

92H/16W  
MINERAL EXPLORATION REPORT  
FOR  
NITRACELL CANADA LTD.  
HILL GROUP  
NICOLA MINING DIVISION

FEB. 1973 M. D. KIERANS P. ENG.

GEOLOGICAL AND GEOCHEMICAL  
REPORT ON HILL GROUP. HILL  
1-20; T<sub>1</sub> 1-10; HILL 21, 23, 25,  
27, 29, 66, 115, 117, AND 119.

WART MTN. AREA, NICOLA M. D.  
49°55' N. LAT; 120°28' W. LONG.  
20 MILES S. E. OF MERRITT B. C.  
JULY 28 TO NOV. 20 1972

N.T.S. 92H/16/E

4230

MINERAL EXPLORATION REPORT

HILL GROUP

THE WART MOUNTAIN AREA,  
NICOLA MINING DIVISION

4230

BRITISH COLUMBIA

JULY - NOVEMBER, 1972

BY

M. D. KIERANS, P. ENG.

FOR

NITRACELL CANADA LTD.

549 Howe Street,  
Vancouver, B. C.

LOCATION

49° 55' North Lat.  
120° 28' West Longitude

N. T. S.  
92 H 16 E

February 5, 1973

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT

NO.

4230

MAP

APPENDIX

Expenses incurred during the geological and geochemical investigations of the HILL 1-20, Ti 1-10, HILL 21, 23, 25, 27, 29, 66, 67, 115, 117 and 119 mineral claims on the HILL Group, approximately 20 miles S. E. of Merritt, B. C. in the Nicola Mining Division. For geophysical wages and expenses see P. E. Walcott and Associates Ltd. invoices.

Nitracell Canada Ltd. - Hill Claims

Mike Smith - Nitracell Employee

<u>(1) Soil sampling</u>		
September 26, 27, 28, 29, 30	- 5 days @ \$37.00	185.00
October 3, 7	2 days @ \$37.00	<u>74.00</u>
		\$ 259.00
<u>(2) Line cutting</u>		
October 6	1 day	<u>37.00</u>
<u>(3) Core sampling, etc.</u>		
October 11, 12, 14, 16, 20, 21,		
22, 26, 30	9 days @ \$37.00	333.00
Nov. 3, 8, 10, 14, 15, 17, 19	7 days @ \$41.00	<u>287.00</u>
		\$ 620.00
<u>(4) Prospecting, Drill spotting, etc.</u>		
October 17, 18, 23, 24.	4 days @ \$37.00	<u>148.00</u>
Totals	<u>28 days</u>	\$ 1,064.00

Kevin Kierans - Nitracell Employee

<u>(1) Line cutting</u>		
August 14, 16, 17, 18, 19, 20, 21	7 days @ \$31.00	<u>\$ 217.00</u>
<u>(2) Soil sampling</u>		
August 4, 5, 7, 8, 9, 25, 26, 30, 31	- 8 days @ \$31.00	<u>\$ 248.00</u>
<u>(3) Camp construction</u>		
August 6	1 day	<u>31.00</u>
Totals	<u>16 days</u>	\$ 496.00

Warren Montsion - Nitracell Employee

<u>(1) Line cutting</u>		
August 14, 15, 16, 17, 18, 19, 21	7 days @ \$32.00	\$ <u>224.00</u>
<u>(2) Soil sampling</u>		
August 4, 5, 7, 8, 25, 26, 27	7 days @ \$32.00	\$ <u>224.00</u>
<u>(3) Camp construction</u>		
August 6	<u>1 day</u>	<u>32.00</u>
	<b>Totals</b>	<b>\$ <u>480.00</u></b>

Martin Kierans - Consulting Geologist, Professional Services fees

July, 1972	7 days	220.52
August 1972	31 days	2,158.89
September "	30 days	2,066.89
October "	32 days	2,189.97
November "	27 days	1,849.06
	<u>127 days</u>	<u>\$ 8,485.33</u>

Office Report Preparation

December 1972	18 days	1,839.56
Jan. 15-Feb. 5/73		1,200.00
		<u>\$ 3,039.56</u>

Crest Laboratories Ltd.

Sept./72	Cheque # 279	176.50
Oct./72	" 304	1,134.50
Dec./72	" 322	474.15
Jan./73	" 334	250.00
Apr./73		<u>138.00</u>
		<u>\$ 2,173.05</u>

Darma Explorations

<u>(1) Line cutting</u>	Cheque #289	1,120.00	
	297	280.00	
	338	<u>98.00</u>	<u>1,498.00</u>
<u>(2) Soil sampling</u>	" 297	875.00	
	338	<u>334.25</u>	<u>1,209.25</u>
			<u>\$ 2,707.25</u>

NITRACELL CANADA LTD.

HILL CLAIMS - Expenses - Summary

1.	<u>Diamond Drilling</u> <u>Connors Drilling Ltd.</u>			
	Oct. 16-31/72	Invoice #2-238	Ck. # 324	6,247.65
	Nov. 1-15/72	Invoice #2-258	329	16,455.50
	Nov. 16-21/72	Invoice #2-275	336	<u>3,054.89</u>
				25,758.04
2.	<u>Peter Walcott</u>			12,714.59
3.	<u>Crest Laboratories Ltd.</u>			2,173.05
4.	<u>Camp &amp; Equipment</u>			1,289.79
5.	Martin Kierans			8,485.33
	Warren Montsion			480.00
	Kevin Kierans			496.00
	Mike Smith			<u>1,064.00</u>
				10,525.33
6.	<u>Darma Explorations Ltd.</u>			2,707.25
7.	Mileage - M. Kierans			1,404.00
8.	Martin Kierans - Office, December 1972			1,839.56
	Extra -			<u>1,200.00</u>
				3,039.56
				<u>59,611.61</u>

Declared before me at the *City*  
of *Vancouver*, in the  
Province of British Columbia, this *5th*  
day of *April, 1973*, A.D.

*M. D. Kierans*

*Joan Paul* SUB-MINING RECORDER  
A Commissioner for taking Affidavits within British Columbia or  
A Notary Public in and for the Province of British Columbia.

MINERAL EXPLORATION REPORT

FOR

NITRACELL CANADA LTD.

HILL GROUP, THE WART MOUNTAIN AREA, NICOLA MINING DIVISION,

BRITISH COLUMBIA

AUGUST - NOVEMBER, 1972

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## ABSTRACT

This report describes results of field exploration work on the Hill Group, Nicola Mining Division, British Columbia, carried out under the writer's field direction, between July 28th and November 20th, 1972. The group containing a total of 258 claims, held by Nitracell Canada Ltd, is located about 20 miles S.E. of Merritt, B.C.

Topography and climate are typical of the Interior Plateau dry belt. Access and location are favorable for exploration and exploitation. Water, hydro-electric power, highway and rail transportation facilities are all within 20 miles of the claims. Merritt is some 230 miles by highway from the Port of Vancouver. There is a rail link from Merritt to the coast.

The claims were previously held by Consolidated Skeena Ltd (now International Mariner Resources Ltd). They were explored between 1961 and 1969. The three short adits on the property were driven by persons unknown about 1900. The eight bulldozed trenches were put down by Skeena in 1966 and W. Petrie of Merritt in 1972. There are three producing copper mines; Craigmont, Brenda Mines and Ingerbelle-Copper Mountain, within a radius of fifty miles of the claims. Bethlehem Copper Mines Ltd hold claims to the west of the Hill Group. International Mariner retain ownership of strategic claim blocks northeast and east of the Hill Group.

The rocks exposed on the Hill 1-20 block (the original block) are Upper Triassic Nicola Group volcanics and shales. The widespread Nicola rocks are hosts to the Craigmont and Ingerbelle deposits. Brenda Mine ores are in granitic intrusive rocks. The Hill showings are east of the Aspen Grove Copper Camp and near a prominent embayment of Nicola rocks into batholithic bodies of Coast Intrusive age - the Princeton and Penask batholiths. A definite "bulge" in the intrusive-Nicola contact is within a mile or so of the Hill showings. The new claims staked during the field exploration cover the generally east-west trending contact and the "bulge".

The adit mineralized zone on the Hill 1-20 block is near the intersection of three topographic lineament directions. The intersectional focus is composed of three elements; a N-S ridge and two NE and NW stream valleys. The photogeological linears, very well developed to the east of the Hill claim block, are consistent and strong. But on the Hill block the adit mineralized zone is not expressed strongly at all on the airphotos.

The only copper bearing mineral seen on the showings was chalcopyrite. Where underground and surface copper-bearing sulphides are exposed to the atmosphere, malachite and azurite are conspicuous. All copper mineralization found on the claims was



in Nicola pyroclastics and breccia. The 300' x 2500' altered zone found by geological mapping, soil sampling and geophysical methods (induced polarization) defined the limits within which copper occurs. Alteration consists of minor epidotization, carbonatization in veins and veinlets and silicification. The copper occurs within carbonate quartz stringers, veinlets and veins from 1/8" to 12" thick. Other sulfide minerals are pyrite and pyrrhotite. The 300' wide zone of alteration and chalcopryrite mineralization strikes at 160° and dips vertically or steeply east. Within the zone numerous faults and joints as well as the veinlets parallel the above attitude. Another set of fractures, rarely mineralized, strikes at 110° and dips vertically. Extensions of the main zone are possible to the NW and SE.

The property, as field work progressed was found to have a dual potential; a small high grade operation and a bulk copper mining open-pit operation. Based on sampling data obtained in the diamond drill program both potentialities for the main adit zone were disproved. Though, a faint possibility still exists for a profitable small operation.

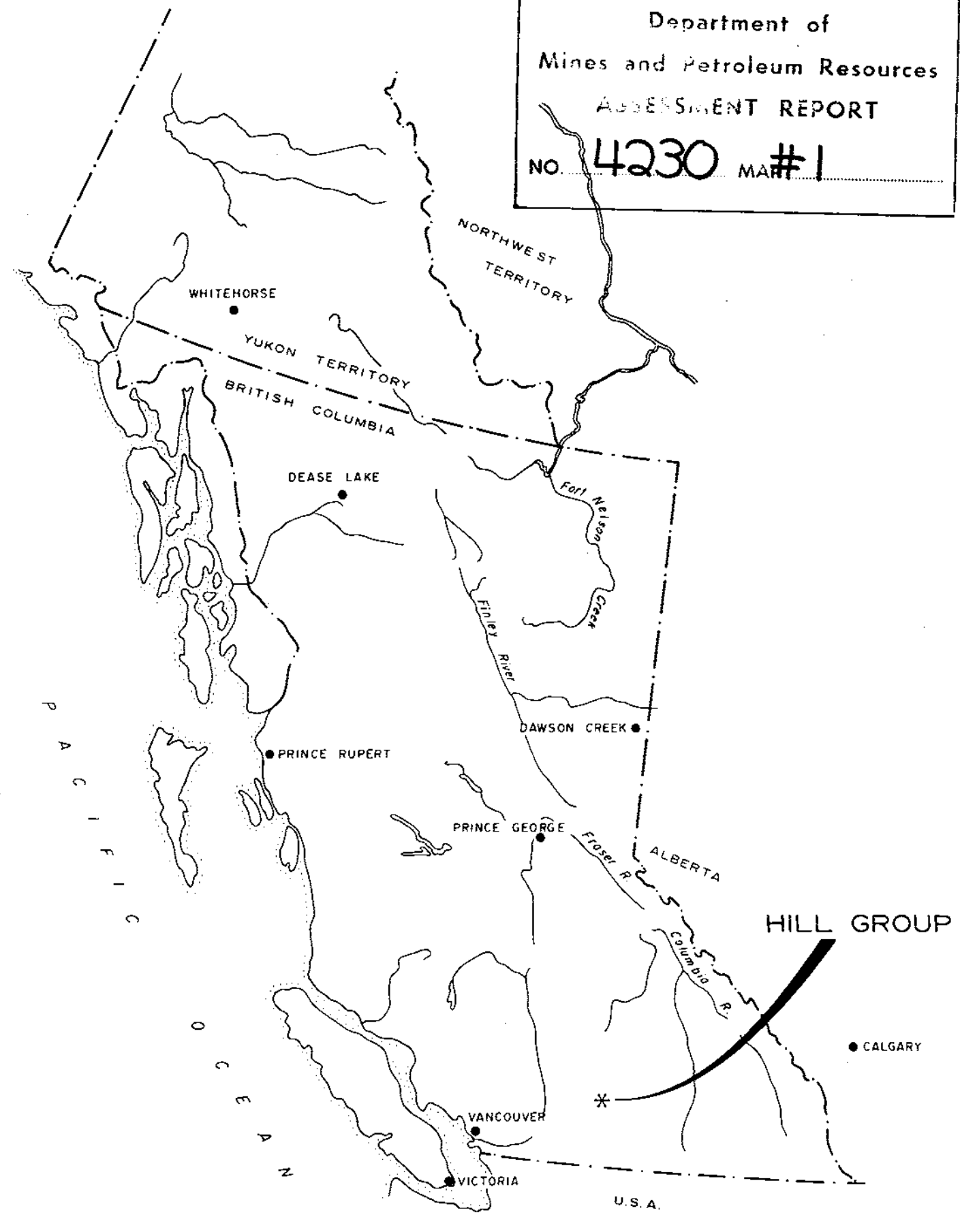
A total of 19.2 miles of picket and base lines were cut on the original block (Hill 1-20). 1367 soil samples were collected on these lines and on claim location lines. The soil samples were tested for copper trace element content by Crest Laboratories Ltd of Vancouver. Background was found to be from 0-50 ppm, from 50-100 ppm was slightly anomalous and above 100 ppm was found by frequency histogram preparation to be anomalous. The soil results outlined the altered zone with remarkable precision. A soil sample reconnaissance program on the new claims was started but of about 1200 possible sample sites, only about 250 were tested. This program should be finished next year.

An EM-16 VLF test on the detail picket lines over the adit mineralized zone, did not locate this type of disseminated mineralization. Signal problems were serious also. This instrument was therefore not used. A Crone CEM unit was used also in a test program. Results were negative. This unit was felt to be useless for defining this mineralized zone or locating similar ones under overburden.

The magnetometer survey and I.P. survey of 16.0 miles of picket line were carried out by P. E. Walcott and Associates Ltd. A report on their work submitted by this firm accompanies this report. The magnetometer was useful in outlining the shale-volcanics contact. The I.P. work reduced the main zone to 150' x 1500'. However four new zones over shales were located. Though the main I.P. zone was considered too small for a bulk mining target the other targets were large enough to keep the bulk mining concept alive.

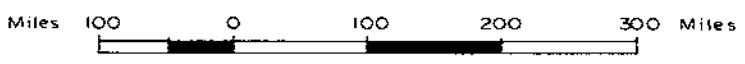
The drilling program, using BQ wireline equipment, consisted of 2,902.5 feet in 5 holes. The results of the programme disproved the existence of a zone of commercial grade copper for bulk mining and also all but eliminated the small tonnage potential of the Hill Group. The average grade of about 250' thickness of the main zone was 0.08% Cu. Gold and silver values were negligible. Despite the negative results of the program on the Hill 1-20 block it is recommended that a \$11,200 program of office research, soil sampling and geological mapping on the remaining claims of the group be carried out in 1973 field season.

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4230 MAP #1



LOCATION MAP

SCALE: 1" = 140 MILES APPROX.



MINERAL EXPLORATION REPORT - THE HILL GROUP, THE WART MOUNTAIN AREA, NICOLA MINING DIVISION, BRITISH COLUMBIA, JULY-NOVEMBER 1972.

M. D. Nierans

December, 1972

INTRODUCTION

This report describes the results of field work, carried out on the Hill property under the writer's direct supervision from July 26 to November 22, 1972. The original 20-claim property was acquired, by Nitracell Canada Ltd. of 549 Howe Street, Vancouver, B.C., in July 1972. Additional claims were staked by Nitracell during the field season as work progressed. The Hill 1-20 group was acquired by Nitracell after property examinations by W. G. Hainsworth, P. Eng., P. Kangas and the writer.

In the adit area of Hill 1-20, the most obvious possibility, stressed by W. G. Hainsworth in his report (1) of an exploration program would have been a small high grade copper operation. However, as field work progressed, it became clear that a second possibility was present and that would be for a low grade bulk copper mining producer. When this became apparent additional claims were staked, tied on to the original group. The dual potential of the property made the prospect attractive for immediate surface diamond drill testing. This testing was carried out in a 30-day period in October and November 1972.

The diamond drilling results, from five holes, eliminate the possibility of a bulk copper mining operation in the adit area and leaves only the faint possibility of a small, intermediate grade operation. This possibility, in the writer's opinion, would best be tested from an underground adit.

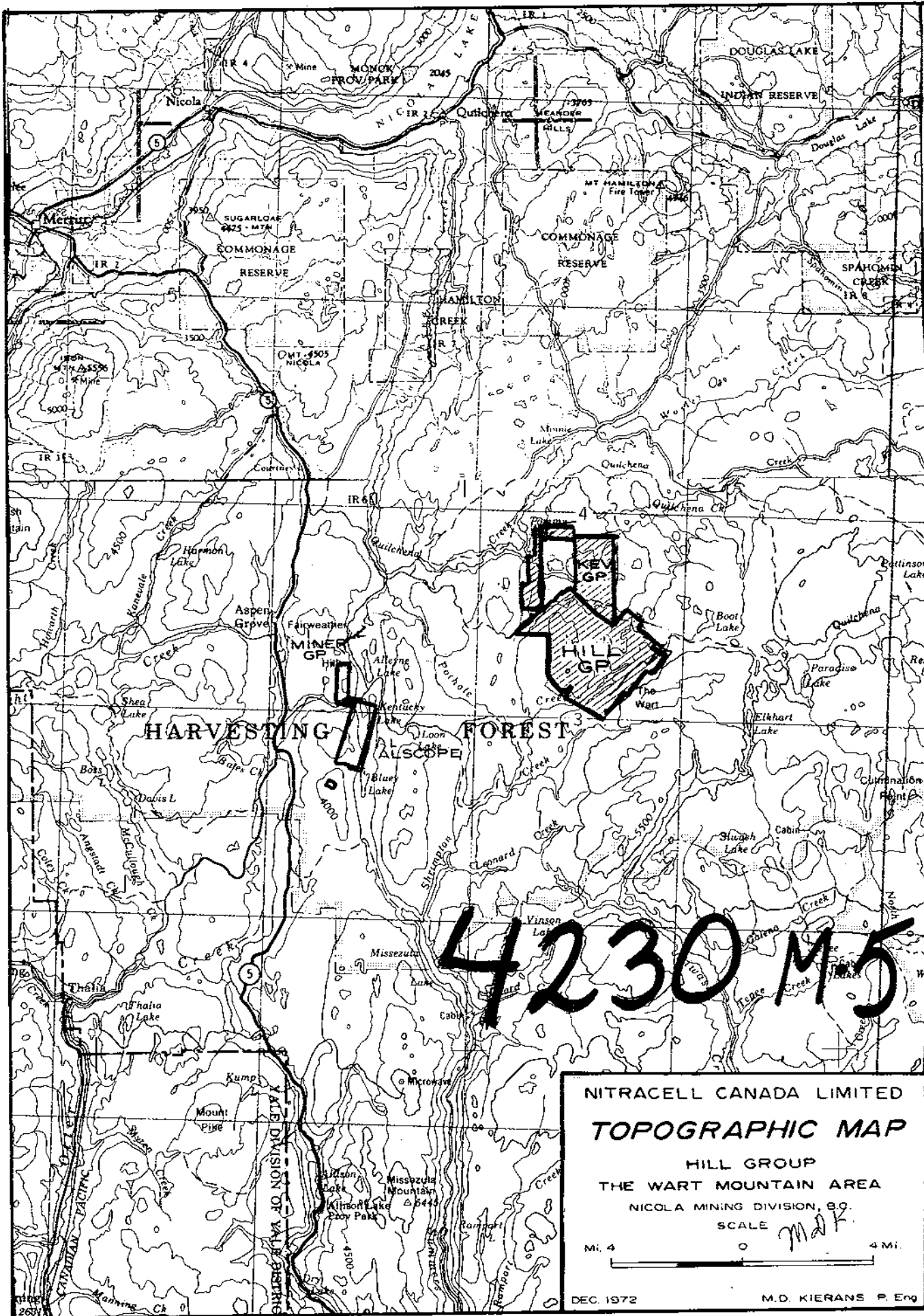
However, the large area of claims held now by Nitracell in an area of known copper mineralization, in a favourable geological environment, should not be written off. Relatively inexpensive soil sampling, prospecting and geological mapping on these claims might well disclose areas of significant copper mineralization, at present unknown.

During the field work four progress report memoranda were submitted by the writer, to Mr. V. M. Prescott, managing director of Nitracell Canada Ltd. These interim reports outlined the writer's conclusions, recommendations and cost estimates as field work results were acquired. This report replaces earlier conclusions and interpretations and presents, in detail, the final diamond drilling results as well as the field data on which earlier recommendations were based.

#### LOCATION AND ACCESS

The original claim block, HILL 1-20, is about 20 miles south-east of Merritt, B.C. two and a half miles south of Tommy Lake on the headwaters of Pothole Creek. Merritt (about 5,000 population) is approximately 130 miles northeast of Vancouver - about 230 miles by paved highway. The claims are all in the Nicola Mining Division. The Recording Office for the Division is in Merritt. Merritt can be reached by highway from Vancouver; by rail; or by air to Kamloops, then about 60 miles by highway from Kamloops to Merritt.

Access to the claims from Merritt is via Highway (No. 5) south towards Princeton a distance of 24 miles. From Kentucky Lake Road, which enters the highway about 4 miles south of Aspen Grove (about 20 miles south on the highway from Merritt) a dirt road passable, normally, for 2-wheel drive vehicles, leads north past Alleyne Lake then swings east to the property. The total dirt road distance to the adit camp on the Hill Group is about 15 miles. There is another dirt road (closed to traffic in August 1972) which enters No. 5 Highway just south of Courtenay Lake, about 15 miles south of Merritt. This road would provide easier and shorter access to the property if two dangerous, sloughed sections were repaired. In a straight line the adit zone is about 10 miles east of No. 5 Highway at Aspen Grove. The dirt roads are adequate for all preliminary exploration and development work. Road construction costs in this low, rolling plateau country would be minimal. A hydro-electric power line, parallel to Highway No. 5, is about 8 miles in a straight line from the property. Water supply for a small mill would be available from Bigney Lake (on the claims) and from Pothole Creek. These supplies could possibly be augmented by underground sources as an artesian flow was cut in our



FROM N.T.S. 92H. "HOPE, B.C."

*M.D. Kierans*

FIG. 5

Department of  
Mines and Petroleum Resources

ASSESSMENT REPORT

NO. 4230 MAP #5

4230 M.P. #5



diamond drill hole No. HNS 73-3. This flow was more than adequate for the subsequent drill holes. For operations of major tonnage water would be probably available from Penask Lake about 14 miles east of the property.

On the property itself and on the new claim blocks, staked by Nitracell, road access varies from good to poor. In the immediate area of the adit showing old logging roads provide good access to almost all parts of the Hill 1 - 20 block. However, south and east of the Hill 1 - 20 block road access is almost non-existent. A bulldozer could readily clear some of the older logging roads so that access to the claims in the vicinity of the Wart Mountain would be greatly improved - for 4-wheel drive vehicles.

For location and access see Figures 1, 2, 5 and 6 attached to this report.

#### TOPOGRAPHY AND CLIMATE

The topography in the area of the Hill claims is typical of the Interior Plateau dry belt. Relief in the area of the claims (except for the vicinity of the Wart Mountain (elevation 5702') seldom exceeds 500'. For most of the claims area the elevation is about 4,200'. The lowest elevation in stream valleys (with small flow) is about 3900'. The highest elevation, apart from the Wart Mountain, is about 4900'. In the area of the adits the unnamed creek valley is at about 4000'. The lowest adit is at about 4200' and the slope upward to the south from the adit rises rather steeply to about 4700'.

The physiography is mature upland. Coniferous trees mantle the rolling hills. There are a few aspen. Though the area has been logged over (about 20 years ago) the vegetation varies from dense second growth scrub pine to open grassland. The area of open land is limited to about 10% of the area. Soil cover is thin. Rock exposure averages about 5% of the area.

South of the Hill 1 - 20 group the bush is quite thick. In fact, on the north slope of the Wart (on Nitracell new claims) the tree cover is so dense that travel here is very arduous. There are a few small lakes and ponds on the claims.



Bigney Lake (on the south end of Hill 1-20 group is the largest - about 1000' long). Some ponds dry up almost completely after prolonged dry spells.

The climate is hot and dry, normally, during the months of May, June, July, August. During winter months snowfall is not excessive, rarely exceeding 5 feet. There can be considerable variation in precipitation in the area, from one year to the next.

In 1972 we had our first snow near the end of September but later warmer weather melted it. When the field program terminated on November 22nd there was no snow on the ground at the Hill 1 - 20 area. In general, year-round, open pit or underground activity would present little or no operational difficulties due to weather.

The discovery of the water flow in Hole HNS 7 2-3 will assist exploration work in the area as it would now provide a camp near the adit with potable water. We had to bring our water from Merritt during the field season. In general, the climate is pleasant and equable for the stock ranching, logging, tourism and mining operations that are the mainstays of the economic life of the region. Figures 5, 6 and 8 show topographic contours of the area.

#### ADJOINING PROPERTIES AND HISTORY

The mineralized "showings" in the area of the Hill Group are some of the few showings not described in Rice's Memoir on the Princeton area (2). These showings are either on the eastern edge of the Aspen Grove "Camp" or a new "Camp". I believe the showings of this area are not part of the Aspen Grove Camp at all but a separate area of copper outcrop, which has not as yet received the exploration attention warranted by the type, grade and intensity of copper mineralization found to date. The Hill Group showings should, however, be considered as part of the "Princeton-Merritt-Kemloups" copper belt.

