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12. TILL GEOCHEMICAL EXPLORATION OF THE HEARNE HILL PORPHYRY Cu DEPOSIT, BRITISH COLUMBIA: DELINEATING ZONES OF HIGH-GRADE Cu-Au MINERALIZATION

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Introduction

The Hearne Hill deposit is a large, low-grade porphyry copper system that contains high-grade Cu-Au mineralization within two known volcanic breccia bodies. The Hearne Hill porphyry was discovered in the early 1960s, but only recently has the size of the Cu-Au-enriched breccias been fully appreciated. This realization is due in large part to exploration over the past four years that has included detailed geological mapping, geochemistry, geophysics, trenching, and diamond drilling. Procedures and results from the surficial geology and geochemistry program that was conducted during the summers of 1996 and 1997 are summarized.

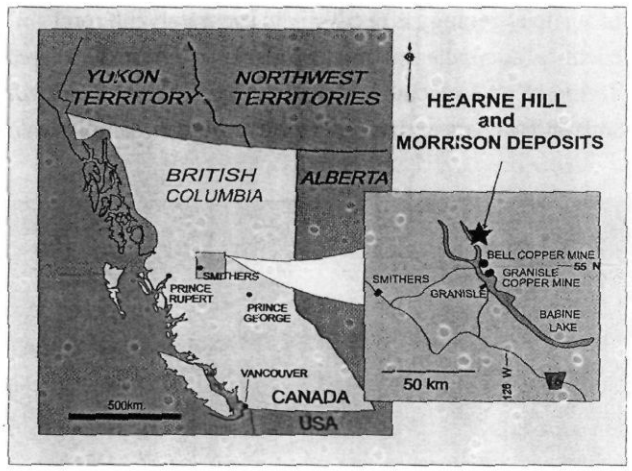

Figure 1. *Location map for the Hearne Hill and Morrison deposits.*

Location and Geological Setting

Booker Gold's Hearne Hill and Morrison claims are 65 km northeast of Smithers in central British Columbia (Fig. 1). The properties are within the Babine Lake Porphyry Copper Belt north of the former Granisle and Bell open-pit mines.

The Hearne Hill property is underlain by the Early to Middle Jurassic Hazelton Group, which consists principally of waterlain grey lapilli and crystal tuffs, and grey andesites with subordinate sedimentary rocks. The Morrison property is underlain by Middle to Late Jurassic sediments of the Ashman Formation from the Bowser Lake Group. These country rocks have been intruded by biotite feldspar porphyry (BFP) bodies belonging to the Eocene Babine igneous intrusive suite (Fig. 2).

The Hearne Hill and Morrison deposits are typical Babine porphyry Cu-Au-Mo-Ag systems. At Hearne Hill, breccia bodies containing Cu-Au-enriched mineralization (>0.8% Cu, >0.5 g/t Au) occur within the porphyry deposit. The Chapman and Bland zones are two distinct areas of the Hearne Hill property known to contain mineralized breccias.

Geochemistry and Surficial Geology of the Hearne Hill Property

A surficial geochemical program was initiated on the Hearne Hill property during the summer of 1996 and was completed in 1997. The objective of the program was to obtain regional geochemical coverage of the property and

