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The Sydney Basin of Eastern Canada; An Overlooked Carboniferous Basin With Demonstrated Petroleum Potential; Thoughts, Facts and Musings

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Introductory Comments

The Sydney Basin represents the most easterly extent of the upper Paleozoic fill of the much larger Maritimes Basin of Atlantic Canada (Figure 1). Thick sequences (12 km+) of mid-Devonian to Upper Carboniferous / Permian sediments include thick non-marine, multi-storied sandstones, extensive limestones and thick salt overlain by multistoried fluvial sands and coal measures. It is worth noting that a significant portion of Canada's light oil and gas output comes from Paleozoic reservoirs, and over 20% of world oil reserves originate in Paleozoic reservoirs. (Enachescu, M.E, 2006)

The Carboniferous sediments of the Maritimes Basin have been productive since the very early 1900's with both oil and gas being produced over an 80+ year period from the Early Carboniferous rocks in the neighbouring province of New Brunswick. Corridor Resources of Halifax has been producing natural gas from the McCully field in New Brunswick from these same sediments since 2003. That field is now connected to the Maritimes & Northeast Pipeline which provides some 400+ mmcf/d to markets locally and to the northeastern U.S. Corridor has also made a significant discovery of oil in sandstone lying beneath as well. Oil shales are found in New Brunswick, Nova Scotia and Newfoundland. Stealth Ventures Ltd. has committed to eastern Canada's first coalbed methane production agreement in the Cumberland Basin of western Nova Scotia. One nearshore well drilled just in the same rock units on the western side of Cape Breton Island, Nova Scotia yielded gas rates of 5.5MMcf/d. Shale gas has been evaluated in Nova Scotia with independent estimates suggesting that some 63 trillion cubic feet (in place) may exist in only one of several basins where the shales are known to occur. On June 24, 2008 Elmworth Energy Corporation submitted a development plan as part of their application in accordance with requirements for a shale gas production agreement. In each case cited, the mentioned resource has both its source and reservoir unit within the Carboniferous interval. Some fifteen companies are currently exploring for, or are developing, Carboniferous reservoirs in the Maritimes Basin of Atlantic Canada.

With a number of demonstrated viable petroleum systems within this Carboniferous interval, and the existence of new infrastructure which was not present at the time of the historical shows, it is surprising that the Sydney Basin of northern Nova Scotia has gone relatively unnoticed. Coal has been mined in the onshore and offshore regions of the Sydney Basin since the early 1700's. Liquid hydrocarbons have been reported in both faults and overlying sandstones in those mines. Natural gas has been reported escaping from seafloor faults (Courtney 1951). Oil shows have been reported from the basal carbonates on the Windsor Group. Two offshore wells in the Sydney Basin, drilled by Murphy and Shell, have a number of gas shows. An independent assessment of the anticlinal feature which was the focus of the offshore drilling indicates a gas-in-place potential in excess of 2.4 trillion cubic feet, with 1.7 tcf recoverable. (Sproule, 1975). Onland, lower Horton oil shales were quarried for oil extraction. Recent geochemical investigations show a number of source rocks that are oil and gas prone within a various stratigraphic horizons. The Sydney Basin, with both onshore and offshore potential, is truly an unexplored basin and one worthy of reconsideration given the recent success in exploration and development elsewhere in Atlantic Canada. Hunt Oil held lands in the Nova Scotia offshore, acquired new seismic but did not drill a well and