Brenda Mine (Mo-Cu) lies about 20 miles to the east of the Hill Group. Craigmont Mine (Cu) is about 30 miles to the northwest and the Princeton area (Copper Mountain, Ingerbelle) is about 45 miles almost due south. Aside from

these producing mines in the general area there are no presently producing mines in the immediate area of the Hill property. Serious exploration work at Brenda started about 1964. Craigmont was found in the late 1950's and the Ingerbelle operation, under Newmont ownership and direction developed the mine presently active in 1968.

Bethlehem Copper owns a large claim block south and west of the Hill Group. The most active company in the general vicinity of the Hill claims has been International Mariners Resources Ltd. (formerly Consolidated Skeena Mines Ltd. ).

The adits on Hill 1 - 20 were driven, according to W. Petrie of Merritt, about the turn of the century by persons unknown. Later Consolidated Skeena Mines commenced exploration in this map area during the spring of 1961 on the original HN & WEN claim group (3). The HN & WEN claims covered the present adit mineralized area. Date of staking these claims is not known but it was prior to 1961.

Consolidated Skeena Mines continued their work in the Fall of 1961, acquiring the Mal & Chal Group southwest of Tommy Lake. Work was discontinued after the fall of 1962. Skeena recommenced work in the general area during the summer of 1966. Reconnaissance geochemical-geological investigations were carried out east and west of the Hill Group during 1966. After 1966 the Mal and Chal groups were expanded. Airborne and ground geophysical surveys were carried out by Skeena around this time. Work was continued in 1967 and 1968. So far as is known Skeena discontinued interest in the general area about 1969. On April 3, 1971 W. Petrie of Merritt staked the Hill 1-20 group over the HN & WEN claims which had expired. Bulldozer trenching was carried out by Petrie in March 1972. On November 22, 1971 W.G. Hainsworth visited the property. He, later, submitted a report dated July 28, 1972 to Nitracell. Kangas examined the property for Nitracell in June 1972. The writer first saw the property on July 23, 1972.

## CLAIMS OWNERSHIP AND PROPERTY

All 248 claims of the Hill-Key group are held in the name of Nitracell Canada Ltd., 10th Floor, 549 Howe Street, Vancouver 1, B.C. In addition the Ti Group of 10 claims which overlap some of the Hill claims south of the adit zone were acquired by Nitracell from John White, of Merritt, by Bill of Sale. The total number of claims in the group is 258. Most, but not all, claims are contiguous.

Hill 1-20 Claims were purchased outright from V. Pudger of Kamloops, B.C.

Hill 21-32, Hill 47-54, Hill 65-72 and Hill 115-126 were transferred from M. Kierans to Nitracell in December 1972. They were staked in August 1972 for Nitracell using Nitracell personnel and funds.

Hill 33-42, 55-60, 73-114, 201-229 were staked by Darma Exploration in August 1972 for Nitracell Canada Ltd. Hill 250-264 were staked by Darma Exploration for Nitracell Canada Ltd. in September 1972. Key 1-78, Key 81-84 and Key 89-92 were staked by Darma Exploration in October 1972 for Nitracell. For claim maps see Figures 7 and 8. It should be noted that the Hill Group 1-20 is misplotted on the B.C. Mining Recorder's official map. Figure 8 shows the Hill 1-20 group in correct relation to the topography of the area.

Table I (attached) gives the pertinent data on the Hill claims, i.e. staker, staking date, recording date, expiry date, work credits, etc.

It should be noted that there is some unavoidable overstaking of nearby claim groups held by others and possible overstaking of the Ti-1-10 group, now held by Nitracell. The area of the Hill claim group is about 9,000 acres.

There is a 12' x 20' tar paper shack, core rack and 8' x 10' tent frame, suitable for accommodations for a small field crew, located within a hundred feet or so of the lower No. 1 adit. In good dry weather this shack camp can readily be reached by 2-wheel drive vehicle. In wet weather a 4-wheel drive vehicle is recommended. A good location for a tent camp would be near the small unnamed pond near the intersection of the road to Paradise Lake and the road to the adit camp.

TABLE I  
Claim Data For Hill Group

<u>Claim or Group Name Record Numbers</u>	<u>Date Staked</u>	<u>Staker</u>	<u>Date Recorded</u>	<u>Transferred</u>	<u>Work Credits</u>	<u>Expiry Date</u>
HILL 1 - 20 contiguous (48813-32 incl.)	April 3, 1972	W. Petrie	April 2/71	V. Paulger to Nitracell Canada Ltd.	In good standing until April 9/73	April 9/73
HILL 21-32 (56780-56781 incl.)	July 29, 1972	K. Kierans	Aug. 14/72	M. Kierans to Nitracell Canada Ltd.	-	Aug. 14/73
HILL 47-54 (56792-56798 incl.)	Aug. 2, 1972	K. Kierans	Aug. 15/72	M. Kierans to Nitracell Canada Ltd.	-	Aug. 15/73
HILL 65-72 (56800-56807 incl.)	Aug. 1, 1972	K. Kierans	Aug. 15/72	M. Kierans to Nitracell Canada Ltd.	-	Aug. 15/73
HILL 115 - 126 (56852 - 56863 incl.)	Aug. 10, 1972	K. Kierans	Aug. 24/72	M. Kierans to Nitracell Canada Ltd.	-	Aug. 24/73
HILL 33-42 (56864-56873 incl.)	Aug. 12, 1972	J. Howden	Aug. 25/72	Agent for Nitracell Canada Ltd.	-	Aug. 25/73
HILL 55-60 (56874-56879 incl.)	Aug. 12, 1972	J. Howden	Aug. 25/72	Agent for Nitracell Canada Ltd.	-	Aug. 25/73

PC

TABLE 1 (continued)

<u>Claim or Group Name Record Numbers</u>	<u>Date Staked</u>	<u>Staker</u>	<u>Date Recorded</u>	<u>Transferred</u>	<u>Work Credits</u>	<u>Expiry Date</u>
HILL 73-114 (56880-56921 incl.)	Aug. 11, 1972	J. Howden	Aug. 25/72	Agent for Nitracell Canada Ltd.	-	Aug. 25/73
HILL 201-229 (56922-56950 incl.)	Aug. 19, 1972	W. Tisdale	Aug. 25/72	Agent for Nitracell Canada Ltd.	-	Aug. 25/73
HILL 250-264 (57322-57336 incl.)	Sept. 29, 1972	B. Brown	Oct. 11/72	Agent for Nitracell Canada Ltd.	-	Oct. 11/73
KEV 1 - 78 (57337-57414 incl.)	Oct. 6 & 7, 1972	B. Brown & J. Howden	Oct. 11/72	Agent for Nitracell Canada Ltd.	-	Oct. 11/73
KEV 81-84 (57415-57418)	Oct. 6, 1972	J. Howden	Oct. 11/72	Agent for Nitracell Canada Ltd.	-	Oct. 11/73
KEV 89-92 (57419-57422)	Oct. 6/72	J. Howden	Oct. 11/72	Agent for Nitracell Canada Ltd.	-	Oct. 11/73
Ti 1-10 incl. (56039-56048)	July 4, 1972	J. White	July 5/72	B/S from J. White to Nitracell Canada Ltd. recorded Oct. 16/72 MR# 76037E	-	July 5/73

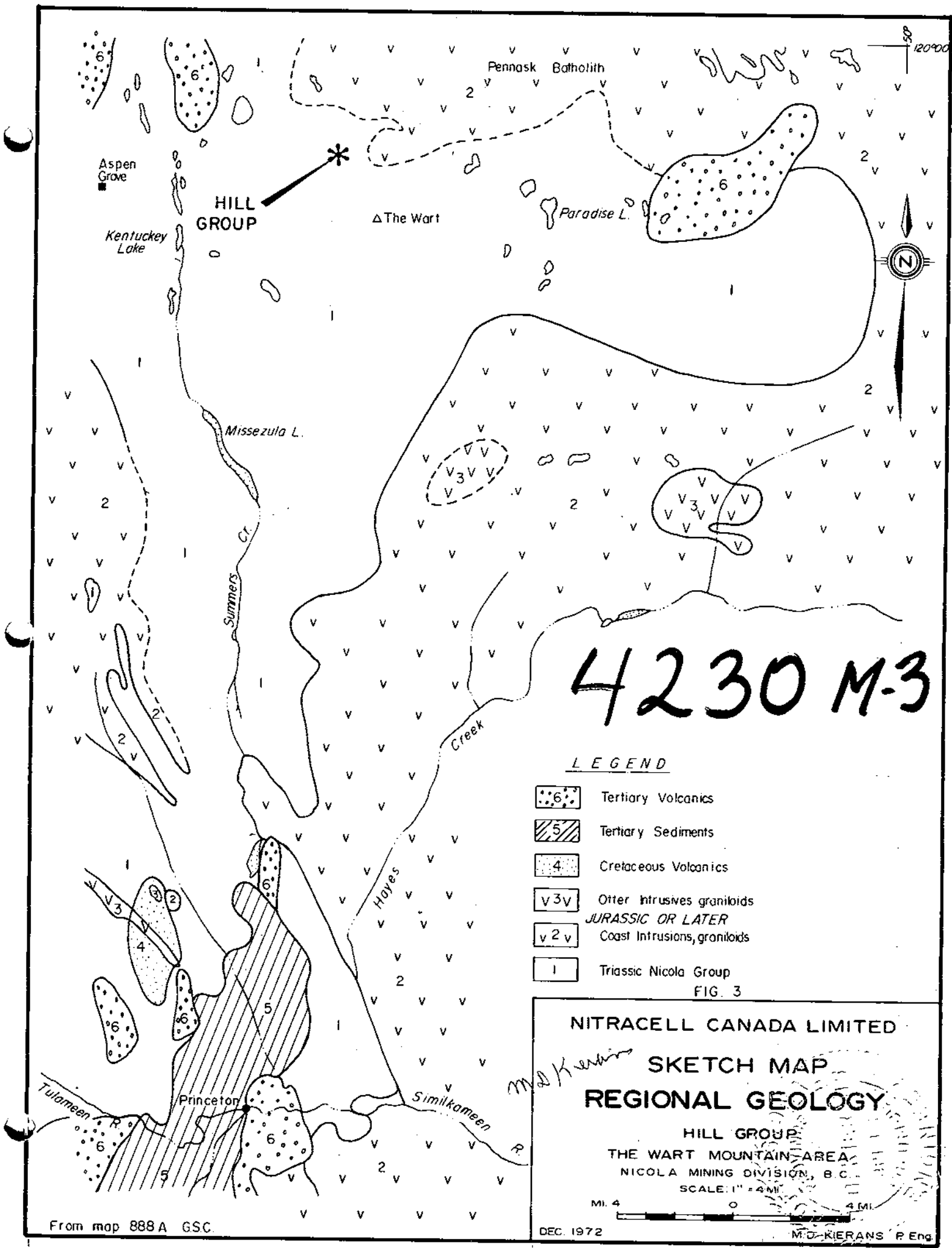
## REGIONAL GEOLOGY

Almost all of the writer's time during the field season was taken up directly with detailed field mapping and the administration of the exploration program which started at the end of July. Very little time was available for geological reconnaissance or for study of the regional geological setting. What follows is based on the G.S.C. map of the region and from notes in W.M. Sharp's report of July 25, 1968 for Consolidated Skeena(3).

All the rocks seen by the writer on claims Hill 1 - 20 belong to the Nicola Group of Upper Triassic age (Map 888A G.S.C.). The Nicola group consists of vari-coloured lavas, argillite, shale, tuff, limestone, chlorite and sericite schist. The Nicola series are widespread. They outcrop from well south of Copper Mountain to Craigmont. The Nicola rocks are hosts to the Craigmont, Ingerbelle & Copper Mountain ore bodies, and to the Hedley gold-arsenopyrite ores.

The Hill group is situated in the north-east part of the Princeton geological sheet. It lies to the east of the well known and well defined N-S copper belt running north from Missezula Lake. This copper belt is spatially related to very strong North-South tectonic fault lineaments along Kentucky & Alleyne Lakes. The Hill Group is situated near the western side of a very prominent embayment of Nicola rocks into batholithic bodies of Coast Intrusive type, of Jurassic age - The Penask and Princeton batholiths.

The new claims staked by Nitracell, lie, in general, over the east-west trending contact zone of the Penask granodiorite mass and the adjacent Nicola volcanic group. Altitudes are remarkably scarce within the Nicola shales and volcanics here but there is reason (from drilling results) for assuming an approximately  $130^{\circ}$  strike and a  $40^{\circ}$  dip to the south west for the Nicola rocks near the Hill group. Sharp reports (3) that "locally, Nicola formations are strongly warped and sheared along trends which are notably divergent to the generally northerly trend of these rocks. The resultant transverse structural panels occur marginally to, and within interior areas of the embayment, and appear to furnish a major structural control for the district Cu-Mu mineralization" (3). See Figures No. 3 and 4 for the regional geological setting of the Hill Group.



50° 120°00'

Aspen Grove

HILL GROUP

△The Wart

Pennask Batholith

Paradise L.

Kentucky Lake

Missezula L.

Summers Cr.

Creek

Hayes Cr.

Similkameen R.

Tulameen R.

Princeton

4230 M-3

LEGEND

- Tertiary Volcanics
- Tertiary Sediments
- Cretaceous Volcanics
- Other Intrusives granitoids  
JURASSIC OR LATER
- Coast Intrusives, granitoids
- Triassic Nicola Group

FIG. 3

NITRACELL CANADA LIMITED

SKETCH MAP  
REGIONAL GEOLOGY

HILL GROUP  
THE WART MOUNTAIN AREA  
NICOLA MINING DIVISION, B.C.

SCALE: 1" = 4 MI.  
0 4 MI

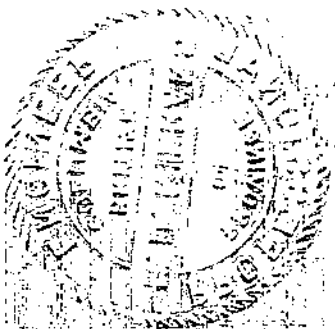
From map 888 A GSC.

DEC. 1972

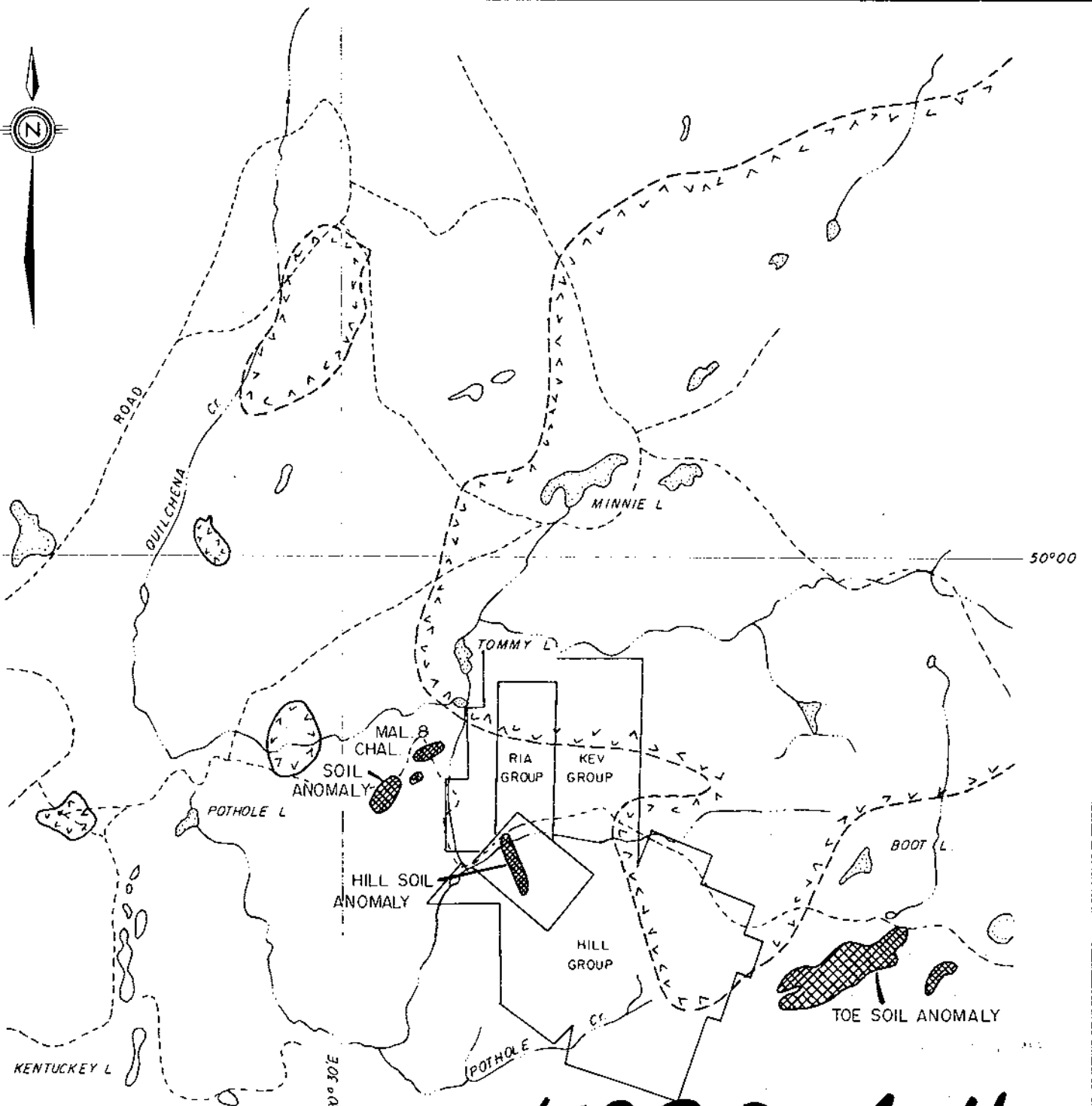
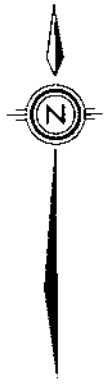
M. J. KIERANS P. Eng.

EM 0824

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4230 MAP #3







4230 M-4

LEGEND





-  Pennask Intrusives
-  Nicola Group
-  Geochemical Anomalies
-  Approx. Hill Group Claim Boundaries

FIG. 4

NITRACELL CANADA LIMITED

SKETCH MAP

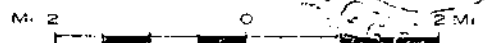
*Mal K New*

GENERAL GEOLOGY

HILL GROUP  
THE WART MOUNTAIN AREA

NICOLA MINING DIVISION, B.C.

SCALE 1" = 2 MI



Department of  
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NO. 4230 MAP #4 24



PHOTOGEOLOGY AND TOPOGRAPHIC LINEAMENTS

Figure No. 10 shows in a general way major photogeological interpretations and an interpretation of the topographic lineaments of the region of the Hill claims at 1" = 1000'. It is unfortunate that time did not permit a thorough geological reconnaissance of the area shown on Figure No. 10. This field work should be part of a continuing program on the Hill Group.

The N-S photo linears in the eastern part of the claims area are remarkably numerous, strong and prominent - as well as quite consistent. These linears are probably topographic responses to major late E-W regional compressive forces.

The direction of the fractures, which are related to, or control the sulphide mineralization on Hill 1-20, are approximately parallel to the direction of the photolinears further east. However, the trend of the main mineralized zone on Hill 1-20 is not at all evident on the air photos nor is it clearly evident in the topographic lineament network.

There is a major N-S topographic lineament, about 5 miles east of the adit mineralized area, on Elkhart Lake. This element, though, is much weaker in topographic expression than the Kentucky Lake N-S faults which are about 5 miles to the west of the area of present interest. There are 2 other prominent directions in the topographic lineament structure. These are NE and NW. The adit mineralized zone is near the intersection of 2 of these elements. The N-S ridge on which the adit mineralization occurs would be the third element of an intersectional focus. The Skeena Cu-Mo soil anomaly about 4 miles to the east of the Hill group trends sub-parallel to the N.E. topographic lineament direction. The Mal and Chal mineralized area does not appear to occur near any significant intersectional foci in the fracture pattern of the region.

Obviously, a great deal more work and research into assessment files and study of the regional geology and tectonics of the area are needed before useful conclusions, to guide the exploration efforts in the Hill "Camp", can be developed. This work is best done during the winter months.

## GEOLOGY OF THE CLAIMS

Figure No. 16 shows the geology of the northern half of the Hill 1-20 group at 1" = 100'. The geological mapping of the claims was confined to the 7 miles (approx.) of picket lines cut during the month of August 1972. The (approximately) 10 miles of picket lines cut in September and October were not geologically mapped. This was due in part to snow and in part to pressure of administrative and other work. The soil sample results and the magnetometer survey of these lines (as well as the I. P. results) indicate that there is little likelihood of anything of economic interest, on these later lines. However, for completion of the geological picture of the claims area this should be done next field season.

The location of the D. D. H. 's as well as the major I. P. targets are shown in Figure 16. Figure No. 11 at 1"=1000' shows an interpretation of the Penask batholith-Nicola series contact. This is based mainly on mapping by Consolidated Skeena. The contact is E-W but there is a distinct "bulge" southward between the Mal & Chat mineralized areas and the major Toe geochemical anomaly. The contact was not seen on the Hill 1 - 20 group nor is the "bulge" itself accurately delimited. However, there is little doubt, that the new claims staked in August and September this year cover this structurally interesting zone. The relationship of the "bulge" to the adit zone mineralization is at present, uncertain. Until additional field mapping is carried out no firm conclusions can be reached on this point. Aside from the apparent relationship of the "bulge" to copper mineralization there does appear to be a broad correlation between the 3 areas of known mineralization and the Penask batholith-Nicola contact. Copper (based on three known occurrences) is found within one mile of the contact in the Nicola series.

Nicola rocks underlying the central and eastern part of the claims are mainly andesitic (locally, basaltic) flows and fragmentals. In places the volcanics are coarsely fragmental - approaching an agglomerate. In the surface mapping (but less obviously in the core logging) a rock with apparently dioritic composition is found in erratically distributed "lenses". These lenses may be up to 30' thick and apparently some hundreds of feet long. In part, in surface mapping, the outcrops of these "intrusive" sills or dikes are diabasic in texture. On the western side of the claims is exposed a thin to thick bedded, massive, slightly pyritized, dark grey to black shale. In part this shale is limy. It weathers brown (because of the minute

pyrite content). In part, drilling has indicated that this shale is graphitic.

The attitude of the shale rocks is not known from outcrop. However, as mentioned above, from the core angle information in the core drilled in Hole HNS 72-1, it appears that the strike of the shale-andesite contact is about  $130^{\circ}$  strike with  $40^{\circ}$  dip to the southwest - possibly the bedding is parallel to the above attitude. The shale was brecciated and faulted at the contact as seen in the core.

The Mal and Chal group is within one mile of the western boundary of the Hill 250 - 264 sub-group. On these groups, according to Sharp (3) "a significant body of magnetite-chalcopyrite mineralization in skarn rock was delineated by trenching and drilling performed during 1962. The major Toe geochemical Cu anomaly with a gross strike length of 11,500' and average width of 3000 feet has been delineated but not completely evaluated by profiling or other geochemical methods". The east margin of Nitracell Hill claim block is within one mile of this geochemical anomaly.

#### STRUCTURAL GEOLOGY AND SULFIDE MINERALIZATION

The copper mineralization of the Hill adit main zone is confined to a zone approximately 300' wide and 2,500' long. This main zone strikes approximately  $160^{\circ}$  and dips vertically or very steeply east. The zone is very near (within 20') of the andesite-shale contact on surface. However, apparently the copper mineralization and the contact of shale with the andesite diverge with depth. If, as deduced from HNS 72-3, the contact dips southwest at  $40^{\circ}$  and the mineralized zone dips at  $90^{\circ}$  then the two structural elements will diverge rapidly with depth. Though no deep drill holes were put down on the main mineralized adit zones, the mineralization to the depth drilled (about 500' below surface) retained about the same character and tenor of chalcopyrite-pyrite mineralization as noted in the upper part of the DDH's. Therefore it is deduced that the andesite-shale contact is not an ore control.

The mineralization of the main adit zone is exposed in three adits and about 8 trenches (2 additional trenches did not reach bedrock). The upper or #3 adit is caved at the portal and not accessible. The lowest (#1) and the middle (#2) adits are open. See Figure 16 for location of the trenches and the adits. The adits and trenches are located at successively higher points up the side hill along the south westerly extension of the main zone. Figure 19 is a longitudinal section showing the adits. Elevations are determined by barometric altimeter and by contours from the

NTS 1:50,000 topographic map enlarged to 1" = 1000'.

Within the 300 foot wide mineralized zone occur veinlets and veins of carbonate and quartz, with widths up to 1'. Usually these carbonate veinlets are 3" thick. Within the quartz-carbonate gangue occur chalcopyrite, pyrite, pyrrhotite and rarely specular hematite. Near surface and underground, oxidation after the veins were exposed to the atmosphere has developed, in places, rather spectacular malachite and (rarely) azurite. The copper mineralization has so far been found only in andesitic and "dioritic" volcanic flows, tuffs and breccias.

The outcrop of good chalcopyrite - malachite which is seen in the #1 tunnel shows progressively weaker malachite staining upward from the tunnel. The outcrop immediately above the very conspicuous copper stain (malachite) near the #1 adit portal is heavily FeO stained (limonite). At numerous places in the trenches heavily oxidized sections of FeO were seen with no copper stain. By analogy with the mineralized exposures near the adit the writer deduced that the FeO stained zones in the adit could contain chalcopyrite mineralization at depth. This theory did not hold up to diamond drill testing. The heavy FeO stained zones as seen within the trenches were originally most likely, barren pyritic zones.

Mapping of the adits at 1" = 20' and the trenches and the surface at 1" = 100' showed clearly that the copper mineralization is structurally related to faults and fractures, some filled with quartz or carbonate and some not filled at all, striking 160° and dipping 35° to the east. There may well be throughgoing faults at 160° - and the diamond drilling seems to indicate this - but most of the fractures are not extensive (approximately 10' - 20' long). Width of the pyrite-chalcopyrite mineralized fractures varies from a fraction of an inch to 12 inches. The striking parallelism of these fractures was a feature of this property.

