HEDLEY GOLD SKARNS

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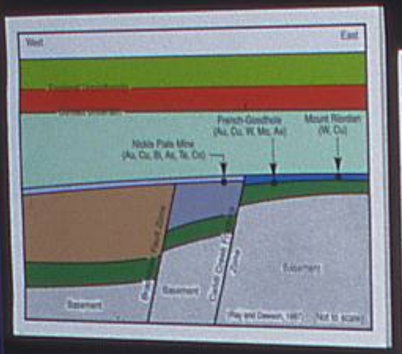
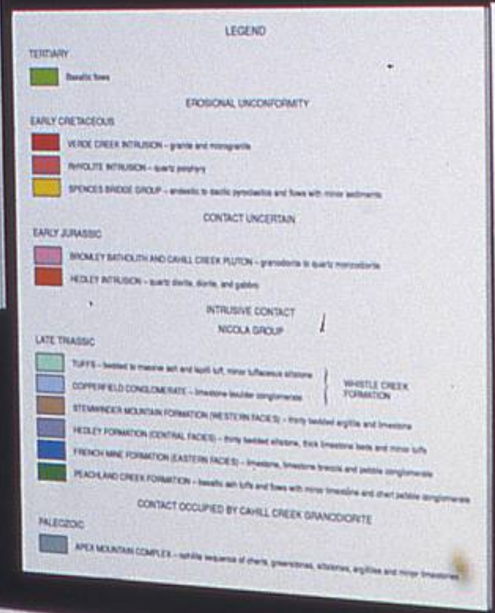
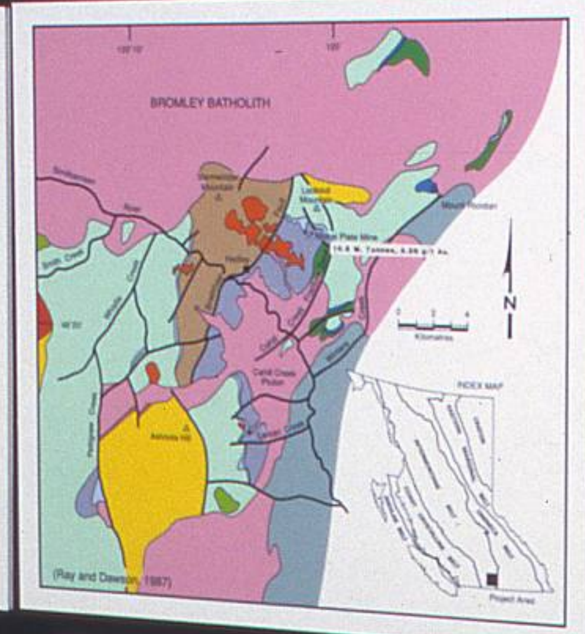


Arsenopyrite in diopside-garnet skarn
Nickel Plate Mt., Hedley





GEOLOGY OF THE HEDLEY DISTRICT

The southeastern portion of the mapsheet is occupied by the Apex Mountain Complex, a highly deformed Paleozoic to Triassic ophiolite sequence.

Much of the remaining area is underlain by the Upper Triassic Nicola Group which is divided into a younger predominantly volcaniclastic Whistle Creek Formation and an older, predominantly sedimentary sequence in which a number of east to west facies changes were present. These facies changes reflect sedimentary deposition across a fault controlled, northwesterly sloping marine basin margin. To the east is the thin, shallow water, limestone-rich French Mine Formation which hosts the French and Goodhope gold skarns. In the central part of the area is the thicker, siltstone predominant Hedley Formation which hosts the Nickel Plate mine mineralization, while to the west are the deeper water argillaceous sediments of the Stemwinder Mountain Formation. The gold skarn mineralization in the district is confined mainly to the shallower water central and eastern facies rocks and is absent in the deeper water Stemwinder Formation.

The plutonic rocks in the area include the early Jurassic Hedley Intrusions that form large stocks and swarms of thin sills and dykes. These range from quartz diorite to gabbro and are spatially and probably genetically related to the auriferous skarn mineralization in the district. A younger suite of early Jurassic plutonism resulted in the Bromley Batholith and the Cahill Creek Pluton, which are of granodiorite composition; this suite is generally barren and not associated with skarn mineralization.

The younger rocks in the area include the early Cretaceous volcaniclastic and sedimentary rocks of the Spences Bridge Group.

GEOCODING

PROGRESSIVE DEVELOPMENT OF SKARN ALTERATION

A temporal sequence of skarn development is recognized in the Hedley district which is illustrated in the adjoining figure. Initiation of the skarn process on the small scale commences with the formation of an irregular area of biotite hornfels alteration often centred about a fracture (A). As the skarn forming fluids continue to pass along the fracture, a central zone of diopsidic alteration starts to form and the surrounding biotite hornfels-type aureole grows in area (B). As the biotite and diopsidic zones increase in size, a central garnet-rich zone is developed (C). When the biotite hornfels aureole reaches a diameter of 10 or 20 metres, its development ceases, but the garnet-rich and diopside-rich zones continue to grow (C) and eventually completely overgrow and replace the outer hornfelsic aureole. This replacement often result in the formation of a thin reaction zone of pink potassium feldspar that separates the biotite and diopsidic alteration (B and C).

The larger skarn envelopes in the district, such as the 6 square kilometre zone of alteration which surrounds the Nickel Plate mine mineralization, possess no peripheral biotite hornfelsic aureole (D). The diopsidic alteration which passes directly out into the unaltered host rocks, contains small, irregularly distributed remnants of the earlier biotite hornfels (D). The gold-sulphide mineralization is commonly found close to the outer, footwall margins of the diopsidic alteration aureole.

SKARN DISTRIBUTION IN THE HEDLEY GOLD CAMP

The adjoining diagram shows the location of areas underlain by major skarn alteration in the Hedley district. All these areas lie within the more shallow marine-facies, lime-rich sedimentary rocks, while in the westerly, deeper basinal facies rocks skarns are only poorly developed. Each skarn altered area generally comprises some central cores of garnet-rich alteration that are surrounded by more extensive, diopside-rich envelopes. The largest skarn in the district covers approximately 6 square kilometres, is up to 300 metres thick and is associated with the Nickel Plate mine mineralization. Other substantial alteration zones in the area include those associated with the Canty, Goodhope and French gold mines, as well as areas east of Ashnola Hill and at Mount Riordan, situated 7 kilometres east of the Nickel Plate Mine. The Mount Riordan skarn, in contrast to the Nickel Plate skarn is massive and garnet-rich, and is associated with gold-poor, tungsten-copper-rich mineralization. The skarn mineralization at the French, Goodhope and Canty mines shows intermediate characteristics to the Nickel Plate and Mount Riordan skarns.

For a more detailed description see Ray, G.E., Dawson, G.L. and Simpson, R. "The geology, geochemistry and metallogenic zoning in the Hedley gold-skarn camp."

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NICKEL PLATE MINE