

2391

GEOLOGICAL & GEOCHEMICAL REPORT

on the "LES" CLAIM GROUP

NORTHERN VANCOUVER ISLAND, B.C.

NANAIMO MINING DIVISION

Lat. 50°27'N

Long. 127°47'W

for

SKAIST MINES LTD. (N.P.L.)

901-736 Granville St.

VANCOUVER, B.C.

by

R. B. STOKES, P.ENG.

and

D. G. LEIGHTON
Geophysicist/Geologist

STOKES EXPLORATION MANAGEMENT CO. LTD.

May 20, 1970

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Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **2391** MAP

INTRODUCTION

Examination and evaluation of the 'LES' property was authorized by Mr. Michael E. Jorgensen, of 3091 West 35th Avenue, Vancouver, B.C., on November 27th, 1969. A preliminary exploration program was conducted on the property by Stokes Exploration Management Co. Ltd. (SEMCO), between November 27th and December 7th, 1969. The work consisted of geological mapping, a reconnaissance geochemical survey, and a photogrammetric study of the property and of the surrounding area. The project was carried out under the direction of R. B. Stokes, P. Eng. This report describes and discusses the results of the program.

In addition to the above program, reports and maps pertaining to the project area were reviewed and studied.

SUMMARY

- (1) Skaist Mines Ltd. (NPL) holds, under option, 42 'LES' mineral claims located near Mahatta River on northern Vancouver Island.
- (2) Stokes Exploration Management Co. Ltd. (SEMCO) carried out a preliminary examination of these claims between November 27th and December 7th, 1969.
- (3) It was found that the 'LES' claims are underlain by Bonanza sub-group volcanic and sedimentary rocks, and that on one part of the property the Bonanza rocks have been intruded by a "granitic" stock.
- (4) A zone of intense hydrothermal alteration was found associated with the Bonanza intrusive contact. The zone is in places several hundred feet in width and has a mineralogy commonly associated with mineral deposits.
- (5) Two types of mineralization were noted in the 'LES' claims area. The one is a pyrite-chalcopyrite dissemination in a volcanic breccia. The other, found as float, is a magnetite-bornite (skarn?).

SUMMARY (Cont'd)

(6) A sound exploration program is recommended for the 'LES' property. This should include geochemical sampling and a ground based magnetic survey as well as geological mapping and prospecting.

PROPERTY

CLAIMS AND OWNERSHIP: The property consists of 42 full size claims. The claims, known as the 'LES' Group, are held under option by Skaist Mines Ltd. (NPL) from L. L. Storey.

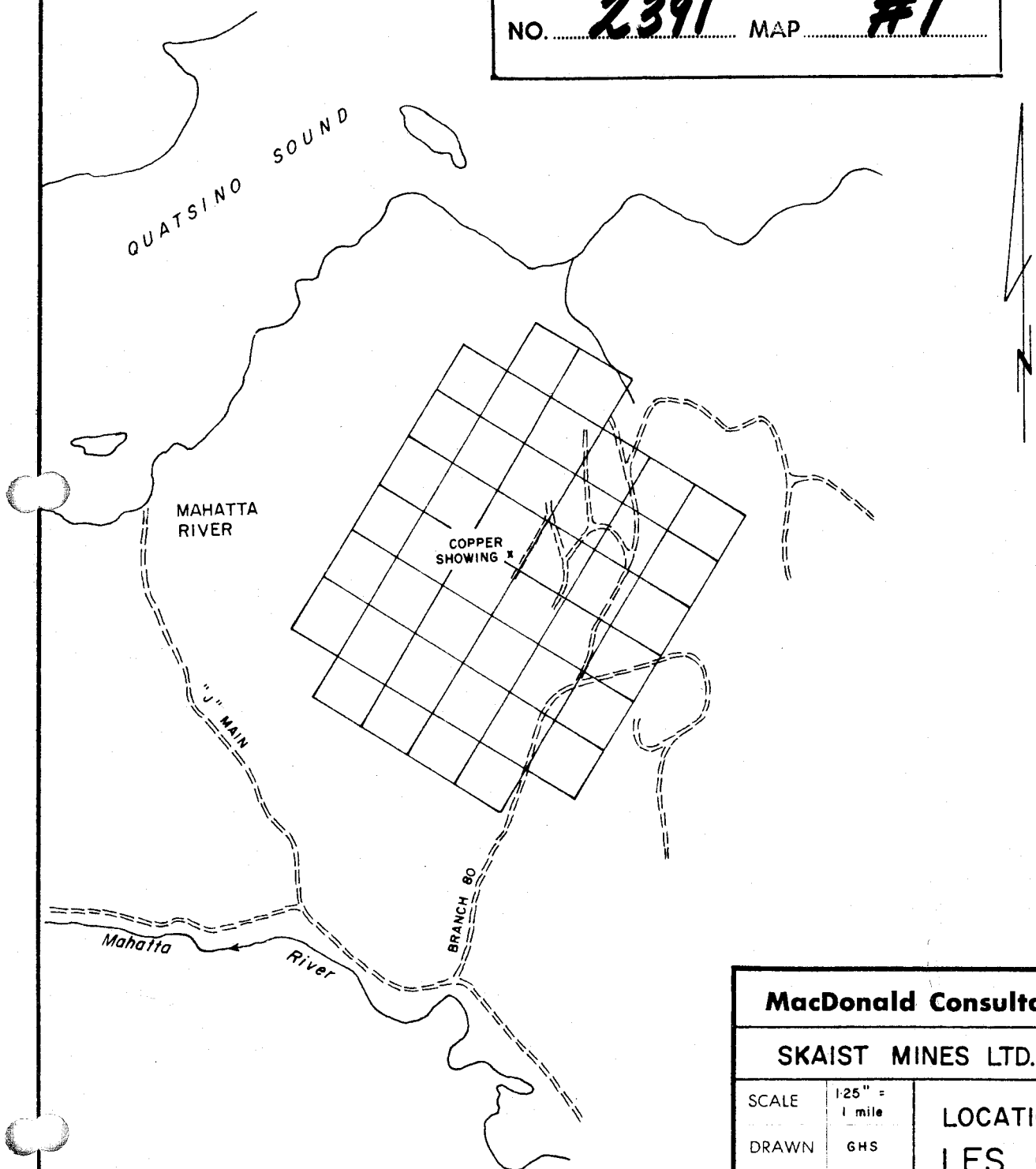
See Appendix I for a list of the claims with their respective record numbers.

LOCATION AND ACCESS: The 'LES' property is situated approximately two miles east of Mahatta River, B.C., at latitude 50°27'N and longitude 127°47'W. Mahatta River is a company town of Rayonier Canada Ltd. located on Quatsino Sound. The 42 claims comprising the 'LES' Group are located between elevations of 300 and 2500 feet.

