

Petrogenesis, age and economic potential of gabbroic intrusions in southern New Brunswick and southeastern Cape Breton Island

A.L. Grammatikopoulos and S.M. Barr

Department of Geology, Acadia University, Wolfville, Nova Scotia B0P 1X0, Canada

The Mechanic Settlement and Duck Lake plutons in southern New Brunswick are layered intrusions that range in composition from olivine pyroxenite to diorite; the smaller Devine Corner pluton is composed entirely of gabbro. The

relationship of the Hamilton Lake diorite exposed southwest of the main body of the Mechanic Settlement pluton is not clear due to poor exposure. However, the diorite may compose the upper part of the pluton. Layering in the Mechanic Settlement pluton trends northeast and dips southeast and consists of mineral layering on the hand-specimen scale and interlayering of rock types on outcrop scale. Cumulate textures are well developed in most samples in both the Mechanic Settlement and Duck Lake plutons with cumulate phases including spinel (only in Duck Lake), chromite, olivine, clinopyroxene, orthopyroxene, and plagioclase. Abundance of hydrous minerals indicates that crystallization probably took place under relatively high water pressure. Major- and trace-element data show that olivine and pyroxene dominated the crystallization sequence and that the plutons

are tholeiitic.

Gabbroic rocks of the St. Peters area in Cape Breton Island vary in composition from olivine gabbro to gabbro to hornblende-bearing gabbro. Other gabbroic plutons in southeastern Cape Breton Island occur near Baleine, Cape Breton, Louisbourg, Black Rock, and Gabarus. They consist of clinopyroxene and plagioclase with minor amphibole, biotite, quartz, apatite, and magnetite. Olivine occurs only in the St. Peters gabbros. Major- and trace-element data indicate that the St. Peters gabbros are alkaline and formed in a within-plate setting. In contrast, the other gabbros are tholeiitic but their tectonic setting is uncertain.

The age (or ages) of these plutons is still uncertain but may be Devonian.