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PORPHYRY COPPER STUDY

OF THE PRINCETON AREA

AND

A REPORT ON THE ELK CLAIM

NTS-92H

by

UNITED MINERAL SERVICES LTD.

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PORPHYRY COPPER STUDY

INTRODUCTION

This report presents the results of a compilation of geological, geophysical and geochemical data and techniques pertinent to porphyry copper exploration in the Princeton district. The main objectives of the study are to:

1. Develop a reasonable metallogenic model for the Princeton district, given the appropriate data.

2. Review and evaluate exploration criteria and methods suited to porphyry copper search.

3. Outline areas of high priority for immediate field evaluation.

The Princeton district has been for many years and still remains today a major area of exploration activity in British Columbia. Past exploration efforts have met with widely varying degrees of success. This is attested to by the fact that the Princeton district displays a very complex geological history. It is clearly evident that a sound method of attack is necessary to ensure a successful exploration program.

The area described in this report is indicated in Figure 1. It includes part of N.T.S. 92H.

PHYSIOGRAPHY

The Princeton district is located at the southern extremity of the Interior Plateau, a topographic feature extending half the length of British Columbia north of the United States border. The plateau surface displays low topographic relief, generally between 4000 feet and 5000 feet above sea level. A local basin near the town of Princeton where elevations are below 3000 feet rises westward to mountainous terrain of the Cascades. The area immediately surrounding Princeton is markedly more rugged than plateau surfaces farther north. Streams have incised themselves deeply into the plateau surface creating narrow, steep-sided valleys. Vertical exposures can reach a thousand feet or more. Glacial deposits and Tertiary and Quarternary volcanic and sedimentary rocks cover much of the district.

Much of the district lies within the rain-shadow belt of the Coastal Mountains. Rainfall varies from as little as 10 inches in the interior valleys to as much as 25 inches or more in upland areas flanking the Cascade Mountains.

The district is served by rail and highway routes. Access to much of the terrain beyond these major routes is afforded by an extensive network of logging and forestry roads.

GENERAL GEOLOGY

The Princeton district forms the southern extension of the Quesnel Trough, which is bounded to the east by Proterozoic and Palaeozoic rocks of the Omenica geanticline and to the west by Palaeozoic rocks of the Pinchi geanticline. The southernmost part of the trough is bounded to the west by deformed, mainly Cretaceous sediments of the Cascade fold belt (Figure 2).

"Quesnel Trough" - is a general term given to a north trending belt of arc-derived Upper Triassic and Lower Jurassic volcanics and volcaniclastic sediments that outcrop for 1200 miles from the International Boundary south of Princeton to the Stikine Arch in Northern B.C.

There are two predominant lithofacies types that make up the Quesnel Trough; a volcanic facies composed of andesitic and basaltic flows, pyroclastics and derived epiclastics, and a distal facies consisting of limestone, chert, argillite, black shale, tuff and minor volcanic assemblages. Coarse clastics and intercalated volcanics of Cretaceous age and later are locally abundant.

Contained within the volcanic facies are syenitic complexes thought to be coeval with them. Rock types are typically diorite, syenodiorite, monzonite and syenite, and manifest themselves as small stocks, intrusive breccias and dyke swarms. Complexes representative of this group are known at Copper Mountain, Jura Station (Elk group) and Aspen Grove (Big Kid claim).

Associated with syenitic intrusions are large batholiths and stocks composed of quartz diorite, granodiorite and quartz monzonite. Typically, these intrusives have formed adjacent to and away from syenitic complexes centered on major northerly trending zones of crustal weakness (Summers Creek fault system). These bodies are of Upper Triassic and Lower Jurassic age. Some appear to be related to deformation and uplift of the volcanic-sedimentary terrain while others seem to be an integral part and coeval with the volcanic rocks they intrude.

The volcano-plutonic assemblage of the Quesnel Trough displays many of the features of island arc systems throughout the globe.

The overall pattern of evolution seems to have been:

