GEOLOGICAL, GEOCHEMICAL, GEOPHYSICAL

&

PHYSICAL WORK REPORT

ON THE

HOO, EL, GEE, LEO, P.S.,

P.G., C.W., AND Z

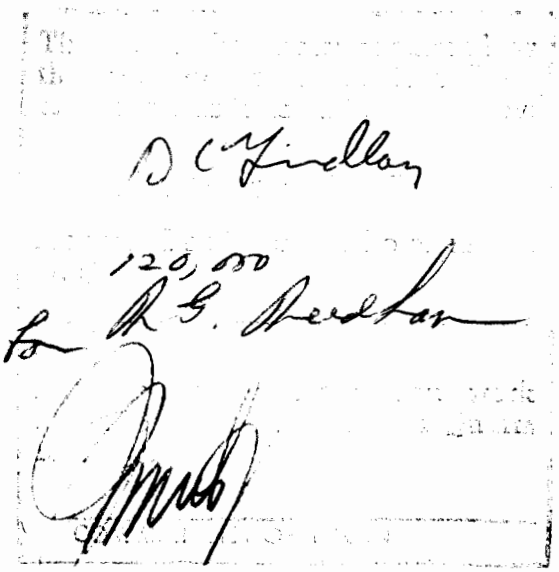
CLAIM GROUPS

BY

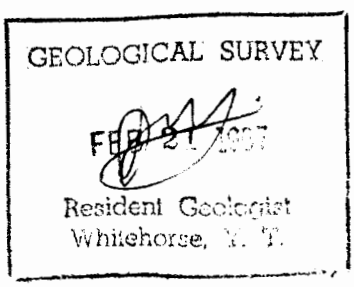
P. H. SEVENSMA, Ph.D., P.Eng.

&

R. T. HEARD



Staking Sheet Nos. 105-G-6, 7, 11 & 12
Latitude: - 61°20'N to 61°32'N
Longitude: - 130°50'W to 131°37'W
Date Work Performed: May 8 - November 4, 1966



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3.	Plan of Mineral Claims and Pan/Silt Samples (lead, zinc and copper plots)	1 inch = ½ mile
4.	Geochemical Maps (lead, zinc and copper plots) Covering Areas 2, 5, 8 & 9, 10, 11, 12, 13, 14, 15, 16 & 19	1 inch = 400 feet
5.	Geophysical Maps (Ronka Survey by Northlake Mines Covering Areas 10, 11, 14, 15 & 19	1 inch = 200 feet
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7.	Plan Layout of Diamond Drill Holes	1 inch = 100 feet
	Log of D.D.H. #18-1	1 inch = 20 feet
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	Log of D.D.H. #18-4	1 inch = 20 feet

SUMMARY

Northlake Mines Limited of 11-425 Howe Street, Vancouver, B.C., acquired from Grassy Lakes Syndicate 560 mineral claims in the Grassy Lakes area of the Watson Lake Mining Division, Yukon Territory. These claims were staked in January 1966. From information gained by compilation of available data plus that obtained by reconnaissance work an additional 264 claims were staked to bring their total number of claims in the area to 824 as of July 25, 1966.

MacDonald Consultants Limited were retained by Northlake Mines Limited to manage a geological, geochemical, geophysical and physical work program under the direction of Dr. P. H. Sevensma, P.Eng.

The exploration program was started by conducting an airborne combined magnetic-electromagnetic survey over the entire claim area. Lockwood Survey Corporation Limited conducted the survey using helicopter-borne equipment, under the supervision of Dr. Sevensma.

The claims were then divided into 19 separate areas of interest (figure 1). Each of these areas contained an airborne geophysical anomaly and/or a mineralized showing that warranted further investigation.

Areas were then selected for gridding and line cutting was carried out on these. The cut grids were surveyed, tied into local topographical features, and then plotted onto a 1000 scale base map that had been prepared by McElhanney Surveying & Engineering Limited.

A geochemical survey was conducted over the grids as it was felt that a preliminary soil sampling program would give an indication to possible vein zones and would define areas for closer follow-up work. In addition to the soil sampling all of the streams draining the area were silt and/or pan sampled.

Geological mapping of the grid areas to 1000 scale plus a preliminary geological reconnaissance of the whole area was conducted. This information was used as an aid in the interpretation of the geochemical results.

Hand trenching was done in one area in conjunction with physical prospecting, and one area containing both an airborne and a ground geophysical anomaly was diamond drilled.

PROPERTY

The properties acquired by Northlake Mines consist of the following claim groups (figure 1):

1. Gee Group. 400 claims. Staking sheets 105-G-6 and 105-G-7

Gee 1-80	Grant Nos. 90172-90250 & No. Y2004
Gee 81-88	Grant Nos. Y2002, Y2003 & Y2005-Y2009
Gee 89-400	Grant Nos. Y2010-Y2321
Gee 401-530	Grant Nos. Y7103-Y7232

2. El Group. 60 claims. Staking sheets 105-G-6 and 105-G-11

El 1-60	Grant Nos. 90012-90071

3. Hoo Group. 123 claims. Staking sheet 105-G-12

Hoo 1-100	Grant Nos. 90072-90171
Hoo 101-123	Grant Nos. Y13368-Y13390

4. P.G. Group. 16 claims. Staking sheet 105-G-6

P.G. 1-16	Grant Nos. Y13352-Y13367

5. P.S. Group. 40 claims. Staking sheet 105-G-7

P.S. 1-40	Grant Nos. Y7854-Y7893

6. Z Group. 2 claims. Staking sheet 105-G-6

Z 1 & Z 2	Grant Nos. Y13085 & Y13086

7. C.W. Group. 23 claims. Staking sheet 105-G-6

C.W. 1-4	Grant Nos. Y13081-Y13084
C.W. 5-23	Grant Nos. Y13333-Y13351

8. Leo Group. 30 claims. Staking sheet 105-G-6

Leo 1-6	Grant Nos. Y13087-Y13092
Leo 7-14	Grant Nos. Y13125-Y13132

LOCATION

All claim groups are located in the Watson Lake Mining District, on N.T.S. 105-G, Finlayson Lake map sheet between 61°20' to 61°32' north, latitude and 130°50' to 131°37' west longitude. The property lies between 10 and 25 miles south of the new Watson Lake-Ross River road and approximately 60 miles east of Ross River.

HISTORY

Nothing is recorded about the early phases of exploration in the area but several old cabins and the remnants of placer workings were discovered. It is probable that the early placer miners passed through and investigated all the creeks and streams in the area for gold around the turn of the century.

The first recorded activity occurred in 1954 shortly after the discovery of the Vangorda Creek lead-zinc deposit. Mr. K. G. Sanders and R. Zielinski initially prospected the Grass Lakes area for Pelly River Explorations Limited, a subsidiary of Pioneer Gold Mines of B.C. Ltd. Nine mineral showings of interest were found in the area now covered by the Gee claims. Some short fibre asbestos was also found in the area now covered by the El group. They also reported minor galena-sphalerite float in limestone and some chalcopyrite in quartz in the vicinity of the Hoo claims. Three showings, the Pit, Rob and Gyp, were staked at that time.

In 1955, the Pit and Rob showings were optioned to Transcontinental Resources of Vancouver, B.C. A ground magnetometer survey was carried out over both showings under the supervision of Andrew Allan, who reported four (4) magnetic anomalies on the Pit and who recommended trenching and stripping. This work was not carried out and the claims were allowed to lapse in 1957.

In 1955, Newmont Mining Corporation prospected the area immediately north and east of the one covered in 1954 by Pelly River Explorations Limited. They reported sulphide float in the vicinity of the Hoo claims. The short fibre asbestos showings now covered by the El claims were staked, but no assessment work was carried out.

Reconnaissance mapping on a scale of 1" = 4 miles was carried out on the Finlayson Lake map sheet in 1958 and 1959 by J. O. Wheeler, L. H. Green and J. A. Roddick of the Geological Survey of Canada. This work was published as map 8 - 1960.

In 1961, the Geological Survey of Canada had an airborne magnetic survey carried out over the Finlayson sheet, the results of which were published in 1963 as map 7006 G on a scale of 1" = 4 miles.

In January 1966, the known showings in the Grassy Lakes area were staked by Grassy Lakes Syndicate of Vancouver, B.C. under the direction of the original prospectors Sanders and Zielinski. These claims were subsequently acquired by Northlake Mines Limited.

There has since been other staking activity and exploration programs were conducted by Riviera Mines Limited, Kerr Addison Mines Ltd, and Atlas Exploration Ltd. in the same general area.

GENERAL GEOLOGY

The general geology of the area has been described by J.O. Wheeler, 1958, 1959; L. H. Green and J. A. Roddick, 1959, map sheet 8 - 1960.

The predominate rocks in the Grassy Lakes area are quartz biotite, quartz-chlorite schist, micaceous quartzite, hornfels, minor phyllite, dolomite, micaceous quartzose gneiss, granitordal gneiss and minor quartz biotite schist.

I GEOLOGICAL SURVEY

A. Detailed Geology

The area is for the most part drift covered and in many instances mapping was done from observation of slide rock or felsenmeer. There is approximately 30% outcrop in the area although fairly good geological sections can be obtained from the scarp faces and on the higher mountains.

The area under consideration forms part of the Anvil Range - Finlayson Lake belt of quartz micaschist and slate rocks as described on G.S.C. Map 30 - 1963. This Finlayson Lake belt contains a greater abundance of serpentinized dunite than the Anvil Range to the northwest and an increase in quartzite and grits and a decrease in mica schist and graphite schist from north to south. In addition there is granitic gneiss present in the Finlayson Lake Belt. There are also numerous small granodiorite masses. In general, a progressive lithological change is indicated from north to south.

B. Structure

The dominant structural configuration is the Tintina Fault. This fault is not visible on the surface but shear faults were encountered in diamond drilling which are assumed to be associated. The fault valley trends northwest-southeast and in this vicinity parallels the Hoole River. There has been considerable folding, faulting and weathering of the beds. The true structure of the area is unknown as the dedrital cover (Pleistocine) obscures most rock. There were no extrusive rocks found in the area.

C. Mineralization

Prospecting and geological mapping found several mineralized locations. These have been plotted on the accompanying maps. Following is a brief description of each area and of any mineralization found therein:

Area #1: minor pyrite in quartz vein material and some pyrrhotite specks in float.

Area #2: 3 showings were located here and were designated as 2, 2a and 2b.

No. 2 - this is a strong gossan zone, approximately 100 x 200 feet in area on the east slope of the mountain near a granite gneiss - limonitic schist contact. Granite and schist bedrock in place. Heavy float of nearby massive pyrrhotite with small blebs and specks of chalcopyrite were found in 3 separate locations within this area. An attempt was made to trench where the float was picked up but due to excessive overburden and permafrost, bedrock could not be reached. Samples of float were assayed but results were negative.

No. 2a - this is a three foot wide dissemenated quartz vein with minor amounts of arsenopyrite and pyrrhotite in the hanging wall.

No. 2b - this showing consists of disseminated and blebs of pyrrhotite and chalcopyrite in a dark green host rock resembling amphibolite. The gossan zone (100 feet x 50 feet) can be spotted from the air. Samples takenhere gave negative results when assayed, ie trace nickel and copper.

Area #3: a silicified mineralization zone was located here but very little of it was exposed from under snow which remained all season. Float containing replacement type mineralization, galena, sphalerite, pyrrhotite, pyrite, and small blebs of chalcopyrite, was picked up. Assays of float material were negative.

Area #4: a small lens of replacement mineralization (galena, sphalerite and chalcopyrite) was located in the schist near the contact with granite gneiss but was of no consequence. A few pieces of pyrrhotite float picked up in the creek below this showing were assayed with negative results.

Area #5: several small quartz veins carrying galena were found cutting the schist in this area.

Area #6: the showing in this area is located at approximately 6000 feet. It is a small showing containing arsenopyrite and very minor chalcopyrite mineralization. Assays were negative.

Area #7: a large gossan zone caused by widespread mineralization of pyrite and pyrrhotite in the granatoid gneiss was observed here. Several quartz veins carrying minor arsenopyrite were located. Some pyrrhotite, chalcopyrite and bornite was observed in place. Float carrying sphalerite, a little galena, arsenopyrite, and chalcopyrite was picked up above the small lake in the centre of the area. Gangue quartz caused by faulting in the area and dolomite were the hosts for this replacement mineralization. Assays were low grade.

Area #8 and #9: a few pieces of quartz float having minute specks of chalcopyrite was found in this area. These were of no consequence. No assays run.

Area #10: arsenopyrite and chalcopyrite float were found in the northern portion of this area. However,the geological examination and mapping did not detect the source for the float, but it probably came from the crest of the mountain near area #6.

Area #11, 12, 13, 14, 15 and 16: there was no mineralization detected in any of these areas.

Area #17: Asbestos float was found in this area at 3 locations and asbestos in place at one. The asbestos examined is spicky and short fibred and would not be commercial. A gossan zone was spotted just outside the claim group to the southeast. This appears to be the source rock for a very good copper anomaly picked up in the creek by geochemistry. Ah additional 30 claims were staked over this area in January of this year.

Area #18: no economic mineralization was found here either by prospecting or in any of the 4 diamond drill holes that were drilled to test an airborne, and supporting ground geophysical anomaly. Some pyrite, arsenopyrite, mareposite and a little chalcopyrite were discovered but assays of the core gave insignificant results.

Area #19: there was no mineralization found in this area.

II GEOCHEMICAL SURVEY

A. Grid Detail:

Grids were cut over 12 of the 19 areas of interest for a total of 127.3 line miles.

Area #2: 4.2 miles. Baseline and 400' spaced cross lines.

Area #5: 23.4 miles. Baseline, cross lines at 400' intervals and tie lines both north and south.

Area #8 and 9: 2.3 miles. Baseline with cross lines at 400' intervals.

Area #10: 37.6 miles. Baseline, cross lines at 400' intervals and tie lines on both the east and west sides.

Area #11: 12.5 miles. Baseline with cross lines at 400' intervals.

Area #12: 8.2 miles. Baseline and tie line with cross lines running between at 400' intervals.

Area #13: 7.5 miles. Baseline and tie line with cross lines running between at 400' intervals.

Area #14: 4.0 miles. Baseline and tie line with cross lines running between at 400' intervals.

Area #15: 2.5 miles. Baseline with cross lines at 800' intervals. No tie lines.

Area #16: 3.0 miles. Baseline with cross lines at 400' intervals.

Area #18: 14.0 miles. Baseline and tie lines both north and south with cross lines at 400' intervals.

Area #19: 8.1 miles. Baseline and tie line, with cross lines running between at 800' intervals.

B. Sampling:

A total of 4615 soil samples were taken from 11 grid areas. Size of the grid plus the terrain over which it was laid governed the sample spacing. In conjunction with the soil sampling all streams making up the drainage of the area were sampled and/or panned at approximately 800 foot spacings. 653 pan/silt samples were taken. All samples were tagged and bagged in polyethylene bags. They were then shipped to Bio Metals Corporation Limited (N.P.L.) in North Vancouver, B.C. to be analysed for lead, zinc and copper.

Samples were taken from areas as follows:

Area #2:	129 soil samples	
Area #5:	1600 soil samples	
Area #8 & 9:	123 soil samples	
Area #10:	1082 soil samples	
Area #11:	364 soil samples	
Area #12:	189 soil samples	
Area #13:	165 soil samples	
Area #14:	202 soil samples	
Area #15:	204 soil samples	
Area #16:	128 soil samples	and 8 silt samples within grid.
Area #17:	192 silt samples	were taken encircling the whole area
Area #18:	22 silt samples	were taken. No soil samples
Area #19:	25 silt samples	and 421 soil samples were taken.

Drainage samples: 653 including those taken from areas 17, 18 and 19 listed above.

C. Method of Analysis:

All samples were analysed at the Bio Metals Corporation Limited (N.P.L.) laboratory located at 204 - 1515 Pemberton Avenue, North Vancouver, B.C. Samples were shipped periodically from Whitehorse via C.P.A. air freight.

When the samples were received by the laboratory, each was dried and then screened to - 80 mesh. A 0.5 gram sample was weighed out and digested in hot aqua regia. They were then diluted, clarified for 20 hours and then tested for copper, lead and zinc content on an atomic absorption spectrophotometer. The "AA" unit used was an 'Evans' manufactured by Evans Co.of Essex, England. Accuracy of this instrument ideally is 1.5 ppm, 0.05 ppm & 0.15 ppm/% absorption for lead, zinc and copper respectively. Individual cathode lamps were used for each element and results were reported in parts per million (ppm).

D. Treatment of Data:

The results of geochemical tests were returned airmail to the field as soon as they were available. The values in ppm were plotted onto field maps and contoured to see whether any areas required follow-up sampling.

In contouring results a background was determined from the % frequency of occurrence of results in ppm. This information was used as a control for detailed mapping and prospecting.

E. Interpretation of Results

All samples taken were analysed for lead, zinc and copper. It was found that copper values (anomalous) were slightly erratic but a definite pattern developed as it was found that they seemed to reflect areas of ultrabasics. There were several good anomalies of copper found though. Silt samples from area #17 gave results up to 7562 ppm. Soil samples taken from area #11 gave copper readings to 409 ppm and seem quite significant due to the lack of ultrabasic intrusives in the area. There were several isolated copper highs in area #19 but more work is required here to define them.

Lead indicated several veins in the vicinity of area #5 which were proven to exist by visual prospecting. These do not appear to be significant at this time but further work should be done in this area.

F. Conclusions and Recommendations

Conclusions and recommendations are made in Dr. Sevensma's report which follows the physical work section of this report.

III GEOPHYSICAL SURVEY

A. Airborne Geophysics:

The airborne geophysical survey was conducted by Lockwood Survey Corporation Limited under the supervision of Dr. P. H. Sevensma, Ph.D. P.Eng. The actual field work was broken into three separate programs by claim groups. These were the Hoo, El, and the Gee groups of claims.

Following are three separate reports written by Dr. Sevensma covering each of these programs. Also on the Gee group of claims nine small showings were checked using the Gee Cal helicopter-borne electromagnetic method. Details of this survey are included in Dr. P. H. Sevensma's report "Airborne Geophysical Methods" - Gee Group of Claims.

B. Ground Geophysics:

1. Summary

Huntec Limited of Toronto were contracted to carry out ground electromagnetic surveys on Northlake Mines ground in the Grassy Lakes area. Huntec completed surveys on these grids as follows:

Area # 5: Horizontal loop E.M. survey using the Ronka Mark III unit.
Area #10: Turam Inductive Loop E.M. survey.
Area #18: Turam Inductive Loop E.M. survey.

The methods of conducting these surveys is explained in a separate report contained herein as written by Norman R. Patterson, Ph.D., P.Eng.of Huntec Limited.

Huntec's operator for the Ronka Mark III Horizontal Loop E.M. unit left their employ on July 29. The operator, Mr. Meryl Currie, had trained one of Northlake Mines employees to operate this unit. It was felt by MacDonald Consultants Ltd. that this man was competent enough to operate this E.M. unit and surveys were conducted on the following grid areas: No. 10, No.11, No. 14, No. 15 and No. 19. Maps of these five surveys are included in this report.

United Geophysical were contracted and a small gravity survey was run over the soil anomaly on area #11 but results were inconclusive. A larger more detailed survey will have to be conducted before a true interpretation could be made.

2. Conclusions and Recommendations:

See Dr. Sevensma's report of Conclusions and Recommendations following the physical work section.

IV PHYSICAL WORK

A. Trenching

Trenching employing the use of a drill and explosives was carried out on showing No. 2 in area #2 on Mineral claim numbers Gee 173 and 174.

A total of 95 cubic yards of rock and frozen material was excavated in 9 trenches. Bedrock was not reached in any of the trenches due to the permafrost and the depth of the slide rock covering the area.

One sample of nearly massive pyrrhotite from one of the trenches was assayed spectrographically.. Results were negative.

B. Diamond Drilling

Four fiamond drill holes were drilled on the Hoo claim group for a total of 1596 feet of AQ wire line. The contractor was A. Arsenault Diamond Drilling of Whitehorse.

There was 565 feet of AX casing, 186 feet of BX casing, 86 feet of NX casing, as well as 8 cement jobs and 4 dip tests run.

All diamond drill holes have been surveyed and plotted on topographical map.

CONCLUSIONS AND RECOMMENDATIONS

See Dr. P. H. Sevensma's report which is attached hereto.

APPENDIX

APPENDIX

Summary of 1966 Assessment Work and Costs

In order that a better understanding may be had of the following breakdown of costs a few notes of explanation will be made here:

Note #1: Costs are broken into two sections; directly chargeable and not chargeable to a specific project.

Note #2: Section 1 is broken down into three separate claim areas - (1) El claims; (2) Hoo claims and (3) Gee claims, which includes the P.G., C.W., Z, Leo, and P.S. claims which are contiguous.

Note #3: Section 2 is distributed to the three claim groups by the percent claims in each group, i.e.,

EL	60/824	or 7.3%
Hoo	124/824	or 14.9%
Gee	641/824	or 77.8%

Note #4: Complete cost breakdowns follow in the included job cost account journal. This journal has been audited to December 31, 1966. Accounts payable from January 1st to the present have not been included in the assessment costs.

SECTION A (directly chargeable)

El Group	$ 7,736.96
Hoo Group	58,746.70
Gee Group	84,958.41
TOTAL	$151,442.07

SECTION B (not directly chargeable to any specific project)

El (7.3%)	$ 5,775.52
Hoo(14.9%)	11,788.39
Gee(77.8%)	61,552.78
TOTAL	$ 79,116.69

TOTAL MONIES APPLICABLE AS ASSESSMENT WORK:

$230,558.76

El	$ 16,830.79
Hoo	34,353.26
Gee	179,374.71

AFFIDAVIT OF COSTS

I, R. T. HEARD, of 11 - 425 Howe Street, Vancouver 1, Province of British Columbia, HEREBY MAKE OATH AND SAY:

That the cost statement on page 11 of the Geological, Geochemical, Geophysical and Physical Work Report on the El, Hoo, Gee, Leo, P.S., P.G., C.W. and Z Claim Groups, to the best of my knowledge and belief, is the true amount of monies spent on the 1966 exploration program of the said Claims.

SWORN before me at the City of Vancouver, Province of British Columbia, this 7th day of February, A. D. 1967.

A Commissioner for Oaths for the Yukon Territory.

R. T. Heard

HELLIWELL, MACLACHLAN & CO.
THORNE, GUNN, HELLIWELL & CHRISTENSON
CHARTERED ACCOUNTANTS

VANCOUVER

W. R. C. PATRICK — D. J. KELSEY
G. M. MILLER — J. M. MOYNES
W. G. MITCHELL — H. B. SMITH
G. SPARE — R. G. STEWART
K. S. GUNNING — D. G. USHER
J. G. HALPIN — B. FAHY
R. E. BURRELL — J. C. MCKINNEY

CONSULTANTS

J. L. HELLIWELL — H. H. ADAIR

FIDELITY LIFE BUILDING
1112 WEST PENDER STREET
VANCOUVER 1, B.C.
TELEPHONE: 683-1277

February 7, 1967

The Mining Recorder,
Watson Lake, Yukon.

Dear Sir:

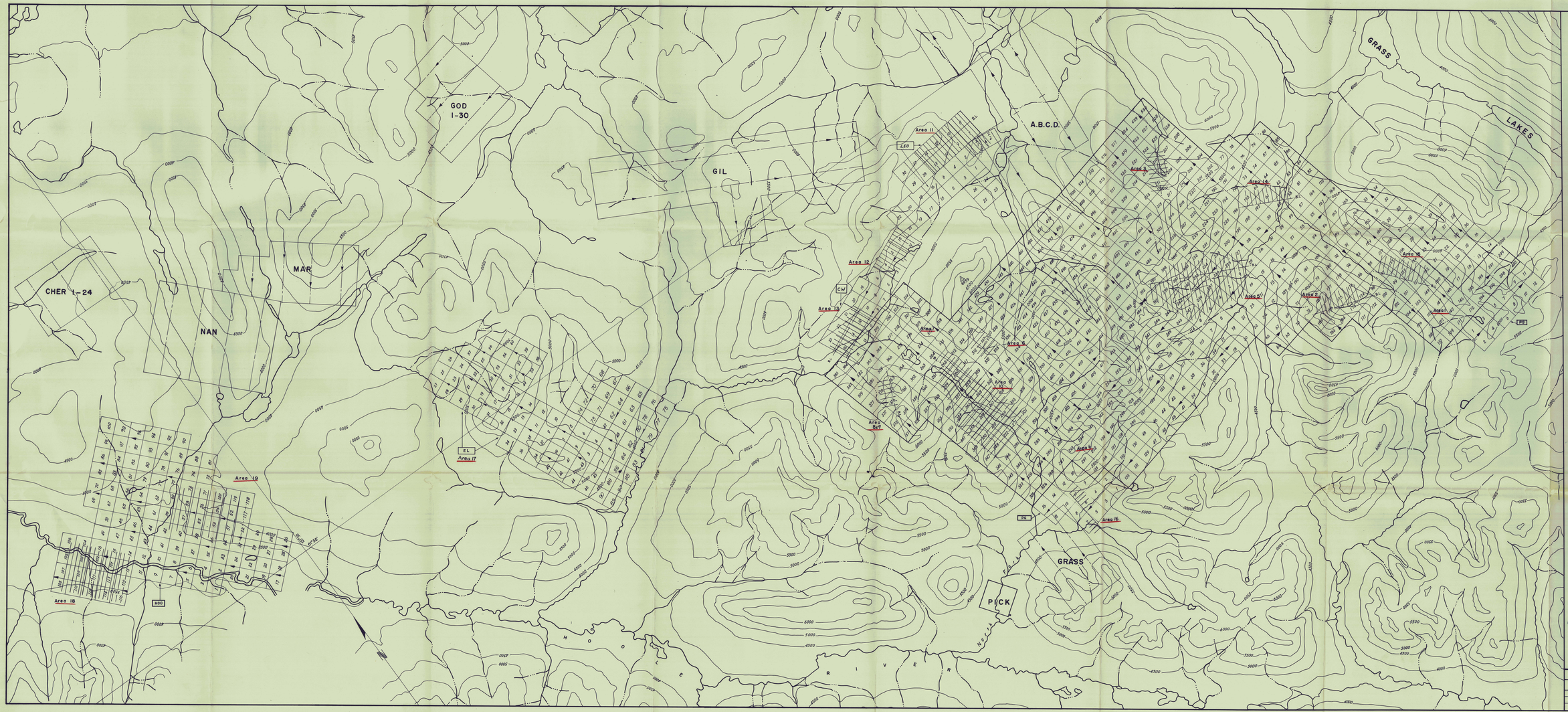
Re: Northlake Mines Ltd. (N.P.L.)

At the request of MacDonald Consultants Ltd. we have summarized on the attached sheet the expenditures for the period from May 18, 1966 to December 31, 1966 made by MacDonald Consultants Ltd. on behalf of Northlake Mines Ltd. (N.P.L.) from the records maintained by MacDonald Consultants Ltd.

Yours very truly,

H. M. C.

WGM: jt



CLAIM & GRID LOCATION MAP

1000 ft 0 1000 2000 3000 4000 5000

NORTH LAKE MINES LTD.	
MACDONALD CONSULTANTS LTD.	
DRAWN	
DATE	
SCALE	

AREA NO. 3

N

- Graphite Schist
- Chloritic Schist
- Biotite Schist
- Dolomitic Schist
- Micaceous Schist
- Limonitic Schist
- Quartzite Schist
- Dolomite
- Quartzite
- Granite Gneiss
- Ultrabasic
- Geological Contact Observed
- Geological Contact Assumed
- Fault Observed
- Fault Assumed
- Bedding
- Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.
11-425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1"= 1000'	PROJECT NO. 204
Drawn:		
Date:		

AREA NO. 5

N

- Graphite Schist
- Chloritic Schist
- Biotite Schist
- Dolomitic Schist
- Micaceous Schist
- Limonitic Schist
- Quartzite Schist
- Dolomite
- Quartzite
- Granite Gneiss
- Ultrabasic
- Geological Contact Observed
- Geological Contact Assumed
- Fault Observed
- Fault Assumed
- Bedding
- Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.

11-425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1" = 1000'	PROJECT NO. 204
Drawn:		
Date:		

AREA NO. 8 & 9

AREA NO. 7

AREA NO. 10

AREA NO. 6

N

- Graphite Schist
- Chloritic Schist
- Biotite Schist
- Dolomitic Schist
- Micaceous Schist
- Limonitic Schist
- Quartzite Schist
- Dolomite
- Quartzite
- Granite Gneiss
- Ultrabasic
- Geological Contact Observed
- Geological Contact Assumed
- Fault Observed
- Fault Assumed
- Bedding
- Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.

11-425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1" = ~~1000'~~ 1200'	PROJECT NO. 204
Drawn:		
Date:		

AREA NO. II

N

- Graphite Schist
- Chloritic Schist
- Biotite Schist
- Dolomitic Schist
- Micaceous Schist
- Limonitic Schist
- Quartzite Schist
- Dolomite
- Quartzite
- Granite Gneiss
- Ultrabasic
- Geological Contact Observed
- Geological Contact Assumed
- Fault Observed
- Fault Assumed
- Bedding
- Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.
11-425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1"= 1000'	PROJECT NO. 204
Drawn:		
Date:		

AREA NO. 12

AREA NO. 13

N

- Graphite Schist
- Chloritic Schist
- Biotite Schist
- Dolomitic Schist
- Micaceous Schist
- Limonitic Schist
- Quartzite Schist
- Dolomite
- Quartzite
- Granite Gneiss
- Ultrabasic
- Geological Contact Observed
- Geological Contact Assumed
- Fault Observed
- Fault Assumed
- Bedding
- Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.

11–425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1"= 1000'	PROJECT NO. 204
Drawn:		
Date:		

AREA NO.3

AREA NO. 14

32+00
28+00
24+00
20+00
16+00
12+00
8+00
4+00
0+00

N

- Graphite Schist
- Chloritic Schist
- Biotite Schist
- Dolomitic Schist
- Micaceous Schist
- Limonitic Schist
- Quartzite Schist
- Dolomite
- Quartzite
- Granite Gneiss
- Ultrabasic
- Geological Contact Observed
- Geological Contact Assumed
- Fault Observed
- Fault Assumed
- Bedding
- Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.

11 – 425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1" = 1000'
Drawn:	
Date:	

PROJECT NO. 204

AREA NO. 2

AREA NO. 15

AREA NO. 1

2A

2B

N

- Graphite Schist
- Chloritic Schist
- Biotite Schist
- Dolomitic Schist
- Micaceous Schist
- Limonitic Schist
- Quartzite Schist
- ~~Volcanic~~ Granite
- Quartzite
- Granite Gneiss
- Ultrabasic
- Geological Contact Observed
- Geological Contact Assumed
- Fault Observed
- Fault Assumed
- Bedding
- Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.

11-425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1" = 1000'	PROJECT NO. 204
Drawn:		
Date:		

AREA NO. 4

AREA NO. 16

N

- Graphite Schist
- Chloritic Schist
- Biotite Schist
- Dolomitic Schist
- Micaceous Schist
- Limonitic Schist
- Quartzite Schist
- Dolomite
- Quartzite
- Granite Gneiss
- Ultrabasic
- Geological Contact Observed
- Geological Contact Assumed
- Fault Observed
- Fault Assumed
- Bedding
- Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.
11 – 425 Howe St. Vancouver B.C.

GEOLOGICAL MAP

Scale:	1" = 1000'	PROJECT NO. 204
Drawn:		
Date:		

AREA NO 17

CLOUDBURST OBSTRUCTION

N

- Graphite Schist
- Chloritic Schist
- Biotite Schist
- Dolomitic Schist
- Micaceous Schist
- Limonitic Schist
- Quartzite Schist
- Dolomite
- Quartzite
- Granite Gneiss
- Ultrabasic
- Geological Contact Observed
- Geological Contact Assumed
- Fault Observed
- Fault Assumed
- Bedding
- Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.

11-425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1" = 1000'	PROJECT NO. 204
Drawn:		
Date:		

AREA NO. 18

Mic. Chl. Sch.
Dolomite
Mic. Chl. Sch.
Graphite Sch.
L. Mic. Chl. Sch.
Ultrabasic

64+00
60+00
56+00
52+00
48+00
44+00
40+00
36+00
32+00
28+00
24+00
20+00
16+00
12+00
8+00
4+00
0+00

Graphite Schist
Chloritic Schist
Biotite Schist
Dolomitic Schist
Micaceous Schist
Limonitic Schist
Quartzite Schist
Dolomite
Quartzite
Granite Gneiss
Ultrabasic

Geological Contact Observed
Geological Contact Assumed
Fault Observed
Fault Assumed
Bedding
Mineralization Observed
Core Hole

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.
11-425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1" = 1000'	PROJECT NO. 204
Drawn:		
Date:		

AREA NO. 19

Cloud Shadow Broken Contours

Chl. Sch.

Graphite Schist

Chloritic Schist

Biotite Schist

Dolomitic Schist

Micaceous Schist

Limonitic Schist

Quartzite Schist

Dolomite

Quartzite

Granite Gneiss

Ultrabasic

Geological Contact Observed

Geological Contact Assumed

Fault Observed

Fault Assumed

Bedding

Mineralization Observed

NORTHLAKE MINES LTD.

MacDonald Consultants Ltd.

11-425 Howe St. Vancouver, B.C.

GEOLOGICAL MAP

Scale:	1"= 1000'	PROJECT NO. 204
Drawn:		
Date:		

MacDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

PLAN OF MINERAL CLAIMS & PAN/SILT SAMPLES

LEAD PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	26	-	50
	51	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	over		12,800

40/30 Lead ppm = parts per million (ppm)

SCALE: 1 inch = 1/2 mile

R.T. HEARD

DECEMBER, 1966

MacDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

PLAN OF MINERAL CLAIMS & PAN/SILT SAMPLES

ZINC PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	26	-	50
	51	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	over		12,800

•135/36 Zinc ppm in parts per million (ppm)

SCALE 1 inch = 1/2 mile

R.T. HEARD

DECEMBER, 1966

MacDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

PLAN OF MINERAL CLAIMS & PAN/SILT SAMPLES

COPPER PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

26 - 50	
51 - 100	(orange)
101 - 200	(green)
201 - 400	(red)
401 - 800	(blue)
801 - 1600	(purple)
1601 - 3200	
3201 - 6400	
6401 - 12,800	(pink)
over 12,800	

•102/36 Copper plot in parts per million (ppm)

1/2 1/4 0 1/2 1 1 1/2 2

SCALE: 1 inch = 1/2 mile

R.T. HEARD

DECEMBER, 1966

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

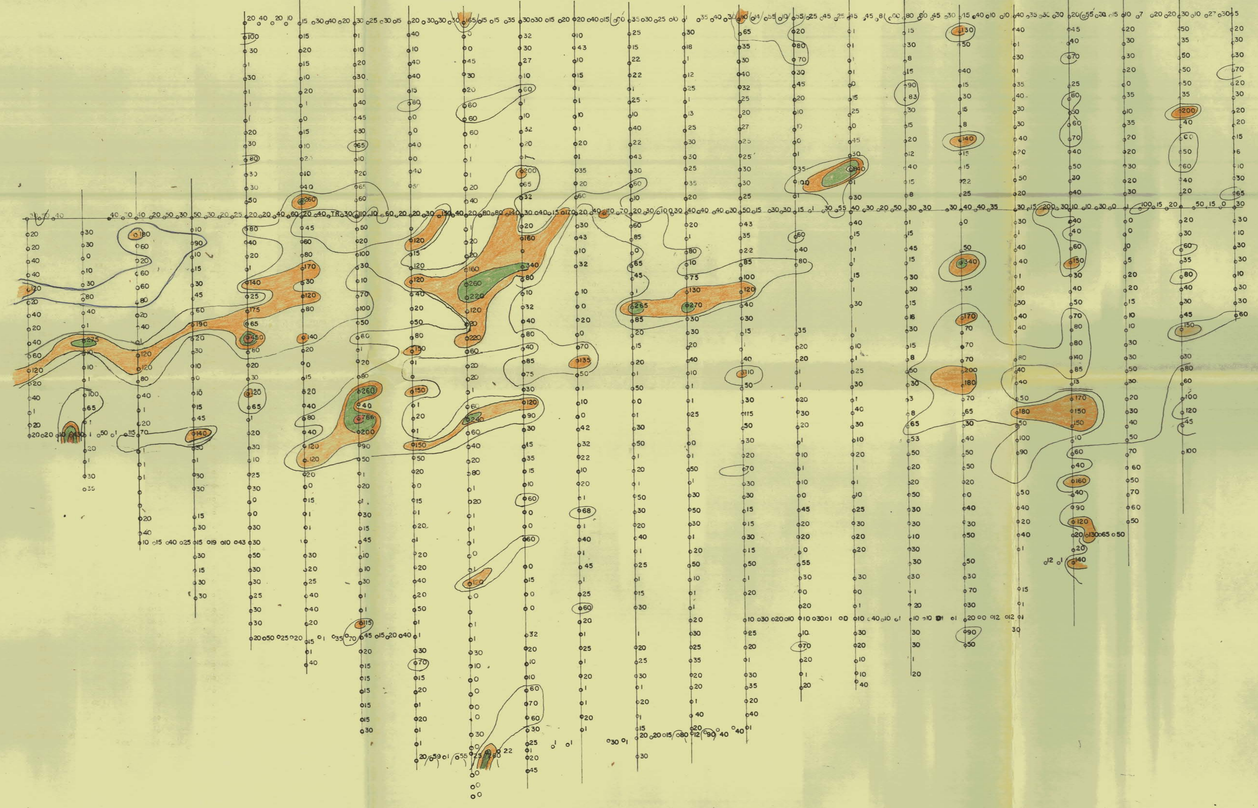
NORTHLAKE MINES LTD.

G CLAIM GROUP

AREA NO. 5

SOIL SAMPLING

LEAD PLOT



CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	26 -	50
	51 -	100
	101 -	200
	201 -	400
	401 -	800
	801 -	1600
	1601 -	3200
	3201 -	6400
	6401 -	12,800
	over	12,801

Lead plot in parts per million (ppm)

Anomaly Reference Number

Photo Center	Trail
Spot Height	Cut Line
Buildings	Roads
Bluff	Bulldozer Trench
Swamp	Hand Trench
Stream	Workings
Slide Rock or Frost Heave	Adit

400 200 0 400 800 1200 1600

SCALE 1 inch = 400 feet

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

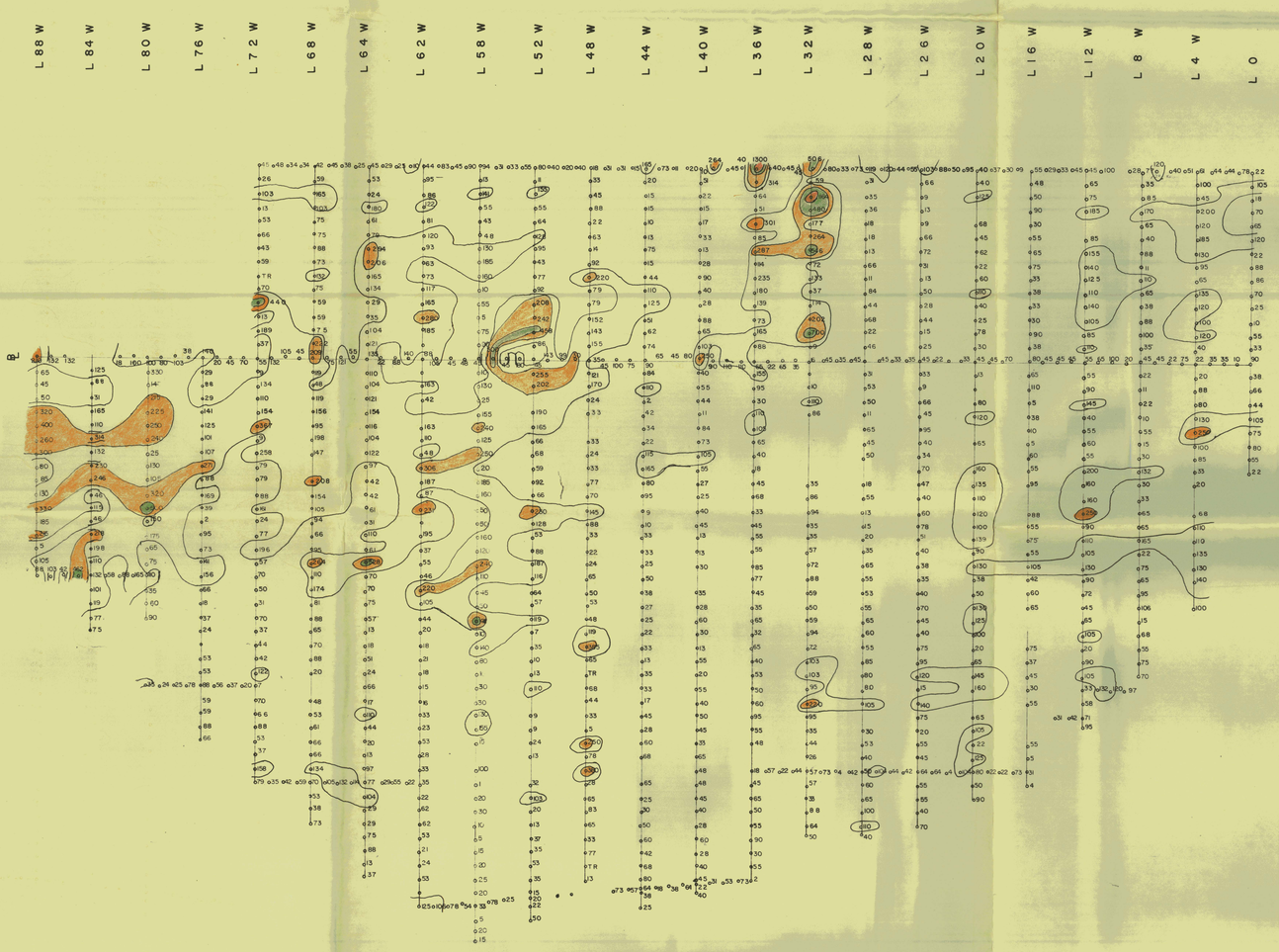
NORTHLAKE MINES LTD.

G CLAIM GROUP

AREA NO. 5

SOIL SAMPLING

ZINC PLOT



CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	0	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	12,801	-	25,600
	over		25,601

Zinc plot in parts per million (ppm)

- Photo Center
- Spot Height
- Buildings
- Bluff
- Swamp
- Stream
- Slide Rock or Frost Heave
- Trail
- Cut Line
- Roads
- Bulldozer Trench
- Hand Trench
- Workings
- Adit

400 200 0 400 800 1200 1600

SCALE 1 inch = 400 feet

060250

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

G CLAIM GROUP

AREA NO. 10

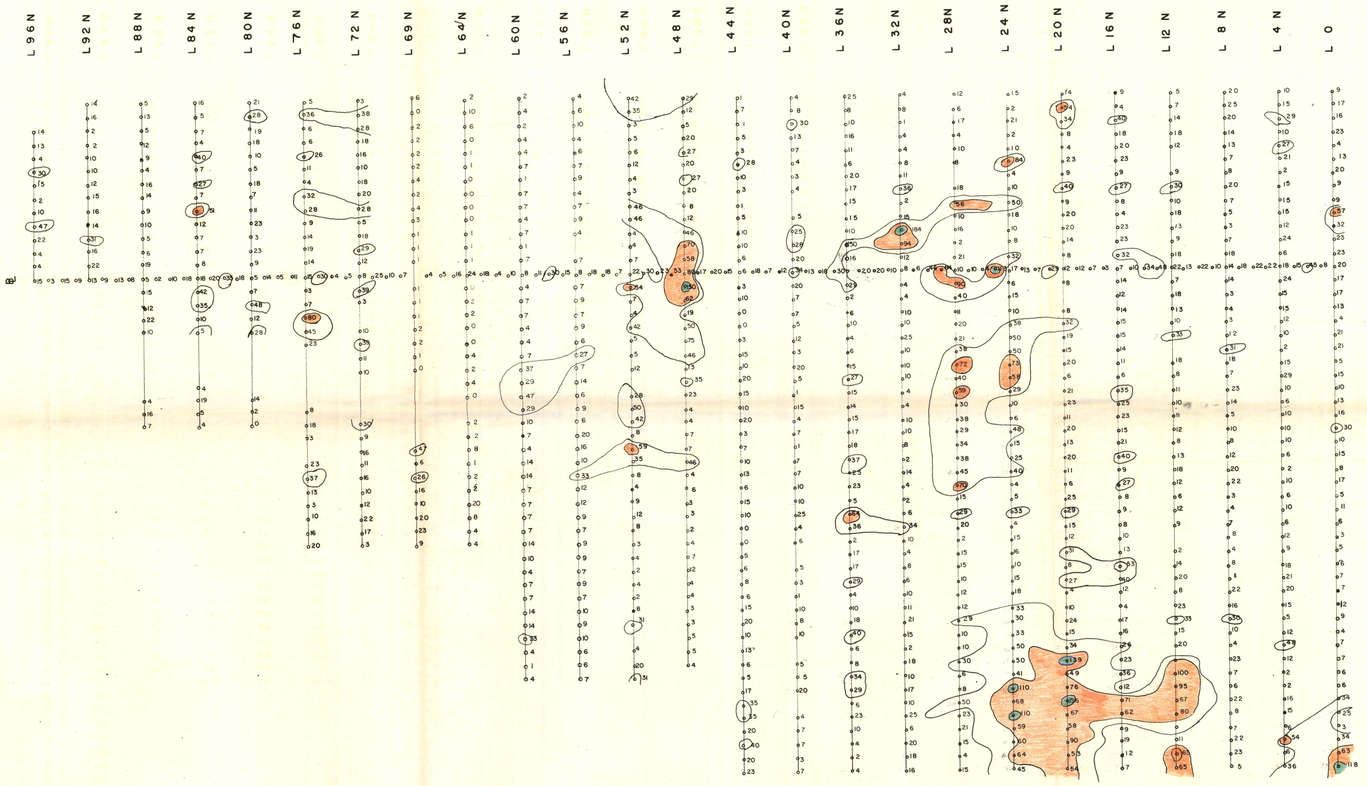
SOIL SAMPLING

COPPER PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	26	-	50
	51	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	over	12,800	

-16 -40 -32
-40 -16 -48 Copper plot in parts per million (ppm)



+ 267	Photo Center	— — —	Trail
3770	Spot Height	— · —	Cut Line
□	Buildings	≡≡≡	Roads
	Bluff		Bulldozer Trench
	Swamp		Hand Trench
	Stream	□	Workings
	Slide Rock or Frost Heave	⊢	Adit

inches
0 1 2
0 1 2 3 4 5
centimetres

This reference scale bar has been added to the original drawing. The scale of the same has been changed and can be used as a reference for the original size.

400 200 0 400 800 1200 1600

SCALE: 1 inch = 400 feet

060250

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

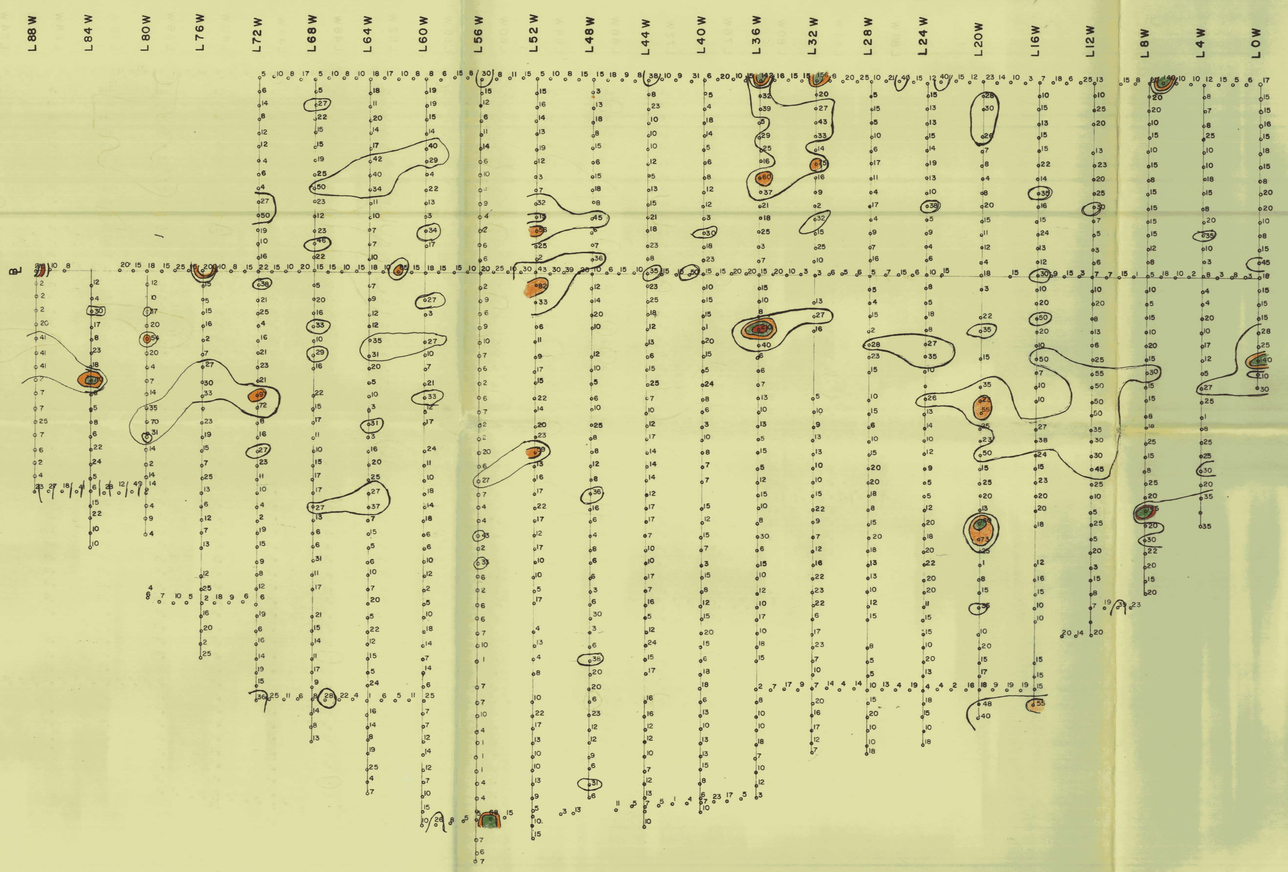
NORTHLAKE MINES LTD.

G CLAIM GROUP

AREA NO. 5

SOIL SAMPLING

COPPER PLOT



CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	26 -	50
	51 -	100
	101 -	200
	201 -	400
	401 -	800
	801 -	1600
	1601 -	3200
	3201 -	6400
	6401 -	12,800
	over	12,801

Copper plot in parts per million (ppm)

+ 257	Photo Center		Trail
3170	Spot Height		Cut Line
	Buildings		Roads
	Bluff		Bulldozer Trench
	Swamp		Hand Trench
	Stream		Workings
	Slide Rock or Frost Heave		Adit

400 200 0 400 800 1200 1600

SCALE 1 inch = 400 feet

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

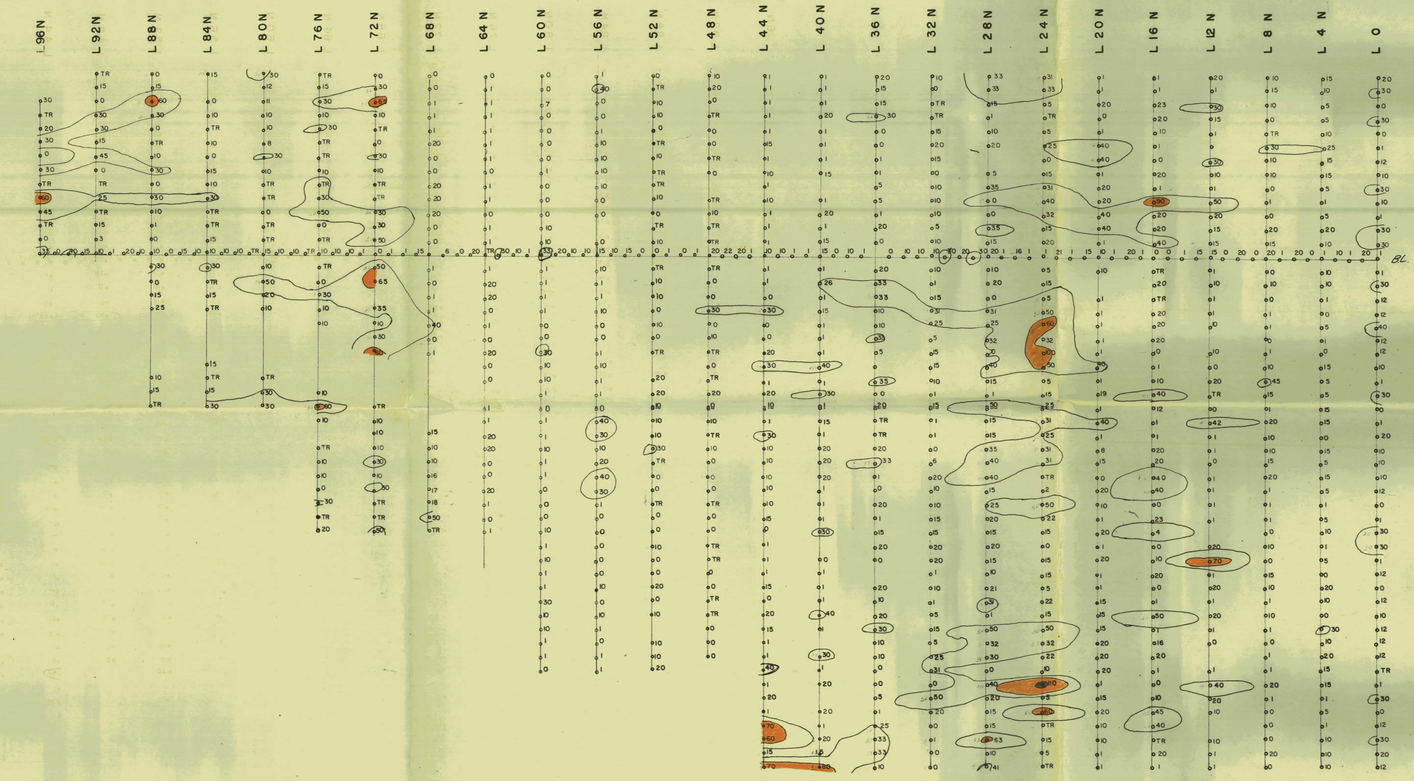
NORTHLAKE MINES LTD.