The claims can be reached by logging road, a distance of about seven miles, from Mahatta River. The town is served by regular water taxi service from Coal Harbour and float plane service based in Port Hardy.

Rayonier have been particularly helpful by providing information about the area and transportation to and from the mineral claims.

Department of
 Mines and Petroleum Resources
ASSESSMENT REPORT
 NO. **2391** MAP **#1**



MacDonald Consultants Ltd.		
SKAIST MINES LTD. (N.P.L.)		
SCALE	1/25" = 1 mile	LOCATION MAP LES GROUP
DRAWN	GHS	
DATE	JAN. '70	
NO.	220-1-1	
		<i>From map by SEMCO dated 20 DEC. 1969</i>

GROUND CONTROL

For geological mapping purposes, a 400 feet to 1 inch contour map was used. The map was prepared from a plan of the same scale provided by Rayonier Canada Ltd.

A baseline was established in a north-south direction through the center of the property by means of a chain and compass survey. This line runs between station 0+00 and 43+00 South on a bearing of 030°.

A number of crosslines were put in perpendicular to the baseline. These lines were extended to cover part of an alteration zone as determined from geological mapping. Crossline stations are marked at 100 foot intervals.

GEOLOGY

(1) GENERAL: The general geology of the 'LES' claim project area is that of a plate of Bonanza sub-group rocks that strikes approximately N30°E and dips about 40° to the west.

The Bonanza sub-group refers to rocks that are older than the Coast Range intrusives and younger than the Quatsino (limestone) formation. The Bonanza has been divided into two divisions, the Lower being predominately sedimentary in origin, and the Upper composed primarily of volcanic rocks. Both of these divisions are thought to underlie the 'LES' claims, though only the Upper Bonanza rocks have been seen in outcrop. Muller has evidence which suggests that vesicular andesite (see accompanying geological map) correspond to the lower part of the Upper Bonanza Group. This has possible economic significance.

A small ($\frac{1}{4} \times 1\frac{1}{2}$ mile) "granitic" stock intrudes the Bonanza Group rocks in the northeast corner of the property.

Where the "granitic" pluton contacts Bonanza Group rocks there is an alteration zone that varies from a few hundred to at least 1500 feet in width.

GEOLOGY (Cont'd)

(2) MINERALIZATION: Two types of mineralization were found on the 'LES' property. One is a pyrite-chalcopyrite-hematite dissemination in volcanic breccia. The other, found only in float, is bornite-magnetite (skarn?).

The disseminated mineralization, though sub-economic, indicates a potential porphyry copper type deposit within the claim boundaries. The mineralized breccia, shown on the accompanying geological map, is located just outside a zone of intense alteration.

The massive (skarn?) type mineralization, though not found in place, was found in a sufficient number of places to have a source that is probably within the property boundaries.

(3) DESCRIPTION OF MAP UNITS: For mapping purposes a number of well-defined rock units were chosen. These include:- (i) intrusive rocks; (ii) volcanic breccia; (iii) vesicular andesite; (iv) fine-grained andesite; and (v) intensely altered rock.

(i) Intrusive Rocks: Outcrops are massive white to pink coloured rocks. In fresh hand specimens the rock varies from green to pink, fine to medium-grained. Mostly the rocks are fine-grained and pink. Thin section study of one representative specimen (L-6-4) is given in Appendix II. The rock is a fine-grained hornblende-albite (diorite).

GEOLOGY (Cont'd)

(ii) Volcanic Breccia: In outcrop rock is massive showing breccia fragments on weathered surfaces. Origin is not apparent, though Muller has suggested "pillow breccias". On fresh surface the rock consists of grey fragments averaging about 2-3 inches in diameter. Matrix is dark grey and mineralized with specularite, pyrite, magnetite (and in places, chalcopyrite). See Appendix II, specimen LX-2, for a description of thin and polished sections.

(iii) Vesicular Andesite: Rock is a fine-grained, dark green, dense to amygdaloidal lava. This unit is a medium to dark green andesite. In the Mahatta River area amygdaloidal lavas of this type are characteristic of the basal parts of the Upper division of the Bonanza sub-group (Muller, 1969).

(iv) Fine-grained Andesite: In outcrop this rock unit is a fine-grained dark green to black andesite.

(v) Intensely Altered Rock: Outcrop is silicified and/or pyritized rock (of any origin). This map-unit contains argillic alteration, as well as tourmalization and carbonitization in places. See Appendix II, LX-3.

GEOLOGY (Cont'd)

(4) ALTERATION: Hydrothermal alteration was noted on the 'LES' claims. The alteration, which varies in intensity from pervasive to weak, is a contact aureole related to an intrusive stock.

An alteration zone, shown on the accompanying geologic map, consists mainly of intense silicification with pyritization and tourmalization. Argillic alteration, carbonitization, and hematite were also noted in scattered occurrences. This zone varies in width from a few hundred feet to at least 1500 feet.

Not shown on the accompanying geologic plan is an extensive area of pyrite and hematite (specularite) alteration. In this area pyrite and hematite occur as disseminations and fracture fillings in all rocks, but especially in the more permeable volcanic breccia.

The minerals chlorite and epidote are widespread, but the significance of these minerals, which are common in Vancouver Group rocks, is not known.

Intense hydrothermal alteration should be considered significant because of its close relation to economic mineralization. Because of its complex composition, involving such "mineralizers" as fluorine and boron, tourmaline, is a particularly significant hydrothermal mineral.

GEOLOGY (Cont'd)

(5) PETROGRAPHIC STUDIES: Petrographic studies have been made on a number of representative rock samples from the 'LES' claims. The work was done by Dr. A.J. Sinclair, geologist with the University of British Columbia. Such studies have contributed significantly to the understanding of the geology of the project area and should be extended to keep pace as the exploration program develops.

Three specimen studies are quoted directly in Appendix II of this report. Specimen L-6-4 is typical of the stock that occurs in the northeast corner of the 'LES' claim block. Sample LX-3 is from the alteration zone south of the intrusive. Specimen LX-2 is characteristic of the mineralized Volcanic Breccia.

(6) PHOTOGEOLOGY AND STRUCTURE: A photogeologic survey was made of the 'LES' claims and surrounding area. The study compared fracture densities and delineated primary structural features. The results of the photo studies are presented on an accompanying $\frac{1}{2}$ mile to 1 inch plan.

In keeping with standard practice lineations exceeding 10,000 feet in length are defined as faults and those less than 10,000 feet long as fractures. Only major fractures are shown.

GEOLOGY (Cont'd)

The most pronounced structural feature in the area is a fault which runs up through the town of Mahatta River from the southeast. This is a major structure not less than 20 miles in length. Another parallel fault cuts through the Mahatta River area about $2\frac{1}{2}$ miles to the northeast.

