ASSESSMENT REPORTS

MAP No. 105-O-6,7 TYPE OF WORK: Ground Geophy

REPORT FILED UNDER	Northlake Mines L
DATE PERFORMED	July-Sept 1966 — DATE FILED: Feb 1967
LOCATION — LAT.	61° 27' N — Grass Lake Area, Yukon
LONG.	131° 00' W
CLAIM Nos.	OBE Gp
WORK DONE BY	N.R. Paterson (Huntec Ltd)
WORK DONE FOR	Northlake Ms L
REMARKS	Ground EM surveys (3 types) over 3 areas located weak anomalies in Area 5, 6 weak to medium strength conductors in Area 10 and 8 conductors in Area 15.

REPORT ON

GROUND GEOPHYSICAL SURVEYS

ROSS RIVER, YUKON TERRITORY

FOR

NORTHLAKE MINES LTD.

BY

HUNTEC LIMITED

TORONTO, ONTARIO

JANUARY, 1967

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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. F.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 h undred 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 c.nductor 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

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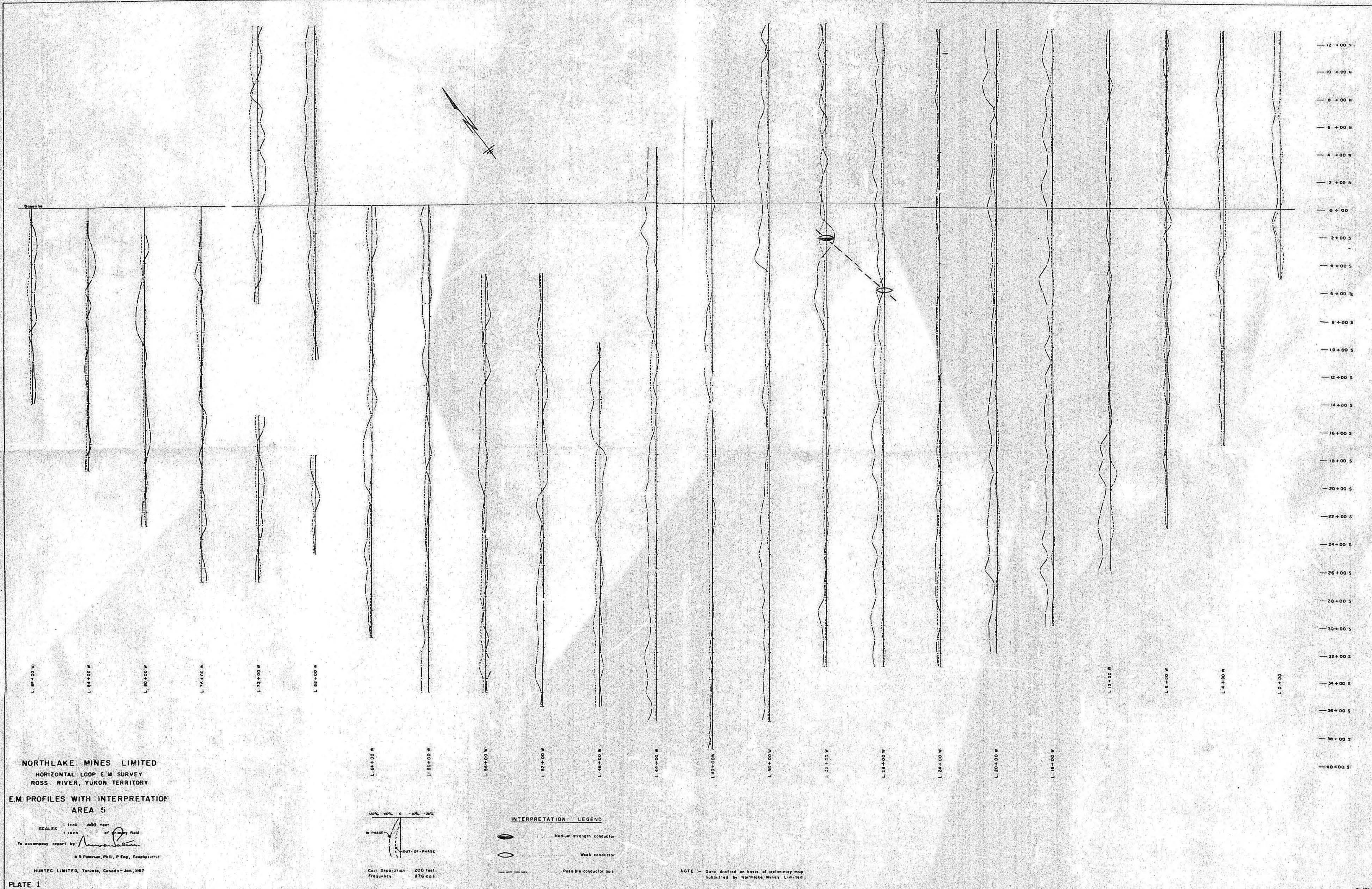
Ph. D., P. Eng.,
Geophysicist.


