GEOLOGICAL AND GEOCHEMICAL REPORT

FOR

DOLLY VARDEN MINES LTD. (N.P.L.)

ON WORK DONE BETWEEN

MAY 20, 1970 and AUGUST 20, 1970

ON THE "COPPER BELT"

KITSAULT RIVER VALLEY, ALICE ARM, B.C.-SKEENA M.D.

REPORT INCLUDES DANA GROUP OF CLAIMS
(Lat.55° 42½'N., Long.129° 35'W.)

By M.A. Mitchell
Chief Geologist
Dolly Varden Mines Ltd. (NPL)

2887

DOLLY VARDEN MINES LTD. (NPL)

Silver Mines
ALICE ARM, B.C.

1400-409 GRANVILLE STREET, VANCOUVER 2, B.C. PHONE 682-4296

October 30, 1970

Mr. George Aaltonen
General Manager
Dolly Varden Mines Ltd. (N.P.L.)
Suite 1400
409 Granville Street
Vancouver 2, B.C.

Dear Sir,

Enclosed is the part of my report of the summer, 1970 geology program on the "copper belt" dealing with the geology and mineral showings of the property.

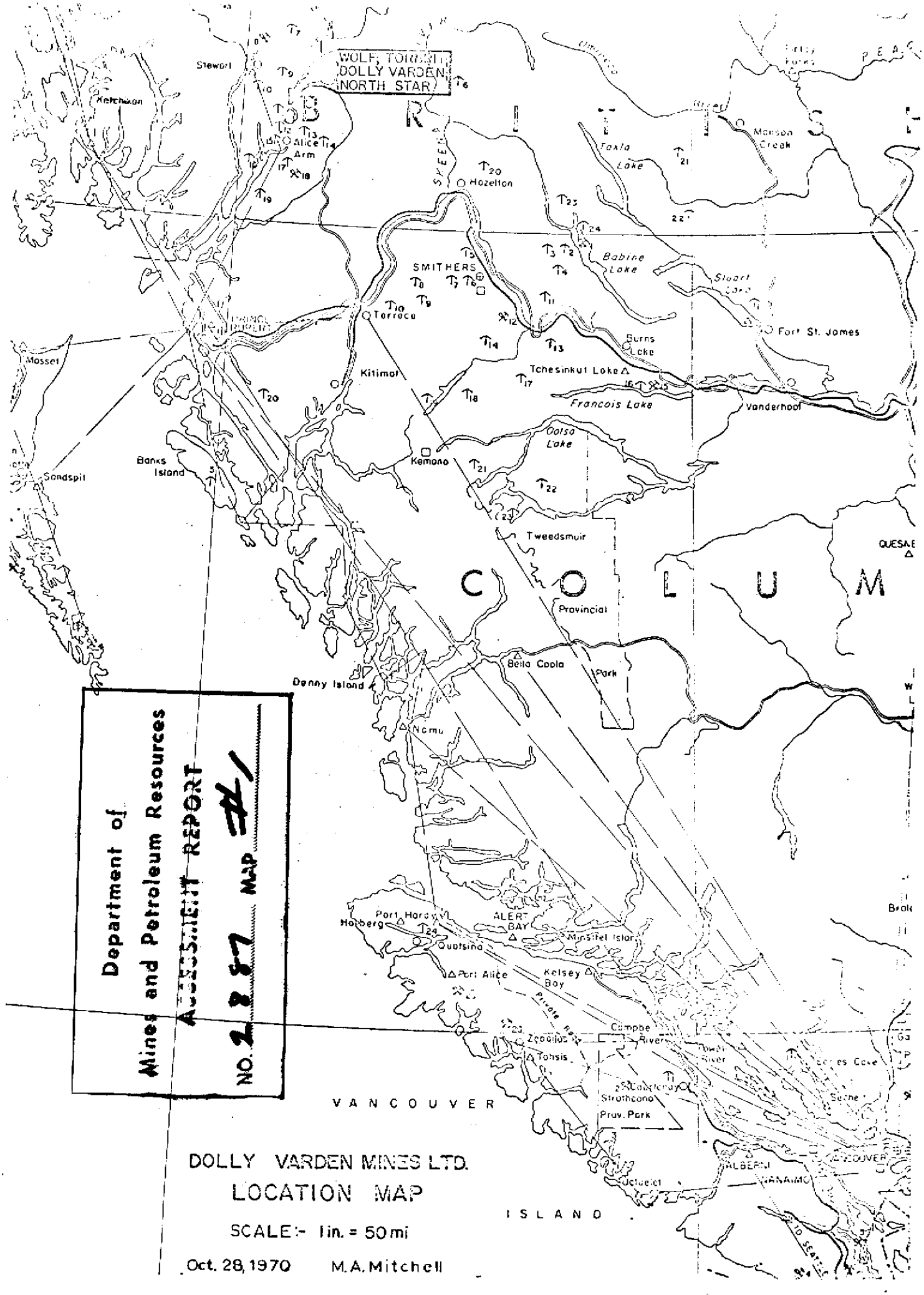
Although a location map for soil geochemical values is included in the report, the section of the report dealing with interpretation of results and general conclusions is omitted.

I hope, as time permits, to have the remainder of the report ready for you shortly.

Yours truly,

M.A. Mitchell
Geologist
DOLLY VARDEN MINES LTD. (N.P.L.)

MAM:vg
Encl.



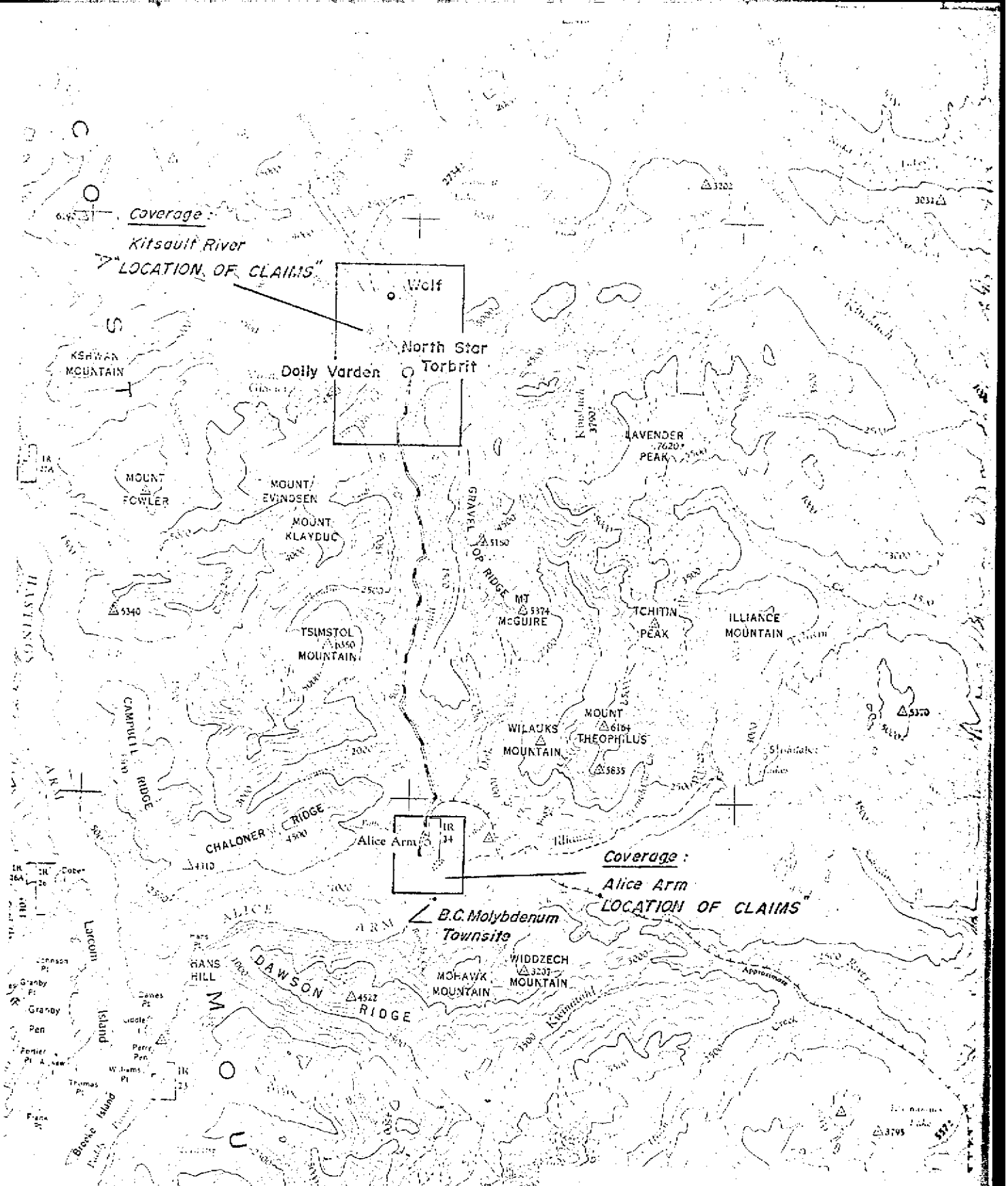
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2827 MAP #1

DOLLY VARDEN MINES LTD.