A set of smaller "segmented" faults runs through the area in a generally northeast-southwest direction. These faults parallel, and in some places coincide with, the logging road known as Branch 80. There may be a relationship between this stress system and the intrusive stock shown as well as mineralization in the 'LES' claims area.

There is a pronounced "curvilinear" located south of the intrusive which is possibly related to a pulse of plutonic activity. This feature terminates at a fault intersection near the alteration zone shown.

GEOCHEMISTRY

A total of 113 soil and 21 silt samples were collected on the 'LES' property. The soil samples were assayed for concentrated perchloric acid extractable copper and the silts for weak hydrochloric acid extractable copper. The geochemical sampling is too limited to permit more than a very generalized assessment of the project area.

A histogram made from the 113 soil sample assays indicated an average value of 11.5 p.p.m. for copper. Threshold values then are in the order of 15 to 20 p.p.m. This is a particularly low copper background, especially for northern Vancouver Island.

On the basis of the statistical analysis there is a silt sample anomaly in the creek flowing past baseline station 4300S. There are a number of above threshold values located in the alteration zone south of the intrusion.

It is recommended that an extensive soil sample survey be made of the 'LES' property. The sampling should be done on a 400 foot by 100 foot grid and should cover all claims.

GEOCHEMISTRY (Cont'd)

Northern Vancouver Island is characterized by a heavy rainfall and poorly developed soil. The interpretation of geochemical survey results is at best difficult. Therefore, when samples are taken a record should be made which includes sample number, location, and a description of the material collected. Special information such as whether the ground is freely or poorly drained, the degree of slope and the depth of the sample should be recorded.

GEOPHYSICS

No geophysical measurements were made on the 'LES' property. Nevertheless, consideration should be given to this exploration technique in the future.

It is recommended that a ground based magnetic survey be made, especially in the vicinity of the Bonanza-Intrusive contact. Measurements should be made on a grid not less than 100 feet by 400 feet. The grid proposed for follow-up geochemical sampling would be ideally suited ground control for a magnetic survey.

With a magnetic survey it should be possible to delineate the alteration zone, previously described, in areas covered by overburden. Also, any skarn type copper-iron deposit(s), if present, should be readily detectible with a magnetic survey.

If in later work it is found that economic mineralization is associated with intense pyritization, an induced polarization survey may be advisable.

CONCLUSIONS

The 'LES' claims constitute a promising prospect. They are promising in that they contain many of the "earmarks" of a mineral deposit - intrusive stock, favorable host rock, and extensive hydrothermal alteration. The mineralization found there is a new discovery and little, if any, exploration work has been done there previously.

The prospect definitely merits a thorough exploration program.

RECOMMENDATIONS

A comprehensive exploration program is recommended for the 'LES' claims project area. Initially, this should include geological mapping, prospecting, soil sampling and a ground based magnetic survey. A second stage, contingent upon the results of the first, would include bulldozer trenching, diamond drilling, and sampling.

Respectfully submitted,

STOKES EXPLORATION
MANAGEMENT CO. LTD.



R. B. Stokes, P. Eng.
Mining Engineer.



D. G. Leighton,
Geophysicist/Geologist.

May 20, 1970

APPENDIX I

CLAIMS LIST

APPENDIX I

December 10, 1969.

CLAIMS LIST

'LES' CLAIMS - MAHATTA RIVER, B.C.

<u>Claim Number</u>	<u>Tag Number</u>	<u>Record Number</u>	<u>Date Staked</u>	<u>Date Recorded</u>
LES 9	868983	24949	May 3, 1968	May 31, 1968
10	868982	24950	May 3, 1968	May 31, 1968
11	868771	24951	May 3, 1968	May 31, 1968
12	868772	24952	May 3, 1968	May 31, 1968
LES 51	917047	30123	Oct. 17, 1969	Nov. 7, 1969
52	917048	30124	Oct. 17, 1969	Nov. 7, 1969
53	917049	30125	Oct. 17, 1969	Nov. 7, 1969
54	917050	30126	Oct. 17, 1969	Nov. 7, 1969
55	917051	30127	Oct. 17, 1969	Nov. 7, 1969
56	917052	30128	Oct. 17, 1969	Nov. 7, 1969
57	917053	30129	Oct. 17, 1969	Nov. 7, 1969
58	894898	30130	Oct. 17, 1969	Nov. 7, 1969
LES 3565	3565 M	30440	Nov. 30, 1969	Dec. 10, 1969
3566	3566 M	30441	Nov. 30, 1969	Dec. 10, 1969
3567	3567 M	30442	Nov. 30, 1969	Dec. 10, 1969
3568	3568 M	30443	Nov. 30, 1969	Dec. 10, 1969
3569	3569 M	30444	Nov. 30, 1969	Dec. 10, 1969
3570	3570 M	30445	Nov. 30, 1969	Dec. 10, 1969
3571	3571 M	30446	Nov. 30, 1969	Dec. 10, 1969
3572	3572 M	30447	Nov. 30, 1969	Dec. 10, 1969
3573	3573 M	30448	Nov. 30, 1969	Dec. 10, 1969
3574	3574 M	30449	Nov. 30, 1969	Dec. 10, 1969
3575	3575 M	30450	Nov. 30, 1969	Dec. 10, 1969
3576	3576 M	30451	Nov. 30, 1969	Dec. 10, 1969
3577	3577 M	30452	Nov. 30, 1969	Dec. 10, 1969
3578	3578 M	30453	Nov. 30, 1969	Dec. 10, 1969
3579	3579 M	30454	Nov. 30, 1969	Dec. 10, 1969
3580	3580 M	30455	Dec. 5, 1969	Dec. 10, 1969
3581	3581 M	30456	Dec. 5, 1969	Dec. 10, 1969
3582	3582 M	30457	Dec. 5, 1969	Dec. 10, 1969
3583	3583 M	30458	Dec. 5, 1969	Dec. 10, 1969
3584	3584 M	30459	Dec. 5, 1969	Dec. 10, 1969
3585	3585 M	30460	Dec. 5, 1969	Dec. 10, 1969
3586	3586 M	30461	Dec. 5, 1969	Dec. 10, 1969
3587	3587 M	30462	Dec. 5, 1969	Dec. 10, 1969
3588	3588 M	30463	Dec. 5, 1969	Dec. 10, 1969
3589	3589 M	30464	Dec. 5, 1969	Dec. 10, 1969
3590	3590 M	30465	Dec. 5, 1969	Dec. 10, 1969
1866	51866 M	30466	Dec. 5, 1969	Dec. 10, 1969
1867	51867 M	30467	Dec. 5, 1969	Dec. 10, 1969
1868	51868 M	30468	Dec. 5, 1969	Dec. 10, 1969
1869	51869 M	30469	Dec. 5, 1969	Dec. 10, 1969

TOTAL - 42 claims.

