

An Integrated Petroleum Systems Study of the Saglek Basin

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Abstract

A comprehensive review of old well log and seismic data coupled with more recent geophysical data, shows some intriguing possibilities that could establish the 1979 Hekja O-71 2.3 Tcf gas and condensate discovery as the forerunner of a new hydrocarbon fairway within the Saglek Basin that underlies Hudson Strait and the northern Labrador Margin. The predominantly clastic depositional environment for this basin, that has a sediment source from a region greater in area than the U.S. Gulf coast, hosts numerous complex structural features whose origins are not easily understood.

An integrated interpretation approach, incorporating a revised plate tectonic history based on marine gravity and magnetic data, newly acquired targeted seismic refraction data, and over 15,000 km of vintage seismic reflection data gave a new perspective on the understanding of the basin architecture. The results of this integrated study have provided depth-converted seismic horizons for major events within the basin and defined major structural elements that influenced the basin evolution. The widespread Paleocene flood basalts associated with the tectonism adds an additional element of geological complexity, with effects that range from limitations on seismic imaging within the basins to the thermal maturity of the sediments. This synthesis represents a substantial improvement in understanding the tectonic influence on the petroleum system within the Saglek Basin and is fundamental to modelling the petroleum prospectivity.