

REPORT ON GEOLOGICAL, GEOCHEMICAL  
AND GEOPHYSICAL SURVEYS

of the

MANOR MINES LTD. (N.P.L.) PROPERTY

Highland Valley, B. C.  
Kamloops Mining Division

Under Option to and Work Done by or on Behalf of

SILVER STANDARD MINES LTD.

BY

G. D. Ulrich, B. A. Sc.  
Wm. Meyer, B. Sc.

ENDORSED BY

D. Arscott, P. Eng

Claims: Tac Group, Cat Group, Tam Group 68186 - 68231; 68240 - 68265

Location: 11 miles southeast of Ashcroft  
Latitude  $50^{\circ} 36' N$  Longitude  $121^{\circ} 07' W$

Dates: June - December 21, 1970

December 21, 1970

Vancouver, B. C.

2838

Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 2838 MAP
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## INTRODUCTION

The following report is based on field work carried out by consultants to Silver Standard Mines Ltd. (N.P.L.) during the 1970 field season. The work was completed on a 72 claim group in the Woods Creek area of the Highland Valley owned by Manor Mines Ltd. (N.P.L.) and presently under option to Silver Standard.

The company had previously cut a line grid on part of the property. The initial part of the 1970 programme consisted of extending the line grid to cover most of the property.

The second part of the programme consisted of a ground magnetometer survey and a geochemical soil survey. The object of the magnetometer was to pick up possible altered zones or geological features and the soil survey to find any anomalous copper values that could be related to bedrock. This part of the programme was supervised by J. Ziegler of Geophysical Engineering and Surveys Ltd.

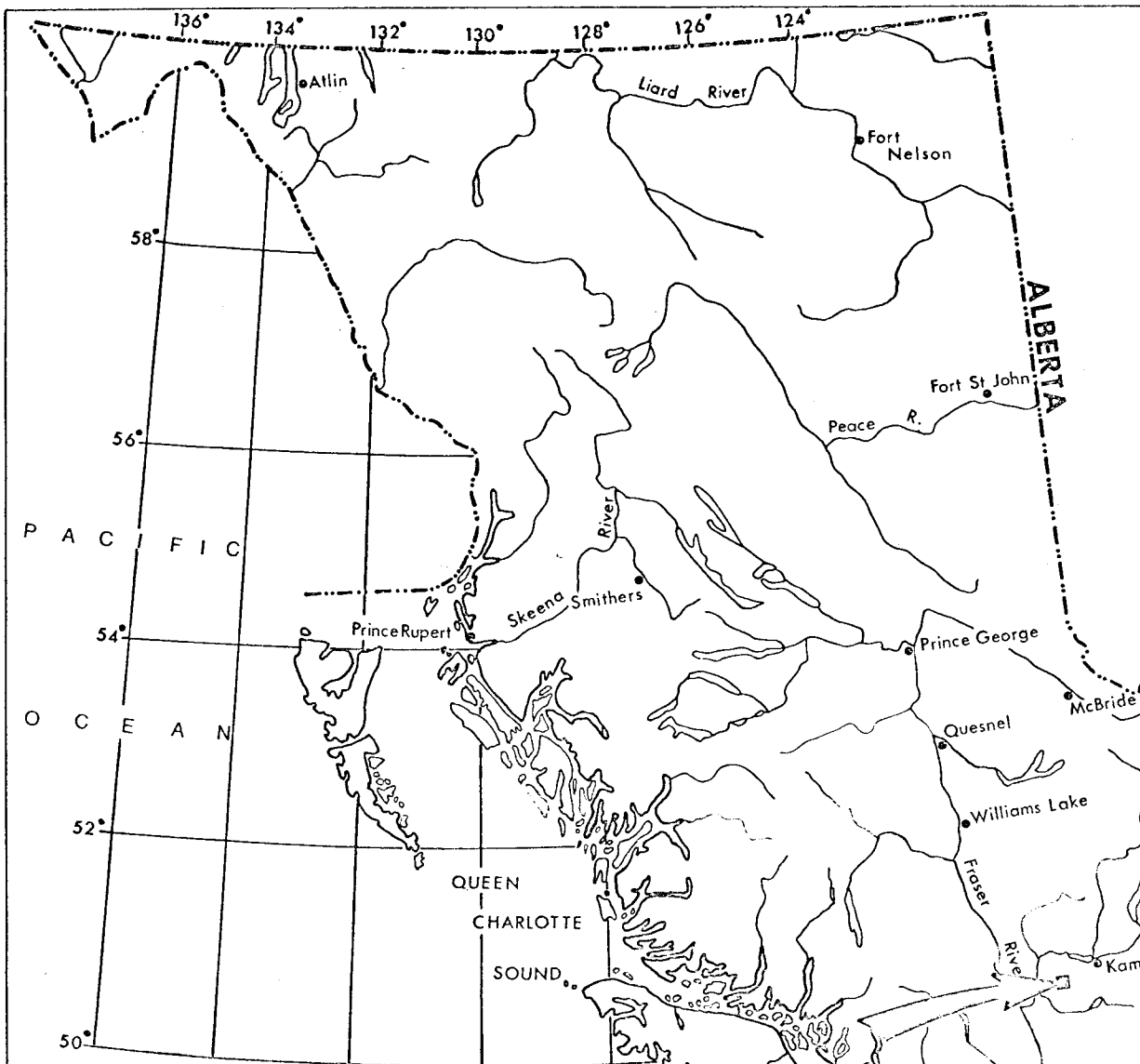
The third part of the programme consisted of detailed geological mapping with emphasis on alteration and structures. The nomenclature used for describing the lithic units was that generally accepted locally and based on the nomenclature developed by Dr. Northcote of the B. C. Dept. of Mines.

