data. This strategy also proves as a low cost approach to increase oil production in the current low oil price situation.