Marginal molassic basin onlap and mineral deposits, Loch Lomond Basin, Cape Breton Island

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The Loch Lomond Basin is a small structural basin that presently has the form of a northeasterly trending half graben. It is fault bound to the northwest and contains up to 800+ m of Visean to Namurian age rocks. It is bordered on the northwest by Hadrynian Fourchu Group volcanic-sedimentary rocks and plutonic rocks of the East Bay Hills. The major unconformable contact to the southwest is with similar rocks of the East Bay Hills (largely the Loch Lomond Pluton).

The Loch Lomond Basin contains a mixed Carboniferous succession dominated by marginal continental alluvial-fluvial and marine evaporite-carbonate sediments representing molassic deposition. Major rock packages recognized are comparable (with a few exceptions) with those in other parts of Nova Scotia and include in ascending order: Windsor Group evaporite, fine to coarse redbeds and marine carbonate (middle and upper parts only), Enon, Loch Lomond and Uist Formations (up to 350 m); fine grained Canso Group (up to 200 m); and upper Canso Group (dominantly grey sandstone up to 250+m).

Progressive onlap and overstep of stratigraphic packages with accompanying facies changes are well documented both parallel and perpendicular to the

strike of the Loch Lomond Basin. Similar changes are also present in the Salmon River - Glengarry Basin. Details of these features remain to be fully documented (1983).

Paleotopography and tectonism greatly influenced sedimentation in the Loch Lomond Basin especially the early stratigraphic units. Their importance decreased with time as erosion and deposition of onlapping strata buried the basement topography. The stratigraphic section to the top of the fine grained Canso Group displays general fining upward and basinward trends. Coarse fanglomerate facies occur as a marginal facies of the Windsor Group at all stratigraphic levels.

The numerous mineral occurrences in the area are concluded to be closely related to paleogeography (topography), tectonics and sedimentation history (especially unconformities and stratigraphic onlap-overstep). Progressive onlap-overstep is inferred to be the principal factor which produced conditions suitable for the concentration and entrapping of contact oriented and stratabound celesite, barite, Pb, Zn, Cu, Mn and abundant, but economically unattractive Fe.

Base metals ± minor celestite ± Fe ± Mn occurrences are contact oriented and localized at or near unconformity pinchouts at all stratigraphic levels. Secondary redistribution of celestite ± base metlas ± Fe (supergene ?) is inferred to have occurred in karst related hydration zones. Barite and celestite ± Pb ± Zn ± Fe are dominantly stratabound, stratified to nodular deposits (within marine carbonate, gypsum-anhydrite, red siltstone-sandstone) and may represent diagenetic replacement during or soon after Windsor Group sedimentation.