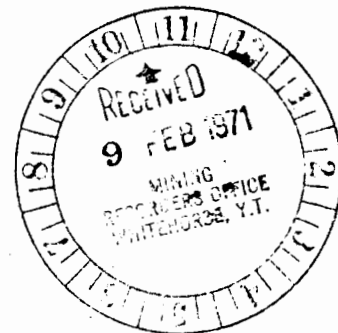




REPORT ON INDUCED POLARIZATION SURVEYS

FOR

MITSUBISHI METAL MINING COMPANY LTD.

ON

KL MINERAL CLAIM (1 to 9 inclusive) GROUP

61° 29' N, 136° 45' W, LONG LAKE AREA 115-H-7

WHITEHORSE MINING DISTRICT, YUKON TERRITORY

BY

P. Norgaard, P. Eng., Geophysicist
Geoterrex Ltd., Ottawa, Ontario

January 15, 1971

This report has been examined by the
Geological Survey of Canada and is recom-
mended to the Yukon Mining Act.
ed as required by the Yukon Mining Act.

\$7,498.93

D. B. Craig
D. B. Craig
Geophysicist

Considered to be a valid work under
Section 55 of the Yukon Mining Act.

[Signature]
Commissioner of Yukon Territory

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STATEMENT OF QUALIFICATIONS

Peer Norgaard, P.Eng., Geophysicist

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REPORT ON INDUCED POLARIZATION SURVEYS
ON KL MINERAL CLAIM (1 to 9 inclusive) GROUP
61° 29' N, 136° 45' W, LONG LAKE AREA, 115-H-7
WHITEHORSE MINING DISTRICT, YUKON TERRITORY

I. INTRODUCTION

In the period from July 26 to August 5, 1970, Geoterrex Limited of 1312 Bank Street, Ottawa, Ontario, completed induced polarization surveys on the "KL" claim group located in the Long Lake Area of the Yukon Territory on behalf of Mitsubishi Metal Mining Company Limited, which is a mining company legally incorporated in Japan having its main office in Tokyo and one of its branch offices in Vancouver (404-900 West Hastings Street, Vancouver 1, B. C.).

The purpose of the induced polarization surveys was to map the subsurface distribution of polarizable material in areas of interest previously defined by geological and geochemical surveys.

A total of approximately 58,300 line feet of induced polarization survey including detailed work was completed in the above period. The survey was completed by G. O'Reilly, a Geoterrex staff geophysicist, under the supervision of P. Norgaard, P. Eng., senior geophysicist with Geoterrex Limited.

II. GENERAL STATEMENT

1) Location and Geographic Features (See Fig. 1)

The property is situated at about $61^{\circ} 29' N$, $136^{\circ} 45' W$ in Long Lake Area of Claim Sheet 115-H-7, in Whitehorse Mining District, Yukon Territory. It is about 75 air miles NW of Whitehorse.

There is no access road into the property although there is Aishihik road about 10 air miles west of the property.

The elevation of the mineral claim group is approximately 4,000' to 4,800' on a steep hill with some vegetation at the bottom and less at the top.

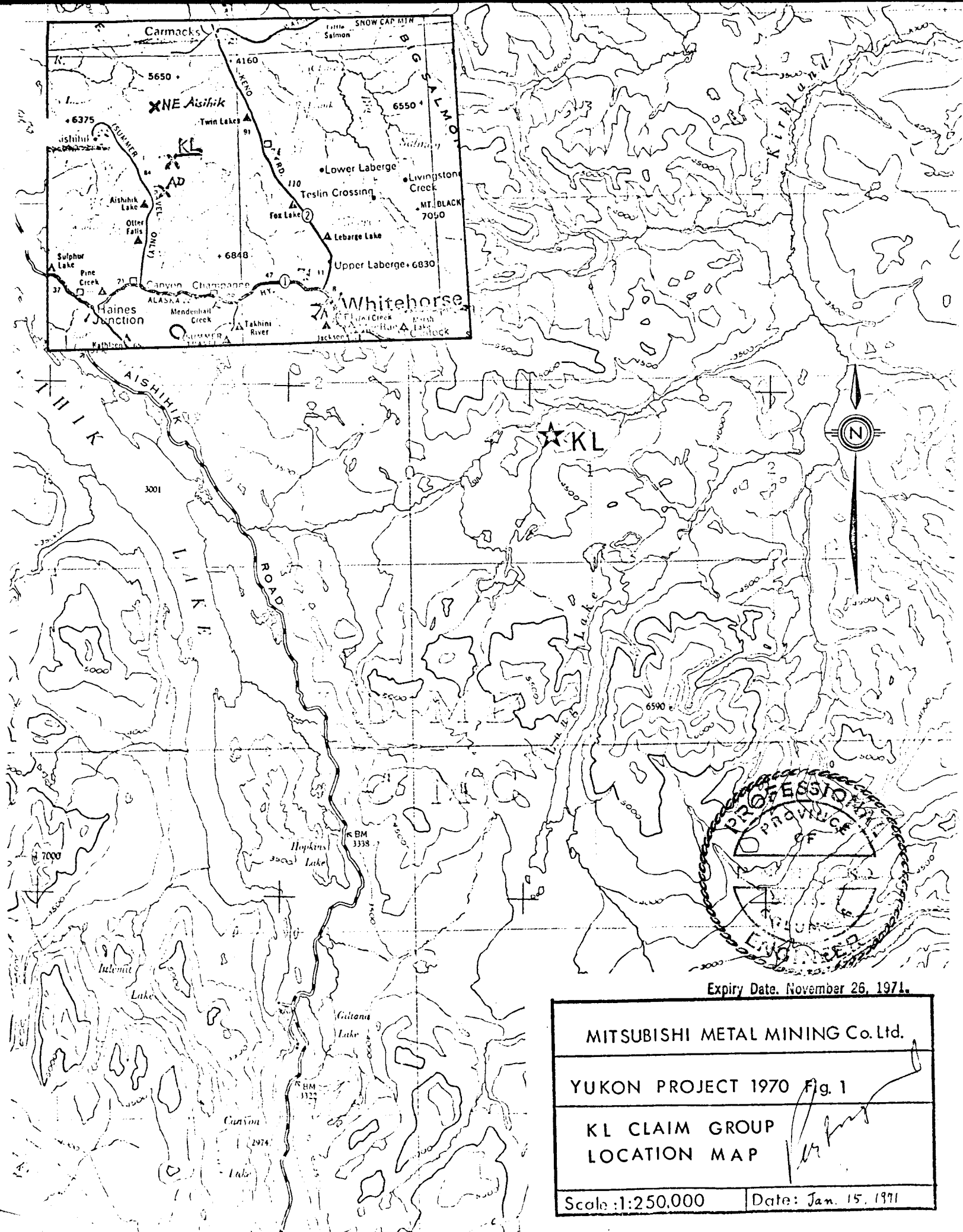
2) History of Mineral Claims (See Fig. 2)

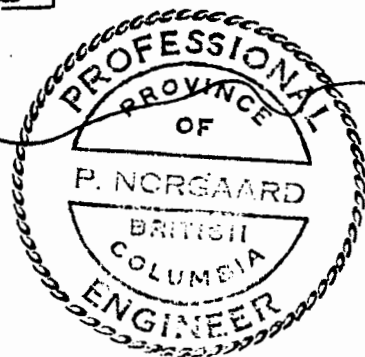
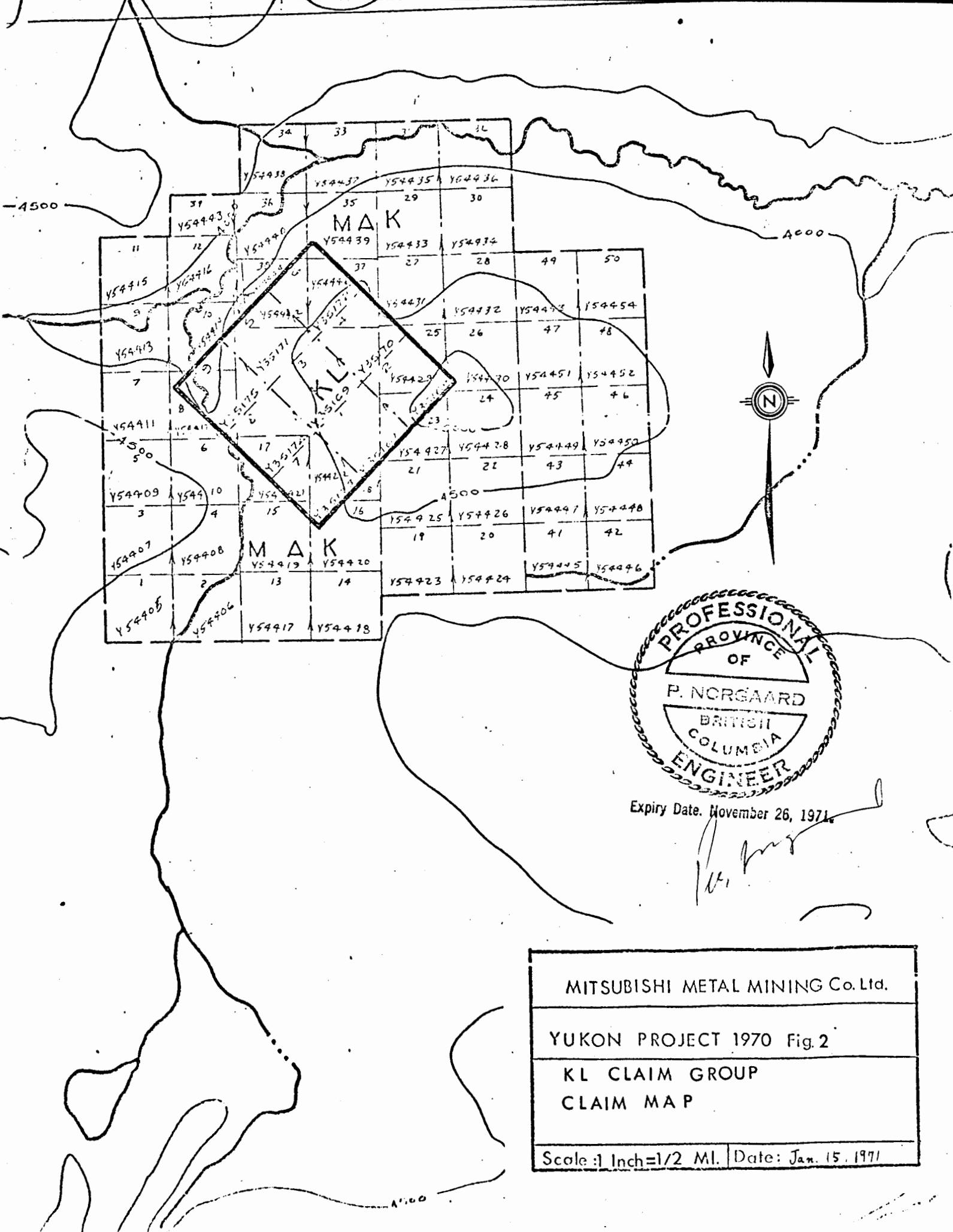
These mineral claims were located and transferred to Mitsubishi Metal Mining Co., Ltd. in 1969 as is shown in Table 1.