G CLAIM GROUP

AREA NO. 10

SOIL SAMPLING

LEAD PLOT



CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	26	-	50
	51	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	over 12,801		

13 13 13 / 40 7 16 Lead plot in parts per million (ppm)

(5) Anomaly Reference Number

267	Photo Center		Trail
3770	Spot Height		Cut Line
	Buildings		Roads
	Bluff		Bulldozer Trench
	Swamp		Hand Trench
	Stream		Workings
	Slide Rock or Frost Heave		Adit

400 200 0 400 800 1200 1600

SCALE : 1 inch = 400 feet

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

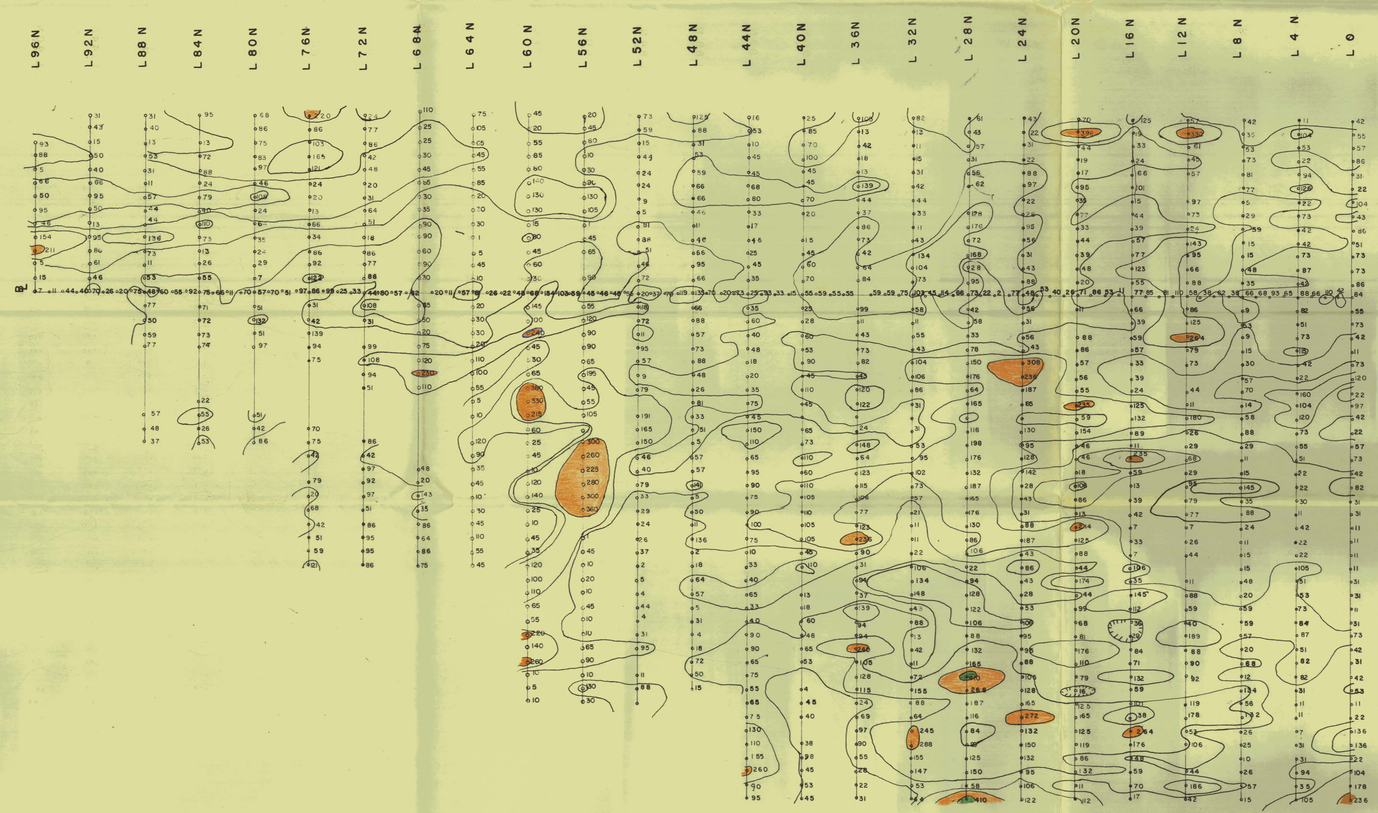
NORTHLAKE MINES LTD.

G CLAIM GROUP

AREA NO. 10

SOIL SAMPLING

ZINC PLOT



CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	0	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	12,801	-	25,600
	over 25,601		

Zinc plot in parts per million (ppm)

Photo Center	Trail
Spot Height	Cut Line
Buildings	Roads
Bluff	Bulldozer Trench
Swamp	Hand Trench
Stream	Workings
Slide Rock or Frost Heave	Adit

400 200 0 400 800 1200 1600

SCALE 1 inch = 400 feet

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

G CLAIM GROUP

(UNLESS INDICATED OTHERWISE)

SOIL SAMPLING
LEAD PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	26 - 50	
	51 - 100	
	101 - 200	
	201 - 400	
	401 - 800	
	801 - 1600	
	1601 - 3200	
	3201 - 6400	
	6401 - 12,800	
	over 12,801	

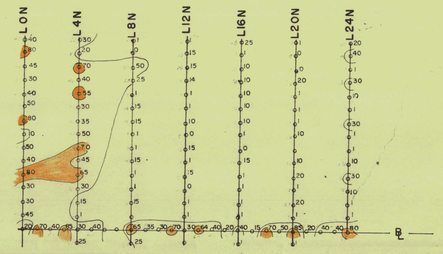
(Lead plot in parts per million (ppm)

(5) Anomaly Reference Number

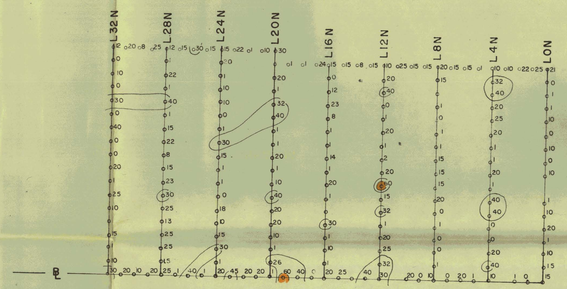
Photo Cleaver	Trail
Spot Height	Cut Line
Buildings	Roads
Bluff	Bulldozer Trench
Swamp	Hand Trench
Stream	Workings
Slide Rock or Frost Heave	Adit

400 200 0 400 800 1200 1600

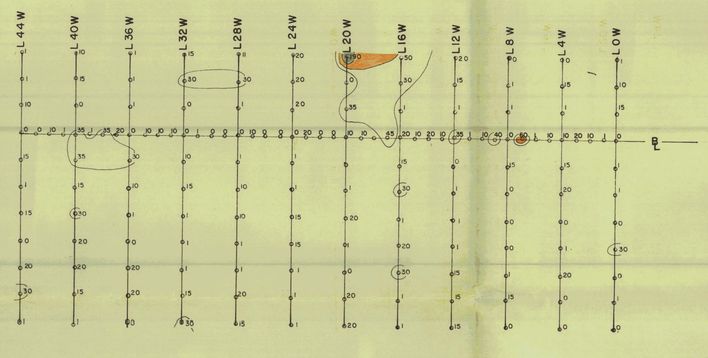
SCALE 1 inch = 400 feet



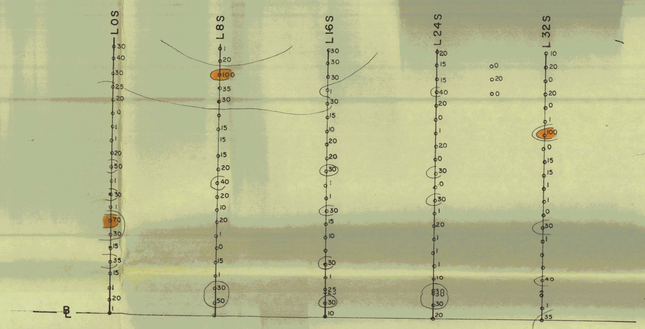
AREA "889"



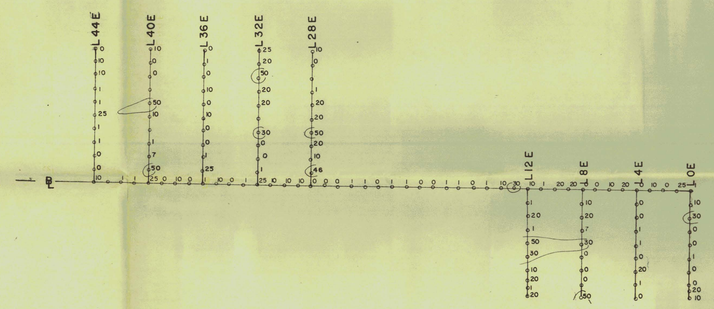
AREA 14



AREA 13 (C.W. Claim Group)



AREA 15



AREA 16 (P.G. Claim Group)

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

G CLAIM GROUP

(UNLESS INDICATED OTHERWISE)

SOIL SAMPLING
ZINC PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

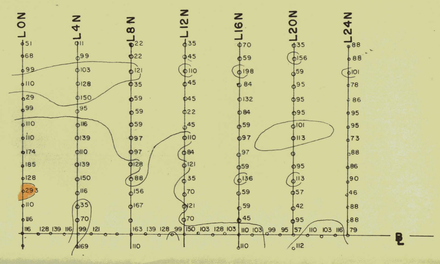
	0	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	12,801	-	25,600
	over 25,601		

Zinc plot in parts per million (ppm)

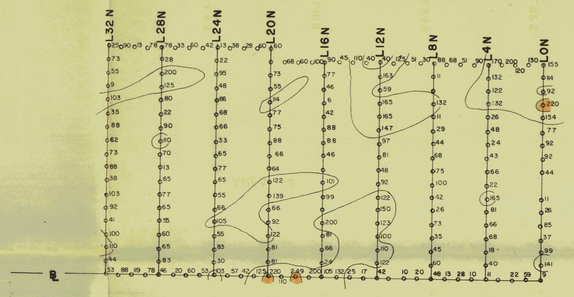
+	Photo Center		Trail
	Spot Height		Cut Line
	Buildings		Roads
	Bluff		Bulldozer Trench
	Swamp		Hand Trench
	Stream		Workings
	Slide Rock or Frost Heave		Adit

400 200 0 400 800 1200 1600

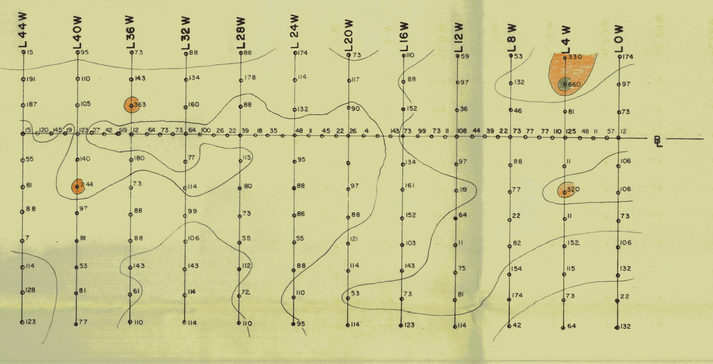
SCALE 1 inch = 400 feet



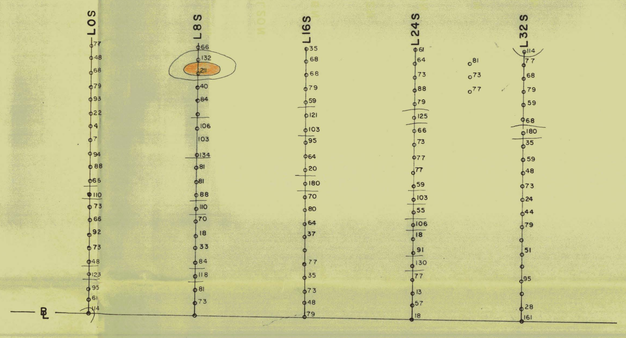
AREA "889"



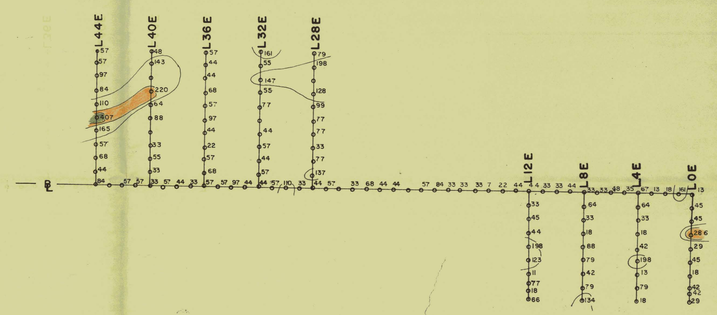
AREA 14



AREA 13 (C.W. Claim Group)



AREA 15



AREA 16 (P.G. Claim Group)

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

G CLAIM GROUP

(UNLESS INDICATED OTHERWISE)

SOIL SAMPLING
COPPER PLOT

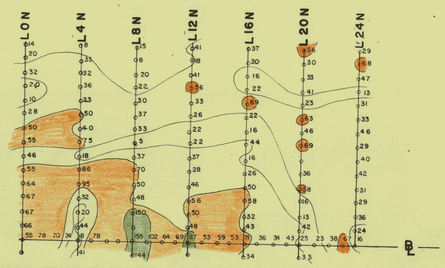
CONTOUR INTERVALS IN PARTS PER MILLION (P.P.M)

	26	-	50
	51	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	over 12,801		

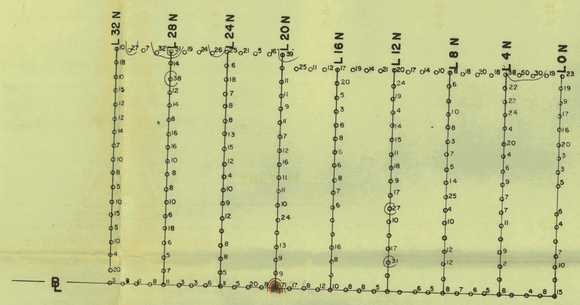
16 40 32
40 16 48 Copper plot in parts per million (ppm)

+ 267	Photo Center		Trail
3770	Spot Height		Cut Line
	Buildings		Roads
	Bluff		Bulldozer Trench
	Swamp		Hand Trench
	Stream		Workings
	Slide Rock or Frost Heave		Adit

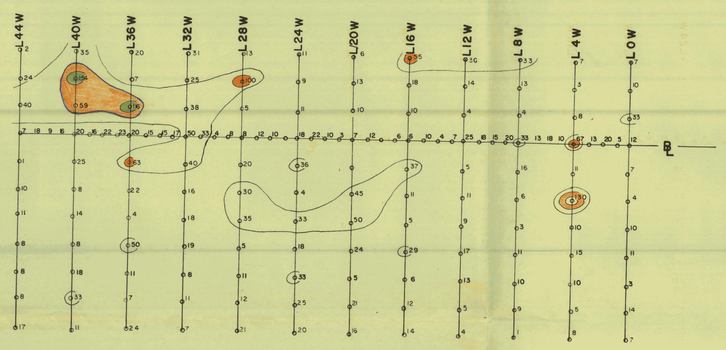
400 200 0 400 800 1200 1600
SCALE 1 inch = 400 feet



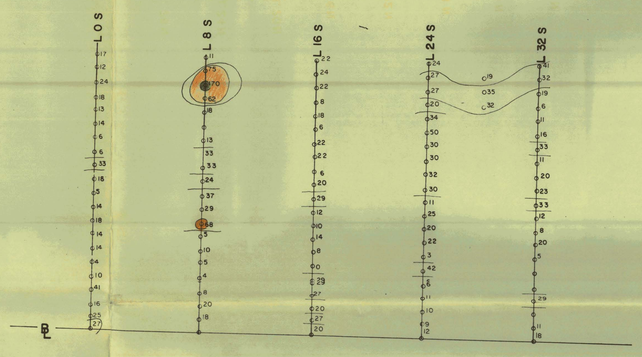
AREA "8 & 9"



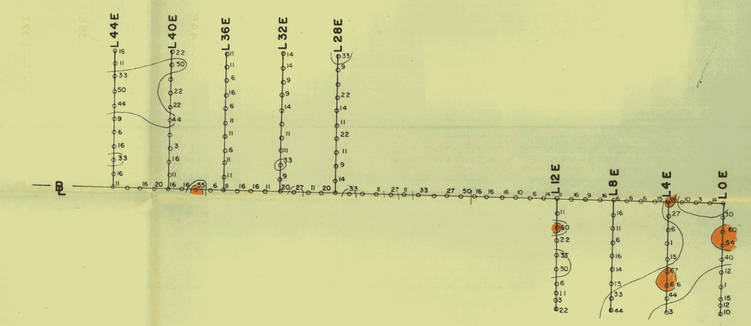
AREA 14



AREA 13 (C.W. Claim Group)



AREA 15



AREA 16 (P.G. Claim Group)

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

G CLAIM GROUP

SOIL SAMPLING ASSAY PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

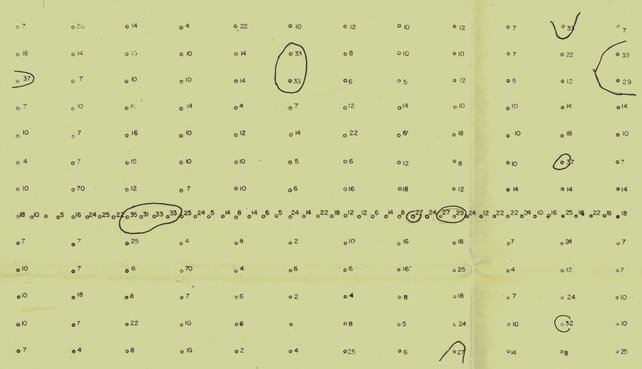
	0	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	12,801	-	25,600
	over 25,601		

-64 -48 -81
-96 -40 -64 Zinc plot in parts per million (ppm)

+	Photo Center	- - -	Trail
	Spot Height	—·—	Cut Line
□	Buildings	≡≡≡	Roads
⌒⌒	Bluff	⊐⊐⊐	Bulldozer Trench
(ω)	Swamp	<<<<<	Hand Trench
~	Stream	□	Workings
⋯	Slide Rock or Frost Heave	⊢	Adit

400 200 0 400 800 1200 1600
SCALE : 1 inch = 400 feet

AREA 12

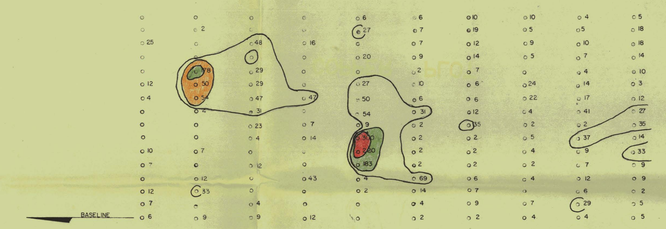


COPPER PLOT

LEAD PLOT

ZINC PLOT

AREA 2



COPPER PLOT

LEAD PLOT

ZINC PLOT

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

G CLAIM GROUP

SOIL SAMPLING
ASSAY PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	0	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	12,801	-	25,600
	over 25,601		

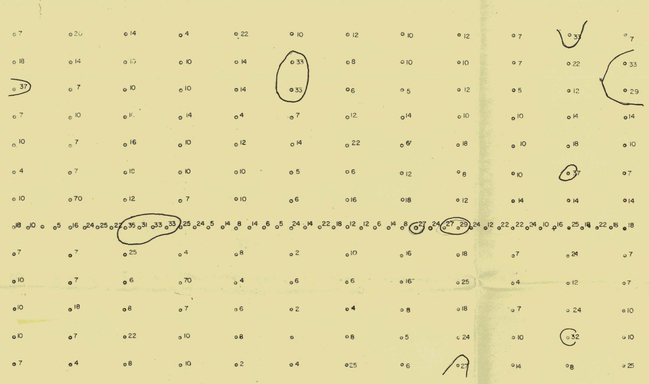
Zinc plot in parts per million (ppm)

+	Photo Center		Trail
	Spot Height		Cut Line
	Buildings		Roads
	Bluff		Bulldozer Trench
	Swamp		Hand Trench
	Stream		Workings
	Slide Rock or Frost Heave		Adit

400 200 0 400 800 1200 1600

SCALE: 1 inch = 400 feet

AREA 12

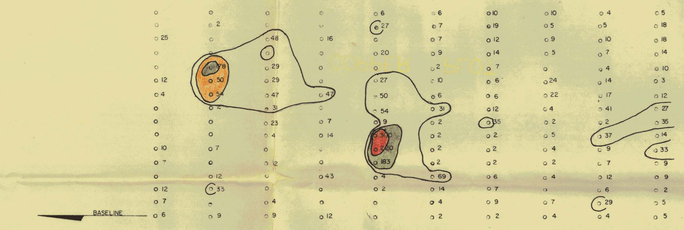


COPPER PLOT

LEAD PLOT

ZINC PLOT

AREA 2



COPPER PLOT

LEAD PLOT

ZINC PLOT

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

H CLAIM GROUP

AREA NO. 19

SOIL SAMPLING

LEAD PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

26	50
51	100
101	200
201	400
401	800
801	1600
1601	3200
3201	6400
6401	12,800
over	12,801

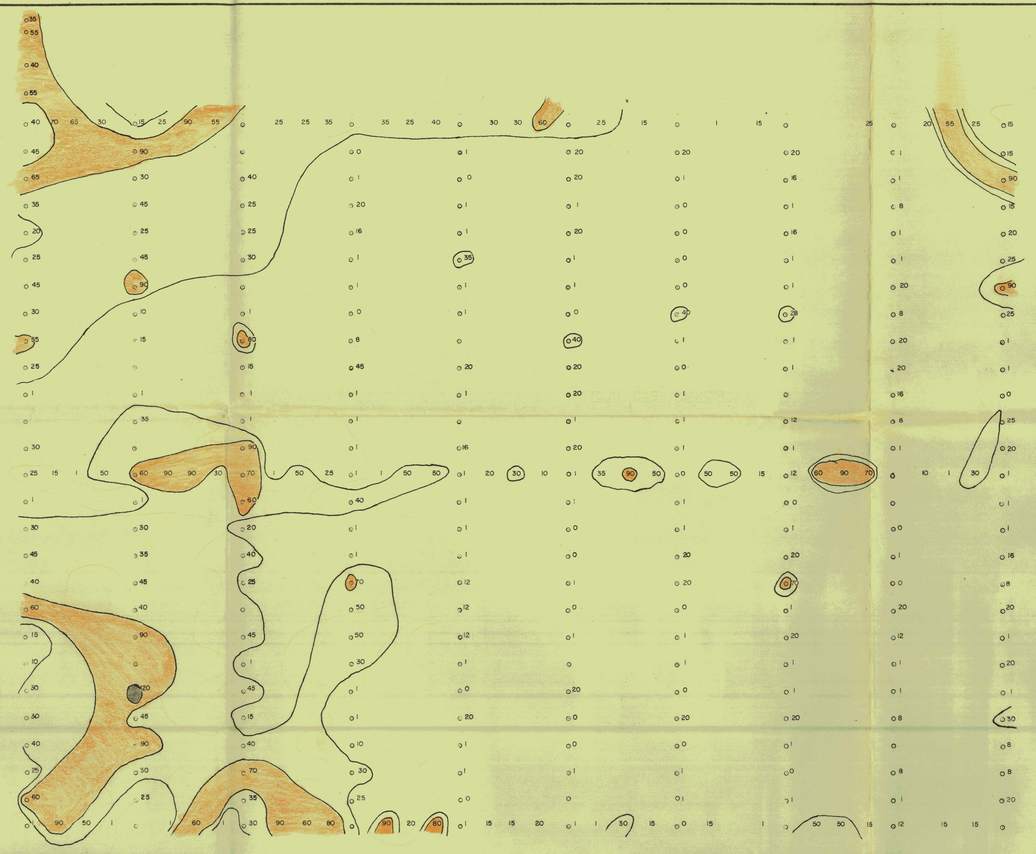
Lead plot in parts per million (ppm)

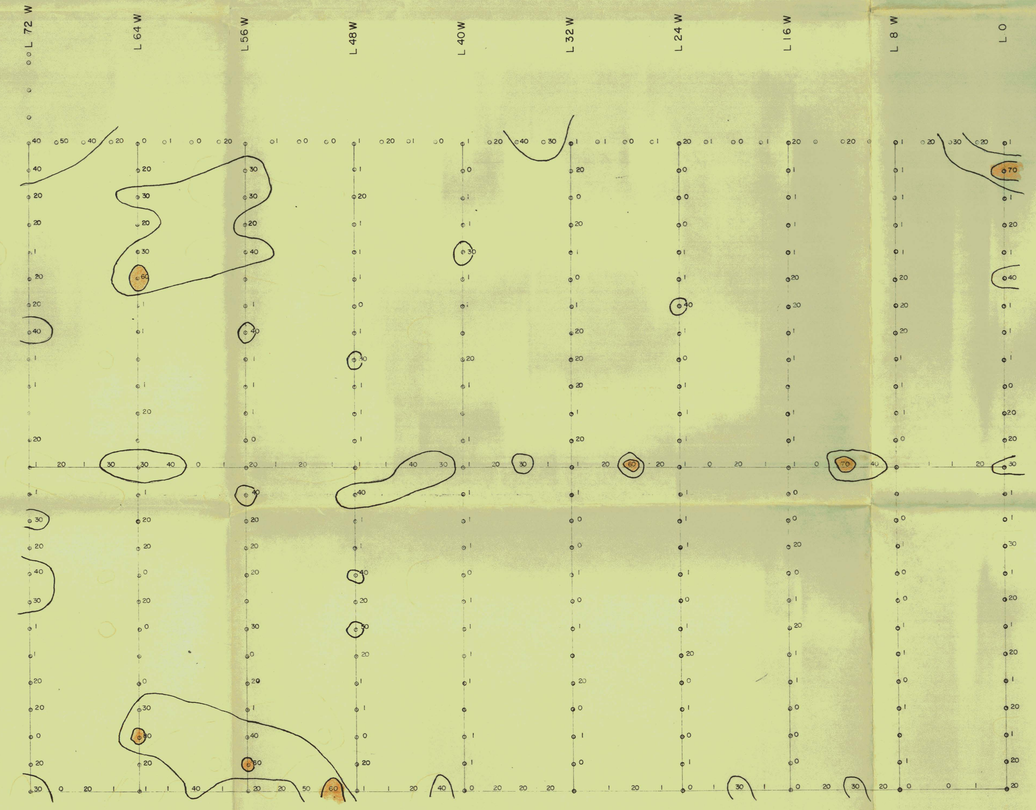
(5) Anomaly Reference Number

Photo Center
Spot Height
Buildings
Bluff
Swamp
Stream
Slide Rock or Frost Heave
Trail
Cut Line
Roads
Bulldozer Trench
Hand Trench
Workings
Adit

400 200 0 400 800 1200 1600
SCALE 1 inch = 400 feet

ORIGINAL LEAD PLOT





LEAD PLOT (original samples re-analized)

No reason can be found for discrepancy in results.

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

H CLAIM GROUP

AREA NO. 19

SOIL SAMPLING

ZINC PLOT

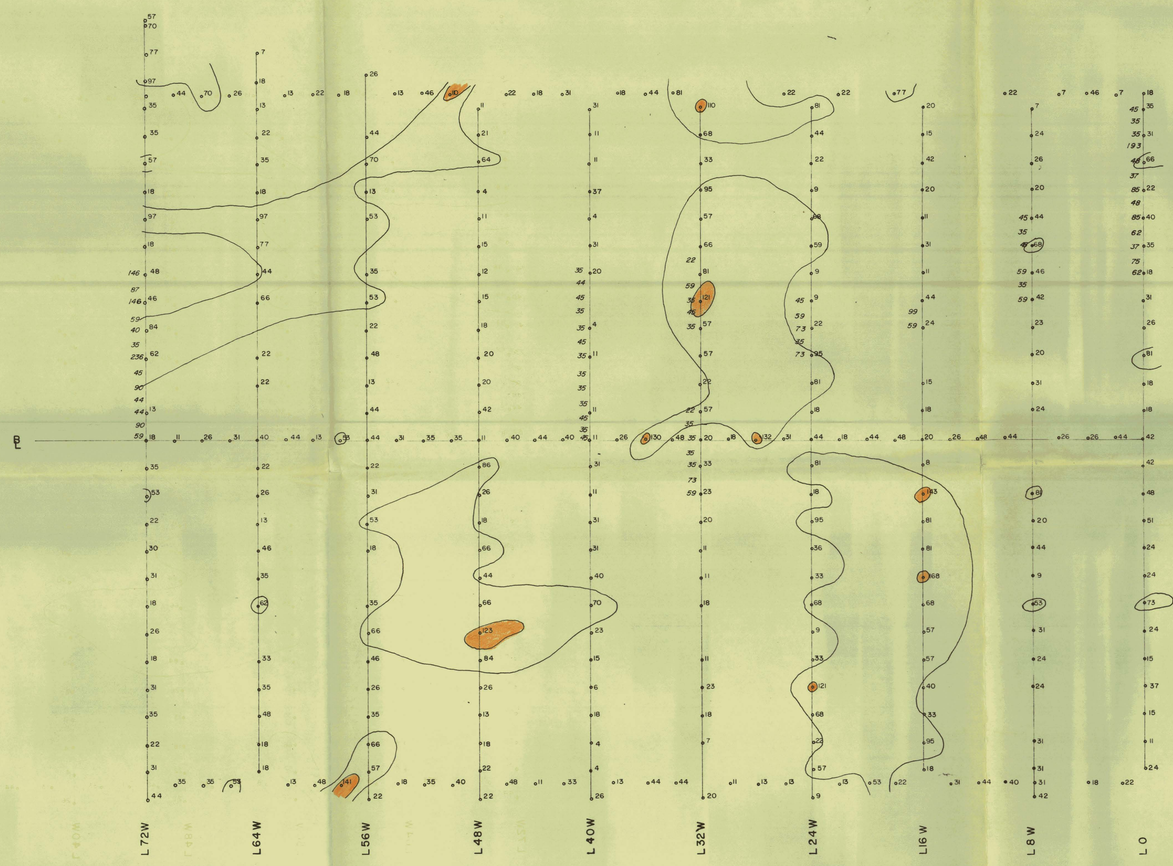
CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	0	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	12,801	-	25,600
	over 25,601		

44 48 51
96 40 44 Zinc plot in parts per million (ppm)

+	Photo Center	- - -	Trail
	Spot Height	+-+-+	Cut Line
	Buildings		Roads
	Bluff		Bulldozer Trench
	Swamp	<::::>	Hand Trench
	Stream	□	Workings
	Slide Rock or Frost Heave	>—	Adit

400 200 0 400 800 1200 1600
SCALE 1 inch = 400 feet



719

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

H CLAIM GROUP

AREA NO. 19

SOIL SAMPLING

COPPER PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

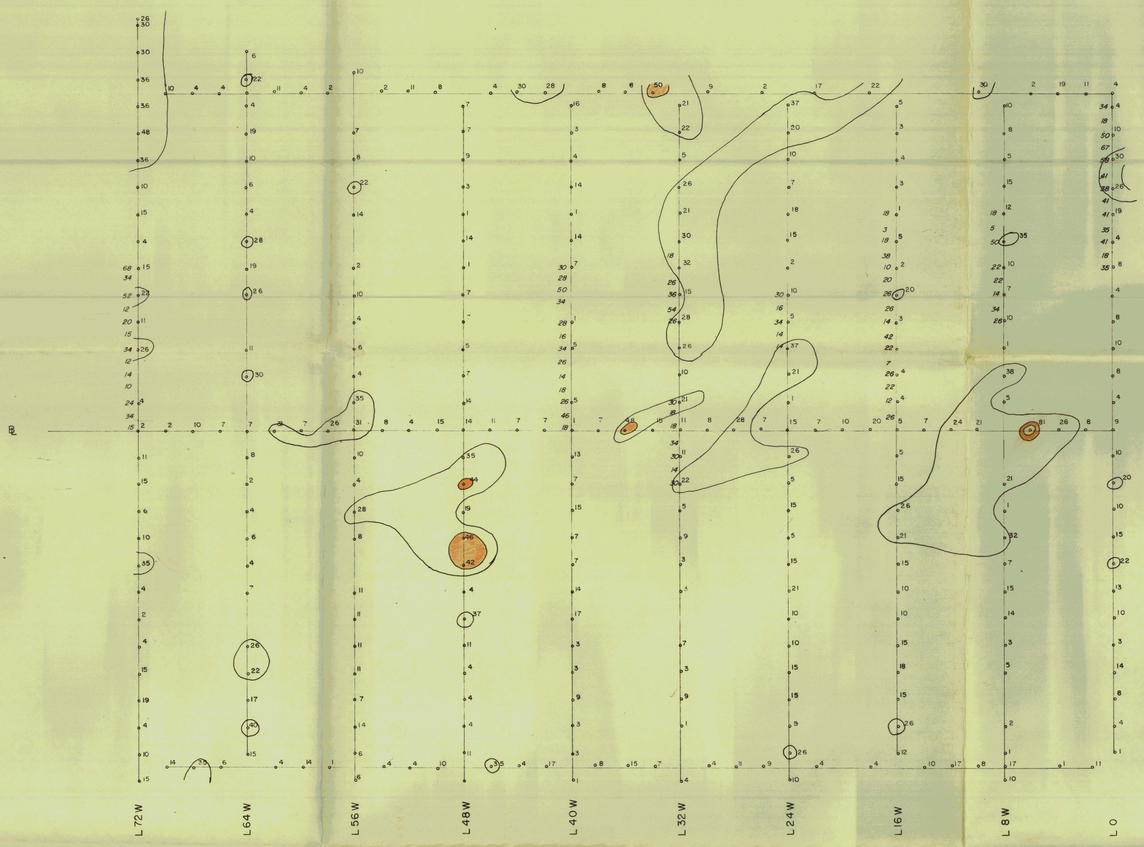
	21	40
	41	80
	81	160
	161	320

Copper plot in parts per million (ppm)

Photo Center
Spot Height
Buildings
Bluff
Swamp
Stream
Slide Rock or Frost Heave
Trail
Cut Line
Roads
Bulldozer Trench
Hand Trench
Workings
Adit

400 200 0 400 800 1200 1600

SCALE 1 inch = 400 feet



MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

LEO CLAIM GROUP

SOIL SAMPLING
LEAD PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

26 -	50
51 -	100
101 -	200
201 -	400
401 -	800
801 -	1600
1601 -	3200
3201 -	6400
6401 -	12,800
over	12,801

Lead plot in parts per million (ppm)

(5) Anomaly Reference Number

NORTHLAKE RIVIERA CLAIM BOUNDARY

Photo Center
Spot Height
Buildings
Bluff
Swamp
Stream
Slide Rock or Frost Heave
Trail
Cut Line
Roads
Bulldozer Trench
Hand Trench
Workings
Adit

400 200 0 400 800 1200 1600

SCALE 1 inch = 400 feet

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

LEO CLAIM GROUP

SOIL SAMPLING
ZINC PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

0	-	100
101	-	200
201	-	400
401	-	800
801	-	1600
1601	-	3200
3201	-	6400
6401	-	12,800
12,801	-	25,600
over 25,601		

Zinc plot in parts per million (ppm)

- Photo Center
- Spot Height
- Buildings
- Bluff
- Swamp
- Stream
- Slide Rock or Frost Heave
- Trail
- Cut Line
- Roads
- Bulldozer Trench
- Hand Trench
- Workings
- Adit

400 200 0 400 800 1200 1600

SCALE 1 inch = 400 feet

NORTHLAKE RIVERA CLAIM BOUNDARY

L48W L44W L40W L36W L32W L28W L24W L20W L16W L12W L8W L4W

L4S L8S L12S L16S L20S L24S L28S

L4E L8E L12E L16E L20E L24E L28E L32E L36E

MACDONALD CONSULTANTS LTD.
VANCOUVER B.C.

NORTHLAKE MINES LTD.

LEO CLAIM GROUP

SOIL SAMPLING
COPPER PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	26	-	50
	51	-	100
	101	-	200
	201	-	400
	401	-	800
	801	-	1600
	1601	-	3200
	3201	-	6400
	6401	-	12,800
	over	12,801	

Copper plot in parts per million (ppm)

Photo Center
Spot Height
Buildings
Bluff
Swamp
Stream
Slide Rock or Frost Heave
Trail
Cut Line
Roads
Bulldozer Trench
Hand Trench
Workings
Adit

400 200 0 400 800 1200 1600

SCALE 1 inch = 400 feet

NORTHLAKE RIVIERA CLAIM BOUNDARY

L 48W L 44W L 40W L 36W L 32W L 28W L 24W L 20W L 16W L 12W L 8W L 4W BL

L4S L8S L12S L16S L20S L24S L28S

L8E L16E L24E L32E

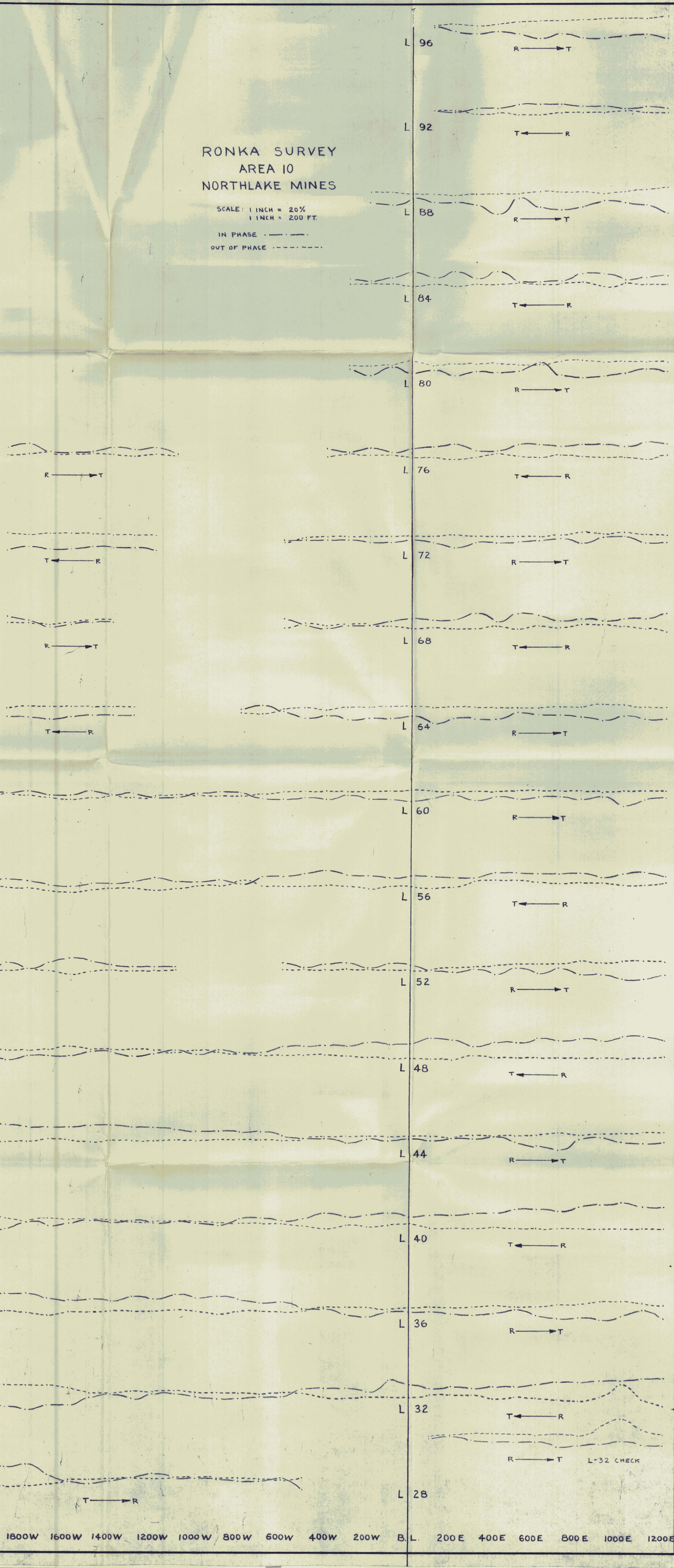
GRID #10
RONKA SURVEY

RONKA SURVEY
AREA 10
NORTHLAKE MINES

SCALE: 1 INCH = 20%
1 INCH = 200 FT.

IN PHASE ·—·—·

OUT OF PHASE ·----·----·



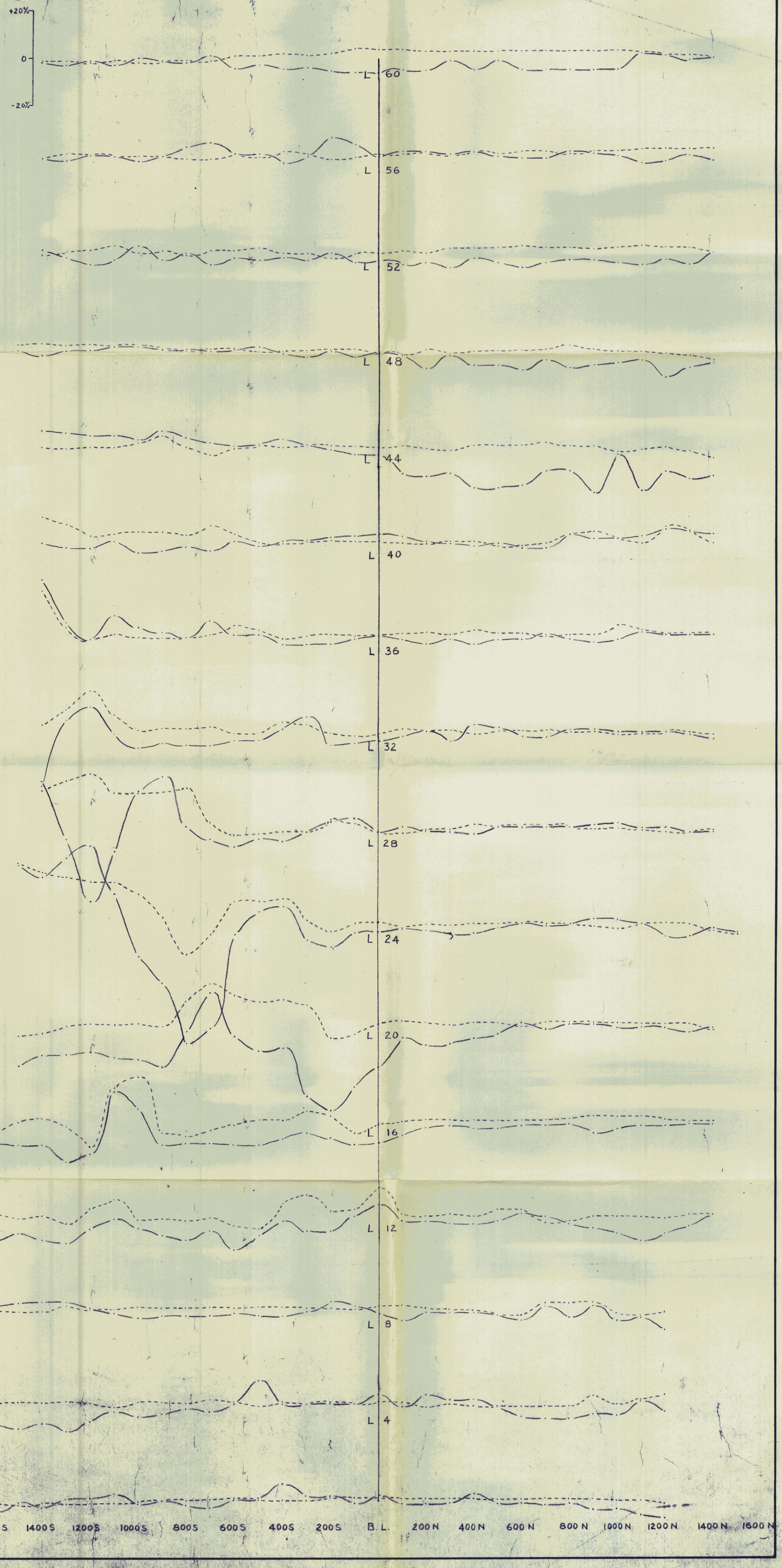
RONKA SURVEY
AREA II
NORTHLAKE MINES

SCALE: 1 INCH = 200 FT.
1 INCH = 20%

IN PHASE ·——·——·

OUT OF PHASE ·-·-·-·-·

DRAWN BY BILL PELTON



RONKA SURVEY OF AREA 14 NORTHLAKE MINES

+20 %

-20 %

L32

L 32
BACK CHECK

L28

L24

L20

L16

L12

L8

L4

L0

BL 200N 400N 600N 800N 1000N 1200N 1400N 1600N

SCALE: 1 INCH = 200 FT.
1 INCH = 20 %

IN PHASE .—.—.—.

OUT OF PHASE .-.-.-.-.

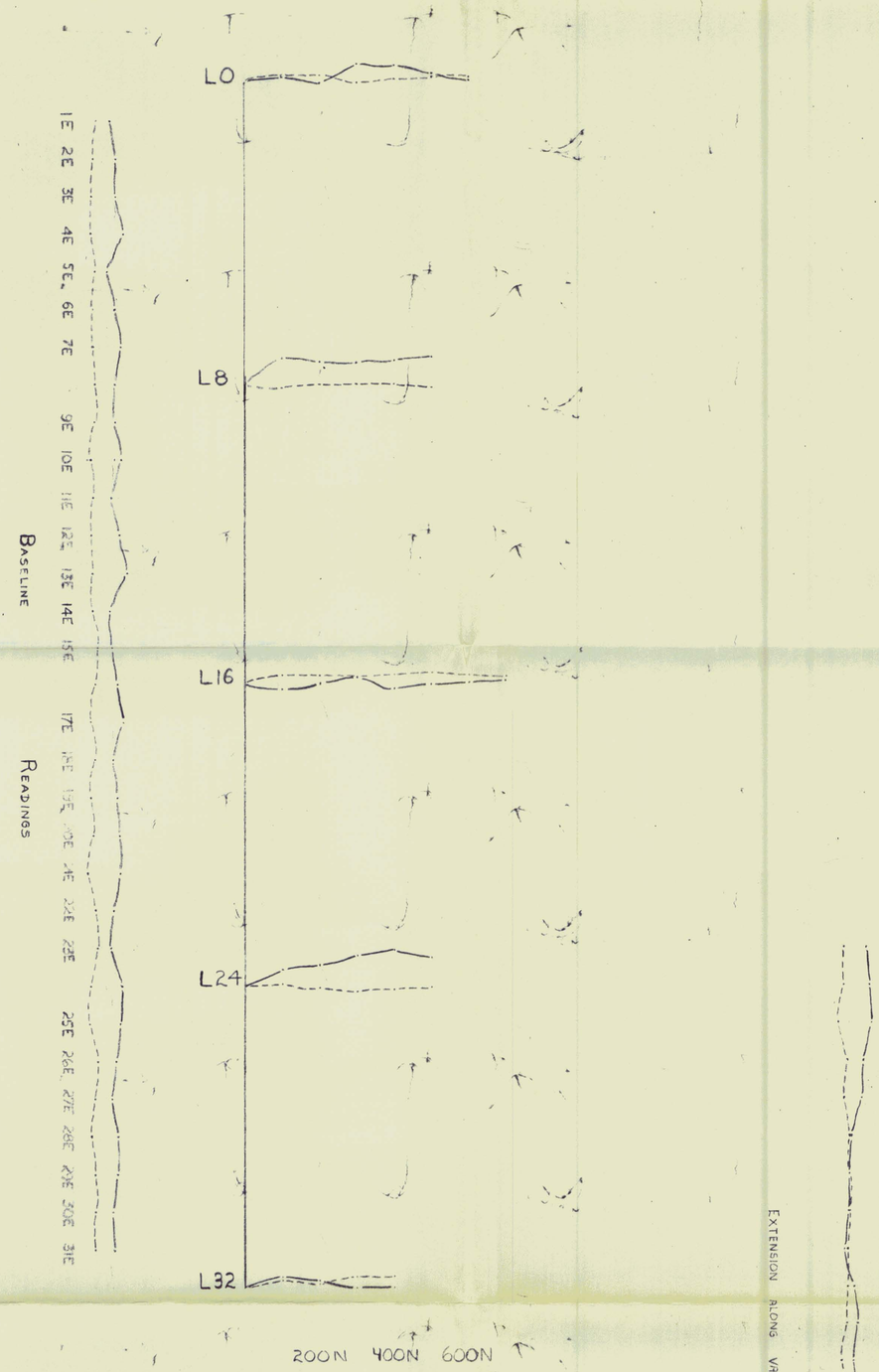
DRAWN BY BILL PELTON

RONKA SURVEY
AREA 15

1 inch = 200'
1 inch = 20%

Long Baffle

----- out of phase
—— in phase



NORTHLAKE MINES LTD.

AREA 19

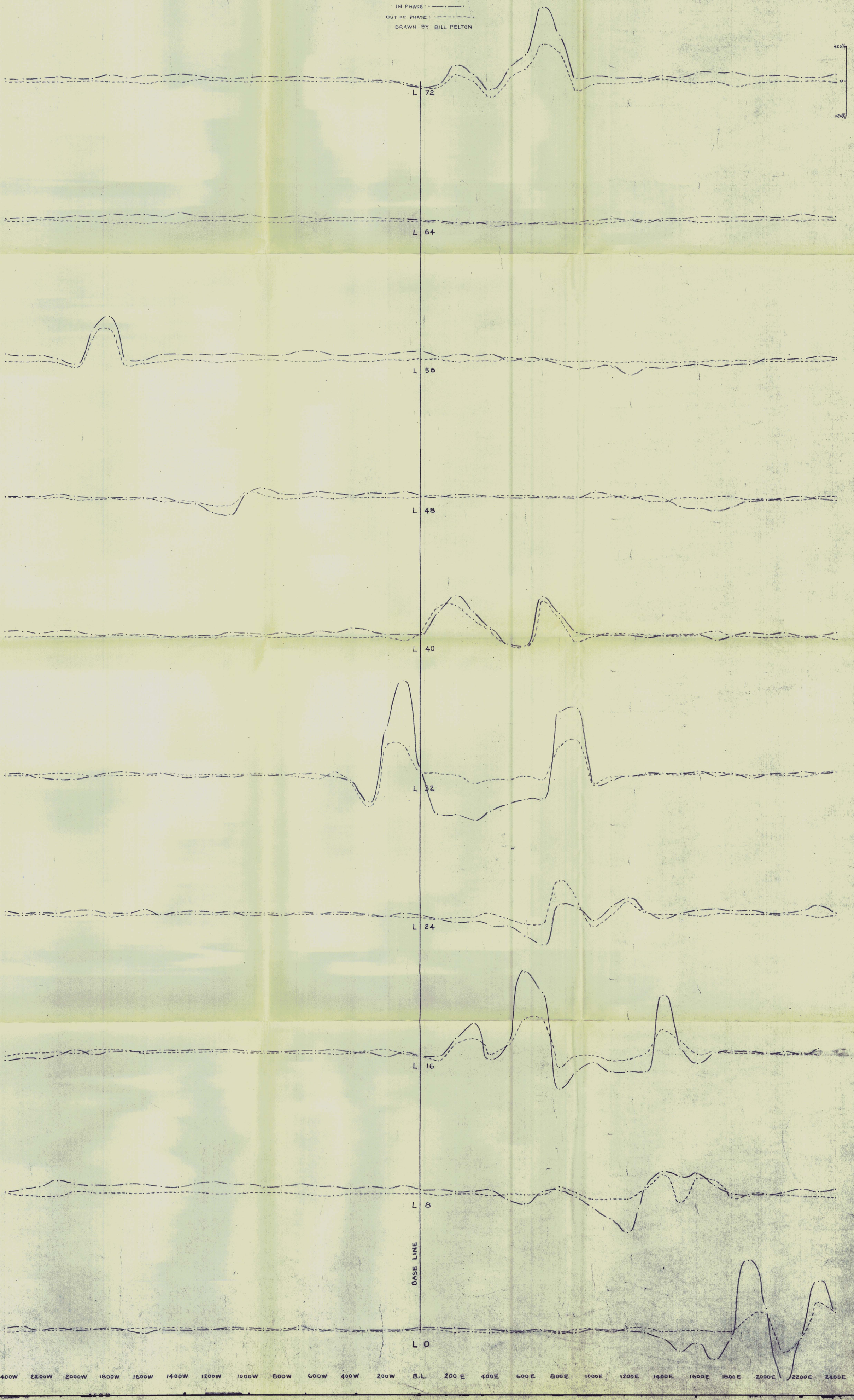
RONKA SURVEY

SCALE: 1 INCH = 20%
1 INCH = 200 FT.

