

2276

Report on
GEOCHEMICAL, GEOPHYSICAL AND GEOLOGICAL SURVEYS
On The Hol-Claim Group
Vancouver Island, B.C.
For
Nicola Lake Mining Co. Ltd. (N.P.L.)

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TABLE OF CONTENTS

Introduction 1
Location and Access 1
Physiography 2
Property 2
Exploration Program 2
Regional Geology 2
Discussion of Local Geology 5
Geochemical Survey 6
Magnetometer Survey 8
Interpretation 8
Conclusions 9
Recommendations 9

MAPS

SCALE

#1 Base Map	1" = 500 feet
#2 Geological Survey	1" = 500 feet
#3 Geochemical Survey	1" = 500 feet
#4 Magnetometer Survey	1" = 500 feet

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **2276** MAP

Introduction

The Hol Group of claims, owned by Nicola Lake Mining Co. Ltd (NPL) consists of 42 recorded mineral claims lying approximately 20 miles west of Port Hardy and approximately 5 miles north of Holberg, a Rayonier logging camp, on northern Vancouver Island. The claims were staked in early 1968 along a geological favourable belt of volcanics, sedimentary, and intrusive rocks which extend across the island in a northwesterly direction. Numerous base and precious metal deposits have been found along this belt.

Extensive claim staking and exploration took place throughout this area during 1968 following announcement of a major copper discovery by Utah Construction and Mining Co.

Reconnaissance, geological, geochemical, and magnetometer surveys were conducted over the property during the period of January 7 to January 21, 1970.

The following report summarizes the results of the program and recommends a program for additional investigation of the claims.

Location and Access

The claim group lies 20 miles west of Port Hardy and 2 miles north of Holberg, British Columbia, adjoining to the south a large group of claims held by Utah Construction & Mining Co. Coordinates near the centre of the group are $50^{\circ} 45'$ north latitude and $128^{\circ} 02'$ west longitude.

Access to the claims is by the Port Hardy - Holberg road with several logging roads traversing the property. Port Hardy can be reached by scheduled airline service or by road from Vancouver, British Columbia, a distance of 220 miles to the south east.

Physiography

The area exhibits moderate topographic relief, elevations range between 500 and

1000 feet.

All of the claim group has been logged within the last 30 years. Thick second growth and heavy slash make traversing the property, away from partially overgrown old logging roads, extremely difficult.

Property

The property consists of 42 mineral claims:

Claim	Record Number
Hol 1 - 20 - 20	23034 - 53
Hol 25 - 34 - 10	23054 - 63
Hol 37 - 47 - 11	23064 - 74
41	

Exploration Program

The exploration program conducted during the period of Jan. 7 - Jan. 21, 1970 consisted of geological, geochemical, and magnetometer surveys. The original plan called for the establishment of a grid system, consisting of flagged and chained lines at 400 foot intervals with stations at every 200 foot. This plan had to be abandoned because of thick second growth, heavy slash and snowfall during the first part of the program, making traversing of the property away from old roads dangerous and near impossible. The program was continued along all roads traversing the property. The roads were surveyed by chain and compass and stations were established at 200 foot intervals to provide ground control.

Regional Geology

General:

The area in which the current exploration activity is being concentrated is underlain by a west - northwest trending belt of Triassic volcanics and sediments. These have been intruded by several intrusive bodies, acid to intermediate in composition, of Jurassic and Tertiary age. In a few small areas the older rocks are overlain by Cretaceous and Tertiary sediments and volcanics.

The youngest Triassic rocks, and those in which the Utah deposit occurs, are referred to as the Bonanza Sub-group, consisting mainly of andesites and tuffs with agglomerate, argillite and limestone. These are underlain by the Quatsino Limestone with which numerous mineralized skarn zones are associated, and in turn by the Karmutsen Formation consisting mainly of andesitic and basaltic volcanic flows.

The various units occupy an open syncline. Numerous faults cut the belt, the most prominent directions being west-northwest and northeast.

Two distinct types of mineral deposits are being explored in the region. Numerous deposits of the contact metamorphic and skarn variety are found associated with limestone bands near intrusive contacts. Mineralization, consisting variously of copper, lead, zinc, iron, and precious metals generally occurs in skarn zones developed along limestone-andesite contacts. Known deposits of this type are concentrated in the Nahwitti Lake area and northwest and east of Quatse Lake.

