1651

A GEOPHYSICAL REPORT ON AN INDUCED POLARIZATION (I.P.) SURVEY LODE CLAIM GROUP, TULAMEEN, B.C.

(49°, 120°, N.W.)

-for-

COPPER MOUNTAIN CONSOLIDATED LIMITED

92 H - 10/W

HUNTEC LIMITED

JULY, AUGUST, 1968

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INTRODUCTION

General

This report contains the results of an Induced Polarization (I.P.) survey carried out by Huntec Limited for Copper Mountain Consolidated Limited on the Lode Claim Group in the Similkameen Mining Division of British Columbia.

The purpose of the survey was to prospect for sulphide mineralization in both massive and disseminated form. In particular the survey was to outline completely an anomaly, considered to be indicative of sulphide mineralization, which was partially detected in an I.P. survey during October, 1967.

A reconnaissance profile was also obtained along the Lawless Forestry Road to determine if mineralization in that area would respond to the I.P. method and, if so, to outline possible targets for future exploration work.

The field work was carried out between June 29 and July 2, 1968. The field party chief was Mr. M. Samilski and the project was supervised from Vancouver by Mr. W. A. Finney.

The Property

The claims surveyed include Lode Claims 15, 16, 17 and 18, located about 4 miles northwest of Tulameen, B.C. Access to the property was by the Lawless Forestry Road from Tulameen and a 'cat' road for the final mile. The survey area is underlain by limestones and rocks of the Nicola Complex and mineralization within these rocks is visibly apparent in many outcrops.

SURVEY SPECIFICATIONS

The Equipment

The Induced Polarization equipment used was a 2.5 kw pulse-type instrument manufactured in Toronto by Huntec Limited. The following specifications apply:

Type of current	Direct Current broken at periodic intervals.
Period	1.5 seconds "current on" and 0.5 seconds "current off". Alternate pulses have reverse polarity.
Integrating time	400 milliseconds
Maximum power available	2.5 kw
Maximum current available	3.0 amps

Measurement taken in the field were:

1. The current flowing through the current electrodes C_1 and C_2.
2. Primary voltage V_p between measuring electrodes during "current on" time.
3. Secondary voltage V_s between measuring electrodes during "current off" time.

The apparent chargeability (M_a) in milliseconds is calculated by dividing the secondary voltage by the primary voltage and multiplying by 400 which is the sampling

time in milliseconds of the receiver unit. The apparent resistivity is calculated by dividing V_p by the current and multiplying by the geometrical factor appropriate to the electrode array being used.

Electrode Configuration

Both the reconnaissance and detailed parts of the survey were carried out in the pole-dipole configuration. In this array the current electrode C_1 and the two potential electrodes P_1 and P2 are moved in unison along the line to be surveyed. The quantity "a", or "electrode separation" is the distance between C_1 and P_1. In this array the distance between P_1 and P_2 is kept equal to one-half "a". For the reconnaissance phase of this survey the value of "a" was kept at 200 feet.

Since the value of "a" is a rough approximation to the depth penetration, detailing of anomalies discovered in the reconnaissance phase was done by profiling the anomalies at the different values of "a". This additional data provides information from which depth, dip and location of detected causative bodies may be calculated more easily than from a single profile.

For reasons of operational convenience some detailing was done using the "three-array" which is the same as the pole-dipole array except that the distance $P_1 - P_2$ is equal to $C_1 - P_1$. The response is almost identical and the two types of data may be used in combination for interpretation of the causative body. The two types of array will be distinguished on the profiles by a "p.d." or "3".

RESULTS AND INTERPRETATION

Presentation

The results of the survey carried out on the grid system which is controlled from stations along the 'cat' road are presented as contours of apparent chargeability and apparent resistivity in Drawings No. 1 and No. 2.

The portion of the line which was surveyed in detail is indicated by the double line and arrows on Drawings No. 1 and No. 2. The results of this detailed work are presented in profile form in Drawing No. 3.

Outlines of interpreted causative bodies are shown on Drawing No. 1 and the estimated cross-section of the causative body is shown beneath the profile in Drawing No. 3.

Results of the reconnaissance profile obtained along the Lawless Forest Road are shown separately on Drawing No. 4, and a cross-section of the interpreted causative body is indicated beneath the profile.

