

Exploration Opportunities in the Sverdrup Basin, Canadian Arctic Archipelago

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The Sverdrup Basin is located in the Canadian Arctic Islands and is 1000 km long in a NE-SW direction and is 300 km across. The basin fill consists of 5 km of Late Paleozoic strata and 8 km of Mesozoic to Paleogene strata. The strata are deformed by folding and thrust faulting in the eastern half of the basin. Only broad folds and normal faults occur in the western half. Salt diapirs, sourced from a Carboniferous salt unit, are widespread and began to rise in Permian and continue to grow today. Localized and short lived basic volcanic activity occurred in Carboniferous and Permian and was much more widespread during the Early Cretaceous (130 – 95 MA). Cretaceous dikes and sills are common in Mesozoic strata in the eastern portion of the basin but are rare in the west.

The Late Paleozoic stratigraphic succession consists of a variety of tectonic and stratigraphic settings from rift basins to broad carbonate shelf/slope/basin systems to gently sloping ramps and these strata are accessible to the drill along the margins of the basin. Potential reservoirs include rift-related conglomerates and sandstones and a variety of carbonate facies from reef to shelf edge. Source rocks in the Late Paleozoic succession are not well characterized but potentially occur in basinal strata in a number of sequences. Few wells have tested Late Paleozoic plays and substantial potential exists for structurally and stratigraphically trapped petroleum in these strata along the southern basin margin.

The Mesozoic succession holds the greatest promise for future discoveries. Eighteen oil and gas fields have already been discovered in Triassic and Jurassic strata and recoverable reserves are estimated at 18 TCF of gas and .5MMBs of oil. Excellent oil-prone source rocks of Middle and Late Triassic age occur over most of the basin and porous sandstones of fluvial, strandplain, delta front and shelf origin are present in the 30 Mesozoic, third order sequences recognized in the basin. Potential traps include Tertiary anticlines, salt swells, salt dome flanks and a variety of stratigraphic/structural configurations. The greatest potential lies throughout the western portion of the basin and in the southeast where favourable maturation levels are present.

Infrastructure to produce and transport gas (LNG) from the large discovered fields will likely be put in place when gas prices rise. Substantial opportunity exists for discovering new fields which would be economic once the transportation facilities are present.