In May, 1970, Mitsubishi Metal Mining Co., Ltd. carried out geological and geochemical survey as representation work and was entitled validation of the claims until June, 1973.

3) Work Done

The representation work covered by this report was completed during the period July 26 to August 5, 1970 by Geoterrex Ltd. with the following field crew:





Expiry Date. November 26, 1971.

MITSUBISHI METAL MINING Co. Ltd.	
YUKON PROJECT 1970 Fig. 2	
KL CLAIM GROUP CLAIM MAP	
Scale: 1 Inch=1/2 MI.	Date: Jan. 15, 1971

TABLE 1 STAKING AND RECORDING SITUATION OF KL CLAIM GROUPS
(see Fig. 2 for location)

<u>CLAIM NAME</u>	<u>DATE LOCATED</u>	<u>NAME OF LOCATOR</u>	<u>DATE RECORDED</u>	<u>GRANT NO.</u>	<u>DATE TRANSFERRED TO MITSUBISHI</u>	<u>DATE EXTENDED BY ASSESS. WORK IN 1970</u>
KL - 1	31 May 1969	T. Kashiwagi	11 June 1969	Y35167	9 July 1969	11 June 1973
KL - 2	"	"	"	Y35168	"	"
KL - 3	"	"	"	Y35169	"	"
KL - 4	"	"	"	Y35170	"	"
KL - 5	"	"	"	Y35171	"	"
KL - 6	"	"	"	Y35172	"	"
KL - 7	"	"	"	Y35173	"	"
KL - 8	"	"	"	Y35174	"	"
KL - 9	"	W.E. Fraser	"	Y35175	"	"

Name and Address

G. O'Reilly, Geophysicist	740 Springland Drive, Ottawa, Ontario.
P. Norgaard, Geophysicist	749B Springland Drive, Ottawa, Ontario.
D. McLarty, Operator	23 Lommanche Drive, Ottawa, Ontario.
P. Volard, Helper	S.S. #1, Kimberley, B. C.
B. Wagg, Helper	Manotick, Ontario
G. Alton, Helper	S.S. #1, Kimberley, B. C.

The survey covers at least parts of claims KL-1 to KL-9 inclusive.

III. SURVEY INSTRUMENTS

Direct current, pulse-type induced polarization equipment was employed for the survey.

The I.P. receiver is of Newmont design and manufactured by Scintrex Limited, Concord, Ontario. The receiver has the integration time constant adjusted to give readings of apparent chargeability equivalent to those with a timing cycle of 3:3:1 in spite of the fact that it actually operates on a timing cycle of 2:2:0.65 (current "off" time, secs., current "on" time, secs., integration time, secs.).

The transmitter and motor-generator set are manufactured by Huntco Limited, Toronto, Ontario. A power supply and a transmitter of 2.5 kilowatt rating were used for the present survey.

Detailed specifications for the instruments are enclosed in the Appendix to this report.

IV. SURVEY PROCEDURE

1) Survey Procedure

The induced polarization survey was completed using the pole-dipole electrode configuration which is illustrated in Figure 3 in the Appendix to this report. The pole-dipole array is known as the equispaced three array when the three moving electrodes are spaced equidistant along the survey line for a particular reading.

Before commencing the reconnaissance I.P. Surveys in either of the two areas several "expanders" were completed within the survey area in order to select suitable dipole lengths and determine the pole-dipole separations required for adequate penetration. As the survey progressed such "expanders" were completed at fairly regular intervals along the lines and especially in areas where changes in the apparent chargeability and resistivity levels suggested that there might have been a change in the depth of cover. An "expander" here consists of a series of readings taken at one location using the equispaced three electrode array and electrode spacings ranging from 5 feet to 400 feet as required and expanding roughly at logarithmic intervals (5 ft., 10 ft., 25 ft., 50 ft., etc.). For readings taken with electrode spacings of 100 feet or smaller the current pole would be fixed at one point and the potential electrodes alone would be moved to obtain equispaced electrodes; for spacings greater than 200 feet the mid-point between the current pole and the "near" potential electrode would be the point at which the current pole had been fixed for the small spacing readings.

For the reconnaissance coverage of the survey areas 100 feet or 200 feet dipole lengths were employed and readings were always taken for pole-dipole separation equal to the dipole length and twice the dipole length yielding dual reconnaissance coverage, and thus continuous depth control throughout. The reading interval along the lines for the reconnaissance work was always equal to the dipole length employed.

For purposes of better definition of causative bodies and interpretation of anomalies, detailed work was completed on selected sections of lines using the equispaced three array and electrode spacings of 25 feet, 50 feet and 100 feet as required. For this detailed work the reading interval along the lines is equal to the electrode spacing.

2) Data Observed

The field measurements taken are as follows:

- a) The applied current, I_a , flowing through the two current electrodes.
- b) The primary voltage, V_p , which exists between the potential electrodes while the current is flowing.
- c) The apparent chargeability, M_a which is the I.P. effect noted for two current pulses applied in opposite directions.

3) Data Reduction

The apparent chargeability, M_a , in milliseconds or millivolt-seconds per volt is read directly on the Newmont type I.P. receiver. As mentioned earlier in this report, the chargeability is measured for a complete cycle rather than per single pulse.

From the observations of primary voltage, V_p , and the applied current, I_a , the apparent resistivity is calculated at each station as follows:

$$\rho_a = \frac{V_p}{I_a} \cdot K$$

Where ρ_a is the apparent resistivity in ohm meters

V_p is the primary voltage in volts

I_a is the applied current in amps

K is the constant dependent on the array geometry.

V. DATA PRESENTATION

The apparent chargeability and apparent resistivity data are presented in profile form on plates accompanying this report at a horizontal scale of 1 inch = 200 feet. The apparent chargeability results are plotted at a vertical scale of 1 inch = 10.0 milliseconds and the apparent resistivities at a logarithmic scale as shown on the plates.

Please note that for the sake of clarity of presentation of the results, the lines are not spaced to scale on the profile plots.

The reconnaissance chargeability values are also presented in contoured form at a scale of 1 inch = 200 feet and with a contour interval of 5.0 milliseconds. Where, in the course of completing the reconnaissance survey, the electrode geometry was changed, this has been indicated on the contour plans and the contours for data obtained using different spacings has been contoured separately.

The results obtained from the expanders are shown as individual log-log plots attached to this report. All expander positions are clearly indicated on the profile plots; a triangular symbol shows the fixed location of the current "pole" for electrode spacings of less than 100 feet and an arrow indicates the direction in which the potential electrodes were moved to obtain the readings for the particular expander.

The distribution of data on the various plates is as follows:

Plate I KL Area, Profile Presentation

Plate II KL Area, Contour Plan

VI. DISCUSSION OF RESULTS

To aid in the interpretation of the induced polarization survey data, Mitsubishi Metal Mining Company Limited made the following information available to Geoterrex Limited:

KL Claim Group

Assessment Report, 1970, by Toru Kikuchi, Ph.D., P.Eng.

Geological Map, 1970, Mitsubishi.

Geochemical Soil Sampling Maps, Copper and Molybdenum,
1970, Toru Kikuchi, Ph.D., P.Eng.

Ground Magnetic Survey Data, 1970, Mitsubishi.

KL AREA

The KL area grid does not cover the entire claim block as only fractions of claims KL 5, 6 and 9 were covered by the present survey. Except for the northeast corner of the grid which is mapped as granite the survey area is underlain by what has been described as a monzonite porphyry. (T. Miyauchi, N. Sato, August 1970)

A zone of alteration has been outlined near the centre of the grid within the area underlain by the monzonite porphyry and within this zone disseminated mineralization consisting of pyrite, magnetite and chalcopyrite has been mapped. A substantial geochemical anomaly is related to this "showing area".

The reconnaissance coverage of the KL grid yielded anomalous chargeability values almost throughout, suggesting that mineralization in the area is widespread. The depth of cover within the area ranges from zero near the top of the ridge on which the base line is roughly centered to 100 - 150 feet further down the hillside towards grid north and grid west.

Numerous depth-to-source estimates have been made as indicated on the chargeability contour plan (plate II). With dual reconnaissance data as was obtained here it is possible to estimate such depths on all anomaly peaks.

The contoured reconnaissance data shown on plate II indicates two main concentrations of mineralization, one of which appears to be completely outlined by the present survey; it is located between lines 9W and 30W. The other zone(s) is situated at the west end of the grid and is only partially covered at present, but the apparent lack of any geochemical responses in association with this zone makes it of second priority at this time; it should be noted that the depth of cover or capping on the source material in this vicinity is in the order of 80 feet - 100 feet.

Detailed work completed on lines 15W and 21W has pinpointed the main concentrations of polarizable material near the alteration zone and just up slope from the main geochemical anomaly. No detailed work was completed over the anomalous area at the west end of the grid.

In general there is a direct relationship between the areas of the highest concentrations of polarizable material, and zones of substantial magnetic activity within the priority region located between lines 9W and 30W which enclose the "showing area".

The magnetic anomalies here are caused by near surface source material and concentrations of magnetite in the order of 15% - 20% by volume are indicated. Magnetite is thus a significant contributing factor to the high polarization responses noted in this vicinity.