Copper mineralization is common in both the Karmutsen and Bonanza volcanics with concentrations generally associated with shearing and/or granitic intrusions. The major deposit being developed by Utah Construction & Mining Co. on their Bay Group consists of copper-molybdenum mineralization in strongly altered volcanics of the Bonanza Group and intrusive dikes and sills. Similar mineralization has been explored on the Hep Group of Utahs to the west, 4 1/2 miles east of the Hol Group. A molybdenum-copper deposit occurring in granitic intrusives and volcanics also occurs on the West Coast Mining property 2 1/2 miles North of the Hol claims.

Detailed

The mapped area lies along the northern limb of a northwesterly trending syncline which occupies the central section of northern Vancouver Island.

Extensive block faulting renders the structural setting highly complex, hence tracing of the different rock units outcropping in the area is difficult.

Besides minor sediments, consisting of sandstone interbedded with conglomerate of Lower Cretaceous age, the main area is underlain by rocks belonging to the Vancouver Group which range in age from Upper Triassic to Jurassic (?). Dr. J. E. Müller's terminology was used to break the Vancouver Group into distinct formations or sub-groups. No attempt has been made to measure the thickness of the individual sections in the general area.

Stratigraphy:

Lower Cretaceous: Sandstone, conglomerate, siltstone, silty shales.

Vancouver Group:
(Upper Triassic and (?) Jurassic)

Bonanza Sub-group: andesitic flows and breccia, felsite, tuff, greywacke, shale, argillaceous and calcareous shales, argillaceous limestone.

(Upper Triassic)

Quatsino Formation: Limestone

Karmutsen Formation: massive and amygdaloidal volcanic flows, breccia, pillow lava, tuff of andesitic and basaltic composition, thin limestone beds.

(Late Jurassic to Tertiary (?)) Quartz diorite, andesitic dykes or sills.

Local Geology

Geological mapping was conducted at a scale of 1 inch - 500 ft. over the entire claimgroup. Ground control was obtained by stations established along old logging roads and airphotographs. Outcrops are nearly exclusively confined to creeks and road cuts, but in general, consist of thin narrow strips and isolated occurrences.

Rocks were identified in the field with the use of a hand lense, therefore any names given are field names only. However, special care was taken to place the different rock units within the correct stratigraphic horizon.

Discussion of Local Geology:

Stratigraphy:

Upper Triassic and (?) Jurassic, Bonanza Sub-group:

The Main outcrop area of the Bonanza Sub-group lies along the north eastern part of the claim group. All rock outcrops investigated consist of thin interbedded shales or argillites forming the base of the Bonanza. Along the eastern boundary, in a quarry, the contact between Bonanza sediments and Quatsino limestones is exposed. Here a 5 foot thick andesitic band, possible a sill, is the only volcanic representative of the Bonanza.

Approximately 3 miles northeast the quatsina limestone and Bonanza are separated by a thick section of andesitic volcanics, possibly sills.

The indicated strike of the Bonanza sediments is uniformly to the north-west and dips are gently to the SW.

In the central section of the claims the Bonanza sediments appear to strike into a section underlain by Karmutsen volcanic, hence, a north south trending fault is indicated.

Upper Triassic - Quatsino Limestone

The Quatsino Limestone was observed in two isolated outcrops only. The first occurs along the eastern boundary in a quarry overlain by Bonanza sediments. The limestone is dark grey to nearly black, fine grained, and forms the top of the Quatsino formation. No attitude measurements were obtained at this locality. The second occurrence is along the North - west boundary along the Goodspeed River. Here the river forms a deep narrow canyon. Attitudes vary considerably in a short distance and a series of north south trending faults cut the limestone. The limestone is thick bedded, greyish to white, coarse to fine crystalline, and fossiliferous along the bottom of the canyon. In general it is similar to the central section of the Quatsino Formation outcropping to the northeast of the claims.

Triassic - Karmutsen Formation:

The western and southern section of the mapped area is underlain by dark green, finegrained to amygdaloidal andesites. The amygdules are in general filled with calcite and ferro-magnesia minerals and in places with minor chalcopyrite. Finely disseminated chalcopyrite has also been found in the massive andesite bands under laying the amygdaloidal volcanics.

A small area of andesitic pillow lava occurs in the extreme north western section of the property. Alteration haloes of dark to brown color surround individual pillow. Shearing and fractures are abundant and are filled by calcite and epidote. Very occasional chalcopyrite has been observed.

Geochemical Survey:Field Procedure:

At first, a grid system was started in the western part of the claims. An east-west baseline was established and north south crosslines were spaced 400 ft. apart. Stations were marked at 200 ft. intervals by flagging, and soil samples taken.

