#1657

EXPLORATION WESTERN DISTRICT

Cominco

GEOLOGICAL REPORT ON

CAT GROUP NO. 1

JOHNNY MOUNTAIN - ISKUT RIVER AREA

56° 131' N. E.

LIARD MINING DIVISION

NTS: 104 B/11

REPORT BY

R. G. BAGSHAW

UNDER SUPERVISION OF

D. W. HEDDLE, P. ENG.

C O M I N C O L T D.

EXPLORATION WESTERN DISTRICT

GEOLOGICAL REPORT ON CAT GROUP NO. 1 JOHNNY MOUNTAIN - ISKUT RIVER AREA 56° 131' N.E. LIARD MINING DIVISION NTS: 104 B/11

The CAT GROUP NO. 1 is located three miles south of the confluence of Bronson Creek and Iskut River on the northwest slope of Johnny Mountain. It is approximately 70 air miles northwest of Stewart, B.C. in the Liard Mining Division. The group comprises the following claims:-

Claim	Record No.	Anniversary Date
CAT 1-12 inclusive	28364-28375 inclusive	September 28, 1968

Annual work requirements for assessment are $1,200.00 due on September 28, 1968. Work for which five years credit is requested was carried out during the period August 1 to September 7, 1968.

REPORT BY

R. G. BAGSHAW

UNDER SUPERVISION OF

D. W. HEDDLE, P. ENG.

RGB:mk
October 11, 1968
Vancouver, B. C.

C O M I N C O L T D.

EXPLORATION WESTERN DISTRICT

GEOLOGICAL REPORT ON CAT GROUP NO. 1 JOHNNY MOUNTAIN - ISKUT RIVER AREA 56° 131' N.E. LIARD MINING DIVISION NTS: 104 B/11

TABLE OF CONTENTS

RGB:mk
October 11, 1968
Vancouver, B. C.

C O M I N C O L T D.

EXPLORATION WESTERN DISTRICT

GEOLOGICAL REPORT ON
CAT GROUP NO. 1
JOHNNY MOUNTAIN -ISKUT RIVER AREA
56° 131' N.E.
LIARD MINING DIVISION
NTS: 104 B/11

GENERAL STATEMENT

This report presents the results of geological mapping done on the CAT 1-12 mineral claims during the period August 1 to September 7, 1968. Direct expenditures incurred amount to $6,270.00.

It is requested that five year's assessment credit be applied to each of the 12 claims, making a total of $6,000.00 to be applied for a total credit of 60 years. An Affidavit on Application for Certificate of Work was submitted to the Vancouver Sub-Mining Recorder prior to the anniversary date of September 28, 1968.

INTRODUCTION

General

A program of geological mapping on the CAT 1-12 claims was carried out to evaluate the economic potential of base metal occurrences on the claims and to ascertain the geologic setting of this mineralization. Work was carried out by R. G. Bagshaw (BSc - University of Manitoba - 1966), Cominco Exploration Geologist, under the supervision of D. W. Heddle (U.B.C. 1949), Cominco Senior Exploration Geologist and registered B. C. Professional Engineer. I. E. Hutcheon, third year geology student, U.B.C., assisted in field work.

Mapping was done on a scale of 1 inch = 200 feet, using a plane table and telescopic alidade. As the terrain is locally rugged, a topographic map with a 50' contour interval was made during the course of the mapping to permit a more accurate interpretation of the plotted geological information. Owing to extremely wet weather, the CAT 1 and 2 claims and the western half of the CAT 3 and 4 claims were mapped by chain and compass. The topographic information in this portion of the map is taken from an enlargement of a 1000' scale topographic map produced from aerial photographs by Huntec Ltd.

Work was carried out between the dates of August 1 and September 7, 1968. During the latter half of this period progress was hampered by incessant rain characteristic of the Coast Mountains climate. Vegetation presents no problem as the property is above timberline. Glacial debris covers large portions of the map area to depths up to 100 feet along the major moraine ridges shown on the map. Average depth of overburden over most of the covered areas is only two to five feet. Bedrock is exposed on only about 10 per cent of the surface area of the claims. The distribution of outcrop, however, is such that geological information is scant in a number of critical areas.