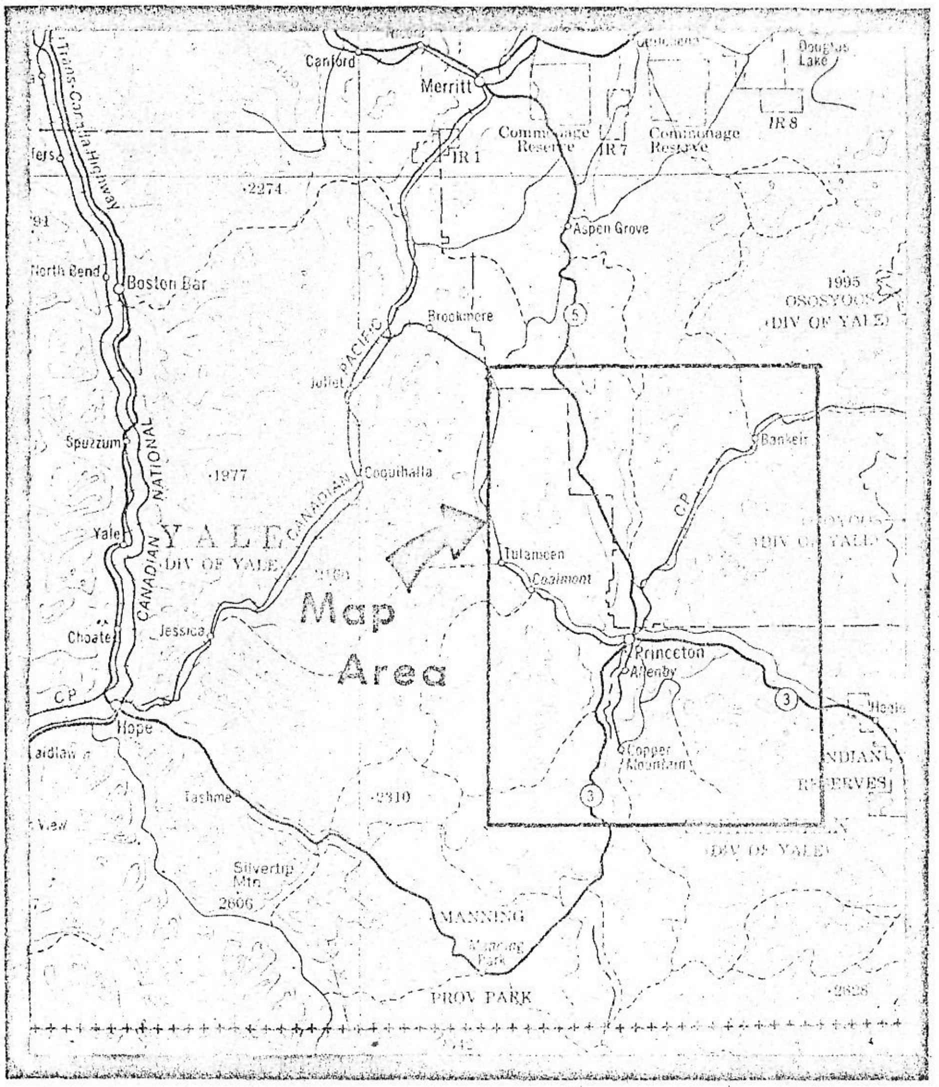

FIGURE 1 – Map showing location of area described in report and covered by the accompanying geological map.

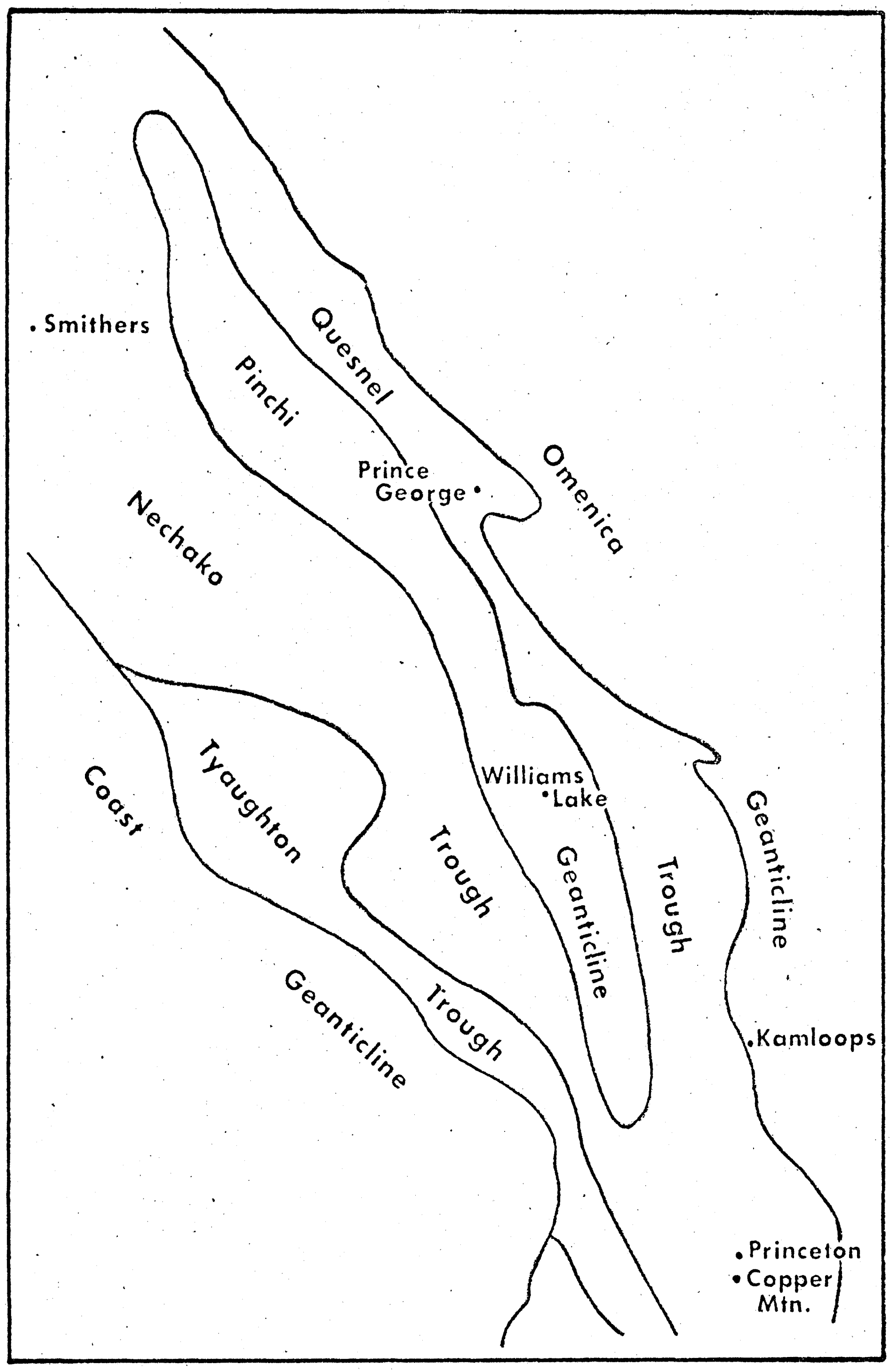

FIGURE 2 - Map showing the location of the Quesnel Trough and adjacent tectonic elements.

1. Submarine erruptions of andesite and basalt, building a thick volcanic succession.

2. Formation of subaerial volcanic centers.

3. Development of peripheral sedimentary basins and alluvial fans.

4. Emplacement of subalkaline intrusive complexes in volcanic centers.

5. Intrusion of large granitic plutons.

6. Uplift and regional metamorphism.

7. Continental deposition in successor basins.

8. Continental volcanism and emplacement of sub-volcanic plutons.

LITHOLOGY

A geological map of the Princeton area is provided in the map pocket, on a scale of 1 inch to 2 miles. Rock formations are all Upper Triassic or younger.

The two predominant lithofacies types of the Quesnel Trough are well represented in the Princeton area and are described collectively as the Nicola Group.

A central north-striking belt from Pasayten River to Aspen Grove (Unit 16) is formed from volcanic rocks consisting of andesitic and basaltic flows, pyroclastic and epiclastic sediments.

Much of the volcanic lithology consists of calc-alkaline basalt and andesite and green to grey andesite. Pyroclastic deposists are common and are usually composed of crystal and lithic tuffs and less often complex breccias.