A grid system had to be abandoned because of thick second growth, heavy slash and snow.

The main part of the property was sampled along all available roads. The roads were surveyed by chain and compass and samples taken at 200 ft. interval.

All stations were established by chains and compass and marked by flagging with stations marked at each sample location for future reference. A total of 3,600 ft. of baselines were established, approximately 14 miles of roads and crosslines were sampled.

Samples were collected with an auger and taken, where ever possible, from the soil horizon immediately underlying the humus layer (B horizon). In general, this consists of medium to dark brown or reddish brown sandy clay. Sample depth varied from 1 to 36 inches, but averaged between 10 - 15 inches.

Geochemical Testing:

All samples were packaged in kraft envelopes and analyzed for total copper by Chemex Labs Ltd. of North Vancouver. Analysis was by atomic absorption, with perchloric acid the extractive medium used, following drying in an electric oven and screening to - 80 mesh.

Survey Results:

Geochemical values were plotted at a scale of 1 inch = 500 feet and contoured where possible, at 20 ppm intervals for copper.

Previous geochemical surveys conducted over the area lying just north of the Hol group showed a definite dependency of copper content in the soil to the underlying rock formation. Thus, the sampled area is broken down into two sections according to geology.

Section 1 - Bonanza Sub-group

The Bonanza sub-group underlies the eastern and northern section of the sampled area. Background is taken as 35 ppm and values 2 1/2 times background are considered anomalous. Several isolated samples are well above background. Peak values in this area is 605 ppm in the northwestern part along a road.

Section 2 - Upper Triassic (?) Karmutsen volcanics

The western part of the sampled area is underlain by Karmutsen volcanics. Background is taken as 60 ppm copper.

A series of anomalies were outlined in the southern part of the grid and along a northwesterly trending logging road, but the presence of chalcopyrite as amygdaloidal filling and fine dissemination would account for them. Peak value of 298 ppm is in the vicinity of a chalcopyrite bearing outcrop.

Magnetometer Survey:

Instrument:

A Sharp MF1 Fluxgate magnetometer was used for this survey. This instrument is a direct reading, self orienting vertical component magnetometer.

Field Method:

On beginning the survey the instrument was adjusted to read on the lowest, 1000 gamma, scale to obtain the highest possible sensitivity.

Base stations were established by taking 3 successive readings half an hour apart. During the survey, the base stations were checked every half hour to get an accurate estimate for drift and short term field variations.

The readings were corrected for diurnal changes, plotted and the values contoured where possible, at 100 gamma interval for interpretational purpose.

Interpretation:

A comparison between the magnetic map and the geology map shows that the property can be divided into two sections.

Section 1 - Bonanza Sub-group

Readings along roads traversing this section range from 60 to 400 gammas with only the occasional reading above this value.

The available data is not sufficient to make a valid interpretation.

Section 2 - Upper Triassic (?) Karmutsen Formation

Readings in this section vary, in general, from 500 to a maximum of 1300 gammas about 2 to 3 times the value of section 1.

Conclusions:

The Hol Claim group is underlain by the Bonanza sediments in the eastern and by Karmutsen volcanics in the western part.

Geochemical highs associated with the Karmutsen volcanics in the western section can be related to amygdaloidal andesite carrying very minor amounts of chalcopyrite.

Isolated high geochemical readings along roads traversing the area underlain by the Bonanza Sub-group are inconclusive and more work, possibly on a grid base is necessary.

The magnetometer can be used to outline the different rock formations, specially the sedimentary section of the Bonanza.

The survey results over the eastern part of the claim group are inconclusive, and more field work is necessary to fully evaluate the mineral potential.


Recommendations:

- 1) Establish a grid by chain and compass over the whole eastern section

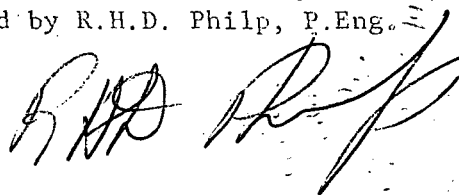
of the property with 400 foot lines and 200 foot stations.

- 2) Soil sampling at 200 foot intervals.
- 3) Magnetometer survey to outline the limits of the sedimentary section of the Bonanza and hence possibly find the volcanic members of the Bonanza.
- 4) Detailed geological mapping to locate any alteration zones, or intrusives.
- 5) Detailed geochemical survey on a 200 foot by 100 foot grid over indicated anomalous zones.
- 6) X-Ray diamond drilling to evaluate detail - anomalies found.