LOCATION MAP

SCALE:- 1 in. = 50 mi

Oct. 28, 1970 M.A. Mitchell



DOLLY VARDEN MINES LTD (NPL)

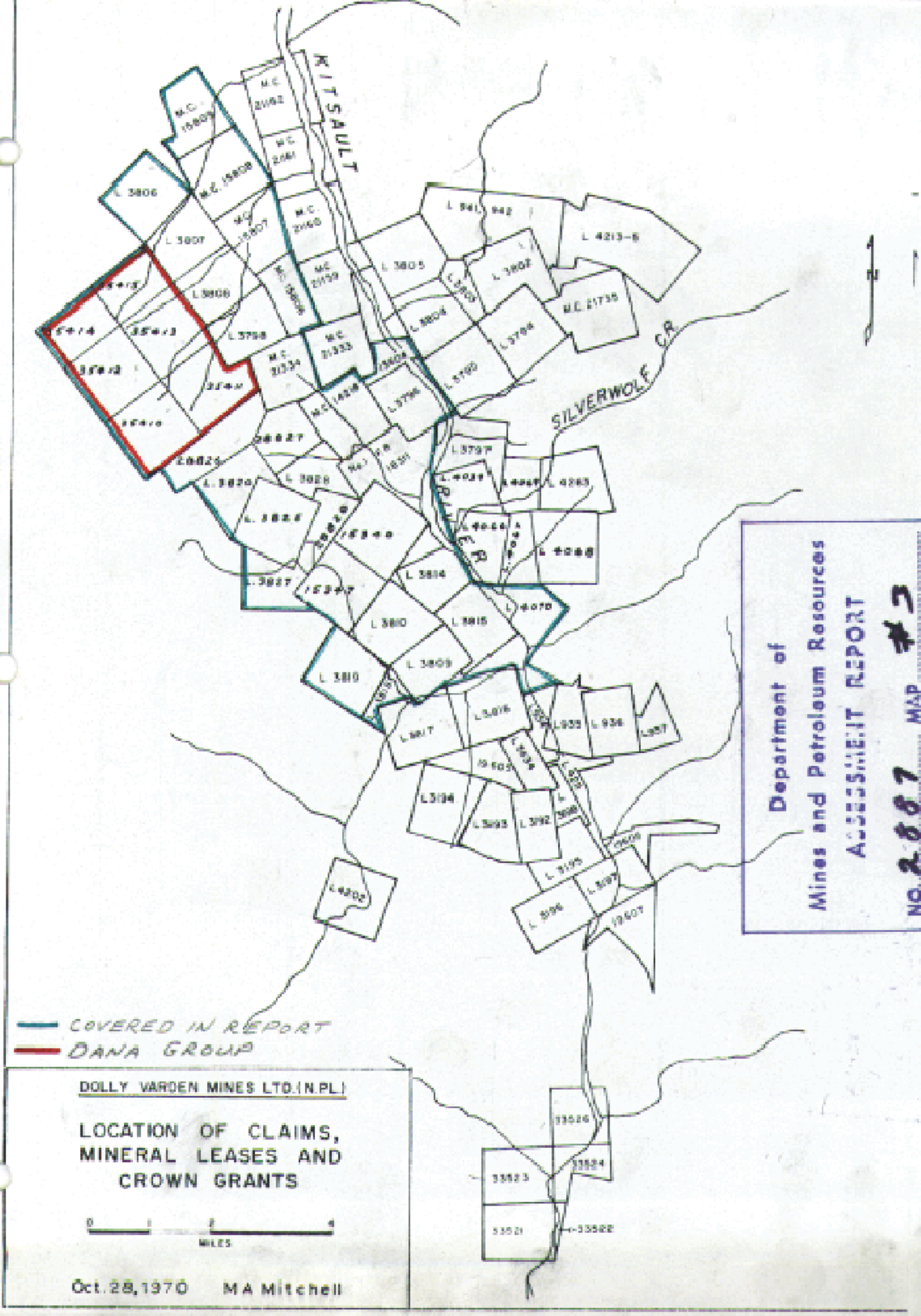
MINE LOCATION MAP

Source : National Topographic System
Sheet 103 P "Nass River"

1 : 260,000

0 5 10 MILES

Oct 28, 1970 M.A. Mitchell



DOLLY VARDEN MINES LTD. (N.P.L.)

LOCATION OF CLAIMS, MINERAL LEASES AND CROWN GRANTS

0 1 2 4
MILES

Oct. 28, 1970 M A Mitchell

D O L L Y V A R D E N M I N E S L T D.

Report on 1970 Summer's Program

I N D E X

List of Maps

(1) In Report

(A) Index Maps for Property (3) #1 Location Map #2 Mine Location Map #3 Location of claims

(2) In Folder

(A) #4 Topography & Claims - "Copper Belt" Area 300 sc
(B) #5 Geology "Copper Belt" Area 300 sc
(C) #6 Geochemistry "Copper Belt" Area (Copper) 300 sc
(D) #7 Geochemistry "Copper Belt" Area (Total Moly) 300 sc
(E) &
(F) Trench and Sample Maps, "Copper Belt" Showings 320 sc
(G) Surprise Area Geochemistry (Copper) 100 sc
(H) Surprise Area Geochemistry (Total Moly) 100 sc

Not Included M.A.M.

(1) Introduction

(A) Purpose of Program

In the spring of 1970 the management of Dolly Varden Mines Ltd. (N.P.L.) decided to study the mineral potential of the area known as the "copper belt" on their Alice Arm property in Northern B.C.

Hitherto this time, the area had been worked by individual claim owners, but had been mapped on a regional scale by Hanson in 1921 and by J.M. Black in 1951. Earlier data in the B.C. Minister of Mines Reports, while covering the area quite fully, often left gaps in data and frequently, data given was quite contradictory and inconsistent. However, the data hinted at the possible existence of a large tonnage - low grade porphyry copper type deposit.

While this target was the primary reason for the 1970 summer program, it was thought that should the program fail to disclose large tonnages of low grade copper ore a secondary target would be a smaller tonnage of higher grade material which would definitely enhance the known silver reserves in the valley. The idea behind the secondary target was that while it might not be feasible to mine and mill a small copper deposit by itself, it might be mined after silver reserves were exhausted and milled at the silver mill by converting its silver circuit to copper.

(B) Scope of Report

This report is intended to give a general description of the "copper belt" and to compile, confirm, and correct, where possible, old information contained in government and company reports. In addition, it is hoped that the report will provide, with new information, a basis for further exploration of the "copper belt" area.

(2) General Property Description

(A) Location and Access

The "copper belt" is located on the west slope of the Kitsault Valley and extends from Evindsen Creek some 19,000 ft in a north-westerly direction to a point approximately 4,000 ft north of the west fork of the Kitsault River. The belt, averaging 1,500 ft in width, forms the east slope of Combination Mountain and is within one half mile of the Kitsault River at any point. Access to the area is gained by road and trail from the old Torbrit mine camp 1½ miles to the south where a fully equipped base camp is maintained. Alice Arm, B.C., 100 miles north of Prince Rupert, B.C. is the nearest town and is situated at the mouth of the Kitsault River some 17 miles south of the Torbrit camp. Alice Arm is serviced daily by float and amphibious plane, connecting with Jet service at Prince Rupert, B.C. to Vancouver, B.C. The area is also visited by a 3,000-ton "coaster", the Northland Prince, once per week.

(B) Climate and Topography

The Kitsault Valley is within the coastal rain belt and annual precipitation may exceed 80 inches. Snow from the preceding winter is commonly found in gullies and shaded hollows as late as September and up to 20 ft of snow pack at the 3,500 ft elevation has been noted in recent years. Vegetation is typical coastal rain forest with the preponderance of flora being over-mature, core-rotted hemlock trees, devil's club, and huckleberry bushes. Timberline is at approximately 3,000 ft above sea level.