APPENDIX II

PETROGRAPHIC ANALYSES, by A.J. Sinclair

SPECIMEN 'LES' LX-3

Hand Specimen:

Fairly extensively weathered, aphanitic, leucocratic rock. Numerous fracture surfaces are coated with limonite. Colour is very pale grey, almost white, with about 2% small black patches of radiating tourmaline crystals. The rock is cut by numerous, irregular, hairline fractures.

Thin Section:

The specimen is a sedimentary (clastic) rock consisting principally of about 25% quartz grains set in a matrix of somewhat uncertain mineralogy. Large quartz grains up to about 0.8 to 1.2 mm. long tend to be elongate with subparallel arrangement, giving the rock a layered aspect. Most quartz grains, however, are 0.1 to 0.2 mm. in diameter and are more-or-less equidimensional. Edges of most grains have been replaced by the matrix. The vast majority of quartz grains are composite and are strained indicating a metamorphic provenance.

The matrix consists of high relief material, most of which appears to be 'cloudy' feldspar (albite). In a number of places the identification of plagioclase is certain. Elsewhere twinning is absent. A good part of the matrix contains a small proportion of a high birefringent, fibrous material that appears to be sericite with a somewhat ragged appearance (perhaps 2 to 3% of the rock). Minute grains of opaque material (about 2%) are scattered throughout.

Tourmaline needles are present locally as radiating masses of acicular crystals. Only a few such masses are present in the thin section. Individual tourmaline crystals are about 0.4 to 0.6 mm. long and the radiating clusters are about 1 mm. in diameter. Tourmaline crystals are intergrown with unstrained quartz. There is no evidence of channel-ways for influx of boron to produce tourmaline.

Several late fractures cut the rock and are coated with limonite. Limonite stains grains for a fraction of a millimeter from the fractures.

The rock is of clastic origin (probably a siltstone). Large particles appear to be derived from a metamorphic terrain. The matrix has undergone considerable recrystallization, perhaps contemporaneous with boron metasomatism that produced radiating clusters of tourmaline needles.

SPECIMEN 'LES' LX-2 ("Breccia")

Hand Specimen:

Coarse-grained volcanic breccia. Large fragments (1" plus) are pale grey, aphanitic, volcanic rocks that are slightly epidotized. Smaller fragments and matrix are varying shades of dark grey mostly. Matrix is mineralized in places with specularite, pyrite and chalcopyrite. The specimen is fairly magnetic.

Thin Section:

The rock is a volcanic breccia. Fragments are all andesitic volcanic rock, some of which are slightly epidotized and chloritized. All show a very pronounced trachytic structure (flow layering) to microlites of plagioclase. In a few cases chlorite amygdules are present.

Much of the contrast between fragments, particularly the finer-grained ones, results from varying amounts of opaque material interstitial to plagioclase microlites. Matrix is also igneous in origin and has much the same composition as the fragments.

Late thin irregular veinlets of calcite cut all fragments and the matrix. Chloritization is associated, at least in part, with the introduction of calcite. There is no obvious increase in amount of opaque minerals in or near calcite veinlets observed in the thin section.

The rock is a volcanic breccia, perhaps a flow breccia.

Polished Section:

Three opaque minerals account for about 3% of the specimen. In order of decreasing abundance these are, specularite-magnetite-pyrite. Textures indicate the order of deposition to be magnetite-pyrite-specularite-calcite, probably with considerable overlap in deposition of specularite and calcite. Chalcopyrite was observed in hand specimen as monominerallic blebs but was not seen in the polished surface.

Pyrite occurs in a late fracture. One large anhedral grain was seen that was closely associated with and replaced by specularite.

Specularite occurs in interstitial positions between fragments, these appear to be minute vugs. Texture is foliate. Deposition is earlier than calcite for the most part.

Magnetite occurs mainly as minute isolated crystals scattered through andesite fragments. A couple of large crystals are associated with specularite masses and pre-date the specularite. These large crystals are up to 0.6 mm. diameter. Grains in andesite are mostly about 0.01 mm. diameter.

SPECIMEN 'LES' L-6-4

Hand Specimen:

The specimen is a fine-grained, even grained, leucocratic igneous rock, probably plutonic. It is massive and has a fairly deep pink colour due predominantly to the very abundant feldspar. The rock contains about 10% mafic material, in part as black clots up to 1 cm. in diameter, but mainly as disseminated needles mostly about 1 mm. long. The specimen is fairly strongly magnetic.

Thin Section:

Mineralogy is as follows:-

Plagioclase (85%)--occurs as stubby laths 0.8 to 1.0 mm. long. A few rare laths are up to 1.5 mm. long. Refractive index is less than balsam and albite twinning is prevalent. Crystals are anhedral with no preferred orientation. If K-feldspar is present it is not readily distinguished and is present only in very minor amounts.

Hornblende (7%)--pale green to pale brown thin needles mostly about 1 mm. or less in length. Most grains are twinned and many are slightly altered to chlorite. Many crystals contain minute inclusions of opaques.

Quartz (5%)--occurs entirely as small rounded blebs intergrown with plagioclase in interstitial positions to plagioclase laths.

Opaque Minerals (3%)--small, anhedral, rounded grains about 0.1 to 0.3 mm. in diameter. Apparently magnetite in large part as rock is fairly strongly magnetic.

Sphene (trace)--a few anhedral grains associated with opaque grains.

Chlorite (trace)--small fibrous patches forming rare alteration patches in hornblende.

The rock is a fine-grained hornblende-albite diorite. The only slight sign of alteration is chloritization of hornblende and that appears to be deuteric. The albite composition of feldspar appears to be primary as there are no signs of normal alteration products of calcic plagioclase.

APPENDIX III

REFERENCES

REFERENCES

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APPENDIX IV

MACDONALD CONSULTANTS LTD.

SUITE 12 - 425 HOWE STREET, VANCOUVER 1, B.C.

Report

on the

'Les' Group of Mineral Claims

Mahatta River, B.C.

Latitude $50^{\circ} 27' N$, Longitude $127^{\circ} 47' W$

for

Skaist Mines Ltd. (N.P.L.)

by

MacDonald Consultants Ltd.

E. D. Dodson, P. Eng.

January 28, 1970

INTRODUCTION

The writer visited the 'Les' Group of mineral claims on December 15, 1969 accompanied by Mr. D. G. Leighton, a Semco geologist. Mr. Leighton had been in charge of field work on the property and so was able to escort the writer to the various known geologic features with a minimum of effort.

Most of the material contained in this report is derived from Semco's work. Geological data was verified on the ground on the writer's visit and certain conclusions were arrived at in conjunction with D. G. Leighton. The geological and geochemical map herein were produced by Semco.