Fragmental rocks appear to have diverse origins. Fragments of andesite and syenite are common. Groundmass fabrics vary considerably, ranging from pyroclastic and clastic types to igneous fabrics typical of volcanic rocks. Many of the coarser fragmentals are poorly sorted and are associated with nearby well sorted tuff beds and epiclastic sediments. In general they are believed to be associated with a subaerial stage. Flow breccias, lahars, coarse volcanic conglomerate related to the collapse and erosion of the volcanic pile and tuff breccias formed by explosive volcanism are also present.

A recent study (Preto - 1975) has subdivided the Aspen Grove area into three lithologically different belts separated by major fault systems (Figure 3). In the area south of Aspen Grove the Summers Creek fault marks the boundary between largely sub-aerial assemblages of the Eastern belt and mostly submarine sequences of the Central belt.

Dyke swarms, complex intrusive breccias and small plutons of syenite, syenodiorite and monzonite (Unit 3) occur in the volcanic assemblage. Syenitic rocks are commonly associated with volcanic rocks that have undergone extensive alteration to rocks rich in albite, K-feldspar, biotite, epidote, scapolite and various sulphides and oxides. Alteration represents a late meta-somatic period involving introduction of Na-Ca-K, volatiles and various metals. This period is a typical and important feature of the volcanic stage. Ore bodies currently undergoing development at Copper Mountain (Newmont) are directly associated with this fumarolic stage.

Carbonate rocks occur at various horizons within the volcanic sequence intercalated with fragmental units. They are typically calcarenites developed from the erosional products of reefs originally formed around volcanic centers.

Argillite, limestone, chert, quartzite and thin inter-bedded volcanic members are the main constituents of the sedi-mentary lithofacies (Unit 1b). The origin of these rocks is most probably variable. Undoubtedly some of the sediment originated from erosion and shedding of materials from the Omenica geanti-cline. However, much of the sediment immediately flanking the volcanic belt can be expected to originate from the erosional products of emergent parts of the volcanic terrain. Tuff, tuff-aceous argillite and volcanic breccia are not uncommon and are found as thin discontinuous beds and lenses.

Batholiths and stocks of quartz diorite, granodiorite and quartz monzonite (Units 4, 5) comprise the bulk of intrusive bodies in the Princeton area. Most are Upper Triassic or Lower Jurassic in age. The Eagle, Cathedral and Okanagan batholiths are among the largest. Variable in composition and texture, the plutons consist for the most part of medium to coarse grained equigranular grey and reddish quartz diorite and granodiorite. Most have intruded rocks of the Nicola group as evidenced by numerous inclusions and roof pendants of Nicola rocks.

Plutons such as the Okanagan batholith may be related to deformation and uplift of the volcanic and sedimentary rocks. Others contained entirely within the volcanic lithofacies are most probably an integral part of the volcanic assemblage, intrus-ive into their own volcanic pile. Many were unroofed by Middle Jurassic or earlier.

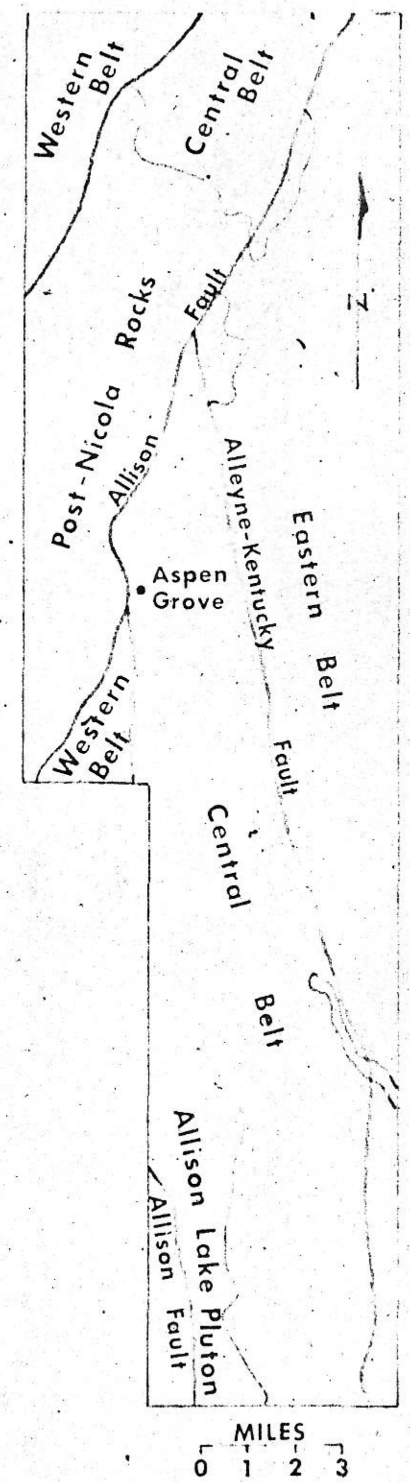

FIGURE 3 – Map of the Aspen Grove Area showing major lithological belts within the Nicola. (Preto–1975)

Pink and grey granodiorite (Otter intrusions, Unit 8) form a series of small plutons extending from Copper Mountain northeasterly to Otter Lake and Kingsvale.

Tertiary deposits of conglomerate, sandstone and shale (Unit 10), basalt and andesite (Unit 11), and plateau basalt (Unit 12), overlie much of the older rocks and are particularly abundant near Princeton.

STRUCTURE

Major structural features are indicated in geological map in pocket. The most important structure is the Summers Creek lineament, a series of northerly striking subparallel faults found from Pasayten River south of Copper Mountain to Nicola Lake in the north. The southern extension of the system is formed by the Boundary fault west of Copper Mountain, which offsets the Ingerbelle orebody and brings sedimentary rocks of Unit 1a into fault contact with volcanic rocks of Unit 1b. The Summers Creek fault, Missezula fault and Kentucky fault together form the northern counterpart of the system.

Northeasterly trending lineaments are numerous and manifest themselves as magnetic linears, faults and topographic features. The Trout Creek linear, and another parallel linear a few miles north are among the most prominent. The southwestern members of these linears intersect the Summers Creek lineament near the Axe property where both directions are common fracture directions. If the northern member of the Trout Creek lineament is extended along strike to the northeast it would eventually intersect the westerly trending MacDonald Creek lineament near the Brenda mine. The most commonly mineralized fractures in the Brenda orebody trend westerly and northeasterly.