Interpretation

The I.P. survey of the Lode Claim Group has detected an anomalous zone which strikes in a north-south direction for approximately 600 feet (Drawing No. 1). The northern limit of the zone has not been completely defined, but at this end it is narrow and appears to be pinching out. The zone is widest at the southern end, approximately 350 feet, reducing to approximately 150 feet at the northern end.

Background chargeability is between 3.0 and 4.0 milliseconds, and the main anomaly is a region of high chargeability rising to more than three times background.

The resistivitiy results (Drawing No. 2) indicate only minor changes in the conductivity characteristics of the rock type underlying the anomalous zone, which suggests that the material producing the high chargeability readings is present in disseminated form, rather than in massive form. The changes in conductivity which do occur, could easily be accounted for by variations in depth or overburden.

The detailed profile along line 36W (Drawing No. 3) shows the response on the shorter electrode array increases from south to north. This indicates that the top of the mineralized zone is shallower at the northern end and probably outcrops in this region. However, these readings could be biased as part of the increasing response might be due to closer proximity of the line to the causative body at the northern end. From the contour map (Drawing No. 1) line 36W is off-centred from the causative body at the southern end and angles towards the body at the northern end.

Using the larger electrode array (a = 400 feet), the chargeability response is considerably stronger at the southern end. The gradients on this profile are smaller because each reading is sampling a much larger volume than for the case of the shorter electrode array (a = 100 feet), and consequently variations between stations 200 feet apart are much smaller. However, there is clearly an increasing chargeability response in proceeding from station 1N to 3S on the profile for a = 400 feet. This is an indication that the 'centre' of the causative body is much deeper at the southern end, probably

lying between 300 and 400 feet below ground level. If the source of the anomaly is a single continuous body in a north-south direction, then the above analysis suggests an overall dip gently to the south. There are indications however, of two easterly trending faults cutting the mineralized zone. Vertical movement downward on the southern side, along these faults, could account for the increasing depth of the mineralized zone at the southern end. A cross-section of the causative body is shown on Drawing No. 3 and estimates of the sulphide content as a volume percentage have been made where this seems possible.

It was unfortunate that the line orientation was approximately coincident with the strike of the body which makes it difficult to interpret the results quantitatively. An extension of the line along the road (i.e., a continuation of last year's work) would result in a good profile from which a better interpretation of the geometry of the causative body could be made. It is noted that there appears to be a discrepancy between the axis of the causative body as outlined in the present survey and the axis of the causative body detected in the 1967 survey. The displacement is of the order of 200 feet in an east-west direction. This appears to be too great to be caused by the asymmetry inherent in the pole-dipole method which undoubtedly is causing a partial displacement, as the lines are now oriented north-south. We strongly suspect that the present grid stations, although correct relative to each other, do not correspond exactly to the temporary stations along the road used in the 1967 survey.

Lawless Forestry Road

The Detail Profile from the Lawless Forestry Road shows generally background values of chargeability and resistivity in the region 8W to 20W. In this region the area

is believed to be underlain by limestone containing little or no sulphides. At approximately 8W the profile crosses the contact between Nicola and intrusive rocks. Between 8W and 3W the chargeability increases abruptly to almost twice the background level over the limestone, and the resistivity drops to a minimum of about 200 ohm-meters. The increase in chargeability could be accounted for by the change in composition of the country rock, particularly the increase in magnetite. On the other hand, it could be the result of minor sulphide mineralization. The source of the anomaly is expected to be shallow. It is understood that "ironized copper" grading approximately 0.4% is observed in outcrop along the Camp Road in the vicinity of this anomaly, and could easily account for the anomaly. If so, the extent of mineralization would be approximately as shown on the attached Detail Profile. Estimated concentration is 0.2 to 0.6% sulphides by volume. The bottom limit of the zone has not been determined.

Recommendations

It would be preferable, before recommending positions for diamond drill holes, to complete a profile along the road, or parallel to this, across the anomalous zone in order to determine more accurately the geometry of the causative body. However, it is fairly clear that the mineralized zone must be shallow, particularly so at the northern end, and it would be almost certain that a short drill hole, either vertical or dipping steeply to the north, positioned on the axis of the anomaly would intersect mineralization below 50 feet. The recommended site for this drill hole is on line 36W at station 2+50N.

A second hole is recommended further south on line 35W at station 1+50N. This should be a vertical hole, drilled to at least 300 feet, and would be expected to intersect the main zone of mineralization below 150 feet. Together with hole no. 1, this should result in good representative sampling of the causative body.