The best resolution of zones of greatest concentration of polarizable material is obtained when employing the smaller dipole lengths, providing the depth of cover is not too great for a particular electrode spacing. For example, the data obtained on line 15W, using the 50 ft. dipole length, maps the locations of the anomalous material very well between stations 4N and 18N, but there is no indication of the polarizable material located below station 22N. Hence, to locate the source material reference should always be made to the results obtained with the smallest dipole length and pole dipole spacing, which is clearly illustrated by the data obtained on line 15W using dipole lengths varying from 50 feet to 200 feet.

On line 15W anomaly axis related to source material coming to surface are located at stations 5 + 25N, 6 + 75N and 7 + 75N with concentrations in the order of 6% - 10% average by volume being possible at the latter two locations. A depth of 15 feet - 20 feet is indicated at anomaly peaks located at 11 + 50N and 15 + 25N, but the concentrations of source material here would be less than that indicated near station 7N. All these chargeability anomaly peaks located between 4N and 18N have correlating magnetic anomaly peaks.

Centered at station 22 + 50N a chargeability anomaly was noted using the 100 feet equispaced three array. This particular anomaly lacks magnetic correlation and appears to be caused by polarizable material located at a depth of about 100 feet. The concentration of source material could be in the order of 5% - 10% average by volume.

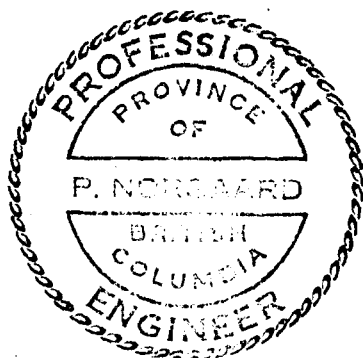
The large "shoulder" noted on line 12W on the "a = 100, n = 2" profile is probable reflecting this same zone, but here the depth of cover or capping is likely greater than 100 feet.

On line 21W where extensive detailing was also completed, anomaly axis defined by the 50 feet spacing three array are located at stations 5N, 7 + 75N and 19 + 75N. At the latter point the depth of cover is indicated to be about 15 feet - 20 feet but at the other locations the source material appears to come to the surface. The greater concentration of polarizable material is located near station 20N where 4% - 6% average by volume could be present. As for line 15W, there appears to be good correlation between chargeability anomaly peaks and magnetic anomalies.

SUMMARY - KL AREA

The reconnaissance coverage indicates that polarizable material is widespread within the area surveyed which includes a zone of alteration carrying pyrite, chalcopyrite and magnetite. A substantial copper geochemical anomaly has been outlined in the north central part of the grid. Detailed work in this vicinity has mapped the concentrations of chargeable material which, generally speaking, occur in correlation with large magnetic anomalies; as much as 15% - 20% by volume of magnetite could be causing the magnetic anomalies which, on lines 12W and 15W, have amplitudes in the order of 9,000 - 12,000 gammas. Such concentrations of magnetite could give rise to chargeability anomalies of the amplitudes noted here.

Trenching is suggested for checking the polarization anomalies near the base line on lines 15W and 21W where the source material appears to come to the surface, but drilling would be necessary to check the I.P. anomaly located on line 15W near station 22N. Trenching on the anomaly peaks where cover in the order of 15 feet is indicated, might be possible considering the topography in the area. For purposes of drilling the deeper zones, depths and anomaly axis points have been specified.



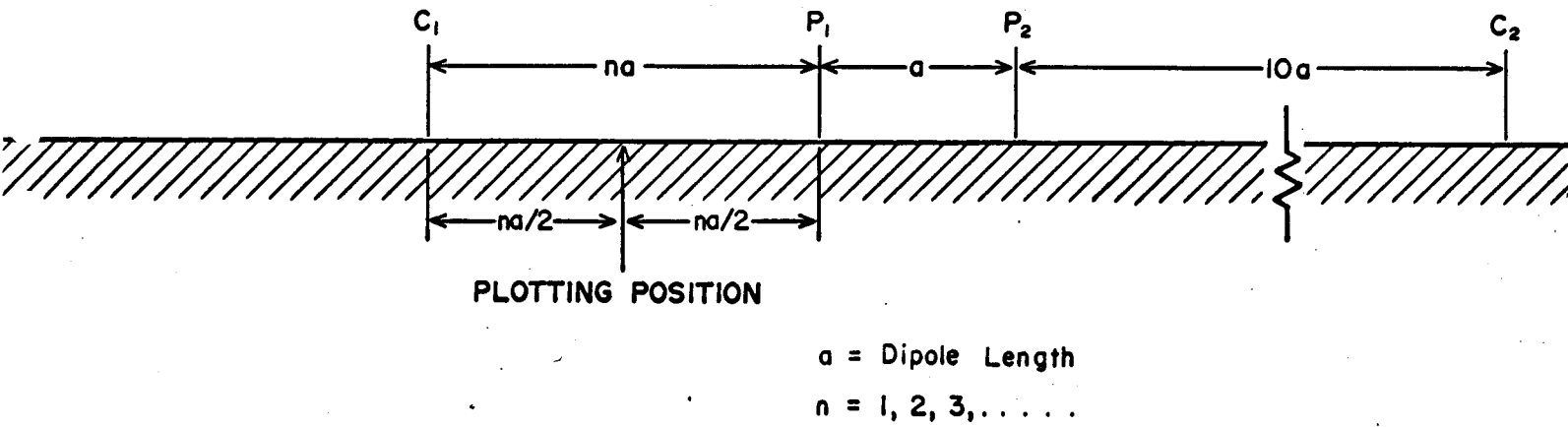
Expiry Date. November 26, 1971.

Respectfully submitted,

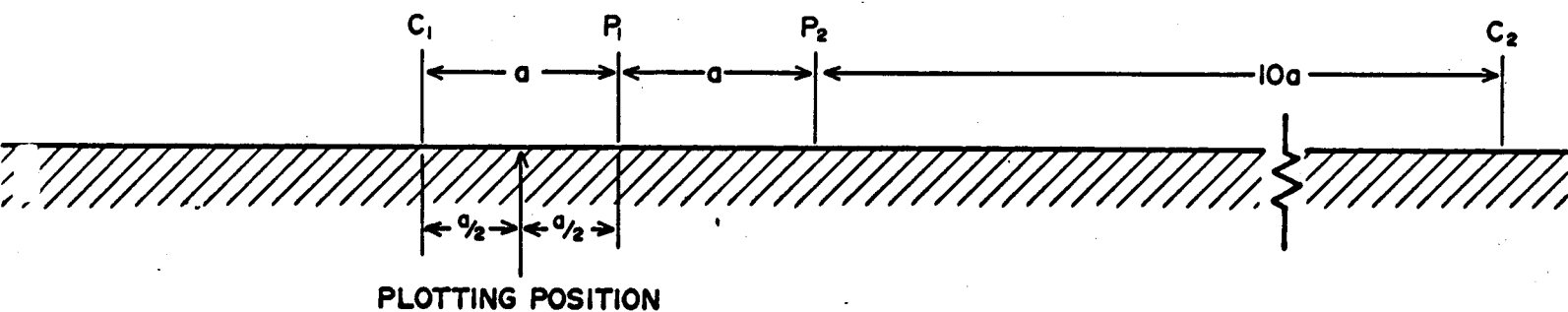
A handwritten signature in black ink, appearing to read "Peer Norgaard".

Peer Norgaard, P.Eng.,
Geophysicist

POLE-DIPOLE ELECTRODE ARRAY



EQUISPACED THREE ELECTRODE ARRAY



3
 FIG: ■ POLE-DIPOLE ELECTRODE CONFIGURATIONS.

INSTRUMENT SPECIFICATIONS

1. Newmont Receiver:

Electrical -

Primary Voltage Range	300 microvolts to 30V Accuracy $\pm 3\%$
Input Impedance	300 K ohms
Chargeability (M) Reading Range	0-100 and 0-300 milliseconds Accuracy $\pm 5\%$
Curve Factor (L) Reading Range	0-100 and 0-300 milliseconds Accuracy $\pm 5\%$
Delay Time Before Integration	0.45 seconds
SP and VLF Noise Compensation	Manual: ± 1.5 volts Automatic: 1mV range ± 10 mV total 30 volt range ± 10 volt total
Power Supply	Internal rechargeable nickel cadmium batteries. Rated life 45 hours/charge.
Temperature Range	-20° to 130° F (-29° C to $+55^{\circ}$ C)
Humidity Range	to 100% non-condensing

NOTE: A time reference signal is remotely obtained from the received primary signal to give coherent detection.

Automatic SP corrections are applied during each reading period using a memory circuit.

Mechanical:

Weight	13½ lbs. (6.1 kg) including batteries.
Dimensions	14" x 11" x 6½" (32.5 cm x 28 cm x 16.5 cm).

INDUCED POLARIZATION TRANSMITTER

2.5 KW System

Output	300-5000 volts DC in 8 steps 3 amps maximum
Input	3 phase 400 cps 115 volt 2.75 KVA
Output	2 ranges
Current Meter	0-1.5 amps and 0-3 amps $\pm 2\%$
Dummy Load	2 Level - 1750 watts and 500 watts
Size	21" x 17" x 11 $\frac{1}{2}$ " (53.1 cm x 43.2 cm x 29.2 cm)
Weight	Console 50 lbs. (22.7 kg) Shipping weight 75 lbs. (34.0 kg).

MOTOR GENERATOR SET

Output	2.75 KW, 120 volts 400 cycle 3 phase 13.8 amps/phase
Engine	Briggs and Stratton 6 HP at 3600 RPM
Fuel	Capacity: 0.92 Imperial Gals. (4.1 litres). Consumption: Approx. 1.2 lbs/KWH (.5 kg/KWH)
Alternator	6000 RPM Belt Driven. Sealed bearing, rotating field.

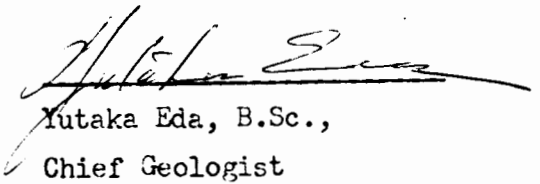
Statement of Expenses

With an Affidavit by Y. Eda
Chief Geologist of the Work
Mitsubishi Metal Mining Co., Ltd.