IN PHASE: ——·——·——

OUT OF PHASE: — — · — — · — —

DRAWN BY BILL PELTON



M.C. GEE 173

M.C. GEE 174

6

5

7

8

4

3

2A

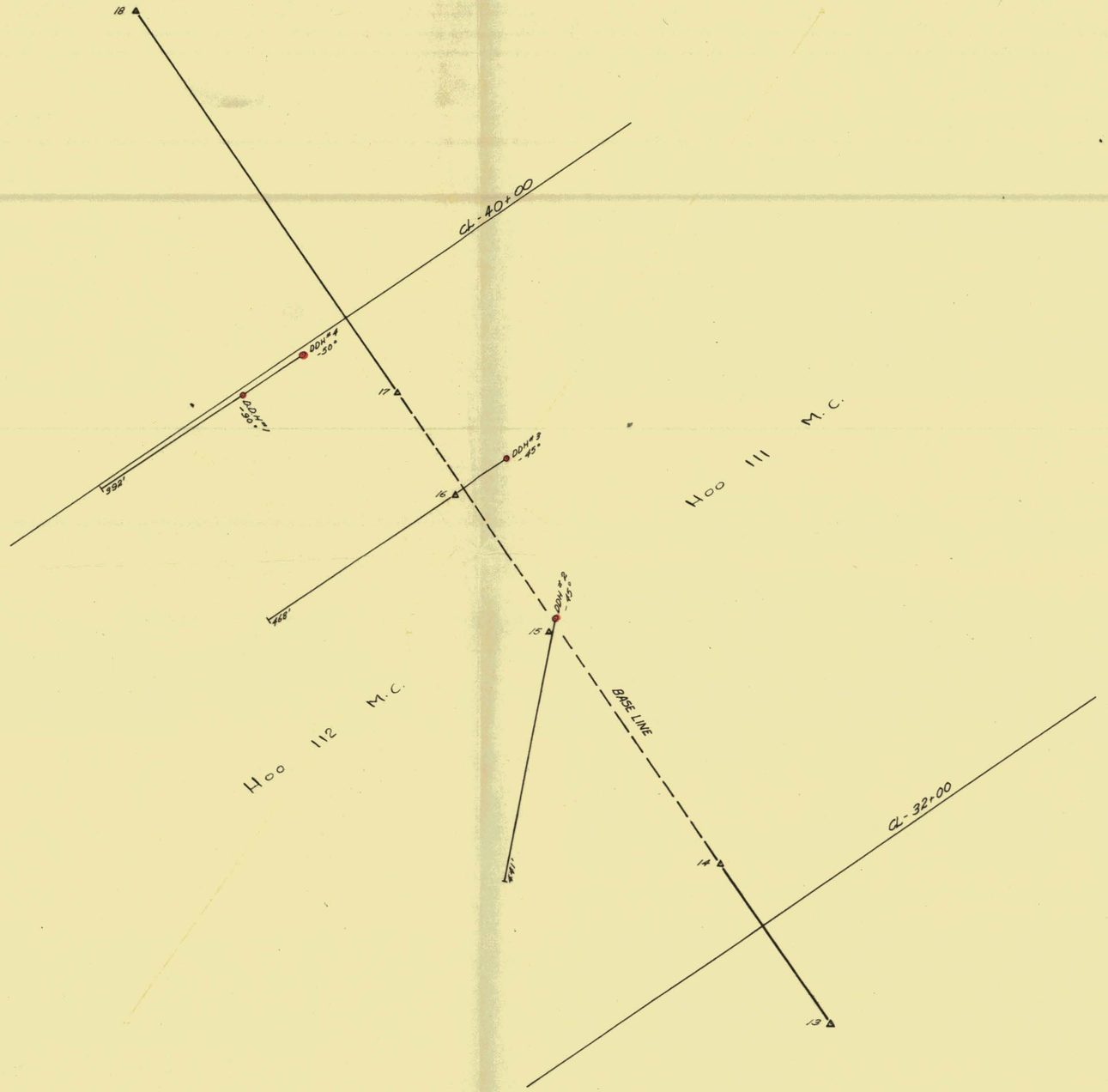
2

1

N

MacDonald Consultants Ltd.		
TRENCH LOCATION MAP		
SCALE	1"=20'	NORTHLAKE MINES Ltd.
DRAWN	CVD	
DATE	Feb. 67	
NO.		

BCIL - 20588 - M.C.



LAYOUT OF DIAMOND DRILL HOLES ON AREA # 18 HOOLE RIVER

SCALE : 1" = 100'
OCT. 26/66

NORTHLAKE MINES Ltd.		
MacDonald Consultants Ltd.		
SCALE	1"=100'	
DRAWN		
DATE		
NO.		

ELEV. - 3350'

AREA # 18
HOOLE RIVER
HOLE NO. 1-18
Sept. 4 - Sept. 13, 1966
76 % Recovery
Scale: 1" = 20'

Location: Line 40+00 W
@ 2+50 S.

0	OVERBURDEN
30	GRAPHITE SHIST
54	GRANITE GNEISS & HIGHLY ALTERED GRAPHITE SHIST.
93	
97	GNEISS TR. - PYRITE @ 108'.
127	GNEISS WITH QUARTZ STRINGERS.
131	GNEISS & ALTERED GRAPHITE SHIST. TR. - PYRITE @ 134'
142	GNEISS.
154	GNEISS & CHLORITIC SHIST LAMINATED.
158	GNEISS
165	GNEISS, CHLORITE SHIST.
168	GNEISS, QTZ. INCLUSIONS, CHL. SCH. TR. - PYRITE @ 168.3'-169.6' & 175'-176'.
179	PYRITE, GNEISS.
184	GRAPHITE SHIST
186	CHL. SHIST, QTZ, GNEISS, PYRITE. TR. - CHALCOPYRITE @ 191.6'-193.0'
191.6	
193	GNEISS & QUARTZ
196	GNEISS, QUARTZ, CHLORITIC SHIST.
201	GNEISS, QUARTZ
203	GNEISS
205	GNEISS, QUARTZ
210	PYRITE, GNEISS, QUARTZ
211.6	PYRITE, GNEISS, QUARTZ, CHLORITIC SHIST.
217	PYRITE, QUARTZ, CHLORITIC SHIST
229	PYRITE, QUARTZ CHLORITIC SHIST, GNEISS.
239	PYRITE, QUARTZ, CHLORITIC SHIST.
253	PYRITE, QUARTZ, CHLORITIC SHIST, GNEISS.
256	PYRITE, QUARTZ, CHLORITIC SHIST
262	PYRITE, QUARTZ, CHLORITIC SHIST, GNEISS
281	PYRITE, CHLORITIC SHIST. TR. - CHALCOPYRITE.
295	

	Pb Zn Cu Au Ag
181	
184	R-605
186.5	R-604
189	R-603
217	R-602

NORTHLAKE MINES Ltd.		
MacDonald Consultants Ltd.		
SCALE	1"=20'	
DRAWN		
DATE		
NO.		

COPY

DIAMOND DRILL RECORD

PROPERTY Yukon Territory. HOLE No. 1-18.

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 1-18 Sheet No. 1 Lat. L 40 W Total Depth 295'
Section Hoole River Dep. 2450 S Logged By D.M.Lang.
Date Begun Sept. 4, 1966. Bearing Vertical Claim
Date Finished Sept. 13, 1966. Elev. Collar 3350. Core Size AX.

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				REC.
97-99	Gneiss						1.2'
99-106	Gneiss						3.0'
106-116.6	Gneiss Tr Pyrite At. 108'						6.5'
116.6-120.6	Gneiss						2.1'
120.6-124	Gneiss						3.3'
124-127	Gneiss						3.0'
127-131	Gneiss with Quartz Stringers						5.7'
131.6-133.6	Gneiss & Altered Graphite Schist						2.0'
133-142	" " " " Tr. Pyrite 134'						5.2'
142-146	Gneiss						4.0'
146-154							8.0'
154-158	Gneiss & Chloritic Schist Laminated.						4.0'
158-161	Gneiss						3.0'
161-165	Gneiss						2.2'
165-168	Gneiss Chlorite Schist						3.0'
168-172	Tr Pyrite 168.3'-169.6' Gneiss, Qtz Inclusions, Chl. Sch.						3.9'
172-174							2.0'
174-179	Tr Pyrite 175-176 Qtz. Inclusions Gneiss Chl. Schist.						5.0'
179-186	Pyrite 179'-184 Graphite Schist 185-186						7.0'
186-191.6	Chl. Schist, Qtz, Gneiss Pyrite 186-191.6						5.6'
191.6-193	Tr. Chalcopyrite 191.6-193						1.4'

Copy

DIAMOND DRILL RECORD

PROPERTY Yukon Territory HOLE No. 1-18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 1-18 Sheet No. 2
Section Hoole River
Date Begun Sept 4, 1966
Date Finished Sept 13, 1966.

Lat.
Dep.
Bearing
Elev. Collar 3350

Total Depth 295'
Logged By D.M. Leaf.
Claim
Core Size A-X

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				REC.
193 - 196	Gneiss & Quartz						3.0'
196 - 201	Gneiss & Quartz, Chloritic Schist.						5.0'
201 - 203	Gneiss & Quartz						2.0'
203 - 205	Gneiss						2.0'
205 - 208	Gneiss & Quartz						3.0'
208 - 210	" "						2.0'
210 - 211.6	Pyrite, Gneiss, & Quartz						1.4'
211.6 - 217	Pyrite, Gneiss, Quartz, Chloritic Schist						5.4'
217 - 220	Pyrite, Chloritic Schist & Quartz						3.0'
220 - 229	Pyrite " " "						9.0'
229 - 233	Pyrite " " " Gneiss						4.0'
233 - 239	Pyrite " " " "						6.0'
239 - 243	Pyrite, Quartz, Chloritic Schist						2.0'
243 - 253	Pyrite " " "						5.0'
253 - 256	Pyrite, Quartz, Chloritic Schist Gneiss						3.0'
256 - 258	Pyrite, Quartz, Chloritic Schist						1.0'
258 - 262	Pyrite " " "						1.0'
262 - 265	Pyrite, Quartz, Chloritic Schist, Gneiss						3.0'
265 - 273	Pyrite " " " "						8.0"
273 - 277	Pyrite " " " "						1.0
277 - 281	Pyrite " " " "						1.0'

Copy.

DIAMOND DRILL RECORD

PROPERTY Yukon Territory. HOLE No. 1-18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 1-18 Sheet No. 3 Lat. Total Depth 295
Section Hoole River Dep. Logged By D. McKay.
Date Begun Sept. 4 1966 Bearing Claim
Date Finished Sept 13, 1966 Elev. Collar 3350 Core Size AX.

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				Rec.
281 - 285	Pyrite, Tr. Chalcopyrite, Chloritic Schist						1.0'
285 - 295	Pyrite, Tr. Chalcopyrite, Chloritic Schist.						1.0'
	Overburden To 30', Graphite Schist to 54'						
	From 54' to 93', Granite Gneiss & Highly						
	Altered Graphite Schist.						
	43' NX Casing.						
	87' BX Casing						
	181' AX Casing.						
	At 285' Strong water sand unable to core						
	deeper due to sand & water pressure.						
	Core Recovery - 76.4%						

AREA # 18
HOOLE RIVER.

HOLE NO. 2-18

Sept. 18 - Sept. 28, 1966.
70% Recovery
Scale: 1" = 40'

Location: Line 36+00 N
on Baseline.
Az. = 150° Mag.
Claim: Hoo 1M.

NORTHLAKE MINES Ltd.		
MacDonald Consultants Ltd.		
SCALE	1"=40'	
DRAWN		
DATE		
NO.		

DIAMOND DRILL RECORD

PROPERTY Northlake Mines HOLE No. 2 - 18

DIP TEST		
	Angle	
Footage	Reading	Corrected
200'	43	

Hole No. 2 - 18 Sheet No. 1 Lat. Line 36+00 N Total Depth 441'

Dip Section 45° Dep. Collar on ℄ Logged By R T Hilker & DM Cox

Date Begun Sept 16, 1966 Bearing 150° Mag. Claim 1100 111

Date Finished Sept 28, 1966 Elev. Collar S 3350 Core Size AX

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				Core Rec Ft
0 - 38	OVERBURDEN						
38 - 56	BROKEN UP ULTRABASIC TO 56,						
	WHICH IS THE TOP OF THE GRAPHITE						
	SCHIST						
56 - 61	GRAPHITE SCHIST. BADLY BROKEN UP						
	FIRST CORE @ 61'						
61 - 63	FOLIATED QTZ GRAPHITE SCHIST. MINOR FeS2						1.0
63 - 89	" " " " " "						26.0
	6" QTZ BETWEEN 81 - 82						
	3 - 2" BANDS QTZ BETWEEN 86 - 87						
89 - 93	FOLIATED GRAPHITE SCHIST WITH QTZ						2.0
	MINOR PYRITE						
93 - 96	FOLIATED QTZ GRAPHITE SCHIST WITH PYRITE						2.5
96 - 100	" " " " " "						2.5
100 - 104	" " " " " "						1.5
104 - 106	" " " " " "						1.5
106 - 108	" " " " " "						2.0
108 - 111	" " " " " "						0.5
111 - 112.5	" " " " " "						1.5
112.5 - 121	" " " " " "						0.4
121 - 173	FOLIATED QTZ GRAPHITE SCHIST WITH MINOR PYRITE						

DIAMOND DRILL RECORD

PROPERTY ..... HOLE No. 2 - 13

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. ..... Sheet No. 2 Lat. ..... Total Depth .....

Section ..... Dep. ..... Logged By D. M. Cox TO 200'

Date Begun ..... Bearing ..... Claim T. HERRO TO 441

Date Finished ..... Elev. Collar ..... Core Size AX

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE PER FT
173 - 182	QTZ & CALCAREOUS SCHIST						5.0
182 - 184	QTZ CALC SCHIST WITH GRAPHITE SCHIST						1.5
184 - 185	" " " " " "						0.9
185 - 186	QUARTZOSE						1 0
186 - 189	QTZ BIOTITIC SCHIST MINOR PYRITE						2.0
189 - 190	QTZ & " "						1.0
191 - 192	QUARTZ GRANITE GNEISS						1.0
192 - 195	GNEISS CALC & QUARTZ SCHIST						3.0
195 - 197	" " & " "						1.0
197 - 200	QTZ & BIOTITIC SCHIST						3.0
200 - 202	QTZ BIOTITIC SCHIST. FOLIATED. MINOR PYRITE						0.5
202 - 205	GRAPHITE SCHIST. MINOR PYRITE IN						1 0
	CRYSTALS						
205 - 209	FOLIATED QTZ BIOTITIC SCHIST						4.0
	2" QTZ INCLUSION @ 205'						
209 - 220	QTZ BIOTITIC SCHIST						11 0
	1" QTZ @ 217'						
220 - 222	QTZ BIOTITIC SCHIST. THIS SCHIST						2.0
	IS ALMOST A GNEISS. DIFFICULT TO						
	DIFFERENTIATE BETWEEN THESE TYPES						
222 - 231	AS ABOVE 1" QTZ @ 227'						9 0

DIAMOND DRILL RECORD

PROPERTY ..... HOLE No. 2-18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. ..... Sheet No. 3 Lat. ..... Total Depth .....

Section ..... Dep. ..... Logged By T. HENRY

Date Begun ..... Bearing ..... Claim .....

Date Finished ..... Elev. Collar ..... Core Size .....

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC FT
231 - 251	QTZ BIOTITIC SCHIST SL GNEISSIC.						20.0
	CONTAINING CHLORITIC & GRAPHITIC						
	SECTIONS MINOR PYRITE THROUGHOUT						
251 - 254	QTZ CHLORITIC SCHIST. DARK GREENISH						2.0
	TO BLACK CHLORITE. 4" QTZ						
	INCLUSION @ 254'						
254 - 256	VERY SILICEOUS CHLORITIC SCHIST						2.0
	6" QTZ @ 256'						
256 - 258	QTZ STAINED GREEN BY CHLORITE						1.0
258 - 264	QTZ BIOTITE & CHLORITE SCHIST.						5.0
	BEED QTZ. SOME CHLORITIC SECTIONS						
	(LOSS @ 260. 261.5)						
264 - 265	QTZ BIOTITIC SCHIST						1.0
265 - 271	" " " WITH A GRAPHITE						3.0
	SECTION FROM 270'. MINOR PYRITE.						
	QUITE SILICEOUS IN PART						
271 - 273	QTZ WITH DARK GREEN TO BLACK CHLORITE						0.2
273 - 275	QTZ BIOTITIC SCHIST. MINOR CHLORITE						2.0
	& GRAPHITE						
275 - 277	AS ABOVE W/ MINOR PYRITE						2.0

DIAMOND DRILL RECORD

PROPERTY ..... HOLE No. 2-18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. ..... Sheet No. 4 Lat. ..... Total Depth .....

Section ..... Dep. ..... Logged By T. H.

Date Begun ..... Bearing ..... Claim .....

Date Finished ..... Elev. Collar ..... Core Size .....

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT
277 - 280	QTZ BIOTITE SCHIST . 2" QTZ						3.0
	INCLUSION @ 277.5 . QTZ VEINLETS						
	TO 1/8" @ 279						
280 - 287	GRAPHITE SCHIST CONTAINING CHLORITE						7.0
	& QTZ . 2" QTZ @ 282 & 1" @ 283						
287 - 288.6	QTZ BIOTITIC SCHIST						1.6
288.6 - 290	PRON BROKEN UP QTZ BIOTITIC						0.5
	SCHIST . PRED QTZ						
290 - 296	QTZ BIOTITIC SCHIST . 295-296						5.0
	BROKEN UP GRAPHITE SCHIST						
296 - 299	ALMOST COMPLETELY QTZ IN A						3.0
	MATRIX OF QTZ . BIOTITIC SCHIST						
299 - 321	QTZ BIOTITIC SCHIST 2" QTZ @ 303'						20.0
	VERY MINOR PYRITE & CHLORITE						
321 - 329	PRED QTZ BIOTITIC SCHIST QUITE CHLORITIC						8.0
	IN SECTIONS MINOR FeS_2						
329 - 340	PRED QTZ. BIO. SCHIST WITH MAJOR BL.						11.0
	CHLORITE SECTIONS @ 329 - 329.5 & 335 - 340						
340 - 345.6	CHLORITE SCHIST BLACK SOME QTZ &						4.0
	MINOR FeS_2						

DIAMOND DRILL RECORD

PROPERTY .....

HOLE No. 2 - 18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. ..... Sheet No. 5 ..... Lat. .....

Section ..... Dep. .....

Date Begun ..... Bearing .....

Date Finished ..... Elev. Collar .....

Total Depth .....

Logged By T. M.

Claim .....

Core Size .....

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				
345.6 - 348	BROKEN UP QTZ & CHLORITIC SCHIST						2.0
	WITH BIOTITE						
348 - 369	QTZ CHLORITE SCHIST. GNEISSIC TEXTURE						20.0
	1" QTZ @ 359 4" QTZ WITH CHLORITE						
	STAIN @ 362 SOME MINOR PYRITE.						
369 - 376	BADLY BROKEN CHLORITIC SCHIST (VERY SILICEOUS)						5.0
	GRAPHITIC IN PART.						
376 - 380	QTZ CHLORITIC SCHIST.						3.0
380 - 388	QTZ BIOT. SCHIST CHLORITIC STRONGLY						5.0
	CALC. @ 385 - 388 REACTS STRONGLY TO ACID						
388 - 390	CALC. BASE QTZ & CHLORITE						2.0
390 - 392	CALC. BASE QTZ & CHLORITE						0.5
392 - 397	CALC. BASE QTZ & CHLORITE						1.5
	BADLY BROKEN MINOR FeS_2						
397 - 401	QTZ CHLORITIC SCHIST ALMOST GNEISSIC @ 398						9.0
401 - 405	CALC. CHLORITE & QTZ.						5.0
405 - 411	CALC. CHLORITE & QTZ IN ENTS & STRINGERS						6.0
	MINOR FeS_2						
411 - 421	SLIGHTLY CALC. CHLORITE & QTZ SCHIST						10.0
	WITH BIOTITIC PARTS. ALMOST GNEISS.						
	1" CALCITE @ 420						

DIAMOND DRILL RECORD

PROPERTY .....

HOLE No. 2 - 18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. ..... Sheet No. 6 ..... Lat. .....

Section ..... Dep. .....

Date Begun ..... Bearing .....

Date Finished ..... Elev. Collar .....

Total Depth .....

Logged By T. WEBB

Claim .....

Core Size .....

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				
411 - 421 (cont)	SECTIONS HAVE A PORPHYRITIC APPEARANCE						
	WITH BLUE QTZ EYES TO 1/6".						
	REACTS WITH ACID THROUGHOUT.						
421 - 433	AS ABOVE ONLY SLIGHTLY MORE CALCAREOUS						12.0
	GNEISSIC.						
433 - 441	HIGHLY BROKEN QTZ. CHLORITE SCHIST						3.0
	SCHIST WITH QUARTZOSE APPEARANCE. CALCAREOUS						
	6" QTZ SECTION @ 437' CONTAINING CHLORITE						
	WITH MINOR PYRITE.						
	439.5' FRAGMENTS OF BLACK GRANITIC DIKE.						
CASING	0 - 8' NX						
	0 - 15' BX						
	0 - 86' NX						
	CORE RECOVERY 70.0 %						

AREA # 18
HOOLE RIVER.
HOLE NO. 3-18

Sept. 30 - Oct. 12, 1966.
72% Recovery
Scale: 1" = 40'

Location : 37+71' W. &
58' N. of ℄.

NORTHLAKE MINES Ltd.		
MacDonald Consultants Ltd.		
SCALE	1"=40'	
DRAWN		
DATE		
NO.		

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES

HOLE No. 3 - 18

DIP TEST		
	Angle	
Footage	Reading	Corrected
300	43	

DIP

Hole No. 3 - 18 Sheet No. 1

Section 45°

Date Begun SEPT 30, 1966

Date Finished OCTOBER 12, 1966

Lat. 3771' W

Dep. 58' N of ℄

Bearing 105° MAG

Elev. Collar ± 3350

Total Depth 468 FT.

Logged By R.T. HEARD

Claim 1100 107

Core Size AX

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT.
0 - 53	OVERBURDEN						
53 - 59	QTZ GRAPHITE SCHIST MINOR PYRITE.						1.2
59 - 63.5	" " " " "						2.0
63.5 - 66							1.8
66 - 69							3.0
69 - 74	VERY BADLY BROKEN QUARTZ GRAPHITE SCHIST						2.5
74 - 80	QTZ GRAPHITE SCHIST MINOR PYRITE						2.5
80 - 81	" " " " "						1.0
81 - 83	" " " " "						0.5
83 - 91	" " " " "						1.8
91 - 95	" " " " "						3.0
95 - 97	" " " " "						1.5
97 - 101	" " " " "						0.75
101 - 105	" " " " "						1.0
105 - 106	QTZ. GRAPHITE SCHIST MINOR PYRITE 4" QTZ						1.0
106 - 109	" " " " "						1.0
109 - 111	" " " " "						0.75
111 - 112.5	" " " " "						1.5
112.5 - 114	" " " " "						.5
114 - 116	" " " " "						1.2
116 - 120	" " " " "						3.0

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES. HOLE No. 3 - 18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 3 - 18 Sheet No. 2 Lat. Total Depth

Section Dep. Logged By T. HEARD

Date Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE Rec. FT
120 - 124	QTZ GRAPHITE SCHIST MINOR PYRITE						3.0
124 - 125.5	QUARTZOSE SERICITIC CHLORITE SCHIST						1.5
	WITH GNEISSIC TEXTURE.						
125.5 - 127	QUARTZOSE SERICITIC CHLORITE SCHIST						1.5
	WITH GNEISSIC TEXTURE						
129 - 129	QUARTZOSE SERICITIC CHLORITE SCHIST						2.0
	WITH GNEISSIC TEXTURE						
129 - 133	AT 129' - 1" OF GRAPHITE SCHIST						2.5
	129 - 130 . BULL QTZ						
	130 - 133 QUARTZOSE SERICITIC CHLORITE						
	SCHIST WITH GNEISSIC TEXTURE						
133 - 138	133 - 133.3 AS ABOVE						2.0
	133.3 - 133.6 - QTZ						
	@ 133.6 - QTZ GRAPHITE SCHIST						
	1" QTZ TO 138'						
138 - 141	SILICIFIED GRAPHITIC SILICIFIED QUARTZ						4.0
	SERICITE SCHIST WITH GNEISSIC TEXTURE						
	MINOR PYRITE - 1" (N.A. @ 140'						
141 - 145	AS ABOVE						2.5
145 - 150.5	" "						5.0
150.5 - 151.5	" "						0.5

DIAMOND DRILL RECORD

PROPERTY Northlake Mines HOLE No. 3 - 18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 3 - 18 Sheet No. 3 Lat. Total Depth

Section Dep Logged By T. Heard

Date Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC FT.
151.5 - 156	Slight Granitic, Silicified Qtz						5.0
	Sericite Schist with Gneissic Texture						
	Minor Pyrite						
156 - 158	As above 156 - 156.5 Biotitic						1.0
158 - 163	" " Slight Foliated						2.0
163 - 169	At 163' 6" Qtz with Chlorite in parts						1.2
	Grades into a Foliated Qtz Biotite and						
	Graphite Schist with Minor Pyrite.						
169 - 170	Slight Foliated Qtz Graphite Schist						0.8
	Minor Pyrite.						
170 - 174	Slight Foliated Qtz Graphite and Biotite						4.0
	Schist Chloritic in part throughout.						
	Also Pyrite Throughout.						
	Red. Chlorite 170 - 171						
174 - 178	Slightly Silicified Qtz,						3.3
178 - 185	Graphite and Biotitic schist with						7.0
185 - 187	Very Minor Pyrite Throughout						1.0
187 - 188	At 188 Foliations are @ 85° to the						1.0
	Core Axis						
188 - 191	As Above.						3.0
191 - 192	" "						1.0

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES. HOLE No. 3 - 18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 3 - 18 Sheet No. 4 Lat. Total Depth.

Section Dep. Logged By T. HEARD.

Date Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT.
192 - 193	STRONGLY SILICIFIED QTZ. BIOTITE						1.0
	AND GRAPHITE SCHIST. SLIGHTLY FOLIATED						
193 - 200	HIGHLY SILICIFIED QTZ BIOTITE AND						7.0
	GRAPHITE SCHIST. MINOR PYRITE THROUGHOUT						
	1" QTZ @ 195.5. SLIGHTLY FOLIATED.						
200 - 205	AS ABOVE						5.0
205 - 209	" " 4" QTZ @ 208.5						3.0
209 - 211	" "						1.5
211 - 213	SLIGHT FOLIATED AND SILICIFIED QTZ.						2.0
	GRAPHITE BIOTITIC & CHLORITIC SCHIST.						
213 - 219	SLIGHTLY FOLIATED QTZ GRAPHITE AND						4.0
	BIOTITE SCHIST. AT 214.5 APPROX. 10"						
	SECTION VERY SILICIFIED WITH 20 - 30% PYRITE.						
219 - 220	FOLIATED QTZ. BIOTITE & GRAPHITE SCHIST.						1.0
	MINOR PYRITE 80 - 85° TO CORE AXIS.						
220 - 238	AS ABOVE.						18.0
238 - 239	" "						1.0
239 - 242	" "						2.0
242 - 244.5	" "						2.5
244.5 - 247	FOLIATED QTZ. BIOTITE & GRAPHITE SCHIST MINOR						2.4
	PYRITE. FINE GRAIN & DISSEMINATED @ 245.5.						

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES. HOLE No. 3 - 18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 3 - 18 Sheet No. 5
Section
Date Begun
Date Finished

Lat.
Dep.
Bearing
Elev. Collar

Total Depth
Logged By T. HEARD.
Claim
Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT.
247 - 248	FOLIATED QTZ. BIOTITE & GRAPHITE SCHIST.						0.2.
	MINOR PYRITE						
248 - 249	AS ABOVE						1.0
249 - 250	" "						0.5
250 - 251	" "						1.0
251 - 253	" "						1.0
253 - 259	QTZ. BIOT. & GRAPHITE SCHIST, ALMOST						1.2
	GNEISSIC IN APPEARANCE						
259 - 263	AS ABOVE						0.2
263 - 279	THERE WAS A VERY STRONG SEAM OF WATER						1.0
	SAND ENCOUNTERED IN THIS SECTION. THE						
	ONLY CORE RECOVERED IS OF QTZ. BIOTITE &						
	GRAPHITE SCHIST, SLIGHTLY FOLIATED GNEISS						
279 - 282	FOLIATED QTZ. BIOTITE & GRAPHITE SCHIST.						1.0
282 - 285	AS ABOVE CHLORITIC IN PART.						2.0
285 - 288	CHLORITE & GRAPHITE SCHIST.						0.8
288 - 291	QTZ. BIOTITE GRAPHITE & CHLORITE SCHIST						3.0
	SLIGHTLY FOLIATED. GNEISSIC.						
291 - 293	AS ABOVE						1.8
293 - 298	QTZ. BIOTITE & GRAPHITE SCHIST.						4.0

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES. HOLE No. 3 - 18

DIP TEST		
	Angle	
Footage	Reading	Correct

Hole No. 3 - 18 Sheet No. 6 Lat. Total Depth

Section Dep. Logged By T. HERRS.

Dat. Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT.
298 - 300	SLIGHTLY FOLIATED QTZ BIOTITE & GRAPHITE						2.0
	SCHIST, MINOR PYRITE						
300 - 339	SLIGHTLY FOLIATED QTZ BIOTITE & GRAPHITE						39.0
	SCHIST. PYRITE THROUGHOUT. 4" QTZ @ 310.5.'						
	6" HIGHLY SILICIFIED SECTION FROM						
	311.5 - 312. HIGHLY GRAPHITIC SECTIONS						
	FROM 319 - 321 & 328 - 331 + 95% GRAPHITE.						
339 - 342	AS ABOVE.						1.5
342 - 345	QUITE HIGHLY SILICIFIED QTZ. BIOTITE &						2.5
	GRAPHITE SCHIST WITH A FAIRLY LARGE						
	PERCENTAGE FeS2 ASSOCIATED WITH THE						
	QTZ 5%						
345 - 392	FOLIATED QTZ. GRAPHITE & BIOTITE SCHIST.						47.0
	SILICIFIED QUITE HIGHLY IN SECTIONS.						
	THESE CARRY UP TO 10% PYRITE, STRONGLY						
	GRAPHITIC 372 - 373 4" @ 385'						
392 - 395	SLIGHTLY FOLIATED QTZ. GRAPHITE & BIOTITE						1.0
	SCHIST. MINOR PYRITE THROUGHOUT.						
395 - 399	AS ABOVE.						4.0
399 - 401	" " @ 401 BEDDING = 50°						1.0
401 - 403	" "						2.0

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES. HOLE No. 3 - 18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 3-18 Sheet No. 2 Lat. Total Depth

Section Dep. Logged By T. HEARD.

Date Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT.
403 - 411.5	SLIGHTLY FOLIATED QTZ. GRAPHITE & BIOTITE						7.5
	SCHIST. MINOR PYRITE THROUGHOUT.						
	STRONGLY GRAPHITIC @ 406.						
411.5 - 418.5	AS ABOVE. STRONGLY GRAPHITIC @ 418						4.5
418.5 - 420	" "						2.5
420 - 421.5	" "						1.0
421.5 - 426.5	" "						5.0
426.5 - 429.5	" "						3.0
429.5 - 435	" "						4.5
435 - 439	THIS IS AN AREA WHERE WATER & SAND						0.2
	WERE ENCOUNTERED ONLY 0.2' OF CORE						
	QTZ. GRAPHITIC & BIOTITE SCHIST.						
439 - 440.5	QTZ. GRAPHITE & BIOTITE SCHIST.						1.0
440.5 - 441	" " " " "						0.5
441 - 442	" " " " "						0.5
442 - 443.5	HIGHLY SIL. QTZ GRAPHITE & BIOTITE						1.0
	SCHIST. APPROX. 2% PYRITE IN QTZ.						
443.5 - 445	AS ABOVE.						0.8
445 - 447	" " VERY HIGHLY SILICEOUS						2.0
	20 - 30% PYRITE APPROX. WITH QTZ.						

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES. HOLE No. 3-18

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 3-18 Sheet No. 8 Lat. Total Depth

Section Dep. Logged By T. HERRO.

Date Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT.
447 - 450	QTZ. BIOTITE & GRAPHITE SCHIST. FINE						3.0
	GRAIN BIOTITE.						0.
450 - 451	AS ABOVE SLIGHLY MORE SILICEOUS						0.5
	5% MASSIVE FINE GRAIN PYRITE.						
451 - 454	CONTACT IN HERE BETWEEN THE QTZ						1.0
	BIOTITE & GRAPHITE SCHIST AND A LIGHT GRAY						
	QTZ. CHLORITE ALMOST GNEISS.						
454 - 458	QTZ. CHLORITE GNEISS MINOR PYRITE.						1.0
458 - 462	" " " " "						0.8
462 - 465	" " " " "						1.0
465 - 468	" " " " "						0.8
CASING	10' NX						
	34' BX						
	61' NX						
	CORE RECOVERY - 72.4%						

AREA " 18

HOOLE RIVER

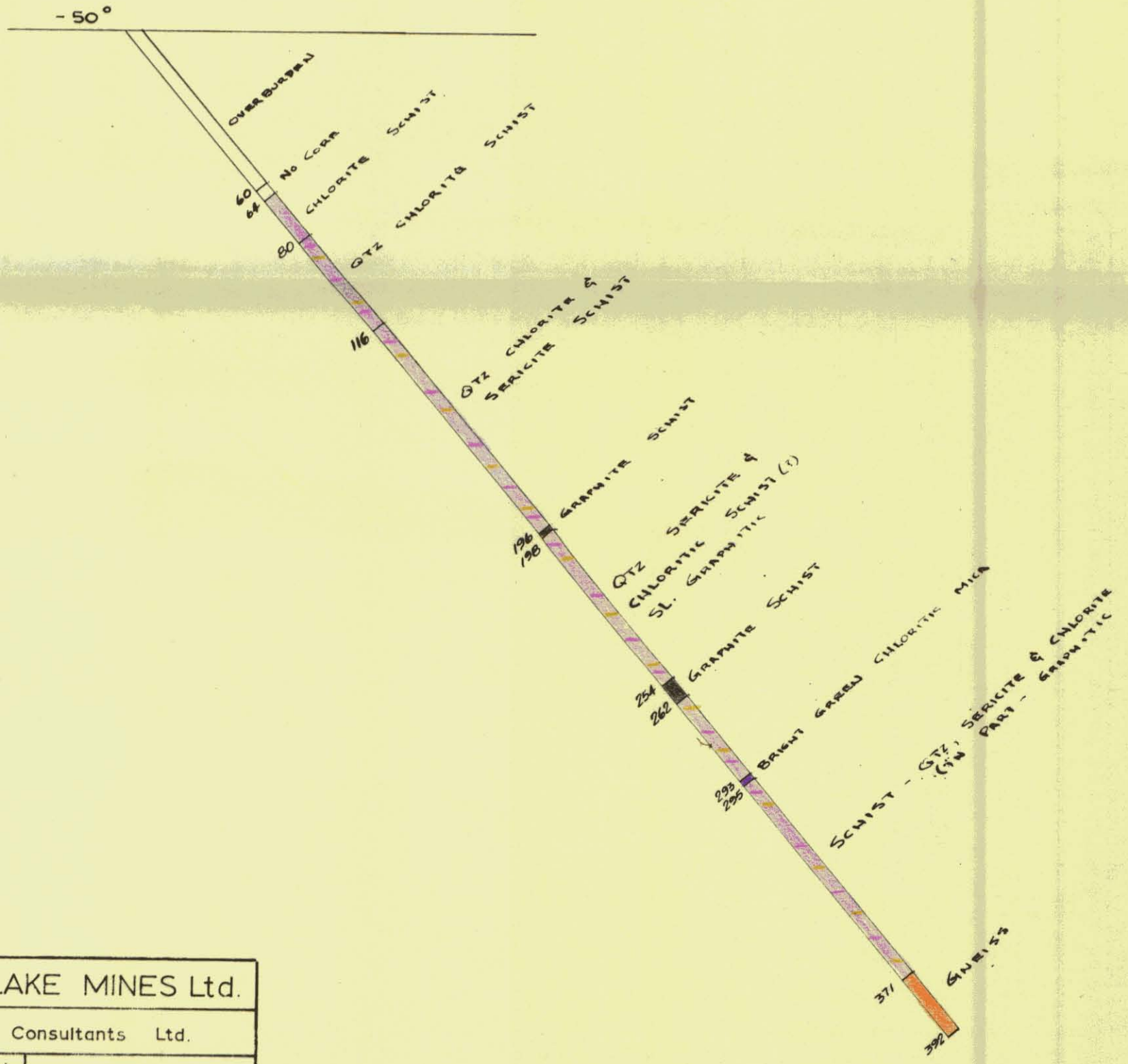
HOLE 4-18

OCT. 14 - 26TH, 1966

59.7 % RECOVERY

Scale 1" = 40'

LOCATION L 40 W
60 + 05



NORTHLAKE MINES Ltd.		
MacDonald Consultants Ltd.		
SCALE	1"=40'	
DRAWN		
DATE		
NO.		

DIAMOND DRILL RECORD

PROPERTY: NORTHLAKE MINES HOLE No. 4

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 4 - 18 Sheet No. 1 Lat. L 40 W Total Depth 392'

Dip Section 50° Dep. 60 + 0 S Logged By R.T. HERRED.

Date Begun Oct. 14/66 Bearing 195° MAG Claim

Date Finished Oct 26/66 Elev. Collar Core Size AX

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT.
0 - 64	OVERBURDEN						
64 - 80	LIGHT TO DARK GREEN TO BLACK SERPENTINE						
	SCHIST MINOR FINE GRAIN FeS$_2$.						
	2" QTZ. FRAGMENT @ 80' IT IS DIFFICULT						
	TO TELL MUCH ABOUT THIS SECTION AS IT						
	IS COMPOSED OF FRAGMENTS HELD						
	TOGETHER BY MUD (FOREIGN)						
80 - 86	PREV MUD CORE CONTAINS FRAGMENTS						2.0
	SOME QUARTZ FRAGMENTS						
86 - 89	MUD QTZ CHLORITE SCHIST SOME GRAPHITE						3.0
	MINOR FeS$_2$ FAULT GOUGE 80-86'						
89 - 92	QTZ BIOTITE & CHLORITIC SCHIST						2.5
	MINOR FeS$_2$ BLACK.						
92 - 95	QTZ CHLORITE VERY SLIGHTLY FOLIATED						3.0
	BEDDING @ APPROX 60°						
95 - 98	AS ABOVE SLIGHTLY MORE SILICEOUS						3.0
	SOME PYRITE						
98 - 100	VERY BROKEN BROKEN AT CHLORITE SCHIST						2.0
100 - 102	AS ABOVE MINOR FeS$_2$						1.0
102 - 103	90% MUD CONTAINING FRAGMENTS OF QTZ.						1.0
	& BLACK CHLORITE.						

DIAMOND DRILL RECORD

PROPERTY NORTHLAND MINES HOLE No. 4

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 4 - 15 Sheet No. 2 Lot.....
Section..... Dep.....
Date Begun..... Bearing.....
Date Finished..... Elev. Collar.....

Total Depth.....
Logged By T. HEARD
Claim .....
Core Size .....

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				
105 - 111	QTZ. CHLORITE SCHIST. DARK GREY TO						6.5
	BLACK. MINOR FeS2						
111 - 115	AS ABOVE						4.0
115 - 116.	BRKD QTZ SERICITE & CHLORITE						1.0
	SCHIST MINOR PYRITE THROUGHOUT.						
116 - 120	AS ABOVE						4.0
120 - 122	AS ABOVE.						0.2
122 - 124	AS ABOVE.						1.5
124 - 127	AS ABOVE.						2.0
127 - 129	AS ABOVE.						0.5
129 - 132	AS ABOVE						2.5
132 - 134	AS ABOVE						2.0
134 - 136	DARK GREEN TO BLACK QTZ CHLORITE						0.2
	SCHIST SERICITIC						
136 - 138	AS ABOVE. FINE GRAIN PYRITE IN						1.5
	QTZ STRINGERS.						
139 - 140.5	QTZ CHLORITE SERICITE SCHIST MINOR						1.0
	DISSEMINATED PYRITE IN QTZ.						
140.5 - 144	BRKD QTZ WITH CHLORITE & SERICITE						0.5
	SCHIST						
144 - 145	QTZ						0.2

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES HOLE No. 4

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 4 - 18 Sheet No. 3 Lat. Total Depth

Section Dep. Logged By T. HYNES.

Date Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT
145 - 147	QTZ SERICITE & CHLORITE SCHIST						0.3
147 - 150	MATERIAL RECOVERED IS QTZ. WITH GREEN						0.3
	CHLORITE STAINED SECTIONS						.
150 - 154	PINK QTZ. WITH CHLORITE & SERICITE						0.5
	SECTIONS.						
154 - 157	AS ABOVE.						0.5
157 - 161	QTZ CHLORITE & SERICITE SCHIST.						1.4
161 - 166	QTZ CHLORITE SCHIST FINE GRAIN						1.0
	BECOMES VERY MINOR FeS2						
166 - 171	QTZ & DARK GREEN CHLORITE. 1" QTZ @ 176.1						1.0
171 - 181	QTZ CHLORITE SCHIST. DARK GREEN TO BLACK.						0.5
181 - 182	AS ABOVE						1.0
182 - 184	AS ABOVE MINOR FeS2						1.7
184 - 186	AS ABOVE						1.0
186 - 188	AS ABOVE						1.0
188 - 190	AS ABOVE						2.2.
190 - 192.5	DARK GREEN TO BLACK CHLORITE & QTZ.						2.2
	FOLIATED. MAGNETITE @ 192.5						
192.5 - 192.8	LIGHT GREY MASSIVE SILICIFIED QTZ.						1.0
	CHLORITE & SERICITE						
192.8 - 194	AS ABOVE.						1.5

DIAMOND DRILL RECORD

PROPERTY Northlake Mines HOLE No. 4

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 4 - 18 Sheet No. 4 Lat. Total Depth

Section Dep. Logged By T. Hunter

Date Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				Core Rec. Ft.
196 - 198	0.5' As Above Then Black Graphite Schist						1.0
198 - 199	Pyrd Qtz Biotite Chlorite & Chlorite						0.5
	Schist						
199 - 200	Dark Green Pyrd Qtz. Sericite, Biotite						0.5
	Schist (?) Has almost the appearance						
	of Quartzite						
200 - 202	As Above.						1.0
202 - 204	As Above.						1.0
204 - 207	As Above						1.5
207 - 210	Broken Pyrd Qtz. Sericite & Chlorite						0.5
	Schist Almost a Breccia in Appearance						
	1" Qtz @ 214						
210 - 214	As Above.						1.5
214 - 217	Qtz. Chlorite & Sericite Schist Speck						2.5'
	Pyrrhotite @ 214.2 Minor to Trace						
217 - 219	Qtz. Chlorite & Sericite						1.4
219 - 220	" " " Mottled Grey						0.5
	Qtz. Inclusions.						
220 - 222	Qtz. Chlorite & Sericite						1.0
	The hole was deflected here when						

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES HOLE No. 4

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 4 - 12 Sheet No. 5 Lot. Total Depth

Section Dep. Logged By T. HEARD.

Date Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC. FT
(CONT')	KICKED OUT OF THE HOLE @ 110 DID NOT						
	SAVE THE CORE UNTIL BACK DOWN TO 217'						
217 – 224	PRED QTZ SERICITE & CHLORITE ALTERED						7.0
	CONTACT @ 219. MOTTLED IN APPEARANCE						
	WITH QTZ TO 1/4" GALENA SPECK AT 223'						
224 – 228	SCHIST - QTZ. SERICITE & CHLORITE MINOR						4.0
	FINE GRAINED PYRITE & ARSENO @ 228						
228 – 231	SCHIST - QTZ. SERICITE & CHLORITE MINOR						3.0
	FINE GRAINED PYRITE & ARSENO @ 230 IN						
	3/8" QTZ INCL.						
231 – 235	SCHIST - QTZ. CHLORITE & SERICITE						3.0
	MINOR PYRITE						
235 – 237	SCHIST - QTZ. CHLORITE & SERICITE						1.5
	GRAPHITIC @ 237 WITH PYRITE & MINOR						
	ARSENO						
237 – 239	SCHIST QTZ. GRAPHITE & CHLORITE						1.0
	SLIGHTLY GRAPHITIC						
239 – 240	AS ABOVE						1.0
240 – 242	AS ABOVE @ 241 APPROX. 2% PYRITE						2.0
242 – 244	AS ABOVE						2.0

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES. HOLE No. 4

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 4 - 18 Sheet No. 6. Lat. Total Depth.

Section. Dep. Logged By. T. HEARD

Date Begun. Bearing. Claim

Date Finished. Elev. Collar. Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				Core Rec. Ft.
244 - 249.5	SLIGHTLY MORE SILICEOUS SCHIST						4.5
	GRAPHITE SERICITE & CHLORITIC. 6" QTZ						
	SECTION OF 240. AT 2495 BEDDING IS						
	APPROX. 50° TO CORE AXIS						
249.5 - 251	VERY SILICEOUS GRAPHITE, SERICITE &						1.2
	CHLORITIC SCHIST MINOR PYRITE						
251 - 253	AS ABOVE.						2.0
253 - 255	253 - 254 AS ABOVE THEN SILICIFIED						
	FOLLOWED BY GRAPHITIC SCHIST SOME						
	BANDS AND 1% PYRITE IN SECTIONS						
255 - 256	AS ABOVE						1.0
256 - 257.5	AS ABOVE						1.5
257.5 - 259	AS ABOVE						1.5
259 - 262	AS ABOVE						1.5
	FROM 260 - 262 SILICIFICATIONS SCHIST FAIRLY						
	SOFT - 1% PYRITE & MINOR QTZ.						
264 - 266	DARK GREY TO BLACK SCHIST GRAPHITIC QTZ.						4.0
	& CHLORITE MINOR CARBONATE MINOR PYRITE						
	THROUGHOUT.						
266 - 270	AS ABOVE						4.0
270 - 272	AS ABOVE.						2.0

DIAMOND DRILL RECORD

PROPERTY Northlake Mines HOLE No. 4

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 4 - 18 Sheet No. 7 Lat. Total Depth

Section Dep. Logged By T. Hughes

Date Begun Bearing Claim

Date Finished Elev. Collar Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				CORE REC FT.
272 - 275	As Above						3.0
275 - 277	As Above						2.0
277 - 281.5	Schist ! Qtz. Chlorite & Sericite. Some						4.5
	Slightly Graphitic Sections Minor Fuchs.						
	Throughout						
281.5 - 283.5	As Above.						2.0
283.5 - 285.5	As Above						2.0
285.5 - 288.5	As Above						3.0
288.5 - 290	As Above						1.5
290 - 293	As Above - 292 - 295 Contains a Few						4.5
	Percent Green Mica Sprinkled						
	Chlorite (Magnesium !)						
295 - 297	As Above						2.0
297 - 299	As Above						2.0
299 - 301	Schist Qtz Graphite Chlorite &						1.0
	Sericite Minor Fuchs						
301 - 304	Schist Qtz Sericite & Chlorite						0.5
	Slightly Graphitic Sections						
304 - 306	As Above						1.0
306 - 308	As Above						1.0

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES

HOLE No. 4

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 4 - 19 Sheet No. 2 Lat.

Section Dep.

Bearing

Begun Elev. Collar

Finished

Total Depth

Logged By T. Ahmed

Claim

Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				Core Rec. Ft
310 - 311	SCHIST. QTZ. SERICITE & CHLORITE DARK						0.5
	GREY TO BLACK						
311 - 316	AS ABOVE						1.0
316 - 318	AS ABOVE						2.0
318 - 320	AS ABOVE 1/4 QTZ INCL @ 320						2.0
320 - 323	SCHIST QTZ (VERY SILICEOUS) SERICITE &						3.0
	CHLORITE PREG ON 322 - 323						
323 - 325	SCHIST VERY SILICEOUS SERICITE &						2.0
	CHLORITE ALMOST GNEISSIC, SLIGHTLY						
	GRAPHITIC						
325 - 327	SCHIST QTZ SERICITE CHLORITE & SLIGHTLY						2.0
	GRAPHITIC. MEDIUM PYRITE MINERALIZATION						
327 - 328	AS ABOVE						1.0
328 - 329	AS ABOVE						1.0
329 - 331	AS ABOVE 1" QTZ INCL @ 330'						
331 - 336	SCHIST. QTZ. CHLORITE & SERICITE SLIGHTLY						2.0
	GRAPHITIC TO DARK. MOST OF THE QTZ						
	IS STRINGERS FOLIATION PARALLEL						
	CONTACT @ 336 MEDIUM PYRITE MINERALIZATION						
336 - 338	AS ABOVE - FINISHED @ 338						
338 - 340	AS ABOVE						

DIAMOND DRILL RECORD

PROPERTY NORTHLAKE MINES HOLE No. 4

DIP		
	Angle	
Footage	Reading	Corrected

Hole No. 4 - 18 Sheet No. 9 Lat.
Section Dep.
Date Begun Bearing
Date Finished Elev. Collar

Total Depth
Logged By T. Hanson
Claim
Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				Core Rec'd
340 - 341	As Above.						1.0
341 - 343	As Above.						1.5
343 - 344	As Above						1.0
344 - 346	As Above						2.0
346 - 347.5	As Above						1.5
347.5 - 350	As Above						0.5
350 - 351	As Above						0.5
351 - 353	As Above						1.5
353 - 356	As Above						2.5
356 - 358	As Above						1.0
358 - 360.5	As Above						2.5
360.5 - 363	As Above						1.0
363 - 370	As Above						2.5
370 - 371	As Above						1.0
371 - 371.2	As Above						0.25
371.2 - 371.6	As Above - Vein Quartz with Arsenopyrite						0.25
	From 371.5 to 372.0.						
371.6 - 375	As Above						3.5
375 - 378	As Above						1.5
	From 375 Diamond Drilled 3 Rods						
	Through Top Rods on Top Hole						

DIAMOND DRILL RECORD

PROPERTY Northland Mines

HOLE No. 1

DIP TEST		
	Angle	
Footage	Reading	Corrected

Hole No. 1 - 18 Sheet No.
Section
Date Begun
Date Finished

Lat.
Dep.
Bearing
Elev. Collar

Total Depth
Logged By T. Mooney
Claim
Core Size

DEPTH	DESCRIPTION	SAMPLE No.	WIDTH OF SAMPLE				Core Rec'd
378 - 381	As Above						2.5
381 - 385	As Above						1.0
385 - 386	As Above 6" Qtz @ 386'						0.5
386 - 388	As Above						1.5
388 - 391	As Above						3.0
391 - 392	As Above						1.0
	ENDS OF HOLE @ 392. VERY STRONG SAND						
	& WATER SEAM ENCOUNTERED, UNABLE TO						
	TURN RODS & UNABLE TO GET CORE TUBE						
	DOWN HOLE						
Casings	25' - NX						
	50' - BX						
	217' - AX						
	Core Recovery 59.7%						

NORTHLAKE MINES LIMITED

EL GROUP OF CLAIMS

105-G-6/11, 61°28'N, 131°21'W.