A closer geological study is recommended to check out the possibility of faulting as indicated in the interpretation. Drilling sites could be altered slightly in order to intersect the fault zone as well as probing the causative body.

SUMMARY

1. The I.P. survey of the Lode Claim Group near Tulameen was carried out between June 29 and July 2, 1968, and consisted of 1.48 miles of reconnaissance work and 0.59 miles of detailed work.

2. A distinctive anomalous zone about 350 feet wide striking north-south for 600 feet was detected.

3. Indications of cross-faulting within the zone were observed.

4. The causative body is shallow, perhaps outcroping the northern end, and dips gently to the south.

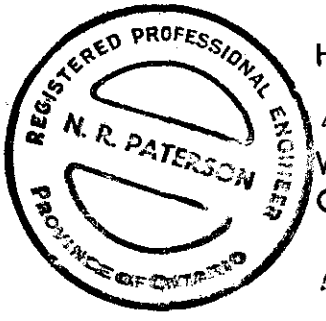
5. Two diamond drill holes, at least 200 feet deep, are recommended to test the body. These are positioned at line 36W station 2+50N, and line 35W station 1+50N.

6. A continuation of the 1967 survey to obtain a cross-sectional profile is also recommended.

7. The profile along the Lawless Forestry Road indicates a positive but relatively weak I.P. response, probably due to minor sulphide, or magnetite, mineralization at shallow depths.

Respectfully submitted,

HUNTEC LIMITED



W. A. Finney, B. Sc.,
Geophysicist.

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

APPENDIX A

ASSESSMENT CREDIT DATA

Miles surveyed:

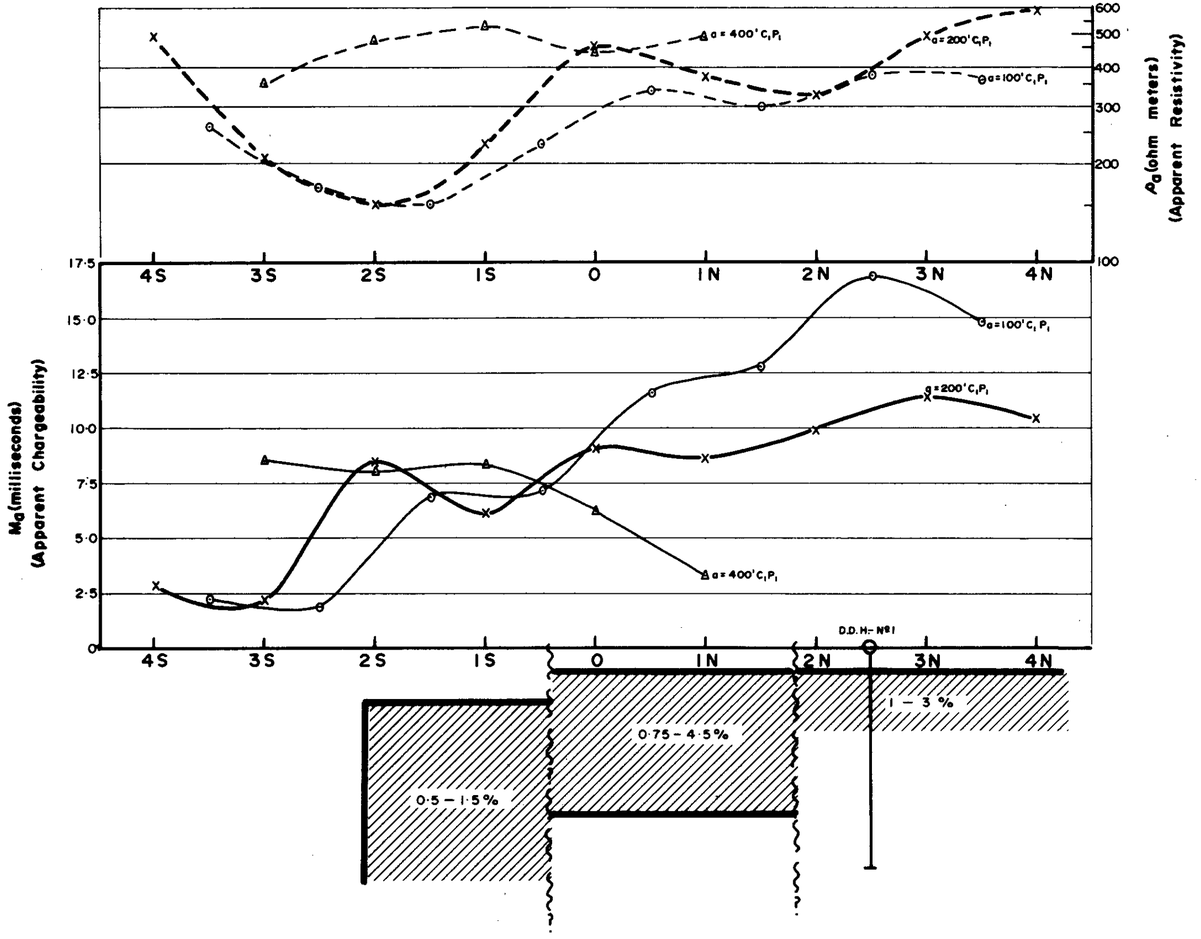
Reconnaissance	1.12
Detail	0.21
	1.33

Lawless Forestry Road:

Reconnaissance	0.36
Detail	0.38
	0.74

Personnel:

Name	Position	Dates	Charge Rate (per day)	Total Costs
M. Samilski	Operator/ Party Chief	June 29 - July 2	$90.00	$360.00
J. Samilski	Operator	June 29 - July 2	75.00	300.00
G. McKay	Helper	June 30 - July 2	22.00	66.00
B. Stanley	Helper	June 30 - July 2	22.00	66.00
G. Provencher	Helper	July 1 - July 2	22.00	44.00
E. Helkio	Draftsman	July 9 - July 11 (2-1/2 days)	60.00	150.00
W.A. Finney	Geophysicist (Interpretation & Report Writing)	Aug. 28 - Aug. 30 (2-1/2 days)	125.00	310.00
I.P. Unit	--	June 29 - July 2	70.00	280.00
Truck	--	June 29 - July 2	22.50	90.00
				$1,666.00



INDUCED POLARIZATION SURVEY.

DETAIL PROFILE: LINE - 36W.

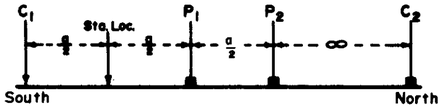
LEGEND

1-3% — INTERPRETED CAUSATIVE BODY. 1-3% - ESTIMATED AVERAGE SULPHIDE CONCENTRATION BY VOLUME.

RECOMMENDED D.D.HOLE.

POSSIBLE FAULT.

POLE - DIPOLE ARRAY



COPPER MOUNTAIN CONSOLIDATED LIMITED.

TULAMEEN AREA, SIMILKAMEEN M.D. - B.C.

Horizontal Scale: 1 inch = 100 feet.

Vertical Scales:

Chargeability - 1 inch = 5·0 milliseconds.

Resistivity - 3 inches = 1 logarithmic cycle (ohm-meters)

To accompany report by: W. A. Finney

N. R. PATERSON — W. A. Finney, B.Sc., Geophysicist.

REGISTERED PROFESSIONAL ENGINEER PROVINCE OF ONTARIO

HUNTEC LIMITED - Vancouver, Canada - July 1968.