Baseline
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
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8 + 00 S
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L 12+00 W
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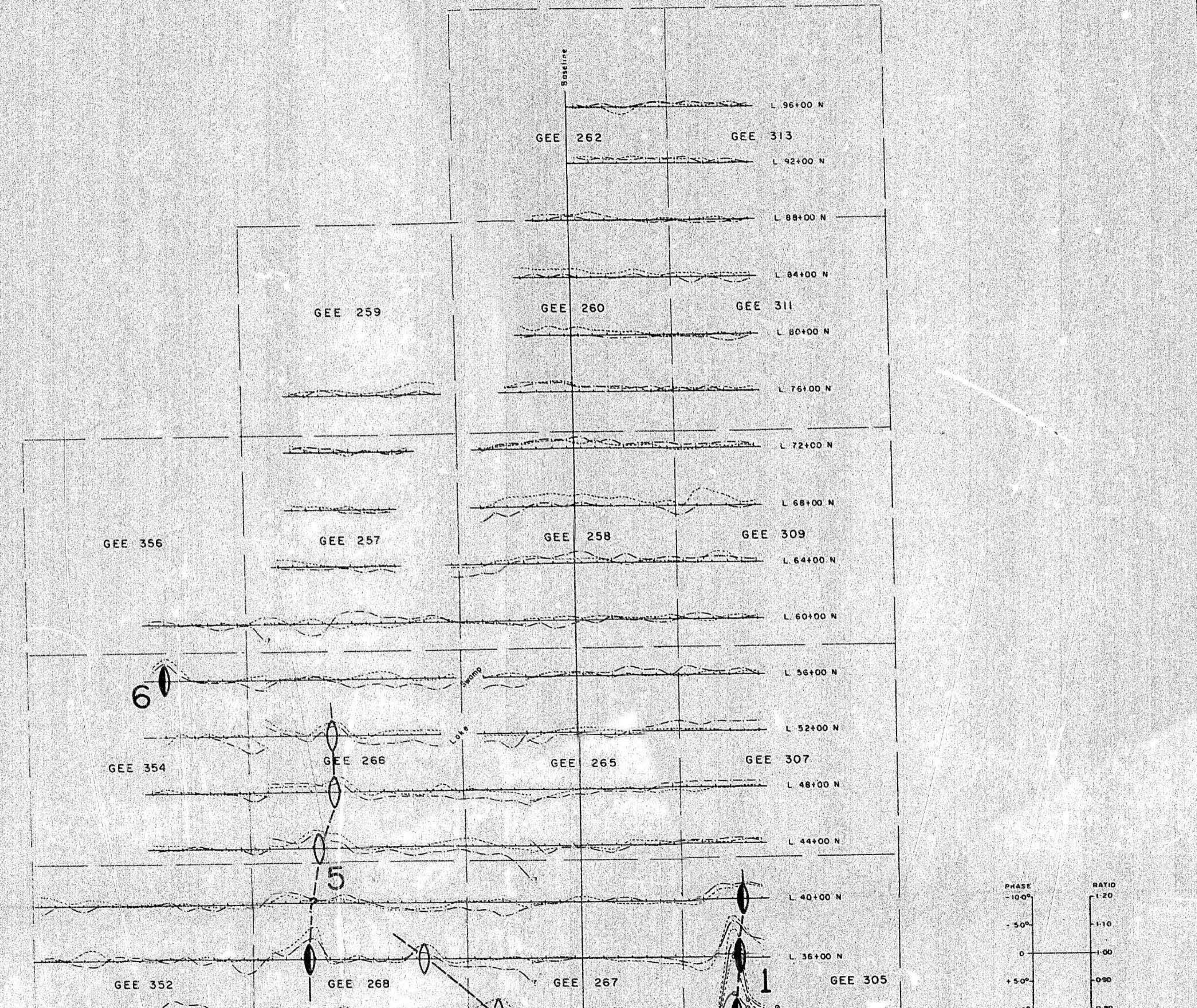
L 4+00 W
L 0+00
NORTHLAKE MINES LIMITED
HORIZONTAL LOOP E.M. SURVEY
ROSS RIVER, YUKON TERRITORY
E.M. PROFILES WITH INTERPRETATION
AREA 5
SCALES 1 inch : 400 feet
1 inch of primary field
To accompany report by
N.R. Paterson, Ph.D., P.Eng., Geophysicist
HUNTEC LIMITED, Toronto, Canada - Jan., 1967
PLATE 1
+20% +10% 0 -10% -20%
IN PHASE
OUT-OF-PHASE
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