Watson Lake M.D.,Y.T.

Report on

AIRBORNE GEOPHYSICAL SURVEY

May 8 - 23, 1966

by

P.H. Sevensma, Ph.D., P. Eng.

TABLE OF CONTENTS

ILLUSTRATIONS

NORTHLAKE MINES LIMITED

EL GROUP OF CLAIMS

105-G-6/11, 61°28'N, 131°21'W

Watson Lake M.D., Y.T.

REPORT ON AIRBORNE GEOPHYSICAL SURVEY

MAY 8 - 23, 1966

1. INTRODUCTION

In early 1966, Northlake Mines acquired several large claim blocks located in the general Grass Lake area, in a belt stretching from the Hoole River in the Tintina Trench in a Southeasterly direction towards the Grass Lakes. (Figure 1)

An exploration program on these claims was initiated by flying a combined magnetic-electromagnetic survey using the helicopter-borne Lockwood Survey Corporation method.

The present report deals with the results of this survey on the El Group, where a total of 82 line-miles were flown.

2. PROPERTY

The property consists of the following claims:

El 1 - 60	Grant Nos. 90012 - 90071
El 61 - 90	Grant Nos. Y17292 - Y17321

The El Group is located about four miles East of the Tintina Trench, and centered on some 6500' high serpentine mountains at approximately 61°28'N, and 131°21'W.

The claims lie between elevations of 4200' and 6500', about 15 airmiles South of the Watson Lake to Ross River road and about 2 miles South of some lakes accessible by fixed wing.

The airborne survey was carried out from a camp on Grass Lakes, but due to poor weather conditions, Ross River had to be used as a secondary base.

3. HISTORY

There is no record of the early phase of exploration in the area. Old cabins and remnants of placer workings were found near the mouth of the Creek draining the SW slopes of the El claims, and in all probability many creeks in the area have been investigated by the early placer miners for gold around the turn of the century.

Following the discovery of the Vangorda Creek lead-zinc deposits, the area of the present claims was examined in 1954 by Messrs. K.G. Sanders and R. Zielinski for Pelly River Explorations Limited, who noted the presence of short-fibre asbestos. No action was taken as a result of that discovery at that time.

The El claims were staked in January 1966 by the same prospectors and subsequently, these claims were acquired by Northlake Mines Limited.

4. REGIONAL GEOLOGY

During the last ten years, the Geological Survey of Canada has been very active in reconnaissance mapping on a scale of 1" = 4 miles of large areas in the Yukon. In addition, large areas have been flown aeromagnetically.

As a result of the correlation of the 1" = 4 mile mapping, new concepts on the age of various rock belts have emerged. The newer concepts have been published in 1964 on a map of the Yukon and the N.W.T. on a scale of 1: 3,000,000, map 30-1963, which has served the writer as a base for figure 1.

The area under consideration forms part of the Anvil Range - Finlayson Lake belt, a belt of metamorphic rocks characterized by extensive mica schist formations and varying amounts of ultrabasic bodies. In the Finlayson Lake area there are also a number of masses of gneiss of unknown origin.

Broadly speaking, the schistose formations, probably of Mississippian age, form a definite belt, although the relationships between the more intensively metamorphosed gneissic rocks and the much lesser metamorphosed schists is not clear. In addition, the degree of metamorphism decreases very gradually from South to North throughout the area pictured on figure 1.

A persistent characteristic of the belt is the presence of the ultrabasics, and 1966 fieldwork has indicated to the writer that these rocks are often associated with very low-grade meta-chlorite schists, slates and even argillites, frequently accompanied by significant amounts of graphitic schists, which occasionally form zones of true graphite slates.

As the change from the more highly metamorphic schist-gneiss assemblages to the less metamorphic slates and argillites is often very sudden but hidden by overburden, it is probable that significant tectonic features have so far remained undetected.

In addition, in the general area of the Northlake holdings, there appears to exist a significant change in tectonic style between the very flat lying schist-gneiss areas and the more steeply dipping slate-ultrabasic assemblages.

Notwithstanding these perhaps very significant differences, the overall characteristics of the schist-ultrabsic association is similar throughout large areas of the central Yukon.

The tudy and correlation of these belts has led to the concept that the Anvil Range - Finlayson belt is nothing else but the offset by the Tintina Fault of the Klondike schists with a right-lateral movement of about 250 miles (G.S.C. paper 65-2, page 57).

There is therefore a good reason to consider these schists an economically very productive unit, as the Klondike has produced some 250 million dollars of gold, and in the Anvil Range, massive sulphide bodies outlined sofar total at least something of the order of 60 million tons containing better than 10% zinc and lead combined with a gross total value of some 1.5 to 2 billion dollars in base metals and silver.

Significant ore-deposits are usually associated with major structural disturbances, and in the area under consideration the regional geology (figure 1) suggests a large regional E-W striking fold within the normal NW-SE trend of the formations.

Also, geologically and topographically, the area has the characteristics of a recently uplifted dome, and the trend of the valleys suggests pronounced fracturing and faulting along N-S and NE-SW cross-trends; both these features are present in many ore-bearing districts. And as a number of small showings are known in the Fire Lake-Northlake-Grass Lake area, some of them of the strata-bound type, this district is considered an excellent target area for exploration for massive sulphide deposits with base metal values.

These various factors have led to the choice of a combined magnetic-electromagnetic airborne survey as a method well suited to an area with extensive but relatively thin overburden covering structures and lithologies favorable for the occurrence of massive sulphide bodies.

5. LOCKWOOD AIRBORNE METHOD

This method will detect formations that are electrically conductive, and subsequent work can then be concentrated over and near these zones, by using geochemical and geophysical reconnaissance methods.

This method of initial reconnaissance is particularly suited to areas without a well defined drainage pattern along which streamsilt sampling could provide complete initial reconnaissance. It is also the best tool for areas with relatively extensive overburden and few outcrops.

The Lockwood method uses a single frequency of 4000 cps to generate a primary electromagnetic field. The transmitter loop is carried in a fibreglass bird and is oriented with the loop axis parallel to the direction of flight. A receiving loop is located 30' away in the other end of the bird; the loops are coaxial.

The bird is suspended at the end of a 70' cable and is towed by a helicopter at an elevation of 100' above the ground.

A magnetometer of the Gulf Mark III type, also located in the bird, measures the total intensity of the magnetic field.

Recorders and a positioning camera are carried on the helicopter and are handled by an operator who indicates to the pilot the planned course plotted on 1" = 1320' airphotographs and who marks fiducial points on the recorder's strips.

In general, the flight lines are laid out at right angles to the strike of the formations and at distances varying from 600' to 1500' apart.

If a conductive body in the ground is crossed by the helicopter carrying this equipment, the primary electromagnetic field creates eddy currents in this conductor which cause the generation of a secondary electromagnetic field. This secondary field is generally of the same frequency as the primary field but out-of-phase with it; it is detected by the receiver loop in the bird.

As a variation in the distance between the transmitter and the receiver coils will create a strong in-phase response, both coils are in a fixed position in the relatively rigid bird. This will eliminate false responses. Increasing out-of-phase responses will be obtained over bodies of low to medium conductivity; as the conductivity increases beyond the medium range, this out-of-phase response falls off again.

In-phase responses are increasingly stronger as the conductivity rises from poor to very high.

The strength of the response is measured in parts per million. For the above-cited reasons, the ratio of the in-phase to the out-of-phase responses is less than one for bodies of poor to medium conductivity and increases rapidly as the conductivity varies from medium to high.

The response is also a function of the size of the conducting body and of the distance from the bird to it.

The maximum distance at which a highly conductive body of large size will give a response is still somewhat unknown, but appears to be about 300' between the bird and the top of the conducting body.

Various geological bodies are electrical conductors and geological conductors are manifold and of greatly varying size, shape and conductivity, the latter often being a function of the internal texture of the conductor.

Some examples of conducting bodies are:

Massive pyrrhotite
Massive pyrite
Disseminated pyrrhotite and/or pyrite
Graphitic schists
Talc schists, especially when wet
Chlorite (serpentine) schists
Wet overburden in swamp
Lake-bottom deposits
Wet shears

Due to their schistose nature, graphitic schists may be excellent conductors if the individual graphite flakes form a conductive layer.

Massive sulphide bodies with 10 - 20% interstitial quartz may be excellent conductors if the main sulphide is pyrrhotite and if the individual grains of sulphide have large contact areas.

Their conductivity drops off rapidly if the main sulphide is pyrite and if the individual iron sulphide grains are isolated by interstitial non-conductors like silica or sphalerite.

For these reasons, a combined magnetic - electromagnetic airborne survey is essentially a geological mapping tool, especially so as the amount of magnetite in rock is even more of a geological variable than conductivity.

The reliability of the method is principally a function of the elevation above ground that can be maintained. Correlation of responses on adjacent lines flown at different elevations, due to weather or topographical conditions, may not be satisfactory. This happens if the survey if flown with too light a helicopter.

Providing the bird is flown at a steady elevation above the ground, interpretation of airborne data is largely a function of the geological conditions.

Different geological environments will lead to different appraisals of quantitatively very similar airborne geophysical responses.

In general, experience has shown that long conductors (several thousand feet or several miles) with relatively low ratios of 1 or less are likely to be of a formational nature, like graphitic schists. Smaller conductors of better than 1, or preferably 2, ratios may represent near-surface sulphide occurrences.

In certain areas, coincidence of magnetic and electromagnetic highs is critical because of an association of sulphides and magnetite. Most magnetic highs are however a reflection of increased magnetite content of the underlying rock formations, and high magnetic readings may have no more than a very indirect relationship to unusual sulphide concentrations in any given area.

Other geological factors complicating a qualitative interpretation are, for example, the frequent association of graphite and sulphide bodies or the presence of sulphide deposits the mass of which is buried beyond the range of the electromagnetic field but that do have a small near-surface expression.

An airborne geophysical survey should therefore be considered as a mapping tool enabling the exploration effort to be directed towards limited portions of the area flown and further ground work in restricted areas should use methods like geological mapping, geochemical reconnaissance, ground EM and gravity to assess conductors or magnetic highs detected by airborne methods.

6. SURVEY OF THE EL GROUP

Due to the strong relief and the poor weather conditions while the survey was being flown, very few lines could be flown across the property. As, however, the higher elevations are mostly talus and bare rock, this was not considered critical.

In addition, the available geological mapping by the G.S.C. (figure 2) and the aeromagnetic maps published by the G.S.C. (figure 4) indicated quite clearly the probable extent of the ultrabasics and it had therefore been decided to fly the areas covering the indicated broad contact zone of these intrusives with the surrounding schists East and North of the property, using a 1320' line spacing.

In view of the significance of the magnetics in the area, a complete data reduction was requested from Lockwood Survey Corporation (figures 5 and 6).

On the basis of previously obtained results in the area of the Gee, Leo and CW claims, it was felt that the contact zone presented potentially the most interesting target area.

While weather conditions precluded flying all lines as laid out on the mosaics, interesting conductors of limited extent and with field strengths and ratios of a type that are often associated with sulphide bodies buried at shallow depth, were located. Subsequent field investigations have indicated that several of these conductors warrant detailed follow-up work.

For comparative purposes and for future reference, a set of maps have been prepared on a scale of 1" = 1 mile, showing the topography, the G.S.C. high level aeromagnetics and the Lockwood Survey magnetics and electromagnetics, attached to this report as figures 3, 4, 5 and 6.

For reference purposes, the El area is identified as Area 17 in the overall exploration program of Northlake Mines.

7. PERSONNEL AND COSTS OF LOCKWOOD SURVEY

The Lockwood Survey was flown under supervision of P.H. Sevensma Consultants Ltd. out of a camp on Grassy Lake, between May 8th and 23rd, 1966.

Due to meltwater on the ice starting May 12th, 1966 and poor weather conditions, Ross River had to be used as a secondary base, and additional helicopter support was required.

A. Personnel on Lockwood Survey

Helicopters were supplied by Klondike Helicopters Ltd.

Geophysical Helicopter:	Bell 47G-3, CF-NJW
Supporting Helicopters:	Hiller UH-12E, CF-MLL
	Bell 43G-3, CF-UAJ
Pilots:	G.F. Kerr
	R. Peters
	J. Dirkie
Engineer:	R. Smegalski
Geophysical Operator:	H. Sandau of Lockwood Survey Corp., Toronto
Field Supervisor:	P.H. Sevensma, P. Eng., Vancouver, B.C.
Auxiliary Personnel:	M. Cloutier, Richmond, B.C.
	J.L. Stout, Mayo, Y.T.
	N. Menegos, Whitehorse, Y.T.
	S. Lothrop, Vancouver, B.C.
	M. Shorty, Ross River, Y.T.

B. Costs of Lockwood Survey

Costs were as follows:

Group	Line Miles	Instrument Rental	Field Expenses	Data Reduction	Total
Gee	462.5	$7,956.34	$9,745.32	$ -	$17,701.66
Hoo	106	1,823.50	2,233.51	1,607.99	5,664.50
El	82	1,410.64	1,727.81	1,243.53	4,381.98
TOTAL	650.5	11,190.48	13,706.64	2,851.02	27.748.14
Cost per line mile		$17.203	$21.071	($15.00)	$42.657

Field costs include labour, fixed wing aircraft, helicopter, sundry expenses and consulting fees.

A cost breakdown is attached as Appendix A.

8. SUMMARY AND RECOMMENDATIONS

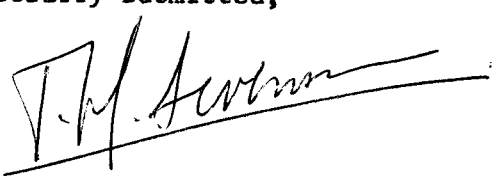
The airborne magnetic-electromagnetic survey of the El group of claims, flown at a cost of $4,381.98, has indicated the presence of promising conducting zones in the schist formations surrounding the ultra-basic plug.

Detailed recommendations for work on this property form part of a separate report being prepared by the writer, and are to a great extent based on geochemical reconnaissance follow-up work carried out in the area during the summer of 1966, as well as on general geological considerations.

These recommendations may be summarized as follows, without any commitment as to their detailed sequence or timing, as they should be viewed within the framework of the overall program. Their priority is rated as 1.

Tote road: 25 miles @ $800		$ 20,000
Linecutting: 20 miles @ $100		2,000
Geological mapping: 4 man-months @ $1,500		6,000
Soil Sampling: 1000 samples @ $3.00		3,000
Electromagnetic surveying: 15 line miles @ $100		1,500
Gravity survey: 10 line miles @ $150		1,500
Transportation: Bombardier, truck		6,000
	Total	$ 40,000
Contingent core drilling: 3000' @ $20		60,000
	Total	$100,000
Engineering, overhead, contingencies; 20%		20,000
Total appropriation		$120,000

Respectfully submitted,



P.H. Sevensma, Ph. D., P. Eng.

January 30, 1967

CERTIFICATE

I, PETER H. SEVENSMA, of Vancouver, B.C., do hereby certify that:

1. I am a graduate of the University of Geneva, Switzerland (Physics and Chemistry, 1937) (Geology and Mineralogy, 1937) where I obtained my Ph.D. in Geological and Mineralogical Sciences in 1941.

2. I am a Consulting Geological Engineer and a registered member in good standing of the Association of Professional Engineers of British Columbia and of the Association of Professional Engineers of Yukon Territory.

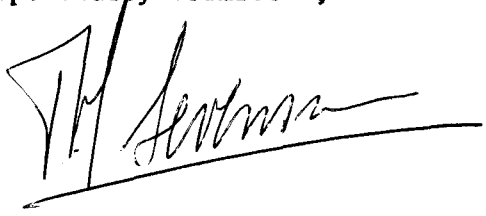
3. From February 1948 until December 1965 I have been engaged continuously in mining and exploration geology in the employ of Cominco Limited. As a Senior Exploration Geologist, I have worked extensively both in Eastern and Western Canada.

4. I have personally examined on several occasions the claims which are the subject of this report and have acted as a consulting geologist since early 1966 on the exploration program conducted by Northlake Mines Limited on these claims.

5. I have personally supervised in the field the airborne geophysical survey conducted by Lockwood Survey Corporation between May 8th and 23rd, 1966 for Northlake Mines Limited.

6. I have not received, nor do I expect to receive or acquire, directly or indirectly, any interest in any of the properties or securities of Northlake Mines Limited.

Respectfully submitted,



P.H. Sevensma, Ph.D., P. Eng.

January 30, 1967

Appendix A

NORTHLAKE MINES LTD.

LOCKWOOD AIRBORNE SURVEY, May 8 - 23, 1966

Accounting Breakdown, L532-1 to -5

Date 1966	Paid to	Chq. No.	Labour (532-1)	Rental (532-2)	Fixed Wing (532-3)	Helicopter (532-4)	Sundry (532-5)	Data reduction (532-2)	Consulting Expenses and Fees
July 7	Lockwood S.C., mosaics	N					$208.75		
June 15	Great Northern Airways	M-7			$1,113.00				
June 15	Klondike Helicopters	M-9				$ 961.00			
June 15	Klondike Helicopters	M-9 part				5,521.00			
	Klondike Helicopters	M-23 part				416.50			
	Tourist Services	M- *					194.75		
Apr. 25	Tourist Services	V113					47.11		
June 16	White Pass	M-11					23.54		
May 24	White Pass	V116 part				816.75*			
June 2	C.N.T.	V117					7.50		
June 2	P.H. Sevensma Cons.	V118					145.24		
May 20	J.L. Stout	W30	$300.00						
May 23	Ross River Enterpr.	W32					169.45		
May 24	N. Menegos	W36	250.00						
	Consulting Expenses	N	1,000.00						$1,875.00
	Consulting Expenses	N							657.05
Nov. 25	Lockwood S.C.	M178		$11,190.48					
Nov. 25	Lockwood S.C.	M180						$2,851.02**	
	Total		$1,550.00	$11,190.48	$1,113.00	$7,715.25	$796.34	$2,851.02	$2,532.05

Note: Cheque prefixes as follows:

- N Northlake Mines Ltd.
- V P.H. Sevensma Trust Vancouver
- W P.H. Sevensma Trust Whitehorse
- M A. MacDonald Consultants

Remarks:

* Charged 33 helicopter hours of gas, supplied @ 15 gallon an hour @ cost delivered at Grass Lake $1.65 gallon

** $4,751.70 paid minus $1,900.68 credit

M* Voucher not available

Certified Correct:

IN THE MATTER OF NORTHLAKE MINES LIMITED
AND IN THE MATTER OF AIRBORNE GEOPHYSICAL
SURVEY REPORT AND HOO, EL, AND GEE CLAIMS

AFFIDAVIT

I, PETER SEVENSMA, of 715-850 West Hastings Street, Vancouver, Province of British Columbia, HEREBY MAKE OATH AND SAY AS FOLLOWS:-

That attached hereto to this my Affidavit, is a report and an Appendix A, providing a list of firms and individuals having been engaged in work for the above, as well as a cost-breakdown and a cost-distribution for 1966 work, which I certify to be true and accurate to the best of my knowledge and belief.

SWORN before me at the City of Vancouver, Province of British Columbia, this 30 day of January, A.D. 1967

A Commissioner for taking Affidavits in and for the Yukon Territory.

Peter Sevensma

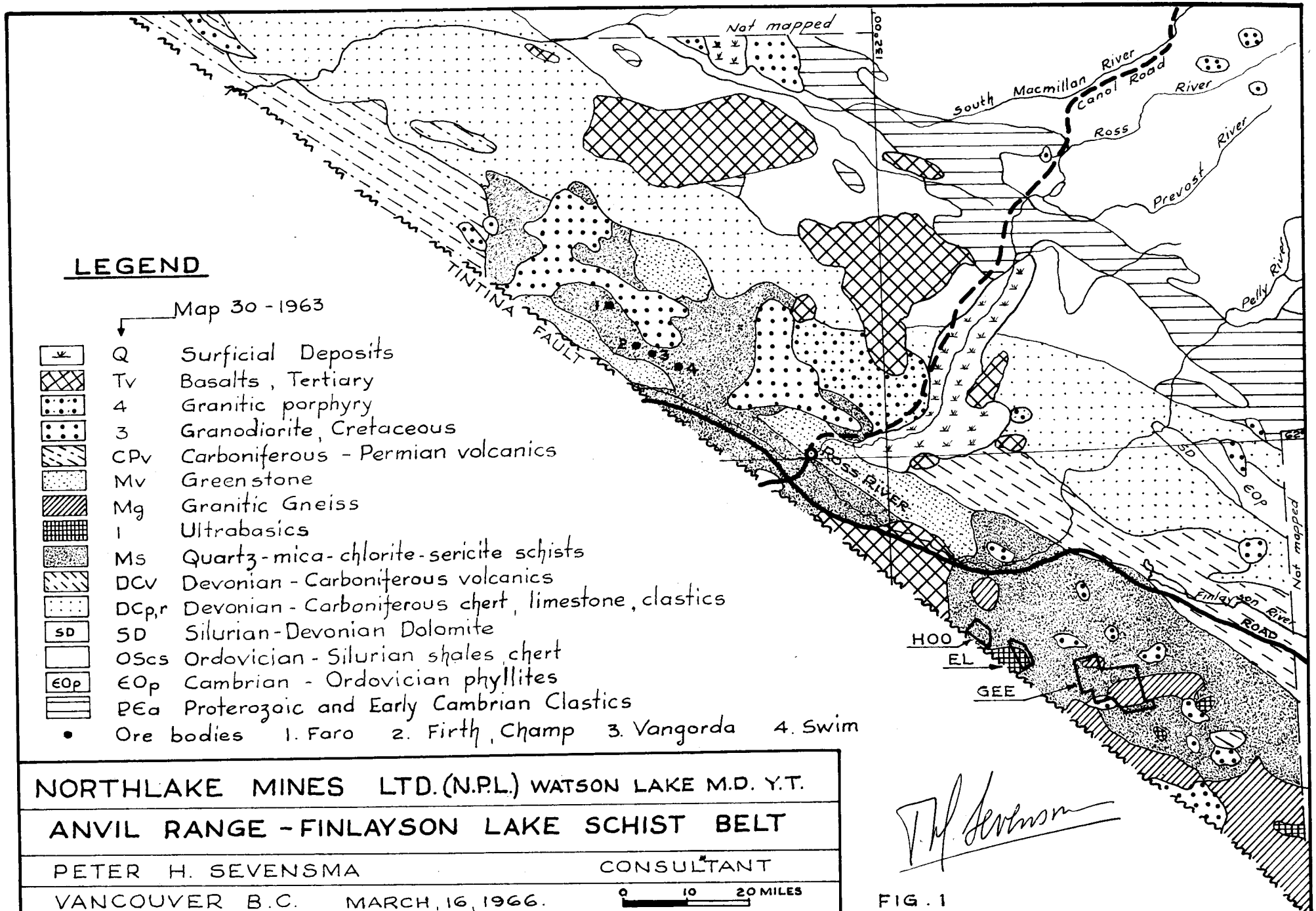
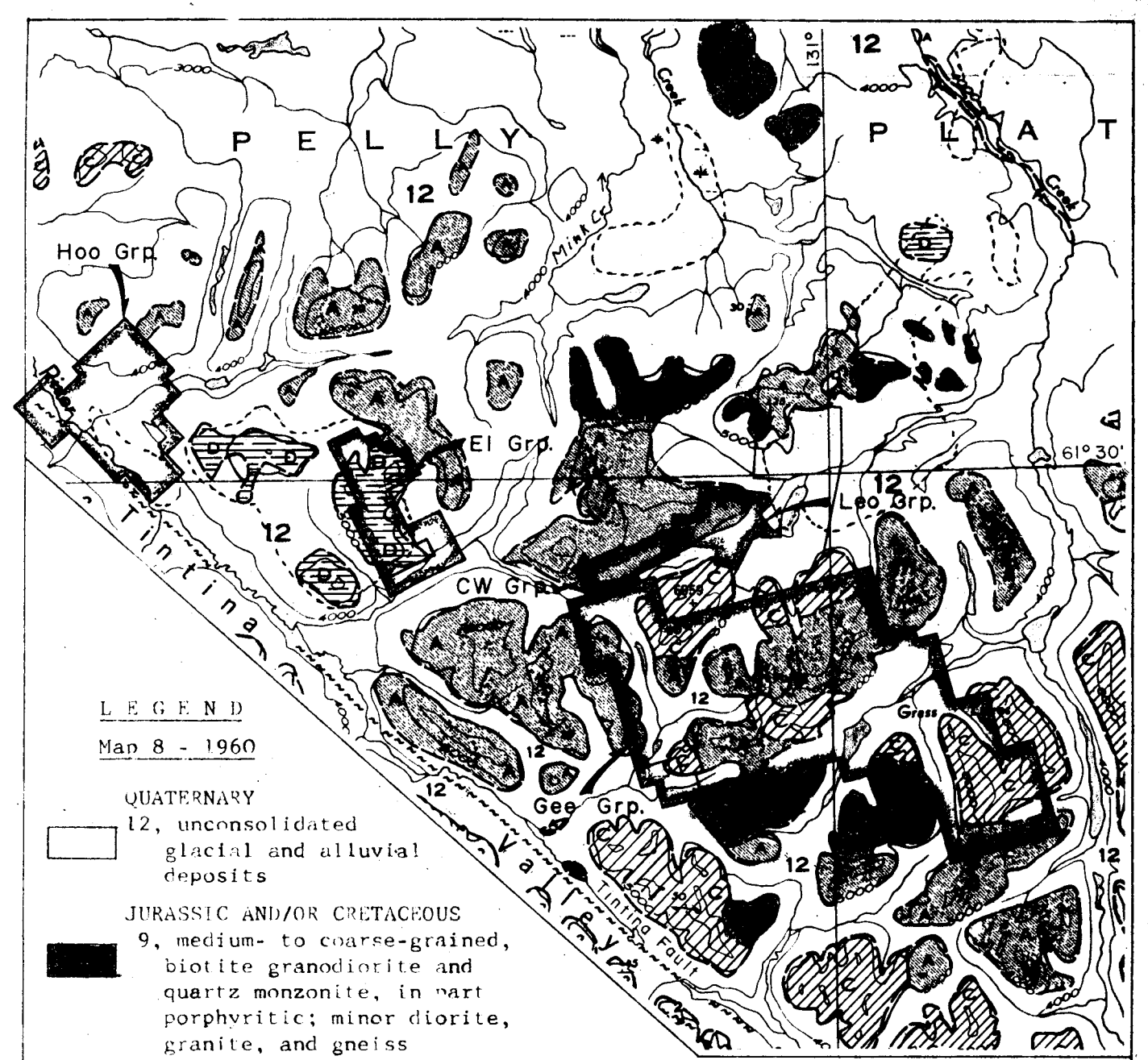

Not mapped
132°00'
South Macmillan River
Canol Road
Ross River
Prevost River
Pelly River
TINTINA FAULT
ROSS RIVER
SD
EOp
Not mapped
Finlayson River
ROAD
HOO
EL
GEE
62
LEGEND
Map 30 - 1963
Q Surficial Deposits
Tv Basalts, Tertiary
4 Granitic porphyry
3 Granodiorite, Cretaceous
CPv Carboniferous - Permian volcanics
Mv Greenstone
Mg Granitic Gneiss
I Ultrabasics
Ms Quartz-mica-chlorite-sericite schists
DCv Devonian - Carboniferous volcanics
DCp,r Devonian - Carboniferous chert, limestone, clastics
SD Silurian-Devonian Dolomite
OScs Ordovician - Silurian shales, chert
EOp Cambrian - Ordovician phyllites
PEa Proterozoic and Early Cambrian Clastics
Ore bodies 1. Faro 2. Firth, Champ 3. Vangorda 4. Swim
NORTHLAKE MINES LTD. (N.P.L.) WATSON LAKE M.D. Y.T.
ANVIL RANGE - FINLAYSON LAKE SCHIST BELT
PETER H. SEVENSMA CONSULTANT
VANCOUVER B.C. MARCH, 16, 1966.
0 10 20 MILES

FIG. 1



L E G E N D

Map 8 - 1960

QUATERNARY

12, unconsolidated glacial and alluvial deposits

JURASSIC AND/OR CRETACEOUS

9, medium- to coarse-grained, biotite granodiorite and quartz monzonite, in part porphyritic; minor diorite, granite, and gneiss

A, Quartz-biotite and quartz-chlorite schist, micaceous quartzite, hornfels; minor phyllite and limestone

C, Micaceous, quartzose gneiss, granitoid gneiss; minor quartz-biotite schist

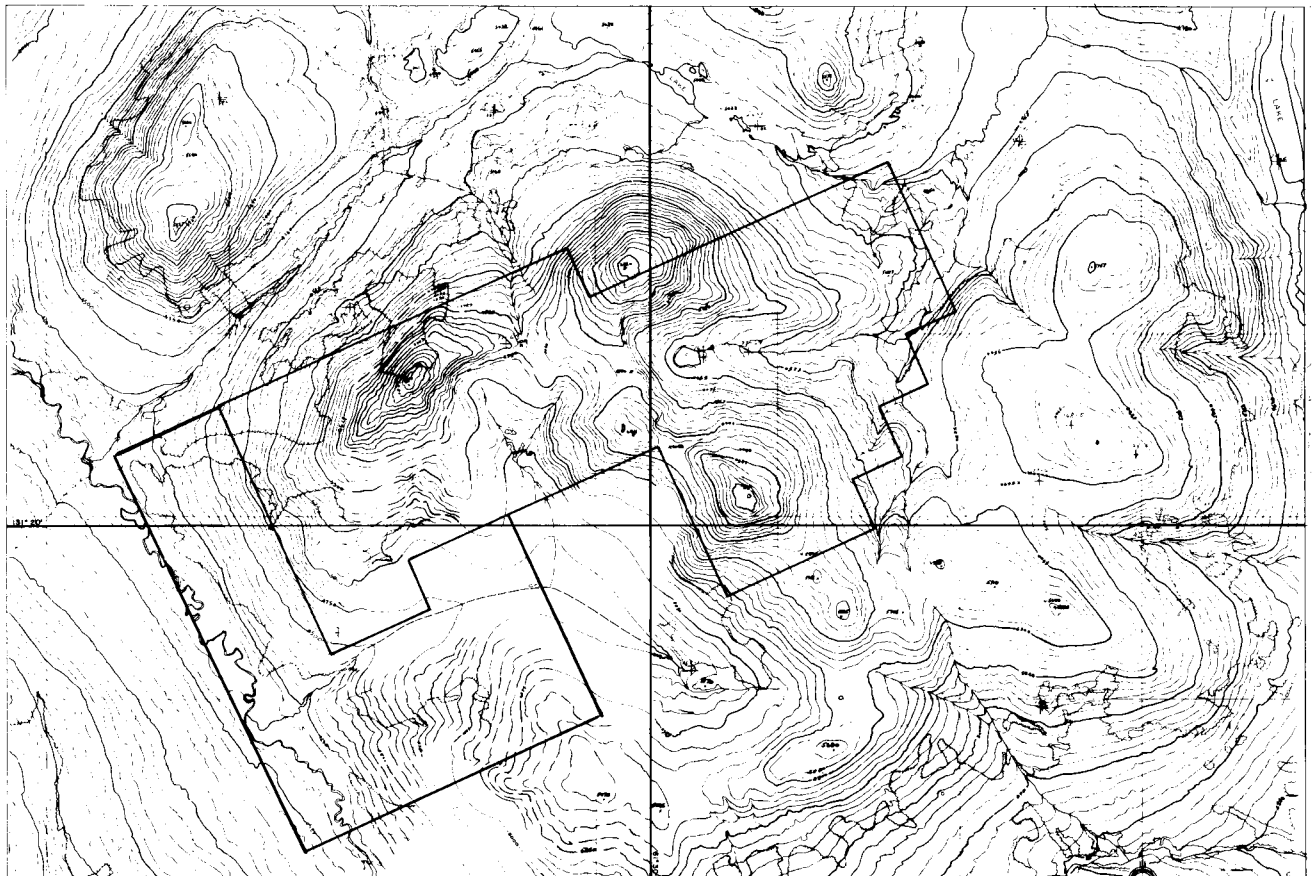
D, Dunite; minor peridotite, pyroxenite, and serpentinized equivalents; gabbro and diorite

Outline of aeromagnetic anomalies estimated to reflect ultrabasic intrusives.

P.H. Sevensma

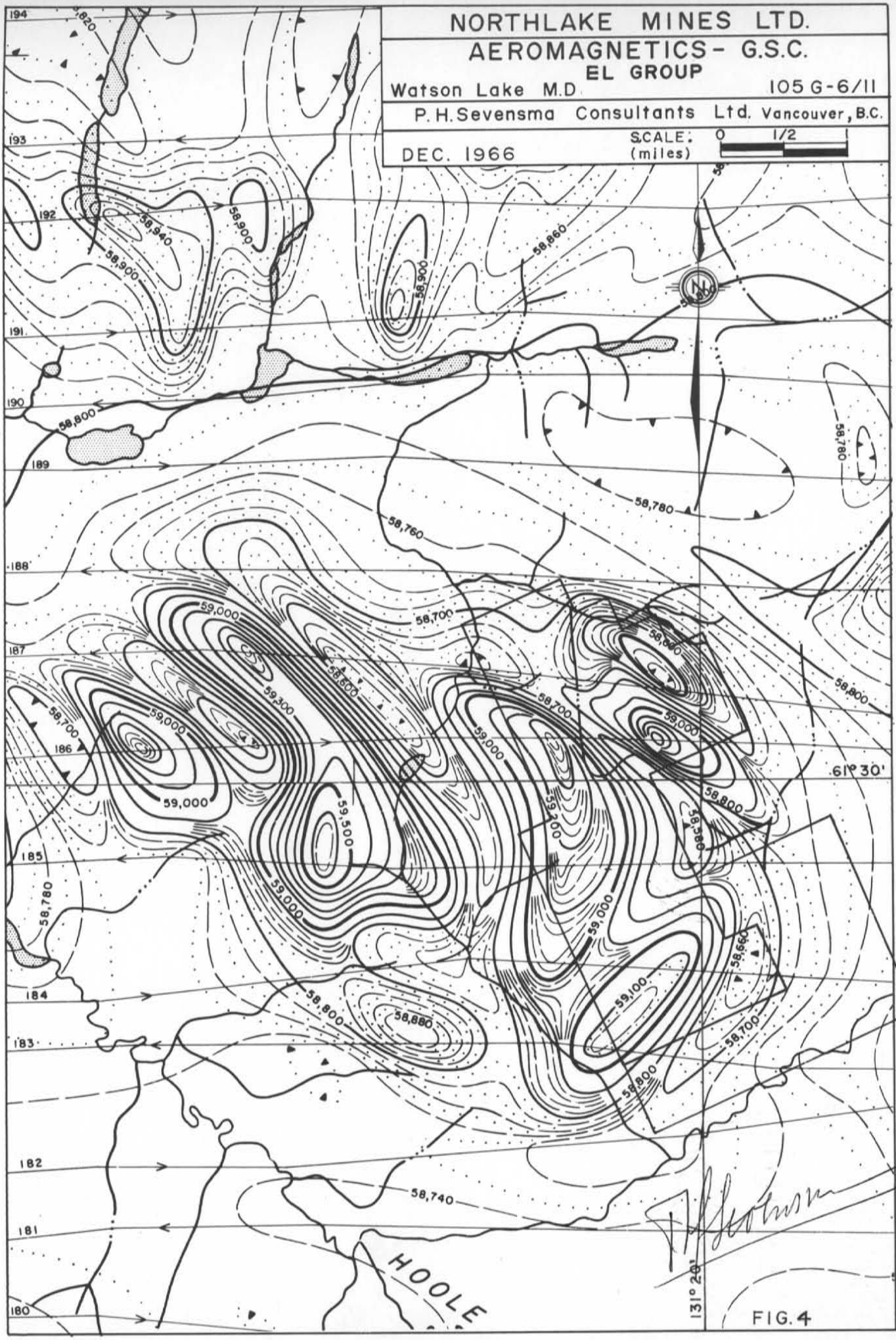
NORTHLAKE MINES LTD.	
GEOLOGY AND LOCATION PLAN	
Watson Lake M.D.	105 G
P.H. Sevensma Consultants Ltd. - Vancouver, B.C.	
December 1966	scale 0 4 mi.

FIG. 2



Northlake Mines Ltd.
El Group
Preliminary Topographic Map
Watson Lake M.D. 105 G-6/11
P.H. Sevensma Consultants Ltd.
715-850 W. Hastings Vancouver, B.C.
Dec. 1965

FIG. 3


NORTHLAKE MINES LTD.
AEROMAGNETICS - G.S.C.
EL GROUP
Watson Lake M.D
105 G-6/11
P.H. Sevensma Consultants Ltd. Vancouver, B.C.
DEC. 1966
SCALE: (miles) 0 1/2 1
194
193
192
191
190
189
188
187
186
185
184
183
182
181
180
58,820
58,940
58,900
58,860
58,800
58,780
58,760
58,700
58,660
59,000
59,300
58,500
59,500
59,200
58,880
59,100
58,740
61° 30'
131° 20'
HOOLE
FIG. 4

NORTHLAKE MINES LIMITED
AIRBORNE GEOPHYSICAL SURVEY

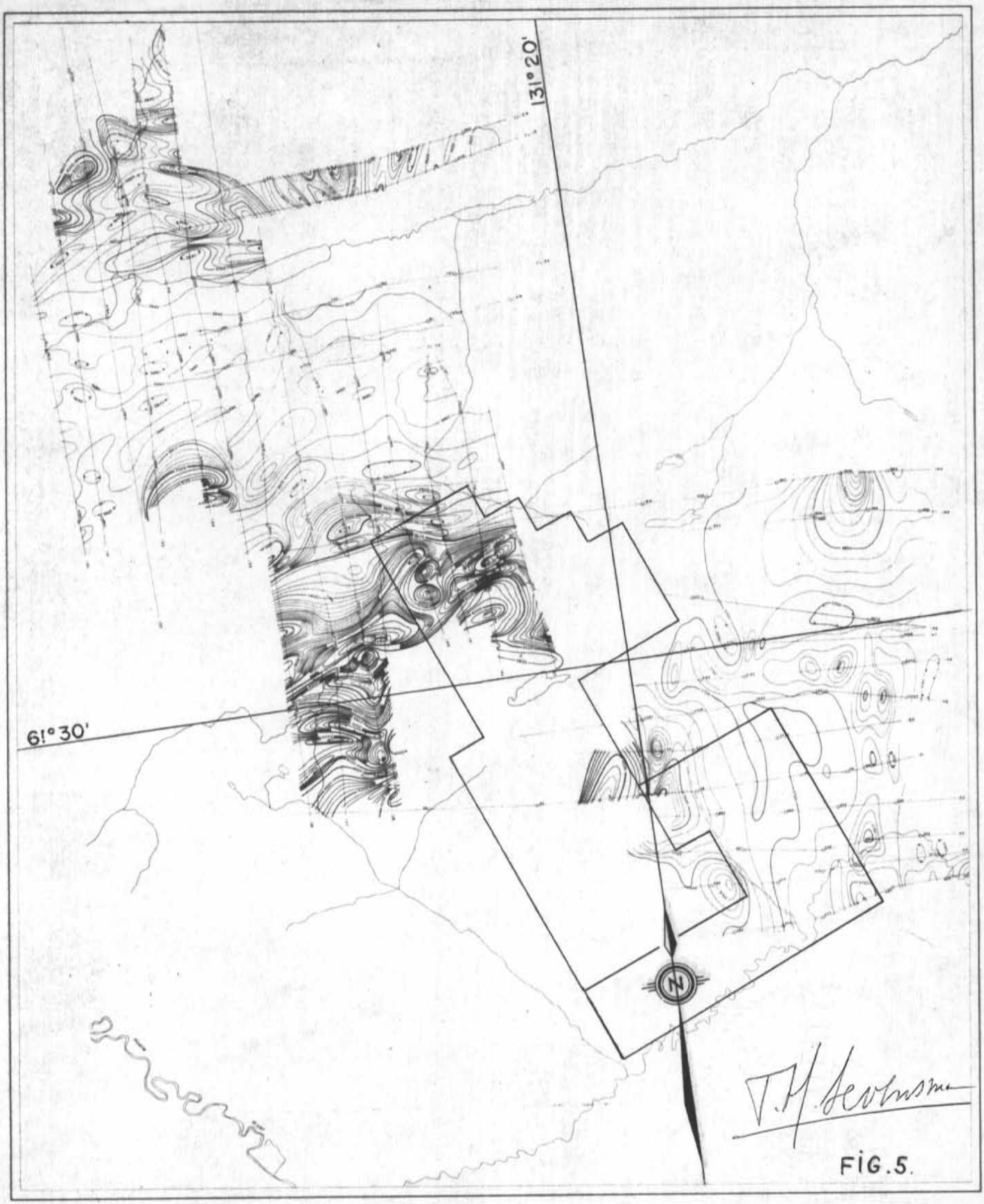


FIG. 5.

CLAIMSHEET 105-5-6 & 11
EL GROUP
YUKON TERRITORY
WATSON LAKE MINING DISTRICT

SCALE

MAGNETOMETRIC MAP

NORTHLAKE MINING LIMITED

AIRBORNE GEOPHYSICAL SURVEY

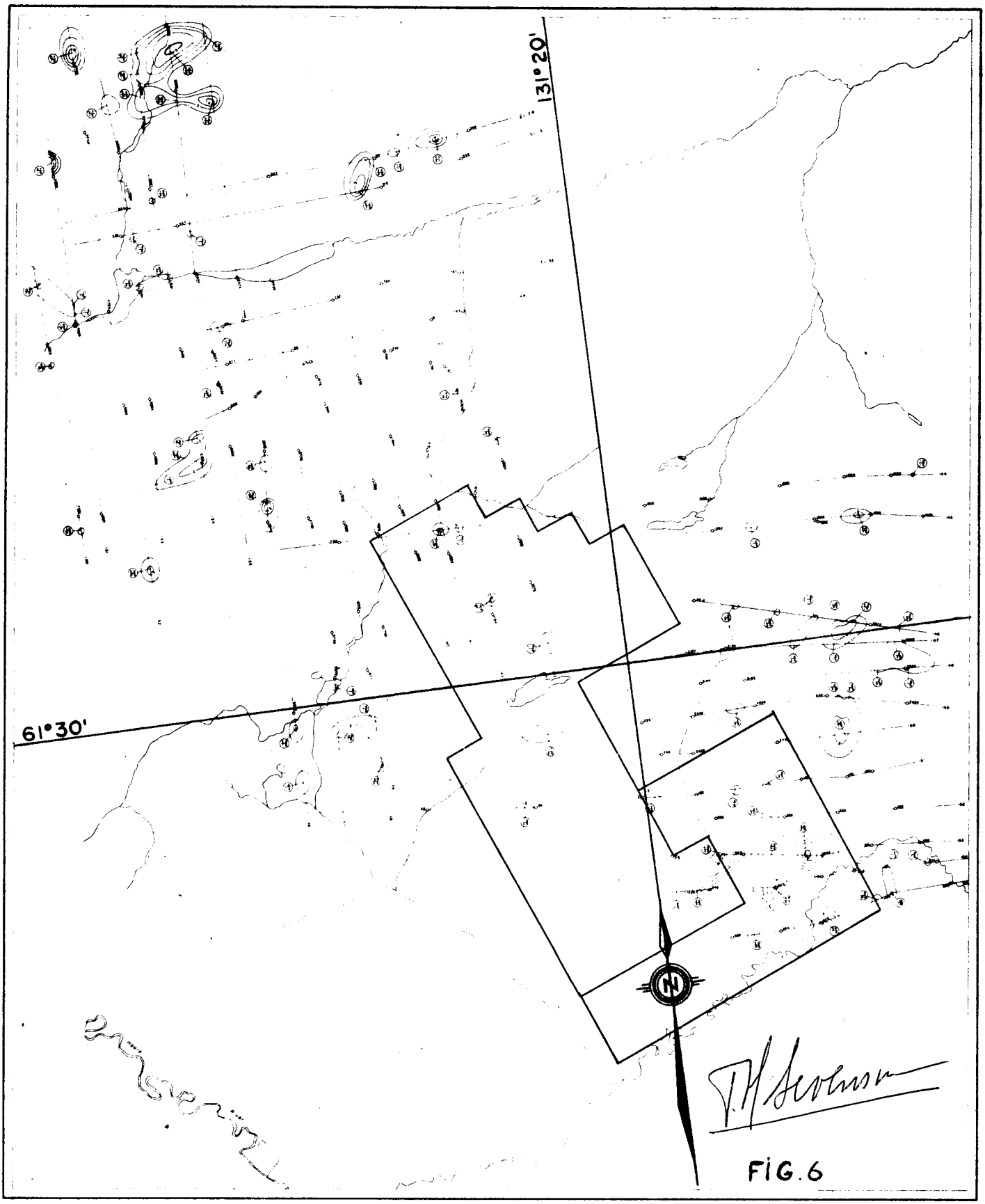


FIG. 6

CLAIMSHEET 105-G-6 & 11

EL GROUP

YUKON TERRITORY

WATSON LAKE MINING DISTRICT

SCALE

PETER H. SEVERIDE AND ASSOC.

CONSULTANT

VANCOUVER, B.C.

GEOTRONICS SURVEY CORPORATION LIMITED

TORONTO, CANADA

1966

ELECTROMAGNETIC MAP

SHEET 105G-12 | SHEET 105G-11

HOO GROUP

EL GROUP

61° 30'
SHEET 105G-6

61° 30'
SHEET 105G-6

131° 30'

131° 15'

131° 30'

NORTHLAKE MINES LTD.

HOO & EL CLAIMS

P. H. SEVENSMA CONSULTANTS LTD.
715 - 850 WEST HASTINGS VANCOUVER, B.C.

REF.:	DATE:	SCALE:
N.T.S. 105-G-6	JAN. 1967	1 in. = 1 mile

P. H. Sevensma

WATSON LAKE M.D. Y.T.

Magnetic North 34° 27' E

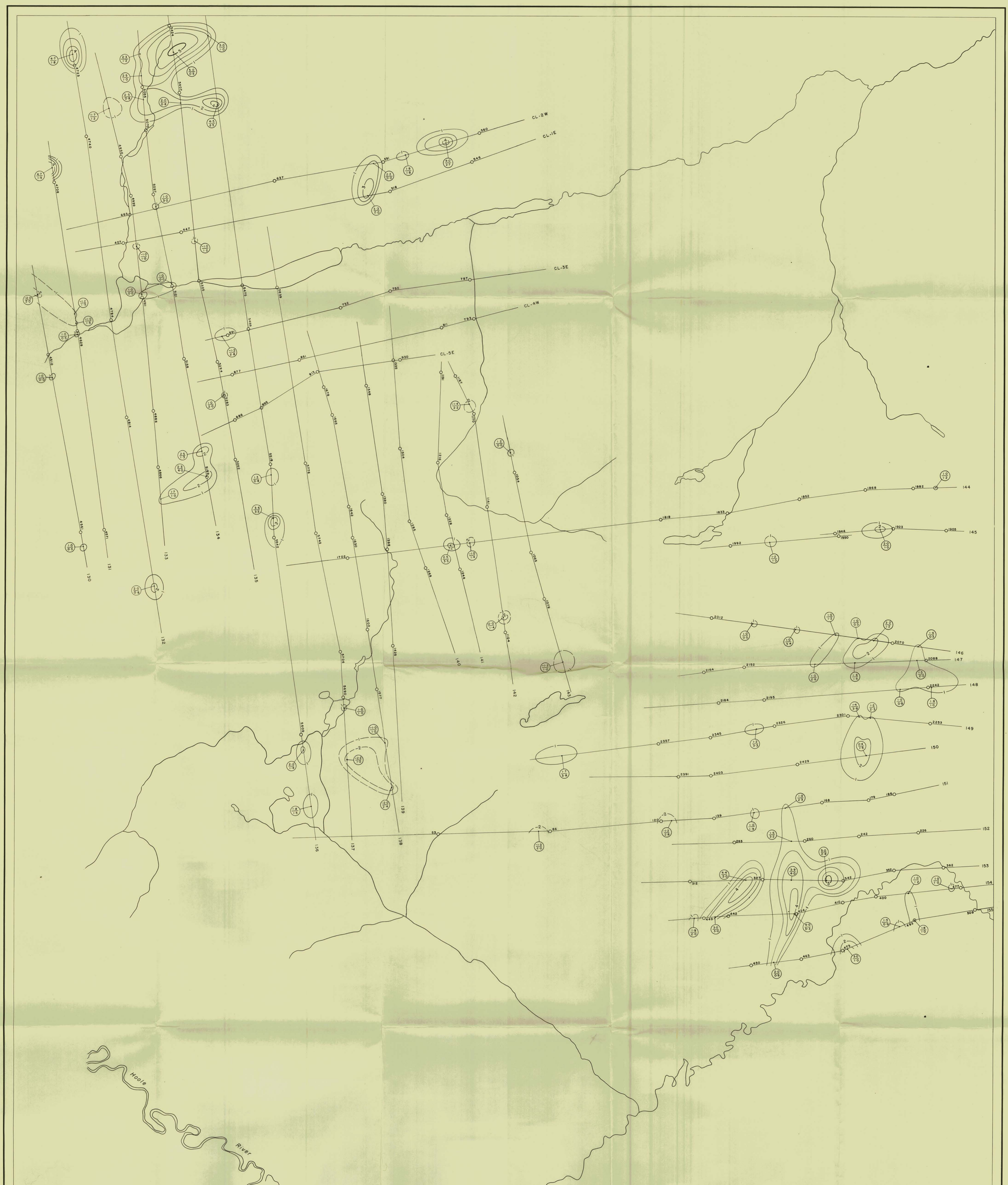
FT. 1500 0 1500 3000 4500 6000 7500 9000 10500 FT

FIG. 7

FIG. 7

NORTHLAKE MINING LIMITED

AIRBORNE GEOPHYSICAL SURVEY



MEAN FLIGHT LINE SPACING ---------- 1000 FEET
MEAN TERRAIN CLEARANCE ---------- 200 FEET
ELECTROMAGNETIC CONTOURS 5,10,15 etc. ----
1, 2, 3, 4 etc. ----
FIDUCIAL POINTS ---------- O 3690
FLIGHT LINES ----------

The contours represent amplitude of in phase response of the resultant field expressed in parts per million of the primary. The figures (23/02) represent amplitude in phase component / quadrature component. The frequency of the primary current is 4000 cycles per second. The contour interval is 10 parts per million.

PETER H. SEVENSMA PHD. P.ENG.

CONSULTANT

VANCOUVER B.C.

CLAIMSHEET 105-G-6 & 11

EL GROUP

YUKON TERRITORY

WATSON LAKE MINING DISTRICT

SCALE

1000 FEET 0 1000 2000 3000 4000 5000 FEET

1 Inch to 1320 Feet

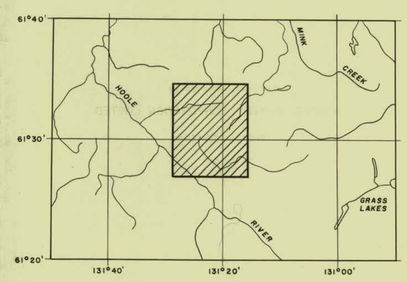
ELECTROMAGNETIC MAP

Flown and compiled by

LOCKWOOD SURVEY CORPORATION LIMITED

TORONTO, CANADA

1966



NORTHLAKE MINES LIMITED

AIRBORNE GEOPHYSICAL SURVEY

CONTOUR INTERVAL ---------- 20 GAMMA
MEAN FLIGHT LINE SPACING ---------- 1000 FEET
MEAN TERRAIN CLEARANCE ---------- 200 FEET
500 GAMMA CONTOUR ----------
100 GAMMA CONTOUR ----------
20 GAMMA CONTOUR ----------
MAGNETIC LOW ----------
FIDUCIAL POINTS ---------- 3690 O
FLIGHT LINES ----------

PETER H. SEVENSMA PHD P.ENG.
CONSULTANT
VANCOUVER B.C.

CLAIMSHEET 105-G-6 & 11

EL GROUP

YUKON TERRITORY

WATSON LAKE MINING DISTRICT

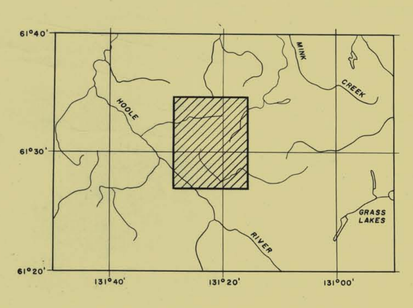
SCALE

1000 FEET 0 1000 2000 3000 4000 5000 FEET

1 Inch to 1320 Feet

MAGNETOMETRIC MAP

Flown and compiled by
LOCKWOOD SURVEY CORPORATION LIMITED
TORONTO, CANADA
1966



NORTHLAKE MINES LTD.