The high costs of access into the area and of servicing a camp from the nearest supply point are the main factors contributing to higher than average exploration expenditures. Reduced productivity due to wet weather conditions is an added cost factor in this particular area.

It will be noted throughout the text of the report that geological information is often described or located with respect to plane table survey stations. These are marked on the map by a triangle △ and numbered in a series from C-1 to C-64. There is, however, no systematic pattern to the numbers.

INTRODUCTION
continued.....

Location and Access

This property is located in the Coast Mountains approximately 70 air miles northwest of Stewart, B.C. The claims lie on the moderate north-facing slope of Johnny Mountain, directly below Johnny Glacier, three miles south of the confluence of Bronson Creek and Iskut River. They are at elevations ranging from 3500' to 4500' in terrain that is locally rugged due to numerous small deeply incised streams and sharp glacial moraine ridges.

The isolated location and rugged terrain makes access most feasible by helicopter. Stewart is the nearest base of supply. Equipment and supplies flown from Stewart by fixed wing aircraft to a gravel strip on Snippaker Creek, 20 miles east of the CAT claims, were ferried by helicopter to the property. Unpredictable weather conditions can greatly restrict the use of both types of aircraft. Alternately it might be possible to land ski-equipped DC-3 or similar aircraft in winter on Johnny Flats immediately below the claims. This would facilitate the moving in of large amounts of heavy equipment and supplies.

GEOLOGY

General Discussion

A 40 to 50 mile wide belt of Permian to Lower Jurassic volcanic and sedimentary rocks and their metamorphic equivalents underlies an area bounded roughly by the Stikine River on the west, the Iskut River on the east, the B.C.-Alaska border on the south, and the Hackett and Sheslay Rivers on the north. This belt trends essentially north-south from the B.C.-Alaska border to Telegraph Creek where it appears to swing somewhat northwest. The southern part lies within the limits of the Coast Intrusive complex. The CAT claims are situated within this southern portion, roughly 20 miles west of the eastern flank of Coast Intrusives. The above belt is intruded by numerous large and small bodies of Coast Intrusive rocks and later intrusions.

The CAT claims lie in an area underlain by Permian to Triassic volcanic and sedimentary rocks trending generally east-west. Although folding is suggested, the fold axes are not apparent from existing regional information. Volcanic tuffs and agglomerates, minor flow rocks, and sedimentary slates and greywackes underlie the CAT claims. An intrusive felsite porphyry cuts these rocks and an orthoclase porphyry is known to outcrop just to the northwest. These are thought to be later intrusions separate from, but associated with, the main Coast granodiorites, outcrops of which are five miles or more distant from the CAT property.

All rocks in the area have undergone relatively strong regional metamorphism resulting in development of a strong foliation and widespread quartz-sericite alteration. The foliation essentially parallels the apparent regional strike of bedding.

The main control of mineralization on the property is an east-west to northeasterly trending system of shears along which alteration has been most intense. Those shear zones carrying mineralization of economic interest lie within a zone which apparently thickens in the area of the CAT claims. A less well developed system of north-south or northwesterly fractures may have exerted some control on localization of mineralization.

Layered Rocks

Type 2 - Andesite

This rock type is not necessarily the oldest in the map area but outcrops as the lowermost section of a north-dipping sequence. Two narrow beds are shown in the southeast corner of the map.

GEOLOGY
Layered Rocks
Type 2 - Andesite continued....

The rock is a medium to dark grey-green fine-grained andesite probably consisting of fine-grained feldspar and biotite with minor quartz. Shearing stresses have caused recrystallization of the biotite to form elongated blebs up to one-quarter inch long parallel to the regional foliation. This foliation is not otherwise developed within the fine grain of the rock. It has an irregular fracture. About 1-2% epidote occurs as fillings of small cavities, now partly weathered out. In two or three small outcrops the rock is porphyritic, possibly a result of recrystallization. Ten to twenty per cent whitish feldspar laths up to 3/16" across are surrounded by a dark green feldspar-biotite matrix.