The Kitsault Valley is a typical steep walled, "U" shaped, glaciated valley. Missing, however, are the sedimentary glacial features such as moraines, kames and eskers, etc. This lack may be attributed to the heavy rainfall in the area. The Kitsault River is fed by the Kitsault and Clearwater glaciers which are lobes of the Cambria ice field.

The "copper belt" rises very steeply from Evindsen Creek on the south as a series of bluffs separated by gullies that trend N 30° E. This direction is traceable as lineations on the aerial photos and is expressed topographically throughout the area either as bluffs or deep narrow canyons such as those through which the following creeks run: Evindsen, Gash, Copper and the west fork of the Kitsault. The south end of the "copper belt" would seem to be a fairly weather resistant rock which forms the "spine" of a ridge to the south-east of Combination Lake. A change to a less weather resistant rock type is indicated north-west of Combination Lake and the "copper belt" underlies the precipitous side of the Kitsault Valley which has many cliffs and rock slides. To the north west of the Surprise showing the "copper belt" underlies a steep slope rising from a terrace 1,000 ft wide and some 800 ft above the Kitsault River. The "copper belt" ranges in elevation from 1,750 ft above sea level at its southern extremity to 3,150 ft near Racehorse Lake and has a mean elevation of 2,500 ft north to the west fork of the Kitsault River from this point. The mean elevation of the Kitsault River adjacent to the "copper belt" is approximately 1,150 ft and the elevation of the Torbrit camp is 1,050 ft.

(C) Claims Held

Dolly Varden Mines Ltd. holds 91 claims in good standing in the Alice Arm, B.C. area.

The following is a list of the claims covering the "copper belt" area and therefore investigated during the 1970 summer program:

Claim Name	Crown Grant Lot	OR	Record #
Bonanza Fr.	L 4070		
Sunset #1	L 3818		
Sunset #2	L 3819		
Red Point	L 3809		
Red Point Extension	L 3810		

Claim Name	Crown Grant Lot	OR	Record #
Kitsol #1	L 3815		
Kitsol #2	L 3814		
Roan Antelope			15347 K
Roan Antelope #1			15348 K
Surprise #1 Fr.			18311 N
Sable Fr.			28828 E
Dan Patch	L 3825		
Nancy Hanks	L 3820		
Polly Fr.			28827 E
Maud S.	L 3828		
Surprise			14218 M
Bear Fr.			28826 E
Wolf #3	L 3796		
Wolf #9			21334 B
Missing Link Fr.			15604 M
Copper Cliff	L 3806		
Copper Cliff #1	L 3807		
Copper Cliff #2	L 3808		
Copper Cliff #3	L 3798		
Copper Cliff #4			15806 G
Copper Cliff #5			15807 G
Copper Cliff #6			15808 G
Copper Cliff #7			15809 G
Midget Fr.			28824 E
Bosun Fr.			28825 E
Dana #1			35410 G
Dana #2			35411 G
Dana #3			35412 G
Dana #4			35413 G
Dana #5			35414 G
Dana #6			35415 G

(3) Description of Work

(A) Preparatory Work

In preparation for the summer's field work the following steps were taken:

(1) A compilation of all pertinent information on the "copper belt" was made from the B.C. Minister of Mines Reports.

(2) A 1000 scale geology and topography map of the Upper Kitsault Valley was made, using as its basis map 67-122 by Lockwood Survey Corp. Ltd. Regional geology from Black, 1951 was superimposed upon this and aerial photo interpretation was added.

(3) A 300 scale topographical field map was prepared of the immediate "copper belt" area using the 1000 scale map 67-122 by Lockwood Survey Corp. Ltd.

(4) Personnel were hired on a three-month basis and such camping material as was needed to maintain them for this period was purchased.

(5) Six claims, the Dana #1 through #6 were staked in the western part of the area.

(B) Field Work

(i) Geochemistry

Soil geochemical surveys were run on the Surprise showing and along the "copper belt" from its south eastern extremity north west to within about a claim length of the west fork of the Kitsault River where cliffs made access impossible.

Location of samples was accomplished by laying out a chain and compass grid using the 300 scale topographical map as a reference and to correct any chainage or compass errors. Slope distances were corrected to the horizontal by means of slope tables. Sample taking was facilitated by means of a 4-ft soil auger.

On the Surprise showing a baseline was run in a N 20° E direction and geochem samples were taken 50 ft apart on lines normal to the baseline at 100 ft intervals.

Considering the larger size of the "copper belt" as compared to the Surprise area a number of baselines were run, as topography dictated, in a N 40° W direction. The geochem grid was expanded by a multiple of four and samples were taken 200 ft apart on lines normal to the baselines at 400 ft intervals.

Accuracy of location of samples might be considered to be within ± 20 ft on the Surprise showing and within ± 80 ft on the "copper belt".

All told, some 510 soil geochem samples were taken during the programme.

The samples were placed in Kraft paper envelopes and sent to Chemex Laboratories Ltd., 1416 Crown St., North Vancouver, B.C., where they were dried, screened to minus 80 mesh and assayed for copper and total molybdenum content by the atomic absorption method.

(ii) Mapping

- Regional mapping was accomplished on 300 scale using the geochemical grid as control. The Surprise area was not regionally mapped owing to a lack of outcrops in the area.

- Tape and compass maps were prepared of various showings in the "copper belt" and Surprise areas. Relative but not true elevations are shown on the maps.

(iii) Sampling

Many of the trenches on the showings were rock sampled for assay. Where the trenches were not sloughed in, chip sampling was done, across strike, using geology to determine sample widths. Samples were generally kept under 5.0 ft maximum width.

Many pyritic shears in the southern fine grained

porphyry body were sampled to assess whether there was any economic potential in them.

A TOTAL of 134 rock samples were taken.

(4) Geology

(A) Regional

(i) Lithology

(a) Sediments and Pyroclastics

Black, 1951, has described the upper Kitsault Valley as being underlain by sedimentary and volcanic rocks of the Jura-Cretaceous Hazelton Group and intrusives that may be closely related to the volcanics. He has subdivided the rocks into two sedimentary formations "A" and "C" and two volcanic formations "B" and "D". Formation "A" is referred to as the oldest in the area and is composed of mainly black, thin bedded, argillite with extensive pebble conglomerate horizons in its upper portion. Black infers that the contact between "A" horizon and the overlying "B" horizon is conformable because of the presence of tuff beds in the upper part of "A" horizon. He feels that a sense of depositional continuity is implied.

Black describes the volcanics of formation "B" as follows; "Fragmental rocks of generally massive habit and green, grey, red and purple in colour. The changes are gradational and the colour outlines are generally irregular and not related to bedding or any other recognizable structure". Further, he states that the fragments are angular and rounded, as much as a foot in diameter, and differ generally undiscernibly from the matrix except as alteration or weathering effects. His thin sections reveal that the fragments consist of igneous rock such as feldspar, hornblende and augite porphyries, with a tuffaceous matrix differing little in composition from the fragments.

It is interesting to note that all economic mineralization to date has been found in formation "B" as vein or small replacement type orebodies.

Formation "C" consists of black, thin bedded argillite, interbedded with sandy (greywacke), and near its basal portion limy and tuffaceous horizons. Black notes that the contact between formations "B" and "C" is disconformable with sedimentary beds occupying hollows on the surface of the volcanic rocks in the Clearwater Creek area, but 1969 drilling in the Wolf Mine area indicates a perfectly conformable but gradational contact between these formations.

Formation "D" overlays formation "C" and consists of a volcanic sequence, similar but not equivalent to formation "B" (Black 1951).

(b) Intrusives

Intrusive bodies are distributed along the west side of the Kitsault River principally in the north western quadrant of the area. Black, 1951, describes them as ranging in composition from a feldspar to an augite porphyry, much altered, therefore, very similar in appearance to the volcanics. He did not, however, differentiate between intrusive types in the field with the exception of the copper belt which he describes as a body or bodies of feldspar porphyry, altered by the addition of silica and pyrite.

From the work carried out in the 1970 field season it is indicated that main and earliest intrusive in the area is an altered quartz diorite stock which has a variable composition from feldspar to augite porphyry as mentioned by Black, 1951. The intrusive in general is very chloritic and mafics tend to be dark green rather than black. The more porphyritic feldspar phases have conspicuous whisps of chloritic material in the quartz matrix. Many "scraps" of altered sediments were seen throughout the main north-west body of the intrusive. Locally there are N 40° W trending, narrow lenses of sheared but relatively unaltered argillite. These roof pendants or "screens" may be, as Black, 1951 suggests, inter-sill masses.