HOO GROUP OF CLAIMS

105-G-12, 61°32'N, 131°33'W

Watson Lake M.D., Y.T.

Report on

AIRBORNE GEOPHYSICAL SURVEY

May 8 - 23, 1966

by

P.H. Sevensma, Ph.D., P. Eng.

TABLE OF CONTENTS

ILLUSTRATIONS

1. INTRODUCTION

In early 1966, Northlake Mines acquired several large claim blocks located in the general Grass Lake area, in a belt stretching from the Hoole River in the Tintina Trench, in a Southeasterly direction towards the Grass Lakes (figure 1).

An exploration program on these claims was started by flying a combined magnetic-electromagnetic survey using the helicopter-borne Lockwood Survey Corporation method.

The present report deals with the results of this survey on the Hoo Group, where a total of 106 line miles were flown.

2. PROPERTY

The property consists of the following claims:

Hoo 1 - 100 Grant Nos. 90072 - 90171
Hoo 101 - 123 Grant Nos. Y13368 - Y13390

The group is located on the Hoole River in the Tintina Trench and on the gently rising NE slope of this valley, approximately centered on 61°32'N and 131°33'W, on claim sheet 105-G-12.

The claims lie between elevations of 3700' in the valley and 4900' on the NE hillside, (figures 1, 2 and 3) about 10 airmiles South of the Watson Lake - Ross River road.

The nearest lake suitable for fixed wing lies about 6 airmiles to the East.

The airborne survey was conducted out of a camp on Grass Lakes, but due to poor weather conditions the aircraft had to use Ross River as a secondary base.

3. HISTORY

Nothing is recorded about the early phases of exploration in the area. Old cabins and remnants of early placer workings have been found further East and in all probability, the Hoole River and its tributaries were investigated by the early placer miners around the turn of the century.

The first recorded activity in the Hoole River area known to the writer occurred in 1954, shortly after the discovery of the Vangorda Creek lead-zinc deposit by A. Kulan and associates.

Messrs. K.G. Sanders and R. Zielinski prospected the area of the present Hoo claims for Pelly River Explorations Limited, a Pioneer Gold Mines of B.C. subsidiary, in the summer of 1954 and reported minor galena=sphalerite float in a limestone host in the creek crossing claims Hoo 44, 46 and 63.

They also reported chalcopyrite in quartz in the creek crossing Hoo 76 and 88.

None of thisfloat could be traced to a source.

They staked the area in January 1966, as part of several groups of claims subsequently acquired by Northlake Mines Limited.

4. REGIONAL GEOLOGY

During the last ten years, the Geological Survey of Canada has been very active in reconnaissance mapping on a scale of 1" = 4 miles of large areas in the Yukon. In addition, large areas have been flown aeromagnetically.

As a result of the correlation of the 1" = 4 mile mapping, new concepts on the age of various rock belts have emerged. The newer concepts have been published in 1964 on a map of the Yukon and the N.W.T. on a scale of 1: 3,000,000, map 30-1963, which has served the writer as a base for figure 1.

The area under consideration forms part of the Anvil Range - Finlayson Lake belt, a belt of metamorphic rocks characterized by extensive mica schist formations and varying amounts of ultrabasic bodies. In the Finlayson Lake area there are also a number of masses of gneiss of unknown origin.

Broadly speaking, the schistose formations, probably of Mississippian age, form a definite belt, although the relationships between the more intensively metamorphosed gneissic rocks and the much lesser metamorphosed schists is not clear. In addition, the degree of metamorphism decreases very gradually from South to North throughout the area pictured on figure 1.

A persistent characteristic of the belt is the presence of the ultrabasics, and 1966 fieldwork has indicated to the writer that these rocks are often associated with very low-grade meta-chlorite schists, slates and even argillites, frequently accompanied by significant amounts of graphitic schists, which occasionally form zones of true graphite slates.

As the change from the more highly metamorphic schist-gneiss assemblages to the less metamorphic slates and argillites is often very sudden but hidden by overburden, it is probable that significant tectonic features have so far remained undetected.

In addition, in the general area of the Northlake holdings, there appears to exist a significant change in tectonic style between the very flat lying schist-gneiss areas and the more steeply dipping slate-ultrabasic assemblages.

Notwithstanding these perhaps very significant differences, the overall characteristics of the schist-ultrabsic association is similar throughout large areas of the central Yukon.

The study and correlation of these belts has led to the concept that the Anvil Range - Finlayson belt is nothing else but the offset by the Tintina Fault of the Klondike schists with a right-lateral movement of about 250 miles (G.S.C. paper 65-2, page 57).

There is therefore a good reason to consider these schists an economically very productive unit, as the Klondike has produced some 250 million dollars of gold, and in the Anvil Range, massive sulphide bodies outlined sofar total at least something of the order of 60 million tons containing better than 10% zinc and lead combined with a gross total value of some 1.5 to 2 billion dollars in base metals and silver.

Significant ore-deposits are usually associated with major structural disturbances, and in the area under consideration the regional geology (figure 1) suggests a large regional E-W striking fold within the normal NW-SE trend of the formations.

Also, geologically and topographically, the area has the characteristics of a recently uplifted dome, and the trend of the valleys suggests pronounced fracturing and faulting along N-S and NE-SW cross-trends; both these features are present in many ore-bearing districts. And as a number of small showings are known in the Fire Lake-Northlake-Grass Lake area, some of them of the strata-bound type, this district is considered an excellent target area for exploration for massive sulphide deposits with base metal values.

These various factors have led to the choice of a combined magnetic-electromagnetic airborne survey as a method well suited to an area with extensive but relatively thin overburden covering structures and lithologies favorable for the occurrence of massive sulphide bodies.

5. LOCKWOOD AIRBORNE METHOD

This method will detect formations that are electrically conductive, and subsequent work can then be concentrated over and near these zones, by using geochemical and geophysical reconnaissance methods.

This method of initial reconnaissance is particularly suited to areas without a well defined drainage pattern along which streamsilt sampling could provide complete initial reconnaissance. It is also the best tool for areas with relatively extensive overburden and few outcrops.

The Lockwood method uses a single frequency of 4000 cps to generate a primary electromagnetic field. The transmitter loop is carried in a fibreglass bird and is oriented with the loop axis parallel to the direction of flight. A receiving loop is located 30' away in the other end of the bird; the loops are coaxial.

The bird is suspended at the end of a 70' cable and is towed by a helicopter at an elevation of 100' above the ground.

A magnetometer of the Gulf Mark III type, also located in the bird, measures the total intensity of the magnetic field.

Recorders and a positioning camera are carried on the helicopter and are handled by an operator who indicates to the pilot the planned course plotted on 1" = 1320' airphotographs and who marks fiducial points on the recorder's strips.

In general, the flight lines are laid out at right angles to the strike of the formations and at distances varying from 600' to 1500' apart.

If a conductive body in the ground is crossed by the helicopter carrying this equipment, the primary electromagnetic field creates eddy currents in this conductor which cause the generation of a secondary electromagnetic field. This secondary field is generally of the same frequency as the primary field but out-of-phase with it; it is detected by the receiver loop in the bird.

As a variation in the distance between the transmitter and the receiver coils will create a strong in-phase response, both coils are in a fixed position in the relatively rigid bird. This will eliminate false responses. Increasing out-of-phase responses will be obtained over bodies of low to medium conductivity; as the conductivity increases beyond the medium range, this out-of-phase response falls off again.

In-phase responses are increasingly stronger as the conductivity rises from poor to very high.

The strength of the response is measured in parts per million. For the above-cited reasons, the ratio of the in-phase to the out-of-phase responses is less than one for bodies of poor to medium conductivity and increases rapidly as the conductivity varies from medium to high.

The response is also a function of the size of the conducting body and of the distance from the bird to it.

The maximum distance at which a highly conductive body of large size will give a response is still somewhat unknown, but appears to be about 300' between the bird and the top of the conducting body.

Various geological bodies are electrical conductors and geological conductors are manifold and of greatly varying size, shape and conductivity, the latter often being a function of the internal texture of the conductor.

Some examples of conducting bodies are:

Massive pyrrhotite
Massive pyrite
Disseminated pyrrhotite and/or pyrite
Graphitic schists
Talc schists, especially when wet
Chlorite (serpentine) schists
Wet overburden in swamp
Lake-bottom deposits
Wet shears

Due to their schistose nature, graphitic schists may be excellent conductors if the individual graphite flakes form a conductive layer.

Massive sulphide bodies with 10 - 20% interstitial quartz may be excellent conductors if the main sulphide is pyrrhotite and if the individual grains of sulphide have large contact areas.

Their conductivity drops off rapidly if the main sulphide is pyrite and if the individual iron sulphide grains are isolated by interstitial non-conductors like silica or sphalerite.

For these reasons, a combined magnetic - electromagnetic airborne survey is essentially a geological mapping tool, especially so as the amount of magnetite in rock is even more of a geological variable than conductivity.

The reliability of the method is principally a function of the elevation above ground that can be maintained. Correlation of responses on adjacent lines flown at different elevations, due to weather or topographical conditions, may not be satisfactory. This happens if the survey if flown with too light a helicopter.

Providing the bird is flown at a steady elevation above the ground, interpretation of airborne data is largely a function of the geological conditions.

Different geological environments will lead to different appraisals of quantitatively very similar airborne geophysical responses.

In general, experience has shown that long conductors (several thousand feet or several miles) with relatively low ratios of 1 or less are likely to be of a formational nature, like graphitic schists. Smaller conductors of better than 1, or preferably 2, ratios may represent near-surface sulphide occurrences.

In certain areas, coincidence of magnetic and electromagnetic highs is critical because of an association of sulphides and magnetite. Most magnetic highs are however a reflection of increased magnetite content of the underlying rock formations, and high magnetic readings may have no more than a very indirect relationship to unusual sulphide concentrations in any given area.

Other geological factors complicating a qualitative interpretation are, for example, the frequent association of graphite and sulphide bodies or the presence of sulphide deposits the mass of which is buried beyond the range of the electromagnetic field but that do have a small near-surface expression.

An airborne geophysical survey should therefore be considered as a mapping tool enabling the exploration effort to be directed towards limited portions of the area flown and further ground work in restricted areas should use methods like geological mapping, geochemical reconnaissance, ground EM and gravity to assess conductors or magnetic highs detected by airborne methods.

6. SURVEY OF THE HOO GROUP

Outside of relative poor weather conditions with low cloud and snow, the Hoo survey did not encounter any serious obstacles.

As it had not been possible to delimit accurately and at a reasonable cost the exact property boundaries previous to the survey, care was taken to extend the lines well beyond the estimated property boundary and beyond the distance required for a good turn around.

Subsequently, the SE boundary of the property was found to lie 3000' beyond the limits of the survey, leaving unsurveyed about 8 claims overlying the ultrabasic. Flight line spacing on the Hoo Group averaged 660'.

In view of the significance of the magnetics in the area as established by the G.S.C. aeromagnetic survey, a complete data reduction was requested from Lockwood Survey Corporation (figures 5 and 6).

Four interesting conductive zones were found (figure 6). Two of these lie beyond the claim boundaries, in the NE part of the area. Subsequent field investigations did not provide any interesting features and no further follow-up work was recommended.

In the most Westerly claims, a restricted conductive zone of medium strength (50 ppm) and ratios of 1.5/0.5, 5.5/1.5 and 3.3/0.8 was located. This conductor was located on the ground using a Turam instrument, as the overburden was estimated to be of the order of 100'. The zone was subsequently drilled, but no economic mineralization was encountered. This area is identified as Area 18 in the overall Northlake Mines program.

In the field, two separate conductive areas were identified and drilling was completed on the most Northerly one. Overburden was found to be only about 30'.

Both graphitic schists and a significant talc zone were intersected in the drilling in Area 18. The best part of the conductivity appears related to the talc zone rather than to the graphitic schists, as an outcrop of the latter was found outside the conducting zone.

In the Southeasterly portion of the claims, a rather extensive conductive zone is located on the NE flank of the aeromagnetic anomaly. This zone, known as Area 19 in the overall program, has been investigated by a Ronka horizontal loop electromagnetic ground survey and by soil sampling. Both investigations were conducted along picket-lines spaced at 800'. Further follow-up work is recommended.

In the general geological context of the area, the 1966 program has demonstrated that the best target zones occur in the schist areas within about one to two miles from the ultrabasics. Both area 18 and 19 justify therefore further investigation.

7. PERSONNEL AND COSTS OF LOCKWOOD SURVEY

The Lockwood Survey was flown under supervision of P.H. Sevensma Consultants Ltd. out of a camp on Grassy Lake, between May 8th and 23rd, 1966.

Due to meltwater on the ice starting May 12th, 1966 and poor weather conditions, Ross River had to be used as a secondary base, and additional helicopter support was required.

A. Personnel on Lockwood Survey

Helicopters were supplied by Klondike Helicopters Ltd.

Geophysical Helicopter:	Bell 47G-3, CF-NJW
Supporting Helicopters:	Hiller UH-12E, CF-MLL
	Bell 43G-3, CF-UAJ
Pilots:	G.F. Kerr
	R. Peters
	J. Dirkie
Engineer:	R. Smegalski
Geophysical Operator:	H. Sandau of Lockwood Survey Corp., Toronto
Field Supervisor:	P.H. Sevensma, P. Eng., Vancouver, B.C.
Auxiliary Personnel:	M. Cloutier, Richmond, B.C.
	J.L. Stout, Mayo, Y.T.
	N. Menegos, Whitehorse, Y.T.
	S. Lothrop, Vancouver, B.C.
	M. Shorty, Ross River, Y.T.

B. Costs of Lockwood Survey

Costs were as follows:

Group	Line Miles	Instrument Rental	Field Expenses	Data Reduction	Total
Gee	462.5	$7,956.34	$9,745.32	$ -	$17,701.66
Hoo	106	1,823.50	2,233.51	1,607.99	5,664.50
El	82	1,410.64	1,727.81	1,243.53	4,381.98
TOTAL	650.5	11,190.48	13,706.64	2,851.02	27.748.14
Cost per line mile		$17.203	$21.071	($15.00)	$42.657

Field costs include labour, fixed wing aircraft, helicopter, sundry expenses and consulting fees.

A cost breakdown is attached as Appendix A.

8. SUMMARY AND RECOMMENDATIONS

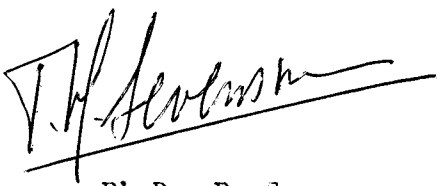
An airborne magnetic-electromagnetic survey of the Hoo Group, flown at a total cost of $5,664.50, has revealed the presence of several interesting conducting zones, two of which are quite extensive and located in the schists close to their contact with the ultrabasics.

Initial drilling on one of these has not encountered economic mineralization, but several targets of interest remain and justify further investigation.

The summary of recommendations which follows must be considered within the framework of the overall program of Northlake Mines; it's priority is rated as 3. These recommendations do not take into account the sequence and timing within the broader program.

Geological mapping: 2 man months @ $1,500		$ 3,000
Soil Sampling: 350 samples @ $3.00		1,000
Transportation, helicopter, 15 hours		2,000
Camp preparation		1,000
	Total	$ 7,000
Contingent linecutting, geophysics, 15 line miles @ $200		3,000
Contingent drilling, 1600' @ $25		40,000
	Total	$50,000
Engineering, overhead, contingencies, 15%		7,500
	Total	$57,500

Respectfully submitted,



P.H. Sevensma, Ph.D., P. Eng.

January 26, 1967

CERTIFICATE

I, PETER H. SEVENSMA, of Vancouver, B.C., do hereby certify that:

1. I am a graduate of the University of Geneva, Switzerland (Physics and Chemistry, 1937) (Geology and Mineralogy, 1937) where I obtained my Ph.D. in Geological and Mineralogical Sciences in 1941.

2. I am a Consulting Geological Engineer and a registered member in good standing of the Association of Professional Engineers of British Columbia and of the Association of Professional Engineers of Yukon Territory.

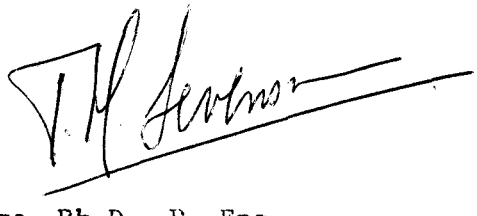
3. From February 1948 until December 1965 I have been engaged continuously in mining and exploration geology in the employ of Cominco Limited. As a Senior Exploration Geologist, I have worked extensively both in Eastern and Western Canada.

4. I have personally examined on several occasions the claims which are the subject of this report and have acted as a consulting geologist since early 1966 on the exploration program conducted by Northlake Mines Limited on these claims.

5. I have personally supervised in the field the airborne geophysical survey conducted by Lockwood Survey Corporation between May 8th and 23rd, 1966 for Northlake Mines Limited.

6. I have not received, nor do I expect to receive or acquire, directly or indirectly, any interest in any of the properties or securities of Northlake Mines Limited.

Respectfully submitted,



P.H. Sevensma, Ph.D., P. Eng.

January 30, 1967

Appendix A

NORTHLAKE MINES LTD.

LOCKWOOD AIRBORNE SURVEY, May 8 - 23, 1966

Accounting Breakdown, L532-1 to -5

Date 1966	Paid to	Chq. No.	Labour (532-1)	Rental (532-2)	Fixed Wing (532-3)	Helicopter (532-4)	Sundry (532-5)	Data reduction (532-2)	Consulting Expenses and Fees
July 7	Lockwood S.C., mosaics	N					$208.75		
June 15	Great Northern Airways	M-7			$1,113.00				
June 15	Klondike Helicopters	M-9				$ 961.00			
June 15	Klondike Helicopters	M-9 part				5,521.00			
	Klondike Helicopters	M-23 part				416.50			
	Tourist Services	M- *					194.75		
Apr. 25	Tourist Services	V113					47.11		
June 16	White Pass	M-11					23.54		
May 24	White Pass	V116 part				816.75*			
June 2	C.N.T.	V117					7.50		
June 2	P.H. Sevensma Cons.	V118					145.24		
May 20	J.L. Stout	W30	$300.00						
May 23	Ross River Enterpr.	W32					169.45		
May 24	N. Menegos	W36	250.00						
	Consulting Expenses	N	1,000.00						$1,875.00
	Consulting Expenses	N							657.05
Nov. 25	Lockwood S.C.	M178		$11,190.48					
Nov. 25	Lockwood S.C.	M180						$2,851.02**	
	Total		$1,550.00	$11,190.48	$1,113.00	$7,715.25	$796.34	$2,851.02	$2,532.05

Note: Cheque prefixes as follows:

N Northlake Mines Ltd.
V P.H. Sevensma Trust Vancouver
W P.H. Sevensma Trust Whitehorse
M A. MacDonald Consultants

Remarks:

* Charged 33 helicopter hours of gas, supplied @ 15 gallon an hour @ cost delivered at Grass Lake $1.65 gallon

** $4,751.70 paid minus $1,900.68 credit

M* Voucher not available

Certified Correct:

IN THE MATTER OF NORTHLAKE MINES LIMITED
AND IN THE MATTER OF AIRBORNE GEOPHYSICAL
SURVEY REPORT AND HOO, EL, AND GEE CLAIMS

AFFIDAVIT

I, PETER SEVENSMA, of 715-850 West Hastings Street, Vancouver, Province of British Columbia, HEREBY MAKE OATH AND SAY AS FOLLOWS:-

That attached hereto to this my Affidavit, is a report and an Appendix A, providing a list of firms and individuals having been engaged in work for the above, as well as a cost-breakdown and a cost-distribution for 1966 work, which I certify to be true and accurate to the best of my knowledge and belief.

SWORN before me at the City of Vancouver, Province of British Columbia, this 30 day of January, A.D. 1967

A Commissioner for taking Affidavits in and for the Yukon Territory.

Peter Sevensma

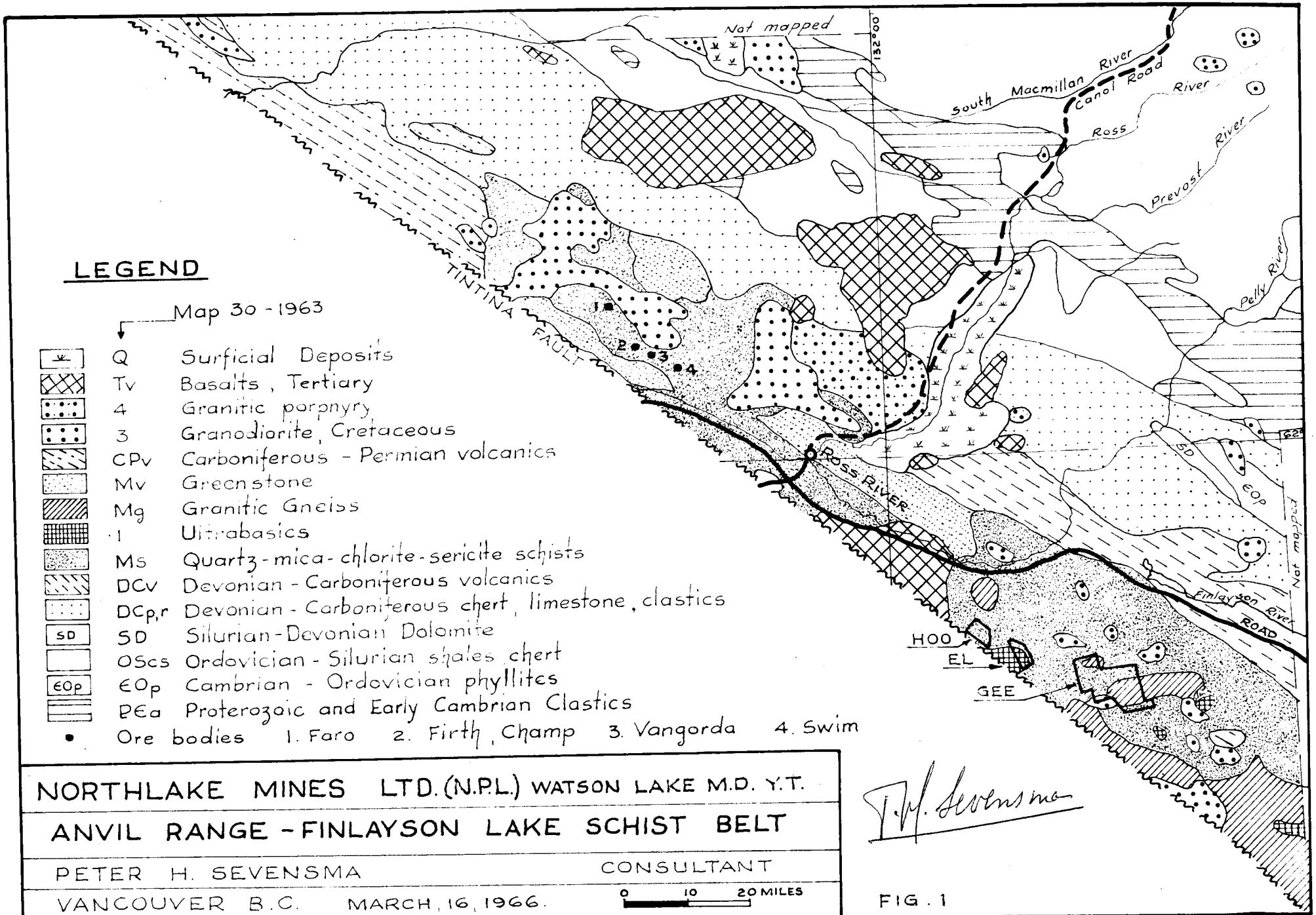
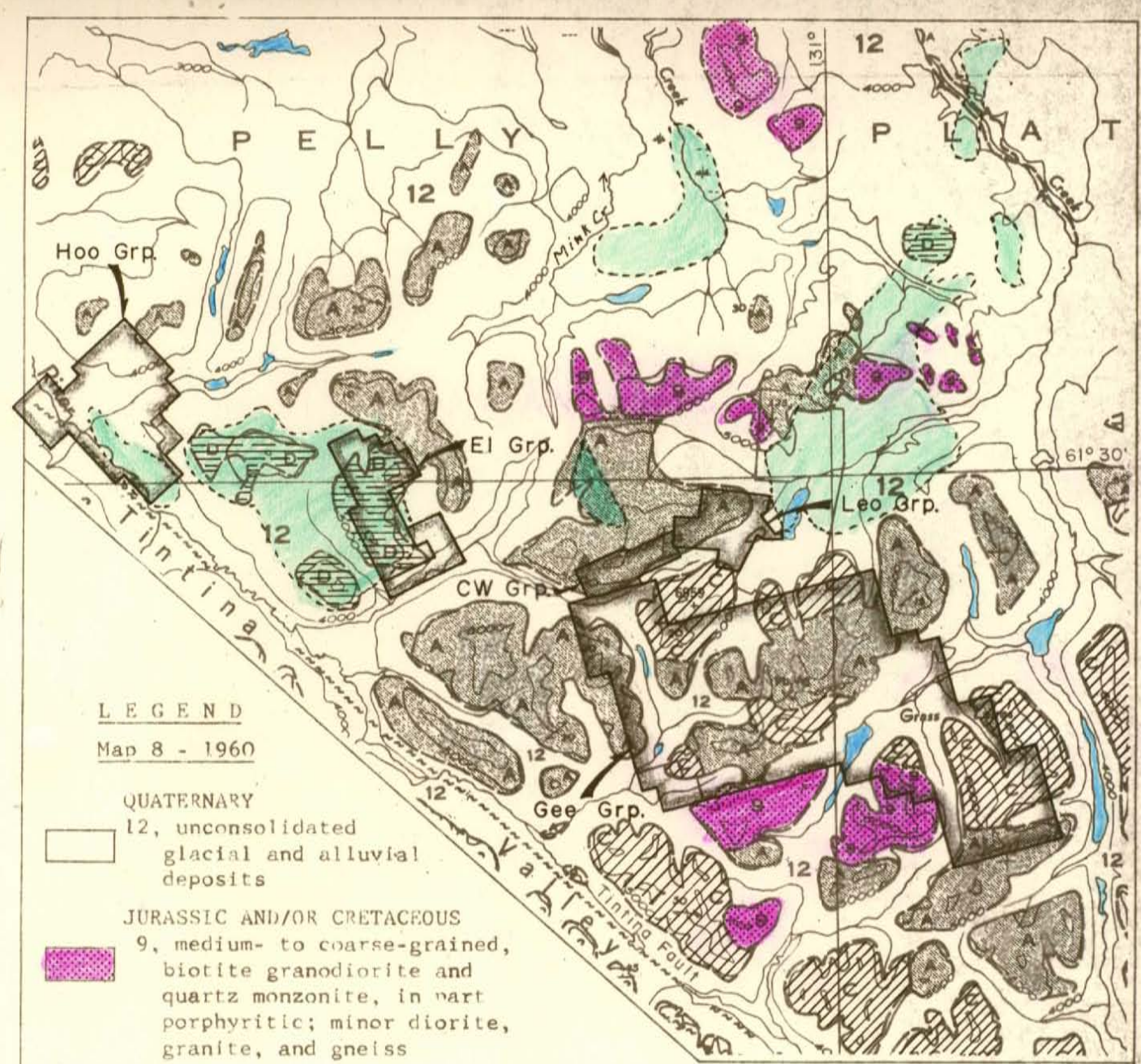

Not mapped
132°00'
South Macmillan River
Canol Road
Ross River
Prevost River
Pelly River
TINTINA FAULT
ROSS RIVER
SD
EOp
Not mapped
Finlayson River
ROAD
HOO
EL
GEE
LEGEND
Map 30 - 1963
Q Surficial Deposits
Tv Basalts, Tertiary
4 Granitic porphyry
3 Granodiorite, Cretaceous
CPv Carboniferous - Permian volcanics
Mv Greenstone
Mg Granitic Gneiss
1 Ultrabasics
MS Quartz-mica-chlorite-sericite schists
DCv Devonian - Carboniferous volcanics
DCp,r Devonian - Carboniferous chert, limestone, clastics
SD Silurian-Devonian Dolomite
OScs Ordovician - Silurian shales chert
EOp Cambrian - Ordovician phyllites
PEa Proterozoic and Early Cambrian Clastics
Ore bodies 1. Faro 2. Firth, Champ 3. Vangorda 4. Swim
NORTHLAKE MINES LTD. (N.P.L.) WATSON LAKE M.D. Y.T.
ANVIL RANGE - FINLAYSON LAKE SCHIST BELT
PETER H. SEVENSMA CONSULTANT
VANCOUVER B.C. MARCH, 16, 1966.
0 10 20 MILES
P.H. Sevensma

FIG. 1



LEGEND

Map 8 - 1960

QUATERNARY

12, unconsolidated glacial and alluvial deposits

JURASSIC AND/OR CRETACEOUS

9, medium- to coarse-grained, biotite granodiorite and quartz monzonite, in part porphyritic; minor diorite, granite, and gneiss

A, Quartz-biotite and quartz-chlorite schist, micaceous quartzite, hornfels; minor phyllite and limestone

C, Micaceous, quartzose gneiss, granitoid gneiss; minor quartz-biotite schist

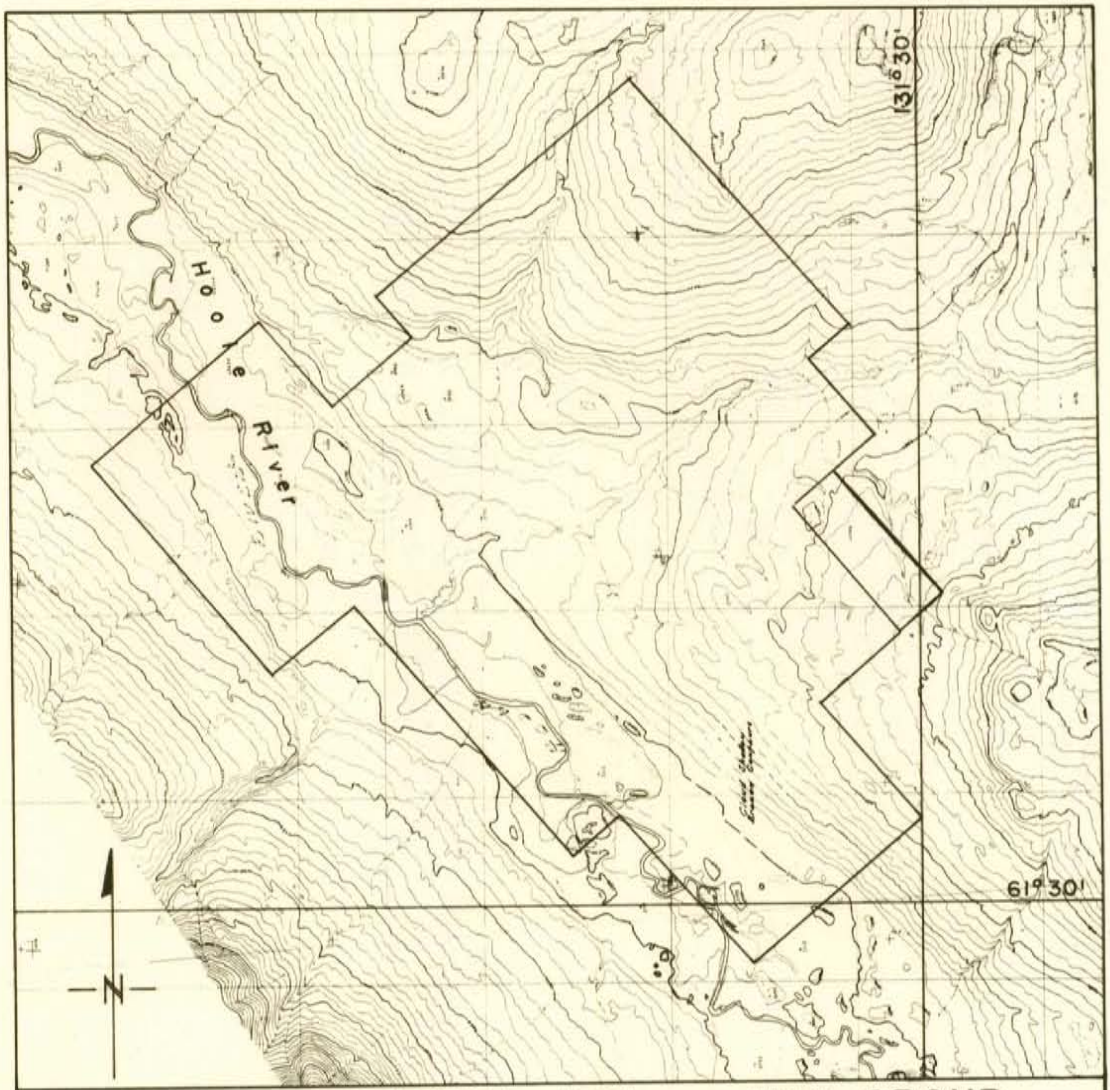
D, Dunite; minor peridotite, pyroxenite, and serpentinized equivalents; gabbro and diorite

Outline of aeromagnetic anomalies estimated to reflect ultrabasic intrusives.

T. H. Sevensma

NORTHLAKE MINES LTD.	
GEOLOGY AND LOCATION PLAN	
Watson Lake M.D.	105 G
P.H.Sevensma Consultants Ltd. - Vancouver, B.C.	
December 1966	scale 0 4 mi.

FIG. 2



NORTHLAKE MINES LTD. - HOO GROUP

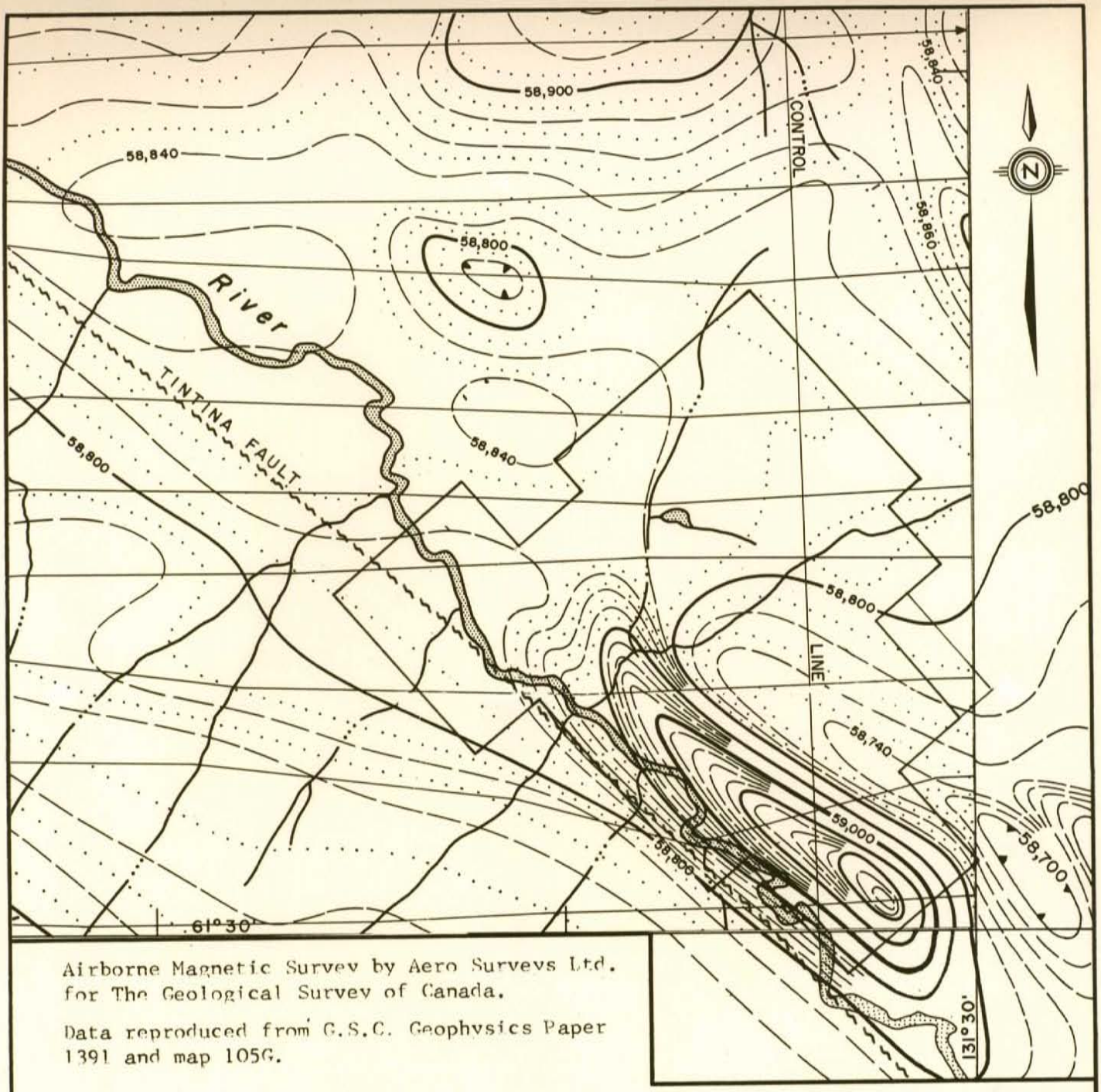
TOPOGRAPHY AND CLAIM LOCATION MAP

Watson Lake M.D. 105 G-12

P.H. Sevensma Consultants Ltd. – Vancouver, B.C.

December 1966 FIG. 3 Miles SCALE 0 1 2

P.H. Sevensma



Airborne Magnetic Survey by Aero Surveys Ltd. for The Geological Survey of Canada.

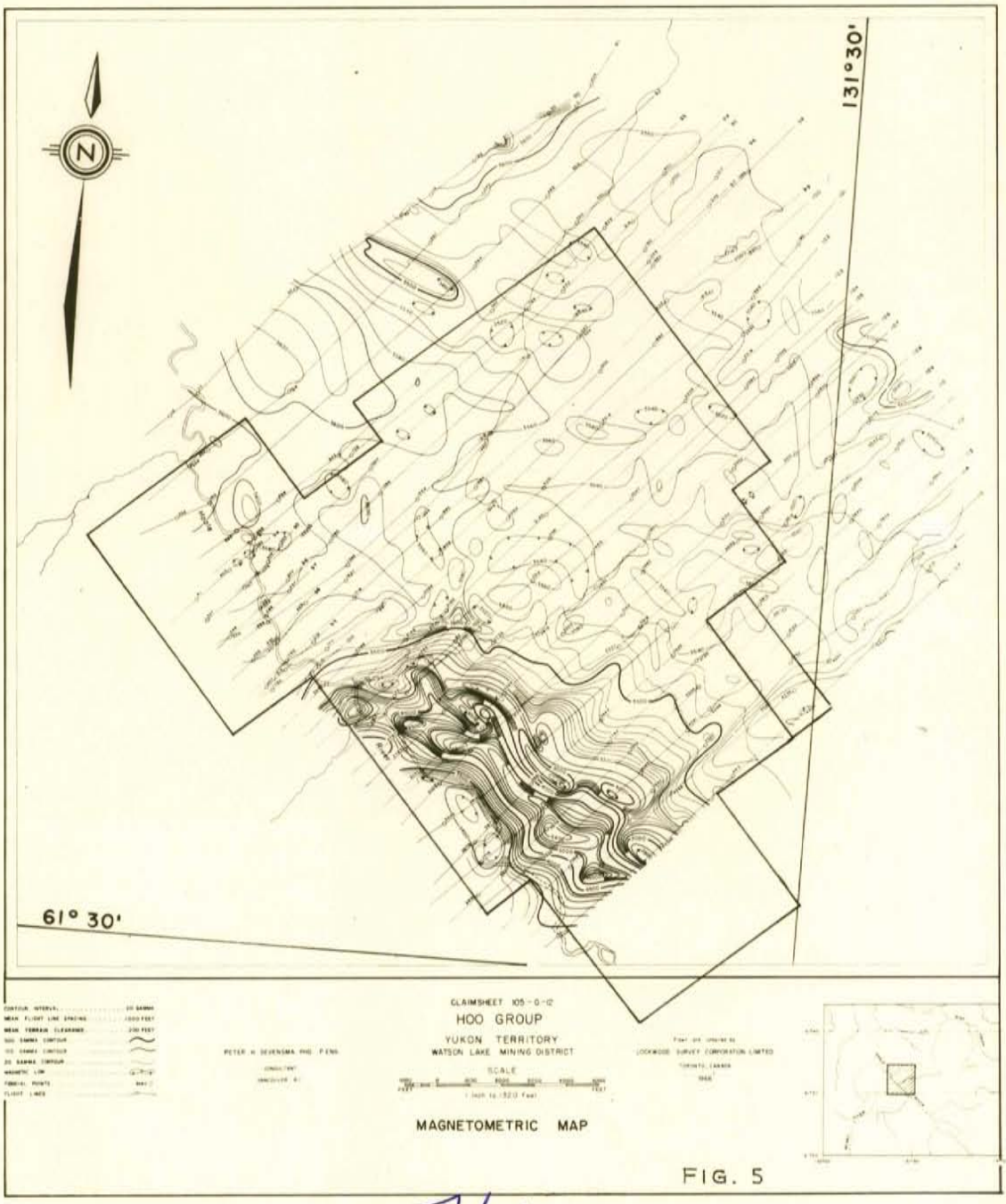
Data reproduced from G.S.C. Geophysics Paper 1391 and map 105G.

NORTHLAKE MINES LTD.	
HOO GROUP – AEROMAGNETICS	
Watson Lake M.D.	105 G-12
P.H. Sevensma Consultants – Vancouver, B.C.	
December 1966	SCALE: MILES 0 2

FIG. 4

NORTHLAKE MINES LIMITED

AIRBORNE GEOPHYSICAL SURVEY



CONTOUR INTERVAL ..... 20 GAMMA
MEAN FLIGHT LINE SPACING ..... 1000 FEET
MEAN TERRAIN CLEARANCE ..... 250 FEET
100 GAMMA CONTOUR
10 GAMMA CONTOUR
20 GAMMA CONTOUR
MAGNETIC LOW
TYPICAL POINTS
FLIGHT LINES

PETER H. SEVENSMA PHD. P.ENG.
CONSULTANT
VANCOUVER, B.C.

CLAIMSHEET 105-D-12

HOO GROUP

YUKON TERRITORY

WATSON LAKE MINING DISTRICT

SCALE

1 inch to 1320 Feet

FLOWN BY UNDER THE DIRECTION OF
LOCKWOOD SURVEY CORPORATION LIMITED
TORONTO, CANADA
1968

MAGNETOMETRIC MAP

FIG. 5

P.H. Sevensma

NORTHLAKE MINES LIMITED

AIRBORNE GEOPHYSICAL SURVEY

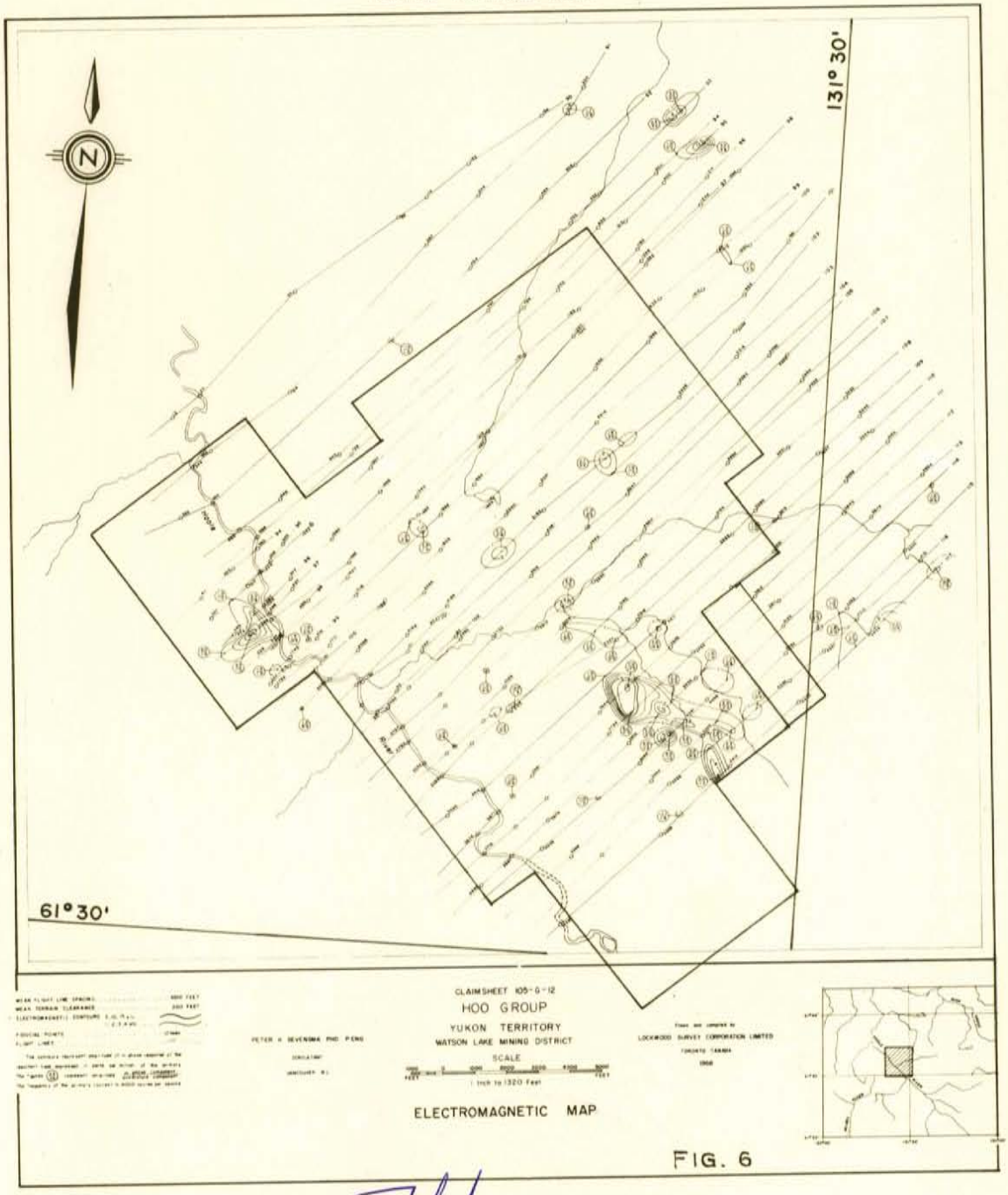


FIG. 6

T. H. Stevens

SHEET 105G-12 | SHEET 105G-11

HOO GROUP

EL GROUP

131° 30'

131° 15'

61° 30'
SHEET 105G-6

61° 30'
SHEET 105G-6

NORTHLAKE MINES LTD.

HOO & EL CLAIMS

P. H. SEVENSMA CONSULTANTS LTD.
715 - 850 WEST HASTINGS VANCOUVER, B.C.

REF.:	DATE:	SCALE:
N.T.S. 105-G-6	JAN. 1967	1 in. = 1 mile

WATSON LAKE M.D. Y.T.

Magnetic North 33° E - 27° E

FT 1500 0 1500 3000 4500 6000 7500 9000 10500 FT

FIG. 7

NORTHLAKE MINES LIMITED

AIRBORNE GEOPHYSICAL SURVEY

MEAN FLIGHT LINE SPACING ..... 1000 FEET
MEAN TERRAIN CLEARANCE ..... 200 FEET
ELECTROMAGNETIC CONTOURS 5, 10, 15 etc. .....
1, 2, 3, 4 etc. .....
FIDUCIAL POINTS ..... O 3690
FLIGHT LINES .....

The contours represent amplitude of in phase response of the resultant field expressed in parts per million of the primary. The figures (2.3 / 0.2) represent amplitude in phase component / quadrature component
The frequency of the primary current is 4000 cycles per second.

The contour interval is 10 parts per million.

PETER H. SEVENSMA PHD. P.ENG.

CONSULTANT.

VANCOUVER B.C.

CLAIMSHEET 105-G-12

HOO GROUP

YUKON TERRITORY

WATSON LAKE MINING DISTRICT

SCALE

1000 FEET 0 1000 2000 3000 4000 5000 FEET

1 Inch to 1320 Feet

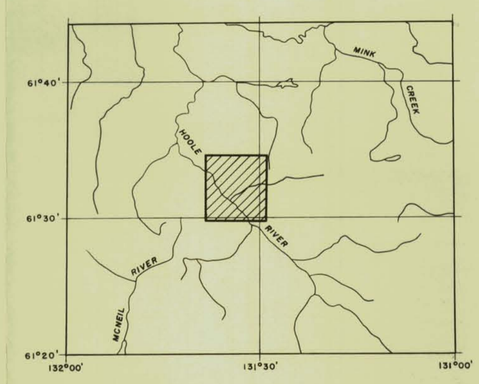
ELECTROMAGNETIC MAP

Flown and compiled by

LOCKWOOD SURVEY CORPORATION LIMITED

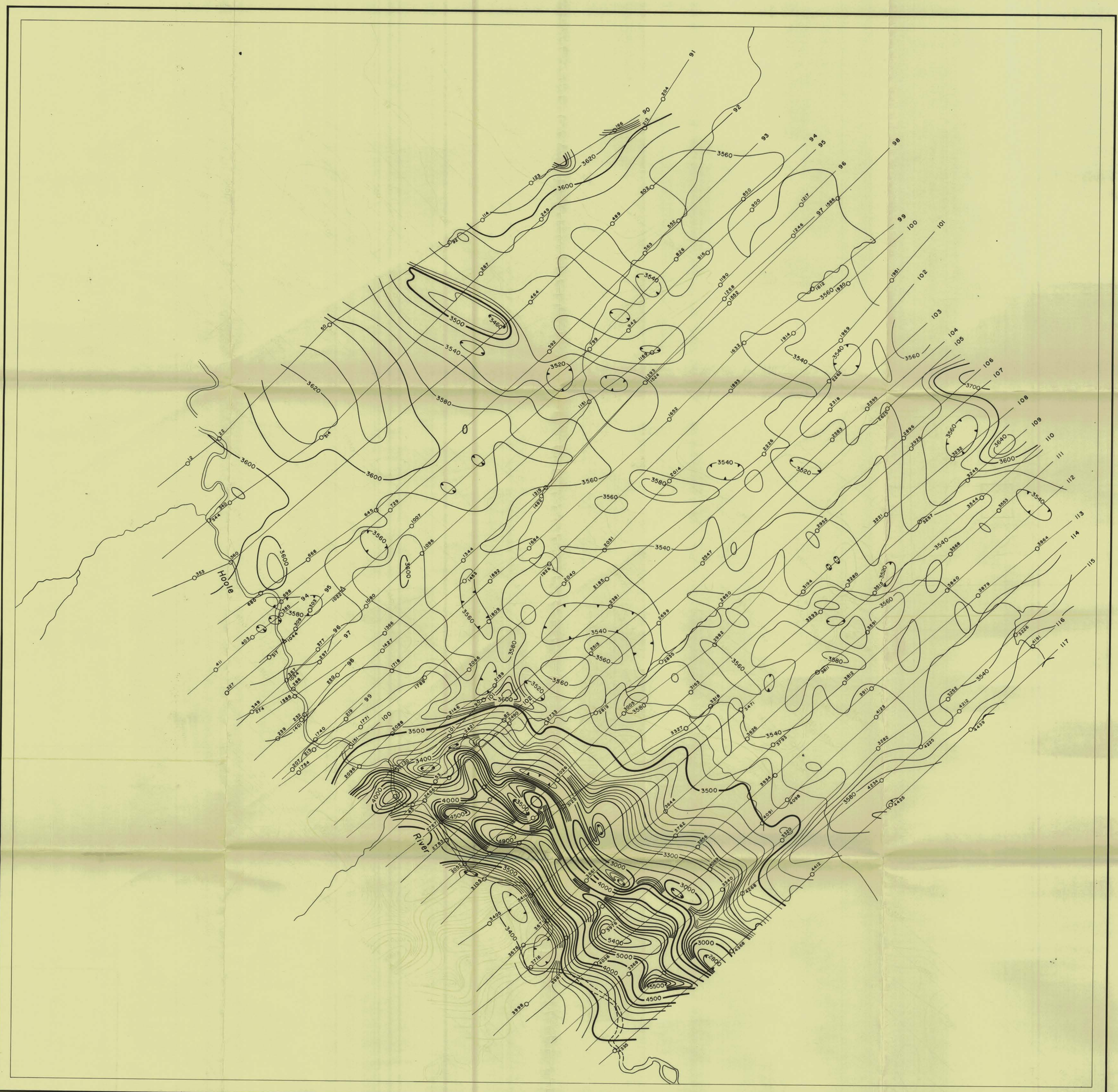
TORONTO, CANADA

1966



NORTHLAKE MINES LIMITED

AIRBORNE GEOPHYSICAL SURVEY



CONTOUR INTERVAL ---------- 20 GAMMA
MEAN FLIGHT LINE SPACING ---------- 1000 FEET
MEAN TERRAIN CLEARANCE ---------- 200 FEET
500 GAMMA CONTOUR ----------
100 GAMMA CONTOUR ----------
20 GAMMA CONTOUR ----------
MAGNETIC LOW ----------
FIDUCIAL POINTS ---------- 3690
FLIGHT LINES ----------

PETER H. SEVENSMA. PHD. P.ENG.