The Hayes Creek fault is a north-northwesterly trending structure that is well documented between its southern terminous near Mount Darcy and Jura Station to the north. The northern extension as shown on the geological map merits possibility but still remains highly speculative. The fault intersects the northern member of the Jura lineament east of the Elk group (former Cop-Ex property), and as noted previously may terminate at this junction.

Ores at Copper Mountain are structurally controlled and are dependent on fractures associated with the Copper Mountain fault. Subparallel and conjugate fractures appear to be the dominant control on the transport and localization of mineralization. Ore grade material at Ingerbelle is also heavily dependent on the intersection of fault and fracture systems.

MINERAL DEPOSITS

The Princeton district is characterized by a large number of mineral occurrences that exhibit variable metal content and geological features.

The majority of deposits fit into five general categories.

1. Volcanogenic Class.
   a. Volcanic lithofacies
   b. Sedimentary lithofacies

2. Plutonogenic deposits.

3. Porphyry deposits.

4. Metamorphic and skarn deposits.

5. Gabbro-ultramafic class.

METALLOGENIC MODEL

Within the Princeton district it has been noted that much of the mid Mesozoic terrain appears to be an island arc environment. In general, the evolutionary trend has been development of submarine eruptions of basalt and andesite; formation of subaerial volcanic centers and peripheral marine basins, intrusion of gabbro and ultrabasic rocks; emplacement of alkaline intrusives in volcanic centers, late fumarolic activity; emplacement of granitic plutons, uplift and regional metamorphism; nonmarine continental deposition in volcanic and sedimentary basins. The categories listed in Table I belong to the environments in the above scheme. Only deposits of the volcanogenic category are restricted solely to rocks of the Quesnel Trough.

The evaluation of copper environments is best accomplished in the light of the above scheme.

Stockwork and disseminated deposits develop in late fumarolic stages in close proximity to volcanic centers, which are typified by the presence of alkalic intrusive and fragmental rocks.

Sedimentary basins peripheral to volcanic centers form the locus for accumulation and concentration of copper, lead, zinc and precious metals. Venting of fumarolic material from these volcanic centers into surrounding basins may result in either the incorporation of these metals into accumulating sediments or the formation of hydrothermal deposits in consolidated rocks close to

TABLE I

CLASSIFICATION SCHEME FOR MINERAL DEPOSITS OF THE PRINCETON DISTRICT, B.C.

	1. VOLCANOGENIC		2 PLUTONOGENIC	3 PORPHYRY Cu & Mo
LITHOLOGY	a) Volcanic lithofacies Andesitic flows, pyroclastics, syenitic complexes.	b) Sedimentary lithofacies Argillite, limestone, chert, volcanics.	a) Internal – quartz diorite, granodiorite, quartz porphyry, breccia pipes. b) External – developed in volcanic rocks adjacent to plutons, may include some skarns.	Porphyritic quartz diorite, granodiorite, quartz monzonite, quartz porphyry. Intrusive breccia. Ignimbrite, dacite, andesite, pyroclastics
ASSOCIATED METALS	Cu (Cu-Mo)	Cu-Au-Zn-As (Pb) Au-As	Cu Cu-Mo (Pb, Zn) Mo	Cu-Mo (Au) Cu-Mo Mo
MINERAL ASSEMBLAGE	Chalcopyrite-pyrite Chalcopyrite-bornite (pyrite) Chalcopyrite-specularite Chalcopyrite-chalcocite-bornite Native-copper-chalcocite	Arsenopyrite-pyrrhotite Chalcopyrite-gold-sphalerite Arsenopyrite-gold (sphalerite) Pyrite-gold (galena)	Bornite-chalcopyrite-molybdenite. Chalcopyrite-molybdenite (pyrite) Pyrite-molybdenite Chalcopyrite-specularite Chalcopyrite-magnetite	Pyrite-chalcopyrite-molybdenite Chalcopyrite-bornite-pyrite
GANGUE	K-feldspar-biotite Epidote-Na,K feldspar-chlorite-pyrite-magnetite. Epidote-chlorite-magnetite (specularite).	Quartz-carbonate-(ankerite, barite) Quartz-sericite (chlorite, clay minerals)	K-feldspar-quartz, sericite-quartz Biotite	K-feldspar-quartz Biotite Sericite-quartz Chlorite
STRUCTURE	Disseminated, stockworks AND vein networks.	Veins or multiple veins, silicified shears.	Disseminated and stockwork, veins and vein networks.	Stockworks Disseminated
TYPE LOCALITIES	Copper Mountain, Jura, Aspen Grove.	Hedley Gold Camp, Laws Camp, Whipsaw Creek.	a) Brenda Mines, Quilchena Ck., Selish Mtn. b) Adonis Mines (Axe property),	McBride Ck, Whipsaw Ck, Mt. Henning.

TABLE I (CONTINUED)

	4. SKARN AND METAMORPHIC	5. GABBRO – ULTRABASIC	
LITHOLOGY	Skarns, pegmatites, quartz veins, metamorphic rocks of medium to high rank. Transitional to and may include deposits of 3b.	Syenogabbro AND diorite, pyroxenite, dunite. Hornblendite Serpentinite	
ASSOCIATED METALS	Cu, Cu–Mo, Cu–Pb–Zn Pb–Zn (Ag) Au (Cu) Pb–Ag (As, Sb, Cu)	Cr–Pt Fe–Cu Cu–Ni	
MINERAL ASSEMBLAGE	Pyrite-gold (galena) Various assemblages of galena, pyrite, pyrrhotite, magnetite, arsenopyrite, stibnite, chalcopyrite, sphalerite, tetrahedrite, jamesonite	Chromite Magnetite – chalcopyrite-bornite.	
GANGUE	Lime silicates Quartz.	Serpentinite Chlorite Amphibole	
STRUCTURE	Veins, vein networks, massive sulphide lenses AND PODS, pegmatite dykes.	Disseminated sulphides	
TYPE LOCALITIES	Skarns at Hedley, Whipsaw Ck.	Olivine Mtn Selish Mtn.	

the sediment water interface. Metal rich strata thus formed are obvious source beds for silicified shear zones, vein networks and skarns that are common within this environment.

Late plutonic activity and metamorphic processes associated with uplift of the volcanic-sedimentary terrain may have extracted much of their metal content from these metal bearing strata. Modification of already existing mineral assemblages by addition of residual volatiles and metals from invading plutons is evident but it appears that the main effect has been to redistribute and perhaps concentrate metals already present in the sedimentary lithofacies at new sites within it or within the plutons themselves. Many syngenetic volcanogenic deposits may therefore become partly or wholly recrystallized either in situ or redeposited elsewhere.