Respectfully submitted,

 F. Holcapek, Geologist.

Endorsed by R.H.D. Philp, P.Eng.



DOMINION OF CANADA:
PROVINCE OF BRITISH COLUMBIA.

To Wit:

In the Matter of the geological, geochemical
and geophysical surveys on the HOL group of
claims for NICOLA LAKE MINING CO. LTD. (NPL)

I, M. B. Hardy

of 201-714 West Hastings St., Vancouver 1, B. C.

in the Province of British Columbia, do solemnly declare that the following personnel were
employed and costs incurred in conducting the surveys:

PERSONNEL:

F. Holcapek-Geologist, Field-	7 days	@ \$	80.00/day	560.00	
" " " Office	3½ "	@	80.00/ "	280.00	
R. Philp- P. Eng. Office	2 "	@	100.00/ "	200.00	
S. Lewis- Soil Sampler	18 "	@	36.00/ "	648.00	
O. Graf- Soil Sampler	8 "	@	34.00/ "	272.00	
H. Hessing - Soil Sampler	14 "	@	34.00/ "	476.00	
W. Barnes-Party Chief	20 "	@	44.32/ "	886.40	
P. Vlaesveld-Draughting & plotting field data	45½ hrs.	@ \$	6.00/hr		
L. Marsh- draughting	11 "	@ \$	6.00/hr	339.00	\$3,661.40

DISBURSEMENTS:

F. Holcapek-Travel, Meals etc.	130.75	
O. Graf- Travel, Meals etc.	60.00	
W. Barnes- Meals, acc.	60.17	
" Transportation	56.10	
Air fares	174.20	
Transportation, Gas, Car Rental	256.13	
Chemex-Geochem testing	396.36	
Accommodation & Meals	361.63	
Supplies, typing, printing, telephone, misc.	108.26	
Magnetometer Rental 7 days @ \$17.07	119.49	
	\$ 1,723.09	
10% overhead on disbursements	172.31	
		1,895.40
		<u>\$ 5,556.80</u>

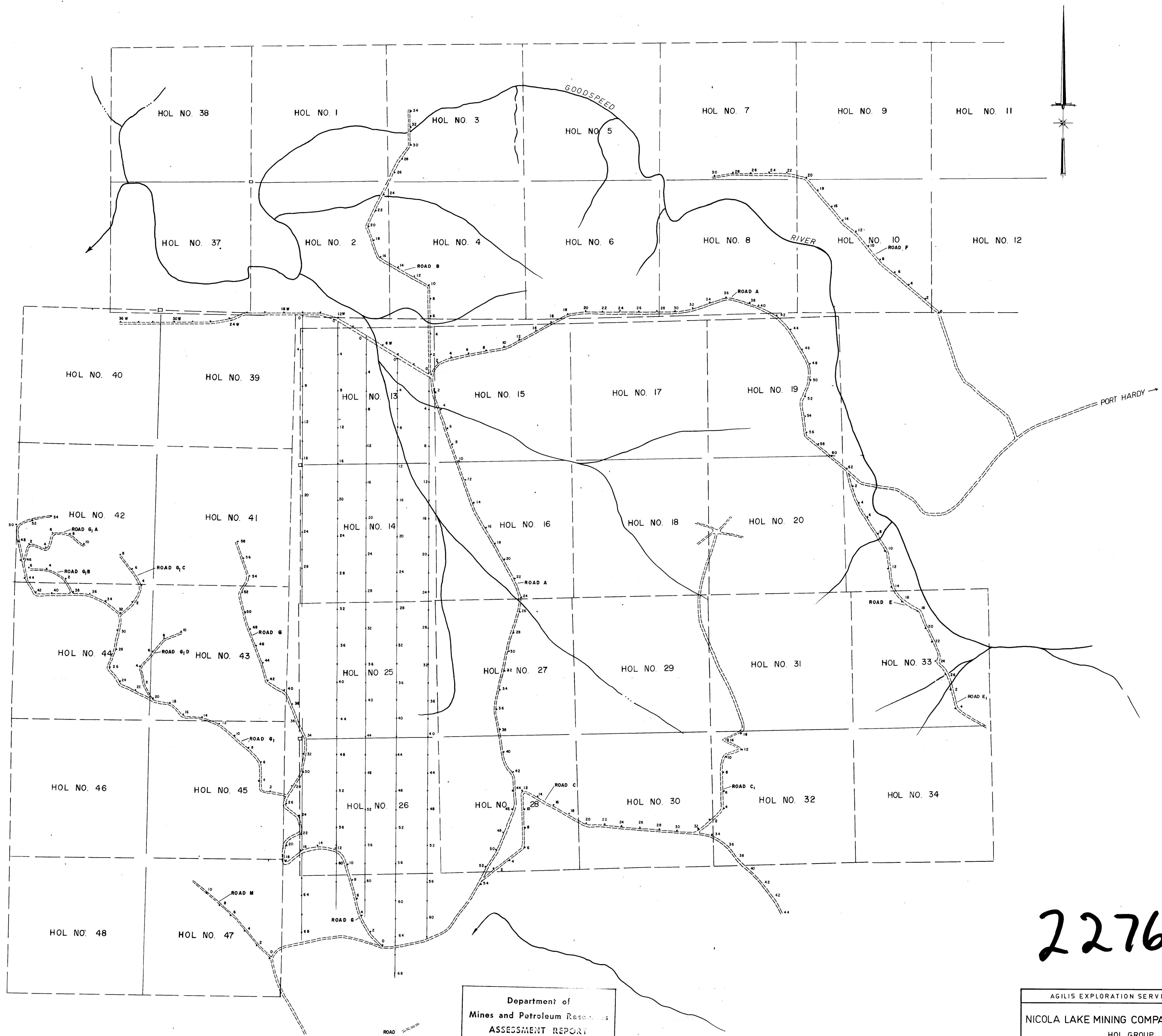
And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of
the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the City
of Vancouver, in the
Province of British Columbia, this 20
day of March 1970, A.D.

