831164
103P/11W

AJAX PROPERTY

ALICE ARM, B. C.

REPORT ON:

POSSIBLE REGIONAL STRUCTURE AND ITS RELATIONSHIP TO SULPHIDE MINERALIZATION, ALICE ARM, B. C.

BY: Tatsuya Takeda.

December, 1966.

INTRODUCTION

Exploration work on the Ajax Property was started in 1965 and concisely summarized in the report for that year.

In accordance with the recommendation in the 1965 report, diamond drilling and detailed surface mapping were carried out in 1966 to obtain additional information regarding the areal extent and structural control of the mineralization.

In addition, all the available drill core including last year's, was relogged for correlation with the surface geology.

CONCLUSIONS

As was suggested in the 1965 report, mapping has confirmed that drag fold structures provided the most favourable environment for the intrusions of porphyries and sulphide mineralization.

Detailed mapping has also indicated:

1. Possible extent of mineralization on surface.
2. Various facies of porphyries and its relation to mineralization.
3. Andesitic horizons as marker beds for structural analysis.

Mineralization extends over an area of 3,500 feet in diameter. A roof pendant-like mineralized zone is suggested to occur intimately related to porphyry intrusives.

Better mineralization seems to be concentrated in an area of 1,000 feet X 1,500 feet with the minimum probable grade of slightly over 0.1% MoS_2.

Sporadical high grade sections ranging from 0.2 to 0.4% MoS_2 are indicated by intersections in some of the holes.

WORK COMPLETED

Mapping

In accordance with the 1965 recommendations, detail mapping was started in early July and continued until heavy snowfall covered the exposures of bedrock in late October.

Mapping covered an area of 4,000 feet X 4,000 feet approximately, in order to obtain the information of the areal extent of mineralization and the geologic structure.

For better control of surface mapping, a compass and chain survey was conducted to locate and delineate the complicated outline of bedrock exposures on the rugged mountain slope.

A detailed geologic sketch was drawn in the field on a scale of 1 inch = 100 feet. This was later compiled on a scale of 1 inch = 200 feet.

A base photogrammetric topographic map was prepared by Lockwood Survey Corporation Limited on a scale of 1 inch = 200 feet. This was very useful not only for the study of geology, but also for various other purposes.

Mapping could not be completed wholly because of the vastness of the mineralized zone and the complicated geological setting.

GEOLOGY

Rock types

The mapped area is underlain by the so-called Hazelton Group of interbedded Mesozoic volcanics and sediments. The above rocks have been intruded by a variety of porphyries and lamprophyre dikes, in pre-sulphide period and post-sulphide respectively.

a) Porphyries range from quartz porphyry in the south to monzonite porphyry in the north. Both show scanty sulphide mineralization.

The former is characterized by the presence of quartz phenocrysts together with an almost negligible amount of biotite, while the latter has abundant biotite, is scarce in hornblende, and contains porphyroblastic potash feldspar spots.

Leucocratic porphyry with a mottled appearance occurs mainly in the central zone of mineralization and is sporadically mineralized by itself. This rock type included both the alteration products of monzonite and the contamination products of inclusions.

Inclusions of brown hornfels origin are often scattered in the periphery of porphyry masses and dykes. These are more or less mineralized with sulphide.

Leucocratic inclusions seemingly tend to increase with depth, suggesting the contamination processs in the porphyries.

An occurrence of "alaskite" was reported by N. Carter (Provincial Government Geologist), near the south end of quartz porphyry mass. Details of this occurrence are not known.

There are four known porphyry masses. They are linked to each other by numerous dykes, indicating that they possibly originated from same magmatic source at almost the same geologic period.

b) Altered sediments are composed of interbedded brown hornfels, a pale green compact rock and andesite -- andesitic tuff in varying proportions.

Near the margin of sulphide zone away from porphyries, a grey colored quartzitic horizon occurs instead of the pale green compact ones, possibly with a transitional change locally.

Outside of the sulphide zone, brown hornfels becomes a soft and less fractured banded rock with intercalated dark argillite lenses. Andesite carrying grey quartzitic bands is usually thin and more frequent in this zone.

c) The occurrence of lamprophyre dykes is limited to the area near the Camp and to the south-west. The dykes are 1 to 3 feet wide and dip almost perpendicularly.

Some lamprophyre floats were found near the northeast side of Mt. McGuire.

The dykes are post-sulphide, cut through pre-existing rocks and remain barren of metallic mineralization.

Metamorphism and Alteration

As pointed out in the 1965 report, surrounding the center of intrusive rock is a "halo" of metamorphism that has altered the sediments into two distinct bands with gradational borders. One is "argillitic hornfels" and another is more metamorphosed and altered sediments, including "transitional" zone.

The border line bounded by argillitic hornfels is likely to be almost identical with the extent of sulphide mineralization. This fact accounts for the intimate relationship between sulphides and porphyries.