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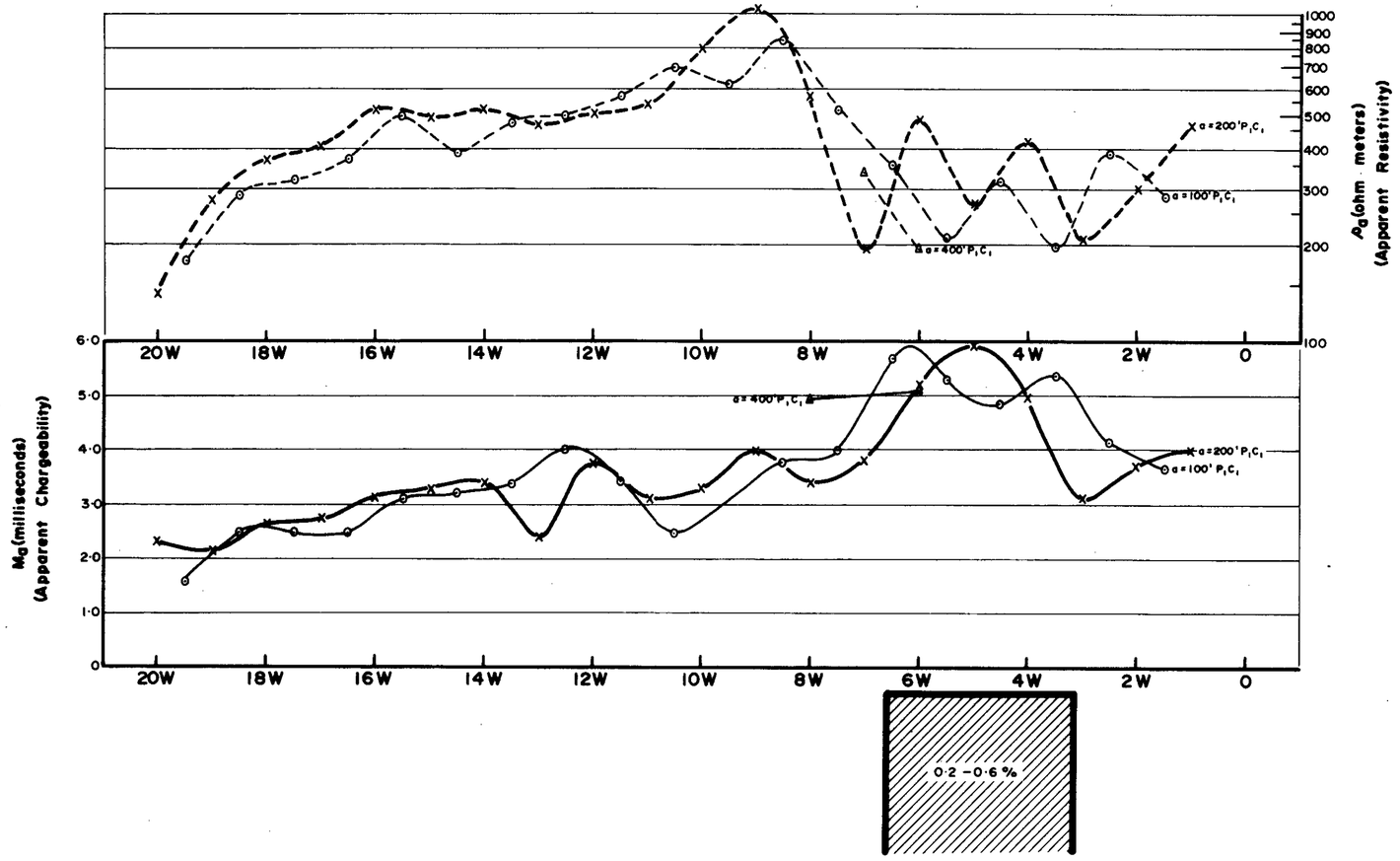

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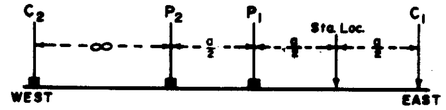
INDUCED POLARIZATION SURVEY.

DETAIL PROFILE LINE of Lawless Forestry Road.

LEGEND

0·2-0·6% — INTERPRETED CAUSATIVE BODY.
0·2-0·6% — ESTIMATED AVERAGE SULPHIDE CONCENTRATION BY VOLUME.

POLE - DIPOLE ARRAY



COPPER MOUNTAIN CONSOLIDATED LIMITED.
TULAMEEN AREA, SIMILKAMEEN M.D. - B.C.

Horizontal Scale: 1 inch = 200 feet.

Vertical Scales:
Chargeability — 1 inch = 2·0 milliseconds.
Resistivity — 3 inches = 1 logarithmic cycle (ohm-meters)

To accompany report of W. A. Finney

N. R. PATERSON W. A. Finney, B.Sc., Geophysicist.

HUNTEC (BC) LIMITED Vancouver, Canada - July 1968.