		Receipt No.
Professional Charge for the IP Survey	\$ 4,150.93	No. 1
Catering for Crews	748.00	No. 2
Helicopter	2,600.00	No. 3
TOTAL	\$ 7,498.93	

This amount, if accepted, is good for Four years
for the Claim Group consisting of Nine Mineral Claims.

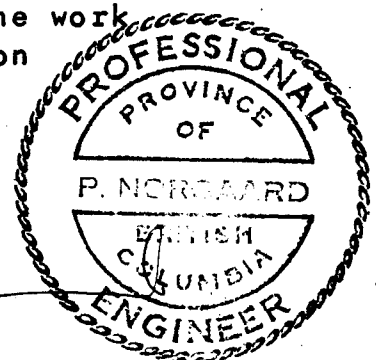
January 15, 1971


Yutaka Eda, B.Sc.,
Chief Geologist

STATEMENT OF QUALIFICATIONS

I, Peer Norgaard, of 749B Springland Drive, Ottawa 8, Ontario, hereby certify that:

1. I attended the University of Toronto for studies in Engineering Physics, Geophysics Option, during the period 1955 to 1959.
2. I am a member in good standing of the Association of Professional Engineers of Ontario and a non-resident member of the Association of Professional Engineers of the Province of British Columbia.
3. I am a member of the Society of Exploration Geophysicists, The Canadian Exploration Geophysical Society and of The Canadian Institute of Mining and Metallurgy.
4. I have been practicing my profession continuously for the past twelve years and am currently a Senior Geophysicist and Manager of Ground Geophysical Surveys at Geoterrex Limited, having its head office at 1312 Bank Street, Ottawa 1, Ontario.
5. I have no direct or indirect interest in the property, nor do I anticipate receiving any such interest.
6. This report is based on my supervision of the work including a personal visit to the property on July 25, 1970.



Expiry Date. November 26, 1974.

January 15, 1971.

Peer Norgaard, P.Eng.

VOICE:

GEOTERREX LIMITED

INTERNATIONAL RESOURCES and ENGINEERING

100 BANK STREET

OTTAWA 1, ONTARIO

Area code (613)-731-9571

Cable address GEOTERREX

TO:

Mitsubishi Metal Mining Co. Ltd.,
404 - 900 West Hastings St.,
VANCOUVER 1, B.C.

DETAILS

15 January, 1971.

RE: Induced Polarization Surveys in Yukon Territory.

Mobilization-Demobilization
Survey Charge July 1 - August 6, 1970

\$1,765.00 U.S.

11,442.50 U.S.

\$13,207.50 U.S.

This charge is prorated as follows:

AD Mineral Claim Group:

\$9,056.57 U.S.

KL Mineral Claim Group:

\$4,150.93 U.S.

Payment Received with Thanks.

Receipt No. 1

BOX 1125, WHITEHORSE, Y.T.

PHONE 068-2136.

WHOLLY OWNED SUBSIDIARIES:
GLOBE AIR SERVICES LTD.
TERRIKON ELECTRONICS LTD.

INVOICE

EXPEDITING
AIRCRAFT CHARTER
CATERING
RADIO COMMUNICATIONS

Receipt No. 2

DATE August 11, 1970

Mitsubishi Metal Mining,
#404 - 900 W. Hastings St.,
Vancouver, B.C.

No. A 1300

DESCRIPTION	AMOUNT
re: catering Aishihik Lake	
August 3 - August 9	
18 man days @ \$7.00 per day	126.00
55 man days @ \$17.00 per day	935.00
TOTAL	1061.00

Stamp: AUG 31 1970

THE TORONTO-DOMINION BANK

499 GRANVILLE & PENDER STS.
VANCOUVER 2, B.C.

✓ 70.
Aug 31 19 70

PAY TO THE
ORDER OF

TERRIKON ENTERPRISES LTD.

\$ 7033.75

— Seven thousand thirty three — 75/100 DOLLARS

499 GRANVILLE ST.
VANCOUVER 2, B.C.

SHIGEKI YABUTA OR NORITAKA SATO

S. Yabuta

⑆95120⑆004⑆ 910 9⑆86975⑆

⑆0000703373⑆

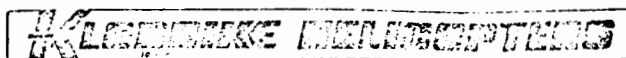
Receipt No. 2

@ \$17.00/day-person x 4 persons x 11 days = 748.00 dollars

THE TORONTO-DOMINION BANK 10-2 ✓
 499 GRANVILLE & PENDER STS.
 VANCOUVER 2, B.C.
 PAY TO THE ORDER OF SHIGEKI YABUTA OR NORITAKA SATO \$ 2,600.00
Twenty thousand six hundred and no/100 DOLLARS
 SHIGEKI YABUTA OR NORITAKA SATO
S. Yabuta
 ⑆95120⑆004⑆ 910 9⑆86975⑆ ⑆0002⑆

Receipt No. 3

20 hours used for I.P. Survey
 @\$130.00/hour x 20 hours = \$2,600.00



HANGAR NO. 1, INTERNATIONAL AIRPORT
CALGARY 67, ALBERTA, CANADA

Receipt No. 3

SOLD TO • Mitsubishi Metal Mining Co.Ltd.
404-900 West Hastings St.
Vancouver 1, B.C.

September 10, 1970

ACCOUNTS DUE WHEN RENDERED
CUSTOMER'S ORDER NUMBER

SHIP VIA

DATE SHIPPED

PAYABLE AT PAR CALGARY

AIRCRAFT

TRIP NO.

CF-UAI, KAD

QUANTITY

PART NUMBER

DESCRIPTION

PRICE

AMOUNT

PILOTS: T.Churcott, R.Brakenbury

TO: Charge for charter of one Bell 47G3 helicopter
as per authorized Daily Flight Reports #22076-#22083,
#22086-#22096, #22099, #22100-#22105 attached. (CF-UAI)

Charge for charter of one Bell 47G3B1 helicopter
as per authorized Daily Flight Report #19287 attached.
(CF-KAB)

FLYING: July 20, 22-29, Aug.2-5, 7-13, 18-24, 1970

CF-UAI 156:20 hrs. @ \$130.00 per hr.
(fuel supplied by charterer) \$20,323.25

CF-KAB 1:30 hrs. @ \$130.00 per hr.
(fuel supplied by charterer) \$ 195.00

TOTAL INVOICE \$20,518.25



Charter • Overhaul • • • Bell and Hiller Helicopters

No 4700

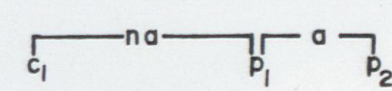
INDUCED POLARIZATION SURVEY
FOR
MITSUBISHI METAL MINING COMPANY LIMITED

"KL" AREA

YUKON

PLATE 1

PROFILE PLAN

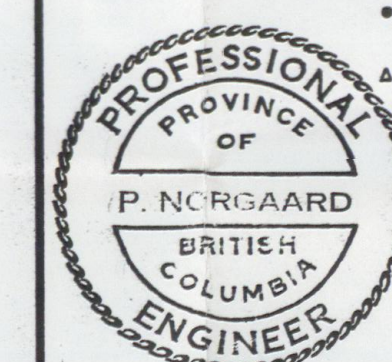
ELECTRODE CONFIGURATION : POLE DIPOLE 

SCALES

HORIZONTAL 1 INCH = 200 FEET
APPARENT CHARGEABILITY 1 INCH = 100 MILLISECONDS
APPARENT RESISTIVITY LOGARITHMIC AS SHOWN
EFFECTIVE "DC. PULSE 1P" TIMING SEQUENCE: 3 : 3 : 1 ON OFF INTR.
N.B. LINES ARE NOT SPACED TO SCALE