This rock type is found in contact with rocks of Type 6 at only one location near the southwest corner of CAT 2 claim. It is apparently interbedded with the Type 6 pyroclastics. Evidence of this was found in outcrops in the creek beyond the west end of the claims, where fine-grained flow rocks are interbedded with more abundant tuff beds.

Type 3 - Greywacke

Rocks of this type underlie much of the CAT 4 claim as shown on the map. They are mainly a dirty, poorly sorted mixture of clastic volcanic and sedimentary material, with the volcanic fraction predominating. The general character is between 20% to 70% coarse sub-angular fragments averaging one to two inches in size, in a matrix of finer tuff-like material of similar composition. Strong shearing stresses have greatly stretched the fragments, producing a marked foliation. They include fine grained andesitic lava, medium to dark colored cherty material, somewhat more acid volcanic flow rocks, and black argillite or slate. Closely spaced fracturing is characteristic and much of the outcrop of this rock type is very rubbly. Within 150 to 200 feet of the contact with calcareous slates on the north, the greywackes contain considerable calcite in irregular blebs and stringers. Here they weather to a very rough surface resembling coarse scoria.

Closer examination of the strong banding in these rocks reveals an apparent incipient segregation of coarser, lighter colored material and darker, finer grained material into layers and sub-parallel lenses. Such effects in these coarse rocks are evidence of the existence of strong shearing stresses. Abundant sericite is present.

Apart from intrusive contacts with quartz-feldspar porphyry sills, the greywackes were seen in contact only with the Type 4 slates at two locations. Both of these were in rubbly outcrop and it could not be definitely determined whether or not the contact was conformable. The nature of greywacke deposits might suggest a thick wedge of limited extent in the original dip direction.

Type 4 - Calcareous slates; 4a - limestone

Sedimentary rocks assigned to this type are found in a moderately thick bed on the CAT 4 claim southwest of the main mineralized zone. Small outcrops of rocks of somewhat different type are found in the creek at the far west edge of the map, in a creek on the location line between CAT 1 and 2 claims and in a creek 300 feet east of plane table station C-64.

The main section of this type consists of a highly calcareous slate which resembles a gneiss in texture. It is strongly foliated and highly sericitic. The sericite forms thin laminae which separate discontinuous layers of granular calcite and aphanitic quartz-feldspar material amounting to 30 to 40% of the rock by volume. Color is a medium to dark grey, weathering reddish or reddish-brown. Little or no sulphides are present.

Rocks which could best be termed calcareous sericite schists outcrop in two of the creeks near station C-64 and on the location line between CAT 1 and 2 claims. These finely laminated, highly sheared rocks, because of their relatively high calcite content, weather very readily to crumbling micaceous sheets. As they seem to be restricted to narrow zones they may possibly indicate faults but this could not be confirmed.

GEOLOGY
Layered Rocks
Type 4 continued....

At the far west edge of the map area dark green highly sericitic and chloritic rocks outcrop in the creek beneath overlying pyroclastic rocks of Type 6. They are best described as a phyllite, having wavy foliation and a composition almost entirely micaceous. They seem to be unconformable with the overlying pyroclastics but this could not be verified in one outcrop.

A sub-type 4a consists of limestone and limestone breccia occurring as thin beds at two or three locations. The limestone is a creamy white, sugary rock, uniformly fine-grained, composed of calcite grains < 1 mm. in size with scattered larger grains up to 2 or 3 mm. in size. Streaks and bands of more and less translucent material give a banded appearance to the rock. Less than one-half per cent pyrite occurs as scattered grains.

Except for one bed, these limestones are too thin to be shown on the map. The one shown within Type 4 slates is particularly persistent, 6 to 10 feet thick. It apparently marks part of the contact between Type 4 and Type 5 rocks, although it "feathers" out at its indicated eastern end. To the west it is contorted and dragfolded on a small scale, suggesting that folding has occurred in the rocks on the property.

A 60 to 70 foot bed of limestone breccia outcrops near the south contact of the greywackes of Type 3. It contains 15-20% subangular to subround fragments of limestone, and possibly some foreign material, in a matrix of fine grained crystalline calcite.

The limestone occurrences seem to be lensy and may not be as continuous as shown on the map.