PROPERTY

The 'Les' group consists of 42 contiguous mineral claims held under option by Skaist Mines Ltd. (N.P.L.) from L. L. Storey. The claims are shown in figure 220-1-1 attached hereto.

The property consists of the following claims:

<u>Claim Name</u>	<u>Record No.</u>	<u>Record Date</u>
Les 9 - 12	24949 - 52	May 31, 1968
Les 51 - 58	30123 - 30	November 7, 1969
Les 3565 - 90	30440 - 65	December 10, 1969
Les 1866 - 69	30466 - 69	December 10, 1969

LOCATION AND ACCESS

The 'Les' group is situate approximately two miles east of Mahatta River, B. C. at latitude 50° 27' north and longitude 127° 47' west. Mahatta River is a Rayonier Canada Ltd. logging camp located on the south side of Quatsino Sound on the west coast of Vancouver Island. Elevations at the

property range between 300 and 2,500 feet.

Current access to the property is via helicopter from Port Hardy. An alternative route is by water taxi or float plane to Mahatta River and thence by approximately seven miles of logging road.

WORK TO DATE

The showings were located in 1968. No work was done at that time and so far as is known no previous work had been done. Between November 27 and December 7; 1969 Stokes Exploration Management Company Ltd. (Semco) carried out a brief preliminary exploration program on portions of the property. The work consisted of geological mapping, geochemical soil sampling and photogrammetric study.

GEOCHEMISTRY

A total of 11,200 feet of line was soil sampled. One hundred and thirteen soil samples and twenty-one silt samples were taken and analysed for copper. The areas sampled were chosen because of evidence of alteration and/or mineralization. This sampling is too limited in extent to provide a reasonable assessment of the property. Leighton states "A histogram made from the 113 soil sample assays indicated an average value of 11.5 ppm for copper. Threshold values then are in the order of 15 to 20 ppm. This is a particularly low copper background, especially for northern Vancouver Island."¹

The writer urges that the original soil samples be reanalysed as it seems improbable that such low values would exist in this environment unless some very unusual leaching conditions exist.

1. D. G. Leighton, December 20, 1969, A Report on the 'Les' Claim Group, Northern Vancouver Island, Nanaimo Mining Division.

GEOLOGY

The 'Les' group is underlain by rocks of the Bonanza sub-group and a sodic intrusive. Attitudes within the Bonanza are extremely difficult to determine as contacts are for the most part covered. Three questionable observations give an attitude near 030/40° west. Topographic features tend to lend support to the above attitude however.

Recognizable rock units within the Bonanza are:

Fine Grained Andesite - This is a fine grained crystalline rock, dark green to black in colour. In structure it appears massive and without any distinguishing features. Texturally and structurally it suggests a fine-grained intrusive but it may be a massive flow.

Volcanic Breccia - This is an extremely interesting rock-type. In hand specimen it consists of grey fragments of an average size of perhaps 2 inches. Locally fragments several feet in diameter occur. All are embedded in a dark grey matrix. The writer suggests that this may represent an autobreccia developed in or about a volcanic vent but further study will be required to establish the origin.

This rock is in part mineralized with specularite, pyrite, magnetite and locally chalcopyrite.

Amygdaloidal Andesite - This is a fine-grained dark green, variably amygdaloidal andesite. It occurs interlayered with the breccia. Its relationship with that unit is in question as no contacts are visible.

Intrusive Rock - This unit is a massive fine to medium grained plutonic intrusive. Specimens from near the contact are grey to green with a pinkish cast, and from the interior are generally pink in colour.

Petrographic work by A. J. Sinclair shows the rock to be composed of sodic plagioclase 85%, hornblende 7%, quartz 5%, opaque minerals 3%, sphene, a trace and chlorite, a trace--Sinclair calls the rock a fine-grained hornblende-albite diorite.

ROCK ALTERATION

Adjacent to the intrusive stock at least on the south and west sides there is a zone of pervasive alteration. This alteration varies somewhat from place to place. Essentially however it appears to be a zone of argillic, sericitic and silicic alteration with accompanying pyritization, all apparently of hydrothermal origin.

On the south side of the intrusive where this zone is at least 1,500 feet in width small radiating clusters and veinlets of black tourmaline occur in association with introduced quartz. Sinclair in examining a thin section from this area identifies the rock as originally a fine-grained sediment.

MINERALIZATION

Two types of copper-bearing mineralization are reported on the 'Les' claims. The first, not seen by the writer, and reported only as float, is a magnetite-chalcopyrite skarn-type. The second is an area of pyrite-hematite chalcopyrite dissemination in volcanic breccia. The latter material was seen in outcrop on the road west of the alteration zone and is shown on the accompanying map by the notation Cpy. Although sub-economic in size and grade this showing indicates the presence of copper in what may be considered a porphyry copper type environment.

CONCLUSIONS AND RECOMMENDATIONS

The unusual nature of this intrusive, the extensive pyritization and alteration and the presence of known copper-iron sulphides on the property combine to make this a good exploration target. The writer therefore recommends the following work:

Phase I

- 1.) Establishment of a grid across the entire property, the lines to be cut at 400 foot intervals at right angles to the base line already partially established. This would provide the control for the work to follow.
- 2.) Magnetometer survey of the property along the above lines with magnetometer stations at 100 foot intervals on the lines. This should help to establish the extent of the intrusive, the extent of the alteration zone and the location of any skarn-type (magnetite rich) mineral deposits.
- 3.) Geochemical survey of the entire property. This should be done after establishing the cause of the low readings to date and after an orientation survey to indicate which soil-horizon should be sampled. The orientation survey should also include rock-chip analysis of bedrocks adjacent to the above orientation samples.

The geochemical survey itself should use the prepared 400 foot grid. Samples should be taken at 200 foot intervals along the lines.
- 4.) Geological mapping of the entire property to establish the extent and nature of the intrusive, and the alteration zone or zones.

Careful prospecting should be carried on simultaneously with the geological mapping and notes kept of the location of any mineralized material found, whether as float or in place.

Phase II

- 1.) Trenching by bulldozer and by hand of any mineralized areas or geochemical anomalies derived from Phase I.
- 2.) Diamond drilling of any worthwhile targets derived from Phase I and the above bulldozer trenching.

