

## **Improving Recovery Factors in Central Sumatra Basin Indonesia Shaly Sand Reservoirs by Horizontal Drilling**

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Petani Field is located in the Central Sumatra Basin of Indonesia and has produced 346 MMBO since its discovery in 1968. Most of that oil has come from high-quality Lower Miocene sands of the Sihapas Group. However, significant bypassed oil remains in lower-quality reservoirs whose recovery is typically in the 14% range. To facilitate and develop strategies to economically exploit these reserves, a 3-D geocellular model of reservoir architecture and properties distribution was made and used as a guide to further development. This model indicates distinct trends of estuarine, sand ridge, and margin facies throughout the field that reflect paleogeography. Reservoir properties and saturations were geostatistically populated within the model. The primary objective was to delineate the volumes and areas of remaining oil for use in developing a recovery strategy. Horizontal wells were chosen as the preferred alternative to provide connectivity among reservoir layers and improve production and ultimate recovery by three or more times over conventional vertical wells or frac jobs. Further reservoir characterization and validation of the geologic model was performed after which a 16-horizontal well project was developed and executed. The program was very successful with only two wells disappointing by excessive water production. A post-drill analysis suggests these two wells suffered uncertainty related to faults along the well bore acting as water conduits and/or improper ECP installation. Production from the project is approximately 3-4 more than vertical wells could achieve and predicted ultimate recovery has improved from 14% to 28%.