LEGEND

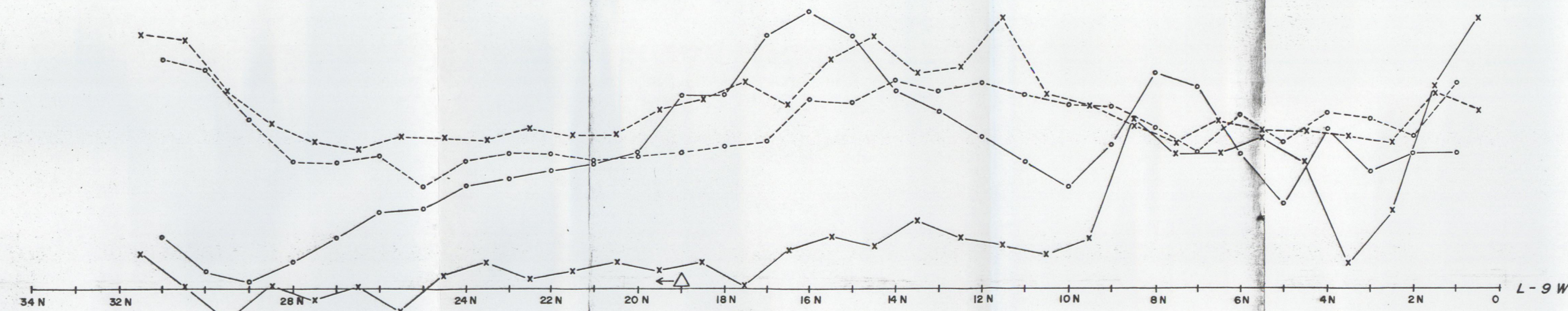
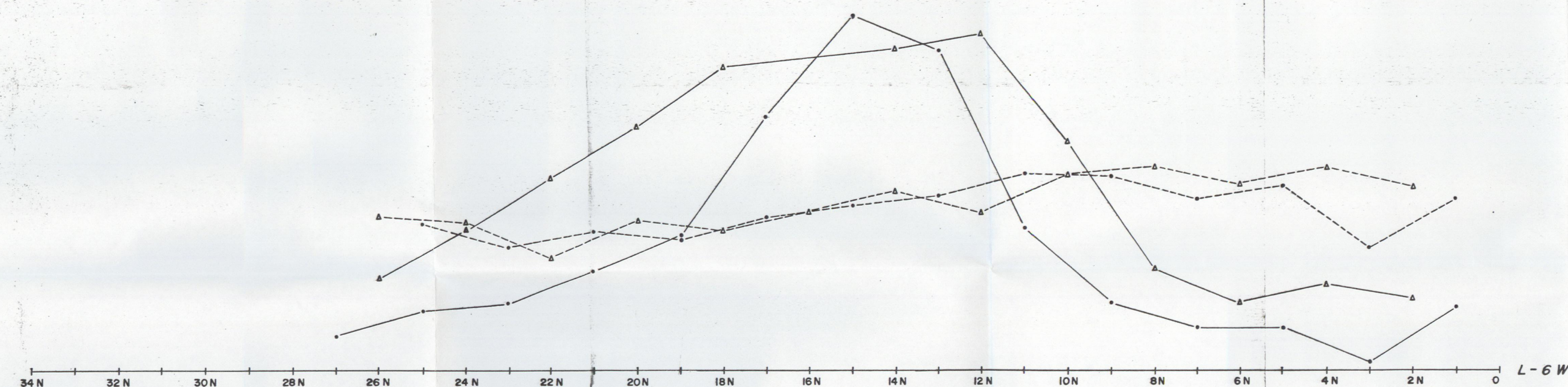
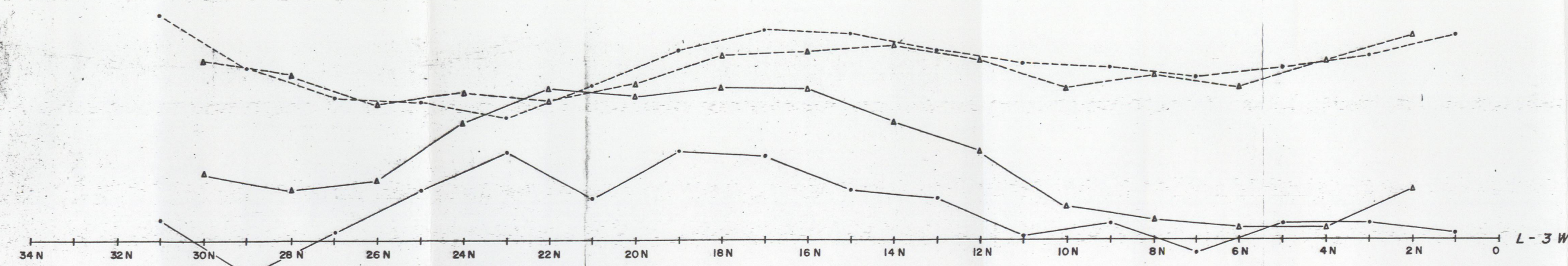
APPARENT CHARGEABILITY	APPARENT RESISTIVITY
● — ●	Q = 50
x — x	n = 1
○ — ○	Q = 100
△ — △	n = 1
—	n = 2
—	Q = 200
—	n = 1
—	n = 2
△ →	= EXPANDER POSITION



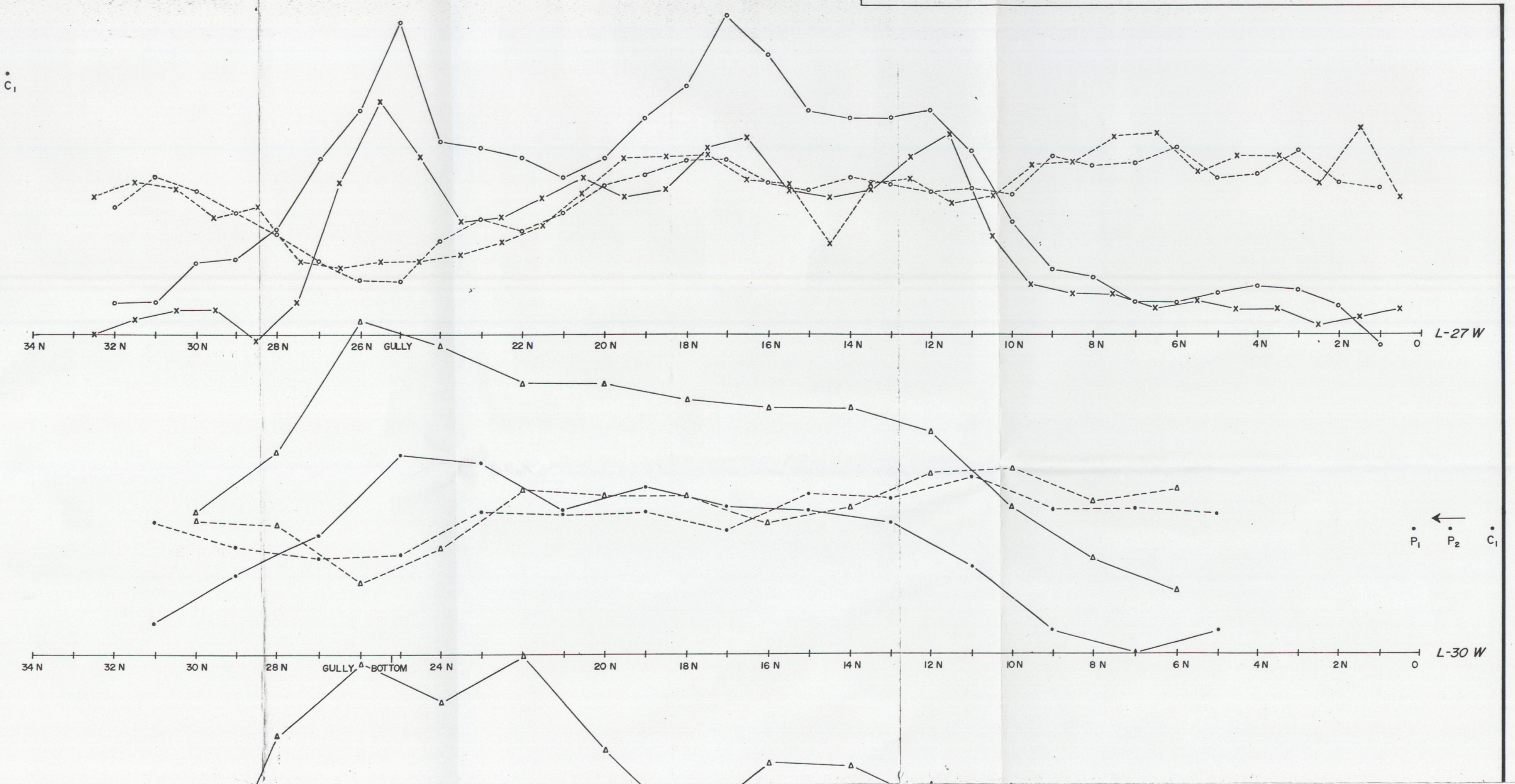
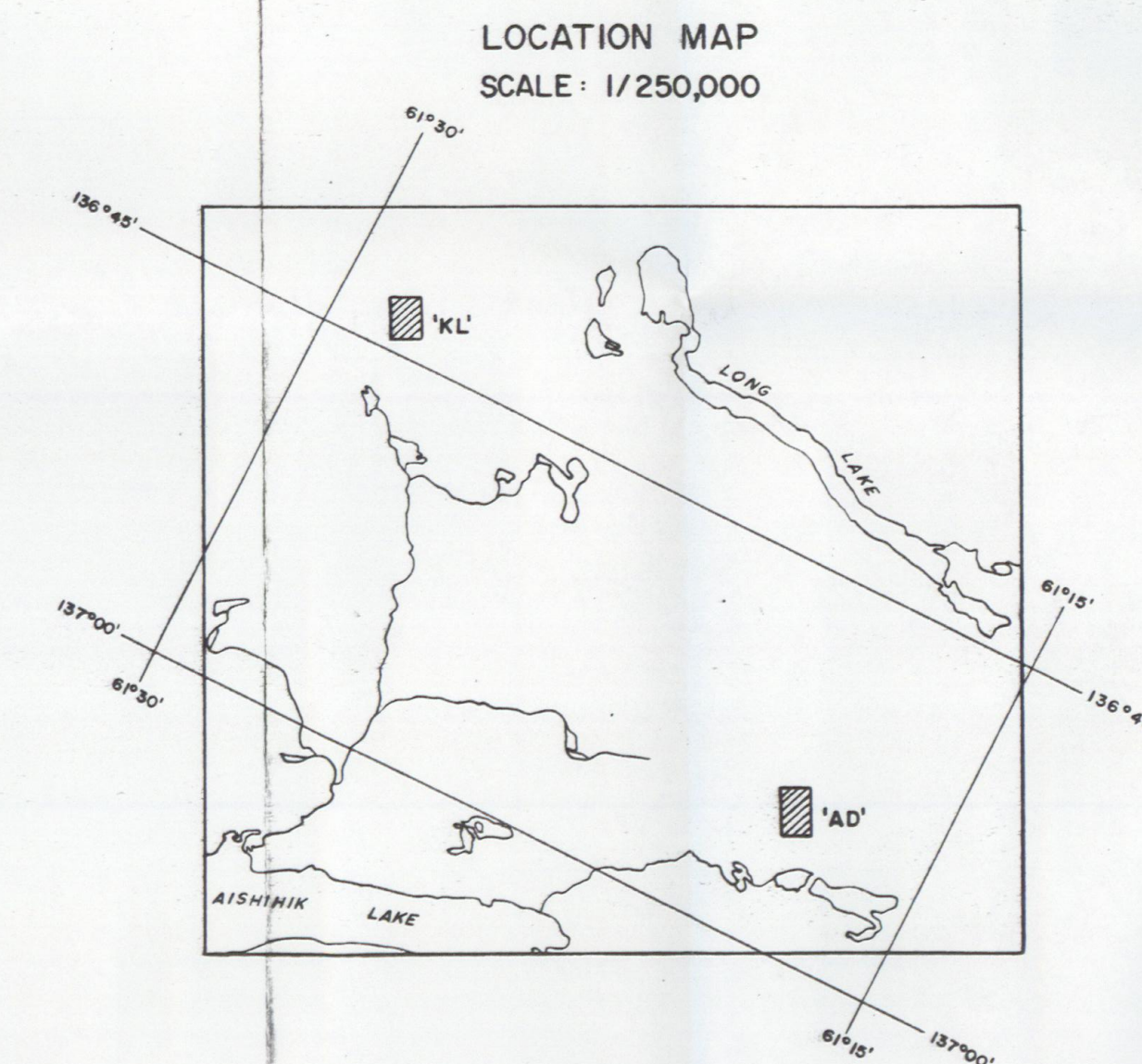
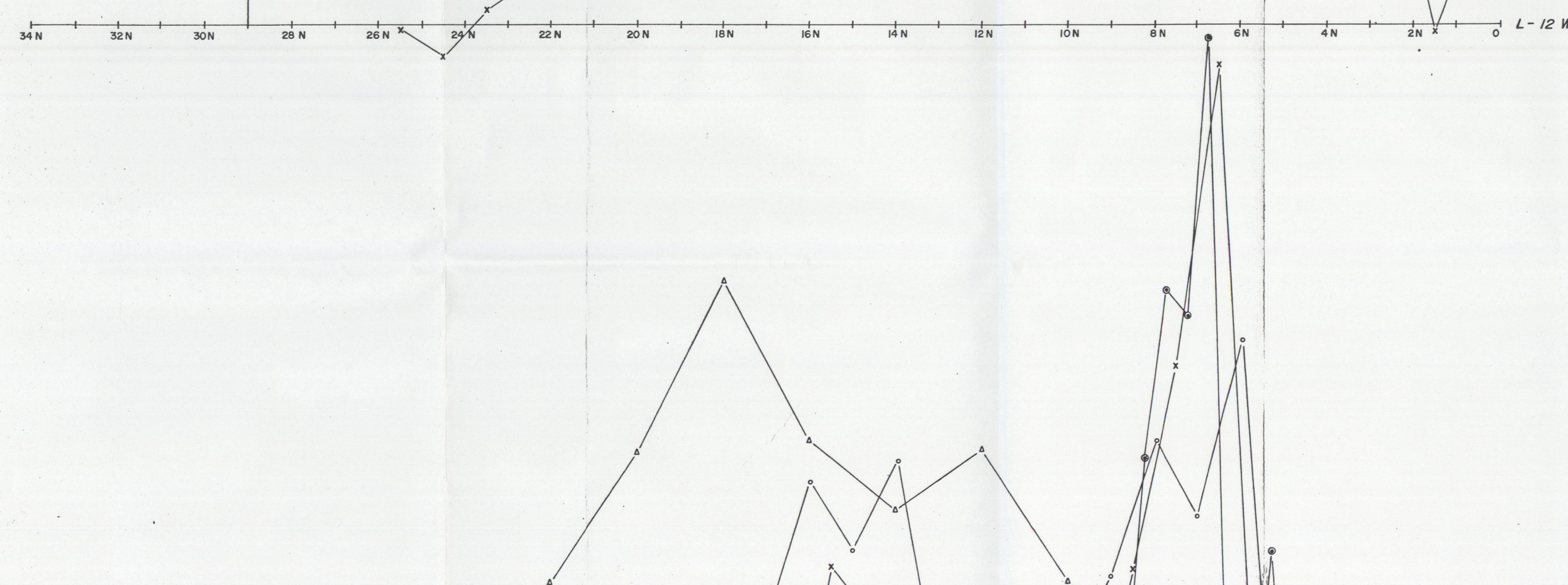
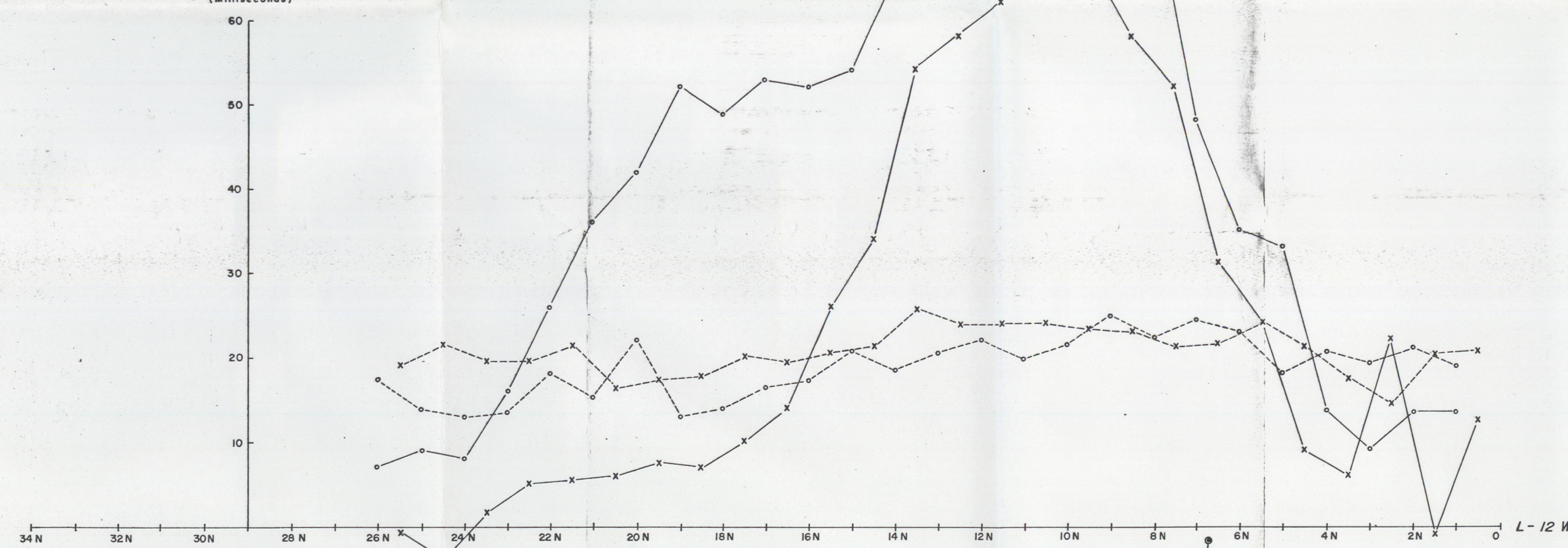
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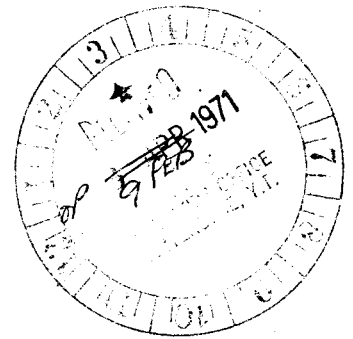
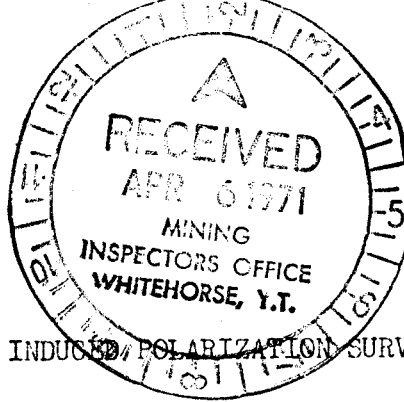
TO ACCOMPANY REPORT BY P. NORGAAUD
AUGUST 1970