EXPLORATION CRITERIA

Within the geological and metallogenic framework thus far described, porphyry copper deposits of large tonnage potential are most likely to be found near to or within syenitic complexes and quartz diorite plutons. Important criteria in recognizing the above environments are listed below.

1. Orebodies are enveloped by large pyritic zones up to two miles in area. Plutonogenic deposits are commonly associated with pyritic halos, whereas syenitic complexes rarely exhibit this peripheral feature.

2. Hydrothermal alteration of host rocks is often well developed. Alkali feldspar (often reddish albite), chlorite, epidote, pyrite and magnetite are commonly associated with syenitic bodies producing a characteristic mottled pink and green rock. Stringers, veinlets, lenses and even narrow dykes and intrusive breccias of syenitic material are common.

   Argillic alteration consisting mainly of quartz, sericite and pyrite is commonly associated with quartz diorite plutons depending on host rock composition.

3. Deposits lie directly on regional faults or on nearby subparallel faults or conjugate structures. These structures provide the necessary structural preparation controlling fluid migration and ore locallization.

EXPLORATION METHODS

Ideally, exploration techniques should be designed to measure those properties considered to be the criteria of the target being sought. The following sections describe various exploration techniques and related problems that can be expected.

Geological Mapping

Knowledge of the geological setting of an area interpreted in the light of a metallogenic model is a powerful decision making tool. Areas of regional extent can be broken down into smaller areas which can then be assigned a priority rating. Areas designated as high priority can then be evaluated by field based studies.

Highest priority is given to areas containing rocks of the volcanic lithofacies and associated syenitic complexes. Lessor priority is given to plutonogenic deposits.

Petrogenesis is probably the most important aspect of the mapping phase. Extreme caution should be exercised when assigning names of genetic value to the various rock units. For example; flows should be distinguished from fine grained sediments, agglomerates from conglomerates, intrusive breccia from laharic or sedimentary breccia, tuff from tuffaceous sediments, and hydrothermal alteration from regional metamorphism.

Geochemical Surveys

Geochemical programs have experienced varying degrees of success. It is felt that they are best utilized as a follow-up tool in detailed studies. Lack of geological and geochemical control makes regional studies difficult to interpret. There are four major complicating factors related to sampling.

1. Precipitation of manganese and/or iron hydroxides in drainage channels.

2. Carbonate deposits ("caliche") in soils.

3. Decaying vegetation in waterlogged areas.

4. Soils developed from glacial debris.

These factors mask the geochemical properties of the underlying bedrock, the properties that would ordinarily have manifested themselves in residual soils.

Geophysical Surveys

1. Aeromagnetic Surveys

Best suited to regional studies airborne magnetometer surveys provide information on the following geological features.

1. Syenitic complexes of the Copper Mountain type (magnetic highs).

2. Internal and external contacts of large batholiths.

3. Facies changes within rocks of the Nicola group - sedimentary vs. volcanic.

4. Faults and regional lineaments.

Much of the southern part of B.C. is covered by Government maps. Although much of the information useful to an exploration program can be extracted from these maps directly, various enhancement techniques are available.

2. Ground Magnetometer Surveys

The ground magnetometer survey is a low cost technique useful as a secondary mapping tool where gross geological features are known. On occasion this method has lent itself successfully to the delineation of sulphide zones associated with magnetite, a minor constituent found in or near many of the deposits in the district. Structural features such as fault and shear zones masked by overburden are often exposed as magnetic linears thus extending or confirming features mapped geologically.

Standard surveys employ one magnetometer that is continually looped back to a base station. Data can then be corrected for diurnal variations. The time consuming looping procedure can be eliminated by the implementation of a second magnetometer connected to a chart or drum recorder. This second unit remains at a fixed base station and monitors the magnetic field, reproduced as a continuous graphic record. Looping is thus reduced to one reading at base station before the days work begins and another reading at days end.

3. Induced Polarization Surveys

Another useful technique employed by the geophysicist is induced polarization. This method is best suited to disseminated deposits in which pyrite is the chief constituent. Previous results in the district have usually resulted in relatively broad drill targets. At Copper Mountain and Ingerbelle, rocks of intermediate response contain the best grade material, while high response conditions were generally due to high concentrations of pyrite. Notable I.P. effects from pyrite-rich banded sedimentary and tuffaceous material within the Nicola volcanic facies are not uncommon. Although some deposits associated with syenitic complexes are rich in native copper and chalcocite (Big Kid prospect), usually sufficient associated pyrite is present to produce an I.P. response.

4. Electromagnetic Surveys

Electromagnetic methods are best suited to massive sulphide projects. Disseminated deposits represent poor conductors which are not responsive to E.M. detection. They are, however, useful in delineation of faults oblique to the regional grain and are recognized by offset conductors.

TARGET AREAS

Priority ratings used to evaluate target areas depend on choice factors derived from metallogenic and geological criteria.

The most important choice factors are:

1. Significant lithology; includes syenitic complexes and plutonic rocks of Upper Triassic to Lower Jurassic age.

2. Lithofacies type or general environment; Nicola volcanic facies.

3. Structure; intersections of inferred faults and linears.

4. Mineral deposits; proximity and abundance (more significant if associated with rocks of items 1 and 2).

5. Geophysics; prominent aeromagnetic highs (typical of syenitic complexes). Arcuate and concentric features indicative of differentiated plutons (Copper Mountain Intrusions).

Armed with the above criteria it is not difficult to select areas of high priority that warrant field examination.

The area most likely to manifest these characteristics is centered about the axis of the Summers fault system between Missezula Lake and Allenby near Jura Station. The ground was originally held by Cop-Ex Mining Corporation Ltd. and is now held by Mr. R. Dickinson of Vancouver, B.C.

The Elk group is situated approximately 7 miles NNE of Princeton. The group consists of thirty units centered approximately 1 1/2 miles north of Jura Station (Figure 4). Christian Creek traverses the property from northwest to southeast. The property includes intrusive bodies ranging in composition from syenite to syenodiorite and diorite that intrude rocks of the Nicola volcanic lithofacies. Major structural features are present; the Jura lineament and its northern counterpart and the Hayes fault. Intersections of these three linears are found to the east and southeast of the property. Two prominent aeromagnetic highs, ovoid in plan, are centered over the immediate area and are comparable in relief to those of the Copper Mountain Intrusions.