The eastern margin of the quartz diorite stock is intruded by two or more fine grained igneous bodies. They range in width from 600 to 2,000 ft wide. Their composition is hard to determine as they are highly altered but field identification indicates that they are, like the main intrusive stock, quartz diorite, but finer grained. The chance that these bodies are the fine grained margin of the main intrusive is small inasmuch as an abrupt transition from coarse to fine grained material may be seen in various canyons across the contact. The fine grained intrusive seems to be fairly homogeneous throughout as no discernible difference was noted in Evindsen Creek Canyon as compared to material in Copper Creek Canyon.

The "copper belt" described by Black, 1951, would seem to be a zone approximately 2,700 ft wide by 19,000 ft long within which there is intensive silicification and pyritization of both fine and coarser grained quartz diorite intrusives. This mineralization would seem to selectively replace the finer grained material within the belt giving rise to large zones of silicification ranging from a stock-work of quartz-pyrite veins and disseminated pyrite. Free silica content in such zones appears to be above 60% and more locally could be above 80%. Pyrite content throughout the zones averages an estimated 10 - 20%. Thin section work by N.C. Carter indicates the composition of the silicified-pyritized zones as mainly quartz, sericite and pyrite. The alteration of the coarser grained quartz diorite within the "copper belt" appears to take the form

of addition of silica to the matrix of the rock accompanied by the chloritization of mafics. Pyrite appears disseminated throughout the rock and in later quartz veins. The alteration appears to diminish gradationally to the west from the fine/coarse quartz diorite contact but is fairly consistent within the belt in a N.W. - S.E. direction.

Dikes trending in a N 30° E direction are common. Notable examples in the "copper belt" area are micro diorite at 2,500 el and felsite at 2,650 el in Black Bear Creek, black lamprophyre and diorite at the Combination showing, black lamprophyre at the Gash Creek showing and black lamprophyre slightly to the north of Racehorse Lake along the contact of the quartz diorite with the volcanics. Undoubtedly, there are many more dike swarms crossing the "copper belt" but generally they are not traceable through the thin but persistent overburden. Elsewhere within the valley there are black lamprophyre dikes at the Torbrit, North Star, and Dolly Varden mines, and a green, calcitic micro diorite dike at the Wolf mine.

(ii) Structure

(a) Folding

Regional mapping by Black, 1951, indicates that the sediments and volcanics underlying the upper Kitsault Valley are folded into a north-westerly plunging syncline giving rise to a horseshoe shaped surface trace of the Formation "B"/Formation "A" contact - open to the north west. However, the surface trace of the Formation "C"/ Formation "B" contact consists of only the eastern half of the "horseshoe" as the western limb of Formation "C" is the locale of the quartz diorite intrusives and the "copper belt". The existence of "scraps" and roof pendants of sediment within the quartz diorite stock out to its western edge indicates that the western half of the argillite horizon, Formation "C", had a larger extent than now known, that the syncline had been formed prior to the emplacement of the intrusives, which in turn, replaced the argillite stratigrapically.

The eastern limb of Formation "C" becomes very contorted as the axis of the syncline and the intrusives are approached and there appears to be doming of the argillite by a small intrusive in which the Surprise showing is located. Finally, Formation "B" appears thinner on the east limb than on the west limb indicating that the syncline might be slightly overturned to the west.

(b) Faulting

Major lineations are very noticeable on the aerial photographs of the area. Formation changes are rather poorly expressed on the photos but the intrusives, parti-

cularly the more silicified areas, stand out as weather resistant ridges and cliffs. Most of the lineations on the photographs have been interpreted as faults as they cross sediments, volcanics, and intrusives indiscriminately. The major fault directions are N 40° W and N 30° E. Subsidiary and possible conjugate fault directions are due north and east-west. The N 40° W fault direction is represented by two major structures: a left handed fault just north of the Torbrit mine which offsets the Formation "B"/Formation "A" contact and Formation "C"/Formation "B" contact and continues north westerly along the eastern margin of the "copper belt" and a fault that lies just south of the Torbrit camp and continues in a north westerly direction, along the western margin of the "copper belt", past the west fork of the Kitsault River. The direction of movement of this latter fault is not known.

The N 30° E faults, as mentioned before, exert a controlling influence on the drainage and topography of the area. The fault in Evindsen Creek forms the south eastern boundary of the "copper belt" and subsidiary structures are topographically expressed throughout the southern part of the "copper belt" north of Racehorse Lake. The south-east contact of the feldspar porphyry intrusive with the volcanics of Formation "B" has a direction N 30° E. It would appear that this is a fault contact with dip-slip movement, the volcanics to the south having been moved up in juxtaposition with the intrusives where normally argillite should occur. The fault zone is now occupied by a dike swarm. There is also a corresponding jog in the Formation "B"/Formation "A" contact to the north east on the opposite contact of the Kitsault Valley. However, the fault could not be traced continuously across the valley, probably because it splits into many smaller faults across the more heavily drift covered valley centre. It is interesting to note that although the N 30° E direction of faulting appears to be post intrusive it is the orientation of many of the silver bearing veins in the central-northern part of the map area.

There appears no clearly established age relationship between fault systems as the N 40° W and N 30° E faults do not offset each other but, the due north faults offset the N 40° W faults to the right and the east-west faults offset the N 30° E faults to the right also. For this reason they might be considered the conjugates to the main fault directions.

(iii) Mineral Occurrences

Mineralization in the upper Kitsault Valley would appear to be of two distinct types, namely; (1) siliceous zones and quartz veins containing pyrite, chalcopyrite, low gold and silver, and, (2) veins and replacement zones consisting of quartz, barite, calcite, pyrite, marcasite, pyrargyrite, galena, sphalerite, and native silver.

As well as being distinct mineralogically the locale of the two different types is distinct. The former type of mineralization is confined to the "copper belt" zone along the axis of the syncline while the latter are found in the volcanics horizon some distance from the "copper belt" but around its periphery in the south east and eastern portion.

From both the location and mineralogy of the deposits a pattern of zoning becomes obvious. The "copper belt" would appear to be the centre of hydrothermal activity in the valley,with higher temperatures and corresponding higher temperature mineralization relative to the lower temperature silver bearing veins in other parts of the valley.

Campbell, 1959,states that sphalerite, galena and chalcopyrite increase with depth in the Torbrit mine. This indicates that the valley as well as being zoned horizontally, may well be zoned vertically.

He also states that barite silver deposits are later than the copper-gold deposits as they cut not only the latter but the porphyry intrusives as well. However, the location of this phenomenon is not stated in his report and has not been evidenced by any of the later work in the valley.

(B) Local Geology - "Copper Belt"

(i) Mineral Occurrences

(a) Mode of Occurrence

Mineralization in the "copper belt" occurs as chalcopyrite bearing quartz veins with some accessory silver, rather than as silver-lead-zinc-quartz veins as found elsewhere in the valley. The deposits occur as quartz-chlorite pyrite veins generally of short length but sometimes greater than 10 ft wide. Depths to 60 ft have been demonstrated.

The mineral showings, found to date, are distributed along or within 200 ft of the contact of the "copper belt" with the intrusives, volcanics, or argillites, principally at the south east end of the "copper belt" area.

Even though some of the deposits are located within the heavily silicified areas they invariably have lenses and irregular masses of chloritic material associated with them which sometimes carry better grade material than the quartz veins. It was found, at the Dan Patch showing, that the chloritic material was argillite derived, there being gradations from an argillite breccia to chloritic material in close proximity to the vein. The source of the chlorite lenses on the other showings is rather more obscure but they could have been derived from sedimentary "screens" or micro diorite dikes within the silicified-pyritized "copper belt".

In most cases, the copper mineralization appears to post-date the general "copper belt" silicification and appears within sheared areas, generally parallel to the "copper belt"/country rock contact.

(b) Description of Showings

Note: For history of showings see The Copper Belt, etc., Cromie, 1970 at rear of report. All assays are tabulated on enclosed map.

- Red Point

Location - at the south west end of the "copper belt", reached by trail from the suspension bridge at the south end of Musketeer flats, to the cabin at the base of the Red Point bluffs, up the trail to the top of the bluffs, then 300 ft east to the top trenches at an elevation of 1,700 ft.