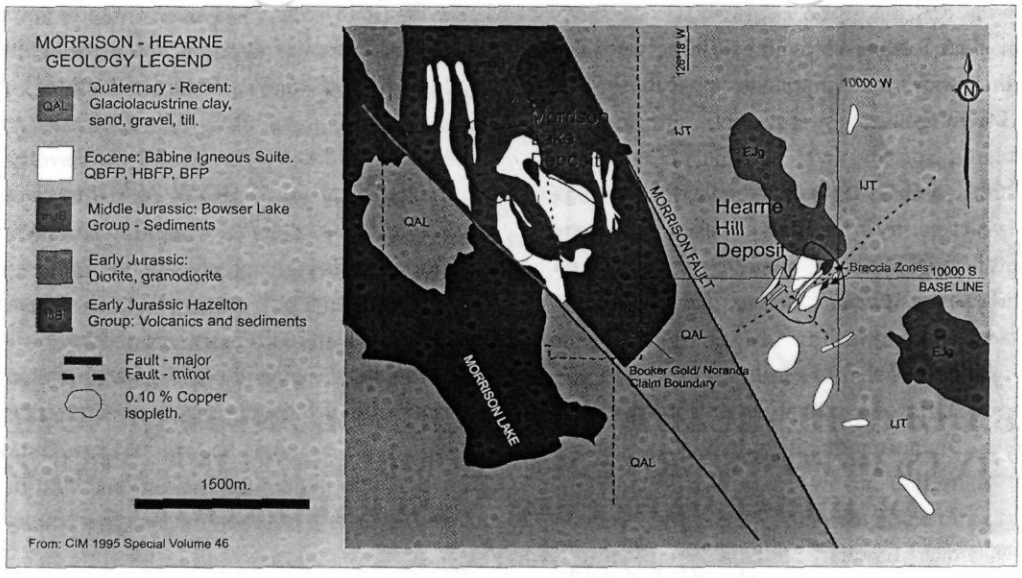

Figure 2. *Local geology of the Morrison and Hearne Hill area.*

to locate additional drill targets. A thorough understanding of surficial geology is necessary to accurately interpret geochemical anomalies on the steep glaciated terrain of the area. To avoid post-glacial hydromorphic effects in B-horizon soils and to characterize better the overburden, samples were collected from the C-horizon at an average depth of 0.8 m below the surface. Terrain morphology at the sample location, and sedimentological characteristics of the sample medium, were noted at each sample site. Most samples were classified as from either a blanket (>1 m thick) or from a veneer (<1 m thick) of basal till, remobilized till, or colluvium. Basal till is a matrix-supported diamicton that is transported and deposited directly from glacier ice. Ice flow in the region during the glacial maximum was south-southeast (150-160°). Remobilized till is diamicton of basal till origin that has been washed of fines and redeposited. Colluvium is weathered, broken-up bedrock transported downslope by gravity. The slope gradient at Hearne Hill is between 10 and 25° toward the west-southwest (250-260°).

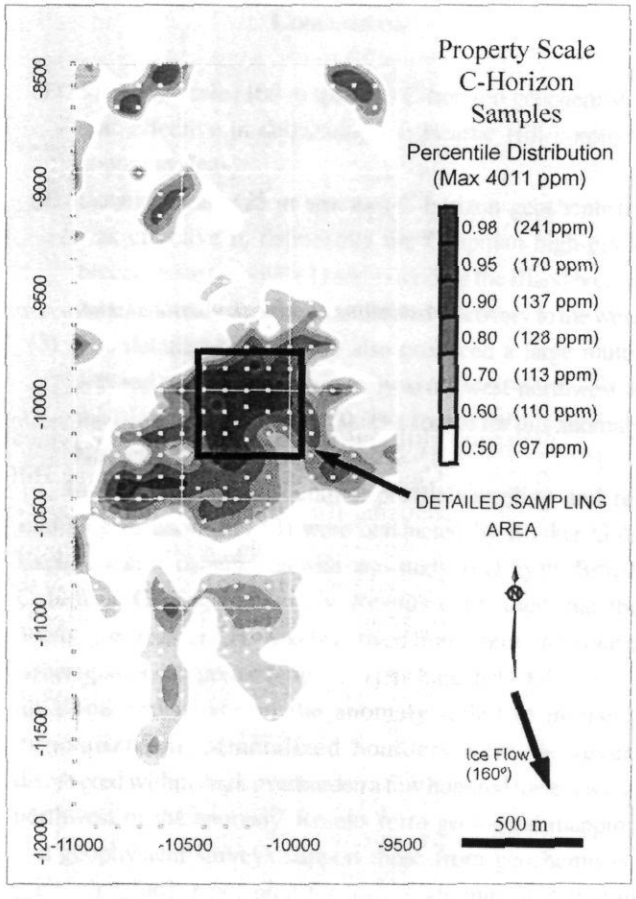

Figure 3. *Property-scale map of Cu concentration.*

A property-scale survey was conducted initially with a total of 406 samples collected at 100-m intervals. Strongly anomalous Cu results occurred over the Hearne Hill porphyry system, with concentrations decreasing downslope (southwest) and down-ice (southeast) of the known deposit (Fig. 3). To delineate potential high-grade zones, a detailed survey was conducted within the area where Cu concentrations were above the 90th percentile. Results for these additional 153 samples collected at 25-m spacing produced areas with Cu-Au concentrations 50-100 times greater than background levels. Samples obtained within the detailed grid were classified predominantly as veneers of either colluvium or remobilized basal till. The sediment in these samples is in theory sourced from areas a short distance up-slope and up-ice of the sample locations.

The Cu-concentration map revealed three distinct multi-site anomalies (Fig. 4). Anomaly (1) was located over the previously delineated high-grade mineralized Chapman

zone. Anomaly (2) was located near the high-grade Bland zone, with maximum Cu values 50 m west of the zone. Anomaly (3) was located in an unexplored area and had coincident anomalies for Au, As, Mo, and K, including two samples above 900 ppb Au (Fig. 5).

Road construction and trenching upslope of stronger concentrations (5900 ppm Cu) within the western part of anomaly (2) uncovered 40 m of intensely mineralized volcanic breccia that assayed more than 1% Cu and 1 g/t Au. Subsequent diamond-drill holes in the area produced excellent results. In contrast, trenching and drilling in the vicinity of anomaly (3) failed to intersect a mineralized zone.

A detailed map of surficial geology was constructed on the basis of information from sample pits and trenches (Fig. 6). Descriptions and assays from profile sampling were also compiled. The surficial geology revealed that anomaly (3) consisted mainly of thin colluvial samples, suggesting a proximal upslope source. However, at the upslope head of the anomaly, thicker basal till sediments were encountered. Profile sampling within the basal till suggested a source farther up-ice, as deeper samples were typically anomalous for Cu (>1000 ppm). Trenching revealed occasional mineralized boulders within thick (>5 m) glacial overburden. Drilling in this area is planned.