REPORT ON THE ELK CLAIM

INTRODUCTION

The Elk claim consists of 30 units and is located 4500 meters southeast of the junction of Rampart and Summers Creek, 3500 meters north of Jura Station and 3000 meters west-northwest of the junction of Christian Creek with Hayes Creek.

Access to the property is by a branch road off the Ospray Lake Road, approximately 2 1/2 miles east of the Belfort turnoff (see Figure 4).

(A) History

The area of the Elk claim has been the focus of considerable exploration activity. In 1969 Kennco Exploration examined an area approximately one mile to the south of the Elk claim and had staked the F.H. group. Amax became interested in the area in 1970 and staked the ROK group of claims adjoining the former Elk group to the north. Bethlehem Copper were engaged in the exploration of the BEL group of claims, one mile to the southwest of the Elk claim.

Initial work carried out by Cop-Ex Mining Corporation Ltd. on the former Elk group consisted of pack-sack drilling, followed by an extensive exploration program involving a geochemical survey, an induced polarization survey, diamond drilling, percussion drilling, geological mapping and trenching.

CLAIM LOCATION MAP

ELK GROUP

NTS 92 H/9

SCALE - 1:50,000

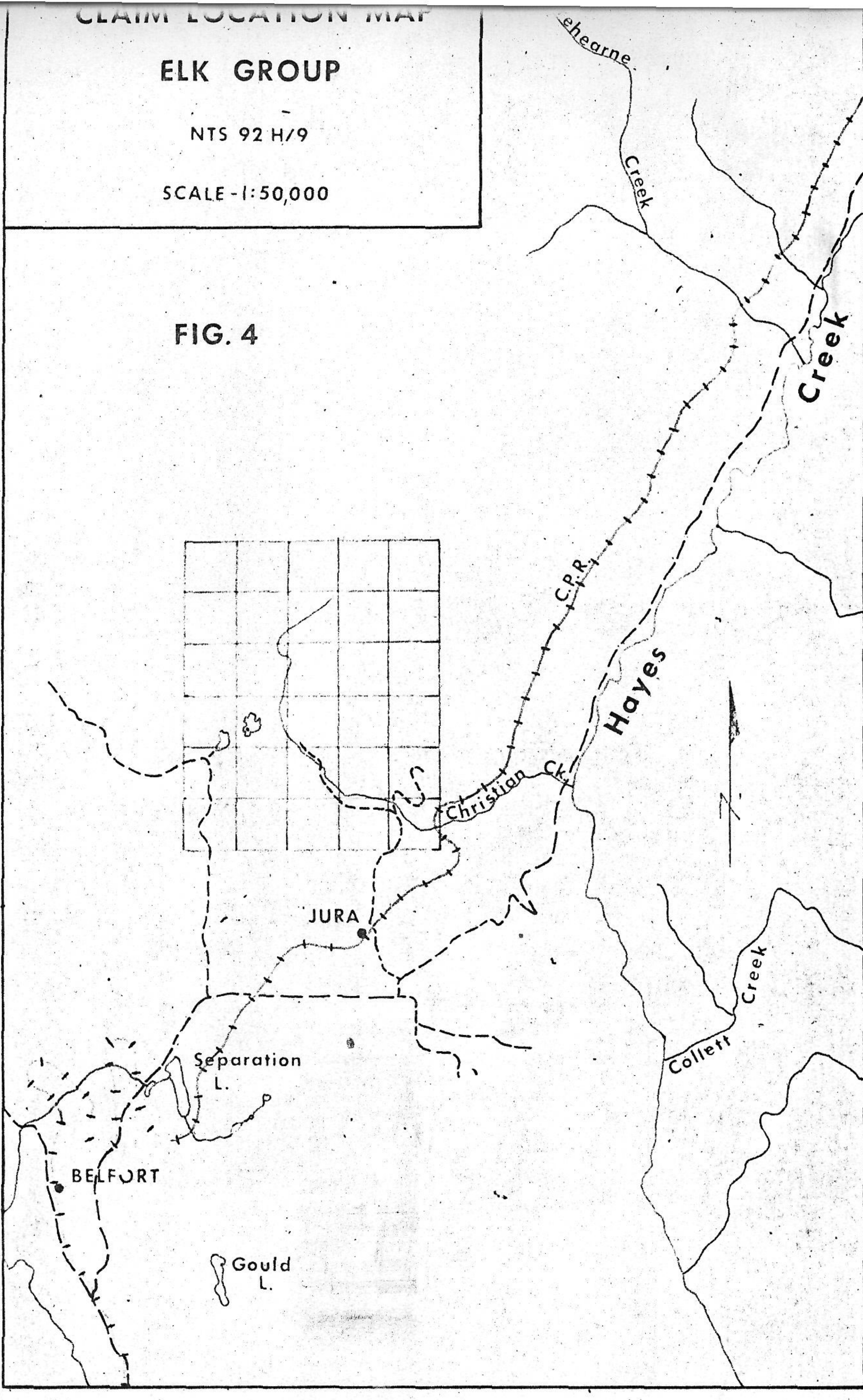

FIG. 4

(B) General Geology

The property is underlain by Triassic Nicola Group volcanic rocks (andesite, basalt, dacite breccia) which have been intruded by two zoned diorite-monzonite stocks. Metasomatic syenite intrudes the Nicola volcanics in the mineralized area.

In the mineralized area (referred to as the North Zone) widespread occurrences of chalcopyrite, malachite and magnetite occur as sporadic disseminations and fracture coatings in volcanic rocks. Pink feldspar and epidote alteration and fracturing is intense and several strong faults are found in the mineralized area.

The characteristics of the deposit are geologically similar to Ingerbell and the claims are found to lie on the flanks of a large magnetic anomaly.

(C) Results of Previous Exploration

Cop-Ex Mining Corporation Ltd. had performed approximately 7600 feet of reliable percussion drilling, 2335 feet of diamond drilling in 1972 and 1410 feet of diamond drilling in 1973. The results of this program is summarized below.