Type 5 - Altered Tuff

A fairly thick section of tuffs and minor agglomerates outcrops on CAT 4 and 6 claims. It is apparently cut by the main mineralized zone. The now highly altered rocks within the main zone of mineralization may belong to this type.

Intense quartz-sericite alteration has modified these rocks and the original fragmental nature is not apparent on a fresh surface. Only scattered grains and blebs of quartz and quartz-feldspar material are visible in the sericite. The weathered surface however reveals the fragmental nature although the fragments are highly elongated parallel to the foliation. The majority of the fragments weather to a reddish brown, probably due to original iron oxide content. The rock surface thus has a general reddish color; a fresh surface is a light to medium grey-green. Fragment size ranges from less than one-half inch up to 12 inches or more in length, averaging 2½-3 inches. The ratio of length to width is about 6 or 7:1.

Contact relationships of this unit are nowhere visible along the north contact. Along the south contact there is a suggestion of interfingering with sediments of Type 4, and a fairly sharp contact marked by the narrow bed of limestone.

Type 6 - Tuff

Apparently overlying the tuffs of Type 5 is a thick sequence of tuffs and minor agglomerates distinct from those of Type 5. Rocks outcropping near station C-30 are tentatively grouped with Type 6 and similar rocks are assumed to underlie the large intervening area of moraine material. Similar rocks are found over fairly broad zones in the western portion of the map area, apparently interbedded with the andesites of Type 2.

At almost all locations the granular pyroclastic nature of these rocks cannot be mistaken despite considerable alteration of the general appearance by pervasive quartz-sericite alteration in many localities. Color

GEOLOGY
Layered Rocks
Type 6 continued.....

includes various shades from light to dark of grey, green, and brown and almost black. The abundance of sericite and possibly some biotite results in a strongly developed foliation everywhere. The tuff fragments are also elongated in most outcrops, so that the texture consists of a layering of the quartz-feldspar grains with intervening lamellae of sericite and biotite.

Aphanitic quartz-feldspar material comprises most of the fragments of the finer, more uniformly grained tuffs, and also of small zones of coarser fragmental rock. Scattered throughout are zones of much coarser fragments up to three feet or more across which include, in addition to the quartz-feldspar material, basic fine to medium grained flow rocks and quartz or quartz-carbonate material in an apparently tuffaceous matrix. The basic material may actually comprise thin flows which have been fragmented. Two or three of the wider zones are shown as lenses of type 7 rocks on the map. Differential weathering of this material produces a very irregular surface.

Except for that in the highly altered zones which cut the tuffs of this type, pyrite content is generally higher in these coarser zones than in the finer tuffs. It is found in both matrix and fragments. Small amounts of chalcopyrite may also be present.

The non-agglomeratic tuffs of type 6 are normally uniformly medium grained with fragments averaging four to six mm in size. Locally coarser material contains fragments up to two or three cm. across and of a more mixed composition, including significant amounts of dark cherty or argillaceous material. Pyrite content is generally about ½-1%, locally 2-4% and in the numerous quartz-sericite altered zones, it may be as high as 6-8% carrying minor amounts of chalcopyrite.

Type 7 - Agglomerate

A broad zone of andesitic agglomerates and minor flows underlies the area below the toe of Johnny Glacier. As mentioned above, a few small lenticular zones of Type 7 rocks are shown within Type 6 rocks; these small occurrences do not closely resemble this main type section.

The relative size, number, and composition of fragments in the agglomerates vary considerably, but there is throughout a distinct size discrepancy between fragments and matrix. Fragments typically measure two to three inches or more across, up to two and three feet. The per cent of fragments varies from 10 to 60%. Most are andesitic volcanic material, many are largely composed of epidote. Some are more acidic quartz-feldspar material. Texture of the matrix varies from very fine grained, suggesting a flow, to medium grained, probably tuffaceous. Again sericite is abundant and a strong foliation is developed in the coarser types. The fine grained matrix does not show a strong foliation, but incipient growth of secondary biotite was observed in these rocks near the glacier. Where fine grained, the rocks are more siliceous and some hand specimens contain quartz eyes up to two or three mm. in size. They are also less sheared, the contained fragments being almost completely undeformed in comparison with those in the tuffaceous agglomerates.