A prominent set of fractures (rarely pregnant with sulfides) strikes about 110° and dips vertically. Occasionally this direction of fracturing is weakly mineralized. There is some evidence in the adit that a post-ore fault along the above strike direction displaced the #1 adit mineralized zone in a right-hand direction. The 160° fracture direction is far more noticeable in the surface and underground mapping than any other direction.

Figures 25 and 24 show the fracture directions in relation to malachite and chalcopyrite mineralization in the two adits.

Alteration in the mineralized zone is quite apparent. Epidotization, silicification, carbonatization, moderate chloritization were seen within the 300' mineralized zone. Outside the mineralized zone the rock is mainly an unaltered volcanic breccia tuff.

In addition to the alteration noted above, within the sections of core and surface and underground exposures, there is pyritization and hairline to 1/4" carbonate stringer formation, called "crackling" in the logs.

From a consideration of the detailed surface mapping results shown in Figure 16 it was quite evident that copper mineralization could occur either as random "high" grade (1-3%) shoots suitable for underground development; or, if one included these "high" grade "shoots" with lower grade veinlets between the shoots a large mass of bulk mining grade was possibly available in a favourable "stripping" ratio topographic form. The higher grade shoots from the field data, prior to diamond drilling, appeared to occur on the margins to the mineralized zone.

The mineralized zone is, at least, 2500' long as seen on the geochemical and geological map, and at least 300' wide. This size of a mineralized mass (with copper grade in the vicinity of 0.8% Cu) could have been economically viable. Unfortunately, the diamond drilling showed the grade across the 300' zone to be much lower than 0.8% Cu.

Extensions of the main zone are possible to the north-west and south-east. Our field geochemical work was discouraging for hoped-for parallel or en echelon zones. On the Ti claims John White, the staker, reported a modest copper showing. This showing was not evaluated by the writer. To search for the extensions of the main zone additional field work; soil sampling, prospecting and geological mapping should be done next field season on the Hill 250-264 block and Hill claims to the south west of the Hill 1-20 boundary. Of course, the Ti claims should be investigated and evaluated.

ECONOMIC ANALYSIS OF A SMALL OPERATION

The short discussion below is hypothetical but it is hoped will set limiting parameters to a consideration of this economic possibility for the property.

From diamond drilling results and surface and underground mapping it would appear that, in the mineralized zone, ten ore shoots of 100' x 100' x 10' (or equivalent) could exist. Using 10 as tonnage factor would give 10,000 tons per shoot. Grade of 2% equivalent copper could be reasonably expected. A model of vertical and horizontal frequency of such shoots above a low level adit would give about 10 such shoots or a total reserve of 100,000 tons. Results may be better or worse than this, if an actual development and exploration program were carried out.

An adit 1500' long, driven from the stream valley near the base line would give an average of 500' of backs above the adit. The minimum expenditure to test the frequency of ore shoots, as in the above model will be about \$100,000 for the adit cost. About 30,000' of EX (or equivalent) underground diamond drilling will be required to test the above model. Cost of such drilling and processing should be about \$4.00 per foot. Drilling should be on cross sections 100' apart, and about 2000' would be drilled on each section (above adit drilling only).

Allowing for ground acquisition and pre-development/exploration expenditure, the cost of testing the model would be:

\$50,000 Pre-development/exploration  
\$100,000 Adit  
\$120,000 Underground D. Drilling  
\$270,000 - allowing for contingencies, say \$300,000.

The minimum expenditure for testing the idea of a small mining operation would be \$300,000 or \$3.00 per ton at hoped for grade of 2% equivalent copper.

It is 37 miles approximately, from the Hill adit camp to Craigmont mill (using the Courtenay Lake road). Twenty-three miles of this distance is on the highway. Some cheap improvement of the dirt road could allow 4 return trips per day with two 30-ton trucks. Allowing a cost of \$3.00 per ton for ore transportation would mean a capital and operating fund of \$300,000 would be available for capital and operation of a 2-truck fleet. This amount should be enough for purchase of two \$60,000 trucks -



and to operate them for 3 years. The production rate of the operation would be about 120 tpd.

The cost breakdown per ton is very roughly estimated as follows:

Exploration-development (adit & adit drilling)	\$3.00 per ton
Additional pre production development (raises & ventilation etc.)	\$1.00 per ton
Direct Mining Costs	\$6.00 per ton
Admin, & Taxes head office	\$2.00 per ton
Custom milling	\$3.00 per ton
Transportation	\$3.00 per ton
	\$18.00

If ore at copper equivalent grade (i.e. plus gold-silver content) of 2% is found and a 0.30¢ per pound price is assumed for copper, then the gross value of the ore is \$20.00. Allowing for 90% recovery rate then the net value of the ore is \$18.00. This exactly balances the cost of finding and getting the ore to the mill. Even if the costs were \$15.00 per ton then the expected total profit would be only \$300,000. It goes without saying that a mill at the mine would be out of the question, for capital cost reasons with the above model.

Using the rough rule of thumb of profit to risk ratio of 10:1 as making a good exploration venture, then the above analysis shows an exploration discovery of 300,000 tons of copper ore at copper equivalent grade of 3% would be the minimum results to satisfy the profit:risk rule above. At this point geological and exploration experience and judgment must be used, on a partially subjective basis. It is the writer's opinion that sampling, and drilling data obtained to date makes the above exploration result quite unlikely. Therefore, the conclusion is that the Hill group as a small shipping mine, has little or no chance of a profitable economic result.

To carry out a surface diamond drilling program on 100' spaced cross-sections at \$10.00 per foot (drilling, processing and other costs) and at 1000' per section would cost \$150,000. Predevelopment cost, surface drilling cost and underground adit would then total about \$330,000 or about the same as the underground program. However, there are 2 important disadvantages to this surface drilling. First geological information from underground openings would provide much more useful data on which to assess future development than from surface diamond drilling. Secondly, twice as much exploratory drilling will be possible using the same capital outlay.

Finally, the profit:risk ratio for the bulk copper mining aspect of the Hill property was so high that precise calculation was unnecessary. For example if 50,000,000 tons of copper ore were found and profit per ton were only \$1.00 then we would be in the neighborhood of \$50,000,000 profit. Cost of a surface Diamond Drill program and geophysical and geochemical program was estimated by the writer at \$38,000 - put the figure at \$50,000 for all costs. This would give a profit:risk ratio of 1000:1.

When it is realized that the bulk mining test would also give very valuable information on the small mining operation aspect of the Hill venture then it will be readily seen that the risk expenditure incurred to date was valid and reasonable for a property of this type.

#### ROCK SAMPLING

Hainsworth (1) reports taking a chip sample 3' long from the back of adit #1 20' from the portal, across a highly oxidized zone. The Assay:

Cu; 2.58%      Au. Tr;      Ag: 0.15 oz./T.

"At another point in the same adit 30' from the face a 2' sample .... was chipped from the back across weakly mineralized shear rock"(1). The assay:

Cu; 2.62%      Au: 0.02 oz./T      Ag: 0.96 oz/T

Hainsworth reported a grab sample from the dump of #3 adit as follows:

Cu; 4.84      Au: 0.02 oz./T      Ag: 1.36 oz./T.

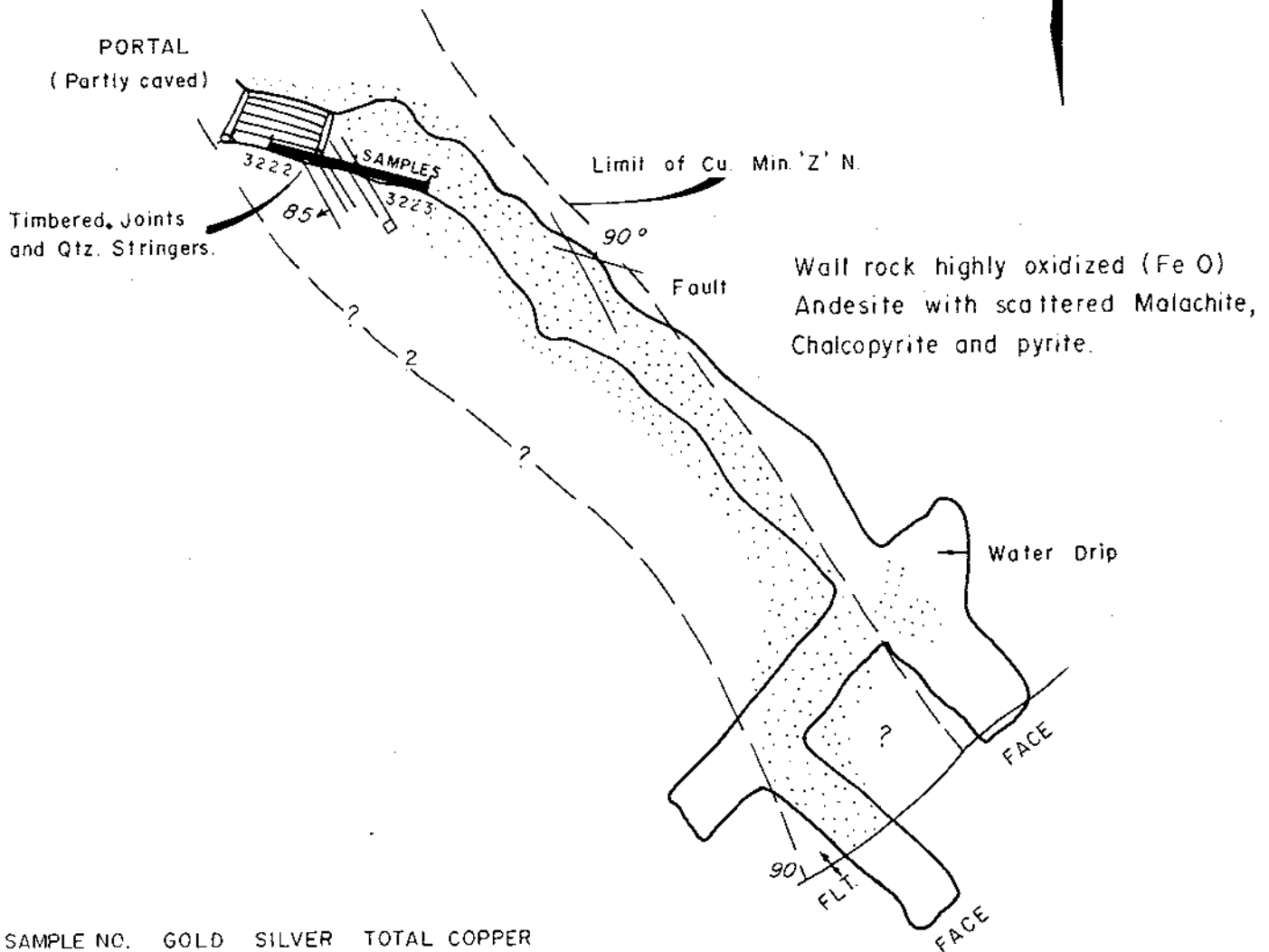
The writer cut 3 chip samples from the wall of the trench near Line 6E. Figure 25 shows these sample locations at scale 1"-20'. Part of this mineralized zone could not be sampled due to overburden.

Assays of the three samples are as follows:

3216	Cu: 0.61%	Au. 0.03 oz./T	Ag. 0.1 oz./T
3217	Cu: 0.88%	Au. 0.02 oz./T	Ag. 0.6 oz./T
3220	Cu: 4.39%	Au. 0.02 oz./T	Ag. 2.7 oz./T

The average of the assays of the three samples (each 5' long) is 1.72% Cu., 0.2 oz./T Au., and 1.1 oz./T. Ag. This average of three samples, because of oxidation, poor exposure, etc. cannot be considered as representative. The near surface true grade in unoxidized, sulfide material would, in my opinion, be definitely

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Wall rock highly oxidized (Fe O)  
Andesite with scattered Malachite,  
Chalcopyrite and pyrite.

SAMPLE NO.	GOLD oz/T	SILVER oz/T	TOTAL COPPER %
3222	0.03	0.5	4.44
3223	0.02	0.1	7.66

L E G E N D

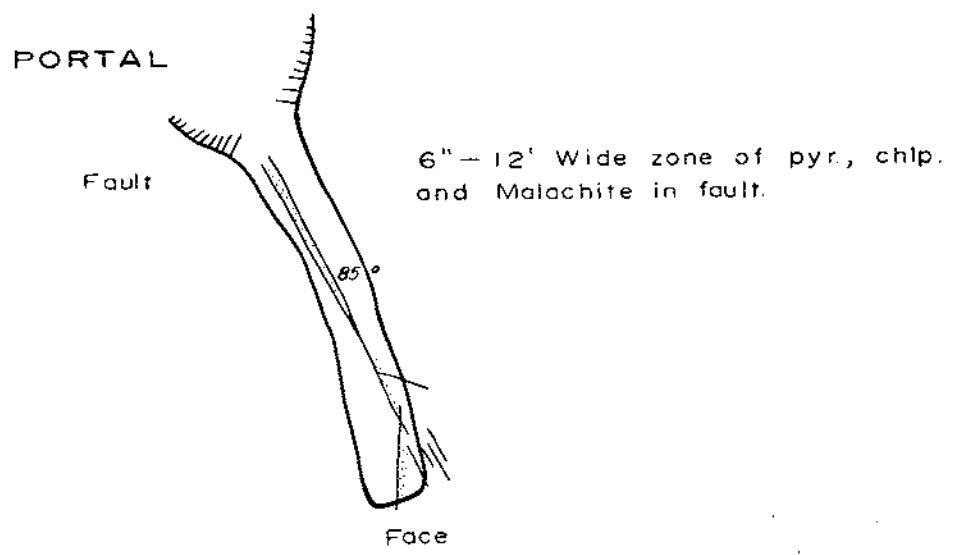
Chlp. and Mal. Min. 'Z' N

FIG. No. 23

NITRACELL CANADA LTD.  
**GEOLOGICAL PLAN**  
*mdk* LOWER No. 1 ADIT *mdk*  
HILL GROUP I-20  
WART MOUNTAIN AREA  
NICOLA MINING DIVISION  
SCALE 1" = 20'  
January 1973 M.D. Kierans P. Eng



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ASSESSMENT REPORT  
NO. 4230 MAP #24



WALL ROCK IS MASSIVE FINE GRAINED  
BLACK LAMPROPHYRE DIKE OR HORNFELS.

LEGEND


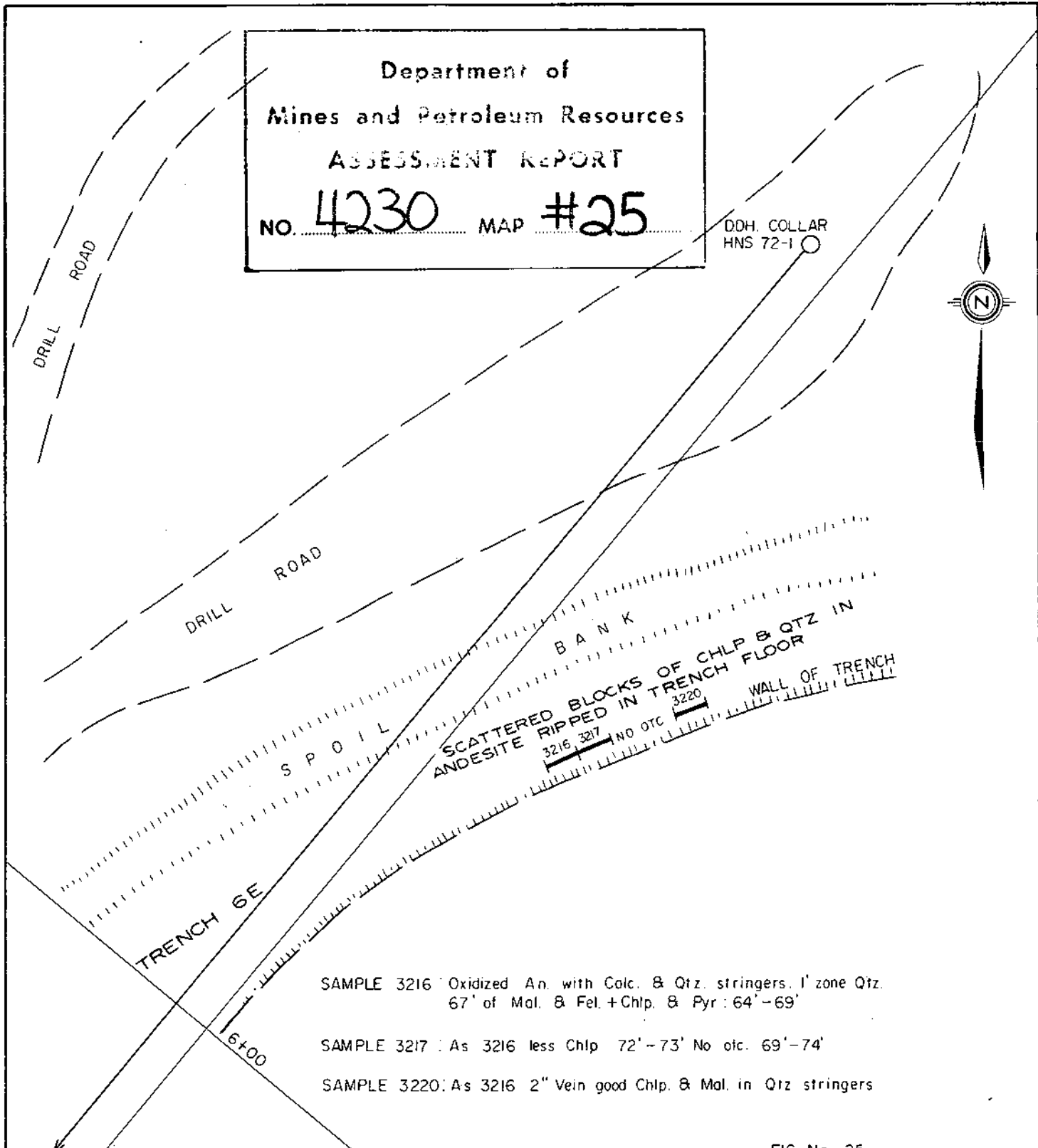
 Chip. & Mal. Min 'Z'N.

FIG No. 24

NITRACELL CANADA LTD.  
GEOLOGICAL PLAN  
MIDDLE No. 2 ADIT  
HILL GROUP 1-20  
WART MOUNTAIN AREA  
NICOLA MINING DIVISION  
SCALE 1" = 20'  
January 1973 M.C. Kierans P. Eng

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 NO. **4230** MAP **#25**

DDH. COLLAR  
HNS 72-1



SAMPLE 3216 Oxidized An. with Calc. & Qtz. stringers. 1' zone Qtz.  
 67' of Mal. & Fel. + Chlp. & Pyr: 64'-69'  
 SAMPLE 3217: As 3216 less Chlp 72'-73' No otc. 69'-74'  
 SAMPLE 3220: As 3216 2" Vein good Chlp. & Mal. in Qtz stringers

SAMPLE No.	GOLD oz/T.	SILVER oz/T	COPPER %
3216	0.03	0.1	0.61
3217	0.02	0.6	0.89
3220	0.02	2.7	4.39

FIG No. 25

NITRACELL CANADA LTD.  
**SKETCH MAP**  
*M. D. Kierans* 6E TRENCH  
 HILL GROUP 1-20  
 WART MOUNTAIN AREA  
 NICOLA MINING DIVISION  
 SCALE: 1" = 20'  
 January 1973 M. D. Kierans, P. Eng.

less than 1.72% Cu. The width of vein material represented by these samples is 15' across the veins.

Two 10-foot samples were chipped in the lowest adit (#1) from heavily oxidized copper stained material. The average of the assays below is 6.05% Cu., 0.2 oz. Au and 0.3 oz. /T Ag. Again this is not representative of grade because of oxidation of the chalcopyrite. The width of vein represented here is 15' across the veins.

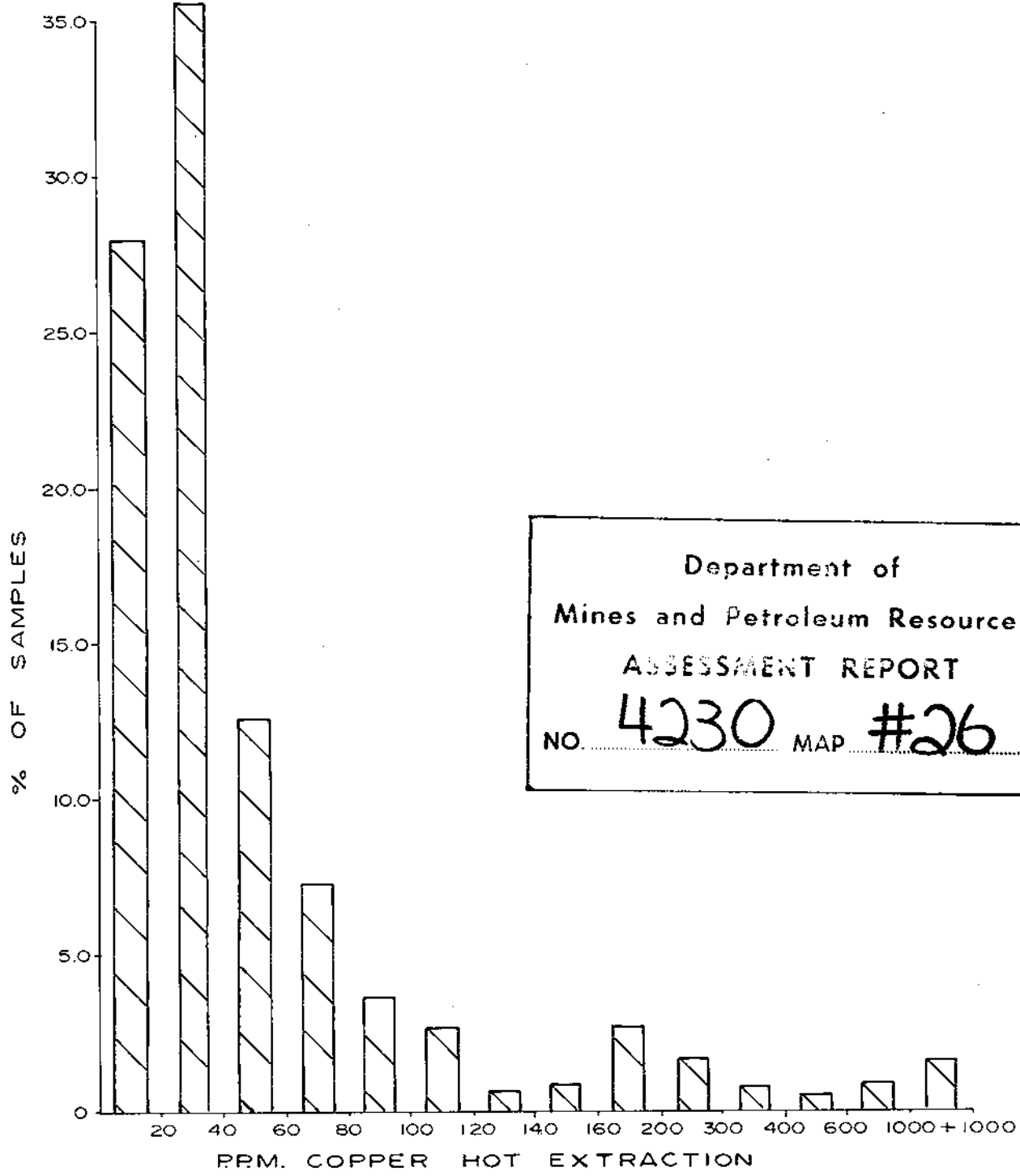
3222	Cu: 4.44%	Au: 0.03 02/T	Ag: 0.05 oz./T
3223	Cu: 7.66%	Au: 0.02 02/T	Ag: 0.01 oz./T

All samples were assayed for total copper by Crest Laboratories Ltd. of Vancouver.

The problem of securing a representative assay, or average of assays, from the trench and underground exposures, early in the program, was a serious problem to which some consideration was given. The writer decided that given the indicated depth of oxidation and the irregular patchwork of exposures in the trenches, only a diamond drill hole - below the level of oxidation i. e. 50' (?) would give a valid sample of the copper, silver and gold content of the mineralized zone. Therefore I did not feel a more comprehensive sampling of the trenches would be useful and could be misleading. Such samples would be merely an assemblage of basically unreliable data. So the purpose of the three trench samples and the two adit samples was to gain only a general idea of the tenor of total copper. Finally, the middle adit (#2) was not sampled because, not only did the copper veinlet that was followed diminish in width along the strike of the veinlet, as exposed, but, over mineable widths (i. e. 5' or over), the grade would be much too low to be of economic interest. The only way that one could consider this high grade narrow (6" - 12") veinlet as of economic interest was as part of a much wider zone and as part of a bulk mining concept.

#### SOIL SAMPLING

There were a total of 1367 soil samples collected and reported during the 1972 field season on the Hill project. These were all shipped to and tested by Crest Laboratories Ltd. of 1068 Homer St. Vancouver, B.C. using atomic absorption methods. The samples were dried and sieved by the laboratories to -80 mesh size,



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TOTAL SAMPLES = 475

FIG. No. 26

NITRACELL CANADA LTD.  
 SOIL SAMPLE  
 FREQUENCY HISTOGRAM  
 HILL GROUP 1-20  
 WART MOUNTAIN AREA  
 NICOLA MINING DIVISION  
 SCALE: 1" = 100 PPM  
 January 1973  
 M.D. Kierans P. Eng

digested by  $\text{HClO}_4 + \text{HNO}_3$  and tested for trace copper only.