CONSULTANT

VANCOUVER B.C.

CLAIMSHEET 105 - G - 12

HOO GROUP

YUKON TERRITORY

WATSON LAKE MINING DISTRICT

SCALE

1000 0 1000 2000 3000 4000 5000
FEET FEET

1 Inch to 1320 Feet

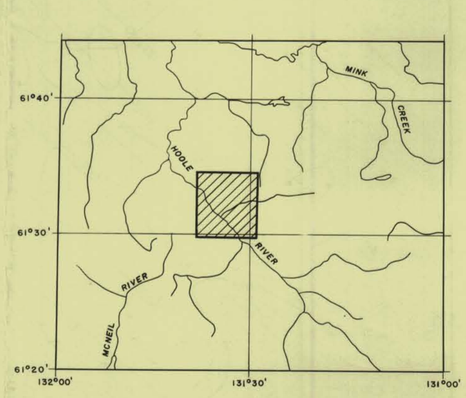
MAGNETOMETRIC MAP

Flown and compiled by

LOCKWOOD SURVEY CORPORATION LIMITED

TORONTO, CANADA

1966



NORTHLAKE MINES LIMITED

GEE GROUP OF CLAIMS

105-G-6/7, 61°27'N, 131°00'W

Watson Lake M.D., Y.T.

Report on

AIRBORNE GEOPHYSICAL SURVEYS

April 4-12 & May 8-23, 1966

by

P.H. Sevensma, Ph. D., P. Eng.

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ILLUSTRATIONS

NORTHLAKE MINES LIMITED

GEE GROUP OF CLAIMS
105-G-6/7, 61°27'N, 131°00'W
Watson Lake M.D., Y.T.

Report on
AIRBORNE GEOPHYSICAL SURVEYS
April 4-12 & May 8-23,1966

1. INTRODUCTION

In early 1966, Northlake Mines acquired several large claim blocks located in the general Grass Lake area, in a belt stretching from the Hoole River in the Tintina Trench in a Southeasterly direction towards the Grass Lakes (figure 1).

On the Gee Group of claims, 9 small showings were known on the high-lying ridges. In view of the rugged topography of the area, it was decided to use the Geo Cal helicopter-borne electromagnetic prospecting method near some of the showing areas at high altitude, and to conduct a helicopter-borne magnetic-electromagnetic survey by the Lockwood method along the main valleys.

Targets located by these methods early in the 1966 season have subsequently been investigated by geophysical, geochemical and geological methods during the summer of 1966.

The present report deals with the results of the airborne surveys on the Gee Group area. Line-miles flown by the Lockwood method totalled 462.5 miles in this area.

2. PROPERTY

The property consists of the following claims:

	Grant Nos.	Date of record
Gee 1 - 80	90172 - 90250 & Y2004	January 31, 1966
Gee 81 - 88	Y2002, 3 and 5 - 9	January 31, 1966
Gee 89 - 400	Y2010 - Y2321	January 31, 1966
Gee 401 - 530	Y7103 - Y7232	April 20, 1966
FS 1 - 40	Y7854 - 7893	May 9, 1966
Z 1 and 2	Y13085 & Y13086	June 14, 1966
Leo 1 - 6	Y13087 - Y13092	June 14, 1966
Leo 7 - 14	Y13125 - Y13132	July 4, 1966
Leo 15 - 30	Y13093 - Y13108	June 14, 1966
CW 1 - 4	Y13081 - Y13084	June 14, 1966
CW 5 - 23	Y13333 - Y13351	July 25, 1966
PG 1 - 16	Y13352 - Y13367	July 25, 1966

These claims form a contiguous group centered on the high mountains between Grass Lakes and Riviera Lake at approximately 61°27'N and 131°00'W.

The claims lie between elevations of 4300' and 7000' about 20 airmiles South of the Watson Lake - Ross River road (figures 1 and 2). The best access by fixed wing is on the Westerly Grass Lake, which served as a base for the airborne surveys. This lake, at 4300' elevation, lies in a bad weather belt, and during the Lockwood Survey, conducted at the start of break-up, Ross River had to be used as a secondary base due to poor weather conditions, which increased the cost of the survey by about 15%. Starting May 12, 1966, fixed wing aircraft where precluded from landing on the lake by flooding of the ice.

3. HISTORY

There is evidence in the area of activity by the early placer miners, probably around the turn of the century.

The area was initially prospected in 1954 by K.G. Sanders and R. Zielinski for Pelly River Explorations Limited and the Rob, Pit and Gyp claims were staked. The two former groups were optioned by Trans-continental Resources, who carried out a ground magnetometer survey, but allowed the claims to lapse.

From 1955 until the early 1960's, various other mineral discoveries were made to the NW and SE of the present Gee Group. During the same period, the area was mapped on a scale of 1" = 4 miles by J.O. Wheeler, L.H. Green and J.A. Roddick of the G.S.C. and an airborne magnetic survey was flown by Aero Surveys for the same organization.

In January 1966, Messrs. Sanders and Zielinski staked 560 claims in the area, including the Gee 1 - 400. All 560 claims were acquired by Northlake Mines.

The description by the stakers of the 9 showing areas covered by the Gee claims is recorded in the writer's report on the area dated March 18, 1966.

Subsequent to the airborne surveys carried out by Northlake Mines in April and May of 1966, A. MacDonald Consultants Limited of Vancouver conducted an extensive ground exploration program during the summer of 1966 for Northlake Mines Ltd.

The writer has acted as a consulting geologist for both the airborne and ground follow-up programs since mid-February 1966.

4. REGIONAL GEOLOGY

During the last ten years, the Geological Survey of Canada has been very active in reconnaissance mapping on a scale of 1" = 4 miles of large areas in the Yukon. In addition, large areas have been flown aeromagnetically.

As a result of the correlation of the 1" = 4 mile mapping, new concepts on the age of various rock belts have emerged. The newer concepts have been published in 1964 on a map of the Yukon and the N.W.T. on a scale of 1: 3,000,000, map 30-1963, which has served the writer as a base for figure 1.

The area under consideration forms part of the Anvil Range - Finlayson Lake belt, a belt of metamorphic rocks characterized by extensive mica schist formations and varying amounts of ultrabasic bodies. In the Finlayson Lake area there are also a number of masses of gneiss of unknown origin.

Broadly speaking, the schistose formations, probably of Mississippian age, form a definite belt, although the relationships between the more intensively metamorphosed gneissic rocks and the much lesser metamorphosed schists is not clear. In addition, the degree of metamorphism decreases very gradually from South to North throughout the area pictured on figure 1.

A persistent characteristic of the belt is the presence of the ultrabasics, and 1966 fieldwork has indicated to the writer that these rocks are often associated with very low-grade meta-chlorite schists, slates and even argillites, frequently accompanied by significant amounts of graphitic schists, which occasionally form zones of true graphite slates.

As the change from the more highly metamorphic schist-gneiss assemblages to the less metamorphic slates and argillites is often very sudden but hidden by overburden, it is probable that significant tectonic features have so far remained undetected.

In addition, in the general area of the Northlake holdings, there appears to exist a significant change in tectonic style between the very flat lying schist-gneiss areas and the more steeply dipping slate-ultrabasic assemblages.

Notwithstanding these perhaps very significant differences, the overall characteristics of the schist-ultrabsic association is similar throughout large areas of the central Yukon.

The study and correlation of these belts has led to the concept that the Anvil Range - Finlayson belt is nothing else but the offset by the Tintina Fault of the Klondike schists with a right-lateral movement of about 250 miles (G.S.C. paper 65-2, page 57).

There is therefore a good reason to consider these schists an economically very productive unit, as the Klondike has produced some 250 million dollars of gold, and in the Anvil Range, massive sulphide bodies outlined sofar total at least something of the order of 60 million tons containing better than 10% zinc and lead combined with a gross total value of some 1.5 to 2 billion dollars in base metals and silver.

Significant ore-deposits are usually associated with major structural disturbances, and in the area under consideration the regional geology (figure 1) suggests a large regional E-W striking fold within the normal NW-SE trend of the formations.

Also, geologically and topographically, the area has the characteristics of a recently uplifted dome, and the trend of the valleys suggests pronounced fracturing and faulting along N-S and NE-SW cross-trends; both these features are present in many ore-bearing districts. And as a number of small showings are known in the Fire Lake-Northlake-Grass Lake area, some of them of the strata-bound type, this district is considered an excellent target area for exploration for massive sulphide deposits with base metal values.

These various factors have led to the choice of a combined magnetic-electromagnetic airborne survey as a method well suited to an area with extensive but relatively thin overburden covering structures and lithologies favorable for the occurrence of massive sulphide bodies.

5. LOCKWOOD AIRBORNE METHOD

This method will detect formations that are electrically conductive, and subsequent work can then be concentrated over and near these zones, by using geochemical and geophysical reconnaissance methods.

This method of initial reconnaissance is particularly suited to areas without a well defined drainage pattern along which streamsilt sampling could provide complete initial reconnaissance. It is also the best tool for areas with relatively extensive overburden and few outcrops.

The Lockwood method uses a single frequency of 4000 cps to generate a primary electromagnetic field. The transmitter loop is carried in a fibreglass bird and is oriented with the loop axis parallel to the direction of flight. A receiving loop is located 30' away in the other end of the bird; the loops are coaxial.

The bird is suspended at the end of a 70' cable and is towed by a helicopter at an elevation of 100' above the ground.

A magnetometer of the Gulf Mark III type, also located in the bird, measures the total intensity of the magnetic field.

Recorders and a positioning camera are carried on the helicopter and are handled by an operator who indicates to the pilot the planned course plotted on 1" = 1320' airphotographs and who marks fiducial points on the recorder's strips.

In general, the flight lines are laid out at right angles to the strike of the formations and at distances varying from 600' to 1500' apart.

If a conductive body in the ground is crossed by the helicopter carrying this equipment, the primary electromagnetic field creates eddy currents in this conductor which cause the generation of a secondary electromagnetic field. This secondary field is generally of the same frequency as the primary field but out-of-phase with it; it is detected by the receiver loop in the bird.

As a variation in the distance between the transmitter and the receiver coils will create a strong in-phase response, both coils are in a fixed position in the relatively rigid bird. This will eliminate false responses. Increasing out-of-phase responses will be obtained over bodies of low to medium conductivity; as the conductivity increases beyond the medium range, this out-of-phase response falls off again.

In-phase responses are increasingly stronger as the conductivity rises from poor to very high.

The strength of the response is measured in parts per million. For the above-cited reasons, the ratio of the in-phase to the out-of-phase responses is less than one for bodies of poor to medium conductivity and increases rapidly as the conductivity varies from medium to high.

The response is also a function of the size of the conducting body and of the distance from the bird to it.

The maximum distance at which a highly conductive body of large size will give a response is still somewhat unknown, but appears to be about 300' between the bird and the top of the conducting body.

Various geological bodies are electrical conductors and geological conductors are manifold and of greatly varying size, shape and conductivity, the latter often being a function of the internal texture of the conductor.

Some examples of conducting bodies are:

Massive pyrrhotite
Massive pyrite
Disseminated pyrrhotite and/or pyrite
Graphitic schists
Talc schists, especially when wet
Chlorite (serpentine) schists
Wet overburden in swamp
Lake-bottom deposits
Wet shears

Due to their schistose nature, graphitic schists may be excellent conductors if the individual graphite flakes form a conductive layer.

Massive sulphide bodies with 10 - 20% interstitial quartz may be excellent conductors if the main sulphide is pyrrhotite and if the individual grains of sulphide have large contact areas.

Their conductivity drops off rapidly if the main sulphide is pyrite and if the individual iron sulphide grains are isolated by interstitial non-conductors like silica or sphalerite.

For these reasons, a combined magnetic - electromagnetic airborne survey is essentially a geological mapping tool, especially so as the amount of magnetite in rock is even more of a geological variable than conductivity.

The reliability of the method is principally a function of the elevation above ground that can be maintained. Correlation of responses on adjacent lines flown at different elevations, due to weather or topographical conditions, may not be satisfactory. This happens if the survey if flown with too light a helicopter.

Providing the bird is flown at a steady elevation above the ground, interpretation of airborne data is largely a function of the geological conditions.

Different geological environments will lead to different appraisals of quantitatively very similar airborne geophysical responses.

In general, experience has shown that long conductors (several thousand feet or several miles) with relatively low ratios of 1 or less are likely to be of a formational nature, like graphitic schists. Smaller conductors of better than 1, or preferably 2, ratios may represent near-surface sulphide occurrences.

In certain areas, coincidence of magnetic and electromagnetic highs is critical because of an association of sulphides and magnetite. Most magnetic highs are however a reflection of increased magnetite content of the underlying rock formations, and high magnetic readings may have no more than a very indirect relationship to unusual sulphide concentrations in any given area.

Other geological factors complicating a qualitative interpretation are, for example, the frequent association of graphite and sulphide bodies or the presence of sulphide deposits the mass of which is buried beyond the range of the electromagnetic field but that do have a small near-surface expression.

An airborne geophysical survey should therefore be considered as a mapping tool enabling the exploration effort to be directed towards limited portions of the area flown and further ground work in restricted areas should use methods like geological mapping, geochemical reconnaissance, ground EM and gravity to assess conductors or magnetic highs detected by airborne methods.

6. SURVEY OF THE GEE GROUP

In view of the general high elevations in the area and the limited carrying capacity of the Bell 47G-3 helicopter at these altitudes, flying was purposely confined to the main valleys (figure 4). Flight-line spacing was 660'.

As the formations on the Gee Group have in general relatively flat dips, care was taken to fly several of the valleys adjoining the claims, so as not to miss possible significant extensions of nearby showings into adjacent valleys.

Tapes were examined in the field. As few conductive zones were found and as the magnetic profiles in general were flat and the flight-elevations irregular, it was decided not to obtain a detailed data reduction. A preliminary data reduction of those areas that evidenced significant electromagnetic profiles was carried out by personnel of Exploration Geophysics (Yukon) Limited at Whitehorse (see attached maps).

Very highly conductive zones were located on the Leo claims (Area 11). Medium conductors were located in area 10 near the Lake on the NW portion of the Gee claims, and weak but localized conductors were found on the area of the PG claims at the SW corner of the Gee Group (Area 16), in the valley bottom 1½ miles NE of Grass Lake (Area 14) and in areas 10, 12 and 13. The latter two are covered by the CW claims.

No conductors were found either in the lower part of Area 5 on the slopes to the NW of Grass Lake which is upslope from the galena float at that point, or in Area 15, covering the long conducting zone located by the Geo Cal method.

In both areas, topography and crosswinds combined to force the helicopter to fly at a higher terrain clearance than normal.

In Area 5, where overburden cover increases rapidly when proceeding down the valley, a horizontal loop-frame survey failed to pick up any significant conductors, and the same condition prevailed in Area 15.

Streamsilt and soil sampling failed to locate any significant and continuous anomalies in Area 15, but Area 5 was found to be generally high in lead.

In Area 15, the negative verdict of the Lockwood Survey and of geochemical and ground electromagnetic surveys led to interpret the Geo Cal conductor as reflecting the presence of conductive schists lying under overburden beyond the range of the horizontal loop method.

Area 5 could only be partially flown, and it is felt that the airborne survey did not materially contribute to the assessment of this area, mainly due to its rugged topography.

The subsequent geochemical reconnaissance of all the valleys of the area flown has in general confirmed the results of the Lockwood Survey and the combination of these two methods has resulted in providing a few definite target areas and in eliminating, with good confidence, large areas.

An element of doubt subsists in the centre of the valleys where depth of overburden may preclude the detection of any large base metal occurrence by either or both geochemical reconnaissance and airborne geophysics.

It is believed however, that this may not apply to any more than perhaps 20% of the valley bottoms, and any discovery under those physical handicaps would have to be very substantial to have an economic potential.

When the results of the Lockwood surveys conducted by Northlake Mines Limited over its three main groups, the Gee, El and Hoo, are considered together, it is felt that the survey has focussed the attention on those situations where subsequent geochemical follow-up has proven very worthwhile targets and has significantly contributed to eliminate, with confidence, large sections of ground without any near-surface potential.

The Gee Group area as flown was, in general, at or somewhat beyond the limit of the capacity of the Bell 47G-3 and the quality of the survey in areas with this type of topography would be improved by using a much heavier machine capable of maintaining the proper terrain clearance under all conditions.

7. PERSONNEL AND COSTS OF LOCKWOOD SURVEY

The Lockwood Survey was flown under supervision of P.H. Sevensma Consultants Ltd. out of a camp on Grassy Lake, between May 8th and 23rd, 1966.

Due to meltwater on the ice starting May 12th, 1966 and poor weather conditions, Ross River had to be used as a secondary base, and additional helicopter support was required.

A. Personnel on Lockwood Survey

Helicopters were supplied by Klondike Helicopters Ltd.

Geophysical Helicopter:	Bell 47G-3, CF-NJW
Supporting Helicopters:	Hiller UH-12E, CF-MLL
	Bell 43G-3, CF-UAJ
Pilots:	G.F. Kerr
	R. Peters
	J. Dirkie
Engineer:	R. Śmegalski
Geophysical Operator:	H. Sandau of Lockwood Survey Corp., Toronto
Field Supervisor:	P.H. Sevensma, P. Eng., Vancouver, B.C.
Auxiliary Personnel:	M. Cloutier, Richmond, B.C.
	J.L. Stout, Mayo, Y.T.
	N. Menegos, Whitehorse, Y.T.
	S. Lothrop, Vancouver, B.C.
	M. Shorty, Ross River, Y.T.

B. Costs of Lockwood Survey

Costs were as follows:

Group	Line Miles	Instrument Rental	Field Expenses	Data Reduction	Total
Gee	462.5	$7,956.34	$9,745.32	$ -	$17,701.66
Hoo	106	1,823.50	2,233.51	1,607.99	5,664.50
El	82	1,410.64	1,727.81	1,243.53	4,381.98
TOTAL	650.5	11,190.48	13,706.64	2,851.02	27.748.14
Cost per line mile		$17.203	$21.071	($15.00)	$42.657

Field costs include labour, fixed wing aircraft, helicopter, sundry expenses and consulting fees.

A cost breakdown is attached as Appendix A.

8. GEO CAL AIRBORNE METHOD

The Geo Cal method is based on the observation that a helicopter equipped with metal rotor blades generates a primary electromagnetic field of approximately 900 c.p.s. with an effective radius of some 150' when the blades are rotating at their normal speed of 320 R.P.M.

When a helicopter with metal blades flies at an elevation of 50' to 100' above a conducting body of some size, a secondary electromagnetic field is induced, and the resultant field shows a significant distortion.

This resultant field can be analyzed with a search coil with a vertical axis held by an operator in the helicopter.

The audio amplifier attached to the search coil is tuned to a signal of 900 c.p.s. and has a gain switch and a feed back squelcher switch.

The former is regulated to produce a barely audible signal when the coil is held with its axis vertical, and the latter is adjusted so that only the 900 c.p.s. signal goes through the amplifier. When the aircraft flies close to the terrain in the absence of a conducting zone, the field signal will have minimum amplitude. If, under these conditions, a conducting zone is traversed, the signal strength will markedly increase in amplitude. Under favorable conditions, the orientation of the resultant field can be analyzed by having the helicopter hover over the conducting zone.

By landing, the conducting zone so discovered can be traversed on the ground with the same receiver coil, using a power-pack transmitter. A Sharp SE 250 unit was used in the present case.

Since the survey was flown, recordings of signals have been made on magnetic tape. Also, a fixed horizontal coil can be carried under the belly of the helicopter. This is fed direct current by the helicopters electrical system to create a non-pulsating strong magnetic field.

In this field, the alternating EM field created by the rotor will be much stronger than in the natural magnetic field, providing increased depth penetration.

The method is a low cost prospecting tool. As it is sensitive to all types of conductors to the same extent as more sophisticated devices, but less discriminating, it could lead to higher ground follow-up costs in the presence of conductive overburden.

9. RESULTS OF THE GEO CAL SURVEY

The survey was restricted to the rugged areas at high elevations (5000 - 6500') where small showings had previously been found by conventional prospecting methods.

Conductors were located on the following claim areas: (figure 4)

Area	Airborne Anom. on claim #	Ground survey with Sharp SE 250 Cross over	Maximum Amplitude	Rating
1	111, 146	Weak	2L, 2R	Insignificant
2	100, 174, 176	no landing possible		unknown
	173-175-186	Good	6L, 8R	Good
	187	Nil	0, 10R	Poor
3	209-210-211	Nil	0, 4R	Insignificant
5	2, 4, 6, 236	no landing possible		unknown
	237, 238	no landing possible		unknown
	240-242	Fair	6L, 10R	Good
6	337	None	0, 8R	Poor
7	322-324	None	0, 2R	Insignificant
8, 9	376-378	Fair	8L, 4R	Fair
15	91, 93	no landing possible		unknown
	151,153,155	no landing possible		Strong HEM only

It is felt that in rugged terrain, the absence of a definite crossover and a weak amplitude suggests topographical effects, or a weak conductor at the limit of depth penetration. The generally schistose rocks of the area may also contribute to weak crossovers.

The maximum depth of penetration of the Sharp SE 250 is probably of the order of 150'.

It is also believed that the depth penetration of the airborne device may be somewhat greater than assumed, and may be beyond the depth range of any of the usual horizontal loop instruments, like a Ronka, which at 200' coil spacing, does not exceed 70' - 80'.

All conductors have subsequently been followed up in the field, all by visual inspection, some by a Ronka survey and most by either stream silt sampling and/or soil sampling. These results may be tabulated as follows:

Area	Visual examination	Geochem	Ronka survey	Total assessment
1	pyrite	streams: spotty Cu, Pb	not required	not significant
2	pyrrh. showings up to 4' wide	spotty Cu	not required	due to pyrrh. showings
3	no visual explanation	nil	not required	not significant
5	quartz & galena veins only	high Pb soils	nil	high Pb requires further evaluation
6	faulting	nil	not required	not significant
7	faulting & various minor showings	streams: weak	not required	not significant
8, 9	considerable faulting	Soils: + BG. Cu, Lead	not required	nothing of economic interest observed
15	deep overburden	streams: spotty Soils: low	nil	N-S fault or N.S. striking schists beyond Ronka range

In summary, areas 1, 3, 6, 7 and 8 + 9 did not reveal anything of economic potential, and the conductors are most likely related to faults or slightly conductive schists.

Area 2 covers showings of massive pyrrhotite with very minor chalcopyrite which would give conductivity readings as observed. The showings do not show economic promise.

Area 5 shows geochemical and visual evidence of the presence of probably numerous quartz veins with galena. Ground follow-up with a Ronka horizontal loop indicated one weak conductor, but in the Southeast portion of the area, the overburden thickness increases rapidly, probably well beyond the range of the Ronka.

The galena-bearing quartz veins could be part of a halo of a larger galena-bearing body related to the granodiorite-schist contact and additional investigations to check this working hypothesis will be recommended.

In area 15, there is no satisfactory explanation for the conductive zone, which may be due to a N-S fault or a conductive schist formation. As there is no geochemical support other than some spotty highs, further work is not recommended in this area.

The Lockwood survey failed to confirm the presence of this conductor, but crosswinds forced the helicopter to fly higher than required for a thorough exploration, whereas the Geo Cal survey was flown no more than 50' above ground level. This may account for the non-confirmation.

It is concluded that the Geo Cal survey did not miss any major near-surface occurrences of possible economic interest in the areas flown.

10. PERSONNEL AND COSTS OF THE GEO CAL SURVEY

The Geo Cal survey was flown out of a temporary staking camp located at Grass Lake, and part of the cost is based upon a split between staking and surveying. Camp costs have been absorbed by the staking account,

A. Personnel on Geo Cal Survey

Helicopters supplied by Klondike Helicopters Ltd.

Geophysical Helicopter	CF-UAA	Bell 43-G-3 B1
Supporting Helicopter	CF-KEL	Bell 47-G-2

Pilots: P. Langlois
E. Burgess

Engineer: McKay

Geophysical contractor: Geo Cal Ltd., 2658 Nelson Avenue, West Vancouver

Geophysical operator: Ian Poyntz, Geo Cal Ltd.

Consulting Geologist: P.H. Sevensma, Ph. D., P. Eng.

Field personnel: M. Cloutier, Richmond, B.C.

B. Costs of Geo Cal survey

Geo Cal, contractor	$ 1,673.10
Helicopter costs	1,362.00
Helicopter gas	222.75
Fixed wing	200.00
Consulting fees	500.00
* Consulting expenses	739.45
**Camp costs	none charged
Total	$ 4,697.30

* Charged all expenses to Geo Cal survey
** Charged all expenses to Staking

A cost breakdown is attached as page 2 of Appendix A.

11. SUMMARY AND RECOMMENDATIONS

An airborne Geo Cal electromagnetic survey was flown at a cost of $4,697.30 over 8 selected rugged areas of the Gee claims, followed by an airborne Lockwood magnetic-electromagnetic survey, flown mainly along the valleys, at a cost of $17,701.66 in the Gee Area.

Total cost of the two surveys was $22,398.96.

In conjunction with information obtained by the Lockwood Survey on other Northlake Mines Limited ground (El and Hoo Groups), it is felt that the airborne surveys, combined with geochemical follow-up, have:

1. Conclusively indicated a potential copper-belt related to chlorite-sericite-graphite schists intruded by ultrabasics, towards the N and NW.

2. Eliminated large areas without conductors and geochemical highs in the more highly metamorphic schist-gneiss assemblage underlying the Gee claims.

3. Proven the value of the existence of 1" = 4 miles reconnaissance geological maps and both 1" = 4 miles and 1" = 1 mile aeromagnetic maps, the combination of which has permitted to formulate exploration guide lines at an early date.

As a result of these surveys on all Northlake's holdings and their ground follow-up, recommendations are being prepared in a separate report by the writer.

These recommendations, as they pertain to the Gee claim area, may be summarized as follows without any commitment as to their sequence and timing, as they should be viewed with the framework of the overall program.

Abandonment of the following areas is recommended:

Detail areas 1, 3, 4, 6, 7, 8, 9 and 15
NW central area

Retention of the following areas is recommended:

Detail areas 2, 5, 10, 11, 12, 13, 14 and 16

In the overall program, the areas recommended for retention in the Gee area are rated as follows:

Priority 2 - Areas 11, 12 and 13, i.e. the Leo Group and its extension to the West (CW). Strong EM anomaly supported by geochemical copper (lead-zinc) highs near the contact of the conductive and the non-conductive formations.

Priority 4 - Area 5. Shallow Ronka ground EM failed to pinpoint conductors located by airborne methods in an area of quartz veins with galena and a high lead background.

Priority 5 - Areas 10, 14 and 16. Airborne work and ground follow-up have indicated various weak targets requiring additional assessment.

Priority 6 - Area 2. Pyrrhotite showings with minor copper values have been located. A review of this situation may be indicated if other discoveries are made in the area.

A summary of recommended expenditures follows. All proposed geological mapping is of a detailed nature, on a scale of 1" = 400', to produce a map of outcrops, float and overburden as related to topography and soil sampling along 400' or 200' picket-lines.

It is assumed that existing camp-gear is about adequate for these programs.

Priority 2

Tote road: 10 miles @ $1,000		$10,000
Geological mapping, 2 man-months @ $1,500		3,000
Linecutting, 10 miles @ $150		1,500
Soil Sampling, 350 samples @ $4.00		1,500
EM surveying, 10 line miles @ $100		1,000
Gravity surveying, 15 line miles @ $200		3,000
Transportation; Bombardier, truck		4,000
Bulldozer trenching, 100 hours @ $35		3,500
Aircraft		2,500
	Total	$30,000
Contingent core drilling: 2000' @ $25		50,000
	Total	$80,000
Engineering, overhead, contingencies @ 20%		16,000
Total appropriation		$96,000

Priority 4

Geological mapping, 1 man-month @ $1,500		$ 1,500
Deep EM or IP survey, 15 line miles @ $300		4,500
Aircraft transportation		1,500
	Total	$ 7,500
Contingent core drilling: 1500' @ $25		37,500
	Total	$45,000
Engineering, overhead, contingencies: 20%		9,000
Total appropriation		$54,000

Priority 5

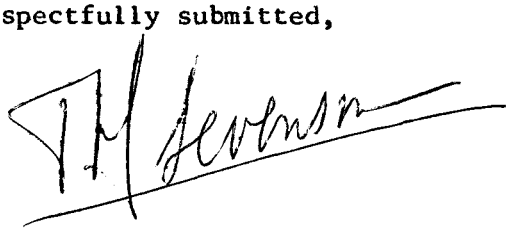
Detailed geological mapping, additional soil sampling, prospecting	$15,000
EM surveying, as indicated	5,000
Engineering, overhead, claim maintenance; 20%	4,000
Total appropriation	$24,000

Priority 6 Nil

Summary

	Fixed cost	Contingent drilling	Engineering, etc.	Total
Priority 2	$30,000	$50,000	$16,000	$96,000
Priority 4	7,500	37,500	9,000	54,000
Priority 5	20,000	-	4,000	24,000
Priority 6	-	-	-	-
Total	$57,500	$87,500	$29,000	$174,000

Respectfully submitted,



P.H. Sevensma, Ph.D., P. Eng.

CERTIFICATE

I, PETER H. SEVENSMA, of Vancouver, B.C., do hereby certify that:

1. I am a graduate of the University of Geneva, Switzerland (Physics and Chemistry, 1937) (Geology and Mineralogy, 1937) where I obtained my Ph.D. in Geological and Mineralogical Sciences in 1941.

2. I am a Consulting Geological Engineer and a registered member in good standing of the Association of Professional Engineers of British Columbia and of the Association of Professional Engineers of Yukon Territory.

3. From February 1948 until December 1965 I have been engaged continuously in mining and exploration geology in the employ of Cominco Limited. As a Senior Exploration Geologist, I have worked extensively both in Eastern and Western Canada.

4. I have personally examined on several occasions the claims which are the subject of this report and have acted as a consulting geologist since early 1966 on the exploration program conducted by Northlake Mines Limited on these claims.

5. I have personally supervised in the field the airborne geophysical survey conducted by Lockwood Survey Corporation between May 8th and 23rd, 1966 for Northlake Mines Limited, as well as the Geo Cal Survey.

6. I have not received, nor do I expect to receive or acquire, directly or indirectly, any interest in any of the properties or securities of Northlake Mines Limited.

Respectfully submitted,

P.H. Sevensma, Ph.D., P. Eng.

January 30, 1967

Appendix A

NORTHLAKE MINES LTD.

LOCKWOOD AIRBORNE SURVEY, May 8 - 23, 1966

Accounting Breakdown, L532-1 to -5

Date 1966	Paid to	Chq. No.	Labour (532-1)	Rental (532-2)	Fixed Wing (532-3)	Helicopter (532-4)	Sundry (532-5)	Data reduction (532-2)	Consulting Expenses and Fees
July 7	Lockwood S.C., mosaics	N					$208.75		
June 15	Great Northern Airways	M-7			$1,113.00				
June 15	Klondike Helicopters	M-9				$ 961.00			
June 15	Klondike Helicopters	M-9 part				5,521.00			
	Klondike Helicopters	M-23 part				416.50			
	Tourist Services	M- *					194.75		
Apr. 25	Tourist Services	V113					47.11		
June 16	White Pass	M-11					23.54		
May 24	White Pass	V116 part				816.75*			
June 2	C.N.T.	V117					7.50		
June 2	P.H. Sevensma Cons.	V118					145.24		
May 20	J.L. Stout	W30	$300.00						
May 23	Ross River Enterpr.	W32					169.45		
May 24	N. Menegos	W36	250.00						
	Consulting Expenses	N	1,000.00						$1,875.00
	Consulting Expenses	N							657.05
Nov. 25	Lockwood S.C.	M178		$11,190.48					
Nov. 25	Lockwood S.C.	M180						$2,851.02**	
	Total		$1,550.00	$11,190.48	$1,113.00	$7,715.25	$796.34	$2,851.02	$2,532.05

Note: Cheque prefixes as follows:

- N Northlake Mines Ltd.
- V P.H. Sevensma Trust Vancouver
- W P.H. Sevensma Trust Whitehorse
- M A. MacDonald Consultants

Remarks:

* Charged 33 helicopter hours of gas, supplied @ 15 gallon an hour @ cost delivered at Grass Lake $1.65 gallon

** $4,751.70 paid minus $1,900.68 credit

M* Voucher not available

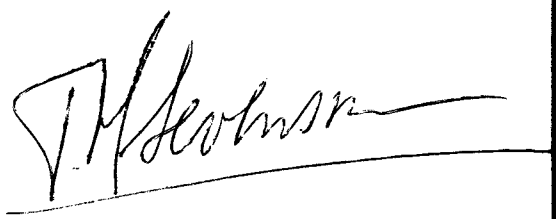
Certified Correct:

GEO CAL AIRBORNE SURVEY, APRIL 4 - 12, 1966

Accounting Breakdown

Date	Cheque No.	Paid to	Amount	Account
1966				
April 15	102 (part)	Great Northern Airways	$ 200.00	532-3
April 15	103 (part)	Klondike Helicopters	609.00	532-4
April 19	108 (part)	Klondike Helicopters	600.00	532-4
April 20	109	Klondike Helicopters	153.00	532-4
April 23	111	Geo Cal	1,673.10	532-2
May 24	116 (part)	* Gas	222.75	Part 537
April 19	107 (part)	P.H. Sevensma Cons. fees	500.00	Part 502-4
April 25	114	P.H. Sevensma Cons. expenses	739.45	503-1
			$4,697.30	

* Gas is estimated on the basis of three barrels used, i.e. 135 gallons at a laid-down actual cost of $1.65 per gallon at Grassy Lake.



IN THE MATTER OF NORTHLAKE MINES LIMITED
AND IN THE MATTER OF AIRBORNE GEOPHYSICAL
SURVEY REPORT AND HOO, EL, AND GEE CLAIMS

AFFIDAVIT

I, PETER SEVENSMA, of 715-850 West Hastings Street, Vancouver, Province of British Columbia, HEREBY MAKE OATH AND SAY AS FOLLOWS:-

That attached hereto to this my Affidavit, is a report and an Appendix A, providing a list of firms and individuals having been engaged in work for the above, as well as a cost-breakdown and a cost-distribution for 1966 work, which I certify to be true and accurate to the best of my knowledge and belief.

SWORN before me at the City of Vancouver, Province of British Columbia, this 30 day of January, A.D. 1967

A Commissioner for taking Affidavits in and for the Yukon Territory.

Peter Sevensma

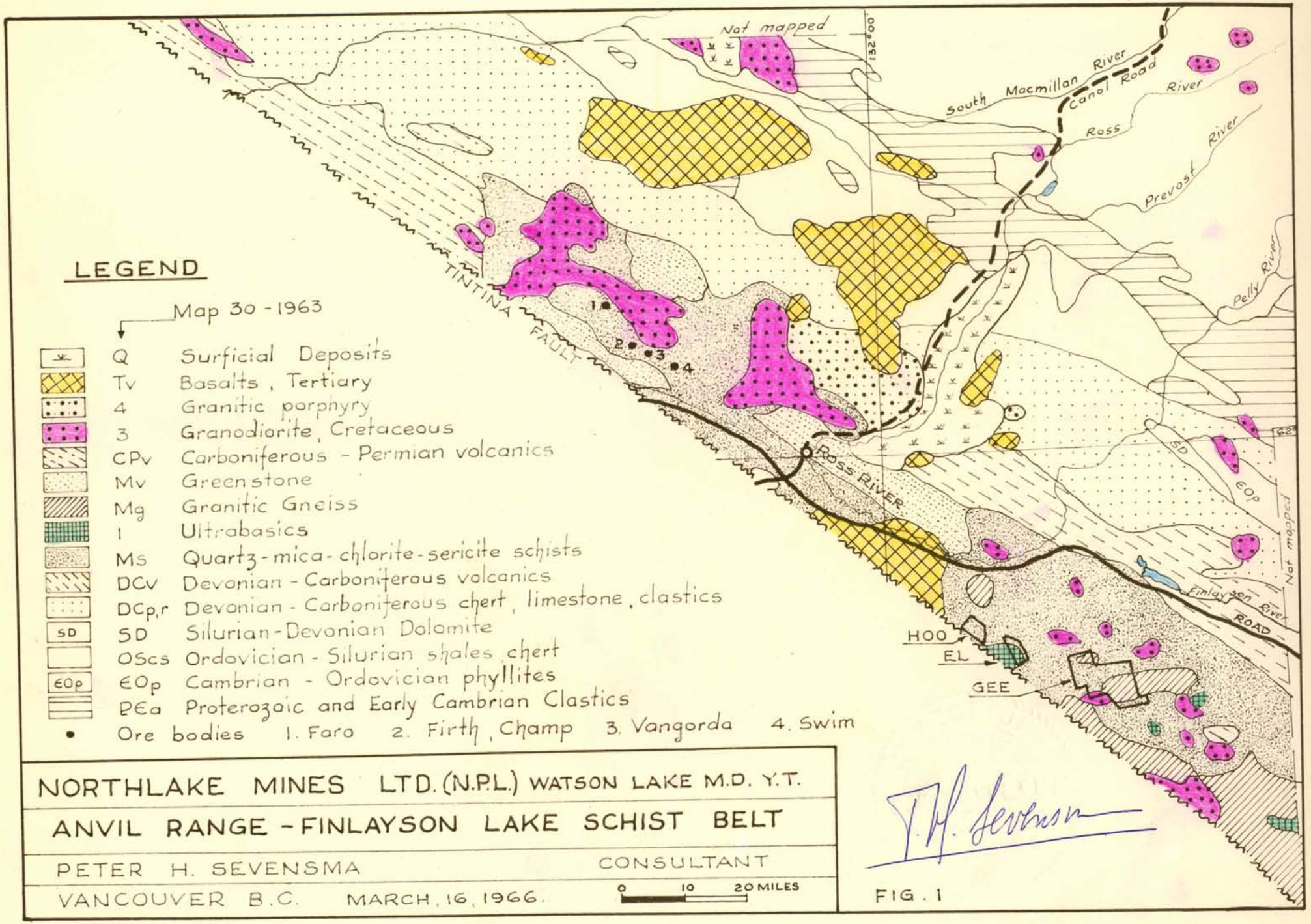
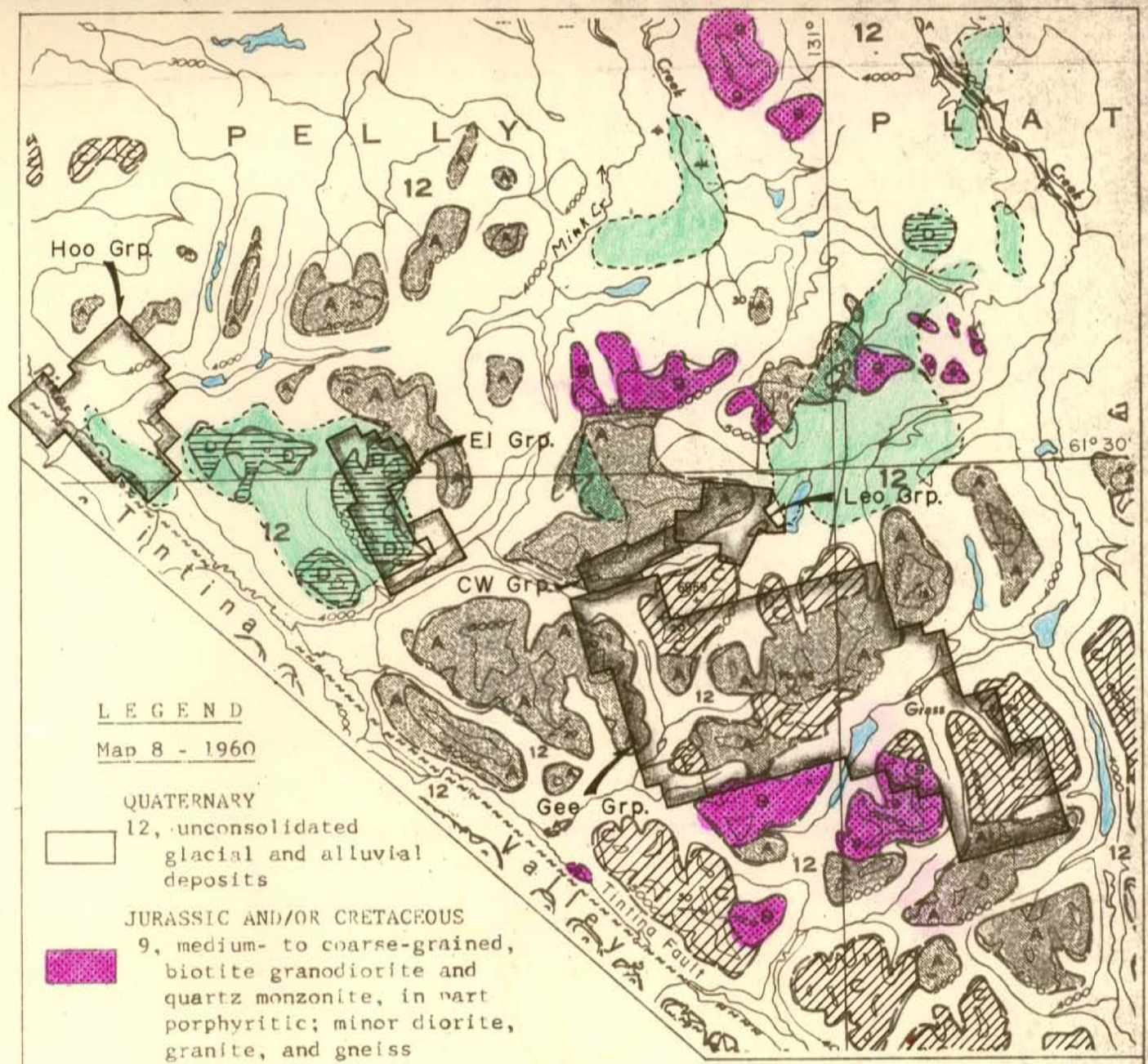

Not mapped
132°00'
South Macmillan River
Canol Road
Ross River
Prevost River
Pelly River
TINTINA FAULT
1
2
3
4
Ross River
SD
EOp
Not mapped
Finlayson River
ROAD
HOO
EL
GEE
LEGEND
Map 30 - 1963
Q Surficial Deposits
Tv Basalts, Tertiary
4 Granitic porphyry
3 Granodiorite, Cretaceous
CPv Carboniferous - Permian volcanics
Mv Greenstone
Mg Granitic Gneiss
I Ultrabasics
Ms Quartz-mica-chlorite-sericite schists
DCv Devonian - Carboniferous volcanics
DCp,r Devonian - Carboniferous chert, limestone, clastics
SD Silurian-Devonian Dolomite
OScs Ordovician - Silurian shales, chert
EOp Cambrian - Ordovician phyllites
PEa Proterozoic and Early Cambrian Clastics
Ore bodies 1. Faro 2. Firth, Champ 3. Vangorda 4. Swim
NORTHLAKE MINES LTD. (N.P.L.) WATSON LAKE M.D. Y.T.
ANVIL RANGE - FINLAYSON LAKE SCHIST BELT
PETER H. SEVENSMA CONSULTANT
VANCOUVER B.C. MARCH, 16, 1966.
0 10 20 MILES
T. H. Sevensma

FIG. 1



LEGEND

Map 8 - 1960

QUATERNARY

12, unconsolidated glacial and alluvial deposits

JURASSIC AND/OR CRETACEOUS

9, medium- to coarse-grained, biotite granodiorite and quartz monzonite, in part porphyritic; minor diorite, granite, and gneiss

A, Quartz-biotite and quartz-chlorite schist, micaceous quartzite, hornfels; minor phyllite and limestone.

C, Micaceous, quartzose gneiss, granitoid gneiss; minor quartz-biotite schist

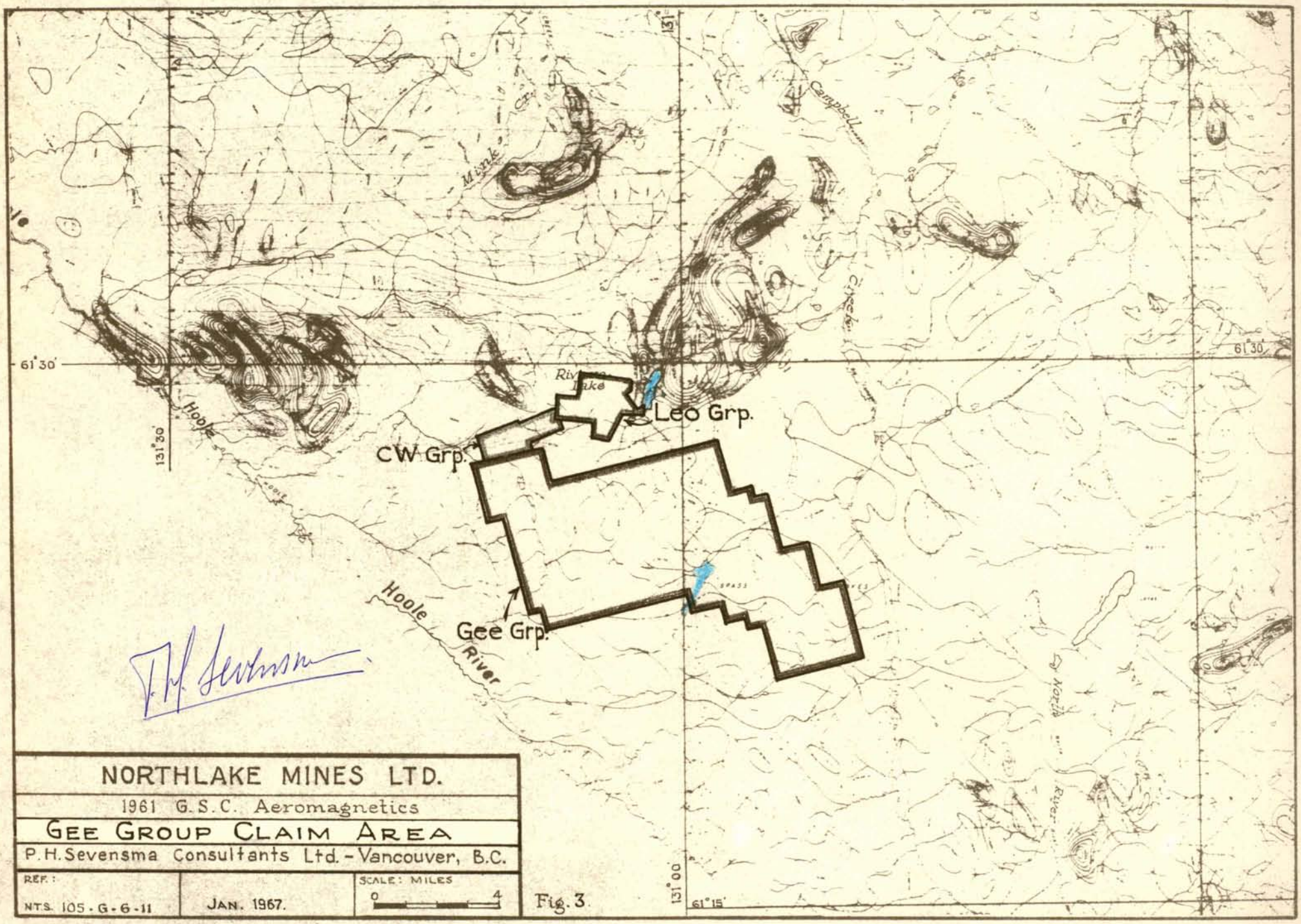
D, Dunite; minor peridotite, pyroxenite, and serpentinized equivalents; gabbro and diorite

Outline of aeromagnetic anomalies estimated to reflect ultrabasic intrusives.

P.H. Sevensma

NORTHLAKE MINES LTD.
GEOLOGY AND LOCATION PLAN
Watson Lake M.D. 105 G
P.H. Sevensma Consultants Ltd. - Vancouver, B.C.
December 1966 scale 0 4 mi.

FIG. 2



NORTHLAKE MINES LTD.		
1961 G.S.C. Aeromagnetics		
GEE GROUP CLAIM AREA		
P.H. Sevensma Consultants Ltd. - Vancouver, B.C.		
REF.: NTS. 105-G-6-11	JAN. 1967.	SCALE: MILES 0 — 4

Fig. 3

SHEET 105G-6 | SHEET 105G-7

T.H. Sevensma

LEGEND

- Geocal HEM prospecting areas.
- Lockwood HEM-HAM flight lines.
- [2] Geocal Survey Areas (1-3, 5-9 and 15
- • Geocal Airborne EM anomaly
- ~ Geocal conductor on the ground
- 31 —— Lockwood flight lines.