BUDGET

Phase I

Line cutting - approximately 44 miles @ \$120/mile	\$ 5,300	
Magnetometer Survey	2,000	
Geochemical Sampling	900	
Geochemical Analysis	2,400	
Geology & Supervision	3,000	
Prospecting	1,500	
Camp Costs	3,000	
Transportation, including helicopter	2,500	
Freight & Communications	400	
Engineering and Assays	<u>1,200</u>	
	22,200	
Contingencies	<u>2,000</u>	\$24,200

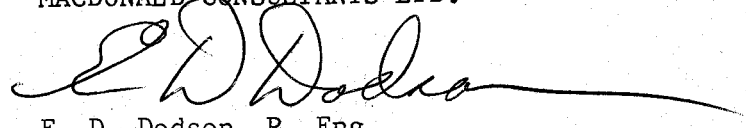
Phase II

Bulldozer Trenching		
200 hours D7E or equivalent	\$ 5,400	

Mobilization	\$ 600	
Diamond Drilling		
2,000 feet @ \$15/foot	30,000	
Mobilization	600	
Camp Costs	2,500	
Transportation	1,800	
Freight & Communications	2,000	
Geology, Engineering & Assays	<u>2,000</u>	
	44,900.	
Contingencies	<u>4,000</u>	<u>\$48,900</u>
		<u>\$73,100</u>

Respectfully submitted,

MACDONALD CONSULTANTS LTD.



E. D. Dodson, P. Eng.

EDD/st

MACDONALD CONSULTANTS LTD.
SUITE 12 - 425 HOWE STREET, VANCOUVER 1, B. C.

January 28, 1970


CERTIFICATE

I, Earl D. Dodson, do hereby declare that:

- 1.) I reside at 2990 St. Kilda Avenue, North Vancouver, B. C. and have business address at 12 - 425 Howe Street, Vancouver 1, B. C.
- 2.) I am a graduate in geology of the University of British Columbia 1954.
- 3.) Since 1954 I have been employed in various phases of mineral exploration; in the latter years in posts of considerable responsibility.
- 4.) I am a professional engineer registered in the Associations of Professional Engineers of the Province of British Columbia and the Yukon Territory.
- 5.) I visited the 'Les' group of mineral claims on December 15, 1969, spending approximately four hours on the ground.
- 6.) I have no interest, direct or indirect, nor do I expect to receive either directly or indirectly any interest in the properties or securities of Skaist Mines Ltd. (N.P.L.).

Respectfully submitted,

MACDONALD CONSULTANTS LTD.



E. D. Dodson, P. Eng.

APPENDIX VI

PROJECT COSTS BREAKDOWN

ASSESSMENT CREDIT DATA

Wages	\$1,726.00
W.C.B., U.I.C., CP.P.P., etc. @ 20%	346.00
Engineering Fees @ 30%	519.00
MacDonald Consultants Ltd.	
E.P. Dodson, P. Eng Report	654.74
Sample Preparation and Analysis	
Geochemical Samples	190.09
Thin Section Studies	92.00
Camp Expenses, Geceries and Meals	404.93
Mobilization	
Helicopter Charter	368.05
Truck Rental	172.35
Air Fares	224.00
Boat Charter	70.00
Drafting and Report Preparation	109.00
Miscellaneous Expenses:	
as Photocopying, Telephone, etc.	57.00
	<hr/>
TOTAL	\$4,933.16
	<hr/> <hr/>

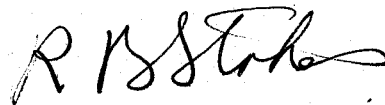
CERTIFICATION

I, RONALD B. STOKES, do hereby certify that:

1. I am a practicing Professional Mining Engineer with offices at Suite 209-678 Howe Street, Vancouver 1, British Columbia and resident of Vancouver.
2. I am a graduate of the Camborne School of Mines, Cornwall, England, 1952.
3. I have practiced Mining Engineering and Mining Exploration for sixteen years, thirteen of which were based in British Columbia.
4. I am a Member, in good standing, of the Association of Professional Engineers of the Province of British Columbia.
5. I am a Member of the Canadian Institute of Mining and Metallurgy and Associate Member of the Institution of Mining and Metallurgy, England, and the Australasian Institute of Mining and Metallurgy.
6. I am President of Stokes Exploration Management Co. Ltd. which carried out the program of exploration.

This report is based on study and interpretation of data assembled by personal examination on the property and work carried out under my supervision.

7. I have a one-third (1/3) vendors interest in the 'LES' Claims Group located near Mahatta River, Northern Vancouver Island. The 'LES' claims were optioned by Skaist Mines Ltd. (N.P.L.) on November 28, 1969