GEOTERREX PROJECT No. 85-15



CHARGEABILITY SCALE
(Milliseconds)





REPORT ON INDUCED POLARIZATION SURVEYS

FOR

MITSUBISHI METAL MINING COMPANY LTD.

ON

AD MINERAL CLAIM (1 to 64 inclusive) GROUP

61° 17' N, 136° 54' W, HOPKINS LAKE AREA, 115-H-7

WHITEHORSE MINING DISTRICT, YUKON TERRITORY

BY

P. Norgaard, P.Eng., Geophysicist

Geoterrex Ltd., Ottawa, Ontario

January 15, 1971

This report has been examined by the Geological Evaluation Unit and is recommended to be filed in the records of the Geological Survey of Canada as a report on the results of a field investigation.

814,948-57
D.R. Craig

Conditioned for use in the work under Section 30 of the Mining Act.

[Signature]
Commissioner of Yukon Territory

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STATEMENT OF QUALIFICATIONS

Peer Norgaard, P.Eng., Geophysicist

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- Fig. 1 Location Map
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Table: 1 List of AD Mineral Claims

Plates: 1 AD Area, Profile Presentation, Lines 15S - 15N
 2 AD Area, Profile Presentation, Lines 18N - 39N
 3 AD Area, Profile Presentation, Lines 42N - 60N
 4 AD Area, Contour Plan

REPORT ON INDUCED POLARIZATION SURVEYS
ON AD MINERAL CLAIM (1 to 64 inclusive) GROUP
61° 17' N, 136° 54' W, HOPKINS LAKE AREA, 115-H-7
WHITEHORSE MINING DISTRICT, YUKON TERRITORY

I. INTRODUCTION

In the period from July 1 to July 24, 1970, Geoterrex Limited of 1312 Bank Street, Ottawa, Ontario, completed induced polarization surveys on the "AD" claim group located in the Aishihik Lake Area of the Yukon Territory on behalf of Mitsubishi Metal Mining Company Limited, which is a mining company legally incorporated in Japan having its main office in Tokyo and one of its branch offices in Vancouver (404-900 West Hastings Street, Vancouver 1, B. C.).

The purpose of the induced polarization surveys was to map the subsurface distribution of polarizable material in areas of interest previously defined by geological and geochemical surveys.

A total of approximately 117,300 line feet of induced polarization survey including detailed work was completed in the above period. The survey was completed by G. O'Reilly, a Geoterrex staff geophysicist, under the supervision of P. Norgaard, P.Eng., senior geophysicist with Geoterrex Limited.

II. GENERAL STATEMENT

1) Location and Geographic Features (See Fig. 1)

The AD claim group is situated at latitude 60°17' N and longitude 136°54' W, just east of the Aishihik Lake Road between miles 31 and 34 which is the Hopkins Lake Area of Claim Sheet 115-H-7 in the Whitehorse Mining District, Yukon Territory.

AD claim group is approximately 3,300 feet to 5,300 feet in elevation. There is a steep hill at the western extremity of the group and most parts of the group consists of a gentle series of hills over 4,000 feet high with sparsely distributed swamps. There is no access road from Aishihik Lake Road to the center of the group.