Description - The Red Point showing was found to be a series of three trenches and two short adits above and in the uppermost Red Point bluff overlooking Evindsen Creek. Various other workings were found in the area, consisting of outcrops that had been shot into and a 750-ft adit some 200 ft vertically below the showings but no mineralization of any note was noticed. All of the workings were found to be just within the "copper belt" zone and the trenches expose up to 20 ft of quartz vein with intercalated lenses of sheared chloritic material. The strike of the zone was found to be N 5° W; parallel to the contact. The southernmost trench contains two spectacular pods of massive chalcopyrite each 2 ft wide but rapidly pinching down to 1 inch within 5 ft over the edge of the cliff. Two short adits some 60 ft vertically lower were driven to intersect the above mineralization and did in fact encounter mineralization of a more disseminated nature. Good looking vein material was found in a sloughed trench lower, and to the south of the adits, but was not found in place. Although trenches were found on either end of the showing only silicified "copper belt" material was found in them.

- Red Point Extension

Location - This showing is found in the face of a low bluff, 350 ft east of the main trail some 1,000 ft south east of Combination Lake.

Description - Three trenches on the top of a low bluff and one trench in the face of the bluff were found, cutting a small shear zone striking N 45° W. Small bunches of chalcopyrite were found to be splattered throughout a pyritic quartz vein and an adjacent lense of chloritic material. Although copper values are low, gold values of 0.430, 0.285, and 0.189 oz/ton over 5, 4, and 5 ft are found in the two lowest trenches. The zone is traceable for 160 ft through

a vertical range of 85 ft, appears to pinch out to the north west, and dives under heavy over burden to the south east. Again, the zone is parallel to the "copper belt"/feldspar porphyry contact but is 250 ft within the silicified zone.

- Combination

Location - The Combination showing is located some 200 ft, by trail, due north of Combination Lake on a steep side hill overlooking the Kitsault River at elevation 2,100 ft.

Description - The showing consists of seven trenches and an adit exposing a very chloritic quartz vein shot through with chalcopyrite stringers and locally pods of massive pyrite. The better looking material occurs in the bottom three trenches where banded and massive chalcopyrite and pyrite occurs. On strike of N 75° W some 160 ft from the lowest trench the mineralization appears to have been offset approximately 110 ft to the north by a fault. This fault passes under Combination Lake and strikes north. Brecciated "copper belt" material was found just north of the lake. The remaining trenches to the west show good patches of chalcopyrite but structure is narrow and somewhat discontinuous. The adit is driven in a southerly direction under trench #4, and while not re-sampled because of hazardous ground conditions, was inspected and the existence of the vein, as shown on old maps, was confirmed. However, sulphide content is low and the vein appears to be mainly quartz. The vein appears to be obliterated by a black lamprophyre dike approximately 75 ft west of trench #4, but material described as diabase on the central and eastern porttions of the showing would appear to be a pre-mineralization silicified andesite dike remnant and not of the same age as the western lamprophyre. Finally, the showing is underlain by these dikes, in direct contact with the siliceous "copper belt" material.

- Dan Patch (RACE HORSE)

Location - The Dan Patch showing is located at elevation 3,150, half way between Black Bear Creek and Racehorse Lake. It is reached by a rough trail from the Combination showing.

Description - A series of three trenches trending in a N 60° W direction were found blasted into outcrops in an area of lightly forested, rolling hillocks. The total length between trenches is some 300 ft but although there is a highly silicified, pyritic, chalcopyrite bearing material in the trenches, minor outcrops between the trenches did not disclose any significant mineralization. As mentioned previously, the chloritic lenses within the vein appear to be derived from the alteration of an argillite breccia found in the vicinity of the vein. The vein material in the trenches while looking impressive enough, only assayed 0.60% copper possibly because what appears to be chalcopyrite, while rather pale, is really an admixture of chalcopyrite and

pyrite. The showing is underlain by altered intrusive, just to the north of the southern quartz flooded area, along side of the N 40° W fault bounding the western margin of the "copper belt"

- Fisher

Location - The Fisher showing is located at elevation 3,100 about 400 ft south east of Gash Creek. Its easiest route of access is from Gash Creek as there are no trails to it.

Description - The showing would appear to consist of a pod of quartz-chlorite-pyrite-chalcopyrite mineralization near the intersection of N 30° E, N 60° W, and due north faults. These faults are topographically expressed by gullies and are found as shearing directions within the mineralization.

The showing was found by P. Fisher, hence its name, and consists of a short trench and a 7 ft "dog hole" shot into the outcrop.

Two samples were taken across one wall of the "dog hole" and assayed as follows: 0.27% Cu and 0.28 oz Ag/3.0 ft, and 0.89% Cu and 2.42 oz Ag/4.0 ft. The showing occurs near the western margin of the "copper belt" and is underlain by altered feldspar porphyry.

- Gash Creek (Copper Cliff)

Location - This showing is reached by following successive southerly forks of Gash Creek from the trail above the Surprise showing to an elevation of approximately 2,500 ft. The showing consists of two trenches and an adit just within the "copper belt" west of the "copper belt"/argillite contact.

Description - The showing consists of two small lenses of chalcopyrite bearing quartz-pyrite mineralization in an area quite heavily pyritized. Inspection of the two trenches showed very little chalcopyrite and the 110 ft adit, presumably driven under the two lenses, failed to encounter any copper mineralization whatsoever. Rich looking quartz-chalcopyrite float was found in the creek but its source was not found.

- Starlight

Location - The Starlight showing is located at 3,500 el along the western N 40° W fault just north west of its juncture with a N 30° E fault which forms the drainage of the north fork of Gash Creek. The easiest means of access is by following the gully of the western N 40° W fault up from Racehorse Lake.

Description - Although this showing is not within the "copper belt" its proximity and probably its similarity of genesis to the "copper belt" showings makes it worth of mention. The

showing itself is exposed in the gully of the westerly N 40° W fault from Racehorse Lake. The mineralization itself consists of many random narrow white quartz stringers that occur in the shearing and bedding planes in the argillite. Occasionally, these stringers contain blebs of chalcopyrite and more commonly just pyrite. Some narrow stringers contained minor dark brown sphalerite but did not run in copper. Samples taken across some of the more dense pyrite mineralization in two pits ran 0.09% and 0.02% copper over 7.0 and 5.0 ft respectively.

- Surprise

Location - The Surprise is located approximately half way between the Kitsault River and the "copper belt" about ¼ mile west of Wolf hill. Access may be gained by log across the Kitsault at the north end of Musketeer flats and thence up a Department of Mines trail to a cabin at the 1,500 ft el.

Description - The Surprise is another showing that while not within the "copper belt" in the strictest sense, appears to be genetically related. The showing is located in the north west corner of a highly altered and pyritic fine grained intrusive. The appearance of the intrusive is strikingly similar to the fine grained material within the "copper belt" but locally appears somewhat tuffaceous and occasionally agglomeratic leaving the exact genesis of the rock in question. The intrusive produces a slight doming effect in the argillite. A series of eleven randomly scattered surface trenches, a 6 ft and a 20 ft adit show both siliceous-pyrite-chalcopyrite bearing veins and quartz-calcite-barite veins containing galena and sphalerite.

The mineralization appears to be contained in two veins, the first striking N 60° E is 240 ft long and of unknown width and the second striking N 20° E is 250 ft long and is also of undetermined width.

The mineralization approaches the economic range although a composite value of all metals may have to be utilized to put it in the category of ore. Perhaps one of the most significant features of the showing is that due to its position between the "copper belt" and the "silver belt" to the east, the showing exhibits the mineralization of both belts and further work should indicate whether Campbell, 1959, is correct in stating that the copper mineralization predates silver mineralization.