NORTHLAKE MINES LTD.
GEE CLAIM AREA
Geocal and Lockwood Surveys
P.H. SEVENSMA CONSULTANTS LTD.
715-850 W. HASTINGS VANCOUVER, B.C. JAN. 1967.
WATSON LAKE M.D., Y.T. SCALE 0 1/2 1 MILE

FIG. 4

SHEET 105G-6 | SHEET 105G-7

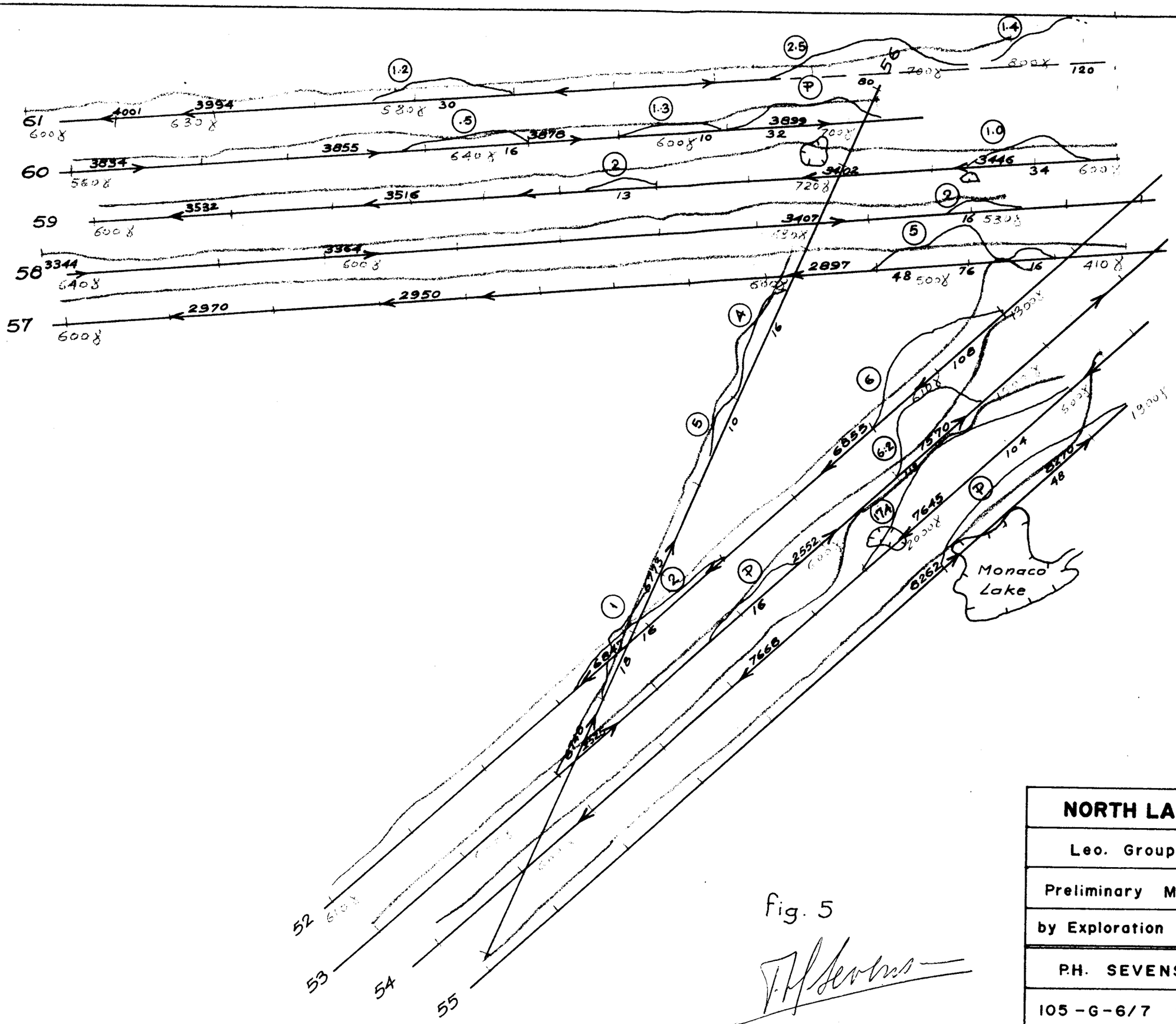


Fig. 5

F.H. Sevensma

NORTH LAKE MINES LTD.	
Leo. Group – Area II	
Preliminary Mag. + EM Profiles	
by Exploration Geophysics (Yukon) Ltd.	
P.H. SEVENSMA CONSULTANTS LTD.	
105-G-6/7 Watson Lake M.D., Y.T.	
June 1966	0 1320'

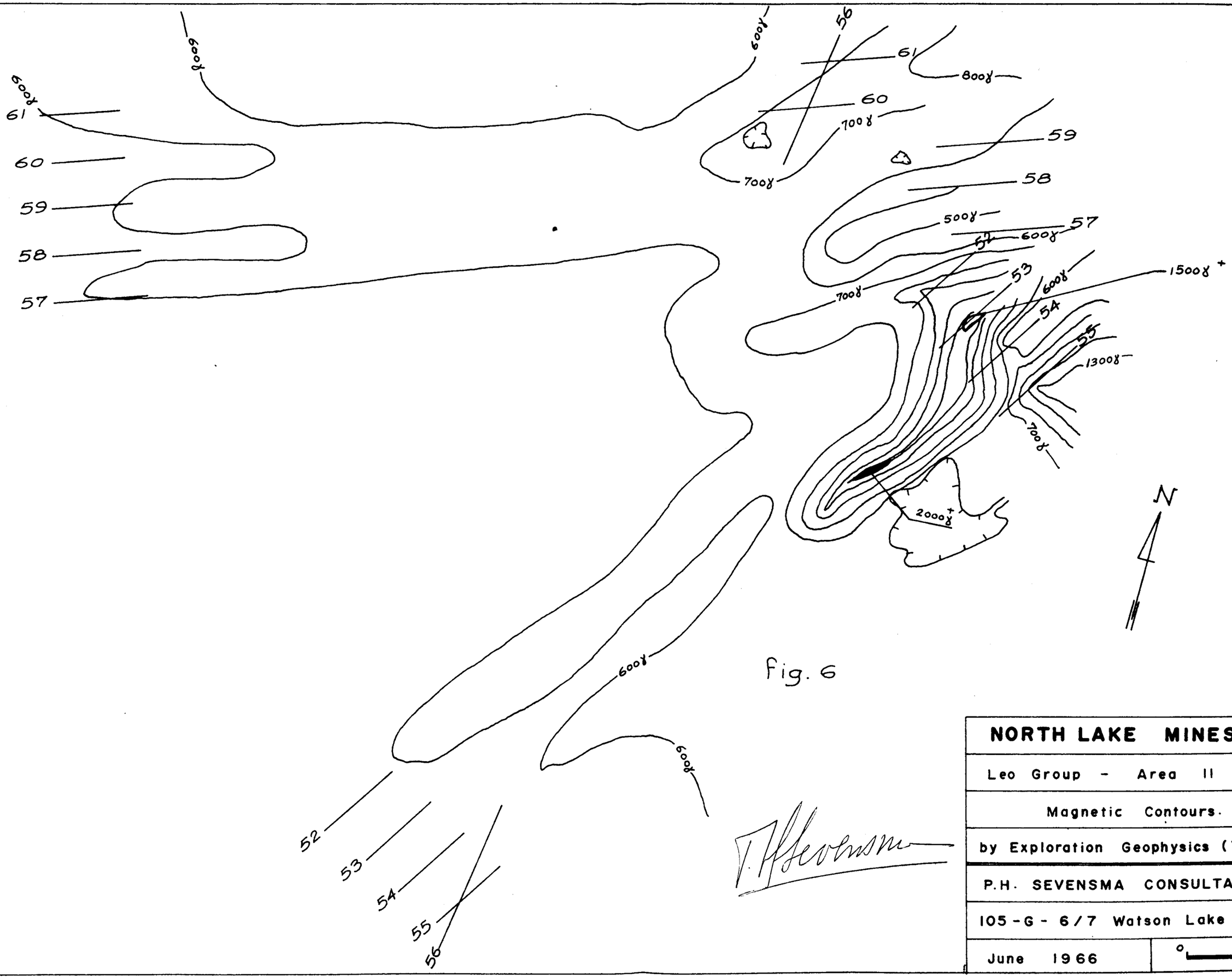
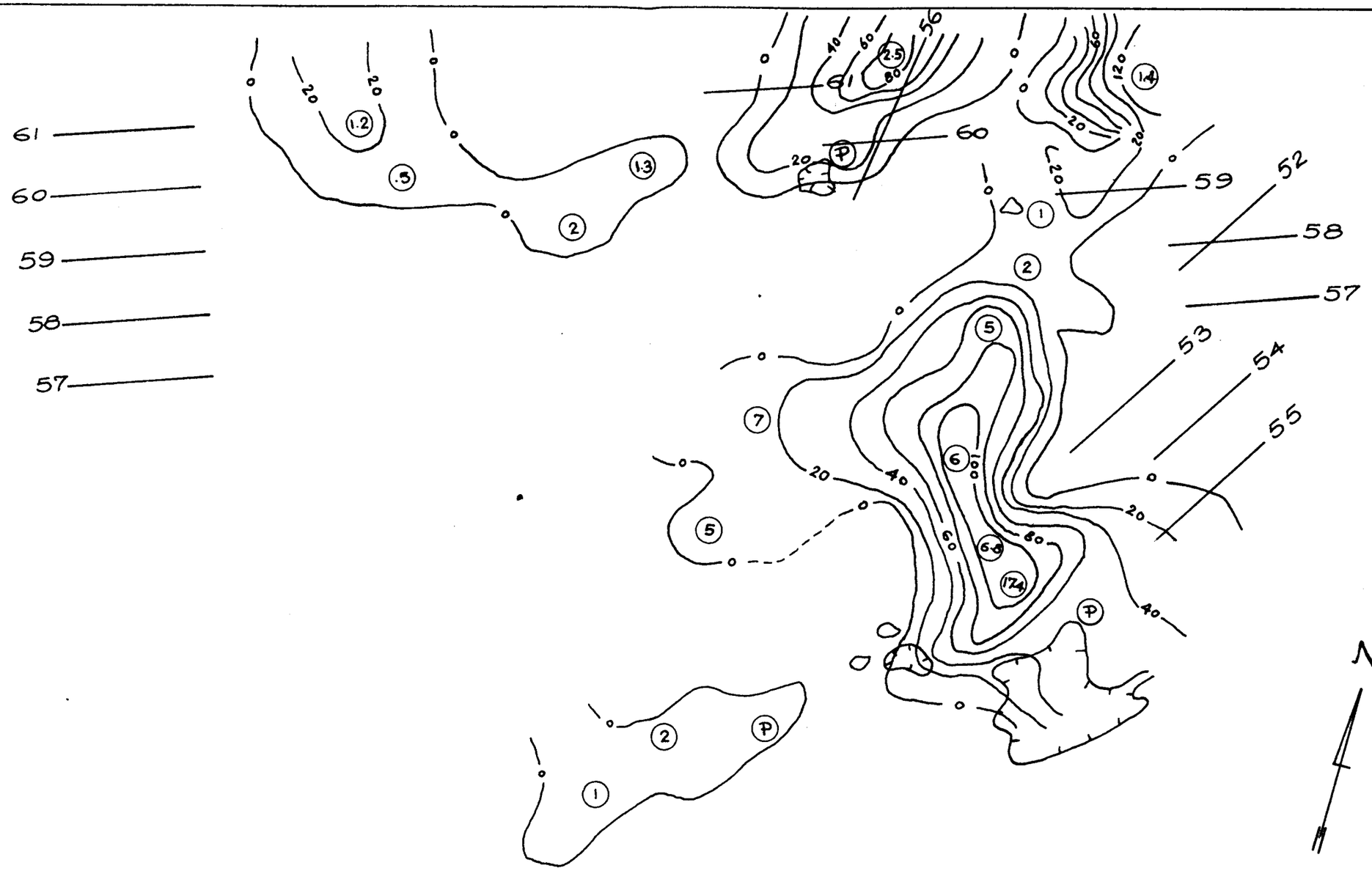


Fig. 6

NORTH LAKE MINES LTD.	
Leo Group - Area II	
Magnetic Contours.	
by Exploration Geophysics (Yukon) Ltd.	
P.H. SEVENSMA CONSULTANTS LTD.	
105-G-6/7 Watson Lake M.D., Y.T.	
June 1966	0 1320'



LEGEND

51 ——— Flightlines

② Ratio in-phase to out-of-phase

20 Contours in ppm. of primary field.

fig 7

T.H. Sevensma

NORTH LAKE MINES LTD.	
Leo Group – Area II	
E M . Contours .	
by Exploration Geophysics (Yukon)Ltd	
P.H. SEVENSMA CONSULTANTS LTD.	
105 - G - 6/7 Watson Lake MD, Y.T.	
June 1966	0 1320'

N

52
53
45
54
46
55
47
48
50
49
50
51

T.H. Sevensma

NORTH LAKE MINES LTD.
Gee. Group — Area 10
Preliminary Mag. + EM Profiles
by Exploration Geophysics (Yukon) Ltd.
P.H. SEVENSMA CONSULTANTS LTD.
105-G-6/7 Watson Lake M.D., Y.T.
June 1966 — 0 1320'

fig 8

N

52
53
45
54
46
55
47
56
48
49
50
51

600γ
600γ
700γ
600γ
600γ
600γ
600γ
600γ

45
46
47
48
49
50
51

52
53
54
55
56

R009

T.H. Sevensma

NORTH LAKE MINES LTD.	
Gee. Group – Area 10	
Magnetic Contours.	
by Exploration Geophysics (Yukon) Ltd.	
P.H. SEVENSMA CONSULTANTS LTD.	
105-G-6/7 Watson Lake M.D., Y.T.	
June 1966	0 1320'

fig 9

N

52 53 54 55 56

45 46 47 48 49 50 51

(2) (4) 1.4 20 1.2 1.4 1.6 P (4) .3 (4)

(1) 20 1.8 1.2 .7 .6

20 .5 .5

45 46 47 48 49 50 51

52 53 54 55 56

fig 10

NORTH LAKE MINES LTD.

Gee. Group – Area 10

EM. Contours.

by Exploration Geophysics (Yukon) Ltd.

P.H. SEVENSMA CONSULTANTS LTD.

105 - G - 6/7 Watson Lake M.D., Y.T.

June 1966

0 1320'

LEGEND

51 ——— Flightlines

(2) Ratio in-phase to out of phase

20 Contours in ppm. of primary field.

REPORT ON

GROUND GEOPHYSICAL SURVEYS

ROSS RIVER, YUKON TERRITORY

FOR

NORTHLAKE MINES LTD.

BY

HUNTEC LIMITED

TORONTO, ONTARIO

JANUARY, 1967

TABLE OF CONTENTS

INTRODUCTION

Between July 9th and September 11th, 1966, ground electromagnetic surveys were carried out by Huntec Limited for Northlake Mines Limited in an area near Grass Lake, approximately 50 miles south of Ross River, Yukon Territory.

The party chief for the survey was Mr. A. Dyck, supervision being provided in the field by Mr. P.E. Lane and from Toronto by Messrs. A.R. Dodds and N.R. Paterson. Final drafting of results, interpretation and report writing were done in the Toronto office of Huntec Limited.

The survey was divided into three separate grids as follows:

Area 5 Horizontal Loop E.M. survey using ABEM Mini-Gun and Ronka Mark III unit.

Area 10 Turam Inductive Loop E.M. survey.

Area 18 Turam Inductive Loop E.M. survey.

The surveys were conducted on lines approximately 400 feet apart, with station intervals of 100 feet. The Ronka survey employed a coil separation of 200 feet and a frequency of 876 cps; the Turam survey used a 100 foot separation between receiving coils and a basic frequency of 660 cps. Some detailing was also done at a frequency of 220 cps.

The data are presented in the form of profiles of in-phase and out-of-phase secondary field components (for the horizontal loop survey) and reduced amplitude ratio and phase differences (for the Turam surveys).

E.M. SURVEY METHODS

The basic principle of all E.M. methods is that when an electrical conductor is subjected to a primary alternating field, a secondary current is induced in the conductor. This in turn produces a secondary alternating field which, together with the primary field, causes a resultant field whose amplitude and phase is different from that of the primary field. Distortions of the primary field are related therefore to the present subsurface conductors.

In the horizontal loop method, the primary field at the receiving coil is compensated for electronically, and the two secondary field components (in-phase and out-of-phase) are recorded as percentages of the primary field at the receiver coil.

With the Turam method, the primary field is set up by closed inductive loops laid out on the ground. Two receiving coils or staffs, with vertical axes, connected by a lightweight shielded cable to a compensating amplifier are used to measure the resultant electromagnetic field. The quantities recorded are:

a. The ratio of the field strength at the two coils.

b. The phase difference between the fields at the two coils.

Lines are surveyed perpendicular to the long side of a rectangular primary loop, readings commencing 200 feet from the side of the loop. Several primary loop setups were required for the surveys of Area 10 and Area 18.

INTERPRETATION

Area 5

In relatively hilly terrain such as prevails in most of the Yukon Territory, the out-of-phase component is by far the most reliable indicator of subsurface conductors. The in-phase component is affected positively by cable shortening and negatively by coil misorientations (non-parallelism), both of these effects originating from topographic variations. On this particular survey, variations of the in-phase component were kept generally below ± 4%, indicating close attention to both of the above mentioned effects.

The out-of-phase component responds most strongly to the weaker conductors, such as clay beds and water saturated zones in overburden and bedrock. The in-phase component responds more strongly to the massive, metallic conductors, ratios of 1 or more (in-phase to out-of-phase) generally indicating massive sulphides or graphitic zones.

On Area 5, the only out-of-phase anomalies exceeding 3% are in the positive direction and most probably represent very shallow layers of clay or water-saturated overburden. Examples of these can be seen on Lines 0, 4, 28 and 32. With the exception of the last two, coincident in-phase response is lacking. The weak anomalies on Lines 28 and 32 may possibly indicate a subsurface condition consisting of a shallow, weak conductor plus a deeper and more massive conductor. However,

they are also typical of a combination of topographic effects, such as a valley or creek bed. This possibility should be determined before any further investigation of the anomaly is done.

Area 10

The Turam survey of Area 10 revealed six weak to medium strength conductors.

Conductor 1 is the strongest, exhibiting phase/ratio and frequency characteristics common to the more weakly conducting metallic conductors and the more highly conducting electrolytic conductors. The zone is approximately 1500 feet long, maximum conductivity occurs at a depth of approximately 130 feet, and the zone has a steep dip to the east.

The survey by the Ronka horizontal loop method on Lines 32 to 40N, give only very minor out-of-phase response, confirming the low conductivity of the zone. Normally, on the basis of this evidence, a low priority would be assigned for further investigation. On the other hand, the conductor is definitely associated with some bedrock structure, and certainly contains conducting material. Supporting geological evidence might justify further work.

Conductors 2, 3 and 5 are of still weaker conductivity, as evidenced by the phase/ratio characteristics. Conductor 2 exhibits

locally better conductivity as it crosses the projection of the strike of Conductor 1. The three conductors are fairly continuous along strike, varying in length from 1400 feet to approximately 3200 feet. Depth to maximum conductivity is generally in excess of 200 feet. The conductors are believed to represent water-filled faults or shears, though the lack of any geologic or magnetic data in the area renders such an interpretation somewhat speculative.

Conductors 4 and 6 are represented by one-line anomalies whose phase/ratio characteristics suggest local conductivity of medium strength. Conductor 4 is poorly defined as it coincides with the edge of a primary loop where the data overlap and are unreliable. These conductors should be considered significant only if encouragement is provided by further investigation of Conductor 1.

Area 18

At least eight conductors have been located in this area. They vary in strength from weak to strong and in strike length from a few hundred feet to more than 2000 feet.

Conductor 1, lying at the west end of the area, is of low conductivity and typical of a water-filled fault or shear zone. Depth to the main conductor axis is probably of the order of 150 to 200 feet, though the conductor probably widens and becomes weaker at depth.

Conductor 2 is likewise of weak strength and may be an extension of Conductor 1. The axes of these and the following conductors is inferred on the basis of assumed strike continuity and general similarity from line to line. Since the lines are 400 feet apart, the axes can therefore be considered tentative only.

Conductors 3, 4, 5 and 6 occur in a generally conductive area between Lines 32 and 44W. Conductor axes are highly speculative. Conductivity varies from weak in the case of portions of Conductors 3 and 6, to strong in the case of Conductors 4 and 5, and part of Conductor 3. The anomalies caused by these conductors merge with one another making quantitative interpretation impossible. Depth to main conductor axes appear to vary from 100 to 200 feet. Dips are probably nearly vertical.

Conductors 4 and 5 are definitely considered worthy of drilling. Recommendations for drill locations were made in August and it is understood that considerable diamond drilling followed. Any detailed interpretation made without the benefit of these data would serve no useful purpose.

Conductor 7 is based on a one-line anomaly and, although sharp and strong on the phase component, shows very weak conductivity. It is not considered worthy of further investigation.

Conductor 8 has the greatest strike length on the grid, exhibiting continuity of over 2000 feet. The conductor is still open east of Line 0. Conductivity is strong from Line 0 to Line 8W, medium thereafter. The conductor may be banded, the second zone occurring at least 100 feet north of the main zone. Quantitative interpretation is complicated by this factor. Depth to the main conductor axis seems to vary from 150 to about 200 feet. Drilling has been recommended on Line 8W and it is understood that the conductor was explained.

SUMMARY AND CONCLUSIONS

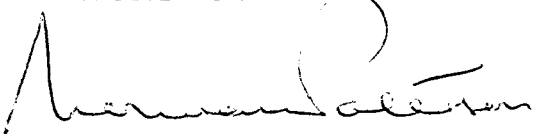
The horizontal loop survey of Area 5 revealed only one conductor whose characteristics are such that no further investigation can be recommended on the basis of geophysics.

Several weak to medium strength conductors were located by Turam in Area 10, one of which was confirmed by the horizontal loop survey. Conductor 1 is recommended for careful consideration as it exhibits the sort of conductivity that is common to some poorly connected sulphide bodies in similar geological environments. The decision should be based on geological and any other geophysical information available.

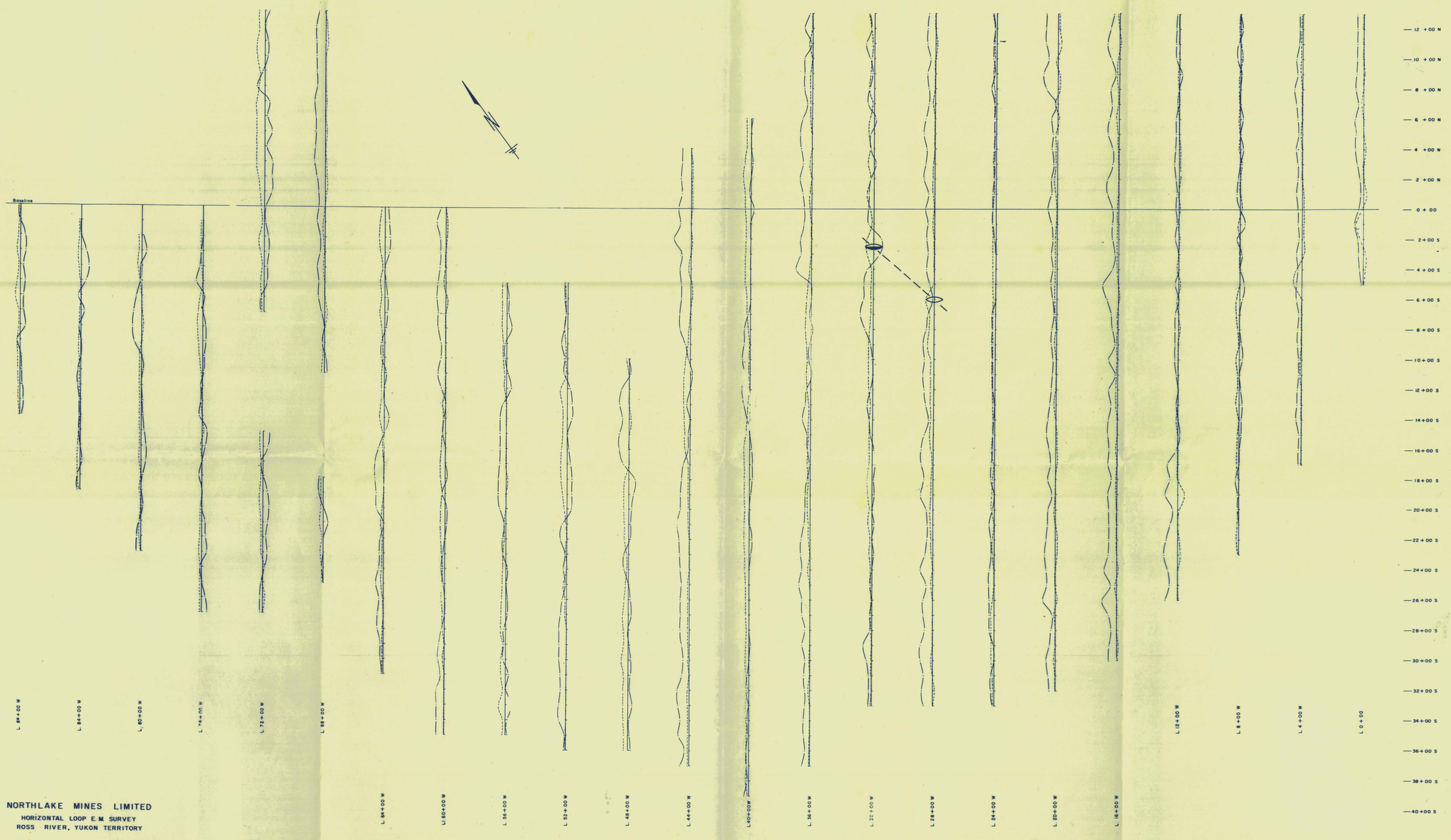
A number of strong and quite favourable conductors were found in Area 18 and have been recommended at the time of the survey for drilling. It is understood that subsequent diamond drilling has confirmed these conductors, though the results have not been provided to the interpreters.

Respectfully submitted,

HUNTEC LIMITED



Norman R. Paterson
Ph. D., P. Eng.,
Geophysicist.



NORTHLAKE MINES LIMITED
HORIZONTAL LOOP E.M. SURVEY
ROSS RIVER, YUKON TERRITORY

E.M. PROFILES WITH INTERPRETATION
AREA 5

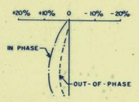
SCALES 1 inch = 400 feet
1 inch = of primary field

To accompany report by

N.R. Paterson, Ph.D., P.Eng., Geophysicist

HUNTEC LIMITED, Toronto, Canada – Jan., 1967

PLATE 1



Coil Separation 200 feet
Frequency 876 cps

INTERPRETATION LEGEND

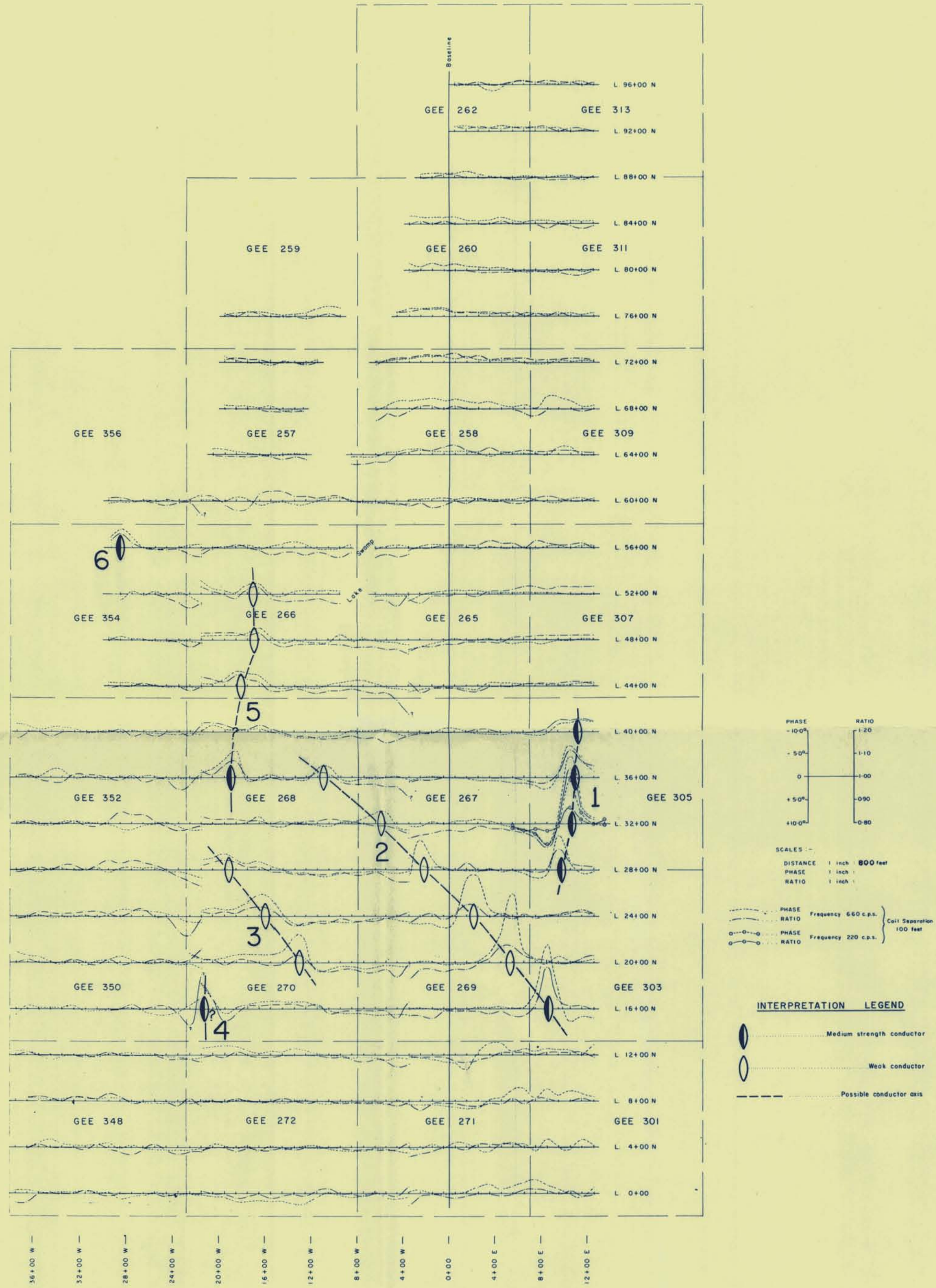
Medium strength conductor

Weak conductor

Possible conductor axis

NOTE – Data drafted on basis of preliminary map submitted by Northlake Mines Limited

PH 496/66



NORTHLAKE MINES LIMITED

TURAM ELECTROMAGNETIC SURVEY
ROSS RIVER, YUKON TERRITORY

E.M. PROFILES WITH INTERPRETATION
AREA 10

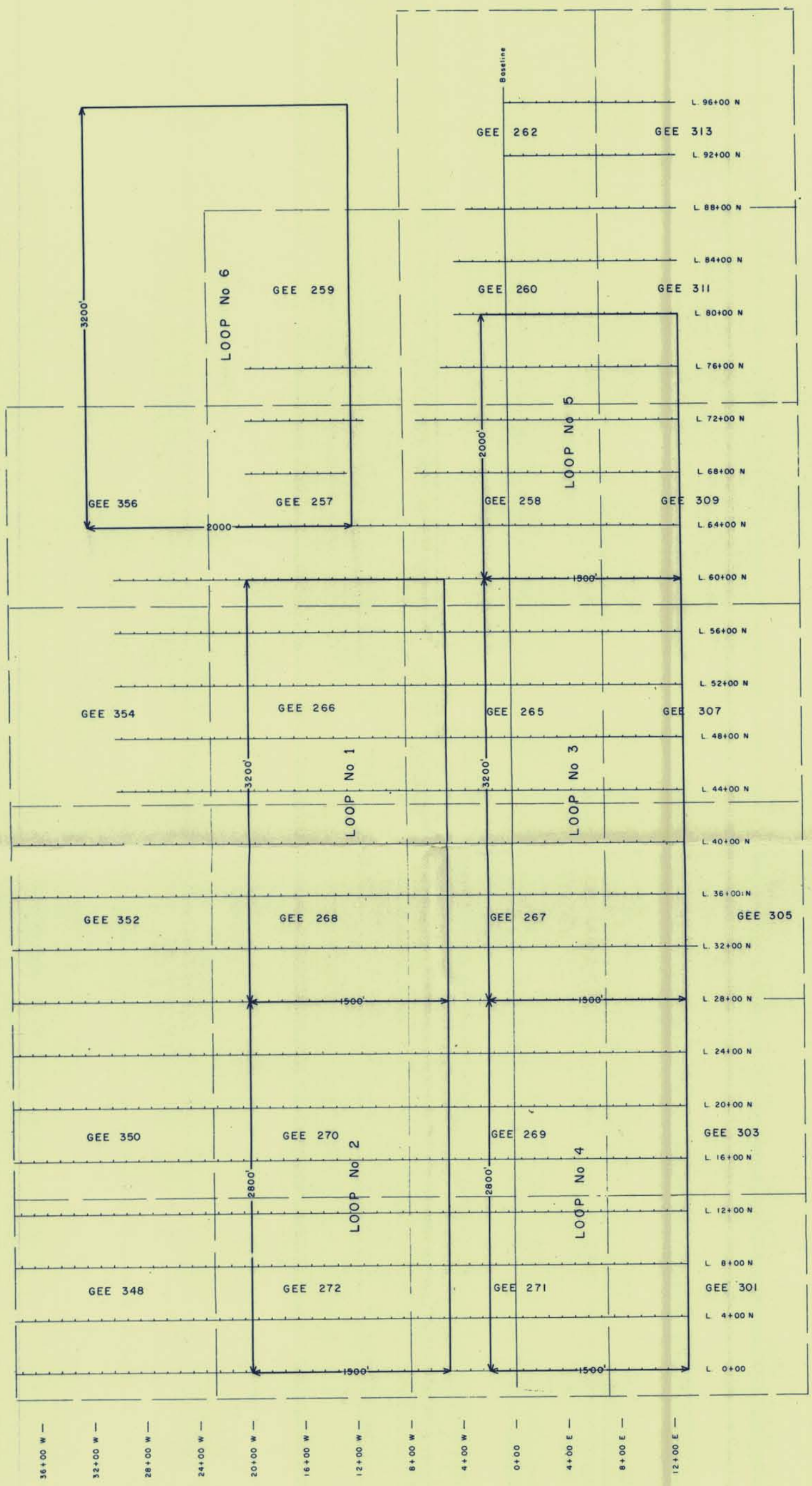
To accompany report by

N R Paterson, Ph.D., P Eng., Geophysicist

HUNTEC LIMITED, Toronto, Canada - Jan., 1967

PH 496/66

PLATE 2



NORTHLAKE MINES LIMITED

TURAM ELECTROMAGNETIC SURVEY

ROSS RIVER, YUKON TERRITORY

LOOP LOCATION MAP – AREA 10

SCALE 1 inch = 400 feet

To accompany report by

N. R. Paterson, Ph.D., P. Eng., Geophysicist

HUNTEC LIMITED, Toronto, Canada – Jan., 1967

PLATE 3

PH 496/66

L 64+00 W
L 60+00 W
L 56+00 W
L 52+00 W
L 48+00 W
L 44+00 W
L 40+00 W
L 36+00 W
L 32+00 W
L 28+00 W
L 24+00 W
L 20+00 W
L 16+00 W
L 12+00 W
L 8+00 W
L 4+00 W
L 0+00

18+00 N
16+00 N
14+00 N
12+00 N
10+00 N
8+00 N
6+00 N
4+00 N
2+00 N
0 + 00
2+00 S
4+00 S
6+00 S
8+00 S
10+00 S
12+00 S
14+00 S

1
2
3
4
5
6
7
8

3200'
3000'

LOOP No 1
3200' x 3000'

3200'
3000'

LOOP No 2
3200' x 3000'

PHASE
RATIO
Frequency 660 c.p.s.
PHASE
RATIO
Frequency 220 c.p.s.
Coil Separation 100 feet

PHASE −100° −50° 0 +50° +100°
RATIO 1.20 1.10 1.00 0.90 0.80

INTERPRETATION LEGEND

- Strong conductor
- Medium strength conductor
- Weak conductor
- Possible conductor axis

NORTHLAKE MINES LIMITED

TURAM ELECTROMAGNETIC SURVEY
ROSS RIVER, YUKON TERRITORY

E.M. PROFILES WITH INTERPRETATION
AREA 18

SCALE 1 inch : 400 feet

To accompany report by

N.R. Paterson, Ph.D., P.Eng., Geophysicist

HUNTEC LIMITED, Toronto, Canada - Jan., 1967

PLATE 4

PH 496/66

NORTHLAKE MINES LIMITED

GEE, EL AND HOO GROUPS
105-G-6, 7, 11, and 12
Watson Lake M.D., Y.T.

SUMMARY REPORT AND RECOMMENDATIONS

JANUARY 31, 1967

by

P.H. SEVENSMA, Ph. D., P. Eng.

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SUMMARY REPORT AND RECOMMENDATIONS
JANUARY 31, 1967

1. INTRODUCTION

During 1966 Northlake Mines Limited conducted an extensive exploration program in the area lying in general WNW of the Grassy Lakes, Finlayson Map Sheet 105-G in the Yukon Territory. (Figure 1). Details of the program have been reported elsewhere by MacDonald Consultants Limited, property managers, and by the writer, Consulting Geologist.

This report is intended to set out a brief summary and the recommendations for follow-up work.

For details, the reader should refer to the above mentioned reports.

2. PROPERTY

	Initial claims, March 30, 1966	560
Plus	Staked March 30, 1966 - January 30, 1967	294
	Total claims, January 30, 1967	854
Minus	Recommended for abandonment	574
	Recommended for retention	280

3. REGIONAL GEOLOGY

The basic concepts underlying Northlake Mines program are as follows:

a. The belt of variously-metamorphic rocks originally known as the Yukon schists has been, at least in part, subdivided and correlated by the G.S.C. (map 30 - 1963).

b. Part of this belt is believed to be of Mississippian age and consists of biotite-chlorite-sericite schists with limey and quartzitic members characterized by ultrabasic intrusives.

c. This type of formation has produced in excess of $250 million of gold in the Klondike. More recently, in excess of 60 million tons of massive sulphide bodies averaging about 10% lead and zinc combined with minor copper and close to 1½ oz/t of silver have been outlined in these schists in the Vangorda Creek area. The gross value of these sulphide bodies, which are of long term commercial grade and for a large part minable by open pit, is of the order of $1.5 billion.

d. These schists may be called the productive schists and merit extensive exploration, especially in areas where there is evidence of strata-bound sulphide deposition and of favorable structure.

e. Minor-size copper-zinc-(lead) bearing deposits of this type are known in the Fire Lake - North Lake - Grass Lakes area.

f. This area is characterized by a pronounced East-West trend across the normal NW-SE structural grain. There is also evidence of pronounced NE and N trending faulting, and of recent domal uplift accompanied by Tertiary basalts.

g. The area, especially in the lower lying parts, is covered by extensive overburden which does not appear to reach the great thicknesses of several hundred feet more common much further south.

h. This set of favorable conditions warrants an exploration program by airborne magnetic and electromagnetic methods with a ground follow-up program consisting of electromagnetic and geochemical prospecting.

4. PROGRAM SUMMARY

The program was initiated in early April 1966 by flying the vicinity of nine minor showings lying at high altitude with a reconnaissance-type electromagnetic helicopter-borne device, the Geo Cal method.

In May, the program continued with a helicopter borne magnetic-electromagnetic survey over the less rugged parts of the claims by Lockwood Survey Corporation.

The airborne programs located a total of 19 areas of interest.

In June, linecutting and ground surveys started. A summary of the overall program in table form is attached. In general, the details of the program were adjusted to conditions. Considerable emphasis was placed

on streamsilt and soil sampling, the former along streams draining the surveyed areas, the latter confined to the vicinity of electrically conducting zones, usually after grids had been cut and the zones located by a ground survey.

One anomaly located by airborne methods on the Hoo Group was pinpointed by Turam and drilled without geochemical work as the depth of overburden was estimated to be in the vicinity of 100'. However, overburden was found to be in the vicinity of 30'; the drilling intersected graphitic schists, chloritic-sericitic schists, and a talc-schist zone and encountered only traces of copper in disseminated pyrrhotite.

After completion of the field program in October, assay returns of the geochemical reconnaissance continued to come in until well into December and assessment of the complete results was not completed until about mid-January 1967.

As a result of this assessment, it has been recommended to abandon 574 claims and to continue work on the remaining 280 claims, representing 11 of the original 19 areas. These have been divided into 6 priorities, defined from 1 to 6 in order of decreasing interest.

5. PROGRAM RESULTS

a. The airborne geophysical surveys did not reveal any outstanding conductors near any of the known showings, ruling out the presence of near-surface large sulphide bodies in their vicinity.

b. The Lockwood Survey located a number of interesting electromagnetic anomalies in the vicinity of ultrabasic intrusives, specifically in areas 11, 17, 18 and 19.

c. Streamsilt sampling revealed a definite pattern of increased coppers and occasionally lead and zinc, in the vicinity of the ultrabasics. One outstanding anomaly was found to originate in an area of rust and near a conducting zone of characteristics that may reflect the presence of massive sulphides in area 17.

Zinc anomalies did not show a very significant pattern.

Lead, and to a lesser degree copper, show a definite increase in areas draining the granodiorite intrusives, especially around the intrusive at Grass Lake.

Remarkable are the absence of lead and the relatively low zinc in the high copper anomaly in the streams draining the South part of the El Group. In the main streambed, the copper in silts shows a constant increase over a length of about 2½ miles from 240 ppm to 7562 ppm.

d. Soil sampling, conducted over 11 of the 19 areas on grids with both 800' and 400' line spacing, with a 200' or 100' sample spacing, showed in general spotty results. Over area 11 however, a significant copper anomaly was found with peak values of 409 ppm Cu, 100 ppm Pb and 660 ppm Zn. This anomaly occurs on a well drained slope and originates in a strongly conducting zone, apparently from a contact between chlorite schists and graphite schists of very low metamorphic grade and known to contain strata-bound fine grained massive pyrite-pyrrhotite on a nearby property. Both folding and faulting are indicated nearby.

e. Linecutting, picketing and line surveying was done respectively over 10, 15 and 6 areas, as conditions suggested.

f. Reconnaissance geological mapping on a scale of 1" = 1000' was carried out over all the significant claim areas and surroundings, with emphasis on the showing areas, using a 1" = 1000' base map prepared by McElhanney Surveying and Engineering.

g. Ground EM surveys were conducted with a moving source Ronka instrument over 5 areas, and with a constant source Turam instrument over two areas (see table).

These surveys pinpointed several conductors detected by airborne methods.

h. Ground magnetics were not used, as the government aeromagnetic maps and the results of the Lockwood surveys showed high magnetics over ultrabasics and very uniform low magnetics over the more highly metamorphic schists of the Gee area.

Some magnetic surveying is indicated in further proposed work.

i. Gravity. One small gravity survey was run in area 11 near the source of the geochemical anomaly. Results were inconclusive and suggested that a much larger survey should be carried out.

j. Trenching in area 2, where massive pyrrhotite showings with minor chalcopyrite occur, was not successful and failed to find significant extensions to the showings.

k. Core drilling, totalling 1,596' in 4 holes in area 10 on an airborne EM anomaly confirmed by Turam, failed to encounter commercial mineralization.

l. Summary

(i) Two significant discoveries were made. In area 17, as a result of a combination of airborne surveying and reconnaissance geological work, which led to the decision to sample the streamsilts, an outstanding copper anomaly was discovered.

In area 11, as a result of airborne surveying followed by soil sampling in the area of a promising HEM anomaly pinpointed by a Ronka survey, a significant Cu - Pb - Zn anomaly was discovered.

(ii) The combination of airborne surveying and streamsilt and soil sampling has permitted the elimination, with a high degree of confidence, of about 2/3 of the staked areas.

(iii) Seven other areas have provided enough encouragement to justify some further investigation. Streamsilt and soil sampling results have been important factors in several of these areas.

6. INDIVIDUAL TARGET AREAS

The remaining target areas have been divided into 6 priorities, which will be discussed separately.

Priority 1 E1 Group, area 17 (figure 4)

This group consists of 60 claims. Figure 4 shows the relation of the copper streamsilt anomaly to the geology and the airborne EM anomalies.

The lead content of the streamsilts is nil or trace; the zinc content varies between 0 and 117 only, which is normal background.

Viewed in the regional streamsilt pattern, the absence of lead and the normal zinc background in this high copper anomaly may be very significant. Both to the West (Hoo Group) and to the East, minor lead appears about 8 miles away from the E1 Group and at the same time, zinc starts to pick up. This suggests that the E1 Group is the copper-bearing centre of a base metal area where lead and zinc are concentrically arranged away from this centre.

To the East, however, the geological environment is different, and the regional sampling to the North and South is insufficient to non-existent. Additional sampling could well show that the geological environment

has a greater bearing on the base metal distribution. Also, this distribution may not be roughly circular, but could have some oblong shape following some as yet unknown structural trend.

Whatever base metal distribution is ultimately found to exist, there is at least a strong regional suggestion that the El Group lies at the core of the regional copper distribution.

Examining the anomaly in detail, it shows a near-textbook distribution with two sources, a weak one in the Creek West of the group, and a strong one in the Creek on the East part of the group, with a weak "halo" effect upstreams in both cases.

As the sample nearest the source in the Easterly creek assays 7562 ppm, which is equal to 0.756%, it is obvious that the best part of this 1½ mile long copper-bearing zone should lie close to this high anomalous reading.

It is of considerable interest that a line drawn between the two sources is about parallel to the geological structure, which is well defined by the aeromagnetics. The high magnetics reflect the presence of the serpentinized ultrabasic, and one must assume that the surrounding schist formations are more or less parallel to the contact of the ultrabasics, as is usually the case around this type of intrusive.

The conclusion that the odds favor a stratabound high-copper zone very low in zinc and lead is therefore well nigh inescapable. The map shows clearly that this zone produces a marked effect in the streamsilts in locations about 1½ miles apart,

The airborne electromagnetic pattern is also of considerable interest, as it shows, near the high copper anomaly, a well defined conductor of characteristics that may typically reflect the presence of a sulphide body.

When it is remembered that attention was drawn to the area by the existence of a very rusty pinnacle-like hill during reconnaissance-type geological mapping located in the general area of the HEM anomaly, and that this led to the decision to take streamsilt samples in the nearby creek as this pinnacle was not easily accessible, the conclusion is peremptory that a mineralized copper-bearing body lies somewhere in this vicinity.

It is very seldom indeed that so many strong and favorable features point to a target area of as large a size and so well defined as the present one.

The writer has therefore no hesitation in defining the odds of discovering a large-size copper-bearing body in this location as unusually high.

The following program is recommended for an early start in March 1967. A winter road as near as possible to an all-weather location is recommended rather than helicopter-transportation, as it is practically certain that drilling will be justified, and that this can be demonstrated by line-cutting and trenching with a bulldozer while the snow is still on the ground. It is very likely that outcrops with substantial copper will be found in this area.

Snow fell early in October 1966 and in nearby areas there is little frost in the ground. A ripper-equipped bulldozer will permit the taking of soil samples as line-cutting in the area proceeds.

Tote road: 25 miles @ $800		$ 20,000
Linecutting: 20 miles @ $100		2,000
Geological mapping: 4 man-months @ $1,500		6,000
Soil Sampling: 1000 samples @ $3.00		3,000
Electromagnetic surveying: 15 line miles @ $100		1,500
Gravity survey: 10 line miles @ $150		1,500
Transportation: Bombardier, truck		6,000
	Total	$ 40,000
Contingent core drilling: 3000' @ $20		60,000
	Total	$100,000
Engineering, overhead, contingencies: 20%		20,000
Total appropriation		$120,000

Drilling on this property can hardly be considered as contingent, and as the drill should be moved in before break-up, i.e. before May 1st, the full appropriation of $120,000 is recommended for this project.

Priority 2 Leo Group, area 11 (figure 5)

A strong HEM was located in this area. After linecutting, a Ronka survey pinpointed this anomaly and subsequent soil sampling showed a significant copper-lead-zinc anomaly with peaks of 409 ppm Cu, 100 ppm Pb and 660 ppm Zn in an environment similar to the one prevailing on the El Group. Drilling of one hole on nearby ground is known to have located fine-grained massive pyrite-pyrrhotite in a narrow argillite bed very near the contact of thin-bedded and laminated chloritic argillites with graphite slates.

The source of the copper-lead-zinc anomaly in the soil, which has its peak on a well drained slope with little vegetation at an elevation of about 4800', is located near what appears to be the same contact, at the edge of a strongly conducting zone, and, as on the El Group, only a short distance away from an ultrabasic.

It is thought that the base-metal anomaly may not reflect an outcrop of commercial grade copper, but rather indicates the presence of a formation with unusually high copper and probably lead and zinc. As massive sulphide of typical stratabound texture is present nearby and as an apparently similar zone on the El does carry high copper, it is postulated that a specific assemblage may occur throughout the area, i.e. that a favorable "horizon" with massive sulphide deposits occurs.

The Leo Group warrants therefore a high rating, and further exploration as early in the season as possible.

If this general working hypothesis is confirmed by success, or even partial success, on either or both the El and Leo Group, the key to further successful exploration in the area may well have been found.

The following program is therefore recommended for an early start, preferably with a gravity survey in March 1967. It is anticipated that a winter road can be built quite easily, if this appears desirable, from the El road. This road could follow the lower part of talus slopes with Southerly exposures for a good portion of the way, thus preparing the building of an all-weather road.

In the area of the geochemical anomaly, there does not appear to be significant perma frost and bulldozer trenching is therefore strongly recommended.

A small initial gravity survey in 1966 has indicated that the gravity profile rises with the hillside and that a significant gravity anomaly could be present.

Tote road: 10 miles @ $1,000	$10,000
Geological mapping: 2 man-months @ $1,500	3,000
Linecutting: 10 miles @ $150	1,500
Soil Sampling: 350 samples @ $4.00	1,500
EM surveying: 10 line miles @ $100	1,000
Gravity surveying: 15 line miles @ $200	3,000
Transportation: Bombardier, truck	4,000
Bulldozer trenching: 100 hours @ $35	3,500
Aircraft	2,500
Total	$30,000

continued ...

Contingent core drilling: 2000' @ $25		50,000
	Total	$80,000
Engineering, overhead, contingencies @ 20%		16,000
Total appropriation		$96,000

Priority 3 Hoo Group, areas 18 and 19 (figure 6)

These target areas are in an environment similar to the El and Leo groups, i.e. in the general contact area of schistose rocks with the ultrabasics.

One conductor remains to be tested in area 18; good conductors with low soil sampling results and indicated faults are present in area 19.

The possible potential of these areas would be enhanced by economic discoveries on either the El or Leo Groups, and they would become much more accessible.

Only a minor program is therefore proposed for either 1967 or 1968, the timing depending upon the progress of the El and Leo programs.

The importance of detailed mapping taking into account the topography, and soil sampling in judiciously selected locations in area 18, should be stressed.

The recommended expenditure is as follows:

Geological mapping: 2 man-months @ $1,500		$ 3,000
Soil Sampling: 350 samples @ $3.00		1,000
Transportation: helicopter, 15 hours		2,000
Camp preparation		1,000
	Total	$ 7,000
Contingent linecutting, geophysics, 15 line miles @ $200		3,000
Contingent drilling: 1600' @ $25		40,000
	Total	$50,000
Engineering, overhead, contingencies: 15%		7,500
Total appropriation		$57,500

Priority 4 Gee Group, area 5

Soil sampling at 100' spacing on lines 400' apart gave generally spotty trends of high lead and zinc and some spotty high copper values over the West third of the grid. Peak values are:

Pb 840 ppm Zn 500 ppm Cu 210 ppm

A number of galena bearing quartz veins occur in the area.

Further study is required, particularly to determine whether the high lead is due to minute galena particles or is really adsorbed geochemical secondary lead.

This block of ground appears to lie between two contacts. The Ronka survey found only one weak in-phase reaction near the creek; this could be due to short-cable effect but is located near a galena showing and the peak copper value in the soils.

The property requires detailed mapping and exact assessment of topographical conditions near the high lead areas.

The quartz veins and high lead soils could represent a halo around a much larger galena-bearing body buried beyond a depth of 100' and the proposed detailed geological investigation should determine whether a deep-penetration EM like Turam, or an IP survey is justified.

The proposed expenditure is as follows:

Geological mapping: 1 man-month @ $1,500		$ 1,500
Deep EM or IP survey: 15 line miles @ $300		4,500
Aircraft transportation		1,500
	Total	$ 7,500
Contingent core drilling: 1500' @ $25		37,500
	Total	$45,000
Engineering, overhead, contingencies; 20%		9,000
Total appropriation		$54,000

Priority 5 Gee Group, areas 10, 14 and 16

In each case, further assessment is warranted, but the suggestion is not to spend any funds until the El and Leo areas have been more closely assessed.

In each areas, favorable indications are conducting zones, which in 10 and 16 are supported by spotty geochemical highs; in 14, the zone occurs under apparently deep (100' or plus) overburden.

Further investigation involves detailed mapping in area 10, prospecting near area 16 and possible Turam surveying over area 14.

Turam surveying could be done any time an instrument is used on any of the other projects.

Recommended expenditures are as follows:

Detailed geological mapping, additional soil sampling, prospecting	$ 15,000
EM surveying, as indicated	5,000
Engineering, overhead, claim maintenance: 20%	4,000
Total appropriation	$ 24,000

Priority 6 Gee Group, area 2

No expenditures recommended at present.

Prospecting

An appropriation should be available to continue areal streamsilt sampling and follow-up soil sampling, as various localized areas appear of interest even now. Success on the El and/or Leo would (i) enhance the attractiveness of certain situations, (ii) provide good geological guide lines for further areal exploration and (iii) create a staking rush.

It would be desirable for Northlake Mines to be in a position to capitalize immediately on any success obtained on the present holdings.

Using the bulldozer for soil sampling while putting in a winter road and lines would be advantageous and fulfill the requirements of further areal exploration at very little additional cost.

It is recommended that $30,000 be set aside for aerial reconnaissance and property acquisition, covering the following:

Helicopter, one month	$10,000
3000 soil samples	10,000
Property acquisition	10,000
Total	$30,000

7. SUMMARY AND RECOMMENDATIONS

The 1966 Northlake Mines Limited exploration program in the Grass Lakes area has resulted in the discovery of several very attractive exploration targets.

On the El Group, streamsilt sampling, airborne EM and favorable geological environment suggest the presence of a copper-bearing zone of significant size and possibly of major importance.

On the Leo Group, a very good target is reflected by high Cu - Pb - Zn soil samples near a contact zone between chloritic argillites and

graphitic slates known to contain bedded iron-sulphides nearby. Geological conditions are comparable to those on the El Group.

On the Hoo Group, conductive zones in a geological environment similar to the one on the El and Leo are worthwhile targets requiring further assessment.

In area 5 on the Gee Group, a high lead environment suggests the possibility of a significant buried galena deposit.

Several other targets require further work for a final assessment, but are less promising than the first group.

Large areas with an estimated very low potential are recommended for abandonment.

Recommended expenditures may be summarized as follows:

Group	Area	Priority	Firm	Contingent	Engineering	Total
El	17	1	$40,000	$60,000	$20,000	$120,000
Leo	11	2	30,000	50,000	16,000	96,000
Hoo	18, 19	3	7,000	43,000	7,500	57,000
Gee	5	4	7,500	37,500	9,000	54,000
Gee	10, 14, 16	5	20,000	-	4,000	24,000
Gee	2	6	-	-	-	-
Areal Prospecting			30,000			30,000
TOTAL			$134,500	$190,500	$56,500	$381,500

Out of this amount, the following appropriation is recommended for an early start of the program in 1967.

Firm		
El, Area 17	$120,000	Includes drilling
Leo, Area 11	36,000	Drilling is contingent
Priorities 3, 4, 5	24,000	50% of initial work
Areal Prospecting	30,000	Spend at a rate related to success on El, Leo
Cost of 1967 Program	$210,000	Firm commitment
Probable 1967-1968	$171,500	Contingent expenditures
Total Program	$381,500	

CERTIFICATE

I, PETER H. SEVENSMA, of Vancouver, B.C., do hereby certify that:

1. I am a graduate of the University of Geneva, Switzerland (Physics and Chemistry, 1937) (Geology and Mineralogy, 1937) where I obtained my Ph.D. in Geological and Mineralogical Sciences in 1941.