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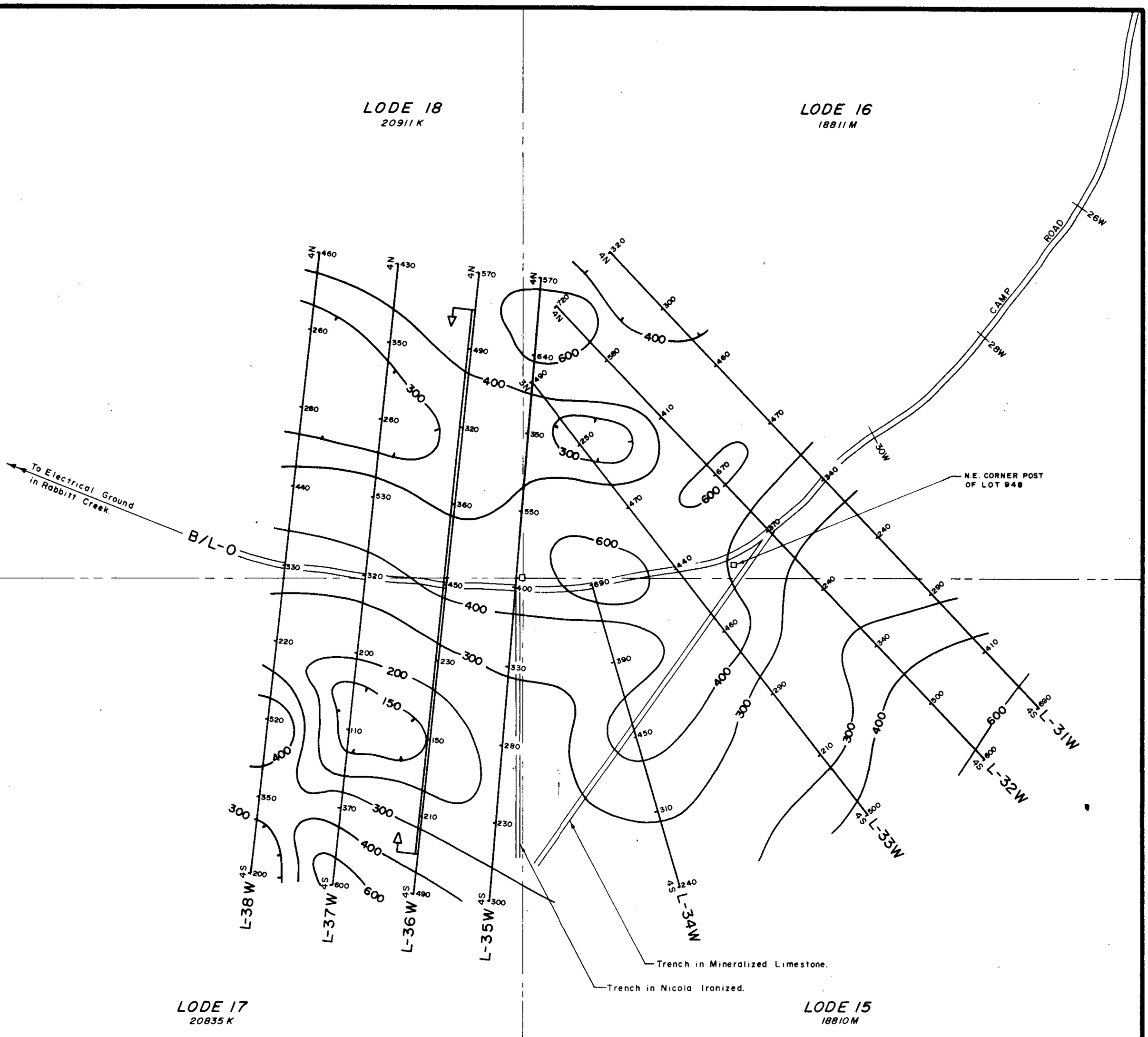
LODE 18
20911 K

LODE 16
18811 M

LODE 17
20835 K

LODE 15
18810 M



Department of Mines and Petroleum Resources
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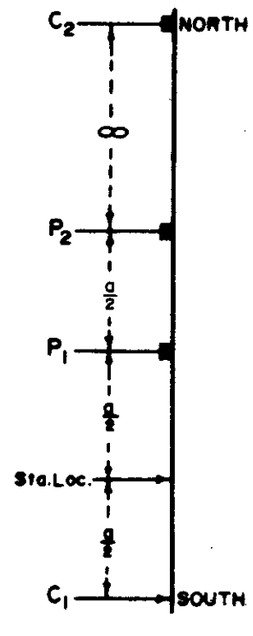
LEGEND

Portion of Line Covered by Detail Surveying.

N

POLE - DIPOLE ARRAY

a = 200 feet.