The programme on behalf of Silver Standard Mines Ltd. (N.P.L.) was directed by W. R. Bergey of Geophysical Engineering and Surveys Ltd. and supervised by W. Meyer of Western Geological Services Ltd. Field mapping was carried out by G. D. Ulrich, geologist and R. E. Reid, assistant, of Western Geological Services Ltd. The geophysical surveys in the field were supervised by J. Ziegler.

## LOCATION AND ACCESS

Silver Standard Mines Ltd. (N.P.L.) holds under option 72 contiguous mineral claims in the Highland Valley area of South Western British Columbia. The group covers an area of approximately 5 square miles, at the headwaters of Woods Creek in the Kamloops Mining Division centered around Lat  $50^{\circ} 36' N$  Long  $121^{\circ} 07' W$ .

The claim area is accessible by major highways to Ashcroft and by good paved road to the Woods Creek "turn-off" on the Ashcroft - Highland Valley road. From the "turn-off" the property is reached by 4 miles of good 4-wheel drive road via the Woods Creek Fire Access Road.



**INDEX MAP**

**BRITISH  
COLUMBIA**



**LOCATION MAP**  
**MANOR MINES CLAIMS**  
 50°-36'N 121°-07'W  
 KAMLOOPS M.D. FIG 1

*S. D. Ulrich*

## CLAIMS

A complete list of the 72 claims on which work is being applied is tabulated in Appendix I attached to this report. The following is a summary of the groups.

GROUP	OWNERSHIP	MINING DIVISION	NO. of CLAIMS
Tac	optioned to Silver Standard Mines Ltd.	Kamloops	40
Cat	optioned to Silver Standard Mines Ltd.	Kamloops	8
Tam	optioned to Silver Standard Mines Ltd.	Kamloops	24

## GEOLOGY

### General Statement

Approximately 60% of the property is underlain by the two outermost phases of the Guichon Creek batholith. These rocks were emplaced  $198 \pm 8$  years ago, their age being either Upper Triassic or Lower Jurassic (B. C. Dept. of Mines, Bull 56, 1969).

The batholith is a semi concordant, composite pluton with several nearly concentric phases. The intrusion supposedly took place as a number of intrusions of a slowly crystallizing magma over a relatively short period of geological time. Roof stoving and assimilation of overlying basic rocks by the outer phases is evident on the property.

Kamloops volcanics of Tertiary age underly 40% of the property and are confined to the Northern section. They are post - batholithic and are probably underlain by part of the batholith on the property.

### Lithology

The "Guichon" variety of the "Highland Valley" phase, the "Hybrid" phase and the Kamloops Group volcanics are the map units described below:

#### 1. "Hybrid" Phase

The "Hybrid" phase forms the margin of the batholith. On the property it has been subdivided into two varieties.

Department of  
Mines and Petroleum Resources  
**ASSESSMENT REPORT**  
NO. 2838 MAP #2