527 of the total 1367 were collected by Kevin Kierans and Warren Montsion. 270 were collected by Michael L. Smith. These three men were temporary employees of Nitracell Canada Ltd. The remainder (571) were collected by employees of Darma Exploration Ltd. of Kamloops on contract basis. Approximately 500 more samples were collected by Darma but were destroyed in a fire when the Darma camp was burned to the ground. Another 270 (approximate) samples were collected by Darma. At this writing these have not been reported to Nitracell - nor paid for. The 500 samples destroyed in the fire were not paid for. The total of all samples collected (not all reported) is 2,135.

Of the 1367 samples collected, tested and plotted, 105 were collected in a preliminary survey over the adit area - as a control or rough orientation survey. 380 samples were collected from the August detail grid at 200' and 100' line spacing 100' apart on the chained picket lines. Later in September 463 samples were collected from the picket lines at 400' spacing on the Hill 1 - 20 block.

A total of 419 samples were collected from the new claim location lines at 100' intervals. 42 of these were collected by Nitracell employees. The remainder were collected by Darma personnel. Almost all of the 500 (approximate) samples destroyed in the Darma fire were from claim lines. The 275 (approximate) soil samples as yet unreported by Darma were from claim lines on the Nitracell claims. No samples were collected on the Hill 1 - 20 claim lines.

The samples were collected in the field using a geologists pick and a wooden spoon from a depth of 6". At many sample sites soil cover was less than 6". Although soil profiles were not made the orientation survey indicated we tested mostly in the "A" zone. The soil samples, of approximate weight 8 oz., were put in standard paper sample envelopes and the envelopes marked with the sample number. Soil sample record sheets were prepared by the field crews and are on file in Nitracell offices.

Using the results of 475 samples, collected from the detail picket line grid, the writer prepared a frequency Histogram shown in Figure 26. From the diagram it was deduced that values from 0 - 50 ppm Cu were normal background trace copper content for the soils of the area. From 50 to 100 ppm trace Copper content was considered to be threshold or slightly anomalous and 100 or higher was



anomalous. Cursory inspection of the later geochemical analyses indicate that a frequency diagram using all 1367 reported assays would give almost identical results to the above. Background content would be possibly somewhat lower using the greater volume of data.

Figures 9 and 13 show the soil sample results. The main zone of mineralization as deduced by mapping was clearly indicated on the soil sample map (Fig. 9). In general, the dispersion pattern for trace copper ions in the soils quite clearly showed what had been indicated by mapping and later by diamond drilling, that is: (a) copper mineralization was confined to areas underlain by volcanics i. e. no anomalous tests over the shale bedrock; (b) the mineralization was located near the shale-volcanics contact; (c) there were areas of soil highs (at the north end of the grid i. e. on lines 5W and 8W) where abundant outcrop clearly showed no significant copper mineralization. Soil results must be used with caution here as indicators of significant copper mineralization in both the negative and positive sense.

The general conclusion from our soil results is that in reconnaissance soil testing readings from 50 ppm Copper and up should normally be followed up. Judgment will still be required in evaluating the results but analyses above 50 ppm will be ignored with some peril.

Because the planned soil sample reconnaissance program was terminated by the unfortunate fire there is little point in a discussion of these incomplete sample results. Two general conclusions, based only partly on the sampling, is that (see Figure 9) there does seem to be a general NW-SE orientation to copper mineralization as well as the dispersion patterns in this area. Also, based on presently available results, there is a concentration of copper on the western side of the Hill Claim group.

## GEOPHYSICAL SURVEYING

All the geophysical survey work was on picket lines. Picket lines were cut only on the Hill 1 - 20 claim block. Almost all of the picket line systems were surveyed by the geophysical contractors using I. P. equipment. All of the systems were surveyed with the magnetometer. Parts of the systems were tested with the EM-16 VLF unit and the Crone CEM electromagnetic unit. The geophysical surveying and testing work was done by P. E. Walcott and Associates Ltd. of 605 Rutland Court, Coquitlam, B.C. Their separate report and maps will accompany this report. For a plot of the picket lines please see Figure 12. Before discussing the geophysical results the picket line system is described.

### Picket Lines

A total of 19.2 miles of picket and base lines were cut on the Hill 1 - 20 claim block. This covers about 75% of the area of the block. The lines were cut in three separate systems or phases in August and September of 1972.

A preliminary system, using chain and compass control, was cut by Nitracell employees. This totalled 2.0 miles. The stations were at 100' intervals and the lines were 100' apart. This system was used for soil sample work exclusively. These picket lines were oriented, using Silva Compass, at 20° azimuth (true). Wooden lathes were used to mark the stations.

A detail grid, with picket lines oriented at 40° azimuth-true, totalling 7.3 miles was cut later in August by Nitracell and Walcott employees. This grid using an extension of the same base line (oriented at 130°) was enlarged in September by 9.9 miles of picket lines. Darma Exploration Ltd. of Kamloops cut these lines on contract basis. Some of the lines of the earlier detailed grid stations were wooden lathes. The extended grid stations were standard pickets. The detail grid lines were, in general, 400' apart with stations every 100'. The common base line for these systems was 6000' long.

The orientation of the base line was about 10° - 15° off from the known direction of the mineralized zone. This was done deliberately to take advantage of open ground, to put the base line near the workings and trenches and to avoid Bigney Lake. The mineralized zone did not extend off the picket lines but a new I. P. zone (discussed below) did extend off some lines.

All the claim posts of Hill 1 - 20 were located and tied to the picket line system. The geological and topographic mapping of course, used the picket line control. In addition to the above, 6,500' of control line along the road to Paradise Lake was cut, surveyed with Silva Compass and chained in order to tie the entire grid to a recognizable topographic feature (a pond). Wooden lathes were used for the stations of this control line. So, in all, slightly over 20 miles of picket and control lines were put in on the Hill 1 - 20 property.

#### Geophysical Work - General

The work was done progressively, after test work disproved or validated the efficacy of the various geophysical techniques available to outline this type of sulfide mineralization. The Walcott report discusses the instruments, techniques used, interpretations, etc. Daily contacts with the operators guided the writer in field decisions as to additional staking, correlation with new geochemical data and other field contingencies. At the end of the geophysical work preliminary field maps and I.P. sections were supplied to the writer promptly, along with a brief written note by Walcott in order to assist selection of diamond drilling sites. A conference in Nitracell office with Mr. V. M. Prescott, P. E. Walcott, G. McMillan (the operator) and the writer was held on October 12th. At this conference the field results were discussed, correlated with the geology, evaluated, and a joint recommendation to drill was made then. A very important consideration was the time element. The field season for diamond drilling (without expensive use of bulldozers to keep the long access road free of snow) was already drawing to a close. It was necessary, therefore, to make the drilling decision before receipt of the final Walcott report. In the writer's opinion the data, maps, etc. obtained from Walcott contained the essential information which would have been presented later in a final report.

So far as is known from government assessment reports, the only previous geophysical work done on the Hill 1 - 20 block was EM surveying on lines 400 feet apart. Results were negative.

The geophysical field work was done in two phases. From August 14 to August 29 the Walcott geophysical crew and Nitracell crew cut picket lines, tested the mineralized zone with the Crone CEM unit, surveyed the detail grid with

magnetometer, tested the mineralized zone with EM-16 VLF unit and the induced polarization unit. A verbal report was presented, on September 6, to V. M. Prescott on the results of this work in the Vancouver office of Nitracell. A memo on the exploration results to that date was written then by the writer, outlining additional recommendations and cost estimates (or more work) on the Hill group project.

The second phase of geophysical work began on Sunday, September 17 and ended October 8. The work consisted of I. P. testing of the detail and extended grid of picket lines. Magnetometer survey of both grids was also finished. Snow did hinder the completion of the work somewhat. A memorandum was submitted by the writer on October 13 outlining a preliminary interpretation of the I. P., magnetometer and soil sampling work to that date. Recommendations to drill were offered in that memorandum.

#### Test Geophysical Results.

(a) VLF (EM-16) Test: P. E. Walcott tested this unit over the mineralized zone. No response was obtained over the adit area in the vicinity of known sulfides. Due to the orientation of the picket lines and direction to the transmitting stations available signals were not good. It was recommended that this work not continue. The writer agreed.

(b) Crone CEM Electromagnetic Test: Operators of the contractor conducted a one-half day test of the sulfide area: Result was negative. A conductor was located 500' to the south of the mineralized zone on Line 0. Information now available indicates that this conductor is probably due to graphite in the shales. The CEM technique was not recommended by Walcott. The writer agreed.

(c) Induced Polarization: P. E. Walcott, using Nitracell personnel as helpers carried out a test on Line 6E. This test was successful in responding to a known sulfide zone. Walcott recommended using I. P. on this type of mineralization to indicate relative sulfide content of known zones, depth persistence and to locate new sulfide zones under overburden. See Walcott report for more complete discussion and presentation of test work.

#### Magnetometer Survey Results:

This survey was useful, in a general way, for discriminating, in overburden areas, between shale and volcanics bedrock. This is an important result in this area where (so far as is known) copper sulfide mineralization is confined to the volcanics. The shale-volcanics contact was outlined by the magnet-

ometer map. Low background was found over shales and higher background gamma readings over the volcanics.

In the area of Figure 15 where geological mapping was carried out the above result was clearly demonstrated. By extension of this concept into unmapped areas of the grid system there is indicated to be a shale-volcanics contact (with some fault offsets or warping) extending from line 20E at 3+00S to about Line 34E at 20+00S. The results are not conclusive but there may also be shale bedrock south and east of Bigney Lake on the grid.

Also it is known that within two miles of the Hill adit area a skarn-magnetite-chalcopyrite deposit occurs. Obviously, the magnetometer would readily have outlined a deposit of that type in limey shales. Unfortunately, there was no response, in the area surveyed, which would indicate a buried skarn deposit.

#### Induced Polarization Results.

The detail grid was surveyed using the I. P. equipment on Lines 8W, 5W, 0, 2E, 4E, 6E, 8E, 10E, 12E and 14E with 100-foot electrode spacing. This spacing lacks penetration but can delineate narrow zones of disseminated mineralization - as well as broader zones. The 200 foot electrode spacing was used on the remaining lines of the picket line grid.

Five zones of interest were found. See Figure 16.

Zone 1 is the main mineralized or adit zone. This zone is at least 1400' long and averages 150' wide. One weak response on strike on line 5W and near an area of known very weak sulfide mineralization could extend the zone to about 2000'. Response on line 16E at the southeast end of the zone was weak. This zone is in volcanics within 200' of the shale-volcanics contact. The zone is closed.

Zone 2 is a broad zone about 400' wide and 700' long parallel to Zone 1. It is separated from Zone 1 to about 200'. It, too, is closed. It is much stronger in response than the main zone. When this response was detected in the field, for reasons to be outlined in the next section under Diamond Drilling, eighty-two additional claims were recommended to be staked for protection.

Zone 3 is a broad zone a minimum of 600' long and 400' wide. The response was good. Part of the zone from surface mapping is known to be in shales. No geochemical anomalies were found in this zone.

Zone 4 diverges from the main zone or No. 1 Zone and broadens markedly to the

ometer map. Low background was found over shales and higher background gamma readings over the volcanics.

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Zone 4 diverges from the main zone or No. 1 Zone and broadens markedly to the

north west. The zone averages 400' in width and is 900' long. This zone is underlain by shales.

Zone 5 is another zone found on line 5W which was not picked up on other lines to the south. On line 8W an incomplete response indicates a possible dislocation by an assumed fault along a prominent creek.

From drilling information now available is assumed that Zones 2, 3, 4 and 5 are black graphitic shale horizons with minor pyritic content.

#### DIAMOND DRILLING

Connors Drilling Ltd. with head office in Vancouver and a field office in Merritt, were the diamond drilling contractors. A proposal was submitted by them on September 22nd. The contract was signed October 13th.

The first hole was collared on October 20th, 1972 and the program terminated on November 20th. Actually, the last hole was finished on November 17th. No work was done on the weekend of November 18th and 19th. Between October 20th and November 17th, 2,902.5 feet of BQ core were drilled, logged and mineralized sections sampled. 5 holes were drilled from three separate surface set-ups. A mobile wire line drill unit, mounted on a rubber-tired army truck, was used. A D-6 tractor, on contract, completed road construction to the drill sites and the drill set-ups in six days at the beginning of the program.

See Figures 18, 19, 20, 21 and 22 for plan and sections of the diamond drill program and results.

The following section gives the target and purpose for each drill hole as well as the results. For detailed logs, sample record sheets and photocopies of the assay certificate see the appendices attached.

HNS 72-1 - This hole was collared on line 6E at 1 + 45N. The purpose of the hole was twofold; to determine the grade of mineralization under the trench on line 6E which had shown copper mineralization, and the other purpose was to sample the entire zone for bulk mining grade. The hole was drilled at  $-60^{\circ}$ . The hole flattened slightly (to  $55^{\circ}$ ) at the bottom. The I.P. response here was narrow, weak and persistent to at least 300'.

The rock, in general, cut in all the holes (except for the shal cut in HNS 72-3) was volcanic. Most of the rock cut was andesitic

(field classification)

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No. **4230** MAP #**20**

S. W.

N. E.

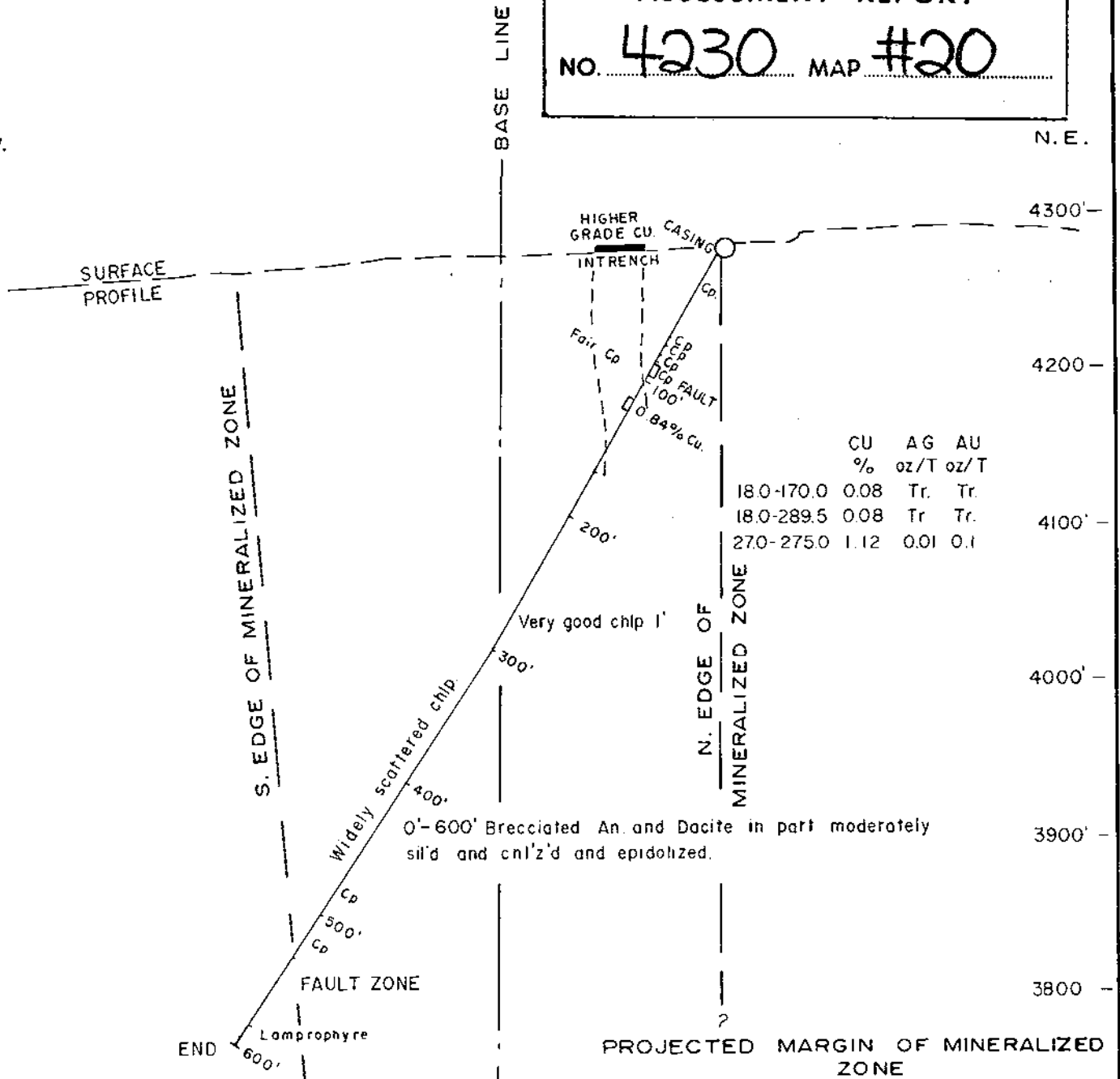


FIG. No. 20

NITRACELL CANADA LTD.  
CROSS SECTION ON PL. 6 E.  
LOOKING N.W.  
DDH. HNS. 72-1  
HILL GROUP 1-20  
WART MOUNTAIN AREA  
NICOLA MINING DIVISION

*M.D.K.* SCALE: 1" = 100'

January 1973

M.D. Kierans P. Eng



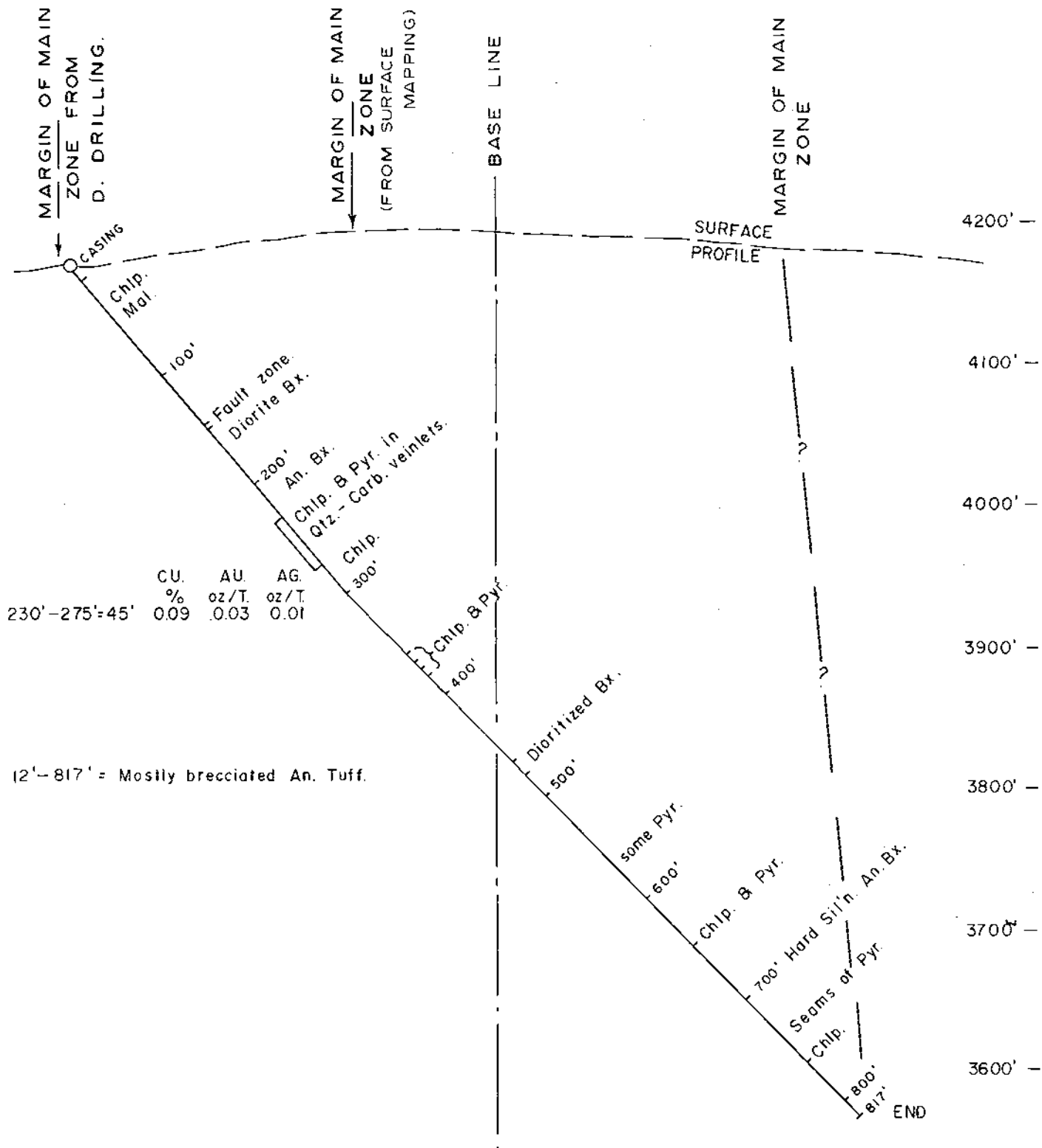


FIG No. 21

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ASSESSMENT REPORT  
No. **4230** MAP # **21**

NITRACELL CANADA LTD.  
**CROSS SECTION ON PL. 4 E**  
LOOKING N.W.  
DDH. HNS. 72-2  
HILL GROUP 1-20  
WART MOUNTAIN AREA  
NICOLA MINING DIVISION  
SCALE: 1" = 100'  
January 1973  
M.D. Kierans P. Eng

with some dacitic sections. Narrow (30') dioritic sections were cut. The volcanic rock was a tuff breccia with angular fragments up to 3". Narrow porphyritic sections were cut also. Within the main zone alteration consisted of epitotization, very minor chlorization, carbonatization and silicification. The sulfide mineralization was principally associated with or found within quartz-carbonate stringers and veinlets. Outside the main zone especially to the north the alteration of the pyroclastic rock was negligible. Alteration does define the mineralized sulfide zone.

In HNS 72-1 scattered non-economic chalcopyrite and pyrite mineralization was found from the collar to 514.0'. Alteration persisted to the bottom of the hole at 600.0'. There is little doubt the main mineralized zone is wider than the 250' true width sampled by the hole. The zone dips very steeply east or is vertical.

The average grade of mineralization from 0 to 289.5' was 0.08% Cu. Gold and silver values were negligible (trace). The best section cut was from 270' - 275' which ran 1.12% Cu, 0.01 oz./T Au, and 0.1 oz./T Ag. The second best section cut was from 113.5' - 123.5' which assayed 0.84% Cu, 0.01 oz./T Au and 0.2 oz./T Ag. See the sample record sheet for the complete assay record of the hole.

HNS 72-2 - This hole was collared at -50' on Line 4E at 3 + 00S. The collar is about 120' in elevation below the collar of HNS 72-1. The hole was drilled to the north across the mineralized zone and in the opposite direction from HNS 72-1 which was drilled to the south. The purpose of HNS 72-2 was to test I. P. Zones 4 and 1 with only one hole. It was expected from geology projections and magnetometer results that this overburdened zone was underlain by shales. Instead the hole collared in slightly mineralized (non-economic) volcanics. Only 45 feet of the best looking mineralization was assayed. The average, from 230' to 275', was 0.09% Cu. Gold and silver values were negligible. It should be noted that oxidation was rather heavy from 30' to 54'. This section may have contained up to 5% sulfides before oxidation. Chalcopyrite in one uneconomical 1" seam was found at 780'.

The results of this hole were quite disappointing. The displacement of the mineralized volcanics zone to the southwest obviously did not allow determination of the cause of the large and impressive "shale" I. P. anomalies. Conceivably,

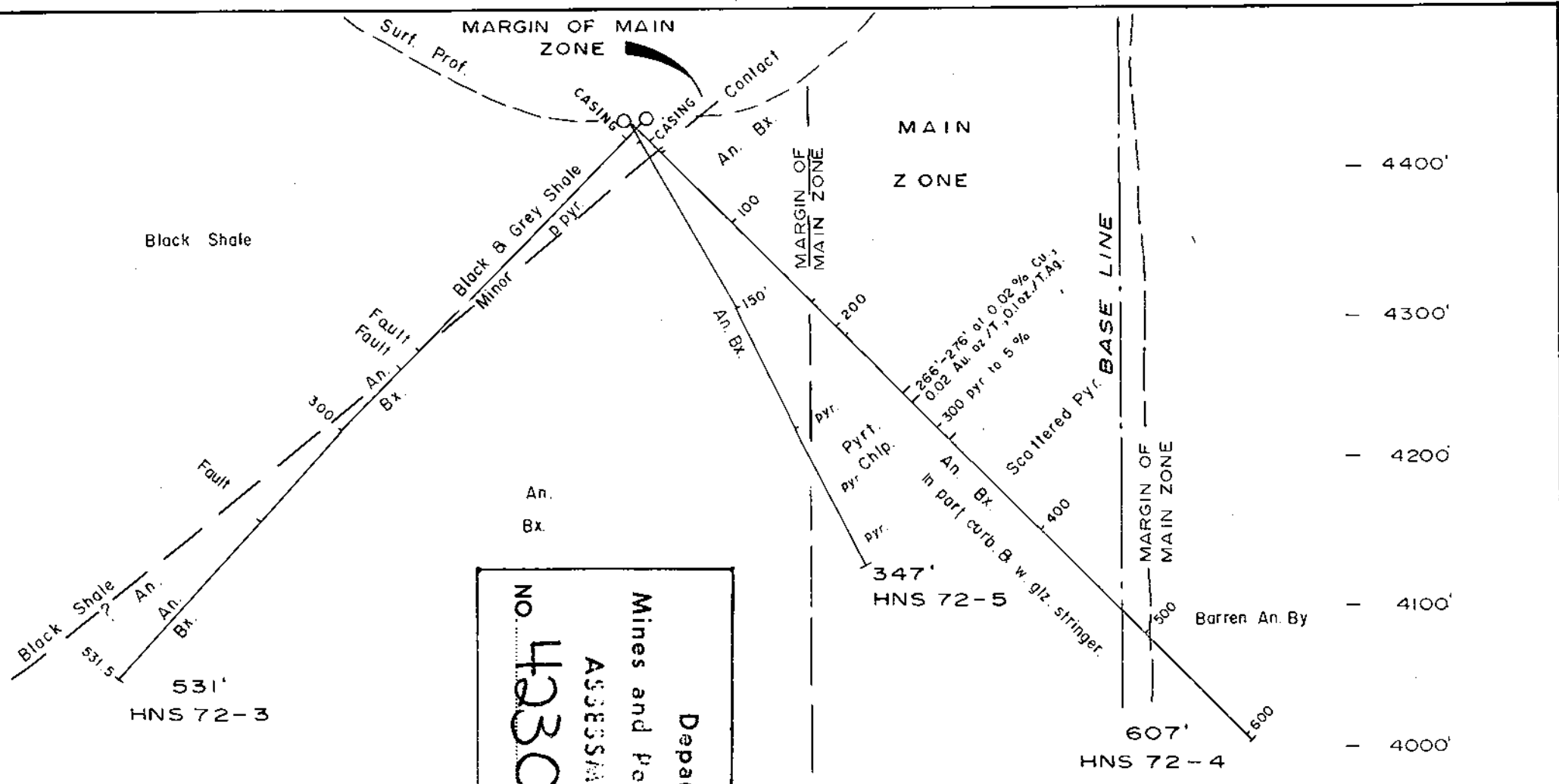
if the "shale" I. P. response could have been shown here to be due to graphite in black shales, then hole HNS 72-3 would not have been needed. An additional reason for drilling HNS 72-3 through I. P. Zone 2 was that the bulldozer, while building our drill road, had turned up chalcopyrite bearing float near Zone 2. The other structural reasons for drilling Zone 2 have been discussed earlier and in previously submitted memoranda.