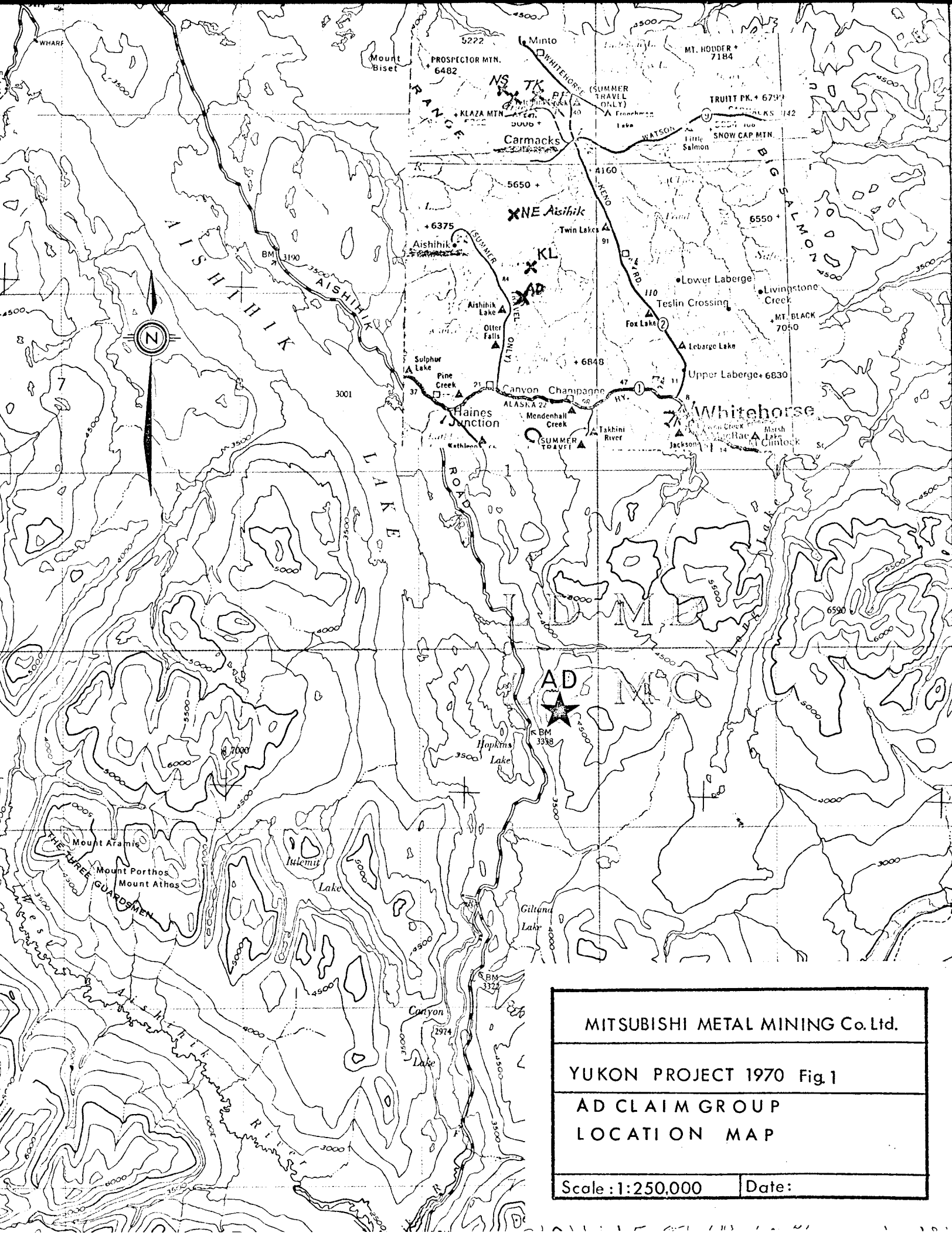
2) History of Mineral Claims (See Table 1)

The AD claim group was staked in 1968 and was transferred to Mitsubishi Metal Mining. In 1968, geochemical and geological surveys were done and this work was allowed as representation work entitling validation of the group until 1972.

An application will be made to group these 64 mineral claims into four groups as is shown in Fig. 2, before applying for a Certificate of Work.

3) Work Done

The representation work covered by this report was completed during the period July 1 to July 24, 1970 by Geoterrex Limited with field crews as follows:



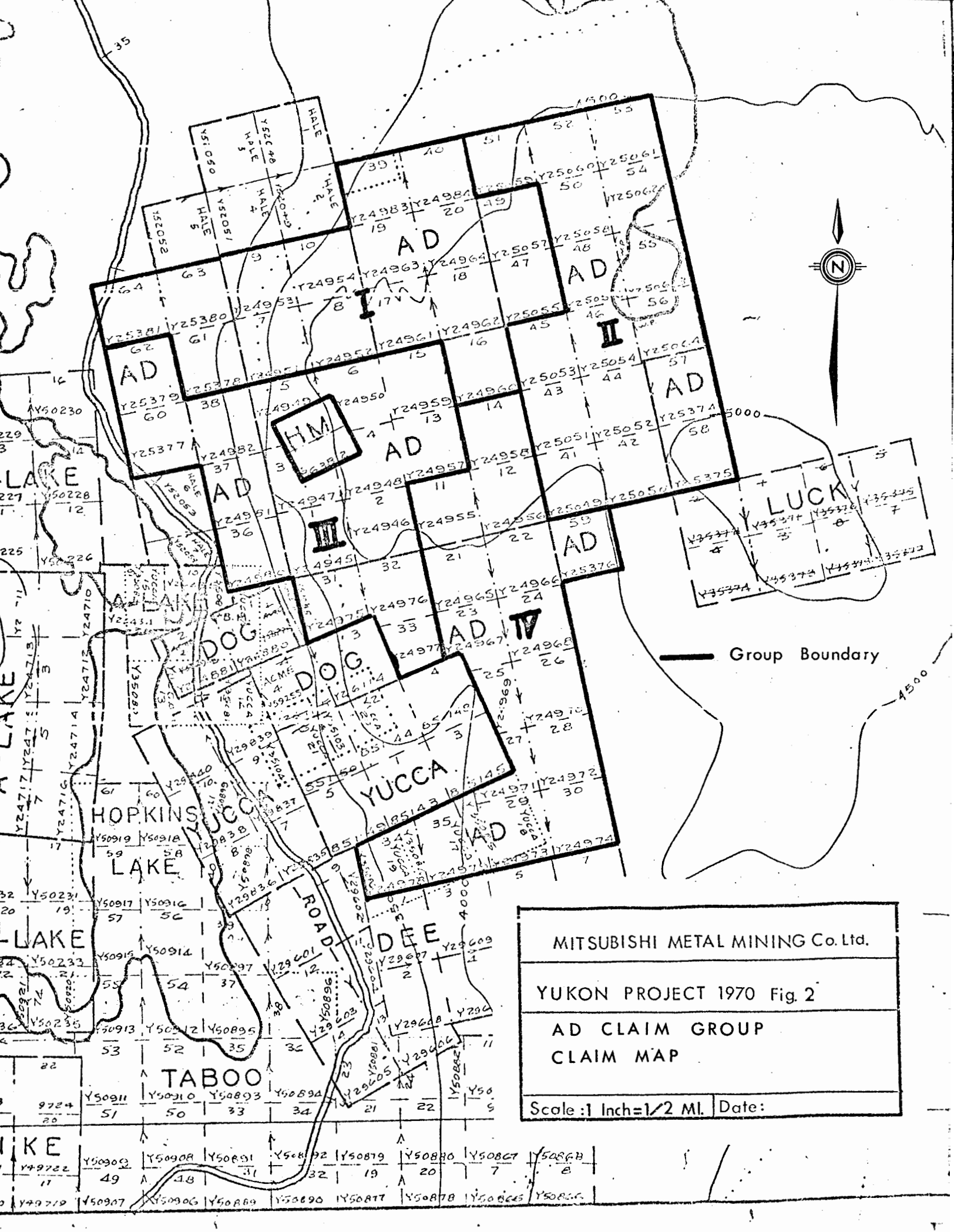
MITSUBISHI METAL MINING Co. Ltd.

YUKON PROJECT 1970 Fig. 1

AD CLAIM GROUP
LOCATION MAP

Scale : 1:250,000

Date:



MITSUBISHI METAL MINING Co. Ltd.

YUKON PROJECT 1970 Fig. 2

AD CLAIM GROUP
CLAIM MAP

Scale: 1 Inch = 1/2 MI. Date:

TABLE 1 STAKING AND RECORDING SITUATION OF AD CLAIM GROUPS
(see Fig. 2 for location)