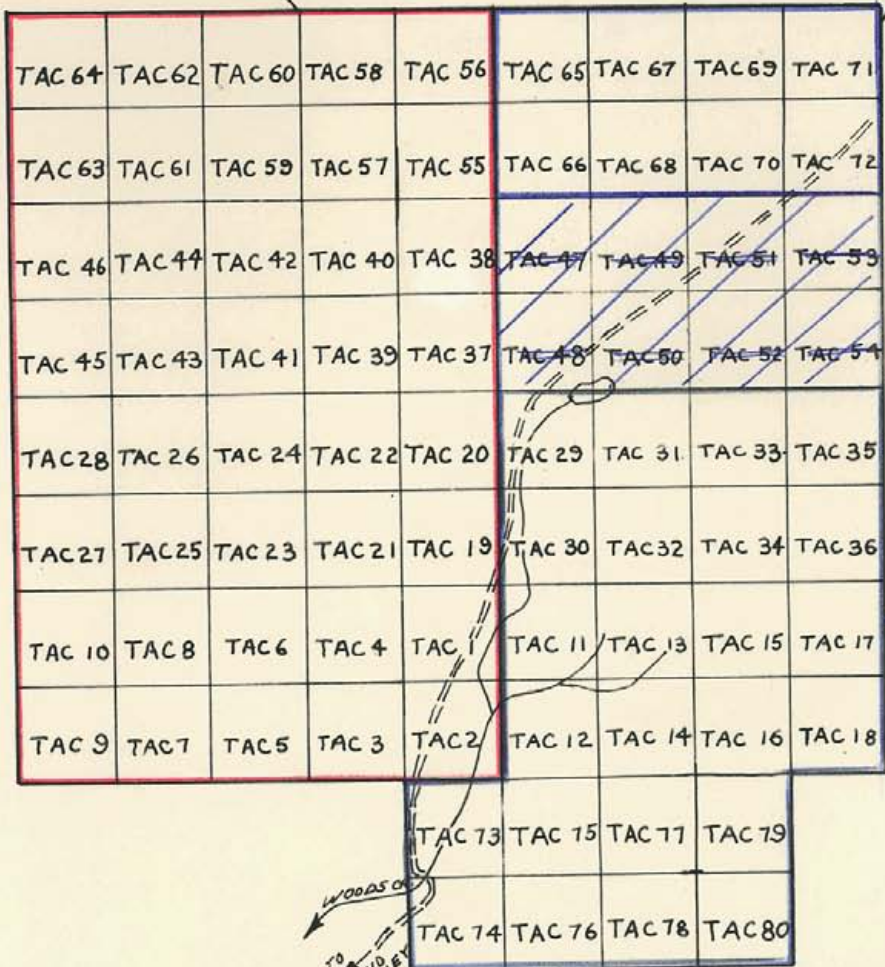


TAC GROUP

CAT GROUP

ANNMAR MINING LTD.

B. I. NESBITT



VALLEY FORGE  
MINING LTD.

← Tam Group.

FIG. 2  
MANOR MINES LTD. (NPL)  
MINERAL CLAIM MAP  
PIMAINUS LAKE  
HIGHLAND VALLEY, B.C.  
SCALE: 1" = 1/2 MI. (APPROX.)  
W.G.S. DECEMBER, 1970

*W. Meyer*  
*G. D. Ulrich*

a) Amphibolite, diorite

An area of coarse to fine grained amphibolite and diorite occurs in the southern section of the property. This is not a marginal unit and appears to be a large, partly assimilated inclusion of basic rock. The rock is highly variable.

Biotite is scarce in the coarse grained amphibolite, but predominates in the fine grained diorite. Plagioclase makes up to 50% of the rock. Magnetite content is usually around 4%. Traces of pyrite and chalcopyrite were identified as accessory minerals. The finer grained material is usually allotriomorphic granular, while the coarser rock is hypidiomorphic and coarsely crystalline. Foliations in this rock are usually weak, and seem to be locally related to the contact with the "Guichon" phase.

b) Quartz diorite, diorite

The sparse outcrops along the western margin of the property are an unusual variety of the "Hybrid" phase. The rock appears to be the product of the assimilation of nearly pure silica, (probably chert) by a basic magma. The resultant rock is a fine to medium grained mafic - poor quartz diorite.

This variety contains from 5 - 20% quartz, 60 - 80% plagioclase and 15 - 20% mafics. Magnetite is usually present to a maximum of 5%. Quartz is in squarish crystals, as is the plagioclase which is in larger crystals giving the rock a porphyritic texture. Biotite: hornblende is 2:1 or more; the mafics are generally in clustures. Some of the rocks are quartz deficient although most are extremely rich in silica for "Hybrid".

2. "Highland Valley" Phase - "Guichon" Variety

The "Guichon" variety of the "Highland Valley" phase occurs on the property east of the "Hybrid" phase and south of the Kamloops volcanics. The "Guichon"

on the property is, in general, a medium grained, weakly foliated, biotite-hornblende granodiorite. Near the "Hybrid" contact, some of this rock is quartz diorite. The "Guichon" through here looks mafic rich but no evidence of contamination was found.

The "Guichon" variety contains approximately 20% mafics. Hornblende:biotite is about 1:1. The rock is slightly magnetic with probably 2-5% magnetite. The mafics are medium grained, in small, evenly distributed clusters. Quartz is closed interstitial (wedgy), fine grained and makes up about 10% of the rock. Plagioclase ranges from approximately 50 - 60%. Orthoclase makes up 0 - 8% of the rock, is poikilitic and interstitial to all other minerals.

### 3. Post-Batholithic Rocks - Kamloops Group

The Kamloops group consists of rhyolites, andesites, basalts and associated tuffs and breccias. The outcrops on the property are mostly fine grained vesicular flows, with some tuffs and breccias. Some typical flow rocks from this area are pink, hematitic, vesicular basalts and andesites with pyroxene phenocrysts, greenish - black vesicular basalts with olivine phenocrysts, and fine to medium grained, massive gray rhyolites with biotite phenocrysts.

The formation seems to dip approximately 30° North. The Kamloops Group post-dates the Guichon Creek batholith and has little, if any, economic significance.