HNS 72-3 - This hole was drilled from 12E at 3 + 25S at an inclination of  $-45^{\circ}$ . The bearing of the hole was to the southwest. Elevation was 50' above Hole HNS 72-1. The purpose of the hole was to test I. P. Zone 2. 220' of shale were cut in this hole. Core angles indicate that bedding and the contact with the volcanics were almost parallel with the hole. The shale was dark grey to black. In places it was thinly bedded with very minor pyrite. The dip of the contact and bedding was deduced as being about  $40^{\circ}$  with strike  $130^{\circ}$ .

Below the shale, volcanic andesitic breccia was cut for 300' i.e. to the end of the hole at 531.5'. No sulfide mineralization of economic interest was seen in the core and no samples were cut. This hole effectively eliminates I. P. Zones 2, 3, and 4 as being of any interest. It should be noted that the I. P. results indicated a dip of  $40^{\circ}$  to the "shale" I. P. Zone 4 on Line 2E. This fact corroborates the shale attitude determination and the source of the I. P. chargeability anomaly as being sedimentary "strata bound" graphite.

HNS 72-4 - This hole was drilled from the same setup as HNS 72-3 but in the opposite direction i.e. to the northeast at  $-45^{\circ}$  inclination. The purpose of the hole was to determine average grade of copper mineralization across the entire width of the main zone and possibly locate high grade sections of copper mineralization for a small tonnage operation. The hole was stopped at 607' after cutting more sulfide content than any other hole. Unfortunately, most of the sulfide material was pyrite. The best pyritic material from 266 to 276 ran 0.02 oz./T Au, 0.1 oz./T Ag and 0.02% Cu. Scattered non-economic pyritic and some chalcopyrite mineralization persisted in the hole to 502.0'. The sulfide mineralization and alteration ended at about the same footage in the core.

There is little doubt that the I. P. results were quite useful as a guide to estimating sulfide content of the main zone. The I. P. response on Line 12E was



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 NO. **4230** MAP #22

FIG No. 22

NITRACELL CANADA LTD.  
 CROSS SECTION ON PL. 12 E.  
 LOOKING N.W.  
 D.D.H. HNS. 72-3, 4 & 5  
 HILL GROUP 1-20  
 WART MOUNTAIN AREA  
 NICOLA MINING DIVISION  
 SCALE 1" = 100'  
 January 1973  
 M.D. Kierans P. Eng

*M.D. Kierans*

*M.D.P.*

much stronger than Line 6E and here the sulfide content proved to be much higher. The other conclusion, corroborated in HNS 72-1 and HNS 72-2, is that the altered mineralized main zone may contain anywhere in the alteration envelope copper bearing sulfides. That is, as long as the alteration effects noted above are seen on surface or in drilling, the zone is of potential economic interest.

HNS 72-5 - This short hole was drilled to test a structural concept. There was a possibility, from the new data on the attitude of the shale-volcanic contact that the mineralization in the volcanic sequence could be confined to one horizon. This horizon, presumably, would be dipping southwest at  $40^{\circ}$ , parallel to the contact. This concept could mean that a very large potential target zone would be opened up under the shale rocks.

The I. P. results for Zone 5, according to the contractors, indicated that this very large and strong zone was weak near surface and increasing in strength downward. In other words, it was just possible that, under the shale "capping", a large sulfide zone in the volcanics rocks could be located by drilling through the shale. Though this possibility was not strong, its implications were important enough to warrant a short hole.

HNS 72-5 was then drilled from the same setup as HNS 72-4 on the same line and in the same direction but at  $-60^{\circ}$ . The shale-andesite contact was cut as expected. Then volcanics with the usual alteration and sulfide mineralization were cut at 30.0'. By plotting on cross-section the start of the sulfide zone in relation to the start of the sulfide intercepts in HNS 72-4 it was clear that the sulfides zone was dipping vertically. This result demonstrated rather conclusively that the control of the main sulfide zone was not stratigraphic but tectonic. Thus, the "shale capping" idea was eliminated and Zone 5 is almost certainly graphite in shales. No samples for HNS 72-5 were cut in the pyritized volcanics. The hole was stopped at 347.0'.

## DISCUSSION AND CONCLUSIONS

The Hill 1 - 20 Project was carried out in three phases. There was some overlapping.

Phase 1: Picket line cutting, soil sampling, geological mapping, rock sampling, magnetometer survey, geophysical testing and ground acquisition.

Phase 2: An extended I. P., soil sampling and magnetometer program to define the main zone and to locate unknown parallel or en echelon mineralized areas on Hill 1 - 20 block. Prior to the I. P. and soil work, more picket lines were cut.

Phase 3: A Diamond Drilling program of 2,902.5 feet in five holes.

A fourth phase, conducted concurrently with Phase 2 was planned as a reconnaissance geochemical survey on the new Nitracell claim lines. About 1000 samples were to be collected for this project. There were about 250 samples collected and reported in this work. About 500 samples were destroyed in a fire and 275 others collected have not, at this writing, been reported by the contractor. No conclusions can be reached at all on this phase. This phase will best be done next year. See Recommendations below.

The first phase, lasting one month, was successful in outlining a possible low grade bulk copper mining target. The soil results, in particular, were quite encouraging for this concept as was the geological mapping. The I. P. tests showed that only this geophysical method would measure sulfide content, locate new zones under overburden and measure depth persistence in this type of low grade sulfide mineralization. During this phase an additional 132 new claims were staked and recorded. This acquisition was recommended on the basis of a geological exploration concept and to protect the apparent enhanced importance of the Hill 1 - 20 block.

The second phase, taking about six weeks to complete, involved the cutting of 10.0 miles of new picket lines (out of a total of 20.0 miles of picket and control lines on the property). On these new lines the I. P. work defined the main zone of mineralization over the adits. This definition reduced the possible size of the bulk copper body to about 1500' x 150' - from about 2500' x 300'. This reduced block would be economical for open pit extraction only if the overall grade exceeded 1.0% Cu. equivalent. This grade was not to be expected from available geological data. Therefore on the main zone, the I. P. results effectively disproved the

possibility of a bulk copper deposit. However, I. P. Zone 2 parallel and close to the main zone more than made up for the loss in tonnage in the reduced main zone. Moreover, the I. P. response was much higher on this zone than on the main zone. The proximity to a warp in the shale-volcanic contact and to the shale-volcanic contact itself made this a structurally attractive target. Also two other very large and strong I. P. Zones (4 & 5) on the north end of the grid kept alive the possibility of a large low grade bulk copper deposit on the Hill 1 - 20 block. A fifth zone was also located near the middle of the south west side of the extended picket line grid. This zone was assumed to be over shales and in the same category as the other I. P. targets.

No parallel or en echelon I. P. anomalous zones were found elsewhere on the claims. The soil sample results elsewhere on the extended grid were negative. The magnetometer survey outlined the shale-andesite contact, within broad limits.

The conclusion from second phase work was that the bulk mining concept was not dead. In fact it had received distinct encouragement. During the field work, when the discovery of I. P. Zone 2 was made, it was recommended that 101 new claims be staked, and the Ti 1 - 10 group to the south of the Hill 1 - 20 block be acquired. A copper showing of modest interest was known to be on these claims. Hill 250 - 264 covered the extensions of the main and other I. P. zones (4 & 5) to the northwest. The Key claims (92) claims) were staked to cover parts of the important "bulge" in the intrusive-volcanic contact. Of course, in addition to the bulk mining concept, with its inherently very favourable profit to risk ratio, the less attractive (but still viable) small tonnage concept remained. The drill program was intended to test both concepts concurrently.

The third phase, diamond drilling, was disappointing. Hole HNS 72-1 proved that a wide (1300') disseminated copper zone did exist but overall grade was only 0.08% Cu., far below commercial grade. The highest grade section of this hole (5' @ 1.12%) dealt a severe blow to the small mine idea. Hole HNS 72-2 completely eliminated the bulk copper concept on the main zone and further reduced the potential of the property for a profitable small mine. There did remain the attractive large I. P. Zone 2. Depending on grade a substantial tonnage was possible

here. Drill results were disappointing. No sulfides were cut in a hole directly below the surface trace of the zone. The response is, most likely, due to graphite in black shales.

The second to last hole HNS 72-4 tested a wide part of the main zone where I. P. response was considerably better than in the area of the first hole. Again drill results were disappointing. Higher sulfide content was found but these were mainly pyrite with negligible copper. The wide mineralized zone was found also but it was definitely of sub-ore grade. The final hole tested the idea of possible stratigraphic control for the mineralization. This concept was disproved. The tectonic (or fracturing control) is the concept or theory best fitting the available facts.

#### CONCLUSIONS

- (1) A sub-ore grade (0.08% Cu.) mass of chalcopyrite-pyrite sulfides, with dimensions in the order of at least 1000' x 200' exists on the claims. Vertical range is known to be, at least 800' for this mass.
- (2) Pods of higher grade material in the order of 10,000 tons each may exist within this body.
- (3) The spatial relation of the mineralization to a shale-volcanics contact is fortuitous. Control for sulfide mineralization is tectonic, i. e. fracture controlled.
- (4) The NW-SE fracture lineaments should be given priority in ore search.
- (5) Soil sampling and stream sediment sampling, on reconnaissance basis, would be a highly effective technique for a search for unknown concentrations of copper bearing sulfides, on the remaining claims of the Hill-Kev group.
- (6) The tectonic pattern, as well as the intrusive pattern, in this predominately extrusive terrain must be carefully studied and used in evaluating the potential of the region - Photogeology, recce mapping and office research should be primary tools in further work on Hill claims.
- (7) It is distinctly encouraging, from a regional exploration viewpoint, that three known mineralized areas, in the order of size needed for bulk copper mining projects, are known in this area, i. e. the Mal & Chal, Toe and Hill zones. The importance of this area for regional exploration cannot be overstated.



- (8) The likelihood of commercial copper deposits on Hill 1 - 20 is very remote. No more work (apart from geological mapping) should be done here.
- (9) Four different types of mineralization for bulk copper deposits may be expected in the region:
  - (a) Magnetite-chalcopyrite-skarn in limey shales, e.g. Mal & Chal;
  - (b) Fracture controlled copper sulphide deposits in volcanogenic rocks;
  - (c) Cu-Mo concentrations of very large size e.g. the Toe anomaly in volcanogenic rocks marginal to the batholiths, and
  - (d) Cu-Mo deposits within batholithic host rocks.
- (10) Geology, location, access, topography and climate are very favourable factors in consideration of this region for additional modest expenditures on the Hill-Kev claim group by Nitracell.
- (11) There is little present competitive interest in the region so that geochemical testing can proceed with little risk on open ground.
- (12) Considering the modest cost of the program recommended below and the very large potential rewards for a successful porphyry copper search, the program recommended is economically attractive.
- (13) The program recommended below should be well within the financial capabilities of Nitracell.
- (14) At this time it would hardly be necessary for Nitracell to seek outside financial assistance, on a participation basis, for the recommended project.

#### RECOMMENDATIONS AND COST ESTIMATE

Based on the above conclusions the following recommendations are offered:

- (1) A thorough search of all available government, assessment, academic, and private sources for geological and exploration information be made during the winter months.
- (2) A detailed photogeological study of the area, from photos now in Nitracell office, be made.
- (3) An uncorrected photomosaic of region should be prepared.
- (4) Aeronagnetic data should be correlated with geological and photogeological information as overlay sheets.

(5) Up-to-date property ownership maps of adjoining claims to be researched and drafted.

(6) A report on the above work to be prepared.

(7) Depending upon results and interpretations of the above research and compilations the following may be recommended. Starting at the earliest possible time after spring break-up the following field work should be carried out:

(a) Geological reconnaissance mapping at 1" = 1000' on the area of Figure 8. Claim lines, roads and streams to be used as control.

(b) Soil sampling on the claim lines of the Hill and Kev groups

(c) Extend soil lines, where trace element anomalies found in the soils, to open ground, if necessary.

(d) Detail soil samples should be taken where anomalous conditions found on the reconnaissance lines.

(e) Stream sediment samples to be collected from areas previously known to be untested by this geochemical method.

(f) A report to be prepared, recommendations and careful cost estimate made for any additional field work depending upon results of the above.

The cost breakdown of the program recommended above is estimated as follows:

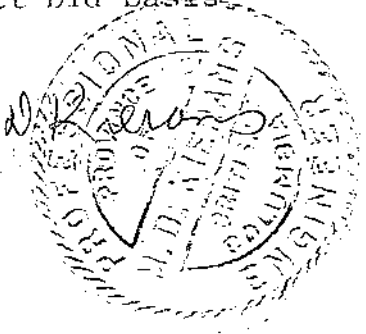
i)	Office research work to be carried out over a period of about two months in January and February	\$2,000.00
ii)	Air photos, drafting, typing and report preparation	500.00
iii)	Contingencies and miscellaneous costs	300.00
iv)	Geological reconnaissance mapping on Hill-Kev group - 10 days @ \$150/day at 1" = 1000'	1,500.00
v)	Soil sampling @ \$3.00 per sample for 1,500 samples	4,500.00
vi)	Drafting prints, report preparation, typing etc.,	500.00
vii)	Preparation of assessment documents, expenses etc.,	200.00
viii)	Travel, field expenses and maintenance	300.00
ix)	Vehicle	400.00

x)	Contingencies at 10%	\$ 1,000.00
	TOTAL	<u>\$11,200.00</u>

The above work should provide conclusive results, at least in the event of negative results.

All of the above work can and should be done on contract bid basis by professional consultants.

Respectfully submitted,

*M. D. Kierans*  


M. D. Kierans, P.Eng.,

February 5, 1973

MDK:ag-vsm

## BIBLIOGRAPHY

1. Hainsworth, W.G. (1972); Hill Group, Nicola Mining Division, for Nitracell Canada Ltd., British Columbia, Private Report July 28, 1972.
2. Rice, H.M.A. (1947); Geology and Mineral Deposits of the Princeton Map-area, British Columbia; Geol. Surv. Canada, Mem. 243.
3. Sharp, W.M. (1968); Assessment Report 32692 Mal-Chal, Echo, HN-WEM, Toe and Boot Groups for Consolidated Skeena Mines, Nicola Mining Division, July 25, 1968.

CERTIFICATE

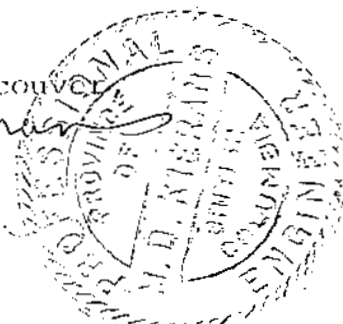
I, Martin D. Kierans of 1908-1075 Comox Street, Vancouver, B.C. with Consulting Geologists Office at 106-525 Seymour Street, Vancouver 1, B.C. do hereby certify that:

1. I am a Consulting Geological Engineer with business office at the above address.
2. I am a Resident Member of the Association of Professional Engineers of the Province of British Columbia.
3. I am a Member of C.I.M. and Associate Member of A.I.M.E.
4. I am a graduate in Geological Sciences of the University of British Columbia, (M.A. 1952) and McGill University (B.Sc. 1949).
5. I have practiced my profession as Geological Engineer and Mine and Exploration Geologist for twenty years.
6. My knowledge of the property discussed in this report is based on detailed geological mapping of part of the Mill Group, field supervision of Nitracell employees and contractors crews on these claims, for about 4 months; on study of Geological Reports and maps by government geologists; on study of assessment reports and on private reports in Nitracell files.
7. I have no interest, either directly or indirectly, in the properties or securities of Nitracell Canada Ltd., nor do I expect to receive any in the future.

DATED this 29th day of December, 1972 at Vancouver  
British Columbia.

*M. D. Kierans*  
*M. D. Kierans*

M.D. Kierans, P.Eng.,  
Consulting Geological Engineer



COMPANY:	Nitracell Canada Ltd	Core Size:	R0
PROPERTY:	Hill Group, Nicola M.D.	Amount Casing:	18.0'
HOLE NO:	HNS72-1	Depth:	817'
LOCATION:	6E, 1+45N	Started:	20/Oct/72
COLLAR ELEV:	4280'	Finished:	26/Oct/72
BEARING:	220°	Drilled by:	Connors Drilling Ltd
INCLINATION:	-60°	Logged by:	M.D. Kierans MK

Acid Tests (uncorrected): 200' = 74° (?)      400' = 72° (?)      600' = 62°  
 Acid Tests (corrected): 200' = 60° (?)      400' = 68° (?)      600' = 56°

From Feet	To Feet	Interval	Core Feet	% Sulf	Core Angle	Description
0	18.0	18.0	-	-	-	Casing no core
18	37.0	19.0	19.0	0.1	60°	Volcanic breccia. Fragments Average $\frac{1}{8}$ ". Angular. 30% Frag. 30% Carbonate stringers with Average thickness $\frac{1}{8}$ ". Chalcopyrite speck at 27'. FeO stain on fractures. Blocky. Groundmass Andesite. In part gossan.
37.0	89.0	52.0	52.0	-0.1	60°	As above less carbonate only 3% Av. Scattered pyrite and chal- copyrite mineralization at 69', 73', 81', 84', 85' mostly pyrite.
89.0	94.0	5.0	5.0	1	-	Rock as above. Little FeO. Minor 1% carbonate. Fair chalcopyrite- possible 0.5% Cu. Chalcopyrite as streaks, blebs, seams with carbon- ate or disseminated in breccia.
94.0	113.5	19.5	19.5	-0.1	60°	Rock as above. 0.5% carbonate. Fault at 98'. 97'-98' chalcopyrite and at 99' and 102'. Very minor epidote some specks of fine chal- copyrite. Chalcopyrite in quartz- carbonate stringers. 1-2% quartz- carbonate.
113.5	123.5	10.0	10.0	2-3	70°	Good chalcopryite in rock as above. (Associated with quartz) as blebs and streaks.
123.5	270.0	146.5	145.0	-0.1	70°	Rock as above. Scattered pyrite and chalcopyrite concentrations mostly in quartz carbonate veinlets. Breccia coarser near end of interval. Some pyrrhotite. Fault at 181'. Minor scattered epidotization.

From	To	Interval	Core	% Sulf.	Core Angle	Description
270.0	275.0	5.0	5.0	1	80°	Rock as above. 30% quartz carbonate as 1" stringers. Very good chlp. chalcopryrite in quartz from 274-275'.
275.0	287.0	12.0	12.0	-0.1	80°	Rock as above mostly. No visible sulfides. Some quartz carbonate
287.0	289.5	2.5	2.5	1.0	90°	Rock as above, pyrrhotite and pyrite and chalcopryrite in quartz-carbonate stringers. Rock as above, scattered quartz-carbonate stringers; pyrrhotite and chalcopryrite widely scattered.
289.5	352.0	62.5	62.0	-0.1	-	Rock as above. Fault 335' to 352'.
352.0	400.0	48.0	48.0	-0.1	80°	Brecciated pyroclastic dacite. Matrix dacite, 60%. Still widely scattered quartz-carbonate stringers with very minor pyrite; pyrrhotite and chalcopryrite. Slight increase chalcopryrite at 359'. In part porphyritic fragments
400.0	407.0	7.0	7.0	-	-	Massive dark green chloritized andesitic volcanic "greenstone".
407.0	421.5	14.5	14.5	-	-	Light green dacitic coarse breccia. Angular fragments to 3".
421.5	437.0	25.5	25.0	-	-	Massive dark green andesite. Some epidote. ¼" massive chalcopryrite in 1" quartz-carbonate veinlet. Highly silicified.
437.0	462.0	25.0	25.0	-	-	Dacitic breccia. Interbanded massive dark green andesite. BX.
462.0	491.0	29.0	29.0	-	-	Massive, silicified andesite broken at 475'. Specks chalcopryrite at 480'. Moderately epidotized near 480'-490'.
491.0	514.0	23.0	23.0	-	80°	Massive light green epidotized gabbro "salt and pepper" texture. Quartz stringers very widely spaced. Silicified
514.0	535.0	21.0	21.0	-0.1	-	Massive epidotized and silicified andesite. Chalcopryrite at 514.0" ¼" massive chalcopryrite in w/quartz and specks of pyrite at 530'. Less than 0.5% w/quartz-carbonate.
535.0	556.0	21.0	14.0	-0.1	-	Fault zone. Center at 545'. Mostly badly broken epidotized and chloritized Andesite IX
556.0	589.0	33.0	24.0	-	-	Highly fractured "crackled" Andesite. BX. Highly epidotized and chloritized rock - as beginning of hole.
589.0	598.0	9.0	9.0	-	-	Massive fine grained dark grey green dike rock. MLamprophyre. Dense hard with no alteration. Post-ore dike.
598.0	600.0	2.0	2.0	-	-	"Crackled" altered andesite BX. Carbonate and quartz stringers. Epidotized and chloritized.

END

## DIAMOND DRILL HOLE SAMPLE RECORD

DDH HNS72-1

Page 1 of 2

Sample Number	From Feet	To Feet	Interval	% Sulf.	Rock Type	Assays			Averages		
						Cu %	Au oz/t	Ag oz/t	Cu %	Au oz/t	Ag oz/t
12001D	18.0	28.0	10.0	-0.1	Breccia	0.02	tr	tr			
12002D	28.0	37.0	9.0	-0.1	Breccia	0.02	0.01	tr			
12003D	37.0	47.0	10.0	-0.1	Breccia	tr	tr	tr			
12004D	47.0	57.0	10.0	-0.1	Breccia	0.01	tr	tr			
12005D	57.0	63.5	6.5	-0.1	Breccia	0.01	tr	tr			
12006D	63.5	73.5	10.0	-0.1	Breccia	0.01	tr	tr			
12007D	73.5	83.5	10.0	-0.1	Breccia	0.01	tr	tr			
12008D	83.5	89.0	5.5	-0.1	Breccia	0.09	0.01	0.1			
12009D	89.5	94.0	5.0	±1.0	Breccia	0.31	0.01	0.2			
12010D	94.0	102.5	8.5	-0.1	Breccia	0.01	tr	tr			
12011D	102.5	106.5	4.0	-0.1		tr	tr	tr			
12012D	106.5	113.5	7.0	-0.1		0.01	tr	tr			
12013D	113.5	123.5	10.0	2-3		0.84	0.01	0.2			
12014D	123.5	133.0	9.5	-0.1		0.03	tr	0.1			
12015D	133.0	143.0	10.0	-0.1	Breccia	0.01	tr	0.01			
12016D	143.0	153.0	10.0	-0.1		0.04	tr	tr			
12017D	153.0	163.0	10.0	-0.1		tr	tr	tr			
12018D	163.0	170.0	7.0	-0.1		tr	tr	tr			
	18.0	1700=152.0							0.02	tr	tr
12019D	181.0	185.0	4.0	-1.0	Breccia	0.02	tr	tr			
12020D	185.0	189.0	4.0	-0.1	Breccia	0.02	tr	tr			
12021D	189.0	193.0	4.0	-0.1	Breccia	0.02	tr	tr			
12022D	193.0	197.5	4.5	-0.1	Breccia	0.16	tr	tr			
12023D	210.0	214.5	4.5	-0.2	Breccia	0.02	tr	tr			
12024D	218.5	223.5	5.0	2.0	Breccia	0.12	tr	tr			
12025D	234.0	238.0	4.0	-0.1	Breccia	0.03	tr	tr			
12026D	238.0	244.0	6.0	-0.2	Breccia	0.04	tr	tr			
12027D	255.0	260.0	5.0	-0.2	Breccia	0.40	tr	0.1			
12028D	260.0	264.0	4.0	-0.1	Breccia	0.08	tr	tr			



## DIAMOND DRILL HOLE SAMPLE RECORD

DDH HNS72-1

Page 2 of 2

Sample Number	From Feet	To	Interval	% Sulf.	Rock Type	Assays			Averages		
						Cu %	Au oz/t	Ag oz/t	Cu %	Au oz/t	Ag oz/t
12029D	270.0	275.0	5.0	±1.0	Breccia	1.12	0.01	0.1			
12030D	275.0	280.0	5.0	-0.1	Breccia	0.02	tr	tr			
12031D	287.0	289.5	2.5	1.0	Breccia	0.18	tr	tr			
	18.0	289.5	271.5						0.08	tr	tr
12032D	357.0	362.0	5.0	-0.2	Breccia	0.03	tr	tr			

Notes: Sample 12013D assayed 0.01% MoS<sub>2</sub>, Trace Pb and Trace Zn  
 Samples assayed by Crest Laboratories Ltd., 1068 Homer Street, Vancouver, B.C.