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TULAMEEN AREA, SIMILKAMEEN M.D. - B.C.

LODES 15 to 18 CLAIM GROUP.

INDUCED POLARIZATION SURVEY.

APPARENT RESISTIVITY CONTOURS

Contours at (logarithmic intervals): 150, 200, 300, 400, 600, 800, 1000 etc., ohm - meters.

To accompany report by: W. A. Finney

N. R. PATERSON — REGISTERED PROFESSIONAL ENGINEER

W. A. Finney, B.Sc., Geophysicist.

HUNTEC LIMITED. VANCOUVER - CANADA.

SCALE: 1 inch = 400 feet.

DRAWN: E.H.

DATE: JULY 1968.

JOB No P.H. 787.

1651

DWG. No - 787-2

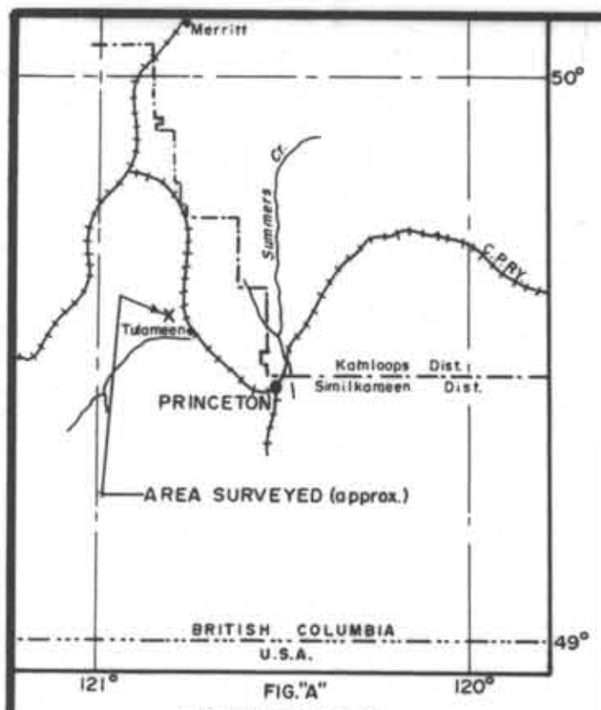


FIG. "A"

LOCATION MAP

Scale: 1 inch = 20 miles.

LODE 18
20911 K

LODE 16
18811 M

CAMP ROAD

26W

28W

30W

N.E. CORNER POST OF LOT 948

To Electrical Ground in Rabbitt Creek.

B/L-0

L-31W

L-32W

L-33W

L-34W

L-35W

L-36W

L-37W

L-38W

Trench in Mineralized Limestone.

Trench in Nicola Ironized.

LODE 17
20835 K

LODE 15
18810 M

LEGEND

Portion of Line Covered by Detail Surveying.

Possible Fault.

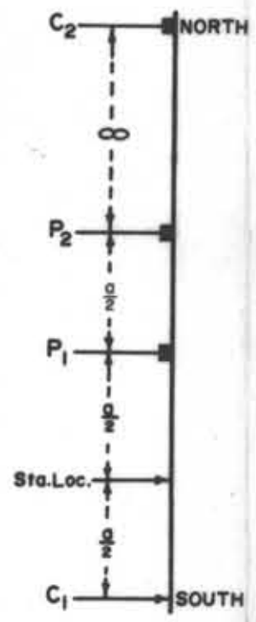
Interpreted Outline of Mineralized Zone.

Nº1 — Recommended Vertical D.D. Hole.

N

POLE - DIPOLE ARRAY

a = 200 feet.



Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 1651 MAP 2.

COPPER MOUNTAIN CONSOLIDATED LIMITED.

TULAMEEN AREA, SIMILKAMEEN M.D. - B.C.

LODES 15 to 18 CLAIM GROUP.

INDUCED POLARIZATION SURVEY.

APPARENT CHARGEABILITY CONTOURS WITH INTERPRETATION.

CONTOUR INTERVAL = 1·0 milliseconds.

REGISTERED PROFESSIONAL ENGINEER N. R. PATERSON

To accompany report by: W. A. Finney
W. A. Finney, B.Sc., Geophysicist.

HUNTEC LIMITED. VANCOUVER-CANADA.

SCALE: 1 inch = 400 feet.

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JOB Nº P.H. 787.

1651

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