## Structure

### 1. Contacts

Very little can be said about the contacts between the various geological units due to the low outcrop density. The contacts, as shown on the map, are projections based on bedrock geology and magnetics.

The amphibolite - "Guichon" contact was observed to be abrupt and in one place is a faulted contact.



## 2. Faults

No major faults were observed on the property. The drainage pattern does not indicate any major structures. As mentioned above, the amphibolite-"Guichon" contact is faulted near line 3 North. This structure is evidenced by a depression, a change in rock type across it and parallel jointing in outcrop. A trace of malachite was found in outcrop near this structure.

## 3. Joints

The rock on the property is, in general, poorly fractured. No prominent joint sets were found. Some possible trends could be worked out, but these would likely be insignificant.

### Mineralization and Alteration

Only two occurrences of copper mineralization were observed on the property. These consist of malachite staining due to the weathering of chalcopyrite. In both cases the mineralization is in minor quantities and of no economic importance.

Weak sericite and hematite alteration is common throughout the "Guichon" variety on the property. The amphibolite tends to alter more to chlorite and epidote. The "Hybrid"-quartz diorite has some chloritic and hematitic alteration, some of which is fairly intense. This alteration does not appear to be significant although the general lack of outcrop in the western half of the property hampers any such judgement.

### GEOCHEMICAL SURVEY

#### General

The geochemical survey was carried out by a Geophysical Engineering and Surveys Ltd. field party supervised by J. Ziegler. Samples were taken at intervals of 100 feet along lines spaced 500 feet apart. They were collected below the humus using a grubhoe. A total of 1573 samples were taken.

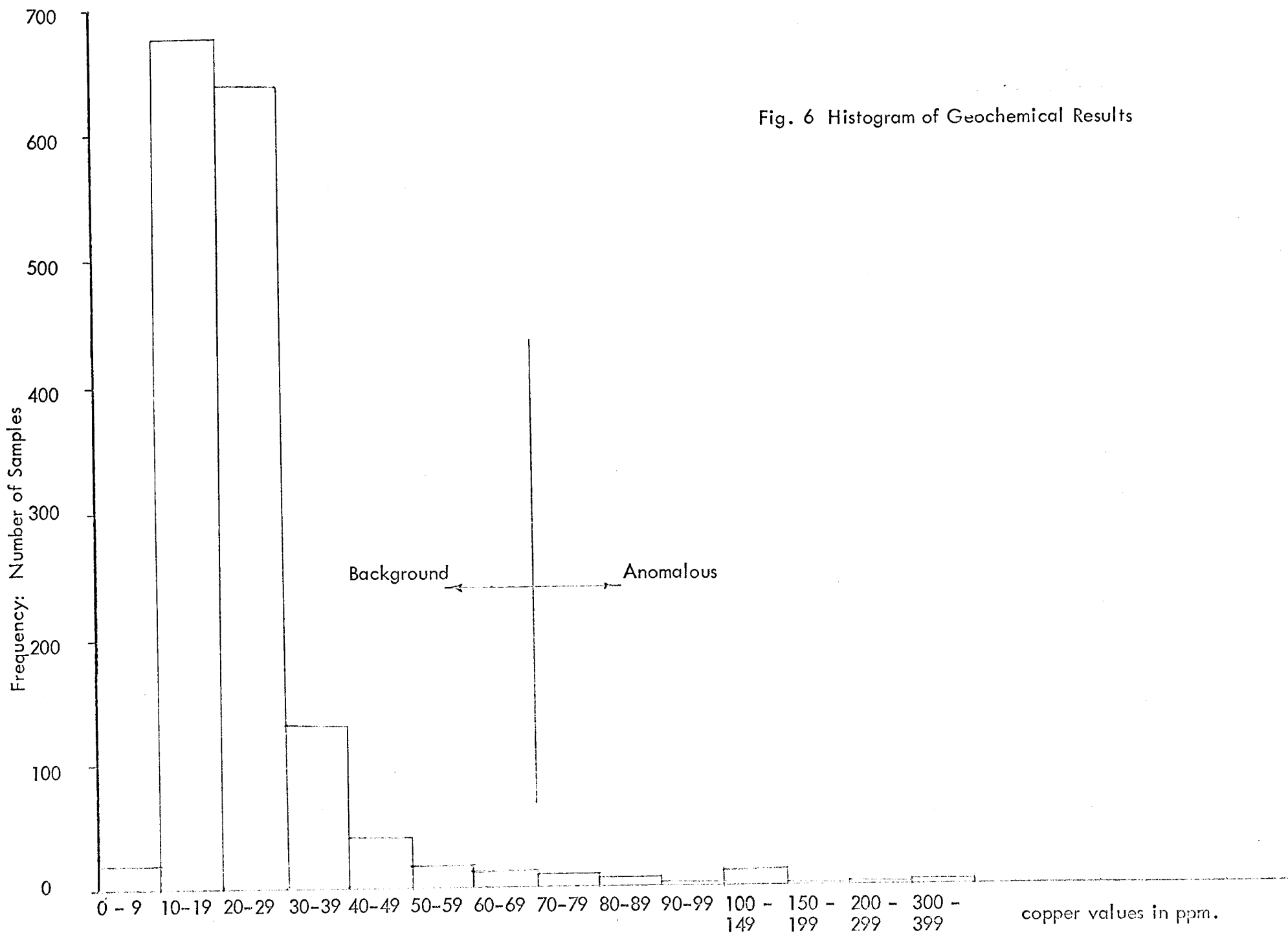


Fig. 6 Histogram of Geochemical Results

The samples were collected in high wet strength 3½" x 6" envelopes and marked with the co-ordinates of the sample location. They were shipped to Seymour Laboratories in North Vancouver for analysis.