Conclusions

(1) Property-scale (100 m spacing) C-horizon geochemistry was effective in delineating the Hearne Hill porphyry copper system.

(2) Detailed-scale (25 m spacing) C-horizon geochemistry was effective in delineating the Chapman high-grade breccia zone (anomaly 1) and extending the Bland breccia zone (anomaly 2), with an additional discovery to the west.

(3) The detailed-scale survey also produced a large multi-site and multi-element anomaly to the west-northwest of the Bland zone (anomaly 3). The source for this anomaly has yet to be found.

In 1996 and 1997, detailed profile sampling and re-sampling of anomanly (3) were conducted by Booker Gold Explorations in conjunction with case-study work by the British Columbia Geological Survey. Results confirmed that the anomaly is 'real' and was likely derived from a proximal source either up-slope or possibly up-ice. Trenching in the fall of 1997 up-slope and up-ice of the anomaly failed to intersect mineralization. Mineralized boulders were, however, discovered within thick overburden a few hundred meters west-northwest of the anomaly. Results form geological mapping and geophysical surveys support those from geochemistry, suggesting further potential for high-grade mineralization in this area.

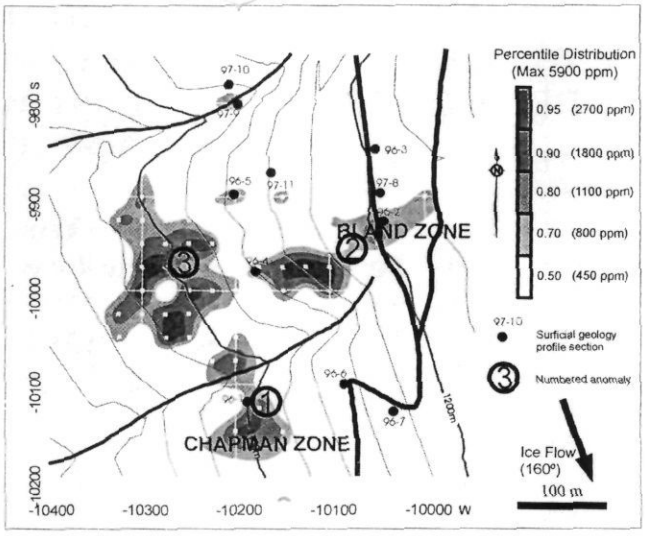

Figure 4. *Detailed-scale map of Cu concentration.*

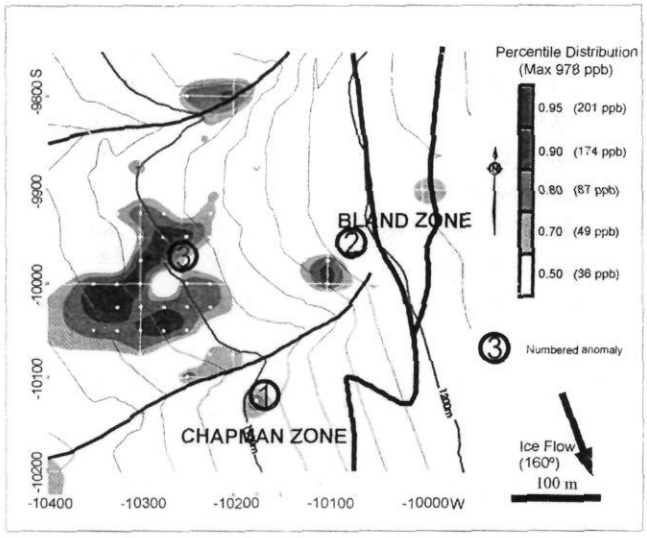

Figure 5. *Detailed scale Au concentration map.*

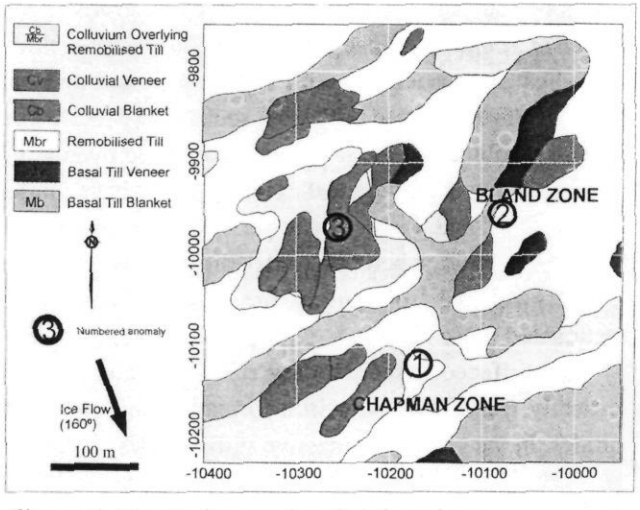

Figure 6. *Detailed map of surficial geology.*