Nova Scotia

We're Worth Exploring

Vein and Breccia Deposits of Fe-Cu-Co-Ni-Ba-Au Associated with the Cobequid-Chedabucto Fault Zone, Nova Scotia

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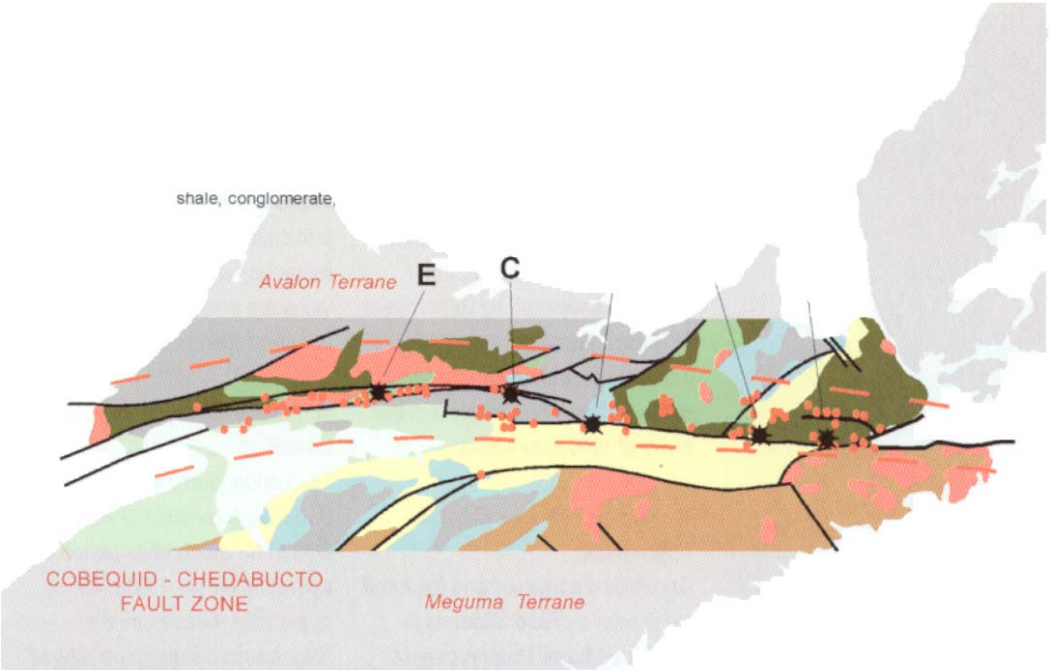
Structural Setting

The Cobequid-Chedabucto Fault Zone comprises a series of crustal-scale faults that bisect Nova Scotia into the Avalon Terrane to the north and the Meguma Terrane to the south. This fault zone is host to more than one hundred mineral occurrences consisting of veins and breccias of ankerite and siderite, many with significant amounts of hematite, specularite, pyrite, chalcopyrite, barite, and manganese oxides. Mineral occurrences range from single veins that have not been subject to exploration, to massive vein and breccia systems where considerable mining activity has taken place in the past (e.g. the Londonderry Iron District). Recent exploration has shown that many of the more sulphide-rich occurrences also contain significant concentrations of Cu, Co, Ni and Au.

The Cobequid-Chedabucto Fault Zone is the most prominent geological feature in the Province of Nova Scotia. The quantity and size of gabbroic intrusions along its length are evidence that this fault system has tapped the mantle. In addition, the quantity of mineral occurrences and their association with extensive hydrothermal alteration haloes indicate that this structure acted as a passageway for large volumes of hydrothermal fluid. The assemblage of Fe-carbonates with sulphides of Cu, Co and Ni is further evidence of a mantle origin for the mineralizing fluids.

Most of the exploration on these mineral occurrences was carried out in the 1800s or early 1900s, and was limited to their potential for deposits of Fe-oxide. From the viewpoint of modern mineral exploration, it is the presence of economically significant concentrations of Cu-Co-Ni-Au in the vein and breccia systems that is worthy of further attention. This information circular summarizes the



Distribution of Fe-Cu-Co-Ni-Ba-Au deposits associated with the Cobequid-Chedabucto Fault Zone in central Nova Scotia.

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features of this interesting elemental association by describing some of the better-known deposits associated with the Cobequid-Chedabucto Fault Zone.

A. Copper Lake Cu-Fe-Au Prospect

After its discovery in the last century, the Copper Lake prospect was explored solely for its copper and iron potential. Exploration since the 1970s indicates that it also has potential for gold. Mineralization is evident in several fissure veins of siderite and ankerite containing chalcopyrite, pyrite and specularite which intrude a well-developed fault zone in dark slate. The veins are associated with very intense carbonate and silica wallrock alteration. Copper assays generally show concentrations of 5-10% Cu; concentrations of 3-4 g/t Au are common in dump samples. Individual assays of 1 oz./ton Au have also been reported.

B. Erinville Fe Mine

At Erinville, Guysborough County, a fault and breccia zone greater than 70 m thick has been invaded by a carbonate- and silica-rich hydrothermal fluid. The fluid precipitated a well-developed ankerite-quartz-specularite vein system that was exploited for its Fe-oxides in the last century. This site has never been evaluated for anything other than iron, but recent examination by Department of Natural Resources geologists indicated that specularite- and pyrite-rich samples contain in the order of 1000 ppm cobalt.

C. Mount Thom Cu-Co Prospect

Originally discovered and explored for copper by Esso Minerals in 1970, the Mount Thorn prospect consists of fault-controlled breccias and veins in metasiltstone in the exo-contact zone of an exposed mafic intrusion. The breccia matrix comprises chalcopyrite, pyrite, hematite, siderite and ankerite. Assays from 48 shallow diamond-drill holes show common intersections with 0.2 - 1.0% Cu, with sections up to 4% Cu. Re-sampling in the last decade has shown that the mineralized intersections also contain significant Co (1000 to 4000 ppm common). This cobalt potential remains to be systematically assessed.

Specimen of chalcopyrite-pyrite-siderite from the Copper Lake Cu-Fe-Au prospect

D. Drug Brook Siderite Occurrence

A breccia and vein zone greater than 30 m wide occurs in Carboniferous sedimentary rocks along Drug Brook, Pictou County. Several siderite-ankerite veins within this zone also contain pyrite and chalcopyrite. Recent exploration has revealed that these veins are anomalous in gold, with concentrations up to 0.48 oz./ton.

E. Londonderry Iron District

The Londonderry Iron District was Canada's foremost iron-mining district for much of its period of operation (1847- 1906). Mining operations focused on the limonite-rich, supergene-altered cap (top 100 m) of fault-controlled ankerite-siderite vein systems. Although the ore production was from three main sites, the massive size and strike extent of the vein systems is of particular note. These veins and breccias persist for a strike length of at least 16 km; separate veins and pods commonly attain widths of 40 m or more.

The Londonderry vein systems are the best developed of the more than one hundred ankerite-siderite vein and breccia occurrences associated with the Cobequid-Chedabucto Fault Zone. Descriptions of the other occurrences show that the widespread hydrothermal event that produced them commonly resulted in significant concentrations of Cu, Co, Ni and Au. Since the Londonderry veins share the same structural style, geological setting and elemental association with these other occurrences, perhaps deeper levels of the Londonderry systems may have potential for metal deposits other than iron. The Londonderry veins, as exposed at surface, are known to be slightly anomalous in these other metals; however, support for a vertical zonation into sulphide-rich ore is provided by old mine reports stating that sulphide content increased with depth. A model of vertical zonation has never been fully evaluated.

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