The analytical procedure involved taking a one-half gram sample of minus 80 mesh material, digesting it in nitric acid and perchloric acid to yield a final acidity of 10%. Aluminum chloride and perchloric acid are then added to the solution to free the copper. The values are obtained by atomic absorption and recorded in parts per million of copper.

Figure 4 drawn on a scale of 1" = 400' is a plot of results. Samples were run for copper only.

#### Survey Results

The statistical analysis of the 1573 copper determinations indicates a background of 40 p.p.m. This value is too low for the "Hybrid" phase of the Guichon Creek batholith and reflects more the low background of the Kamloops volcanics. Values of 70 or greater were considered anomalous over the intrusive rocks. The values were contoured above 100 p.p.m. Values from 70 - 99 were marked "X".

An anomalous area is indicated in the southern part of the property between lines 3N and 33N. This is an area of fairly good rock exposure. Some trace amounts of copper were noted in the bedrock. The anomalous values appear to be related to drainage and to high background values in the bedrock.

#### MAGNETOMETER SURVEY

##### General

The magnetometer survey was carried out by a Geophysical Engineering and Surveys Ltd. field party supervised by J. Zeigler. Instruments used were two Scintrex MF - 2's. Measurements of the vertical field were taken at intervals of 100 feet along lines spaced 500 feet apart. A total of 29.5 line miles were completed.

The purpose of the survey was to define rock types in the covered areas and outline structures and areas of hydrothermal alteration.

Figure 5 drawn on a scale of 1" = 400' shows a plot of the corrected field data.

### Survey Results

The geological boundaries from the field mapping have been plotted on the magnetic map as shown on Figure 5. In general, the magnetic trends are parallel to the contact of the intrusive phases reflecting the variation of magnetite in the phases mapped.

The "Hybrid" phase regionally is highly variable in composition and texture and this is reflected in the magnetic properties in the area surveyed. One of the magnetic highs within the "Hybrid" phase centered around the base line at 18N is underlain by amphibolite, a separate and mappable variety within this phase. Two other areas of high magnetic intensity centered around 38N - 45W and 88N - 27 W are probably related to similar variations within the "Hybrid".

The Kamloops volcanics in the surveyed area are characterized by a relatively low, uniform field.

Respectfully submitted,

  
G. D. Ulrich

  
Wm. Meyer

keb

  
D. Arscott

## CLAIMS

Claim	Record Number	Expiry Date	Title
TAC GROUP			
Tac 1 - 10	68186 - 95	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))
Tac 19 - 28	68204 - 13	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))
Tac 37 - 46	68222 - 31	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))
Tac 55 - 64	68240 - 49	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))
CAT GROUP			
Tac 65 - 72	68250 - 57	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))
TAM GROUP			
Tac 11 - 18	68196 - 203	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))
Tac 29 - 36	68214 - 21	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))
Tac 73 - 80	68258 - 65	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))

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Tac 29 - 36	68214 - 21	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))
Tac 47 - 54	68232 - 39	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))
Tac 65 - 80	68250 - 65	February 19, 1971	Manor Mines Ltd. (N.P.L.) (under option to Silver Standard Mines Ltd. (N.P.L.))

CERTIFICATE

I, Gordon Ulrich, do hereby certify that:

1. I am a geologist with residence at 603 Rutland Court, Coquitlam, B. C.
2. I am a graduate of the University of British Columbia, (BASc - 1970, Geological Engineering)
3. From graduation to present I have been employed with Western Geological Services Ltd.
4. During the period July - December 1970 I supervised and carried out the geological mapping of the claims covered by this report.



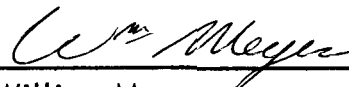
G. D. Ulrich

December 21, 1970

CERTIFICATE

I, William Meyer, do hereby certify that:

1. I am a geologist with residence at 555 Cochrane Avenue, Coquitlam, B. C.
2. I am a graduate of the University of British Columbia (B. Sc., Physics & Geology, 1962)
3. Since Graduation, I have been employed as a geologist with Phelps Dodge Corporation of Canada (4 years), Gibraltar Mines Ltd. (1½ years), Associated Geological Services (½ year) and Western Geological Services Ltd. (from April 1968 to the present).
4. I have made application for standing with the Association of Professional Engineers of B. C.
5. During the period July - December 1970 I supervised the programme on behalf of Western Geological Services Ltd.