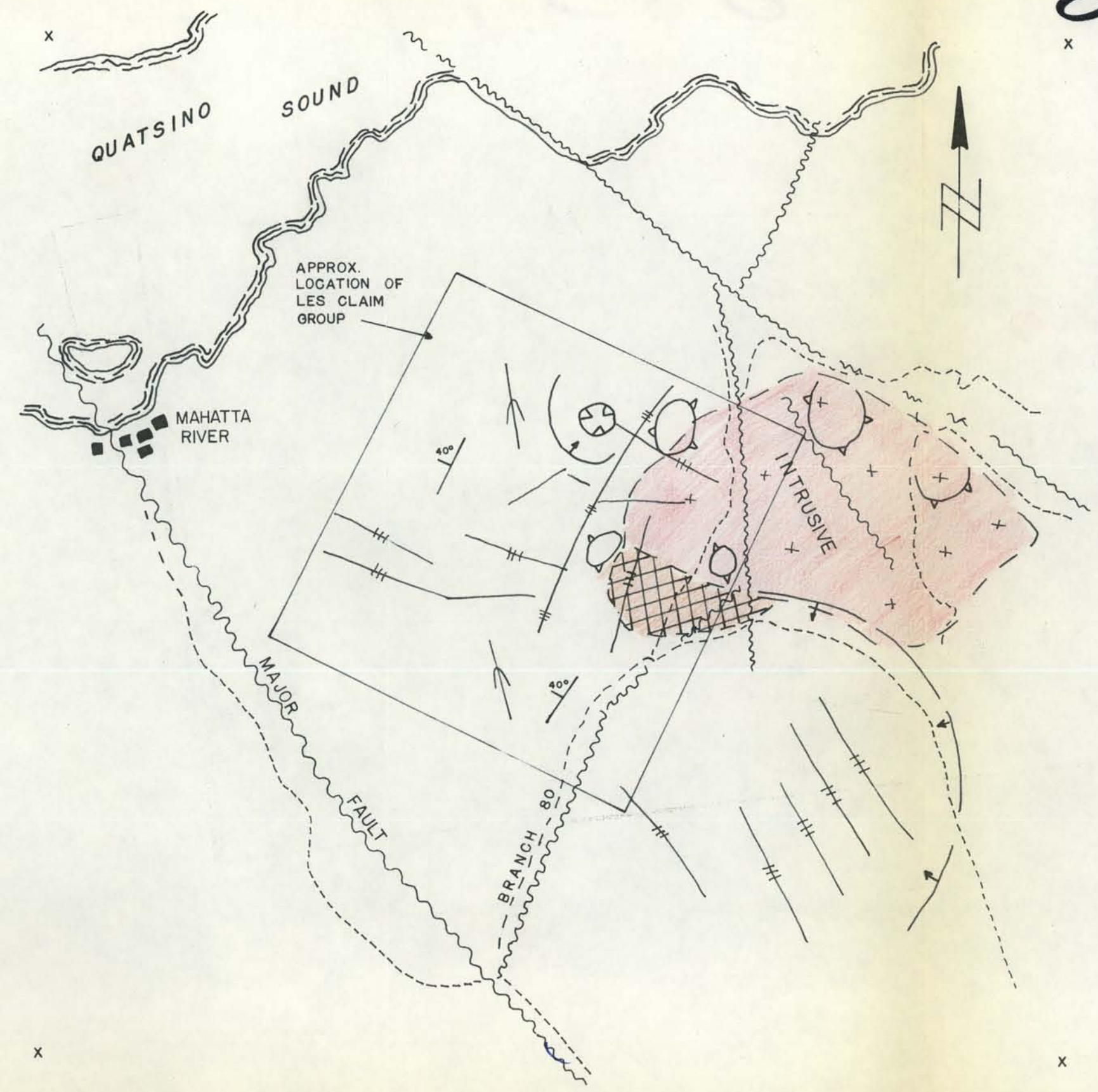


R. B. Stokes, P. Eng.

May 20, 1970

2391

Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. **2391** MAP **#4**



LEGEND





- FAULT
- GEOLOGICAL CONTACT
- LINEATION
- CURVILINEAR
- POSITIVE, NEGATIVE FEATURE
- BEDDING
- GLACIAL STRIATION
- LOGGING ROAD
- INTRUSIVE ROCKS
- ALTERATION ZONE

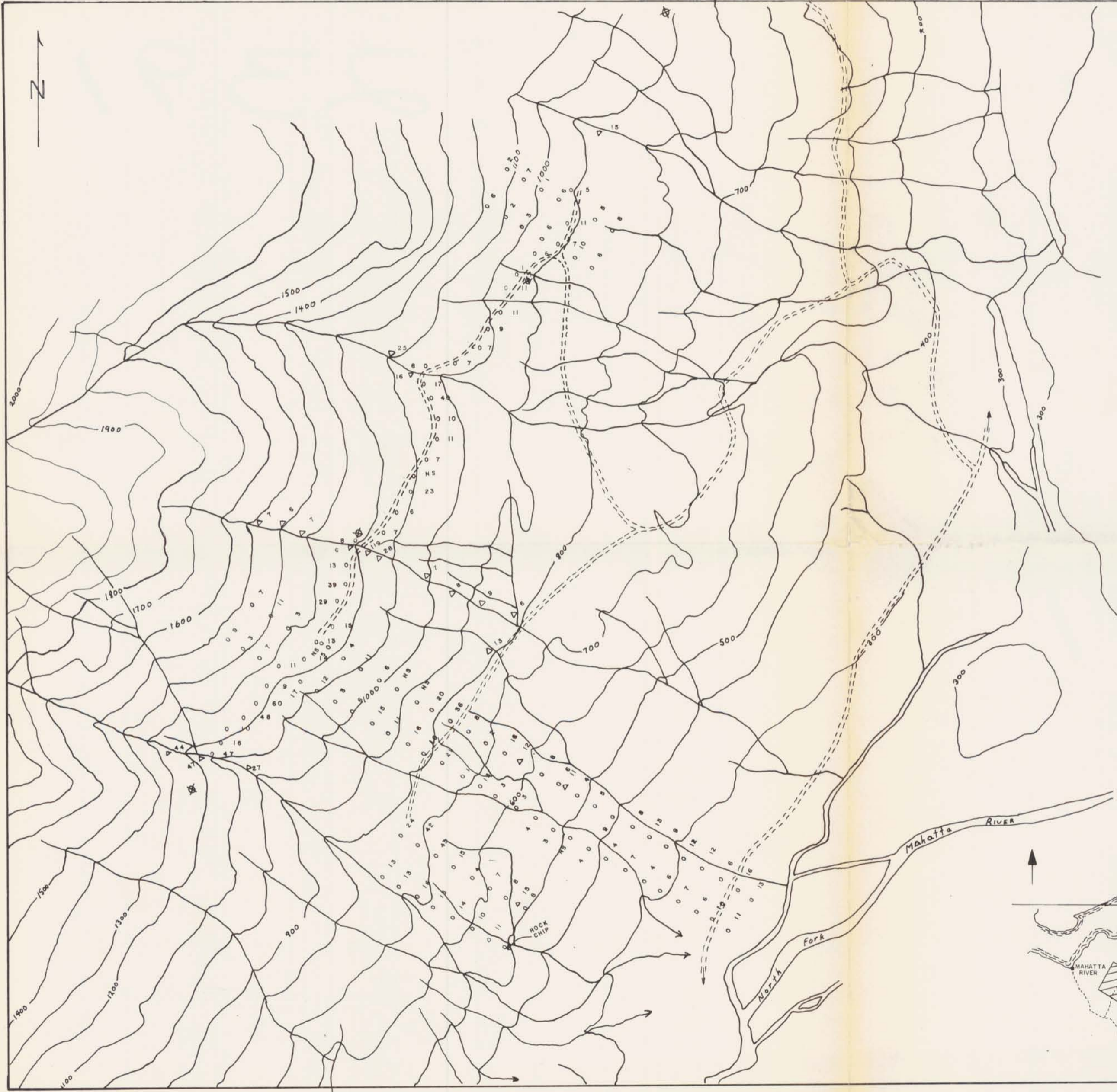
D. H. Lighter

SKAIST MINES LTD. (N.P.L.)
 PHOTO - GEOLOGY
 (INTERPRETATION)
 LES - CLAIMS N. VANCOUVER 18.

2391

LEGEND

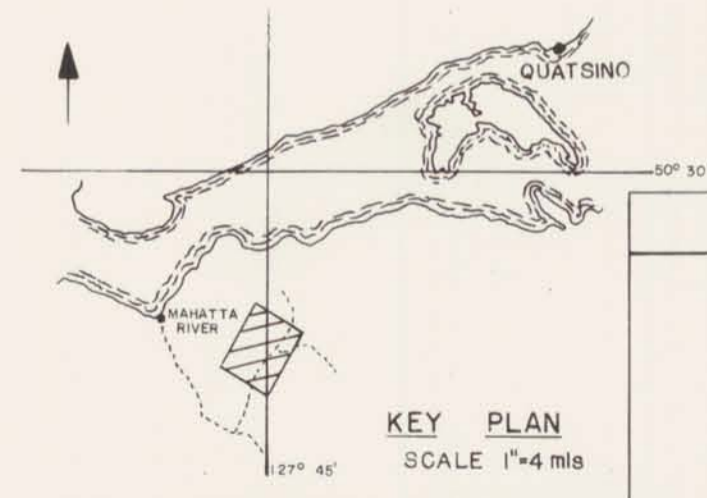
-  ROAD
 -  CLAIM POST
 -  SOIL SAMPLE
 -  SILT SAMPLE
- } COPPER VALUES IN
PARTS PER MILLION
(p.p.m.)