COMPANY:	Nitracell Canada Ltd	Core Size:	BQ
PROPERTY:	Hill Group, Nicola M.D.	Amount Casing:	12'
HOLE NO:	HNS72-2	Depth:	8170'
LOCATION:	4E, 3+00S	Started:	30/Oct/72
COLLAR ELEV:	4160'	Finished:	5/Nov/72
BEARING:	40°	Drilled by:	Connors Drilling Ltd
INCLINATION:	-50°	Logged by:	M.D. Kierans (M.D.)

Acid Tests (uncorrected): 200' = 57° 400' = 52° 600' = 55° 800' = 54°  
 Acid Tests (corrected): 200' = 400' = 600' = 800' =

From	To	Interval	Core	% Sulf.	Core Angle	Description
0	12.0	12.0	-	-	-	Casing no core
12.0	30.0	18.0	18.0	-	-	Massive andesite BX. Rounded fragments widely spaced. Possibly tuff. In part fragments porphyritic. FeO on fracture surfaces.
30.0	56.5	26.5	26.5	-0.1	45°	Rock as above but much more broken. 46'-47' chalcopyrite and malachite. Originally sulfide (pyrite) zone. In carbonate stringers spaced 1' apart. Pyrite at 47.5'. Originally 5% pyrite.
56.5	62.0	5.5	5.5	-	-	Lighter green "salt and pepper" texture. Fragments andesitic tuff. Moderate FeO stain. 1/4" carbonate stringers at 62.0'
62.0	77.0	15.0	15.0	-0.1	-	Massive Andesitic BX. Some minor pyrite in 16" quartz stringers.
77.0	113.0	36.0	35.0	-0.1	-	Volcanic andesitic tuff breccia. Fragments matrix and fragments. Very weak disseminated pyrite.
113.0	114.5	1.5	1.5	-	0	50% quartz carbonate veinlet, with minor FeO stain.
114.5	118.0	3.5	2.5	-	-	Partly broken and FeO stained. Volcanic tuff-breccia.
118.0	146.0	31.5	31.0	-	-	Massive dark green hard silicified andesitic BX. Fragments angular. Some to 1". Average 1/2" 50% matrix. Some fragments sub-rounded. Matrix fragments. Andesitic fragments. Andesite and some intrusive diorite (?) fragments.
146.0	150.0	4.0	1.0	-	-	Fault zone. Chloritic mud with some white quartz fragments.
150.0	180.0	30.0	30.0	-0.1	-	Coarse dioritic breccia. Matrix diorite. Fragments diorite 50%. Fragments to 2". Angular. Av. size 1" Hard and silicified pyrite and chalcopyrite at 156.5' in quartz carbonate stringer. Decrease in brecciation down hole.

From Feet	To	Interval	Core	% Sulf.	Core Angle	Description
180.0	200.00	20.0	20.0	-0.1	-	Diorite very little brecciation. Broken, minor quartz carbonate stringers.
200.0	230.0	30.0	30.0	-0.1	-	Coarse andesitic BX. Pyrite at 227' silicified and broken.
230.0	275.0	45.0	45.0	-0.5	45°	Chalcopyrite and pyrite mineralized zone. Sulfide as blebs in the Andesitic breccia and in quartz-carbonate veinlets. Fault 256' and 263'. Silicified.
275.0	323.0	48.0	48.0	-0.1	-	Massive fragments volcanic andesitic tuff breccia dark green. Chalcopyrite at 288.
323.0	324.0	1.0	1.0	1	45°	Quartz-carbonate veinlet. 1% pyrite and chalcopyrite.
324.0	407.0	83.0	83.0	-0.1	-	Massive dark green andesitic breccia and andesite, "crackled". 2% widely spaced quartz-carbonate stringers. Epidote alteration to 10%. Av. 2% Minor chalcopyrite and pyrite at 358', 363', 381'. 6% to 5% pyrite chalcopyrite in carbonate at 380.5'-381'. Broken at 330-332. Quartz carbonate stringers. Average 2" from $\frac{1}{4}$ " + 6"
407.0	561.0	154.0	153.0	-0.1	20°	Mostly "dioritized". Andesitic volcanic BX. In part silicified. Some pyrite.
561.0	639.0	78.0	78.0	-	40°	Transitional rock to undioritized volcanic andesitic breccia.
639.0	817.0	178.0	175.0	-	30°	Hard silicified andesitic BX tuff. Matrix 15%. Widely scattered seams of pyrite. Chalcopyrite ( $\frac{1}{4}$ " massive) at 761'. 647' pyrite and chalcopyrite.
END						

## DIAMOND DRILL HOLE SAMPLE RECORD

DDH HNS72-2

Page 1 of 1

Sample Number	From Feet	To	Interval	% Sulf.	Rock Type	Assays			Averages		
						Cu %	Au oz/t	Ag oz/t	Cu %	Au oz/t	Ag oz/t
12051D	230.0	240.0	10.0	0.5	Breccia	0.01	0.04	0.1			
12052D	240.0	250.0	10.0	0.5	Breccia	0.01	tr	0.1			
12053D	250.0	260.0	10.0	0.5	Breccia	0.27	0.04	0.1			
12054D	260.0	270.0	10.0	0.5	Breccia	0.01	0.06	0.1			
12055D	270.0	275.0	5.0	0.5	Breccia	0.27	0.02	0.1			
	230.0	275.0	45.0	-					0.09	0.03	0.1

Notes: Samples 12051D through 12055D assayed Trace in MoS<sub>2</sub>  
 Samples assayed by Crest Laboratories Limited, 1068 Homer Street, Vancouver, B.C.

COMPANY:	Nitracell Canada Ltd	Core Size:	60
PROPERTY:	Hill Group, Nicola M.D.	Amount Casing:	43.0'
HOLE NO:	HNS72-3	Depth:	531.5'
LOCATION:	11+88E, 3+25S	Started:	6/Nov/72
COLLAR ELEV:	<del>4330'</del> 4430'	Finished:	10/Nov/72
BEARING:	220°	Drilled by:	Connors Drilling Ltd
INCLINATION:	-45°	Logged by:	M.D. Kierans <i>MDK</i>

Acid Tests (uncorrected): 200' = 52°      400' = 55°      530' = 55°  
 Acid Tests (corrected): 200' = 45°      400' = 48°      530' = 48°

From	To	Interval	Core	% Suff.	Core Angle	Description
0	20	20.0	-	-	-	Casing no core cased to 43.0'
20	65.0	45.0	42.0	-	0-10°	Brecciated shale. Angular fragments. Matrix and groundmass shale. Intermittent FeO stain; unoriented hairline carbonate stringers to 1/8". Very thin bedding in fragments - 1/32". Broken 23'-41'. Carbonate about 1%. Less brecciation down hole.
65.0	108.0	43.0	43.0	-	0-10°	Thin bedded dark grey to black shale. FeO stain on fractured plane surfaces. Broken 80'-85' and 88', 102'-103'. Possibly graphitic in part.
108.0	202.0	94.0	93.0	-	15°	As above; carbonate stringers. Mostly at 45° to core.
202.0	221.0	19.0	18.0	-	-	Badly broken core. Shale as above.
221.0	225.0	4.0	3.0	-	-	Bleached and silicified shale. Badly broken contact zone.
225.0	227.5	2.5	2.0	-	-	Fault. Mud light green color.
227.5	241.0	13.5	10.0	-	-	Andesitic volcanic. Vaguely brecciated badly broken. Fault zone (?)
241.0	313.0	71.5	70.0	-	-	Massive light green andesitic volcanics. 1% fragments 80%. Very minor epidote. Rare "crackles" 2% carbonate in masses to 1/8". Not stringers.
313.0	353.0	40.0	40.0	-	-	Massive fragments andesitic volcanic. Much less brecciation. More silicified. Minor 0.1% carbonate stringers. Flat angle to core. Broken.
353.0	531.5	198.5	197.0	-	-	As 241.0-313.0. Fault 382-384.5 mud and gouge. Slightly coarser fragments. Broken and fault (?) at 454'-455'. Broken 483'-497'. Coarser fragments down hole to 1 1/2" and darker green color down hole.

END

COMPANY:	Hilfrance/H. Canada Ltd	Core Size:	130
PROPERTY:	Hill Group, Nicola M.D.	Amount Casing:	20.0'
HOLE NO:	HNS72-4	Depth:	607'
LOCATION:	T1+88E, S+55S	Started:	12/Nov/72
COLLAR ELEV:	<del>4330'</del> 4430'	Finished:	15/Nov/72
BEARING:	40°	Drilled by:	Connors Drilling Ltd
INCLINATION:	45°	Logged by:	M.D. Kierans <i>MDK</i>

Acid Test (uncorrected):	200' = 51°	400' = 52°	600' = 52°
Acid Test (corrected):	200' = 44°	400' = 45°	600' = 45°

From feet	To	Interval	Core	% Sulf.	Core Angle	Description
0	20.0	20.0	-	-	-	Casing no core
20.0	31.0	11.0	11.0	-	-	Black shale. Highly broken. In part mud. No sharp contact visible. Very minor carbonate in knife edge stringers.
31.0	47.0	16.0	15.0	-	-	Light green andesitic volcanic. A few carbonate stringers; 1/4" up to 8". FeO stained banding also. 3" shale at 36'. 39-40' FeU stained. (oxid. pyr.)
47.0	75.0	28.0	25.0	-	-	Darker green Andesitic volcanic EX; fragments 90%. Vague brecciation. Angular fragments. 1% white carbonate as "crackling" 1/16" non-oriented stringers. Minor FeU stain.
75.0	180.0	105.0	104.0	-	45°	Dark green Andesite volcanic. In part porphyritic 85% matrix 15% phenocrysts. Small 1/8" mass of pyrite at 82'. Minor epidotization. Silicified 2" quartz carbonate stringers at 136' 0.1 pyrite in stringers and masses Starting at 150', less than 1% epidotization. 45° core angle for stringers.
180.0	209.0	29.0	29.0	0.1	45°	Rock as above but brecciated.
209.0	232.0	21.0	21.0	1.0	45°	Brecciated Andesitic volcanic. Average 1% pyrite. Very minor chalcopyrite. Sulfide in carbonate stringers. Very low grade copper. Silicified. In part, coarse brecciation.
232.0	254.0	12.0	12.0	0.5	-	Massive, volcanic andesite. Minor pyrite, silicified
254.0	266.0	12.0	12.0	0.1	45°	Silicified Andesitic EX. Fine BX. 254'-255'. 1% pyrite in quartz-carbonate stringers.
266.0	276.0	10.0	10.0	5	80°	Best pyrite mineralization in quartz carbonate in silicified andesitic BX Sampled.

From Foot	To Foot	Interval	Core	% Sulf.	Core Angle	Description
276.0	309.0	33.0	33.0	2	-	Andesitic BX pyrite widely scattered in $\frac{1}{8}$ " quartz carbonate seams. 296' good pyrite to 5%.
309.0	342.0	31.0	31.0	-	-	Massive porphyritic andesitic volcanics. Silicified. Broken 332'-333' and 338'-339'.
342.0	422.0	82.0	81.0	-	-	Coarse Andesitic BX, moderately epidotized. Fault 381'-382'. A few specks of pyrite.
422.0	427.0	5.0	5.0	2	45 <sup>o</sup>	6" carbonate stringers and minor pyrite and chalcopyrite. 422'-422.5'
427.0	457.0	30.0	30.0	0.1	45 <sup>o</sup>	425'-427' minor chalcopyrite. Silicified andesitic BX. 2% epidote. 439'-440'; 40% quartz carbonate minor pyrite.
457.0	483.0	26.0	26.0	0.5	45 <sup>o</sup>	Quartzose silicified zone. Increasing from 5% quartz carbonate to 100% at end of zone. Less than 1% pyrite. Minor chalcopyrite with pyrite. Rock is silicified Andesitic BX.
483.0	502.0	19.0	19.0	--	-	"Crackled" andesitic volcanic BX. Still part of main zone.
502.0	607.0	105.0	105.0	-	-	Ferron, almost nil, carbonate stringers. Dark green andesitic BX. Coarse angular fragments, $\frac{1}{8}$ " - $\frac{1}{4}$ ". Fragments as usual 80% of rock. Slightly epidotized.
END						

## DIAMOND DRILL HOLE SAMPLE RECORD

DDH HNS72-4

Page 1 of 1

Sample Number	From Feet	To	Interval	% Sulf.	Rock Type	Assays			Averages		
						Cu %	Au oz/t	Ag oz/t	Cu %	Au oz/t	Ag oz/t
12056D	266	276	10.0	5	Ereccia	0.02	0.02	0.1			

Note: Sample assayed by Crest Laboratories Limited, 1068 Homer Street, Vancouver, B.C.



COMPANY:	Nitracell Canada Ltd	Core Size:	EQ
PROPERTY:	Hill Group, Nicola M.D.	Amount Casing:	16.0'
HOLE NO:	HNS72-5	Depth:	347.0'
LOCATION:	11488E, 3455S	Started:	15/Nov/72
COLLAR ELEV:	<del>4750</del> ' 4430	Finished:	17/Nov/72
BEARING:	40°	Drilled by:	Connors Drilling Ltd
INCLINATION:	-60°	Logged by:	M.D. Kierans mdk

Acid Test (uncorrected): 300' = 65°

Acid Test (corrected): 300' =

From	To	Interval	Core	%	Core	Description
Feet	Feet			Sulf	Angle	
0	16.0	16.0	-	-	-	Casing no core
16.0	30.0	14.0	14.0	-	45°	Mostly black shale. Near end interbedded white volcanics. 1/4" white carbonate stringers. Some FeO. Broken near interval start
30.0	47.0	17.0	17.0	-	60°	Light green bleached andesitic volcanics. Fault at 33'. Broken in part. FeO stain on fractures. Core angles refer to stringers of quartz-carbonate.
47.0	125.0	78.0	78.0	-	-	Andesitic volcanic EX. Barren. Broken and FeO at 80'. Vague EX. Silicified No quartz carbonate. 3" 2% pyrite at 115'.
125.0	170.0	45.0	44.0	-	-	Vesicular and porphyritic andesite. Volcanic. Almost nil white quartz and carbonate. Rounded vesicles 1/8" average size to 40% of rock. Soft rock from 137'-147'.
170.0	227.0	57.0	56.0	-	60°	Vaguely brecciated. Andesite. Volcanic More quartz and carbonate. Average 1% Broken 196'-200'. Minor (1%) epidote.
227.0	257.0	30.0	30.0	1.0	60°	Andesite. Volcanic EX. 1-2% white quartz and carbonate. Scattered in zones at 228', 234', 252' Up to 1' long of up to 20% pyrite. Average pyrite content 1%.
257.0	272.0	15.0	15.0	-	-	"Crackled". Andesitic Volcanic EX.
272.0	281.0	9.0	9.0	0.1	-	Massive fragments Andesitic volcanic 0.1 pyrite.
281.0	290.0	9.0	9.0	-	20-60°	An. Volcanic. 2% white quartz-carbonate
290.0	300.0	10.0	10.0	-	45°	An. Volcanic fragments. Silicified vaguely EX.
300.0	322.0	22.0	22.0	-	60°	Speckled An. Silicified volcanic EX. at 303' 1/2" pyrite massive. Epidote to 5% in part well EX.

SUMMARY DIAMOND DRILL HOLE LOG

HNS72-5

From Feet	To Feet	Interval	Core	% Sulf.	Core Angle	Description
322.0	329.0	7.0	6.0	-	-	Massive dark green fragments. Andesite, Volcanic.
329.0	338.0	9.0	9.0	1.0	0	Pyrite stringer parallel to core in silicified epidotized Andesitic BX.
338.0	347.0	9.0	9.0	-	-	Silicified porphyritic andesitic BX. Volcanic "speckled". Epidotized matrix to 2%.
END						

# CREST LABORATORIES (B.C.) LTD.

1568 HOMER STREET  
VANCOUVER 3, B.C.  
PHONE 588-8585

## CERTIFICATE OF ASSAY

TO Nitracell Canada Ltd.

October 30, 1972

Page 2

Lab 4381

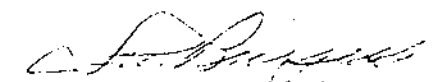
It is hereby certified that the following are the results of assays made by us upon the herein described samples.

MARKED	GOLD		SILVER	COPPER								
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
12016 D	trace		trace	0.04								
12017 D	trace		trace	trace								
12018 D	trace		trace	trace								

**NOTE:**

Rejects Retained One Month  
Pulps Retained Three Months  
Unless Otherwise Arranged.

Gold calculated at \$ ..... per ounce

  
 Registered Assayer, Province of British Columbia

# CREST LABORATORIES (B.C.) LTD.

1068 HOMER STREET  
VANCOUVER 3, B.C.  
PHONE 688-8586

## CERTIFICATE OF ASSAY

TO Nitracell Canada Ltd.  
10th Floor, 549 Howe Street,  
Vancouver, B.C.

October 30, 1972

Lab 4381

I hereby certify THAT THE FOLLOWING ARE THE RESULTS OF ASSAYS MADE BY US UPON THE HEREIN DESCRIBED SAMPLES.

MARKED	GOLD		SILVER	COPPER	LEAD	ZINC	MoS <sub>2</sub>					
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
12001 D	trace		trace	0.02	----	----	----					
12002 D	0.01		trace	0.02	----	----	----					
12003 D	trace		trace	trace	----	----	----					
12004 D	trace		trace	0.01	----	----	----					
12005 D	trace		trace	0.01	----	----	----					
12006 D	trace		trace	0.01	----	----	----					
12007 D	trace		trace	0.01	----	----	----					
12008 D	0.01		0.1	0.09	----	----	----					
12009 D	0.01		0.2	0.31	----	----	----					
12010 D	trace		trace	0.01	----	----	----					
12011 D	trace		trace	trace	----	----	----					
12012 D	trace		trace	0.01	----	----	----					
12013 D	0.01		0.2	0.84	trace	trace	0.01					
12014 D	trace		0.1	0.03	----	----	----					
12015 D	trace		0.1	0.01	----	----	----					

**NOTE:**

Rejects Retained One Month  
Pulps Retained Three Months  
Unless Otherwise Arranged.

Gold calculated at \$ ..... per ounce

*S. J. Burgess*  
Registered Assayer, Province of British Columbia

# CREST LABORATORIES (B.C.) LTD.

1068 HOMER STREET  
VANCOUVER 3, B.C.  
PHONE 688-8586

## CERTIFICATE OF ASSAY

TO Nitracell Canada Ltd.  
10th Floor, 549 Howe Street,  
Vancouver, B.C.

November 6, 1972

Lab 4389

I hereby certify THAT THE FOLLOWING ARE THE RESULTS OF ASSAYS MADE BY US UPON THE HEREIN DESCRIBED SAMPLES.

MARKED	GOLD		SILVER	COPPER	MOLYBDENUM							
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
12019 D	trace		trace	0.02	trace							
12020 D	trace		trace	0.02	trace							
12021 D	trace		trace	0.02	----							
12022 D	trace		trace	0.16	trace							
12023 D	trace		trace	0.02	----							
12024 D	trace		trace	0.12	trace							
12025 D	trace		trace	0.03	trace							
12026 D	trace		trace	0.04	trace							
12027 D	trace		0.1	0.40	trace							
12028 D	trace		trace	0.08	trace							
12029 D	0.01		0.1	1.12	trace							
12030 D	trace		trace	0.02	trace							
12031 D	trace		trace	0.18	trace							
12032 D	trace		trace	0.03	trace							

**NOTE:**

Rejects Retained One Month  
Pulps Retained Three Months  
Unless Otherwise Arranged.

Gold calculated at \$ ..... per ounce

*[Signature]*  
Registered Assayer, Province of British Columbia

# CREST LABORATORIES (B.C.) LTD.

1068 HOMER STREET  
VANCOUVER 3, B.C.  
PHONE 688-8586

## CERTIFICATE OF ASSAY

TO Nitracell Canada Ltd.  
10th Floor, 549 Howe Street,  
Vancouver, B.C.

November 14, 1972

Lab 4410

**I hereby certify** THAT THE FOLLOWING ARE THE RESULTS OF ASSAYS MADE BY US UPON THE HEREIN DESCRIBED SAMPLES.

MARKED	GOLD		SILVER	COPPER	MOLYBDENUM						
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
12051 D	0.04		0.1	0.01	trace						
12052 D	trace		0.1	0.01	trace						
12053 D	0.04		0.1	0.27	trace						
12054 D	0.06		0.2	0.01	trace						
12055 D	0.02		0.1	0.27	trace						

**NOTE:**

Rejects Retained One Month  
Pulps Retained Three Months  
Unless Otherwise Arranged.

Gold calculated at \$ ..... per ounce

*[Signature]*  
Registered Assayer, Province of British Columbia

# CREST LABORATORIES (B.C.) LTD.

1068 HOMER STREET  
VANCOUVER 3, B.C.  
PHONE 688-8586

## CERTIFICATE OF ASSAY

TO Nitracell Canada Ltd.  
10th Floor, 549 Howe Street,  
Vancouver, B.C.

December 4, 1972

Lab 4457

I hereby certify THAT THE FOLLOWING ARE THE RESULTS OF ASSAYS MADE BY US UPON THE HEREIN DESCRIBED SAMPLES.

MARKED	GOLD		SILVER	COPPER									
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
MD11 12056 D	0.02		0.1	0.02									

**NOTE:**

Rejects Retained One Month  
Pulps Retained Three Months  
Unless Otherwise Arranged.

Gold calculated at \$ ..... per ounce

*A. B. [Signature]*  
Registered Assayer, Province of British Columbia

# CREST LABORATORIES (B.C.) LTD.

1068 HOMER STREET  
VANCOUVER 3, B.C.  
PHONE 688-8586

RECEIVED

SEP 11 1972

## CERTIFICATE OF ASSAY

TO \_\_\_\_\_

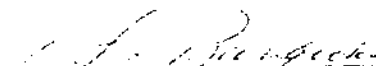
I hereby certify THAT THE FOLLOWING ARE THE RESULTS OF ASSAYS MADE BY US UPON THE HEREIN DESCRIBED SAMPLES.

MARKED	GOLD		SILVER									
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
		1.76	1.3	1.04								
		6.77	1.0	1.0								
		0.70	2.7	1.0								
		1.24	1.0	0.81								
		0.75	1.1	3.62								

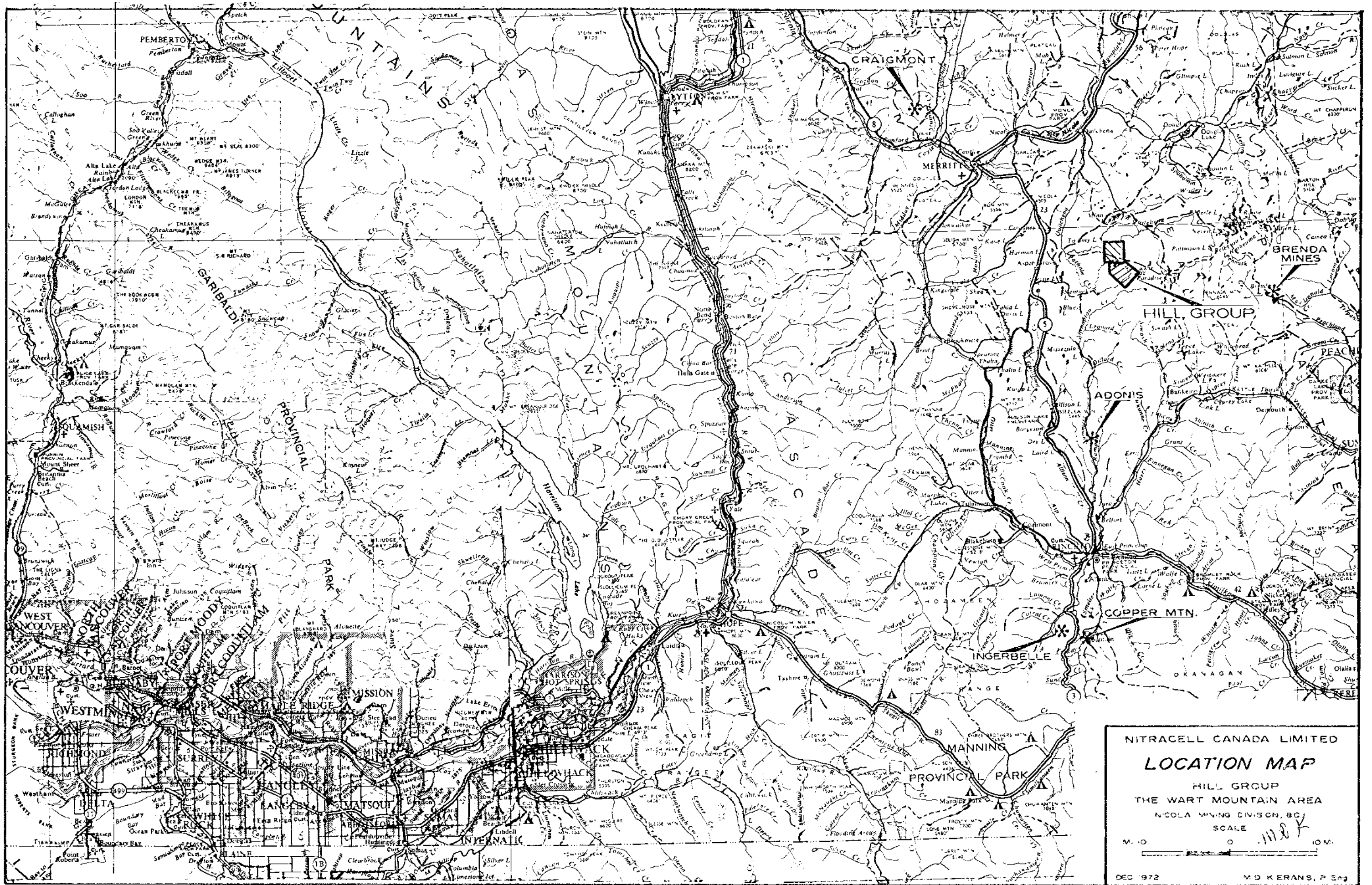
**NOTE:**

Rejects Retained One Month  
Pulps Retained Three Months  
Unless Otherwise Arranged.