RANDOM SAMPLES TAKEN ON SHEARS IN THE SOUTH EAST END OF THE "COPPER BELT" ARE TABULATED AS FOLLOWS

Sample #	Geochem Coords	Width	Assay % Cu	Assay Oz/Ton Ag	Assay Oz/Ton Au	Assay % Mo S2	Line of Sam
41901	0 + 10S 2 + 12W	7.0	0.01	0.01	0.003	0.001	NE
02	4 + 50S 6 + 10W	5.0	0.01	0.07	0.004	"	N
03	8 + 25S 6 + 00W	5.0	0.01	0.02	0.003	"	NE
04	11 + 40S 5 + 70W	5.0	0.01	0.01	0.003	0.002	E
05	14 + 11S 2 + 26W	5.0	0.09	0.49	0.102	0.001	NE
06	13 + 21S 1 + 04W	5.0W	0.04	0.33	0.036	"	N
07	13 + 21S 1 + 04W	5.0E	0.03	0.24	0.034	"	E
08	13 + 18S 0 + 11W	5.0W	0.02	0.29	0.026	"	E
09	13 + 18S 0 + 11W	5.0E	0.01	0.07	0.017	0.002	E
41910	10 + 35S 0 + 25W	5.0	0.01	0.01	0.003	"	E
11	Bottom R.P.E.Tr. 2'E of last sample	5.0W	0.06	1.34	0.028	0.001	E
12	7'E of last sample	5.0E	0.01	0.09	0.003	"	E
13	6 + 50S 3 + 50E	5.0	0.01	0.04	0.003	"	NE
41926	3 + 60S 0 + 80E	5.0	0.01	0.09	0.003	0.001	NW
27	0 + 00N 1 + 00E	5.0	0.01	0.09	0.003	"	NW
28	8 + 00N 15 + 50W	5.0	0.01	0.10	0.003	"	NW
29	7 + 20N 10 + 00W	5.0	0.01	0.02	0.003	"	N
30	0 + 20S 10 + 40W	5.0	0.01	0.03	0.006	"	NE
31	11 + 90N 0 + 50E	4.0	0.01	0.09	0.020	"	NE
32	6 + 25N 3 + 25W	5.0	0.01	0.07	0.006	"	NW

- New Vein (V VEIN)

Location - The showing is found at the crest of a hill overlooking the trail from the suspension bridge at the south end of the "copper belt". Its position on the geochemistry grid is 18 + 00S and 4 + 00E.

V VEIN

Description - This showing was found during the random rock sampling part of the programme and appears to consist of a highly fractured quartz-barite-pyrite vein underlain by "copper belt" material. Small specks of galena and sphalerite are found not only in the vein but in the surrounding wall rock. The zone has been traced for about 45 ft horizontally and 23 ft vertically. The vein appears to strike N 50° E and dip at about 75° to the south east. Samples, locations, and assays are as follows:

Sample #	Location	Width	Assays % Zn	% Cu	Ag	Au
41980	Top exposure	6.0	0.48	0.01	0.41	0.003
41922	Exposure on edge of cliff, 30' NE of #41980	4.0		0.03	67.6	0.015
41981	8' below #41922	5.0	0.36	0.01	9.92	0.006
41982	18' lower, 10' NE #41922	4.0	0.92	0.01	0.29	0.003
41983	23' lower, 15' NE #41922	3.0	0.34	0.01	0.61	0.003

M.A. Mitchell
Geologist

November 2, 1970

DOLLY VARDEN MINES LTD. (NPL)

Silver Mines
ALICE ARM, B.C.

1400-409 GRANVILLE STREET, VANCOUVER 2, B.C. PHONE 682-4296

December 3, 1970

Mr. George Aaltonen
General Manager
Dolly Varden Mines Ltd. (N.P.L.)
Suite 1400
409 Granville Street
Vancouver 2, B.C.

Dear Sir,

Further to my letter of October 30th, please find enclosed the part of my report of the summer, 1970 geology program on the "copper belt" dealing with interpretation of results and general conclusion.

Yours truly,

M.A. Mitchell
Geologist
DOLLY VARDEN MINES LTD. (N.P.L.)

MAM:vg
Encl.

(5) Results and Evaluation of Results

(A) Geochemistry

(i) Description of Soils

The overburden found in the Upper Kitsault Valley is a typical podzol and may be described as follows:

Horizon	Thickness	Description
A_1	1 in - 1 ft	decomposing vegetable matter, mainly hemlock needles and roots, lenses of brown humus near bottom.
A_2	1 - 1½ ft	dark brown to black (in swamps), humus containing fine roots and minor sand. Distributed throughout the bottom part of this horizon are patches and lenses of light gray to white clayey and organic material.
B	½ - 1½ ft	loam, sandy loam lenses, particularly near bottom, occasional cobbles and small gravel beds. Humus near top, colour generally light tan to light orange brown, occasional bluish gray patches.
C	½ ft +	mainly angular rock fragments, matrix material tan, brown and gray clayey loam.

Soil geochem samples were taken in the "B" horizon, generally at a depth of 2 to 3 ft and consisted of loam with as little sandy material as possible.

It was found that soils exhibited more mature, thicker, well developed profiles below the 3,000 ft el, on flatter areas, and particularly over argillite bedrock. Soil depths were shallow and horizons were poorly developed over the more silicous material in the "copper belt" but the coarser grained feldspar porphyries, except on steep hillsides, showed moderate to good soil development over them.

(ii) Statistical Analysis of Results

The results of the geochemical surveys were analyzed as follows:

(1) A bar histogram was prepared of % frequency/class

interval in ppm.

(2) From the histogram an upper limit of a background scatter was selected so that the mean of all of the numbers within the background scatter was approximately one-half of the upper limit of the background scatter. (This tends to give a normal distribution for values considered within the background scatter.)

(3) The standard deviation of the background scatter population was computed using:

$$SD = \sqrt{\left(\overline{X^2} - \bar{X}^2\right)/N}$$

where $\overline{X^2}$ = mean of the squares of all background scatter values

$\bar{X}^2$ = square of the mean of all background scatter values

(4) The upper background scatter limit was checked using:

$$T = M + 2\ SD$$

where T = threshold = upper limit background scatter

M = mean of values in background scatter

SD = standard deviation

If M + 2 SD was significantly greater than the upper limit of the background scatter, the upper limit was lowered and conversely if M + 2 SD was significantly lower than the upper limit of the background scatter, the upper limit was raised. (95.45% of the population should fall between M - 2 SD and M + 2 SD and 99.73% of the population should fall between M - 3 SD and M + 3 SD for normal population distributions but only approximately for moderately skewed population distributions.)

(5) The following was used as criteria for deciding anomalous values:

less than M + 2 SD	= background
between M + 2 SD and M + 4 SD	= threshold
between M + 4 SD and M + 8 SD	= 1st order anomaly
between M + 8 SD and M + 16 SD	= 2nd order anomaly
between M + 16 SD and M + 32 SD	= 3rd order anomaly
greater than M + 32 SD	= high level anomaly

(6) The values were found to be as follows:

Copper

M = 15 ppm	SD = 7.1
less than 30 ppm	= background
between 30 ppm and 43 ppm	= threshold
between 43 ppm and 72 ppm	= 1st order anomaly
between 72 ppm and 129 ppm	= 2nd order anomaly
between 129 ppm and 242 ppm	= 3rd order anomaly
greater than 242 ppm	= high level anomaly

Total Molybdenum

M = 2.27	SD = 1.91
less than 6 ppm	= background
between 6 ppm and 10 ppm	= threshold
between 10 ppm and 17 ppm	= 1st order anomaly
between 17 ppm and 33 ppm	= 2nd order anomaly
between 33 ppm and 63 ppm	= 3rd order anomaly
greater than 63 ppm	= high level anomaly

(iii) Interpretation of Anomalies

(1) Geochemical Environment

The P_h of the soil cover would be expected to differ in areas underlain by different rock types.

Although P_h's were not measured in the field it would be expected that the areas could be ranked, in order of increasing P_h as follows:

(a) Acid - fine grained quartz diorite with pervasive silicification and pyritization, oxidizing pyrite (H_2SO_4) acid vegetation (rotting conifers) with moderately developed podzols.

(b) Slightly Acid - coarser grained quartz diorite within "copper belt" zone. Although this area contains oxidizing pyrite and coniferous vegetation, decomposition of incompletely replaced feldspars might be a source of Ca salts which neutralize H_2SO_4 given off by oxidizing pyrite.

(c) Slightly Acid to Neutral - volcanics and coarse grained quartz diorite - unaltered by "copper belt" silicification and pyritization - acid environment probable in areas of syngenetic pyrite and heavy vegetation.

(d) Basic to Neutral - argillite - although containing minor pyrite this horizon is quite often limy giving rise to a basic environment. This could be neutralized locally by vegetation.

One might expect copper and molybdenum mineralization to be affected by these differing environments and the formation of anomalies real and spurious as follows:

(a) Acid

Copper - extremely soluble in presence of oxidizing pyrite giving rise to definite but well dispersed anomalies.

Molybdenum - solubility inhibited in presence of oxidizing pyrite but scavenging of Mo ions by Mn and Fe hydroxides and precipitation of same in stream channels etc., possible source of spurious Mo anomalies.

(b) Slightly Acid

Copper - moderate to heavy solubility well dispersed anomalies - possible spurious anomalies caused by Cu ions from (a) being washed into (b) and being precipitated due to P_h change.

Molybdenum - solubility inhibited in presence of oxidizing pyrite. Spurious anomalies caused by precipitation of (a) derived Fe and Mn hydroxides carrying Mo in stream channels.

