

Rejuvenation of Exploration Strategy and Paradigm to Discover New Prospect in Mature Basin, Case Study: Central Sumatra Basin, Indonesia

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ABSTRACT

Hydrocarbon energy has an important role for energy sector in Indonesia. The demand of energy is increasing each year. This situation has made the demand of hydrocarbon energy becomes higher than the supply. The needs of exploring hydrocarbon energy is one of the solutions to increase the supply of energy. In the current situation of oil price, exploration seems to be unfavorable. However, this situation can be the perfect time for investing in exploration. It will make a considerable profit if the exploration is success, in the future, once the oil price bounce back.

Central Sumatra Basin is the biggest contributor of hydrocarbon production in Indonesia with 13,000 MMBOE recoverable hydrocarbon (Hardy, et al., 1998). Moreover, Central Sumatra Basin can be categorized as one of the most productive hydrocarbon basin in Southeast Asia. Furthermore, it has simple style of play with one source rock interval as the main charge of hydrocarbon accumulation within the basin. The majority of the reserves are found in two giant fields, Duri Field (4,000 MMBBL) and Minas Field (8,000 MMBBL) (Katz & William, 1997). These two fields alone account for almost 50% of the 25 billion barrels proven in place reserves of the Central Sumatra Basin (Williams & Eubank, 1995). Furthermore, the high amount of hydrocarbon accumulation in Central Sumatra basin comes from oil prone lacustrine deposit, known as Brown Shale, in Pematang Group. The Brown Shale formation of Pematang Group has generated ~60,000 MMBOE (Katz & William, 1997).

However, Central Sumatra Basin is considered to be in a mature stage of exploration (Williams & Eubank, 1995). Focus in this basin is enhancing and/or optimizing the existing field rather than rejuvenating the exploration concept. Nevertheless, Central Sumatra Basin still has huge potency, as the main source rock is regionally extensive, which aid by the high gradient geothermal in Central Sumatra Basin. There is also underexplored Pematang Sand reservoir, which yet to be evaluated.

Rejuvenating the exploration and the play concept is needed in order to discover the hidden potency of Central Sumatra Basin. Integrating basin modelling, play analysis, alongside with dry well analysis, will be significant, as we can learn from the past mistakes and rejuvenate the paradigm in exploration strategy of Central Sumatra Basin, in term of time and space of geological aspects.

The research will focus on Bengkalis trough and surrounding area, onshore Palembang. The scope of work of this study is including basin modelling, petroleum system (source rock, reservoir, seal, migration path, and trap) analysis, and dry well analysis. Basin modelling will gives rigorous understanding about the time of hydrocarbon generation, expulsion, and accumulation. Petroleum system analysis will gives the idea

whether each petroleum system element is suitable or not. Then, the integration of those analysis with dry well analysis will gives an important learning for future strategy.

This study is intended to generates new play concept and/or obtain more understanding of the existing concept, gives recommendation of future exploration strategy, and rejuvenates the exploration paradigm in Central Sumatra Basin. Side purpose of this study is to trigger the reevaluation and restudy of the hydrocarbon occurrence in Central Sumatra Basin.