NORTHLAKE MINES LIMITED

TURAM ELECTROMAGNETIC SURVEY
ROSS RIVER, YUKON TERRITORY

E.M. PROFILES WITH INTERPRETATION
AREA 10

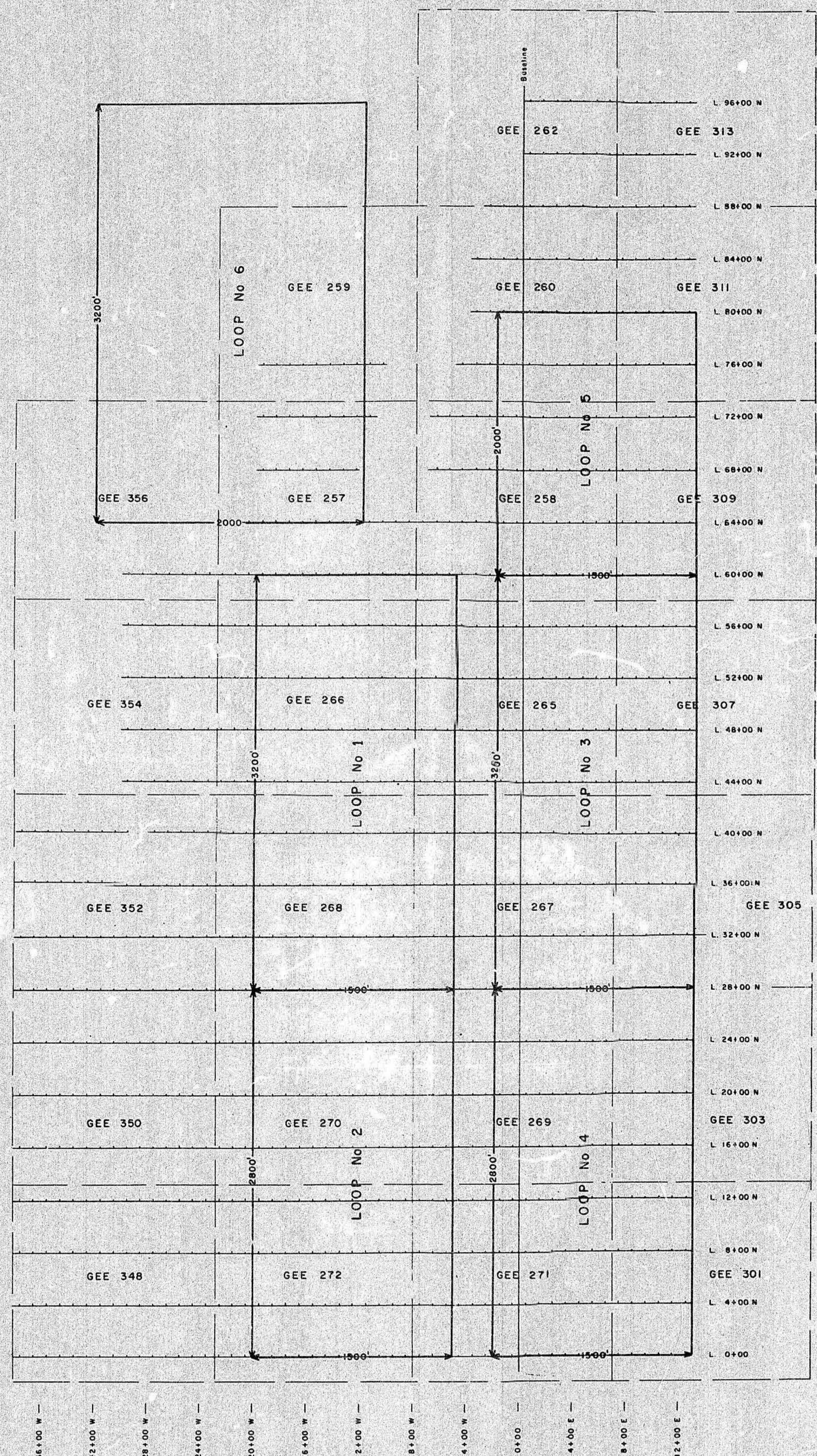
To accompany report by [signature]