Epidote is present both as a major constituent of many of the fragments and as fillings of fractures, irregular pods, and stringers along with quartz and calcite. About 400 feet east of C-56 fine grained light grey rocks are found to contain about ½% magnetite as tiny euhedral grains disseminated in the matrix. One-half to one per cent pyrite is present as sparsely disseminated grains. Up to two or three per cent pyrite occurs in some of the fragments, especially noticeable near station C-43. In this vicinity also there are scattered stringers and pods of pyrite carrying some chalcopyrite and sphalerite.

In composition these rocks range from andesitic to dacitic. No subdivisions have been made. Small (generally less than ½ inch wide) discontinuous gashes, not apparently in definite sets, are filled with red-weathering carbonate. They are undeformed by the shearing stresses, indicating their late development.

GEOLOGY
Layered Rocks continued....

Type 8 - Tuff

This coarse tuffaceous rock type is apparently unconformable with the sequence of rocks thus far described. Its contact with rocks of Type 7 cannot be seen. It appears to be conformable with sedimentary rocks of Type 9 which apparently overlie it to the east.

These rocks are not unlike those of Type 6, but are distinctly more acidic in composition, probably in the range of dacites. Again they are strongly sheared by regional stresses which, however, don't appear to bear any relationship to those which affected the underlying rocks. The foliation in types 8 and 9 is very flat and appears to strike roughly north-south. Sericite is abundantly developed and quartz-feldspar grains are elongated in the foliation. Rocks near station C-51 show a definite size gap between matrix material and coarser fragmental material, but this is not as characteristic of rocks further north. Fragments generally range from $\frac{1}{2}$ mm. to 1 cm. or more in the finer types, and up to six or eight inches in some places. Composition seems quite homogeneous, although some hand specimens show development of secondary biotite in patches. No sulphides were found in rocks of this unit.

Type 9 - Micaceous quartzite, arkose

A sequence of micaceous quartzites and arkosic sediments outcrops above Johnny Glacier on the north slope. The quartzites have a strong foliation essentially parallel with that of the underlying tuffs. The rocks termed arkose are essentially massive mixtures of medium grained feldspar and quartz. They may be very clean unsheared tuffs. Little or no sulphides were found in any of these rocks.

A thick sequence of pyroclastic rocks with some interbedded flows outcrops to the south off the map sheet on the slope above Johnny Glacier. These rocks which apparently overlie Type 9 rocks were found to be similarly flat-lying.

Intrusive Rocks

Type 1 - Quartz-feldspar porphyry

A quartz-feldspar porphyry is the only intrusive rock type found on the property. It is best exemplified by outcrops outside the claim area to the northwest and west. Occurrences within the claims, although undoubtedly intrusive, are highly foliated and the phenocrysts have been destroyed in many places. The porphyry occurs as sills essentially parallel to the regional strike of bedding, intruding the layered rocks, especially the greywackes. There are also larger irregular bodies as shown on the map in the northwest corner of the claim area.

In its massive unsheared parts the rock is an aphanitic quartz-feldspar material containing 10-20% subhedral to euhedral crystals of quartz and feldspar of uniform one to three mm. size. The matrix is cream to pale green, pink or brown. Commonly pyrite is present as about 1% tiny grains disseminated throughout the rock.

Within the map area all occurrences of porphyry are highly foliated aggregates of quartz-feldspar aphanite in thin layers and lenses separated by laminae of sericite. The most highly sheared portions are a dirty brown color but generally it is light brown with a creamy white weathered surface. Foliation is parallel to that of the enclosing greywackes. Some of the sills or tongues consist of rock which is much less obviously a simple sheared quartz-feldspar porphyry. These are very highly sericitized rocks with strong, often crenulated foliation. Sericite is probably more abundant than the original quartz-feldspar matrix. It is grouped as porphyry owing to the fact that it contains 5-10% white quartz crystals up to four or five mm. in size. These are thought to be original pheno-

crysts which have not only survived the metamorphism but have been enlarged by recrystallization. They appear to have been rolled and rounded as they grew, although some have rectangular shapes. The foliation does appear to wrap around them, a fact which suggests that they are not original phenocrysts, but secondary porphyroblasts.