M. B. Hardy

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

Sub-Mining Recorder

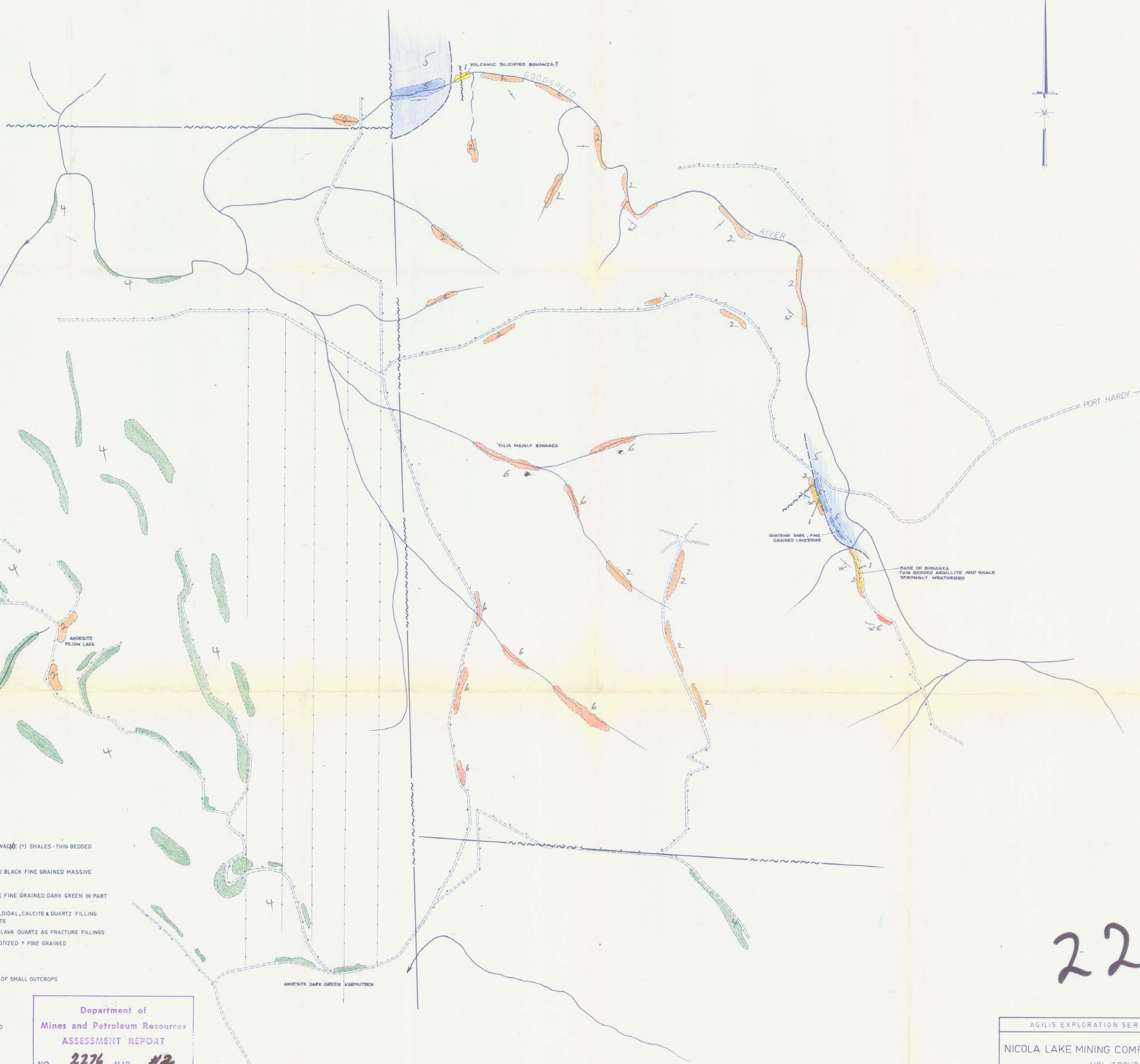


2276

NOTE: all claim boundaries are approximate.

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **2276** MAP #1

AGILIS EXPLORATION SERVICES LIMITED	
NICOLA LAKE MINING COMPANY LIMITED, N.P.L.	
HOL GROUP	
HOLBERG, NORTHERN VANCOUVER ISLAND	
BASE MAP	
DRAWN BY: PV.	DATE: FEBRUARY 1970
CHECKED BY: F.H.	



LEGEND

- BONANZA**
 6 ARGILLITES, GREYWACKE (?) SHALES - THIN BEDDED
- QUATSIÑO**
 5 LIMESTONE GREY TO BLACK FINE GRAINED MASSIVE
- KARMUTSEN**
 4 ANDESITE MASSIVE FINE GRAINED DARK GREEN IN PART AMYGDALOIDAL
 3 ANDESITE AMYGDALOIDAL, CALCITE & QUARTZ FILLING MINOR CHALCOPYRITE
 2 ANDESITE - PILLOW LAVA QUARTZ AS FRACTURE FILLINGS
 1 ANDESITES CHLOROTIZED ? FINE GRAINED

SYMBOLS

- OUTCROP OR SERIE OF SMALL OUTCROPS
 T DIP AND STRIKE
 ~~~~~ FAULT OBSERVED  
 - - - - - FAULT INFERRED  
 ~~~~~ CONTACT INFERRED

Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. 2276 MAP #2

2276

AGILIS EXPLORATION SERVICES LIMITED

NICOLA LAKE MINING COMPANY LIMITED, N.P.L.
 HOL GROUP
 HOLBERG, NORTHERN VANCOUVER ISLAND
 NANAIMO B.C.

GEOLOGICAL SURVEY MAP

500' 0 500 1000'
 SCALE IN FEET

DRAWN BY: PV DATE: FEBRUARY 1970
 CHECKED BY: F.H.



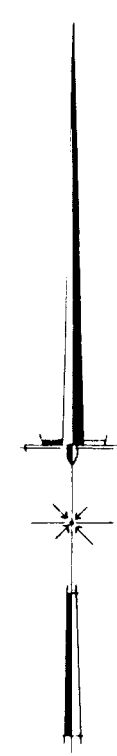
2276

Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. 2276 MAP #3

AGILIS EXPLORATION SERVICES LIMITED
 NICOLA LAKE MINING COMPANY LIMITED NPL.
 HOL GROUP
 HOLBERG, NORTHERN VANCOUVER ISLAND
 NANAIMO B.C.
 GEOCHEMICAL SURVEY (Cu CONTOURS)

500' 0 500 1000'
 SCALE IN FEET

DRAWN BY: PV. DATE: FEBRUARY 1970
 CHECKED BY: FH



2276

Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. 2276 MAP #4

AGILIS EXPLORATION SERVICES LIMITED
 NICOLA LAKE MINING COMPANY LIMITED, N.P.L.
 HOL GROUP
 HOLBERG, NORTHERN VANCOUVER ISLAND
 NANAIMO B.C.
 GROUND MAGNETOMETER SURVEY
 SCALE IN FEET
 500' 0 500 1000'
 DRAWN BY: PV DATE: FEBRUARY 1970
 CHECKED BY: F.H.