William Meyer

January 12, 1971

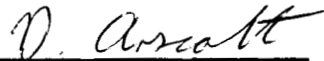


CERTIFICATE

I, David Philip Arscott, am a Professional Engineer, registered in British Columbia, with business address at #302 - 540 Burrard Street, Vancouver, B. C.

I have not visited the Tac, Cat, and Tam claims. However, I have examined all available material on the work carried out, and am satisfied that it has been performed in exemplary style, and in concordance with all pertinent ethical, professional, legal and technical standards.

Respectfully



D. Arscott, P. Eng.

PERSONNEL + DATES

<u>Name and Address</u>	<u>Position</u>	<u>Employed From - To</u>	<u>Days</u>
W. R. Bergey 700 - 1177 West Hastings Street	Geologist	July 1 - Dec. 21/70	3
W. Meyer 1015 - 470 Granville Street	Geologist	July 1 - Dec. 21/70	3
G. D. Ulrich 1015 - 470 Granville Street	Geologist	July 1 - Dec 21/70	39
R. E. Reid 1015 - 470 Granville Street	Geological Assistant	Aug. 18 - Sept 4/70	17
J. Ziegler 141½ Riverside Dr. N. Van	Geophysical Instrument Operator	July 1 - Sept 3/70	59
R. Butler 141½ Riverside Drive N. Van	Assistant	July 20 - Aug. 15/70	23
J. Clarke 141½ Riverside Dr. N. Van	Assistant	July 1 - Aug. 15/70	38
R. Darlington 141½ Riverside Drive N. Van	Assistant	July 1 - Sept. 3/70	59
J. Daily 141½ Riverside Drive. N. Van	Assistant	July 1 - Aug. 11/70	34
A. Wlenksi 141½ Riverside Drive N. Van	Assistant	July 1 - Aug. 11/70	34
K. Davies 141½ Riverside Drive N. Van	Assistant	August 11 - Sept. 3/70	24
B. Edgar 141½ Riverside Drive N. Van	Assistant	Aug. 11 - Sept. 3/70	24

## COST OF SURVEYS

Item

### Professional Services

Geophysical Engineering & Surveys Ltd.	3990.00
Western Geological Services Ltd. (per invoice)	3558.00

### Technical Services

Leitch Mines field personnel (per invoice)	6118.00
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### Related Costs

Camp costs, field tools & hardware, transportation, vehicle rental etc.	2781.74
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TOTAL	16447.74
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AFFIDAVIT re: COST OF SURVEY

I, William Meyer of 555 Cochrane Avenue in the Municipality of Coquitlam in the Province of British Columbia, DO SOLEMNLY DECLARE that the geological, geophysical and geochemical surveys of the Manor Mines property held under option by Silver Standard Mines Ltd. (N.P.L.) were conducted during the field season of 1970 and are described in this report. The data was obtained by consultants to Silver Standard Mines Ltd. (N.P.L.) at a total property related cost of at least \$16,447.74.

