



Abstract:

Luc Cormier, Dalhousie University
Research Advisor: Michael Pegg
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***Study of Effectiveness of Water Flooding Patterns in Potential Offshore Nova Scotia Reservoirs
Using Simulation Tools***

The Play Fairway Analysis³ indicates that there is a high probability that offshore Nova Scotia holds vast quantities of untapped hydrocarbon resources. The purpose of this study is to reveal the efficiency of various water flooding patterns as methods of secondary oil recovery if oil reservoirs were ever to be developed offshore Nova Scotia. Obtaining rock and fluid data from previously developed fields in the same area (e.g Cohasset-Panuke) will ensure this study remains as realistic as possible. Using Petrel and Eclipse simulation software, a simple flat and square reservoir 2 km by 2 km is modeled using porosities and permeabilities that characterize the region's sandstone reservoir rocks. Using a given oil saturation fitting of post primary recovery, water injection will be modelled as secondary recovery using various injection rates in different patterns. Focus is on direct line drive, staggered line drive and five spot injection patterns. Adjusting injection rates, different fractions of the total reservoir pore volume are injected into the reservoir over a selected time period for each pattern, producing varied quantities of oil and gas. The best pattern will be the one that gives the largest oil production rate for the lowest amount of water injection. The cost of wells and injection are not accounted for in the study; however the number of wells and the water quantity required for a specific pattern are noted. The findings of this study can then be taken into account if similar situations should arise in the future of offshore Nova Scotia exploration.