(c) Slightly Acid to Neutral

Copper - low to moderate solubility precipitation of Cu ions in stream channels, spurious anomalies in heavy organic areas.

Molybdenum - solubility poor. Spurious anomalies as in (b).

(d) Basic to Neutral

Copper - this environment might act as a trap for Cu ions forming carbonate salts near limy regions. Anomalies should be considered spurious but upstream sources should be checked.

Molybdenum - this environment could act as a trap for "Mo" ions precipitated along with Fe and Mn hydroxides. Alkaline groundwater enhances accumulation of Mo (Horsnail, 1970).

(2) Discussion of Anomalies

(a) Copper

The "copper belt" area would seem to be anomalous compared to areas of volcanics, intrusives and argillites in close proximity to the "copper belt". The main anomalous areas within the "copper belt" are as follows:

I. The anomalies at the south end of the "copper belt" which closely follow the contact of the pervasive silicification and pyritization with the surrounding rock. Even considering the dispersion of copper ions possible in an acid environment a persistent first and second order anomaly follows this contact, regardless of topographical and drainage controls. While the north end of the area does not exhibit the high level anomalies of the south and eastern end of the area its second and third order anomalies may be indicative of 0.18 copper mineralization mentioned in the Minister of Mines Report for 1916 concerning the Racehorse group. The Combination and Red Point showings are outlined by third and high level anomalies and the Red Point Extension showing by a second order anomaly. These anomalies are significant inasmuch as they may project vein extensions across the local drainage channels. Such cross channel extensions of anomalies preclude drainage contamination from a point source, namely the showings.

II. The persistent first order anomaly following the contact between silicified-pyritized coarse grained quartz diorite and argillite near the eastern edge of the geochemical grid north and south of L 28 N. While the south end of this anomaly may be spurious (Type (b) and drainage) massive chalcopyrite float has been found in N 40° W trending gullies that are sub-parallel to the slope of the valley. Massive pyrite veins have been found in the main drainage system but no economic mineralization has been found in place.

III. The high level anomalies east and west of the Fisher showing on L 46 N. The western anomaly is uphill from the Fisher showing and is not the drainage anomaly from the

Fisher. The area is relatively flat, rolling and overburden covered but would appear to be in pyritized-silicified coarse quartz diorite on the west side of the "copper belt" zone. The anomaly to the east of the Fisher showing although below the showing would appear to be elongate in a N 40° W direction parallel to some of the faults in the area and poses an interesting question whether there might be a vein in the area, oriented in this direction.

IV. The second, third and high level anomalies oriented in a north-west south-east direction, extending from Gash Creek. The second anomaly outlines a zone of pervasive silicification and pyritization within the "copper belt". The area is heavily overburden covered but intense pyritization has been noted in cliffs near the south-east end of the area sampled. No copper mineralization except that in place and float in Gash Creek has been noted.

V. The anomaly on L 70 N. This anomaly would appear to straddle the contact between the zone of pervasive silicification-pyritization and the pyritized silicified quartz diorite. Although outcrops are fairly plentiful in the area and copper mineralization was not noted, the contact, a zone of weakness, should be checked for economic mineralization.

The Surprise area has some excellent high level anomalies. The whole of the intrusive body in the area would appear to be anomalous to some degree and when the results were statistically analyzed the background was found to be 80 ppm Cu. This figure was rejected on the grounds that probably not enough of the surrounding area was sampled to give an accurate background count and the background of 30 ppm Cu determined on the "copper belt" was used as were the other parameters for threshold, first and second order anomalies, etc.

The following are the main anomalies within the Surprise area:

I. The large third order and high level anomaly in the northern half of the area. Enough trenching has been accomplished in the area to indicate that it may be underlain by a number of pods or veins of high grade copper mineralization. A self potential survey

done by M.M. Menzies in 1954 confirms the geochemistry inasmuch as its anomalies correlate extremely well with the geochemistry anomalies.

II. The high level anomaly in the north-east corner of the geochemistry grid. This area is a swampy region directly downhill from the high level anomaly mentioned in "I" and because of this should be considered spurious because of drainage and organic influences. However, a few more samples should be taken to close off the area on the north-east end.

III. The anomalies to the south-east of the anomaly mentioned in "I". Although these anomalies are at a lower elevation than the larger anomalies, there is little reason to expect contamination from the latter source as they are not directly connected by drainage and there is little evidence of mechanical transportation in the area. It may be that there is additional mineralization under these anomalies.

IV. The high level anomaly in the north-west corner of the geochemistry grid. Argillite is exposed in a small creek some 20 ft south of the sample location. Because of this, and because the sample location is directly in the drainage from the "copper belt" it could be safely assumed that this anomaly is spurious.

V. The second and third order anomalies in the south-western quadrant of the geochemistry grid. There is some doubt as to the validity of these anomalies as they are in the drainage area of the Surprise and also at the foot of a talus covered slope derived from the "copper belt". It is felt that the area is underlain by argillite.

(b) Molybdenum

As in the case of the copper anomalies, anomalous molybdenum values are confined almost exclusively to the "copper belt". Except for one sample, the area underlain by coarse quartz diorite is well below the mean of the background scatter. The molybdenum anomalies, while neither as high or as widespread as the copper anomalies, correlate

well with them as to location and indicate nearby sources of copper-molybdenum mineralization or that both are subject to the same agencies of transportation in the same manner but with the molybdenum less affected than the copper.

As mentioned above, the molybdenum anomalies correlate well with the copper anomalies and are described, using the same area classification as follows:

I. The large first order anomaly at the north end of the southern zone. While this anomaly is somewhat displaced to the east from the copper anomaly, its high values correlate rather well.

II. The first and second order anomalies along the eastern edge of the geochemical grid. While not as persistent as the copper anomalies they do correlate high values.

III. The first and second order anomalies east and west of the Fisher showing. Again correlating very well, the eastern anomaly has been displaced to the south, possibly by Mo precipitation in stream channels.

IV. The Gash Creek anomaly - first order through high level anomaly. While high values coincide, the anomalies appear to be angularly displaced,- possibly by contour bias.

V. The anomaly on L 70 W. This appears offset to the north-west, up drainage, from the Cu anomaly indicating that the source of the Cu anomaly might have been where the Mo anomaly is now.

The Surprise area. Molybdenum anomalies in this area are scant. The only anomaly of note is the third order point anomaly at the south end of the workings. However, threshold values with small first order anomalies enclosed within, form a halo around the high Cu anomalies on the south and west side. This halo could mark the contact of the intrusive with argillite; with the argillite-underlain soil being a more hospitable concentrating environment for Mo ions than the intrusive-underlain soil.

(6) Conclusion

The "copper belt" zone of silicification and pyritization appears to be the centre of hydrothermal activity in the Upper Kitsault Valley. The fact that economic mineralization was and is found in veins and replacement zones away from but around the periphery of the "copper belt" gives great promise to the concept of finding economic mineralization within the "copper belt" itself. Notwithstanding the fact that mineralization (found to date) in the "copper belt" has been uneconomic mainly because of size:

(i) anomalous geochemical areas should be more thoroughly prospected to ascertain the source of the anomalies;

(ii) more detailed geochemical sampling should be done to prove vein extensions and potential porphyry type mineralization;

(iii) stripping, where indicated, should be done by, Cat, hand, or hydraulicking to prove up drill targets;

(iv) shallow drilling should be done, where indicated by stripping, progressing to deeper drilling where warranted.

Respectfully submitted,

M.A. Mitchell

M.A. Mitchell
Geologist

December 3, 1970

DECLARATION OF EXPENSES IN THE FORM OF WAGES AND INCIDENTALS

ON THE DANA CLAIM GROUP

Name	Dates Worked	Days	Wages	Total
W. Shellshear	Aug.5/70 - Aug.14/70	10	$15.00/dy.	$ 150.00
P. Fisher	" "	10	$15.00/dy.	150.00
M. Mitchell	" "	10	$31.67/dy.	316.70
D. Cromie	" "	10	$14.00/dy.	140.00

Incidentals

99 Soil Geochemical Samples (assayed 2 metals) $1.70/sample	168.30
4 Rock Samples (assayed 4 metals) $10.50/sample	42.00
Helicopter Service (ref. invoices 3164 & 3248 - Vancouver Island Helicopters)	939.50
	$1,906.50

M.A. Mitchell

Marvin A. Mitchell, B.Sc.
Geologist
Dolly Varden Mines Ltd. (NPL)

February 16, 1971

Declared before me at the City of Vancouver, in the Province of British Columbia, this 10th day of March 1971, A.D.