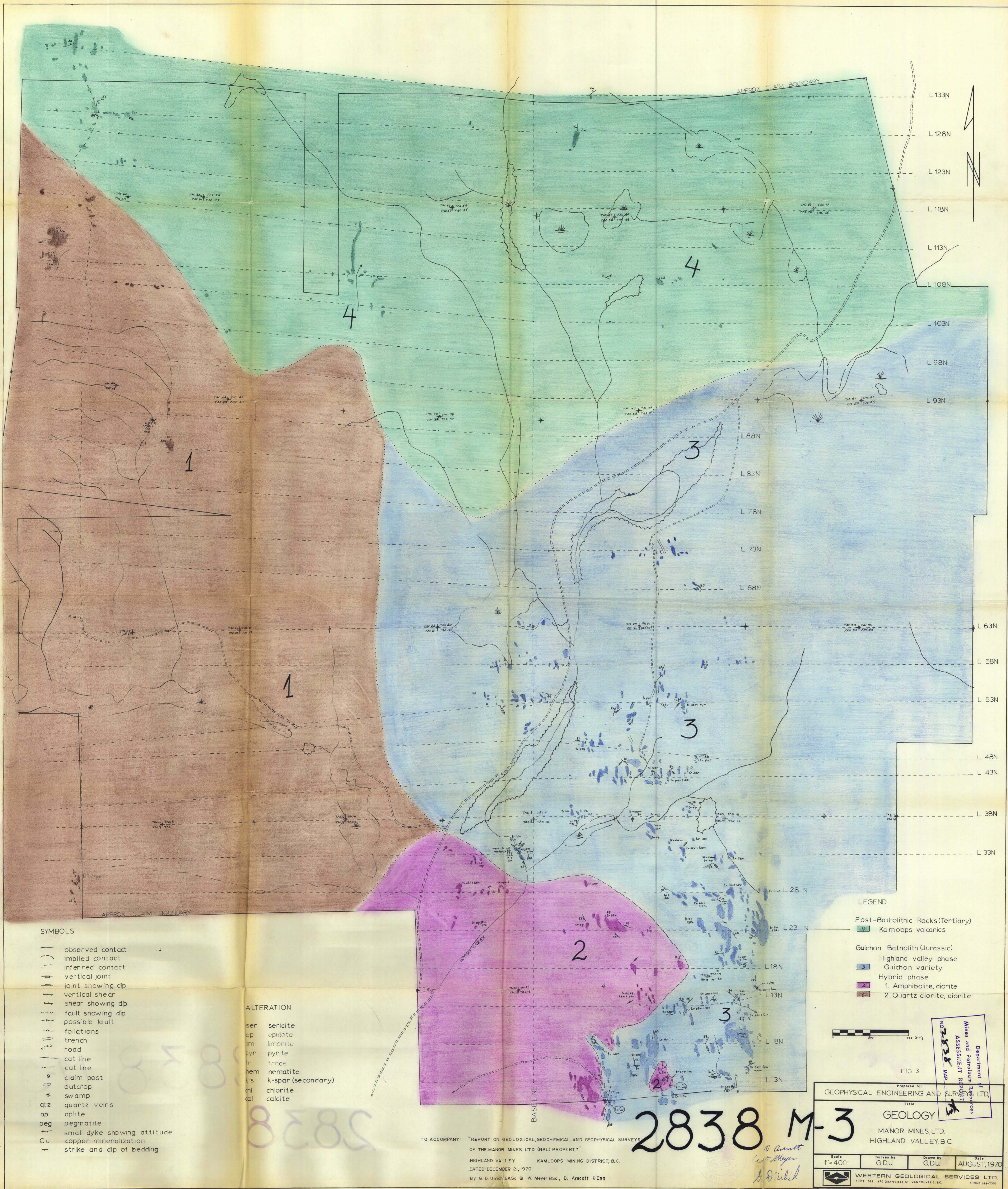
AND I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act".

DECLARED before me at the City )  
of Vancouver, in the Province of )  
British Columbia, this 18 day )  
of January, A. D. 1971. )

*Jui Suran*  
SUB - MINING RECORDER

*Wm Meyer*  
Wm Meyer

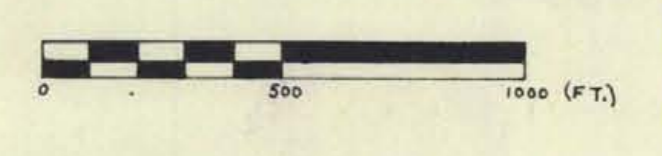




- SYMBOLS**
- ( ) observed contact
  - ( ) implied contact
  - ( ) inferred contact
  - ( ) vertical joint
  - ( ) joint showing dip
  - ( ) vertical shear
  - ( ) shear showing dip
  - ( ) fault showing dip
  - ( ) possible fault
  - ( ) foliations
  - ( ) trench
  - ( ) road
  - ( ) cut line
  - ( ) cut line
  - ( ) claim post
  - ( ) outcrop
  - ( ) swamp
  - ( ) quartz veins
  - ( ) ap aplite
  - ( ) peg pegmatite
  - ( ) small dyke showing attitude
  - ( ) Cu copper mineralization
  - ( ) strike and dip of bedding

- ALTERATION**
- ser sericite
  - ep epidote
  - lim limonite
  - pyr pyrite
  - tr trace
  - hem hematite
  - ks k-spar (secondary)
  - chl chlorite
  - cal calcite

- LEGEND**
- Post-Batholithic Rocks (Tertiary)
    - 4 Ka mloops volcanics
  - Guichon Batholith (Jurassic)
    - 3 Highland valley phase
    - 3 Guichon variety
    - Hybrid phase
      - 1 Amphibolite, diorite
      - 2 Quartz diorite, diorite



Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 2838 M-3  
 AMP

FIG 3

Prepared for  
**GEOLOGICAL ENGINEERING AND SURVEY LTD.**  
 Title  
**GEOLOGY**  
 MANOR MINES LTD.  
 HIGHLAND VALLEY, B.C.

Scale 1" = 400'

Survey by G.D.U.	Drawn by G.D.U.	Date AUGUST, 1970
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WESTERN GEOLOGICAL SERVICES LTD.  
 SUITE 1013 470 GRANVILLE ST. VANCOUVER 2, B.C. PHONE 688-2305