Intrusive relationships with the greywackes indicate that in the area of CAT 4 claim the porphyry forms parallel tongues cutting the intruded rock along its foliation. Thus they are termed sills, but their extent is not known, especially to the west beneath a large area of overburden. They are shown to be connected with the larger body to the west of the main creek, mainly on the basis of their known attitudes on CAT 4 claim. The larger irregular bodies of porphyry are also strongly foliated and may not be as extensive as is indicated.

Structural Geology

It is almost impossible to obtain a clear picture of the structure of the rocks in the map area with the limited regional information available to supplement the detailed work done. True bedding attitudes are almost non-existent. No reliable correlations can be made. The regional foliation is so close to being parallel with the few bedding attitudes recorded that true structure is obscured.

Nevertheless, there is a consistent attitude to the foliation throughout the map area. Strikes in general are within 15° of due east-west, and dips are 40 to 50° to the north. The simplest interpretation, and the one taken here, is that rock types 2 to 7 comprise a uniformly dipping monoclinal sequence in which a strong regional schistosity has been developed essentially parallel to the bedding. Small scale dragfolding can be seen in the thin limestone bed within Type 4 rocks on CAT 4 claim. This evidence of deformation, combined with the fact that in the same vicinity the dip of foliation in the slates varies between steep north and steep south, suggests effects which might take place near the crests of folds. Tight isoclinal folding is thus a possibility, with axial planes parallel to the foliation.

Discordance between this dipping sequence and rocks of Types 8 and 9 to the east is apparent from the very flat dip of foliation in the latter rocks. This attitude is roughly the same as that of a thick sequence of pyroclastics and lavas which overlie Types 8 and 9 outside the map area. This attitude persists over most of the area of Johnny Mountain, a conclusion drawn from brief reconnaissance examinations outside the area of the claims. It suggests either that Types 8 and 9 and rocks above them unconformably overlie the north-dipping sequence, or that a fault contact exists between Type 7 and 8 rocks.

A system of east-west to northeasterly striking shear zones is the main control for mineralization on the CAT property. Because of the limited number and size of exposures, dimensions of these zones cannot be determined. None are thought to exceed 100 feet in width; no estimates of strike length were made. Most of the shears carrying mineralization of any importance lie within the broad altered zone shown on the map. This zone is fairly well defined on the CAT 5 and 6 claims where outcrop is available, but to the east in particular its limits as shown are purely conjectural. They indicate a minimum width for the zone in this area.

A second weaker system of fractures and small shears may have exerted some limiting control in the localization of mineralization. These strike northerly to northwesterly. The strongest of these is shown as a fault coinciding with the creek near station C-30. The magnitude of any movement along this break could not be determined, but it does appear to cut off the mineralization in the altered tuffs immediately west of the fault. Only scattered stringers with pyrite and minor chalcopyrite and sphalerite are found east of this fault. Several small altered pyritic zones within rocks of Type 6 have approximately the same strike. They contain only pyrite.

Alteration

All rock types in the map area have undergone some degree of quartz-sericite alteration, with or without accompanying pyritization. Most intense alteration is confined to the main zone in the central part of the area, a somewhat lenticular area about 750 feet wide at its widest point. Characteristically the rock is very finely shattered and tightly recemented by silica. Sericitization is apparently superimposed over this but no strong directional property is normally apparent. Rocks of Type 5 are the most strongly sericitized outside the main zone, and may differ from those of Type 6 only in this respect, having been much more intensely affected by the forces which produced the alteration and mineralization. Small zones, less than one foot to several tens of feet wide, of quartz-sericite alteration carrying pyrite are common within rocks of Type 6. The central portion along a fracture is completely altered to quartz-sericite-pyrite, while on either side the rock is progressively bleached outward by quartz-sericite replacement.

Development of secondary biotite is apparent in the andesites of Type 2, in some of the very fine grained agglomerates of Type 7, and to a lesser extent in the greywackes of Type 3. It does not appear to be widespread or strongly developed in any of the rock types.

MINERALIZATION

Pyrite is the most abundant and widespread sulphide mineral and, although not everywhere present, it can be found as sparse disseminations at least, in all rock types. It occurs in greater concentrations in several situations:-

(1) In the quartz-sericite-pyrite alteration zones within Type 6 rocks.