Structure

As the result of drilling and detailed mapping, several previously assumed structures were confirmed.

a) Drag folding - although the south end is still unmapped, the argillitic hornfels indicates the general pattern of anticlinal drag folding, which strikes northerly, approximately [illegible] northeasterly

b) Doming - Four ~~masses of major porphyries~~ the porphyry masses are controlled by the major structure and nearly concordant to it. Dykes connecting those masses show the entangled patterns of two intersecting fracture trends. (The porphyries also carry angular inclusions near their peripheries. These data support the assumed doming during the intrusion of porphyries.)

c) Attitude of drag folding - There are two systems of ~~trend~~ strike and dip in the drag folded zone:

1.	N - S	dip 65°- 80°E
2.	N50°E - S50°W	dip 70°- 85°N

~~Accordingly~~ indicating, a possible steep plunge to ~~of~~ the drag folding ~~can be very steep~~ in a north northeasterly direction. (However, it should be noted that fracturing seemingly plays a more important role in sulphide mineralization than does a special horizon.)

d) Pre-sulphide fracturing - To the south southwest of DDH #20, a precipitous gully runs parallel to ~~the~~ fracturing, ~~which carries heavy MoS_2 mineralization for an approximate maximum length of 250 feet and width of 25 feet.~~

~~Its trend is about N50°E - S50°W and dip 65 - 80° S.~~ Leucocratic porphyry dykes cross the fracturing without any remarkable displacement. ~~This can be regarded as one of the pre-sulphide fractures.~~

Mineralization

The porphyry intrusives are regarded as "ore bringers" because sulphide mineralization is associated, to some extent, with them.

~~MoS_2 mineralization occurs~~ in all rocks except the argillitic hornfels and lamprophyre dykes.

Molybdenite is the main ore mineral and occurs in fine grained quartz stringers, in the hairline fractures in smears along shear zones and disseminated throughout some of the more siliceous leucocratic facies.

Pyrrhotite is very common and abundant over the sulphide zone. Pyrite and chalcopyrite are scarce.

During the later stages of sulphide mineralization, well crystallized drusy quartz veins were formed. These are usually sparsely but erratically mineralized with sphalerite and galena, with occasional aggregates of stibnite, the sulphosalts and pyrite.

In the porphyry intrusives, kaolinization and less sericitization are occasionally developed and seem to be related to good MoS_2 mineralization.

INTERPRETATION

The above mentioned facts have been interpreted as follows:

a) As stated in the 1965 report, drag folded structures provided the most favourable environment for the porphyry intrusives and succeeding mineralization by causing intense fracturing of the host rocks.

   The plunge of the drag folding can be very steep in north northeast direction.

b) A roof pendant-like sulphide zone occurs intimately related to porphyry intrusives.

   The sulphide mineralization extends over an area of 3,500 feet in diameter, far beyond the zone of intrusives.

c) Among the various facies of porphyries, the leucocratic phase seems to be the most productive. However, drill hole information is still limited and inconclusive.

d) Porphyry intrusives are all likely to be derivatives from the same magmatic source, and as such, it is probable they will form one large composite stock at depth. However, information is still insufficient at this moment to confirm this.

e) Judging from the assay data, a better concentration of MoS_2 mineralization is indicated in an area of 1,000 feet X1,500 feet (N-S and E-W respectively, with DDH #15 located near the center.)

RECOMMENDATIONS

Mapping

Continue surface mapping to delineate the full extent of the mineralized zone, and to obtain additional information concerning the pattern of drag folding.

Areas will be limited to the following:

a) In the vicinity of DDH #33, #5, #1 and #2.
b) Northeast of Camp area.
c) Southward extension of drag folding structure.

If the same mapping method is used, one month will be required to complete the work.

Diamond Drilling

Additional drilling is proposed in order of priority.

To outline areas with a grade of 0.2 to 0.3% MoS_2 first priority is given to additional "Fill in" drilling in the area of:

a) DDH #1, #2, #3, #4, #19 and so on.

b) Near the center of the sulphide zone, some of the holes were eventually drilled parallel to one of the fracture systems (which may carry heavy Mo mineralization) - N50°E - S 50°W.

Additional drill holes to crosscut this section (as DDH #34) are indispensable to indicate possible high grade sections along fracture zones.

c) In DDH's #20, #30, and #31, numerous host rock inclusions in leucocratic porphyry were intersected. These inclusions are well mineralized and apparently they occur in the same porphyry mass.

Average grade is variable because of their mode of occurrence and the dilution by porphyry containing low grade mineralization.

As long as the inclusions contain 0.2% MoS_2 more or less, additional drill holes are required for a detailed check of this western high grade zone.

d) For the check of possible extension of sulphide mineralization, one drill hole is required in the area to the northeast of the Camp.

LIST OF PROPOSED DRILL HOLES

As per attached sheet.

Submitted by,

Tatsuya Takeda.