2. I am a Consulting Geological Engineer and a registered member in good standing of the Association of Professional Engineers of British Columbia and of the Association of Professional Engineers of Yukon Territory.

3. From February 1948 until December 1965 I have been engaged continuously in mining and exploration geology in the employ of Cominco Limited. As a Senior Exploration Geologist, I have worked extensively both in Eastern and Western Canada.

4. I have personally examined on several occasions the claims which are the subject of this report and have acted as a consulting geologist since early 1966 on the exploration program conducted by Northlake Mines Limited on these claims.

5. I have personally supervised in the field the airborne geophysical survey conducted by Lockwood Survey Corporation between May 8th and 23rd, 1966 for Northlake Mines Limited.

6. I have not received, nor do I expect to receive or acquire, directly or indirectly, any interest in any of the properties or securities of Northlake Mines Limited.

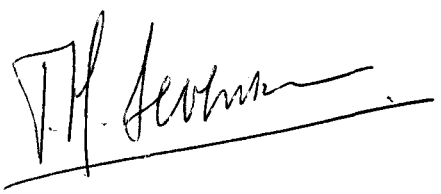
Respectfully submitted,

P.H. Sevensma, Ph.D., P. Eng.

January 30, 1967

If a situation with a definite economic promise is encountered on the El or Leo, an extensive road-building and drilling program would follow involving perhaps anywhere from 10,000' to 20,000' of drilling. It's cost would lie between $300,000 and $500,000.

Respectfully submitted,



E.H. Sevensma, Ph. D., P. Eng.

Personnel and costs are being reported separately by A. MacDonald Consultants Ltd.

TABULATION OF NORTHLAKE MINES LIMITED 1966 PROGRAM AND PROPOSED 1967 - 1968 PROGRAM

Areas:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total 1966
Showing	P	F	P	P	P	P	P	P	P	-	-	-	-	-	-	-	-	-	-	9
Geo Cal	P	F	P	-	F	P	P	F	F	-	-	-	-	-	G	-	-	-	-	9
Lockwood	-	-	N	-	N	-	-	-	-	F	G	F	F	F	N	F	G	G	G	12
Streamsilt	P	P	N	P	G	N	P	-	-	P	-	P	P	N	F	F	EE	-	F	15
Soil Samples	-	P	-	-	E	-	-	F	F	F	E	P	-	P	P	F	R	-	P	11
Linecutting	-	-	-	-	G	-	-	-	-	G	G	G	G	G	G	G	R	G	G	10
Pickets	-	G	F	-	G	F	-	F	F	G	G	G	G	G	G	G	R	G	G	15
Surveying	-	-	-	-	X	-	-	-	-	X	X	-	-	X	-	-	R	X	X	6
Mapping, 1"=1000'	X	X	X	X	X	X	X	X	X	N	X	X	X	N	X	N	X	X	X	16
Mapping, 1"=400'	-	-	-	-	R	-	-	-	-	?	R	?	?	-	-	?	R	R	R	5
Ronka	-	-	-	-	P	-	-	-	-	P	G	-	-	P	-	-	?	-	G	5
Turam	-	-	-	-	?	-	-	-	-	F	-	?	?	-	-	?	?	G	?	2
Gravity	-	-	-	-	-	-	-	-	-	-	F?	-	-	-	-	-	?	?	?	1
Trenching	-	P	-	-	-	-	-	-	-	-	?	-	-	-	-	-	?	-	?	1
Core drilling	-	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	R	P	?	1
Abandon	0		0	0		0	0	0	0						0					8
Retain: Priority	-	6	-	-	4	-	-	-	-	5	2	(2)	(2)	5	-	5	1	3	3	11
No. of claims	-	30	-	-	26	-	-	-	-	20	32	11	12	9	-	16	60	32	32	280

Key:

Work Program:
- \- no work
- X work completed
- R recommended for 1967-1968
- ? probable in 1967 - 1968
- 0 abandon

Results:
- N = nil
- P = poor
- F = fair
- G = good
- E = excellent

Streamsilts refer to drainage of specific area

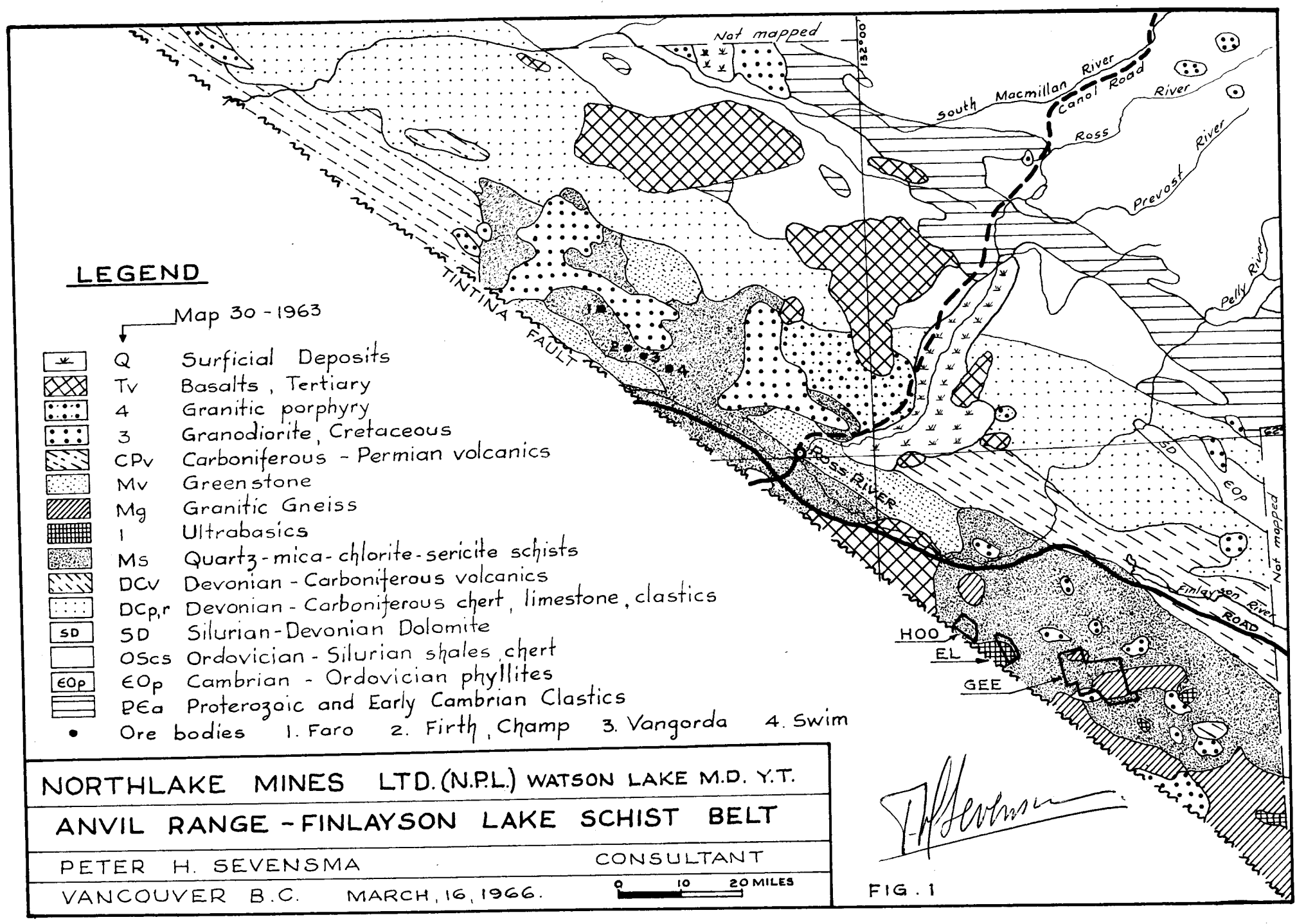
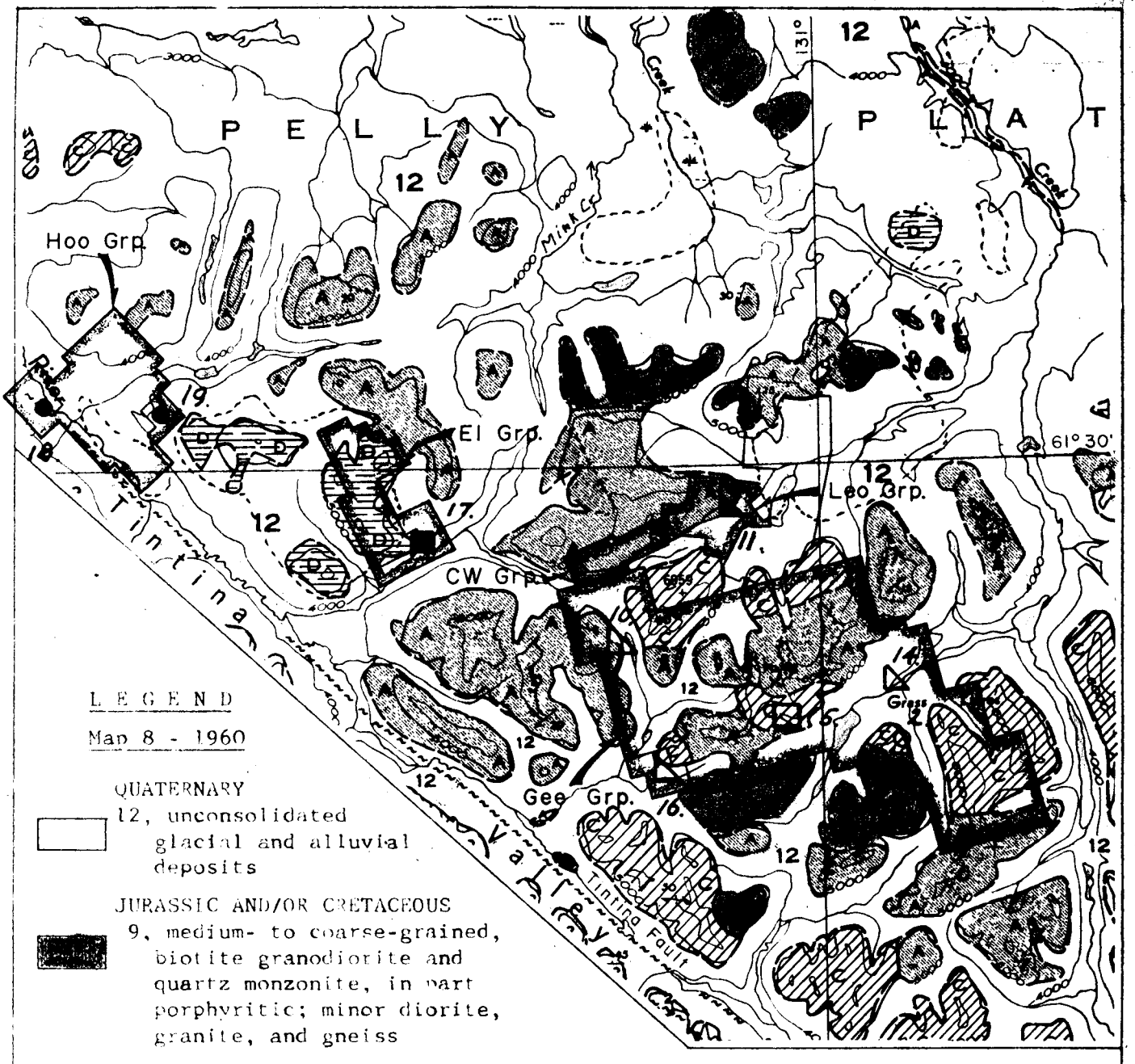

Not mapped
132.000
South Macmillan River
Canol Road
Ross River
Prevost River
Pelly River
TINTINA FAULT
ROSS RIVER
SD
EOp
Not mapped
Finlayson River
ROAD
HOO
EL
GEE
LEGEND
Map 30 - 1963
Q Surficial Deposits
Tv Basalts, Tertiary
4 Granitic porphyry
3 Granodiorite, Cretaceous
CPv Carboniferous - Permian volcanics
Mv Greenstone
Mg Granitic Gneiss
1 Ultrabasics
Ms Quartz-mica-chlorite-sericite schists
DCv Devonian - Carboniferous volcanics
DCp,r Devonian - Carboniferous chert, limestone, clastics
SD Silurian-Devonian Dolomite
OScs Ordovician - Silurian shales, chert
EOp Cambrian - Ordovician phyllites
PEa Proterozoic and Early Cambrian Clastics
Ore bodies 1. Faro 2. Firth, Champ 3. Vangorda 4. Swim
NORTHLAKE MINES LTD. (N.P.L.) WATSON LAKE M.D. Y.T.
ANVIL RANGE - FINLAYSON LAKE SCHIST BELT
PETER H. SEVENSMA CONSULTANT
VANCOUVER B.C. MARCH, 16, 1966.
0 10 20 MILES

FIG. 1



LEGEND

Map 8 - 1960

QUATERNARY

12, unconsolidated glacial and alluvial deposits

JURASSIC AND/OR CRETACEOUS

9, medium- to coarse-grained, biotite granodiorite and quartz monzonite, in part porphyritic; minor diorite, granite, and gneiss

A, Quartz-biotite and quartz-chlorite schist, micaceous quartzite, hornfels; minor phyllite and limestone

C, Micaceous, quartzose gneiss, granitoid gneiss; minor quartz-biotite schist

D, Dunite; minor peridotite, pyroxenite, and serpentinized equivalents; gabbro and diorite

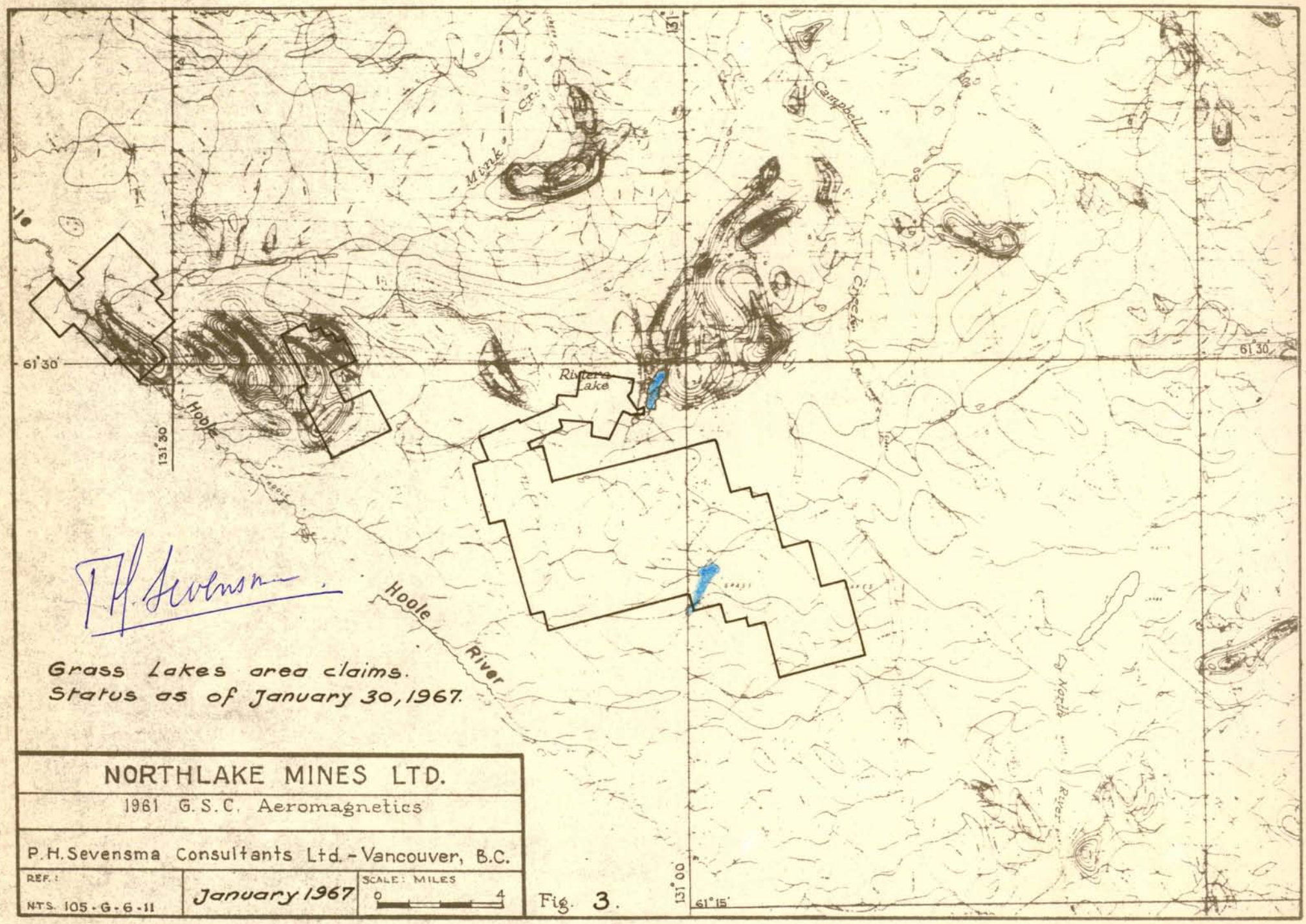
Outline of aeromagnetic anomalies estimated to reflect ultrabasic intrusives.

Priorities:	1.	2.	3.	4.	5.	6.
Areas	17	11	18,19	5	10,14,16	2

T. H. Sevensma

NORTHLAKE MINES LTD.	
GEOLOGY AND LOCATION PLAN	
Watson Lake M.D.	105 G
P.H. Sevensma Consultants Ltd. - Vancouver, B.C.	
December 1966	scale 0 4 mi.

FIG. 2

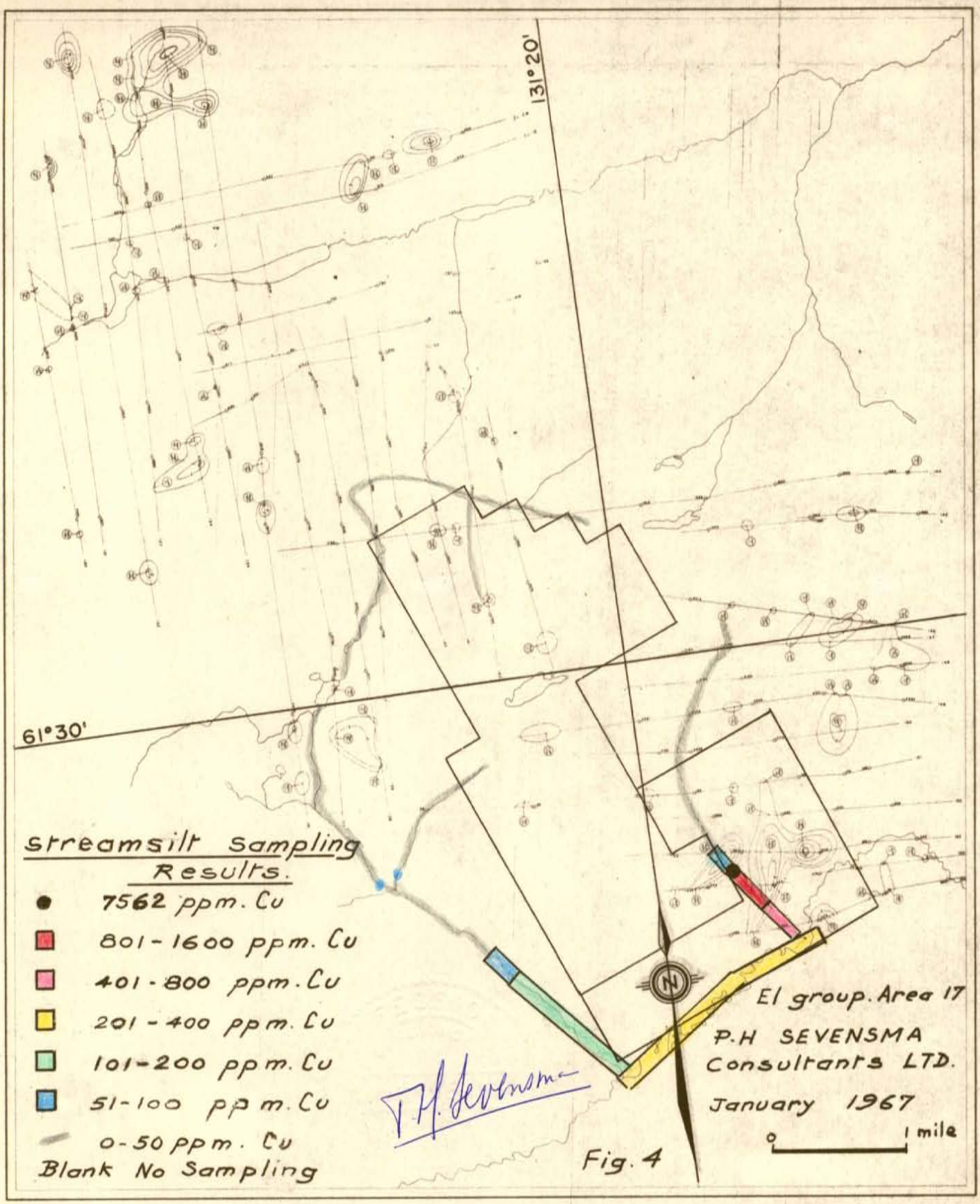


Grass Lakes area claims.
Status as of January 30, 1967.

NORTHLAKE MINES LTD.		
1961 G.S.C. Aeromagnetics		
P.H. Sevensma Consultants Ltd. - Vancouver, B.C.		
REF.: NTS. 105-G-6-11	January 1967	SCALE: MILES 0 — 4

Fig. 3.

NORTHLAKE MINING LIMITED
AIRBORNE GEOPHYSICAL SURVEY



CLAIMSHEET 105 G-8 & 11
EL GROUP
YUKON TERRITORY
WATSON LAKE MINING DISTRICT
SCALE

ELECTROMAGNETIC MAP

AREA NO. II

Strong lineament

N

LEGEND

200' Sample spacing

Outline of near-surface conducting zone, Ronka.

> 400 ppm. Cu.

201 - 400 ppm. Cu.

101 - 200 ppm. Cu.

50 - 100 ppm. Cu.

T.H. Sevensma

Topography: Mc. Elhanney Surv. and Eng.

NORTHLAKE MINES LTD.

P.H. Sevensma Consultants ltd.

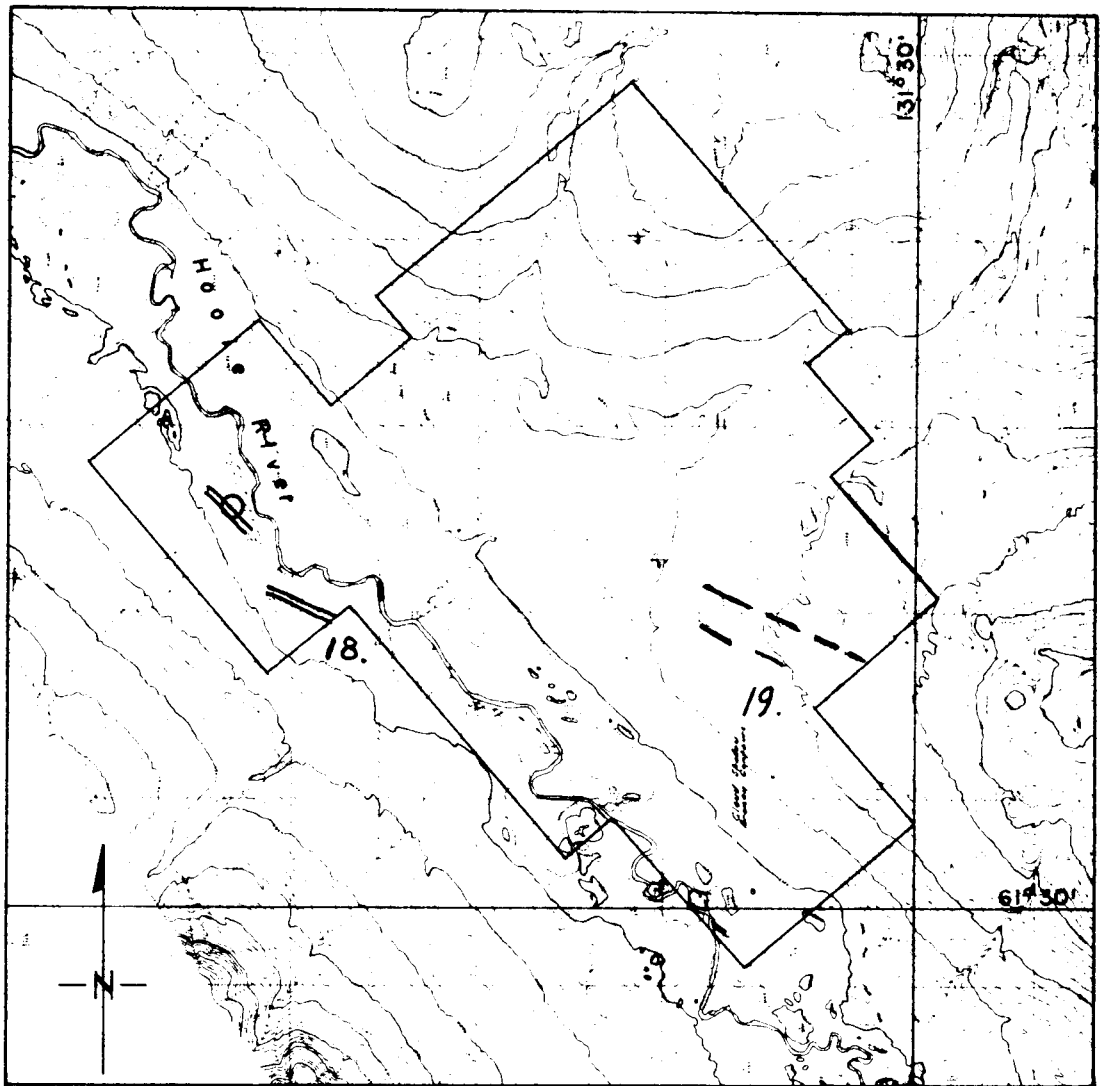
Vancouver B.C. — Whitehorse Y.T.

Interpretation of Soil Sampling

Scale:	1"= 1000'
Drawn:	Fig. 5
Date:	Jan. 1967

Area II

Leo Group



NORTHLAKE MINES LTD. - HOO GROUP

TOPOGRAPHY AND CLAIM LOCATION MAP

Watson Lake M.D. 105 G-12

P.H.Sevensma Consultants Ltd. - Vancouver, B.C.

December 1966 FIG. 6

SCALE 0 1 2 Miles

= Turam Conductors.

– – Ronka Conductors.

O 1966 Core drilling.

P.H. Sevensma

AREA NO. 5

Background on this slope:
Pb: 0-30 ppm
Zn: 10-70 ppm.
Occasional highs in both metals.

Float: galena in quartz

Outline of delta deposits with lead background of 20-100 ppm. Pb.

GRASS LAKE.

W.L. 4240'±

MORAINE

MATERIAL

N

LEGEND

- 100' — Sample spacing
- Creeks and gullies
- Showing, galena in quartz.
- Weak Ronka conductor
- > 401 ppm. Pb.
- 201 - 400 ppm. Pb.
- 80 - 200 ppm. Pb.
- 2 or more > 80 ppm. on line.
- 1 assay > 80 ppm. on line
- Zn mostly > 201 ppm.
- Zn mostly 100 - 200 ppm.

Note: the Geo. Cal Sharpe -250 conductor lies between the two main forks of the creek, approximately from line 56 to 76 W; values are 6L to 12 R.

T.H. Sevensma

Topography: Mc. Elhanney Surv. and Eng.

NORTHLAKE MINES LTD.

P.H Sevensma Consultants Ltd.

Vancouver, B.C. — Whitehorse, Y.T.

Interpretation of Soil Sampling

Scale:	1" = 1000'
Drawn:	Fig. 7
Date:.	Jan. 1967

Area 5
Gee Group

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-MANAGEMENT FEE

ACCOUNT NO. - 500

500

VO. DATE-NO.		SUPPLIER	Mgm. Fee	TOTAL
June 15	2	Macd. Cons.	12080 64	
July	32	"	3500 00	
Aug	69	"	3500 00	
Sept	112	"	3500 00	
Oct	181	"	70000 00	
				12080 64
				19080 64

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-MANAGEMENT EXPENSES

ACCOUNT NO. - 501

501

DATE	VO NO:	SUPPLIER	Mgm. Exp.	TOTAL
Sept 127		NMC Securities Ltd.	21500	21500
Nov		Ranworth Exp.	111465	133465

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-MISC. CONSULTANT's FEES
ACCOUNT NO. 502

V0. DATE - NO.	SUPPLIER	502-1 Geological	502-2 Geochemical	502-3 Geophysical	502-4 Engineering	502-5 Other	TOTAL
June 2	MacD. Cons.	46451					46451
July 64	"	75992			25560		148023
Aug 69	"	150977					
88	GN Air	6200		6200			311380
		279620					
Nov 181	MacD. Con	361373					672753
Dec 211	" "	27991			7825	525000	560816

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-MISC. CONSULTANT'S EXPENSES
ACCOUNT NO. 503

DATE	V0. NO.	SUPPLIER	503-1 Geological	503-2 Geochemical	503-3 Geophysics	503-4 Engineering	503-5 Other	TOTAL
June	2	MacD. Con.	1780					1780
July	56	NW Exped.	1288					
	64	MacD Con.	3374					3432
Aug	69	"	9753			11980		
	96	Versatile Draughting	1100 95				8550	64625
Nov	181	MacD Con.	53537			28810	1600	148572
Dec	206	Coast Geck. Equip	1763					
	211	MacD Con.	700			23502		189837

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT- VANCOUVER OFFICE

ACCOUNT NO. - 504

DATE	VO. NO.	SUPPLIER	504-1 Salaries	504-2 Office Supplies	504-3 Sundry	TOTAL
June	4	Econ Printers		6528		
	12	L G White			100	
	16	L R Norton			496	6864
July	29	Williams Mackie		2058		
	41	Willson Staff		1045		
	42	Williams Mackie		41601		110568
Aug	69	MacDonald Com.		215	3385	
	78	B.C. Ind.		1175	520	
	98	Williams + Mackie		1163		117076
Sept	102	P/R	55066			
	145	T Heard		150		172242
Oct	168	N W Exp.		182		
	177	Williams + Mackie		3021		175445
Nov	181	MacD Cons.	28267	11578	4501	
		Guaranty Trust		1296		
				1089		206679
Dec	211	MacD Cons.			765	
	213	L. R. Norton			659	208121

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-FIELD OFFICE

ACCOUNT NO. - 505

			505-1	505-2	505-3	
DATE	VO. NO.	SUPPLIER	Salaries	Office Supplies	Sundry	TOTAL
July	64	MacDonald Cons		90 15		90 15
17	76	T. Heard		25 03	941	
	87	F. Goertz		127 00		
	89	Hougen's		5 00		
	92	Ivor Evans Prop		133		
	104	PIR	39979			65771
Sept	113	Hougen's		15 00		
	133	White Horse Stn		10605		77876
Oct	157	Erie Ent.		13178		
	174	White Hospital + Surgery			2110	
	175	" Horse Stn		317		93478
Nov	181	MacD Cons.		50418	3051	
				22500	26922	
		"			820	
		Whitehorse Stn		2870		101590

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-BANK CHARGES & EXCHANGE
ACCOUNT NO. - 508

DATE	VO. NO.	SUPPLIER	Bank Charges & Exchange	TOTAL
July	—	Bk Chgs	100	100
Sept	—	"	25	125
Oct	—	"	510	635
		VARIOA	25	610

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT- LEGAL

ACCOUNT NO. 509

DATE	Vo. No.	SUPPLIER	Legal	TOTAL
Nov		Wylie + Collins	7900	7900
Dec 219		" "	7280	15180

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-LICENCES & FEES
ACCOUNT NO. 511

DATE	VO. NO.	SUPPLIER	Licenses & Fees	TOTAL
66 6/1	1A	City of Vancouver	25-	57 54
June	13	"	32 54	77 54
Aug	76	T Heard Prospecting	20 00	79 54
Nov		"	2 00	

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT- COMMUNICATIONS-RADIO & T. & T.
ACCOUNT NO. 512

66 VO.

DATE	NO.	SUPPLIER	Communications	TOTAL
6/12	3A	Spilsbury & Tindall	32460	
June	2	MacD. Con	1200	
	12	L.S White	1910	
	16	L.R Norton	2020	37610
July	21	CN Tele	196	
	50	"	594	
	56	NW Exped.	35500	74400
Aug	84	CN Tele	1170	75570
Sept	118	NW Exped.	35914	
	123	CN Tele	4100	
	139	T Heard	1495	
	145	"	470	117549
Oct	152	CN Tele	1685	
	166	NW Exp	98838	
	169	S+T Rentals	8130	226192
Nov	181	MacD. Cons.	226192 / 12496	
		CN Tele	8130	
		NW Exp	33008	308826
Dec	211	MacD. Con.	13805	
	212	Lake Hotel	1075	
	217	S & T Rentals	8120	331826

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-MISC. FREIGHT & TRANSPORTATION
(not directly chargable to specific projects)

ACCOUNT NO. - 513

DATE	VO. NO.	SUPPLIER	Freight and Transportation	TOTAL
Aug	76	Thera	19 50	19 50
Sept	136	Horn's Trkg.	10000	
	138	TSN Air.	1562	13512
	165	Horn's Trkg.	500	
	166	NW Expo	100	
	176	White Pass Rail	359 10	500 22
Nov		CPA	30 22	
		NW Expo	739	
		Horns Trkg.	3231	5+992
			1000	

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-

ACCOUNT NO. - 514 MacDonald Cons Ltd

DATE	VO. NO.	SUPPLIER	Dr	Cr	TOTAL
Aug	69	MacD. Cons. Engr. a/c advance #33 re 15 Town Surv.		1000.00	
			306.00		
	76	T. Heard Comm. Item			
		E. Green	700.00		
	104	P/R	178006		
Sept	139	T. Heard re [illegible]	200.00		
	142	P/B	94803		
	145	T. Heard re Labour	300.00		
Oct	164	MacD & Bonney Surv.	10560.00		
				4284.15	
				1180	
				41653.5	

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT- MOBILIZATION
ACCOUNT NO. 530

DATE	VO. No.	SUPPLIER	530-1 Direct Labour	530-2 Equip. Exp.	530-3 Frt. & Comm.	530-4 Personnel Transp.	530-5 Site Prep.	530-6	530-7	530-8	530-9	TOTAL
June	3	Collins Intg		313.10								
	14	P/R	111726			3099	111826					256021
July	17	Atlas Copco		345								
	18	Can Freightways			8804							
	20	J Gourley Ltd		103416								
	22	Jones Tent		6.00								
	25	Power Saw Sales		22.00								
	27	Van Cat		26665								
	43	Hamilton Harvey		182293								
	44	Atlas Copco		88885								
	45	J. Gourley		1167.0								
	57	Talga Hotel				16928						
	59	Tourists				5450						
	62	White Pass Pet.			35235							
	64	MacD. Cons.		51555								795184
Aug	69	"				1305						
	70	V Mullaney				1670						
	71	J. Balfour				2160						
	72	B Pelton				5000						
	73	LA Saar				810						
	74	S Rachynski				11500						
	75	R E Burns				12463						
	76	T Hand				16100						
	E1	Can Freightways			948							
	83	Chilcoot Hotel				1100						
	103	B Pelton				7500						85570
Sept	118	Tourists				295						850365
Oct	153	CPA			713							
	166	NW Exp		5.2119	459.00 200	85377						856948
												Jun

Date	Vo #	Supplier	530-1 Direct Labour	530-2 Eq. Exp.	530-3 Trsh & Comm	530-4 Personnel Trans.	530-5 Site Sup.	Total
Nov	181	Mac D Cons.			5000	78300		
		Can Freightways			760			
		Mac D. Cons	5653					
		NW Exp		154100				110076[illegible]

(not directly chargeable to a specific project)

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-AIRCRAFT CHARTER
ACCOUNT NO. 531

DATE	VO. NO.	SUPPLIER		TOTAL
May	88	GN Aviation	36400	
	90	Klondike Helic.	1100000	1136400
Sept	138	GN Av.	24900	
Oct	158	"	66400	116130
	159	Hand Chemicals	620	
	163	Klondike Helic	1374000	
	168	Ross River Ent.	2072	
	176	White Pass Pet.	8379	2687571
Nov		GNA	25360	2712931
"	181	Rice Nav. (Riv)	14329	2727260

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT -AIRBORNE GEOPHYSICS
ACCOUNT NO. 532

VO. DATE	NO.	SUPPLIER	532-1 Labour	532-2 Contract Fee	532-3 Living	532-4 Helicopter	532-5 Standby					TOTAL
June 7		GNA			111308							
9		Kdon.				2 648200						
11		White Pass Per.				2 2354						761854
July 23		Klondike				2 11650						8e3504
						922204						

(Not directly chargeable to a specific project or claim group)

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT - EQUIPMENT RENTALS OR EXPENSES
ACCOUNT NO.

DATE	VO. NO.	SUPPLIER	533-1 Equip. Rent. Charges	533-2 Operating (Equip) Supp.	533-3 Maint. & Repair	TOTAL
June	44	Brintwood Lease.	27 00 00			27 0000
Aug	76	T Heard		97 00	109 00	
	79	Atlas Copco	25 00			
	92	Riley's	85 00			30 16 00
Sept	116	"	17 000			
	117	Atlas Copco	25 00			
	131	Alcan Tire Serv.		107 00		
	139	T Heard	1000	97 28		
		"	36 00			
	145	"		26 45		35 8773
Oct	149	Atlas Copco	25 00			
	155	Clyde Wenn Motors		13 20		
	167	Riley's	85 00			
	168	Ross River Sht.		15 39		
	176	White Pass Pet.		90 93		35 8 + 125
Nov	181	Mac's Cons	316 00	51 25		
			81 000			
		T Heard		64 60		
		Yukon Motors		12 60	30 15	31 3860
		"		425	213 20	33 57 05 *
Dec	30	Atlas Copco	150 00			
	216	Riley's	170 75			34 7 6

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT =SAFETY & FIRST AID
ACCOUNT NO. 534

DATE	V.O. NO.	SUPPLIER	534-1 Labour	534-2 Supplies	534-3 Sundry	
July	53	Hougen's		382		
	56	N W Expo.		7402		7784
Aug	76	~~Imax~~ T. Hewick		60		7844
Sept.	134	Nelson Drugs		3845 1		
	139	Thrane		403 1		12092
Oct	166	NW Expo		1110		13202
				13202		

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-COMMISSARY-All Items
ACCOUNT NO.- 535

DATE	Vo. No.	SUPPLIER			
Aug	69	MacDonald Cons	650		
	89	Hougen's	10032		9382
Sept	113	"	35526		
	115	NW Exp.	364		4517.2
Oct	160	Hogen's	5096		
	168	Ross River Mnt	4455		507.13
Nov	131	MacD Cons.	20353		
		Selwyn Syndicate	355		
		P/R Deds re Commissary	2824		1281
Dec.	208	Hougens	6143		7424
Dec.	Dep.	Pt. Juneau	~~355~~		

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-BASE CAMP OPERATION-EXCLUDING FLY CAMP.
ACCOUNT NO. 536

VO. DATE -NO.	SUPPLIER	536-1 Labour	536-2 Camp &Kit. Equip	536-3 Camp & Kit. Oper. Suppl.	536-4 Sundry	TOTAL
June 6	Serie Enter.		5042			
8	Dones Text		334789			
14	P/R	7947				347778
July 26	Tourists			16520		
28	White Pass Pet.			15601		
39	Tourists			28721		
49	Burns			32518		
51	Can Propane			13171		
52	Serie Ent.			33578		
53	Haugens		88	2680		
54	Lwade Hotels		1795			
55	Northern Interlake		36225			
56	NW Exp		74475	1020		
58	Taylor & Drury		4308			
59	Tourists			53047		
61	White Pass Pet.			7445		
65	P/R	88698				873955
Aug 76	T Hearde			6235		
80	Burns TC			85766		
82	Can. Propane			6860		
88	Gin Airways				595	
89	Hay Ken's		176	421		
93	NW Exp.		36916			
97	White Pass Pet.			2835		
102	P/R	134281				
106	DL Jackson				2432	
Sept 113	Haugens		3227	1497		1152472
115	NW Exp.		9629			
"			1650			
118	Tourists			111766		
"				2823		

Date	Vo #	Name	536-1 Labour	536-2 Camp+Kit Equip	536-3 Camp+Kit Gen Supp.	536-4 Sundry	
Feb			—	—	—	—	
Sept	119	Burns STCo			66231		
	121	Can Propane		26376	23315		
		"			3300		
	126	Yukon Jeters				28231	
	129	Ross River Ent.			2800		
	135	Yor. Comm.			4501		
	136	Norm's Trkg.				500	
	139	T Heard			3575	685	
	140	J Dell			1340		
	142	P/R	88331				
	144	IS Turnbull			730		
	145	T Heard				3945	15109 61
Oct	146	D Cox			2370		
	150	Beldis Supply Lunch		27178		1827	
	151	Burns STCo			94378		
	154	Can. Propane			9900		
	162	Ken Addison			6647		
	172	Tourists		8984	12361		
	—	Prudential Ins.	1568				
	—	"	6576				
Nov	181	Mech Costs.	29763	533949	98067	11807	18234 90
			27000		42315		
		Burns STCo			2076		
		T Heard			2575		
		Mech Costs	8386				
		Tourists			2178		

Date	Voucher	Name	Detour	536-2 Camp & Kit. Eq	536-3 Camp & Kit. Op Supp.	536-4 Sundry	TOTAL
Nov		White Pass Kit.			131 75		
		P&R Board Beds			136 50		11 53 95
Dec P.	210	P Mugford			1658		
	220	Pay roll Ext			32 44 84		17 50 19
Dec.	Dep.	White Pass.			~~131 75~~		

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT -ENGINEERING & GEOLOGICAL
ACCOUNT NO. 550

DATE	V.O. NO.	SUPPLIER	550-1 Contractors Labour		550-2 Supplies	550-3 Equip. Expense	TOTAL
July	24	Scheerenberg			20875		
	58	Taylor & Drury			1254		
	60	White Hosford			998		
	65	P/R	~~11335~~	G	5189		
			65	65908			
			L	5238			99412
Aug	76	T. Heard		1200			
	104	P/R	E	12274			
			H	1516			114402
Sept	122	Willson Stang			2625		
	139	T Heard			1280		
	142	P/R	H	1316			119623
Nov	181	MacDonald		87452	32171		135300
				15677			

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT - GEOPHYSICS

ACCOUNT NO. 551

DATE	VO. NO.	SUPPLIER	551-1 Contract Fees & Exp.	551-2 Co. Labor wages&sal.	551-3 Co. Supplies	551-4 Co. Equip. Expenses	TOTAL
July 6th		PIR		397 13			397 13
Aug 1st		"		598 42			
				153 15			
				826 72			1578 29
Sept 1st2		"		395 79			2374 08
Oct	161	Huntec	221250				
"	176	White Pass Pet.		237121	645		459016
Dec	209	Hunter	90000				549016

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT - CLAIM STAKING

ACCOUNT NO. 552

• 66

DATE	VO. NO.	SUPPLIER	552-1 Contract Fees and Expenses	552-2 Co. Labour (wages-sal.	552-3 Co. Supplies	552-4 Co. Equip. Expenses	552-5 Recording Fees	552-6 Legal	552-7 Fixed Wing	552-8 Helicopter	TOTAL
6/2	21	M. Cloutier	1500 -							2560	
June	2	MacDon Cons									
	5	Frontier Const.	33963								
	9	Klondike H.								1595 00	
	10	Tourists				F 1845				1014 00	479761
	14	P/R		H 7453							479761
July	65	"		H 24300							
				CW 10842							
				PS 14168							
	63	Recording Claims					H 23000				
		"					PS 16000				
							CW 19000				
	56	NW Exped.					490				
	23	Klondike								C 7515 50	
	24	Sorensma					Z 2000				68771
							L 30000				
Aug	69	MacDonald Cons.					CW 7100				
	76	T. Heard			1500						
	77	M Cloutier	2985								
	88	BN Airways							L 2800		
	104	P/R	H 6113	H 11463			90590			3616 50	71972
			19306 1	68226							

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT - LINE CUTTING

ACCOUNT NO. 553

DATE	VO. NO.	SUPPLIER	553-1 Contract Fees & Exp.	553-2 Co. Labour wages & sal.	553-3 Co. Supplies	553-4 Co. Equip. Expenses	TOTAL
July	38	Klondike	G 335 00				
	58	Taylor + Drury			643		
	62	PIR		G 55248			29591
Aug	69	MacDonald Cons.	L 70342 CW 33153 H 315569				
	86	Jim's Enter.			6000	H 10.44 G 49.56	
	89	Hongen's			1890		
	104	PIR		PK 19335			53593
Sept	113	Hongen's			2376		
	115	NW Exp			10100		
	128	Igloo Sptg Goods			8979		
	139	T Heard			1190		55857
Oct	150	Bears Supply Land			2250	H - 3.92 G - 18.58	
	157	Gem Ent.	33 00 H 5.74 456114 G 27.26	74583	5985 394 13	H 10.41 G 49.44	570110
Nov.	181	MacD Cons.	H 53426 9513				
	219	~~Johnston~~ Wylie + Colli	G 95237	G 39780 35791			728286 767076 768566

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT - GEOCHEMICAL

ACCOUNT NO. - 554

DATE-	VO. NO.	SUPPLIER	554-1 Contract Fees & Exp.	554-2 Co. Labour	554-3 Co. Supplies	554-4 Co. Equip. Expenses	TOTAL
June	14	P/R.		G 16894	G-262.84 H-26.733.00 38 EL-10.81		16894
July	30	J C Wilson					
	33	F.L. Price	$ 66.00 EL - 180.00 G - 4375.00 H - 445.00				
	58	Taylor & Drury			44.08		
	65	P/R		G 19542.1			
				CW 4556.7			33573
				H 4274.5			
Aug	76	THeard			6.50		
	88	GN Airways			55.80		
	99	JR Williams	G 7.20				
	104	P/R		G 6066			
				PG 966.7			
				CW 299.0			
				H 1568.8			8764.24
Sept	115	NW Exp.			157.41		
	125	JR Williams	G - 63.67				8985.42
	142	P/R		G 3134			
				CW 263.7			
				H 8089			
				E 804.2			9204.44
Oct	153	CPA	G. 1486 H 477 EL. 1.93. $ 3356				
	170	TSL Lab.	$ 12443	356940	564.17	G 45.00	930300

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT - LABORATORY OPERATION -ASSAYING

ACCOUNT NO. - 556

DATE	VO. NO.	SUPPLIER	556-1 Contract Fees &Exp.	556-2 Co. Labour	556-3 Co. Supplies	556-4 Co.Equip. Expenses	TOTAL
							1049
17 Aug	85	Crown Zellerbach		G 2434.17 H 247.58 EL 100.15	1049		
Sept	111	FLC Price	27819				280739
	124	RM Thompson	G 1500				
	XXX	RMP					
Oct	156	FLC Price	9297	G 813.49 H 82.74 EL 33.47			
							37 3209
	171	RM Thompson	G 1500				
Nov	181	Inco Ltd.	374160		2282		
		CPA	7341	G 64.24 H 6.53 EL 2.64			
		NW Exp	4884				
		FLC Price	86920	G 760.55 H 77.36 EL 31.29			47 2072

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT - DIAMOND DRILLING

ACCOUNT NO. - 558

V.D. DATE	NO.	SUPPLIER	558-1 Contract Fees & Exp.	558-2 Co. Labour	558-3 Co. Supplies	558-4 Co. Equip. Expenses	TOTAL
Sept-	'41	Arsenault DD.	H 209250				209250
Oct	178	Arsenault DD	H 1356080				1567330
Nov	179	Arsenault DD		H 4766			1572096
	181	MacD Cons	H 178955				2361551
Dec	203	Arsenault DD					

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT_TRENCHING
ACCOUNT NO. - 559

DATE	VO. NO.	SUPPLIER	559-1 Contract Fees & Exp.	559-2 Co. Labour	559-3 Co. Supplies	559-4 Co. Equip. Expenses	TOTAL
July	19	C.I.L.			875		
	65	P/R		6 12641			13516
Aug	104	"		6 8058			
	107	J.C. Sweden		6 18064			39638
Sept	–	C.I.L.			875		
	117	Atlas Copco			3475		41238
Oct	176	White Pass Pet.		38763	665 3140		41903

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT • BULK SAMPLING

ACCOUNT NO. • 560

V#. DATE	NO.	SUPPLIER	560-1 Contract Fees & Expenses	560-2 Co. Labour	560-3 Co. Supplies	560-4 Co. Equip. Expenses	560-5 Freight		TOTAL
Sept 14		CPA					12726	G 111.35 H 11.33 El. 4.58 } 556	12726

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT - PROSPECTING
ACCOUNT NO. 561

DATE	Vo. NO.	SUPPLIER	561-1 Contract Fees & Expenses	561-2 Co. Labour	561-3 Co. Supplies	561-4 Co. Equip. Exp.	561-5 Misc.	TOTAL
July	65	P/R		EL 1821				94054
				G 92233				
Aug	89	Hargens			3514			125950
	104	P/R		G 33382				
Sept	115	NW Exp			1967			
	133	White Horse Stn			1800			130907
	139	T Heard		122436	1190			
					8471			

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-AIRCRAFT CHARTER FEES & AIRCRAFT OPERATING EXPENSES
DIRECTLY CHARGABLE TO SPECIFIC PROJECTS
ACCOUNT NO. - 563

563

DATE	VO. NO.	SUPPLIER			TOTAL
June	15	Klondyke H		$5000.00 APPLIED TO TOTAL HELLICOPTOR.	$5000.00
July	28	White Pass Pet.		163.50	$163.50
Sept	138	GN Air	H	96.00	
			H	96.00	$353.50
Oct	158	"	H	35.25	
	~~15~~	~~"~~	H	41.50	
	168	Ross River Smelt.		57.00	$806.50
Nov		Klondike Heli		$806.50	1286.10
				705.960 TOTAL HELLICOPTOR.	

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-FLY CAMP SET UP & OPERATION
ACCOUNT NO. 564

564

DATE	VO. NO.		SUPPLIER			TOTAL
July	53		Hougen's	G	3415	
	56		NW Exp.	G	4444	
	58		Taylor Drury	G	7984	17843
Aug	91		Gov. Comm.	G	16818	34661
Sept	113		Hougen's	G	109931	
	115		NW Exp.	G	14850	
	132		Gordies Trkg.	H	2380	62824
Oct	157		Esso Serv	H	3340	
	160		Hougens	H	1109	
	166		NW Exp.	G	1150	
	176		White Pass Pet-	G	1984 99.23-G	90328
				H	9328 9922-H	
Nov		H	Sulys	H	13866	104194
Dec	208		Hougens	H	2194	106388

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT -SURVEYING
ACCOUNT NO. 565

DATE	VO. NO.	SUPPLIER	565-1 Contract Fees & Expenses	565-2 Co. Labour	565-3 Co. Supplies	565-4 Co. Equip. Exp.	TOTAL
July	53	Haugen's			1244	H 2.20 G 10.14	
	65	PIR		G 20671		G 78541	100456
Aug	104	"		G 30034			
				G 15965			
				G 2096			
				H 76473			225024
Sept	115	NW Exp.		Q 2447.03 M 515.47 EL.	508	H 1.88 G 4.20	
	120	Huntec	296250				
	142	PIR		H 48937			57719
Oct	150	Blaks Supply Land		H. 1273.06 G-6647.23 EL-623.71	1159	H 2.02 G 9.57	
	164	McElhanney Surv.	85400				
	173	Hunter Geo.	G 64800				149078
Nov	178	Lockwood Survey	121450	H-1667.38 E-816.91 G-8708.19	2911		
	180	"	111908				3085296
	181	MacD Cons.	47510	H 708.00 E-346.87 G-3696.83			3069942
			20000		646		
Dec	208	Haugen					

NORTHLAKE MINES LTD.

PROJECT COST ACCOUNT-DEMOBILIZATION
ACCOUNT NO. - 590

DATE	V.O. NO.	SUPPLIER	590-1 Direct Labour	590-2 Equip. Exp.	590-3 Freight & Comm.	590-4 Personnel Transp.	590-5 Site Cleanup	590-6	590-7	590-8	TOTAL
Sept	137	Taku Hotel				1429					
	142	P/R	28728				22578				65596
Oct	148	Alpine Motors				8625					
	166	NW Exp				59730					133951
Nov	181	MacD Cons				82645					
						Site 95	37194				
		CPA			2940						
		GNA				3400					
		Taku Hotel				2000					
		Tourists				2820					236398
Dec	205	City Delivery			1600						
	211	MacD Car	16397								
	212	Taku				7920					
	214	R T Heard				15000					
	215	Norm's Trucking			7000						
	218	Qualita-Kraft					15100				29812