(2) In many of the fragments in Type 7 agglomerates and in stringers in the same rocks.

(3) In the coarse agglomeratic lenses within Type 6 rocks.

(4) In the mineralized shear zones within the major zone of quartz-sericite alteration.

The latter type of occurrence is the one of most apparent economic significance. Only three showings are presently indicated to be of economic interest and these are massive sulphide showings belonging to Type 4 above. The three showings are located in trenches 50 feet west of station C-16, 100' north of station C-4, and 300' east of station C-2. Sulphides in these three showings are pyrite, chalcopyrite and sphalerite; they also contain minor values in gold and silver. Elsewhere within the main zone chalcopyrite and sphalerite are present in small amounts as indicated on the map. Some chalcopyrite and sphalerite are found with pyrite in scattered stringers in Type 7 rocks near station C-43.

CONCLUSIONS

Economic interest in this property is centered on a broad east-west zone of intense quartz-sericite alteration. Within this zone, smaller shear zones belonging to an east-west to northeasterly striking system contain interesting amounts of chalcopyrite and sphalerite with pyrite and minor gold and silver values. It appears that in the area of most important mineralization an increase in the thickness of the zone coincides with a change of strike. Mineralization may thus be localized by flexures along a structural break. The nature of the individual mineralized zones must be further investigated before sound conclusions can be made about the potential of this property. This might be clarified by geophysical surveying to delineate the areal extent of the zones and by follow-up diamond drilling to test grade and continuity at depth.

ATTACHMENTS

(1) Geological plan, CAT Group No. 1, Johnny Mountain - Iskut River Area, Liard Mining Division, NTS 104 B/11, Scale 1" = 200'.

(2) Statement of Expenditures.

(3) Statutory Declaration Relating to Expenditures.

(4) Statement of Qualifications.

Report By _____
R. G. Bagshaw, Geologist

Under Supervision Of _____
D. W. Heddle, P. Eng.

RGB:mk
October 11, 1968
Vancouver, B. C.

Distribution:

Mining Recorder - Victoria	2
Vancouver Expl'n. File	1
Writer - RGB	1

STATEMENT OF EXPENDITURES
GEOLOGICAL SURVEY
CAT GROUP NO. 1
LIARD MINING DIVISION

SALARIES	$	$
One exploration geologist (R.G. Bagshaw) field mapping and report preparation for 45 days @ $45/day.	2,025.00	
One exploration assistant (I.E. Hutcheon) field mapping for 37 days @ $35/day.	1,295.00	
One senior geologist (D.W. Heddle) field supervision for 12 days @ $75/day.	900.00	4,220.00
TRANSPORTATION		
Helicopter charges - 13 hrs, 20 minutes @ $135/hr.	1,800.00	
Charter aircraft charges (Otter) - 2 hrs, 5 minutes @ $120/hr.	250.00	2,050.00
		$ 6,270.00

Endorsed By D W Heddle
D.W. Heddle, P. Eng.

This is Exhibit "A" to the Statutory Declaration of Duncan W. Heddle, declared before me the 15th day of October, 1968 A.D.

Sub-Mining Recorder

DOMINION OF CANADA:
PROVINCE OF BRITISH COLUMBIA.
TO WIT:

In the Matter of

STATUTORY DECLARATION RELATING TO EXPENDITURES ON A GEOLOGICAL SURVEY OF CERTAIN MINERAL CLAIMS OWNED BY COMINCO LTD.

I, DUNCAN WALKER HEDDLE, Professional Engineer

of Vancouver

in the Province of British Columbia, do solemnly declare that

1. I am the person who endorsed a geological report as the result of surveys carried out on certain mineral claims, owned by Cominco Ltd., situated in the Liard Mining Division.

2. Copies of the said report are being filed with the Mining Recorder in Victoria.

3. Attached hereto and marked with the letter "A", upon which I have signed my name at the time of declaring hereof, is a statement of expenditures incurred in connection with the geological survey of the said claims showing in addition the dates during which those making the said survey performed their work.

