From the Mineral Inventory Files

Coxheath Mountain Pyrophyllite: Economic Possibilities

Several pyrophyllite-bearing sites that occur on Coxheath Mountain near Sydney are currently being examined by DNR geologists Phil Finck and Dan Kontak. Pyrophyllite, in formal terms, is a hydrated aluminium silicate, but to the layman it is one of the large family of clay minerals. Talc is a very similar mineral to pyrophyllite, but whereas talc contains magnesium, pyrophyllite is aluminium-rich. The mineral gets its name from the Greek words for fire and leaf (fire-leaf) since it characteristically exfoliates into a flaky, or leafy, mass as water is driven from the mineral on heating. The main uses of pyrophyllite are as a refractory mineral, a filler for rubber, paints and insecticides, and as a component of ceramics.

Hugh Fletcher of the GSC indicated two "fire-clay" pits, one of which was quarried, on his 1899 geology map of the Coxheath area (Fig. 1). These sites were prospected for their fire-clay potential throughout the early part of the 20th Century and Dominion Steel Company used the material in its Sydney steel works as a flux and to extract contaminants from the iron melt. It wasn't until 1943 that E. W. Greig included this prospect in an evaluation of Nova Scotia's clay and shale deposits and confirmed that the clay mineral present is actually pyrophyllite, with grades up to 80% and of good quality. The northeast area of the mountain is littered with numerous old pits and trenches, many of which expose pyrophyllite (Fig. 1). One small quarry exposes a 40 m zone mineralized with quartz-pyrophyllite.

In December 2002 a closure was put on the property and four trenches totalling 200 m were dug by Industrial Minerals Geologist Phil Finck. The trenching revealed that quartz-pyrophyllite occurs as a gradational alteration of the volcanic country rocks along a northwest-trending fault zone. This fault is, in turn, offset by a series of prominent northeast-trending faults. Dan Kontak determined that a sample from this zone consisted of 50% pyrophyllite with the remainder being quartz and a lesser amount of gibbsite (pure aluminum hydroxide). A further 15 samples have been collected and are currently undergoing major and trace element analyses. All of this information will be released as an Open File Report when the closure is removed this spring.

The likely source of hydrothermal fluids that gave rise to the alteration isn't far away. Coxheath Mountain is a small highland massif of late Precambrian plutonic and volcanic rocks, surrounded by a lowland of softer Carboniferous sedimentary rocks. The volcanic and plutonic rocks of Coxheath Mountain are genetically related. The volcanic rocks consist of a mix of andesite, dacite and volcaniclastic units like tuff. The pluton intruding these volcanics is zoned from very mafic gabbro and diorite, to more evolved phases like monzonite, muscovite granite, and felsite. The volcanic and plutonic rocks were likely derived from the same parental magma deep below the mountain.

There is abundant information indicating that the Coxheath Pluton was a "juicy beast" indeed. Occurrences of Cu, Mo and Au abound in the pluton and immediately adjacent volcanic rocks. One such site, the Coxheath Cu-Au deposit, was mined sporadically after its discovery in 1875. Evidence of associated hydrothermal alteration is also abundant. Geologist Greg Lynch of the GSC concluded that the entire volcano-plutonic complex is a typical Cu-Mo-Au porphyry system, consisting of higher temperature potassic alteration within the pluton, zoned outward to progressively lower temperature propylitic, phyllic and argillic alteration zones in the pluton and surrounding volcanic rocks. The argillic alteration is characterized by kaolinite, pyrophyllite and chalcedony, and is likely the source of the quartz-pyrophyllite zone being examined.

George O'Reilly

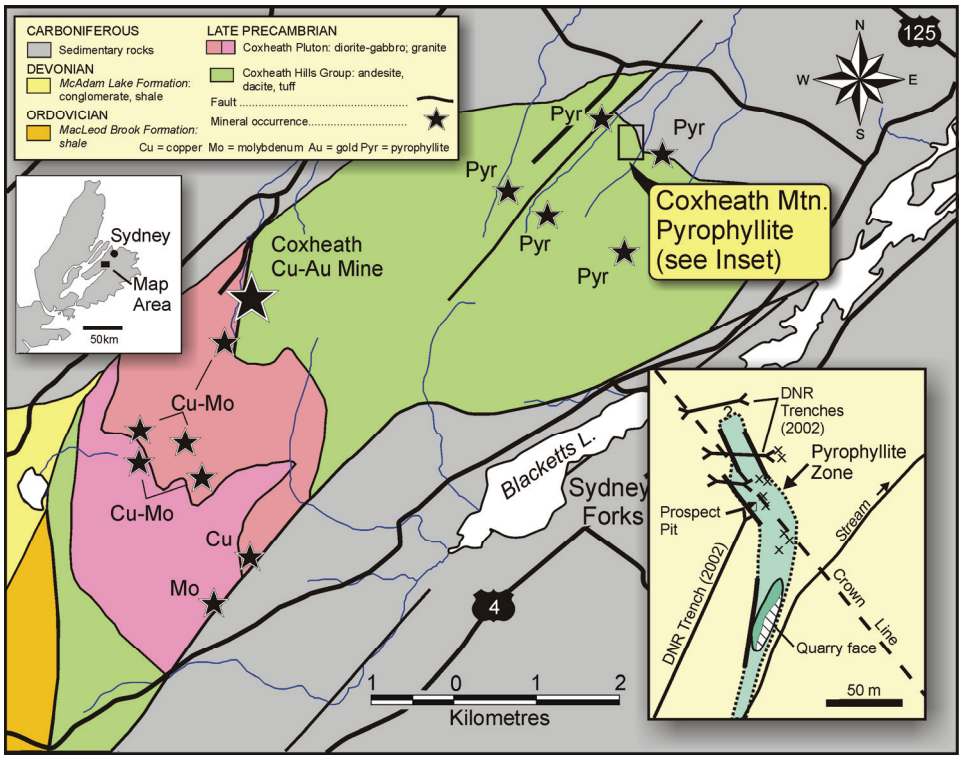

***Figure 1**. Geology map and mineral occurrences in the Coxheath Mountain area.*