Paper P40

An Integrated Approach Towards Delineating Hydrocarbon Prospectivity in Untested Fault Blocks Within a Brown Field. A Case Study in B Field, Offshore Sarawak, Malaysia

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B Field is located approximately 80 km from Bintulu in water depth of about 90 feet, Balingian Province, offshore Sarawak, Malaysia. In was discovered in 1976, with first oil achieved in 1984. Since then, more than 70 wells have been drilled, with production coming from three main accumulations: B North, West, and Northwest. A forth accumulation, B East was recently discovered in 2006. Structurally, B Field is heavily faulted, with the southwest to northeast and associated antithetic faults giving rise to numerous compartmentalizing fault blocks among the adulating anticlines and synclines. Furthermore, channelized sand bodies add another level of complexity towards understanding the hydrocarbon distribution in B. The reservoirs of interest are on Late Oligocene to Early Miocene in age and occur at an average depth between three to five thousand feet subsea. Depending on the stratigraphic succession, these Cycle II reservoirs are interpreted to have been deposited in a Lower Coastal Plain environment, with channel morphologies ranging from braided streams to meandering and distributary channels.

In order to mitigate the uncertainty associated with reservoir presence (sand distribution) and hydrocarbon occurrences in untested prospective fault blocks, a holistic integrated approach was adopted. By rationalizing all available geological, geophysical and production data, an attempt was made to produce a cohesive and consistent geological conceptual model able to predict hydrocarbon presence beyond the proven areas. The workflow began by understanding the depositional environment of the field as observed from well logs and core data. Possible channel widths were established by comparing the observed data with analogs from available literature. A general provenance direction was also known from the understanding of regional geology and dipmeter data. Reservoir morphology was further delineated by using seismic attributes such as RMS of amplitude and sum of negative amplitudes, applied on the angle stack seismic data. Observed anomalies between the near and far stack seismic data allowed us carve-out prospective areas away from know hydrocarbon pools of B Field. These anomalies were further validated by comparing with the well logs and petrophysical data from nearby producing areas. Furthermore, the area and zones of interest were subjected to an AVO study in order to assess the hydrocarbon occurrence probability. The volumes were calculated and risked accordingly in order to account for the remaining uncertainties. The identified prospects have been consistently supported by the available data and studies, and this has led to the finalizing of a drillable location about five kilometers Northwest of nearest platform. The target is situated on an isolate horst block of a plunging anticline with the northerly plunging axis. B field has yet to prove the viability of a stratigraphic and structural combination trap. A sound integrated approach as adopted here has a potential for probing hydrocarbon reserves in this new plays types.

Conclusions

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References

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