Contact metamorphic effects of the Liscomb Pluton on the Eastville lead-zinc deposit, Colchester County, Nova Scotia

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Mineral occurrences in the Cambro-Ordovician Meguma group have been found to be preferentially associated with the transition between the Goldenville and Halifax Formations (GHT, Zentilli and MacInnis, 1984). The Eastville Zn-Pb deposit is located between Eastville and Hattie Lake, Colchester County, Nova Scotia, and consists of a 10 km section of steeply dipping GHT striking to the northeast. The Liscomb Pluton, a Devonian-Carboniferous granodiorite-

monzogranite complex, intrudes the deposit, making this locality a unique place to study the interaction of granitoids with mineralized GHT.

At Eastville, significant quantities of Mn (between 6.9 and 8.6 weight %) predominantly contained in spessartine garnet, are found in finely laminated, locally calcareous, contorted beds (coticules) of the GHT. The protolith of this coticule appears to be Mn-carbonate, as demonstrated by Hingston (1985) at Lake Charlotte (another exposed section of the GHT), where spessartine garnet has grown at the expense of Mn-carbonate with increasing metamorphic grade. At Eastville, the rocks have undergone regional metamorphism to lower greenschist facies represented by assemblages of chlorite ± spessartine garnet ± muscovite ± quartz, indicating temperatures of between 370 and 445°C.

The presence of sphalerite in the cores of regional metamorphic spessartine garnet indicates an important Zn enrichment prior to deformation associated with the Acadian Orogeny (Cameron, 1985). This textural evidence poses constraints on possible genetic hypotheses for the base metal sulphides. Syngenetic-diagenetic models are favored.

Intrusion of the Liscomb Pluton changed Zn/Pb ratios in the deposit and produced a contact aureole of staurolite grade with garnet-biotite geothermometry suggesting a temperature of around 580°C for this episode. These temperatures are only tentative, because the presence of Mn makes these geothermometers of questionable validity. The Liscomb Pluton is similar to other granitoid plutons in the Meguma Zone. Granodiorite occurs in the western section of the pluton, while monzogranite forms the more eastern section. A limited geochemical study of the northwestern corner of the Liscomb Pluton does not reveal metal specialization. If not definite evidence, similar Pb-Zn ratios in the Meguma Group and the pluton, possible metamorphic garnets in the granodiorite, and rounded xenoliths are compatible with significant assimilation of Meguma rocks by the Liscomb Pluton.

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