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the City of Vancouver, in the Province of British Columbia, this 15th day of October, 1968, A.D.

D. W. Heddle

J. Paul Sub-mining Recorder

A Commissioner for taking Affidavits for British Columbia or A Notary Public in and for the Province of British Columbia.

★o

COMINCO LTD.

VANCOUVER, B. C.

STATEMENT OF QUALIFICATIONS

R. G. Bagshaw was responsible for conducting the geological survey described herein. Bagshaw is a graduate geologist of the University of Manitoba and has been employed in geological field work since 1962. During this time he has worked as an exploration geologist on various field projects throughout northern and western Canada. I consider him a competent and experienced geologist.

D. W. Heddle,
Professional Engineer

DWH:mk

JOHNNY GLACIER

CAT 8
CAT 10

CAT 11
CAT 12

SNOW

SNOW

SNOW

SNOW

C-18 C-19 C-20 C-21 C-22 C-23 C-24 C-25 C-26 C-27 C-28 C-29 C-30 C-31 C-32 C-33 C-35 C-36 C-37 C-38 C-39 C-40 C-41 C-42 C-43 C-44 C-45 C-46 C-47 C-48 C-49 C-50 C-51 C-52 C-53 C-54 C-55 C-56 C-57

SYMBOLS

- TRENCH
- PLANE TABLE STATION
- CLAIM POST
- BEDDING
- FOLIATION
  - inclined
  - vertical
  - dip unknown
- JOINTS
  - inclined
  - vertical
- SHEARING
  - inclined
  - vertical
  - dip unknown
- GEOLOGICAL CONTACTS
  - defined
  - inferred
  - postulated
- AREA OF OUTCROP
- CREEK
- AREA OF SNOW OR ICE
- MORAINE RIDGE
- 4500 CONTOUR LINE

LEGEND

LAYERED ROCKS

- 9 [illegible] SLATE
- 8 [illegible] GRANET
- 7 [illegible] TUFF IN PLACES ANDESITE
- 6 TUFF MEDIUM GRAINED, MINOR COARSE TUFF
- 5 TUFF MEDIUM GRAINED, [illegible]
- 4 | 4a MAINLY CALCAREOUS SILTITES, MINOR PHYLLITE; 4a, LIMESTONE, LIMESTONE BRECCIA
- 3 GREYWACKE, MAINLY VOLCANIC POOR SORTED
- 2 ANDESITE

INTRUSIVE ROCKS

- 1 QUARTZ-FELDSPAR PORPHYRY
- ZONE OF SILICIFICATION & SERICITIZATION
- MINERALIZATION

CONTOUR INTERVAL - 50 FEET

TO ACCOMPANY GEOLOGICAL REPORT BY R.G.BAGSHAW, EXPLORATION GEOLOGIST, UNDER THE SUPERVISION OF D.W. HEDDLE, P. Eng., ON THE CAT GROUP NO.1, ON JOHNNY MOUNTAIN, ISKUT RIVER AREA, LIARD MINING DIVISION, DATED OCTOBER 11, 1968.

R. G. Bagshaw

1657

CAT GROUP

LOCATION MAP — SCALE: 1 INCH = 30 MILES

COMINCO Ltd.

DRAWN: HGB	TRACED: PTH	GEOLOGICAL PLAN
PLOTTED BY: DATE:	REVISED: BY: DATE:	CAT GROUP NO.1 - JOHNNY MOUNTAIN
		LIARD M.D. ISKUT RIVER AREA NTS-104-B-11
		SCALE: 1 INCH = 200 FEET DATE: OCTOBER 7, 1968 PLATE C-68-1

C-68

TO ACCOMPANY GEOLOGICAL REPORT BY R.G.BAGSHAW, EXPLORATION GEOLOGIST, UNDER THE SUPERVISION OF D.W. HEDDLE, P. Eng., ON THE CAF GROUP NO. 1, ON JOHNNY MOUNTAIN, 19KUT RIVER AREA, LIARD MINING DIVISION, DATED OCTOBER 11, 1968.

H. S. Bagshaw

C 2

ICE

SNOW

CAT 7
CAT 8

CAT 5
CAT 6

CAT 3
CAT 4

C-3