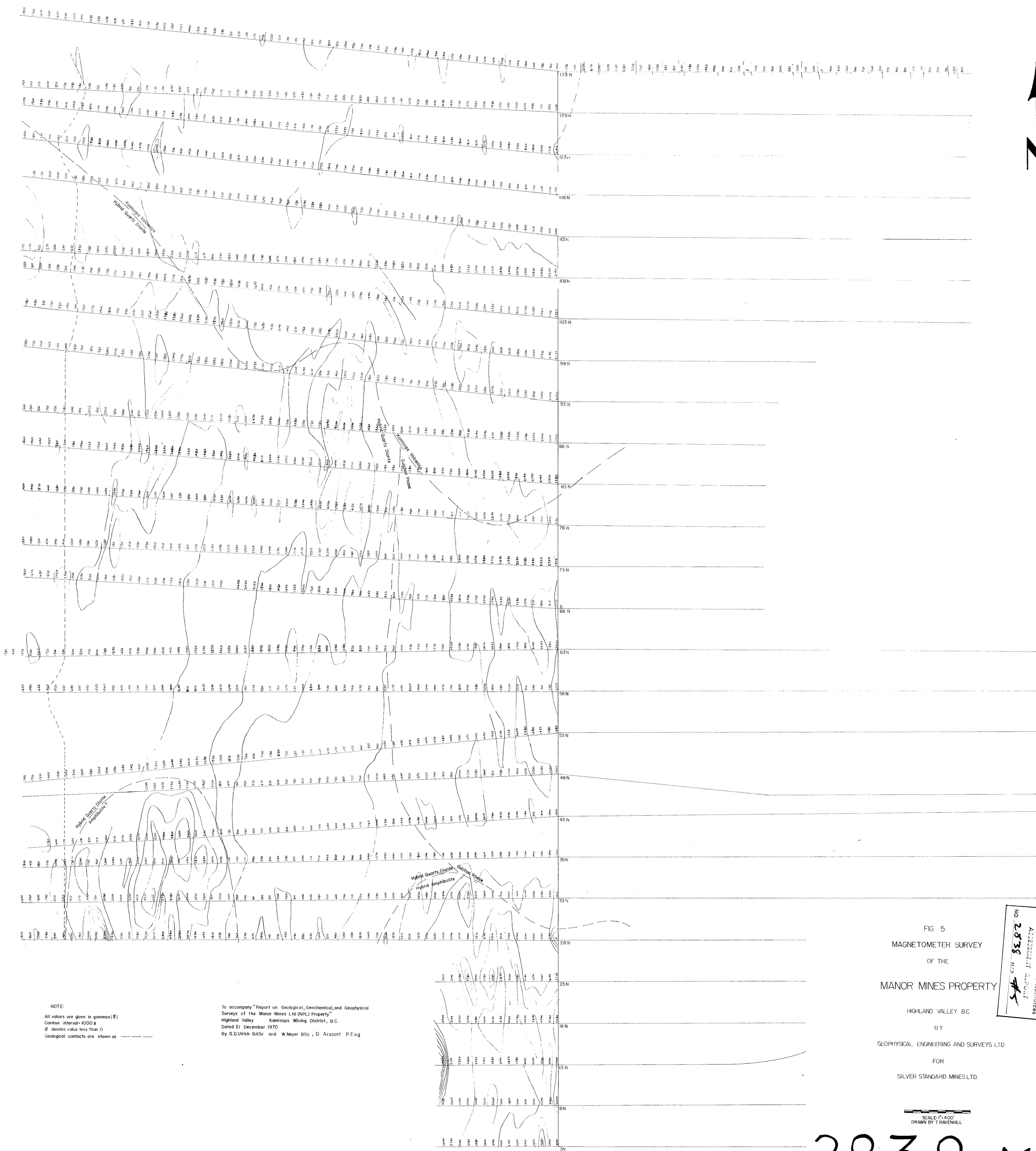
TO ACCOMPANY: "REPORT ON GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL SURVEYS OF THE MANOR MINES LTD. (INPL) PROPERTY"  
 HIGHLAND VALLEY KAMLOOPS MINING DISTRICT, B.C.  
 DATED: DECEMBER 21, 1970  
 By G. D. Ulrich B.A.Sc. W. Meyer B.Sc., D. Arscott P.Eng

**2838 M-3**

*D. Arscott*  
*W. Meyer*  
*D. Ulrich*

8285





NOTE:  
 All values are given in gammas (X)  
 Contour interval: 1000 X  
 Ø denotes value less than 0  
 Geological contacts are shown as - - - - -

To accompany "Report on Geological, Geochemical, and Geophysical Surveys of the Manor Mines Ltd (NPL) Property,"  
 Highland Valley Kamloops Mining District, B.C.  
 Dated 21 December 1970  
 By G.D. Ulrich B.A.Sc. and W. Meyer B.Sc., D. Arscott P.Eng.

FIG 5  
 MAGNETOMETER SURVEY  
 OF THE  
 MANOR MINES PROPERTY  
 HIGHLAND VALLEY B.C.  
 BY  
 GEOPHYSICAL ENGINEERING AND SURVEYS LTD.  
 FOR  
 SILVER STANDARD MINES LTD.

Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 2838 M-5  
 M.D. 7/5

SCALE 1"=400'  
 DRAWN BY T. RAVENHILL

2838 M-5

D. Arscott  
 W. Meyer  
 G.D. Ulrich