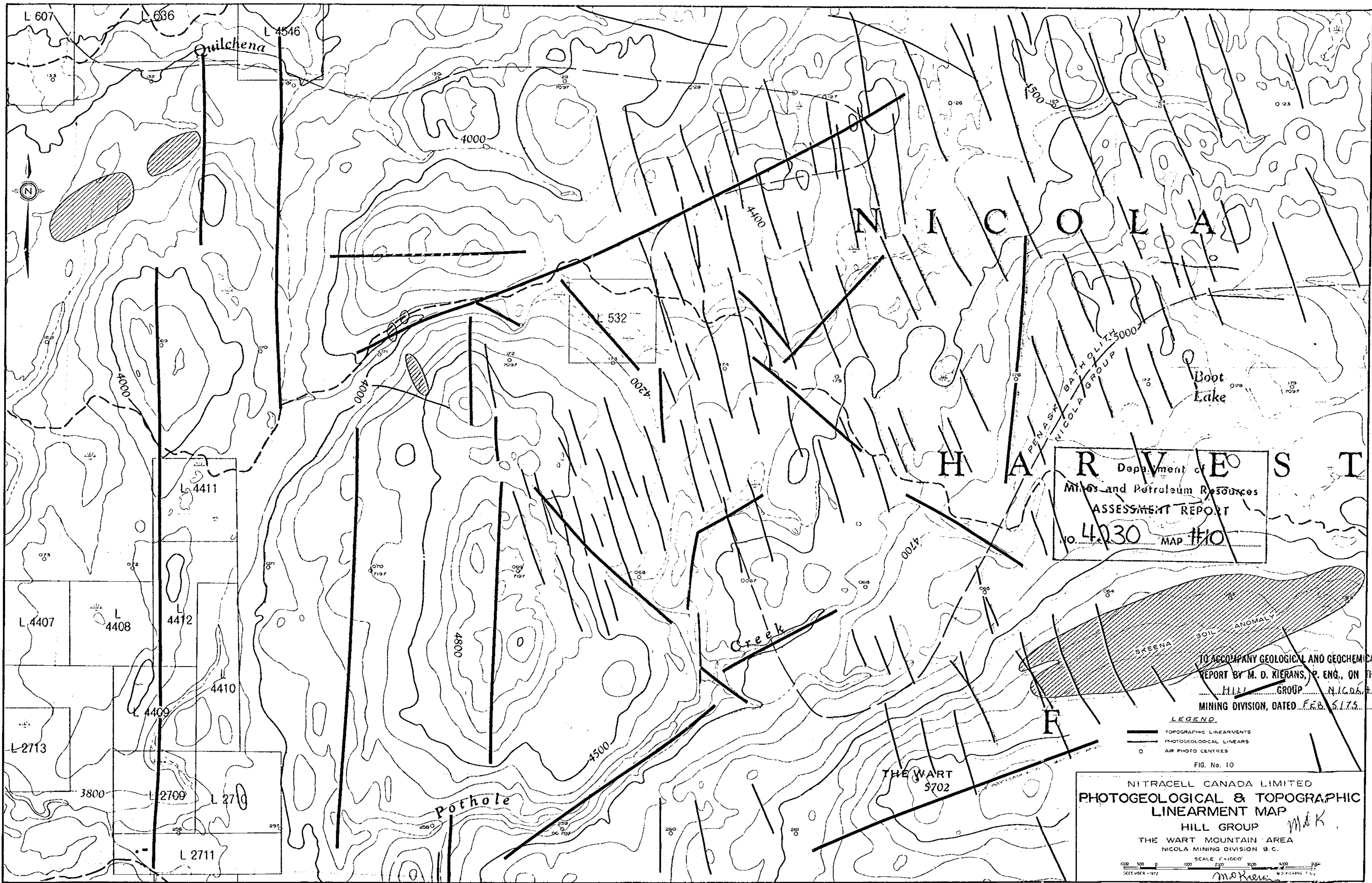
Gold calculated at \$ ..... per ounce

  
 Registered Assayer, Province of British Columbia





NITRACELL CANADA LIMITED  
**LOCATION MAP**  
 HILL GROUP  
 THE WART MOUNTAIN AREA  
 NICOLA MINING DIVISION, BC  
 SCALE *1:50,000*  
 M. 0 10M.  
 DEC 972 M.D. KERANS, P. Eng

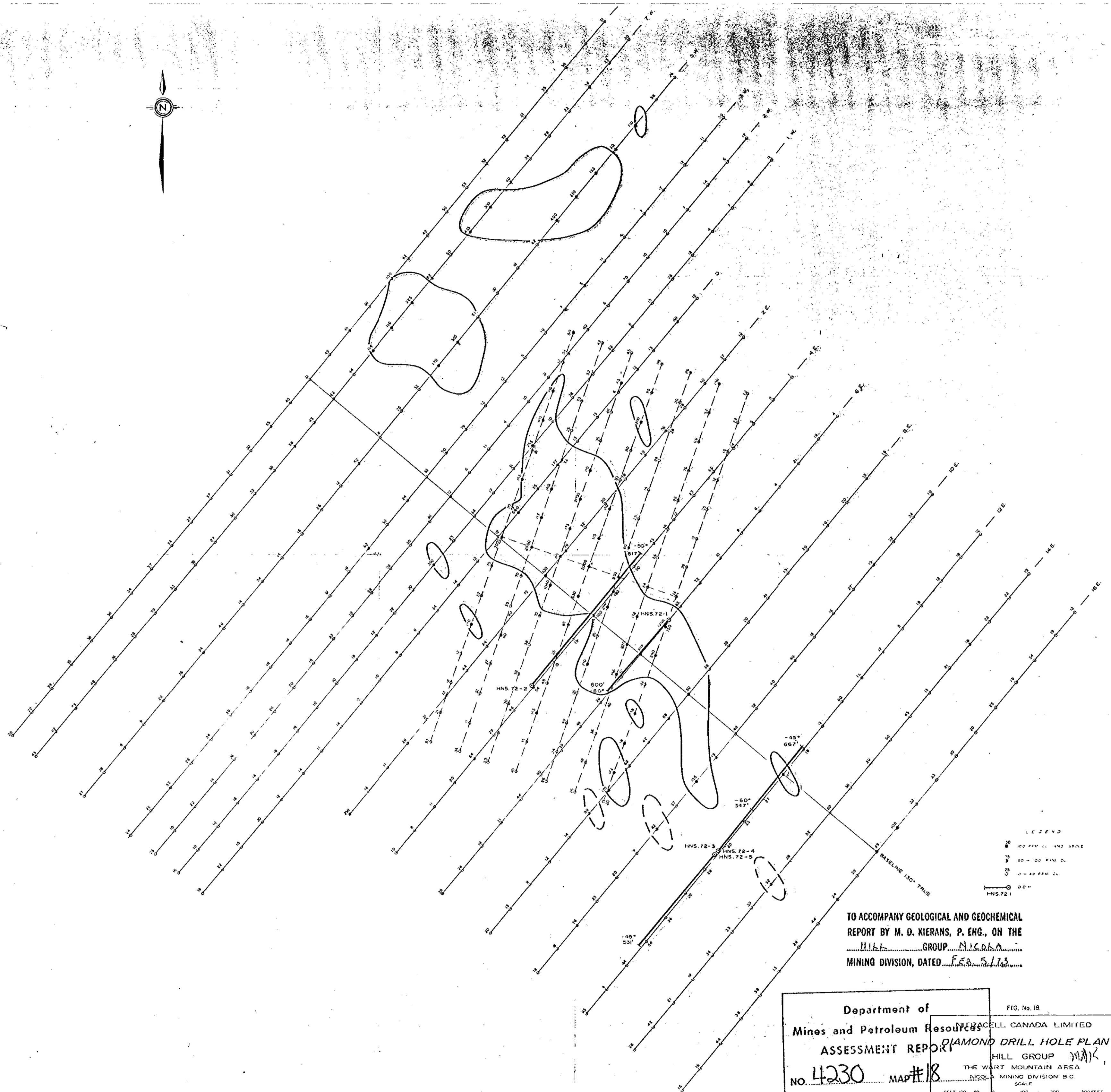


Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 No. 4230 MAP #10

TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
 REPORT BY M. D. KIERANS, P. ENG., ON THE  
 HILL GROUP, N.I.C.D.A.  
 MINING DIVISION, DATED FEB. 5. 1973.

**LEGEND**  
 — TOPOGRAPHIC LINEARMENTS  
 - - PHOTOGEOLOGICAL LINEARS  
 O AIR PHOTO CENTRES

FIG. No. 10  
 NITRACELL CANADA LIMITED  
 PHOTOGEOLOGICAL & TOPOGRAPHIC  
 LINEARMENT MAP  
 HILL GROUP  
 THE WART MOUNTAIN AREA  
 NICOLA MINING DIVISION B. C.  
 SCALE 1:1000  
 0 200 400 600 800  
 DECEMBER 1972  
 M. D. Kierans



TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
REPORT BY M. D. KIERANS, P. ENG., ON THE  
HILL GROUP, NICOLA  
MINING DIVISION, DATED FEB. 5, 1973.

Department of Mines and Petroleum Resources	FIG. No. 18
ASSESSMENT REPORT	NICOLL CANADA LIMITED
NO. 4230	DIAMOND DRILL HOLE PLAN
MAP # 18	HILL GROUP
	THE WART MOUNTAIN AREA
	NICOLA MINING DIVISION B.C.
	SCALE
	FEEET 100 50 0 100 200 300 FEET



TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
 REPORT BY M. D. KIERANS, P. ENG., ON THE  
 HILL CLAIM GROUP 12 NICOLA  
 MINING DIVISION, DATED FEB. 5/73.

FIG. No. 14.

**NITRACELL CANADA LTD.**  
 HILL CLAIM GROUP, PARADISE LAKE AREA, NICOLA M.D., B.C.

**DIAMOND DRILL HOLE PLAN**

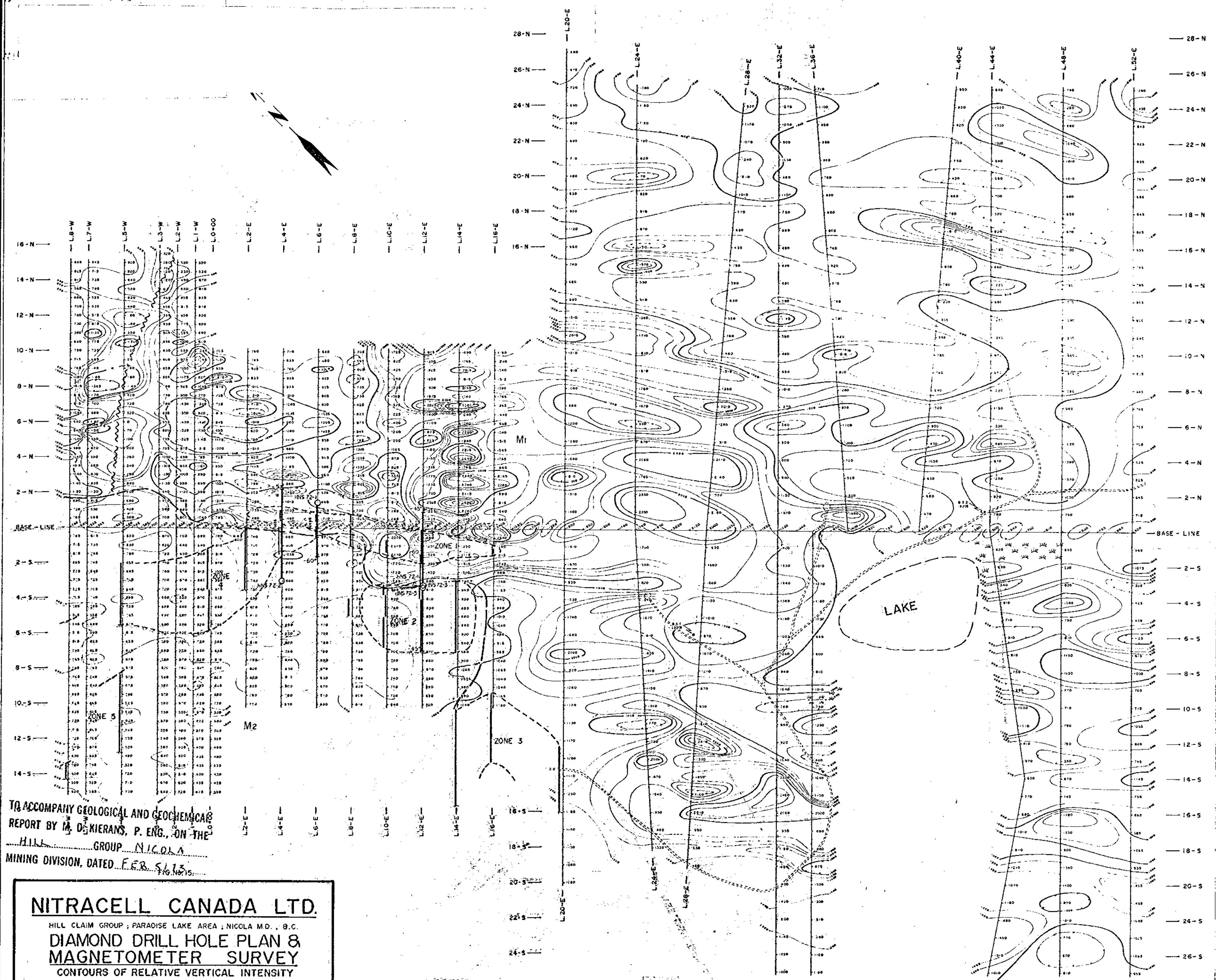
SCALE: 1" = 200 FEET

MAP NO. W-158-3  
 TO ACCOMPANY A REPORT BY  
 PETER E. WALCOTT, P. ENG.  
 DATED - DECEMBER 1972

PETER E. WALCOTT & ASSOC. LTD.  
 AUGUST - OCTOBER 1972

*MDK Kierans*

4230 M-14



TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
 REPORT BY M. DEKIERANS, P. ENG., ON THE  
 HILL CLAIM GROUP, NICOLA  
 MINING DIVISION, DATED FEB. 5, 1975

**NITRACELL CANADA LTD.**  
 HILL CLAIM GROUP; PARADISE LAKE AREA; NICOLA M.D., B.C.  
**DIAMOND DRILL HOLE PLAN & MAGNETOMETER SURVEY**  
 CONTOURS OF RELATIVE VERTICAL INTENSITY  
 (IN GAMMAS)

SCALE 1" = 200 FEET

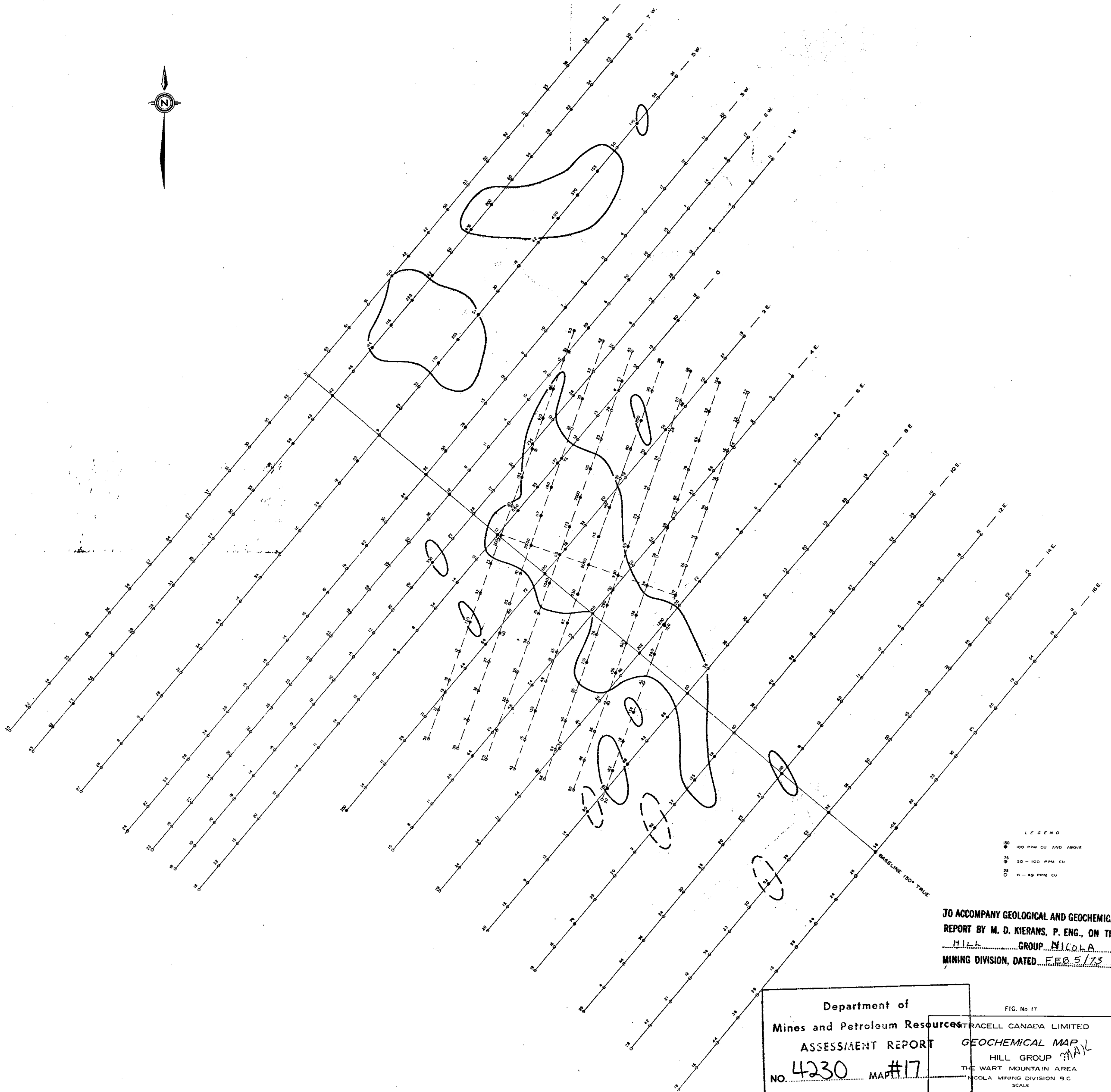
MAP NO. W-153-1  
 TO ACCOMPANY A REPORT BY  
 PETER E. WALCOTT, P. Eng.  
 DATED - DECEMBER 1972

PETER E. WALCOTT & ASSOC. LTD.  
 AUGUST - OCTOBER 1972

- LEGEND**
- M2 MAGNETIC ROCK UNIT
  - MAGNETIC CONTACT
  - - - - - OUTLINE OF I.P. ANOMALOUS ZONE
  - I.P. ANOMALY
  - DIAMOND DRILL HOLE.

- LEGEND**
- 200 GAMMA CONTOUR
  - 1000 GAMMA CONTOUR
  - MAGNETIC DEPRESSION
  - ROAD
  - LAKE
  - SWAMP
  - MAGNETIC BASE STATION

4230 M-15

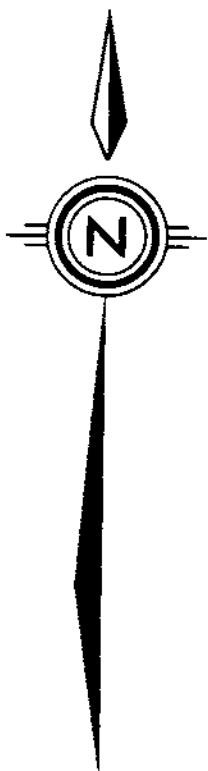


LEGEND  
● 100 PPM CU AND ABOVE  
◉ 50 - 100 PPM CU  
○ 0 - 49 PPM CU

TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
REPORT BY M. D. KIERANS, P. ENG., ON THE  
HILL GROUP NICOLA  
MINING DIVISION, DATED FEB 5/73

Department of Mines and Petroleum Resources ASSESSMENT REPORT No. 4230 MAP #17	TRACELL CANADA LIMITED GEOCHEMICAL MAP HILL GROUP THE WART MOUNTAIN AREA NICOLA MINING DIVISION B.C. SCALE 0 100 200 300 FEET Mod Kierans
---	--

FIG. No. 17.



LEGEND

16 STATION LOCATIONS  
18 SHOWING CU IN PPM

MAIN ANOMALOUS DISPERSION  
100 PPM CU. AND HIGHER.

NOTE: FOR DETAIL SOIL SAMPLE RESULTS ON  
LINES O-8 W. AND O-16 E.  
SEE FIGURE No. 17  
FOR CLAIMS SEE FIGURE No. 14

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4230 MAP #13

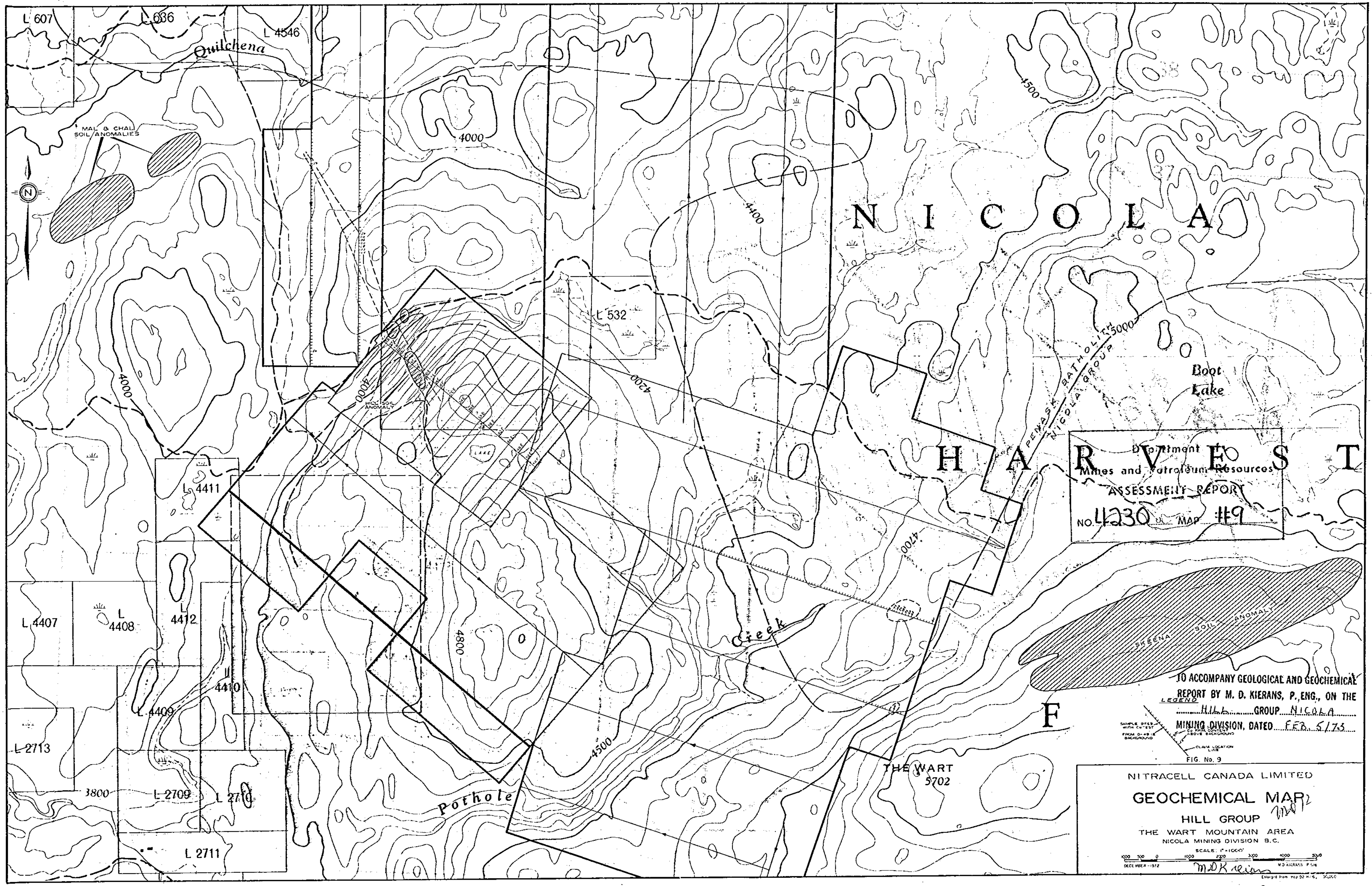
FIG. No 13

NITRACELL CANADA LIMITED  
**SOIL SAMPLE GRID**  
HILL GROUP  
THE WART MOUNTAIN AREA  
NICOLA MINING DIVISION BC.

