

EXPLOITATION OF TRINTOPEC'S MACKENZIE FIELD - CASE STUDY OF GEOLOGY AND FIELD DEVELOPMENT

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ABSTRACT

Trintopec's Mackenzie Field was discovered in 1976 with the successful drilling of well Mk 10. The productive area is 57 acres and the exploitation of the field involved the drilling of sixty-five (65) wells to depths ranging between 1000' and 6000'. Cumulative production to date is 4.3 million barrels of 24-32° API gravity oil.

The field is situated north of the Los Bajos Fault and lies on the southern flank of the Point Fortin Anticline, as it abuts the Los Bajos Fault. Structurally, the field overlies a 'half flower' formed by compressive wrenching along the Los Bajos Fault and this structural feature extends into Trintopec's neighbouring Point Fortin Central (NW) and Palo Seco Lot 8 (SE) Fields.

Two (2) structural components are evident: an overthrust block and an underthrust block. The overthrust block has undergone significant tectonic disturbance and is characterized by steeply dipping beds of the Upper Cruse Unit (800 SE dip) which crop out on surface. The almost vertical beds show up as extremely thick and exaggerated sand sections on electric logs. The underthrust block is characterized by laterally extensive and productive sand of the Upper and Middle Cruse. Dips range from 30-45° SSE.

Field development in Mackenzie took place in three (3) phases. Phase 1 involved the exploitation of the Middle Cruse in the underthrust block. Phase 2 involved the first set of pup wells which exploited the Upper Cruse in the underthrust block. Both these phases were economically successful. Phase 3 involved a second series of pup wells proposed to exploit the steeply dipping overthrust Upper Cruse section. This phase was not as successful as anticipated because of limited lateral extent of reservoirs and hence rapid decline in both production rates and pressure.

Further development prospects in the field are minimal. However, some water-flooding potential exists in the underthrust Upper and Middle Cruse horizons. Finally, exploratory prospects for further underthrust sheets formed by the wrench-related compression in the area could be considered.