(1) Percussion Drilling

The bulk of the percussion drilling was performed within the North Zone (5200 feet) covering an area 1600 ft. by 1000 ft. The results were mostly less than .1% Cu with the best assay .37% Cu over 80 feet. Of the remaining 2400 feet of percussion drilling 2000 feet was unsuccessful in reaching bedrock or had to stop short due to caving. Of the remaining 400 feet, 200 feet was for assessment purposes and outside the area of interest while the remaining work was performed in two isolated holes.

(2) Diamond Drilling

In late 1972 and early 1973 a total of 3745 feet of diamond drilling was carried out. In 1972, 2335 feet was drilled in five holes in the North Zone of which only two holes reached bedrock and had good core recovery (DDH 72-3 and DDH 72-4). These two holes intersected massive andesites and tuffs with some epidote and K-feldspar alteration. The best section was .3% Cu over 60 feet.

In 1973, 1410 feet of diamond drilling was carried out on the North Zone and in an area 1600 feet south of the North Zone. This drilling was done in three set-ups, two of which were to the north and west of the North Zone and the other 1600 feet south of the North Zone.

The best intersection was in DDH 73-2 and was .22% Cu over 10 feet. In the area to the south of the North Zone altered and fractured volcanic and dioritic rocks were encountered.

(3) Induced Polarization Survey

In January 1973 an area 3200 ft. by 4000 ft. was surveyed by induced polarization techniques. This area covered 500 feet of the western portion of the North Zone and 2700 feet to the west of the North Zone.

The results of the I.P. survey showed two distinct regions of chargeability and resistivity. Several broad I.P. anomalies were found to the south of the North Zone. These anomalies occur in an area of flat topography covered by glacial till.

(4) Geochemical Survey

A geochemical survey with a sample spacing of 400 ft. by 400 ft. was carried out over a portion of the Elk claim. The geochemical survey outlined an area partially including and to the east of the North Zone with values of better than 110 ppm Cu. A weaker area of anomalous values exists to the south of the North Zone in an area of thicker overburden. The values in this area are greater than 50 ppm. It is possible that the glacial till in the area of the anomaly to the south of the North Zone is masking copper mineralization.

(D) Conclusions and Recommendations

A significant amount of exploration effort has been done in the evaluation of the economic significance of the North Zone. The results of the exploration program was to delineate an area of approximately 1500 ft. by 1000 ft. of sub-economic amounts of copper (.3% and less). The geological features of the mineralization found in the North Zone are similar to those seen at Ingerbell.

An area approximately 2000 feet south of the North Zone has had very little drill testing and has a coincident weak geochemical anomaly, an induced polarization anomaly and an outcrop of Nicola volcanics with minor copper mineralization. The geochemical anomaly is approximately 1500 ft. by 800 ft. and has three coincident induced polarization anomalies.

It is recommended that this area should be tested further as well as testing the easterly extension of the North Zone.

(1) North Zone

Mapping and sampling of trenches in the North Zone area has not been done and it is suggested that this be carried out along with a limited geochemical sampling program to check the results and location of the previous geochemical survey.

With the information that would be obtained from the aforementioned program, three short percussion holes should be located to the east of the North Zone. The results of these holes would determine if any extensions of the North Zone exist.

(2) Area to the south of the North Zone

The area to the south of the North Zone is predominately drift covered and outcrops are scarce. The weak geochemical anomaly located in this area should be rechecked and located. There appears to be strong structural features within this area as determined by the previous induced polarization survey and diamond drill hole 73-3 has confirmed the presence of Nicola volcanic and intrusive rocks existing to the west of the anomaly.

Three short percussion holes should be located within the anomalous area to determine if any economic amounts of mineralization exist.

In conjunction with the above program an assessment of the area to the north and west of the North Zone is suggested. No information exists as to whether the western portion of the area is underlain by Nicola volcanic rocks or whether it is underlain by rocks of the Princeton Group. A geological appraisal could determine the possibility of mineralization existing in the unexplored area to the west.

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LEGEND

TRIASSIC - JURA VOLCANIC COMPLEX.