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

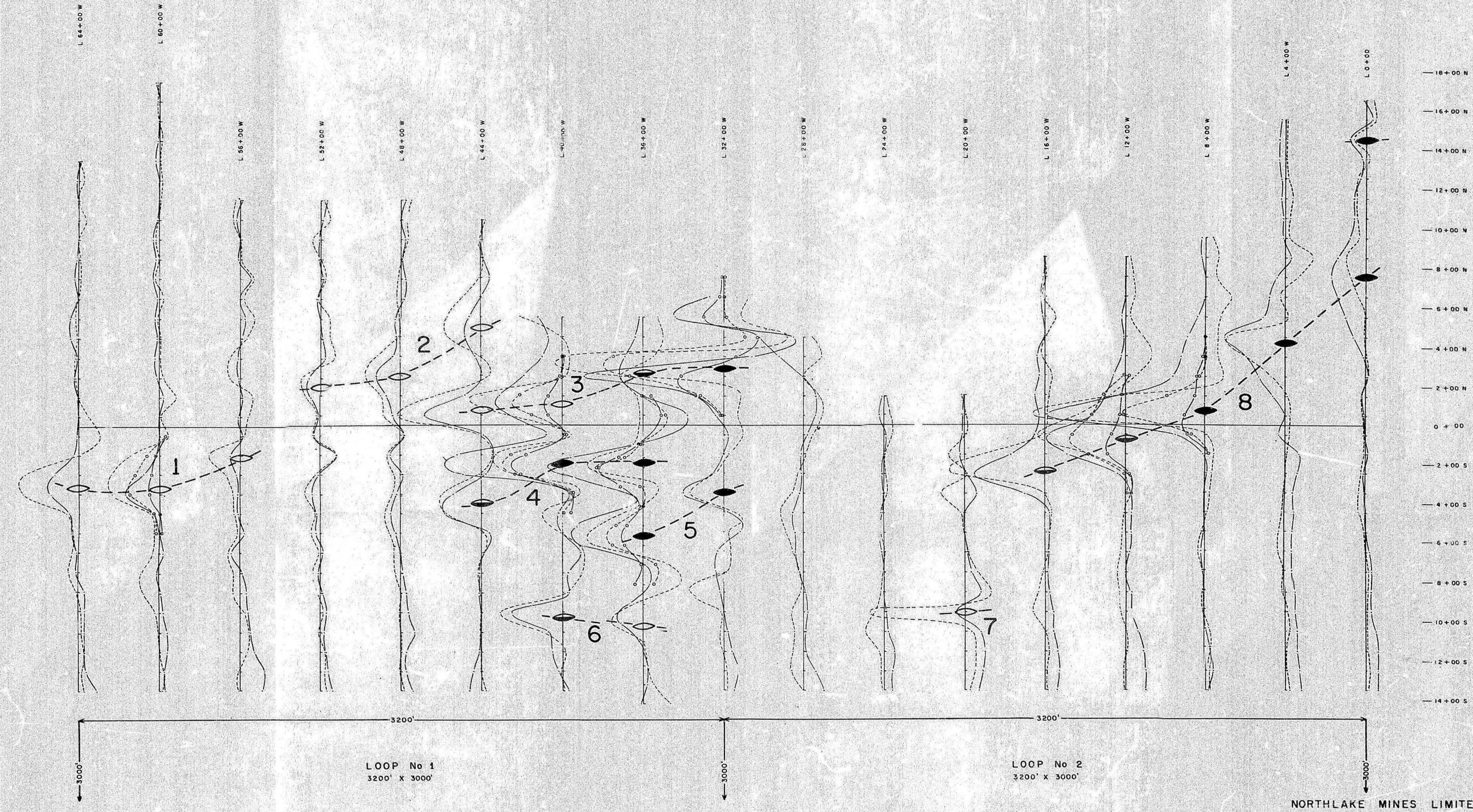
SCALE : 1 inch = 400 feet

To accompany report by

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

HUNTEC LIMITED, Toronto, Canada – Jan., 1967

PLATE 3



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

PHASE −10.0° −5.0° 0 +5.0° +10.0°
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 [signature]

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

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PLATE 4