M.A. Mitchell

L. Vaughan
Sub-mining Recorder
A Commissioner for taking Affidavits within British Columbia
A Notary Public in and for the Province of British Columbia.

STATEMENT OF QUALIFICATIONS

I, Marvin A. Mitchell of Vancouver, B.C., do hereby state:

(1) that I have a degree in Geological Engineering granted by Montana College of Mineral Science & Technology, Butte, Montana, U.S.A.;

(2) that I am an employee of Dolly Varden Mines Ltd. (NPL), Suite 1400, 409 Granville Street, Vancouver 2, B.C., and have been since September 1968;

(3) that I reside at Suite 204, 3777 Cambie Street, Vancouver 9, B.C.;

(4) that I am registered with the Professional Engineers Association of British Columbia, as an engineer in training;

(5) that I have personal knowledge of the Dolly Varden properties and the work detailed in this report was done under my direction and supervision from May through August 1970.

M. A. Mitchell

Marvin A. Mitchell, B.Sc.

February 16, 1971

BIBLIOGRAPHY

Black, J.M., 1951, Minister of Mines, Province of British Columbia, Annual Report, pp 76 - 107 including maps.

Campbell, Finlay A., 1959, Economic Geology, Vol 54, pp 1461 - 1495.

Cromie, D.J., 1970, A History And Geology Of The Copper Belt And Musketeer Claims. (Excerpts from Minister of Mines Reports, 1913 through present, and small reports by others on the valley)

Horsnail, R., 1970, Geo-chemical Prospecting For Copper And Molybdenum In Western Canada. (Paper given at 1970 CIMM Convention, Kamloops, B.C.)

West Fork Kitsault River

MINK - 28821

BOSUN FRACTION 28825

COPPER CLIFF no.7 15809

BLUEJAY FRACTION 28823

MIDGET FRACTION 28824

Copper Creek

COPPER CLIFF C.G. L 3806

COPPER CLIFF no.6 15808

WOLF no.7 21162

WOLF no.6 21161

DANA no.5 35414

DANA no.6 35415

COPPER CLIFF no.1 C.G. L 3807

Gash Creek

COPPER CLIFF no.5 15807

19400 N

DANA no.3 35412

DANA no.4 35413

COPPER CLIFF no.2 C.G. L 3808

WOLF no.5 21160

Kitsault River

COPPER CLIFF no.4 15806

DANA no.1 35410

DANA no.2 35411

COPPER CLIFF no.3 L 3798

Dulay Creek

WOLF no.4 21159

17400 N

SILVER HORDE no.2 M22H L3805

WOLF no.9 21334

WOLF no.8 21333

NOME FRACTION M36 L3519

Trout Creek

BEAR FRACTION 28826

POLLY FRACTION 28827

SURPRISE 14218

MISSING LINK FRACTION 15804

SILVER HORDE M57 L3804

NANCY HANKS C.G. L3826

Racehorse Lake

1400W

WOLF no.3 C.G. L3796

15400 N

DAN PATCH C.G. L3825

Racehorse Creek

WOLF C.G. L3795

MAUD S M39 L3828

Wolf Hill

Wolf Creek

Black Bear Creek

SURPRISE no.1 FRACTION 18311

Wolverine Creek

SABLE FRACTION 28828

ROAN ANTELOPE 15347 k

ROAN ANTELOPE no.1 15348k

Combination Lake

WOLVERINE C.G. L 3797

Kitsault River

13400N

D'ARTAGNAN C.G. L 4071

Musketeer Creek

D'ARTAGNAN no.1 C.G. L4069

600E

ATHOS C.G. L4066

KITSOL no.2 C.G. L 3814

SUNSET no.2 C.G. L3819

RED POINT EXTENSION C.G. L3810

HILL BILLY M40 L4263

PORTHOS C.G. L4067

KITSOL no.1 C.G. L 3815

Porthos Creek

ARMES C.G. L4068

11400 N

RED POINT C.G. L 3809

SUNSET no.1 C.G. L3818

Evindsen Creek

BONANZA FRACTION C.G. L4070

9400N

MAUD Mc PHEE C.G. L 3817

SPORTSMAN C.G. L 3816

7400 N

2600E

4600E

6600E

To Accompany Report on Copper Belt & Dana Group by M.A. Mitchell, Kitsault River Valley, Alice Arm B.C., Skeena M.D.

m.a. Mitchell

Dated Feb 19, 1971

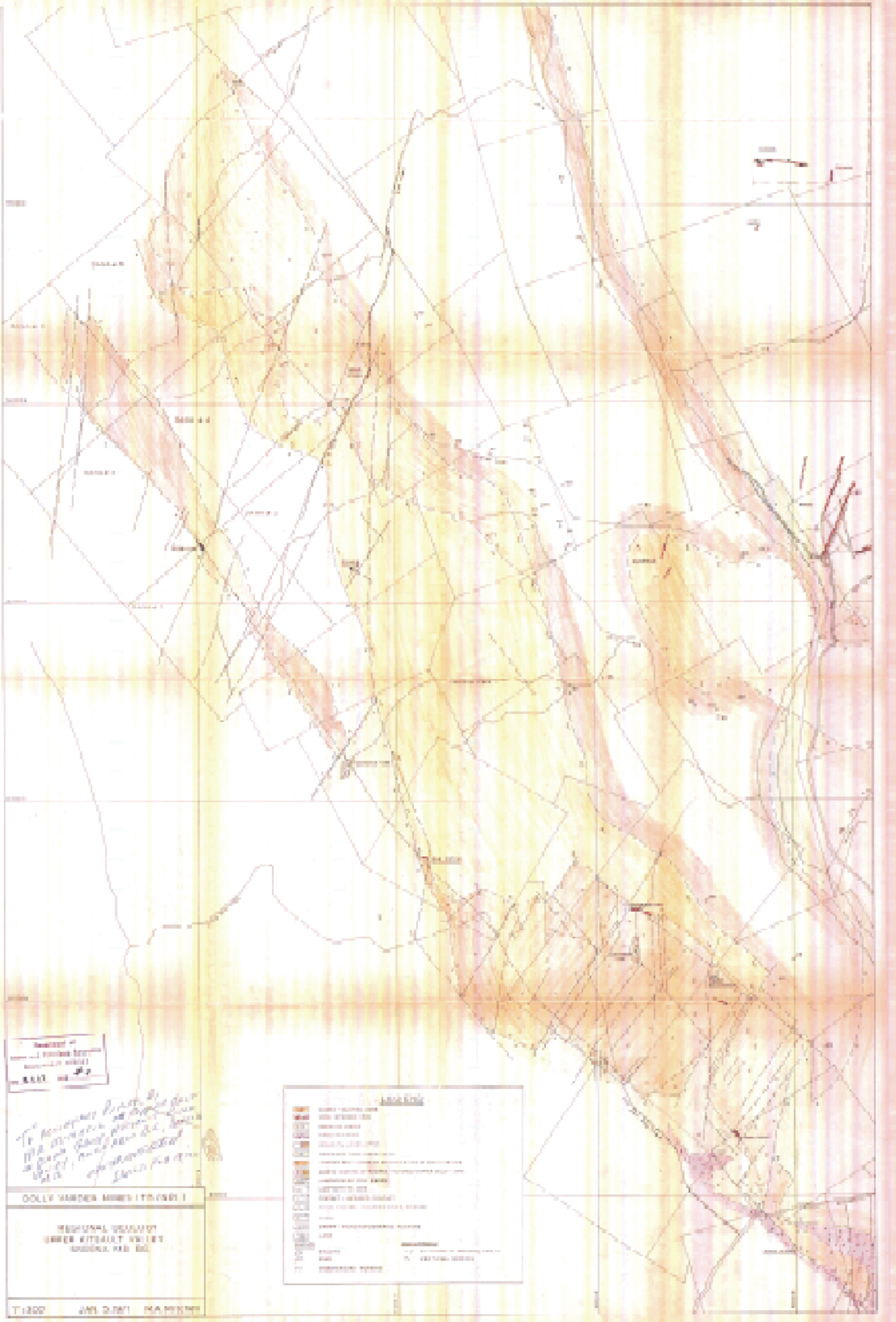
2887 M-4

DOLLY VARDEN MINES LTD. (N.P.L.)

TOPOGRAPHY and CLAIMS

COPPER BELT AREA

1" = 300' OCT. 13, 1970 m.a. mitchell


LEGEND
DOLLY VARDEN MINES LTD (N.P.L.)
REGIONAL GEOLOGY
UPPER KITSAULT VALLEY