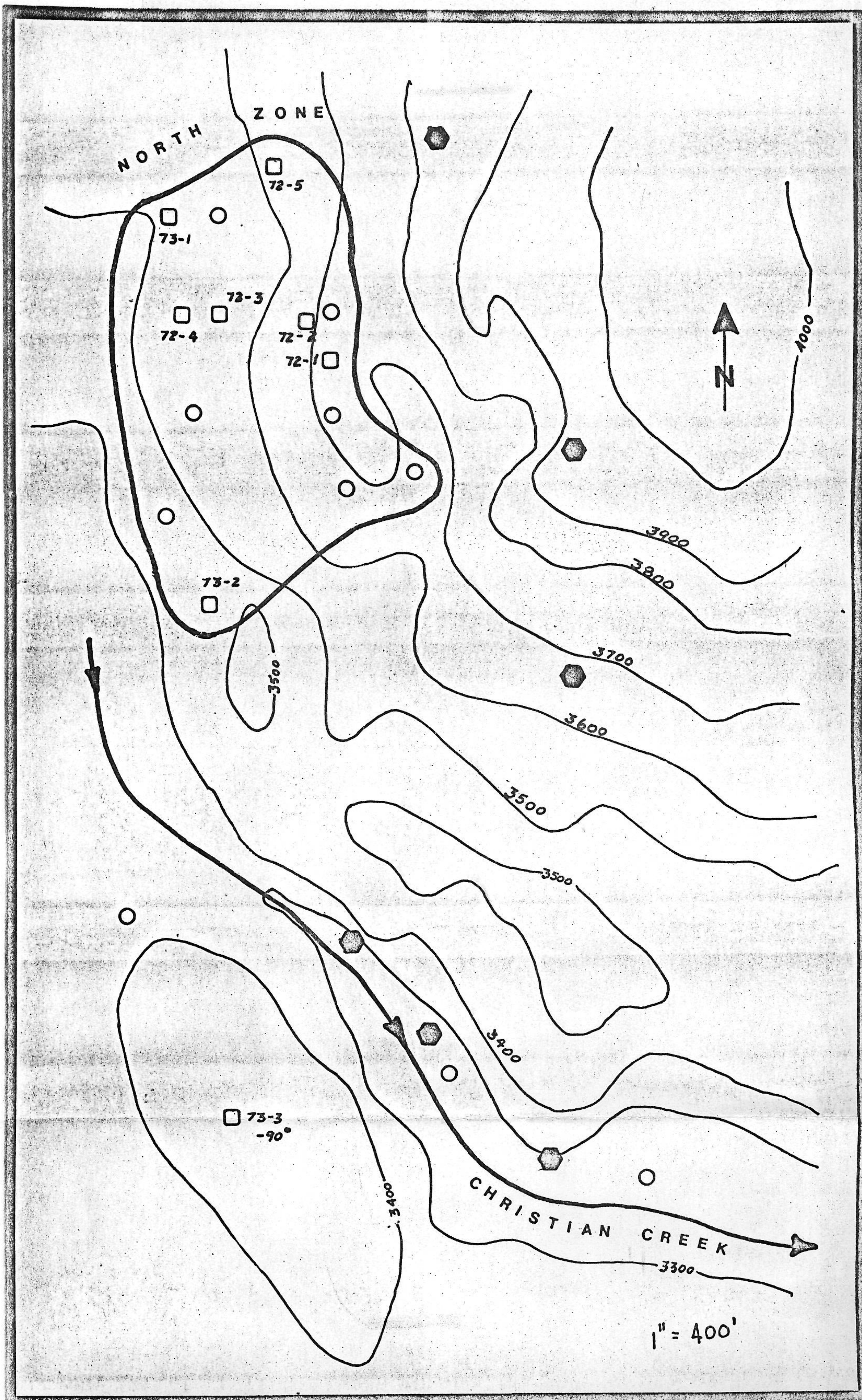
1	HORNBLENDE DIORITE AND SYENODIORITE
2	SYENITE (METASOMATIC), DACITE BRECCIA

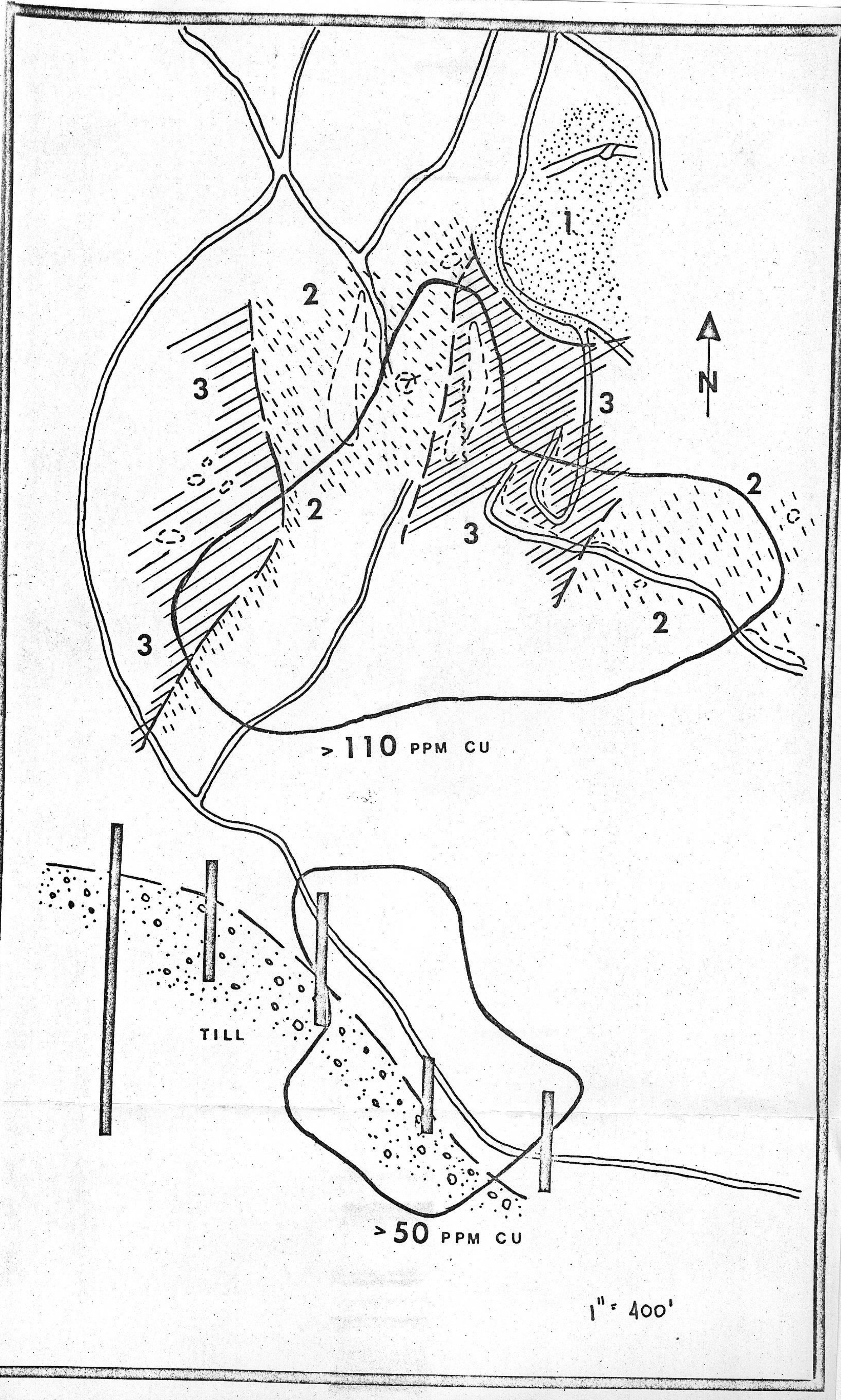
NICOLA VOLCANICS

3	ANDESITE, BASALT, DACITE

SYMBOLS

- GEOLOGICAL CONTACT
- SHEAR
- OUTCROP
- PERCUSSION DRILL HOLE
- DIAMOND DRILL HOLE
- PROPOSED DRILL HOLE
- ADIT
- ROAD AND/OR TRENCH
- INDUCED POLARIZATION ANOMALY


NORTH ZONE
72-5
73-1
72-3
72-4
72-2
72-1
73-2
3500
3900
3800
3700
3600
3500
3500
3400
1000
N
73-3
-90°
3400
CHRISTIAN CREEK
3300
1" = 400'



1
2
3
N
2
3
3
2
2
3
2
>110 PPM CU
TILL
>50 PPM CU
1" = 400'