

## ABSTRACT

Oil shale occurrences have been historically reported in the Cape Breton Island, northern mainland and southern mainland areas of Nova Scotia. Twelve of these occurrences were investigated for this study. Rocks from three of the areas gave oil yields of less than 25 litres per tonne (below oil shale grade) while the remainder gave oil yields greater than 25 litres per tonne (above oil shale grade). The rock types of oil shale grade include silicate-rich shale (Antigonish Basin, Cape St. Lawrence area), carbonaceous shale locally transitional to coal (Minas Basin), limy shale and petroliferous limestone associated with coal (Cumberland and Sydney Basins), silicate-rich shale and cannel shale associated with coal (Debert-Kemptown Basin, Mabou-Inverness coalfield), and silicate-rich shale, cannel shale and boghead shale associated with coal (Stellarton Basin and Trenton Syncline). Of the areas containing rocks with greater than 25 litres per tonne oil yield, the Stellarton Basin represents the Province's largest oil shale resource with an estimated  $825 \times 10^6$  tonnes of oil shale and  $168 \times 10^6$  barrels of shale oil *in situ*. The Antigonish Basin represents the second largest oil shale resource in the Province with an estimated  $738 \times 10^6$  tonnes of oil shale and  $75.6 \times 10^6$  barrels of shale oil *in situ*.

Only Stellarton oil shale deposits have oil yields comparable to such deposits elsewhere, such as those of New Brunswick and Australia, and they represent the most favourable resource for future interest as a source of oil. Development of indirect methods for utilization, identification of useful by-products of the shale oil recovery process, inexpensive mining and retorting methods and/or higher petroleum prices could enhance the economics of oil shale development at Stellarton. Potential multiple uses for oil shale include use as a concrete additive, as an asphalt additive, and for electric power generation. However, oil shale beds are of most immediate use as stratigraphic markers since they can be recognized and correlated across Stellarton Basin. The transition of some oil shale beds into coal suggests the use of oil shale as a coal exploration tool in Stellarton Basin.

Oil shale resources and organic-rich shale elsewhere in the Province may be important petroleum source rocks. The occurrence of these rocks within strata that are age equivalent to known accumulations and occurrences of petroleum elsewhere in Nova Scotia and in New Brunswick suggests that they may have acted as regional petroleum source rocks. This possibility may have significant implications for petroleum exploration.