Hydrocarbon Charge Modeling of the Outer Taranaki Basin

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The Outer Taranaki Basin is one of New Zealand's promising deepwater basins. A pseudo-3-D basin model has been used to define source kitchens and to assess charge potential in the basin and adjacent shelf areas. Three source rocks have been simulated: the proven Wainui Member and Rakopi Formation coals, and a speculative mid-Cretaceous source rock. Migration has been simulated on the base Paleocene sandstone carrier using a ray trace methodology. The model was calibrated to offset wells. Rakopi Formation and Wainui Member source rocks are mature for oil generation on the shelf regions of the study area, but are immature in the deepwater areas of the study region, as these areas lack adequate overburden for maturity. The speculative mid-Cretaceous source rock modelled is mature for gas generation over much of the study area, and is over mature in the deepest areas of the Outer Taranaki basin. Areas on or close to the shelf are prospective for significant oil discoveries (>200 MMstb OIIP), sourced from Rakopi Formation source rocks. Charge is modelled as a significant risk for structures distal from the mature Rakopi Formation source kitchen, and the potential of the outer basin for significant (>1 Tscf GIIP) gas discoveries relies on the presence of deeper mid-Cretaceous source rocks that are evident on seismic, but are as yet unproven.