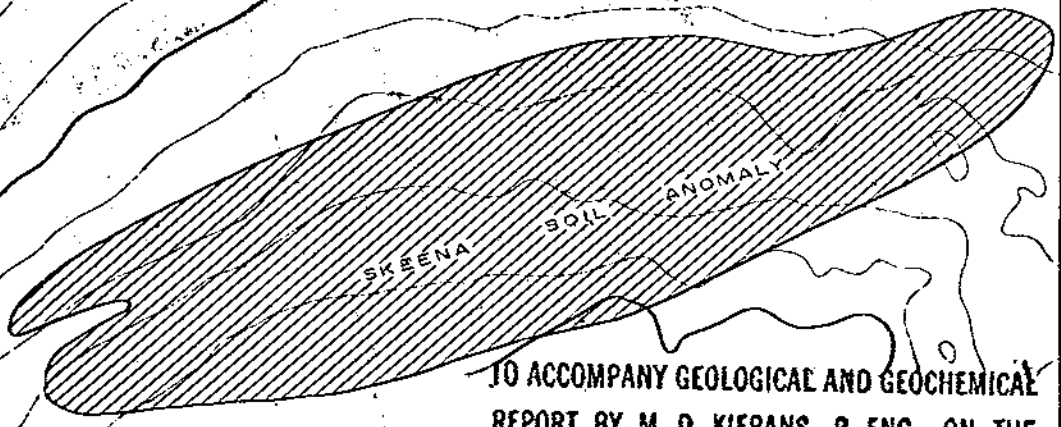
SCALE  
FEET 400 0 400 800 1200 FEET

JAN. 1973

MOK Kierans M.D. KIERANS P. ENG.



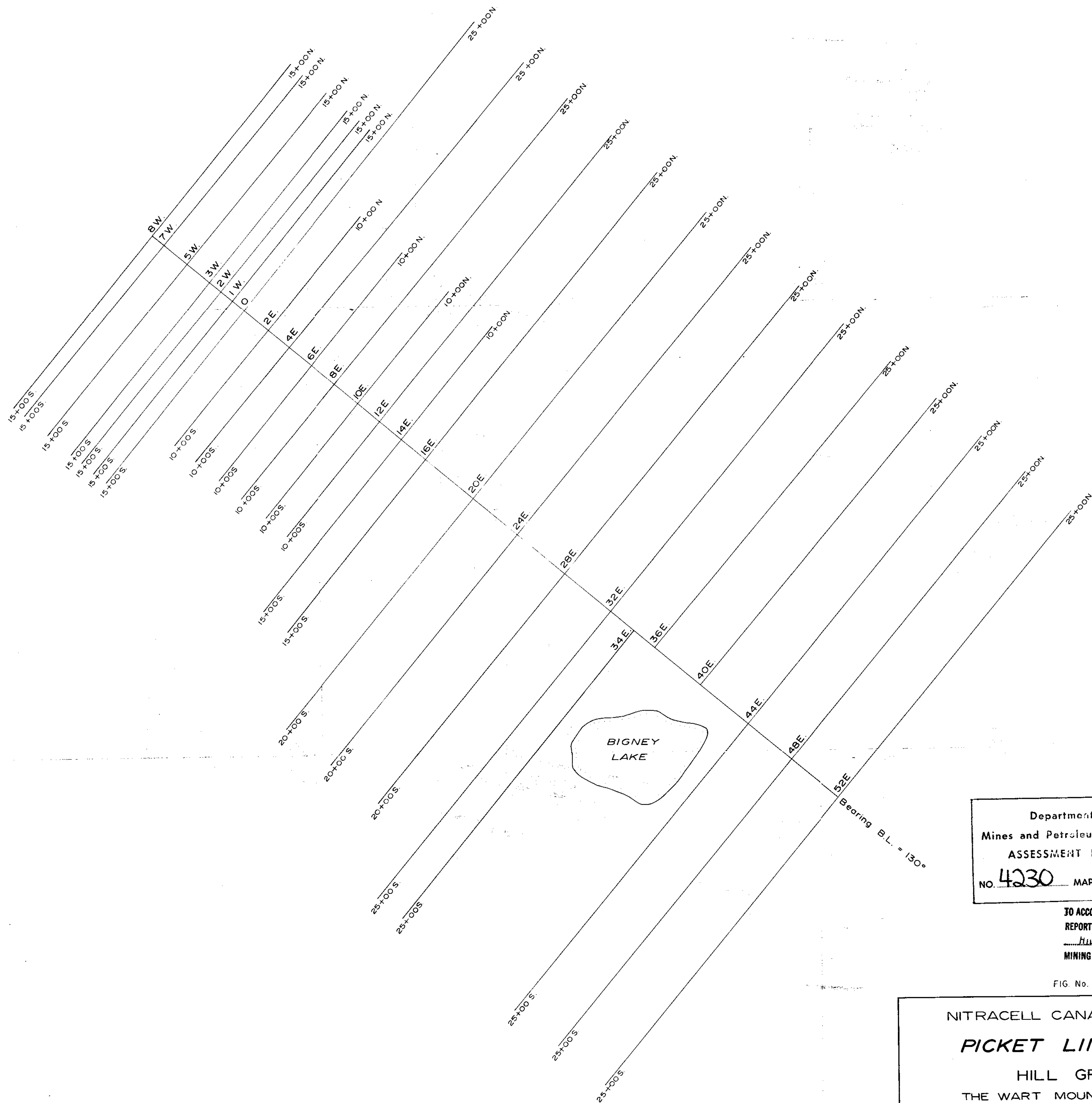
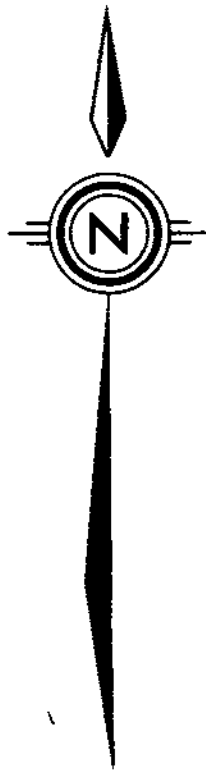
Department  
 Mines and Petroleum Resources  
**ASSESSMENT REPORT**  
 NO. 4230 MAP #19



TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
 REPORT BY M. D. KIERANS, P. ENG., ON THE  
 HILL GROUP, NICOLA  
 MINING DIVISION, DATED FEB. 5/73

FIG. No. 9  
 NITRACELL CANADA LIMITED  
**GEOCHEMICAL MAP**  
 HILL GROUP  
 THE WART MOUNTAIN AREA  
 NICOLA MINING DIVISION B.C.  
 SCALE: 1:10000  
 0 1000 2000 3000 4000  
 DECEMBER - 1972 M.D.K. rems





Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4230 MAP #12

TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
REPORT BY M. D. KIERANS, P. ENG., ON THE  
HILL GROUP NICOLA  
MINING DIVISION, DATED FEB. 6, 1973

FIG. No. 12

NITRACELL CANADA LIMITED  
**PICKET LINE GRID**  
HILL GROUP  
THE WART MOUNTAIN AREA  
NICOLA MINING DIVISION BC.  
SCALE  
FEET 400 0 400 800 1200 FEET  
JAN. 1973  
M.D. Kierans M.D. KIERANS P. ENG.

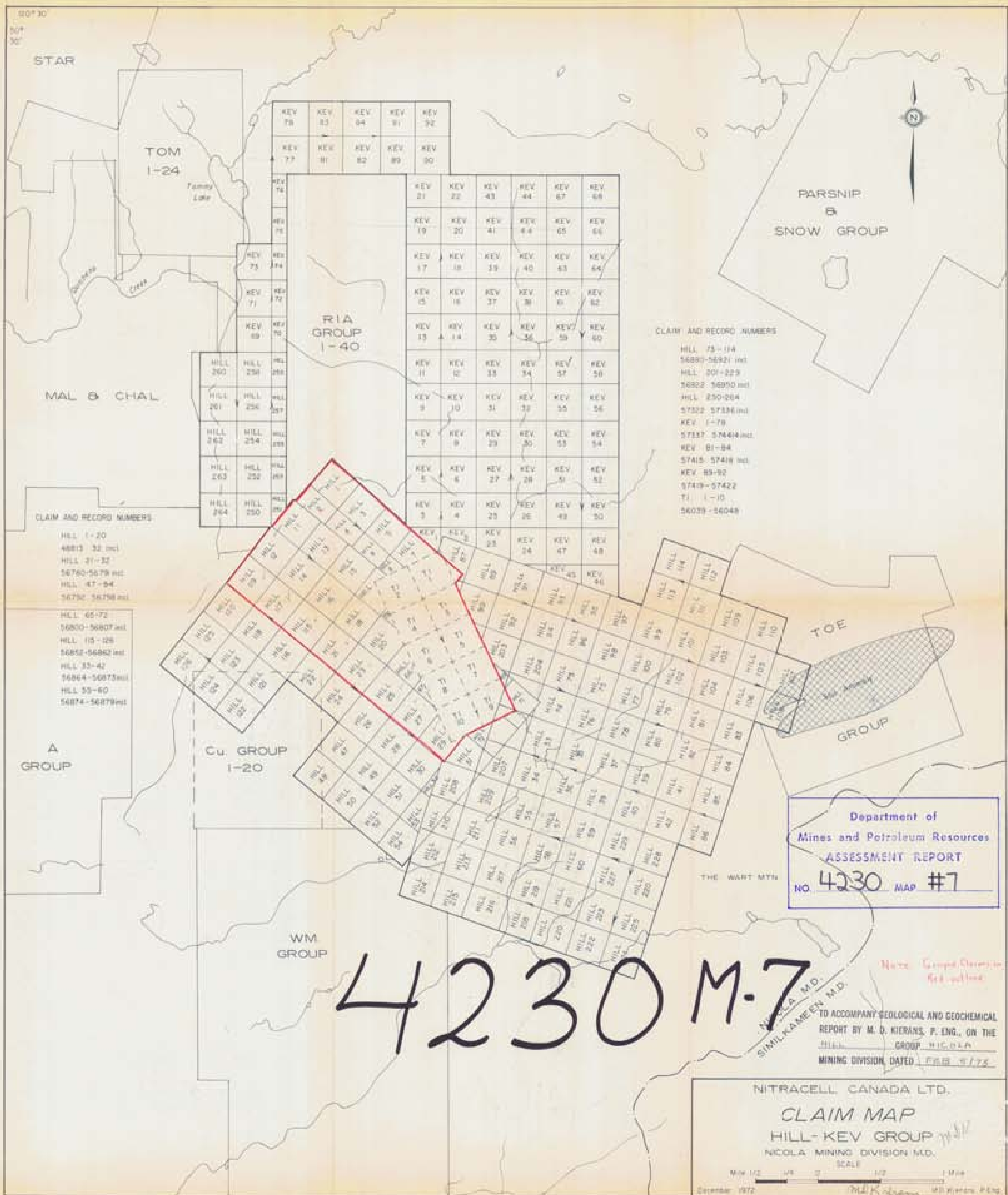


Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4230 MAP #16

- LEGEND
- Dashed line - Boundary of mineralized zone
  - Solid line - Boundary of geological unit
  - Dotted line - Boundary of geological unit
  - Wavy line - Fault, strike, and dip
  - Arrow - Direction of dip
  - Line with 'A' - Adit
  - Line with 'B' - Adit
  - Line with 'C' - Adit
  - Line with 'D' - Adit
  - Line with 'E' - Adit
  - Line with 'F' - Adit
  - Line with 'G' - Adit
  - Line with 'H' - Adit
  - Line with 'I' - Adit
  - Line with 'J' - Adit
  - Line with 'K' - Adit
  - Line with 'L' - Adit
  - Line with 'M' - Adit
  - Line with 'N' - Adit
  - Line with 'O' - Adit
  - Line with 'P' - Adit
  - Line with 'Q' - Adit
  - Line with 'R' - Adit
  - Line with 'S' - Adit
  - Line with 'T' - Adit
  - Line with 'U' - Adit
  - Line with 'V' - Adit
  - Line with 'W' - Adit
  - Line with 'X' - Adit
  - Line with 'Y' - Adit
  - Line with 'Z' - Adit

TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
REPORT BY M. D. KIERANS, P. ENG., ON THE  
HILL 1-2 GROUP NICOLA  
MINING DIVISION, DATED Feb. 5/74

NITRACELL CANADA LIMITED  
GEOLOGICAL PLAN  
MAIN ADIT MINERALIZED ZONE  
HILL 1-2 GROUP  
THE WART MOUNTAIN AREA  
NICOLA MINING DIVISION, B.C.  
SCALE 1:25,000  
M.D. Kierans



CLAIM AND RECORD NUMBERS

- HILL 1-20
- 48813-52 inc
- HILL 21-32
- 56760-5679 inc
- HILL 47-54
- 56795-56798 inc
- HILL 65-72
- 56800-56807 inc
- HILL 105-125
- 56852-56862 inc
- HILL 33-42
- 56864-56873 inc
- HILL 53-60
- 56874-56879 inc

CLAIM AND RECORD NUMBERS

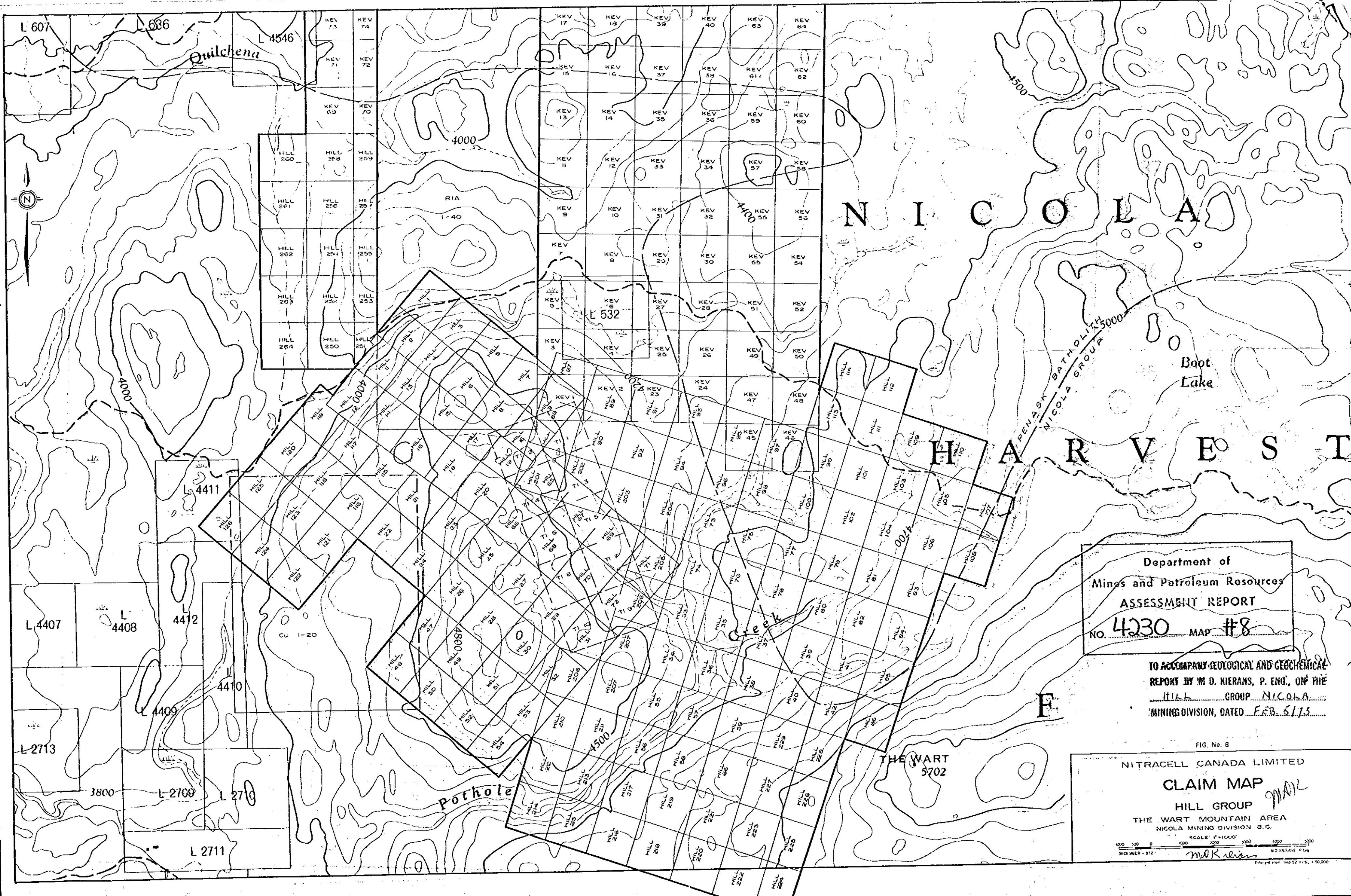
- HILL 73-114
- 56880-56921 inc
- HILL 201-229
- 56922-56950 inc
- HILL 230-264
- 57322-57336 inc
- KEY 1-19
- 57337-57404 inc
- KEY 01-04
- 57415-57418 inc
- KEY 89-92
- 57419-57422
- TI 1-10
- 56039-56048

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. **4230** MAP #7

**4230 M-7**

Note: Group claims in red outline  
TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
REPORT BY M. D. KIERANS, P. ENG., ON THE  
HILL GROUP NICOLA  
MINING DIVISION, DATED FEB 5/75

NITRACELL CANADA LTD.  
**CLAIM MAP**  
HILL-KEV GROUP  
NICOLA MINING DIVISION M.D.  
SCALE  
1/2 1/4 1/8 1/16 1/32  
October 1972

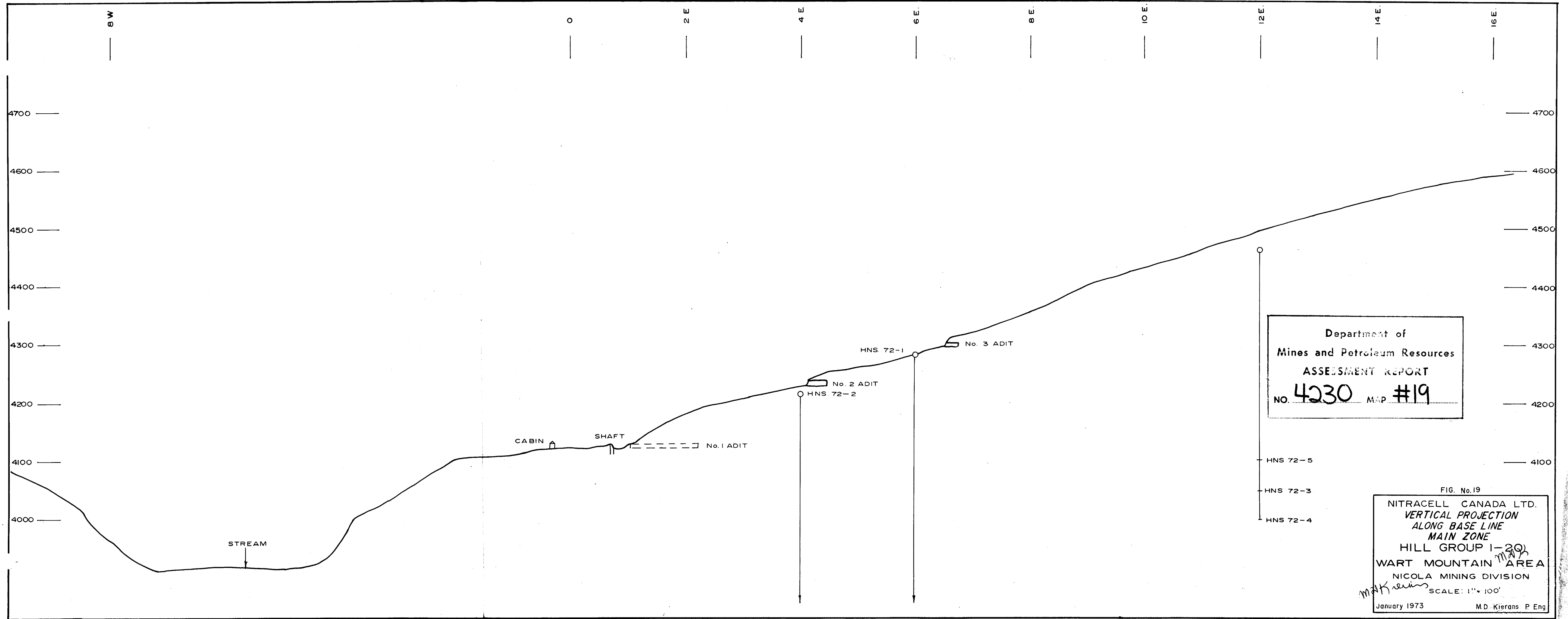


Department of  
 Mines and Petroleum Resources  
**ASSESSMENT REPORT**  
 NO. **4230** MAP # **8**

TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
 REPORT BY M. D. KIERANS, P. ENG., ON THE  
 HILL GROUP NICOLA  
 MINING DIVISION, DATED FEB. 5/75

FIG. No. 8  
 NITRACELL CANADA LIMITED  
**CLAIM MAP**  
 HILL GROUP  
 THE WART MOUNTAIN AREA  
 NICOLA MINING DIVISION B.C.  
 SCALE 1:1000  
 DECEMBER 1972  
 M.D. Kierans

Engr'd from map 92 H.R.S. 1:50,000

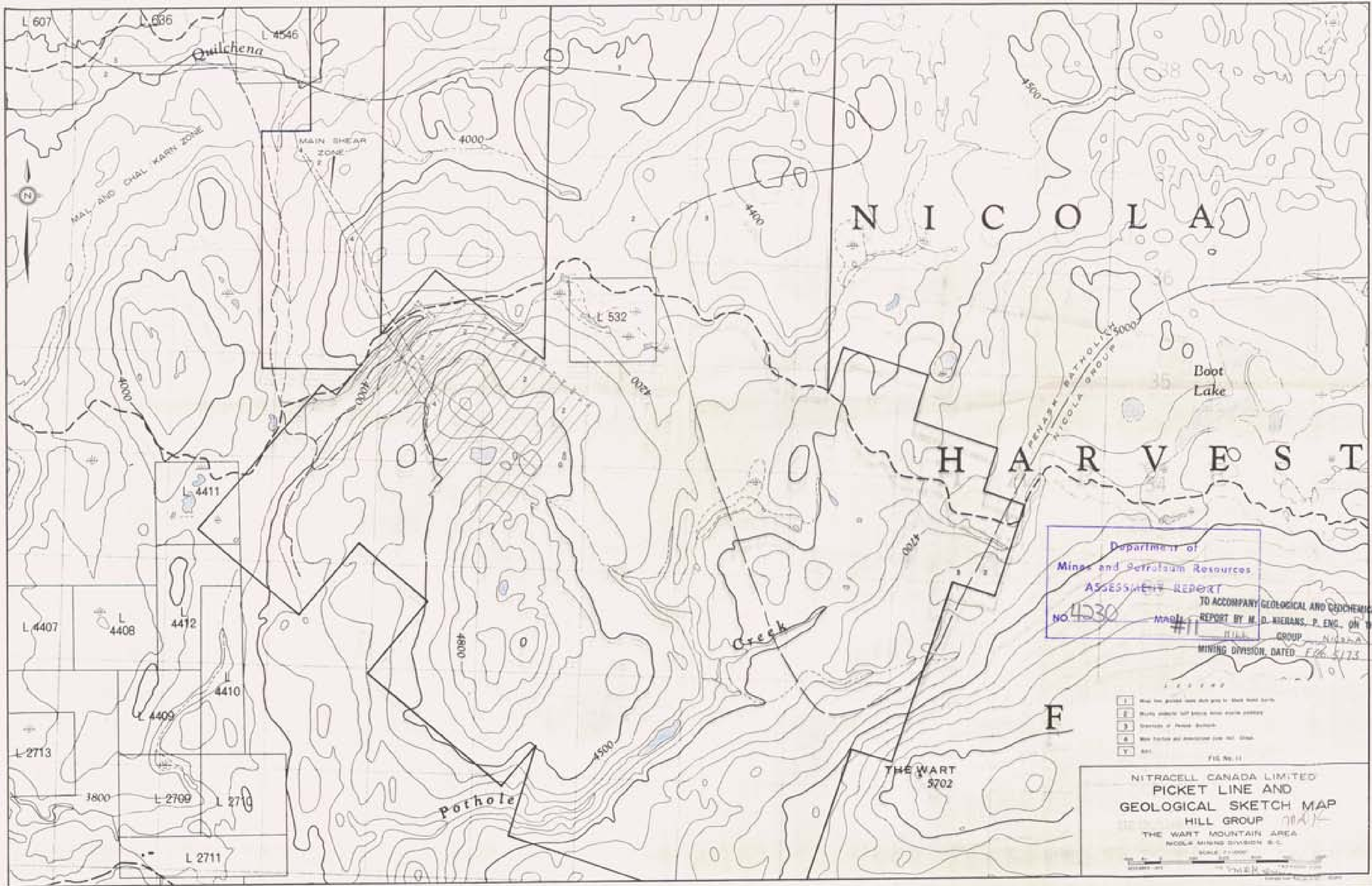


Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 4230 MAP #19

FIG. No. 19  
 NITRACELL CANADA LTD.  
 VERTICAL PROJECTION  
 ALONG BASE LINE  
 MAIN ZONE  
 HILL GROUP 1-20  
 WART MOUNTAIN AREA  
 NICOLA MINING DIVISION  
 SCALE: 1" = 100'  
 January 1973 M.D. Kierans P. Eng



NITRACELL CANADA LIMITED  
**TOPOGRAPHIC MAP**  
 HILL GROUP *MDK*  
 THE WART MOUNTAIN AREA  
 NICOLA MINING DIVISION, B.C.  
 SCALE 1:50,000  
 DEC 1972 M. D. KERANS P. Eng.



Department of  
 Mines and Petroleum Resources  
**ASSESSMENT REPORT**  
 TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL  
 REPORT BY M. D. KIRKANS, P. ENG. ON THE  
 HILL GROUP  
 NO. 4230 #11  
 MINING DIVISION, DATED FEB. 5/73

- 1. Main line grid lines (see also page 10)
- 2. Main line grid lines (see also page 10)
- 3. Main line grid lines (see also page 10)
- 4. Main line grid lines (see also page 10)
- 5. Main line grid lines (see also page 10)

NITRACELL CANADA LIMITED  
**PICKET LINE AND  
 GEOLOGICAL SKETCH MAP**  
 HILL GROUP  
 THE WART MOUNTAIN AREA  
 NICOLA MINING DIVISION B.C.  
 SCALE 1:5000  
 1973