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **2391** MAP **#3**

*To accompany report by MacDonald Consultants Ltd.,
E. D. Dodson, P. Eng., dated January 27, 1970.*

E. D. Dodson



GEO - CHEM
SKAIST MINES LTD. (N.P.L.)

MAHATTA RIVER
PROJECT

NORTH VANCOUVER ISLAND, B.C.

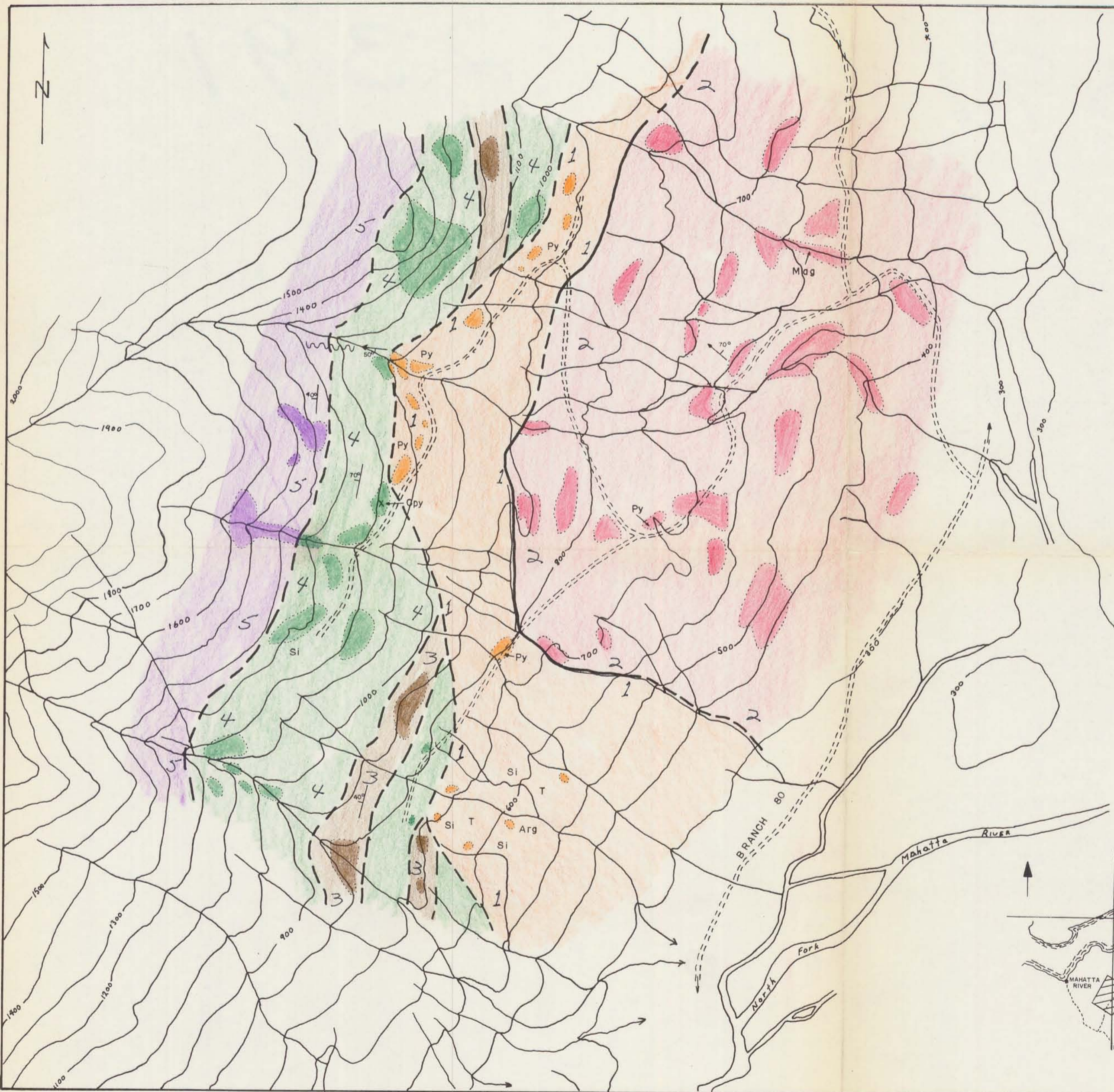
DRAWN BY SEMCO	DATE	SCALE 1"=400'
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2391

LEGEND

- 5 VOLCANICS & SEDIMENTARY ROCKS
FINE GRAINED ANDESITE
- 4 VOLCANIC BRECCIA
- 3 VESICULAR ANDESITE
- INTRUSIVE ROCKS
- 2 HORNBLLENDE - ALBITE DIORITE
- ALTERATION
- 1 MAINLY SILICIFICATION Pyritization.

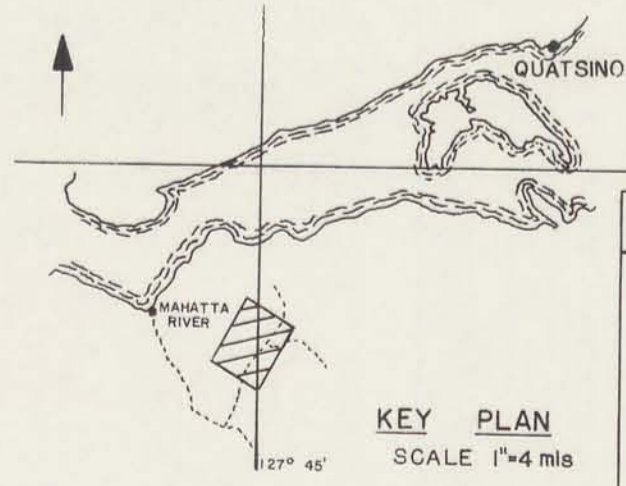
- Py Pyrite
- Cpy Chalcopyrite
- Mag Magnetite
- Arg Argillic alteration
- Si Silica
- T Tourmaline clusters
- ~ Fault; defined, assumed
- Bedding
- Area of outcrop
- - - Contact; defined, assumed
- Logging roads
- ↗ Structural attitude; fault; fracture
- Air photo lineation



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **2391** MAP **#2**

To accompany report by MacDonald Consultants Ltd.,
E. D. Dodson, P. Eng., dated January 27, 1970.

E. D. Dodson



GEOLOGY

SKAIST MINES LTD. (N.P.L.)

MAHATTA RIVER PROJECT

NORTH VANCOUVER ISLAND, B.C.

DRAWN BY SEMCO DATE SCALE 1"=400'