NAME OF CLAIM	DATE LOCATED	NAME OF LOCATOR	DATE RECORDED	GRANT NO.	DATE TRANSFERRED TO MMH	DATE EXTENDED BY ADDRESS. BOOK IN 1968
AD - 1	24 May 1968	Toru Kikuchi	10 June 1968	Y24945	8 August 1968	10 June 1972
AD - 2	"	"	"	Y24946	"	"
AD - 3	"	"	"	Y24947	"	"
AD - 4	"	"	"	Y24948	"	"
AD - 5	"	"	"	Y24949	"	"
AD - 6	"	"	"	Y24950	"	"
AD - 7	"	"	"	Y24951	"	"
AD - 8	"	"	"	Y24952	"	"
AD - 9	24 May 1968	William E. Fraser	10 June 1968	Y24953	8 August 1968	10 June 1972
AD - 10	"	"	"	Y24954	"	"
AD - 11	25 May 1968	"	"	Y24955	"	"
AD - 12	"	"	"	Y24956	"	"
AD - 13	"	"	"	Y24957	"	"
AD - 14	"	"	"	Y24958	"	"
AD - 15	"	"	"	Y24959	"	"
AD - 16	"	"	"	Y24960	"	"
AD - 17	25 May 1968	Takaaki Kashiwagi	12 June 1968	Y24961	8 August 1968	12 June 1972
AD - 18	"	"	"	Y24962	"	"
AD - 19	"	"	"	Y24963	"	"
AD - 20	"	"	"	Y24964	"	"
AD - 21	"	"	"	Y24965	"	"
AD - 22	"	"	"	Y24966	"	"
AD - 23	"	"	"	Y24967	"	"
AD - 24	"	"	"	Y24968	"	"
AD - 25	25 May 1968	Victor D. Brown-John	12 June '68	Y24969	8 August 1968	12 June 1972
AD - 26	"	"	"	Y24970	"	"
AD - 27	"	"	"	Y24971	"	"
AD - 28	"	"	"	Y24972	"	"
AD - 29	"	"	"	Y24973	"	"
AD - 30	"	"	"	Y24974	"	"
AD - 31	"	"	"	Y24975	"	"
AD - 32	"	"	"	Y24976	"	"
AD - 33	25 May 1968	Bernard Gagnon	12 June 1968	Y24977	8 August 1968	12 June 1972
AD - 34	"	"	"	Y24978	"	"
AD - 35	"	"	"	Y24979	"	"
AD - 36	26 May 1968	"	"	Y24980	"	"
AD - 37	"	"	"	Y24981	"	"
AD - 38	"	"	"	Y24982	"	"
AD - 39	"	"	"	Y24983	"	"
AD - 40	"	"	"	Y24984	"	"
AD - 41	16 June 1968	Makoto Shiikawa	21 June 1968	Y25049	8 August 1968	21 June 1972
AD - 42	"	"	"	Y25050	"	"
AD - 43	"	"	"	Y25051	"	"
AD - 44	"	"	"	Y25052	"	"
AD - 45	"	"	"	Y25053	"	"
AD - 46	"	"	"	Y25054	"	"
AD - 47	"	"	"	Y25055	"	"
AD - 48	"	"	"	Y25056	"	"
AD - 49	16 June 1968	Kaoru Hirose	21 June 1968	Y25057	8 August 1968	21 June 1972
AD - 50	"	"	"	Y25058	"	"
AD - 51	"	"	"	Y25059	"	"
AD - 52	"	"	"	Y25060	"	"
AD - 53	17 June 1968	"	"	Y25061	"	"
AD - 54	"	"	"	Y25062	"	"
AD - 55	"	"	"	Y25063	"	"
AD - 56	"	"	"	Y25064	"	"
AD - 57	10 July 1968	Tsuyoshi Kawahara	11 July 1968	Y25374	16 July 1968	11 July 1972
AD - 58	"	"	"	Y25375	"	"
AD - 59	"	"	"	Y25376	"	"
AD - 60	"	"	"	Y25377	"	"
AD - 61	"	"	"	Y25378	"	"
AD - 62	"	"	"	Y25379	"	"
AD - 63	"	"	"	Y25380	"	"
AD - 64	"	"	"	Y25381	"	"

Name and Address

G. O'Reilly, Geophysicist	740 Springland Drive, Ottawa, Ontario
P. Norgaard, Geophysicist	749B Springland Drive, Ottawa, Ontario
D. McLarty, Operator	23 Lommanche Drive, Ottawa, Ontario
P. Volard, Helper	S.S. #1, Kimberley, B.C.
B. Wagg, Helper	Manotick, Ontario
G. Alton, Helper	S.S. #1, Kimberley, B.C.

Mitsubishi Metal Mining Company Ltd. supplied room and board and all transportation needs including helicopter for the crew.

Line cutting for the survey was carried out by Mitsubishi with their own field crews as follows:

W. Lewis, Prospector	St. Regis Hotel, 602 Dunsmuir Street, Vancouver, B.C.
E. Teranishi, Helper	2709 Nanaimo Street, Vancouver, B.C.

The specific claims on which the survey was completed are 18 claims as follows:

AD - 4, 6, 8, 12 to 18 inclusive, 22, 41, 42, 43, 45, 47, 58
and 59

III. SURVEY INSTRUMENTS

Direct current, pulse-type induced polarization equipment was employed for the survey.

The I.P. receiver is of Newmont design and manufactured by Scintrex Limited, Concord, Ontario. The receiver has the integration time constant adjusted to give readings of apparent chargeability equivalent to those with a timing cycle of 3:3:1 in spite of the fact that it actually operates on a timing cycle of 2:2:0.65 (current "off" time, secs., current "on" time, secs., integration time, secs.).

The transmitter and motor-generator set are manufactured by Huntco Limited, Toronto, Ontario. A power supply and a transmitter of 2.5 kilowatt rating were used for the present survey.

Detailed specifications for the instruments are enclosed in the Appendix to this report.

IV. SURVEY PROCEDURE

1) Survey Procedure

The induced polarization survey was completed using the pole-dipole electrode configuration which is illustrated in Figure 3 in the Appendix to this report. The pole-dipole array is known as the equispaced three array when the three moving electrodes are spaced equidistant along the survey line for a particular reading.

Before commencing the reconnaissance I.P. Surveys in either of the two areas several "expanders" were completed within the survey area in order to select suitable dipole lengths and determine the pole-dipole separations required for adequate penetration. As the survey progressed such "expanders" were completed at fairly regular intervals along the lines and especially in areas where changes in the apparent chargeability and resistivity levels suggested that there might have been a change in the depth of cover. An "expander" here consists of a series of readings taken at one location using the equispaced three electrode array and electrode spacings ranging from 5 feet to 400 feet as required and expanding roughly at logarithmic intervals (5 ft., 10 ft., 25 ft., 50 ft., etc.). For readings taken with electrode spacings of 100 feet or smaller the current pole would be fixed at one point and the potential electrodes alone would be moved to obtain equispaced electrodes; for spacings greater than 200 feet the mid-point between the current pole and the "near" potential electrode would be the point at which the current pole had been fixed for the small spacing readings.

For the reconnaissance coverage of the survey areas 100 feet or 200 feet dipole lengths were employed and readings were always taken for pole-dipole separation equal to the dipole length and twice the dipole length yielding dual reconnaissance coverage, and thus continuous depth control throughout. The reading interval along the lines for the reconnaissance work was always equal to the dipole length employed.

For purposes of better definition of causative bodies and interpretation of anomalies, detailed work was completed on selected sections of lines using the equispaced three array and electrode spacings of 25 feet, 50 feet and 100 feet as required. For this detailed work the reading interval along the lines is equal to the electrode spacing.

2) Data Observed

The field measurements taken are as follows:

- a) The applied current, I_a , flowing through the two current electrodes.
- b) The primary voltage, V_p , which exists between the potential electrodes while the current is flowing.
- c) The apparent chargeability, M_a which is the I.P. effect noted for two current pulses applied in opposite directions.

3) Data Reduction

The apparent chargeability, M_a , in milliseconds or millivolt-seconds per volt is read directly on the Newmont type I.P. receiver. As mentioned earlier in this report, the chargeability is measured for a complete cycle rather than per single pulse.

From the observations of primary voltage, V_p , and the applied current, I_a , the apparent resistivity is calculated at each station as follows:

$$\rho_a = \frac{V_p}{I_a} \cdot K$$

Where ρ_a is the apparent resistivity in ohm meters

V_p is the primary voltage in volts

I_a is the applied current in amps

K is the constant dependent on the array geometry.

V. DATA PRESENTATION

The apparent chargeability and apparent resistivity data are presented in profile form on plates accompanying this report at a horizontal scale of 1 inch = 200 feet. The apparent chargeability results are plotted at a vertical scale of 1 inch = 10.0 milliseconds and the apparent resistivities at a logarithmic scale as shown on the plates.

Please note that for the sake of clarity of presentation of the results, the lines are not spaced to scale on the profile plots.

The reconnaissance chargeability values are also presented in contoured form at a scale of 1 inch = 200 feet and with a contour interval of 5.0 milliseconds. Where, in the course of completing the reconnaissance survey, the electrode geometry was changed, this has been indicated on the contour plans and the contours for data obtained using different spacings has been contoured separately.

The results obtained from the expanders are shown as individual log-log plots attached to this report. All expander positions are clearly indicated on the profile plots; a triangular symbol shows the fixed location of the current "pole" for electrode spacings of less than 100 feet and an arrow indicates the direction in which the potential electrodes were moved to obtain the readings for the particular expander.

The distribution of data on the various plates is as follows:

Plate I AD Area, Profile Presentation, Lines 15S--15N

Plate II AD Area, Profile Presentation, Lines 18N--39N

Plate III AD Area, Profile Presentation, Lines 42N--60N

VI. DISCUSSION OF RESULTS

To aid in the interpretation of the induced polarization survey data, Mitsubishi Metal Mining Company Limited made the following information available to Geoterrex Limited:

AD Claim Group

Assessment Report, 1968 by Toru Kikuchi, Ph.D., P.Eng.

Geological Map, 1968, Mitsubishi.

Geochemical Soil Sampling Map, Total Copper, 1969,
Mitsubishi

Geochemical Soil Sampling Map, Total Copper, 1970,
Mitsubishi

VI - 1) AD Claim Block

The portion of the claim block covered by the present survey is indicated to be underlain mainly by granitic rocks except for the northern portion of the grid, particularly the northwest corner, where rock of the so-called Yukon group have been mapped. Mineralization consisting of pyrite, chalcopyrite, and magnetite has been noted in relation with the contact between the two general rock types described above. The northern half of the survey area (north of line 15N) is centered on a copper geochemical anomaly considered highly anomalous for this region. Numerous other geochemical anomalies were also covered by the present induced polarization survey.

With the exception of claim AD-45, AD-6 and the south half of AD-15, nearly all of the area covered north of line 30N is underlain by a fair concentration of polarizable material which is probably the mineralization related to the geological contact between the Yukon group and the granitic rocks. There is a very sharp "break" or geophysical "contact" evident between the large anomalous area to the north and the area south of line 30N where, except for a few isolated anomalies, only normal background apparent chargeabilities were noted. This apparent "contact" between mineralized and unmineralized rocks has been indicated on the contour plan of the grid on plate IV.

Within the large anomalous area which is open towards the north off the present grid there are several well defined anomaly peaks which all indicate the source material to be located very close to surface, possibly at surface in most cases. In view of this apparent lack of overburden cover any of the chargeability anomaly peaks should have a distinct associated or correlating geochemical anomaly if the polarizable material, or at least part of the polarizable material, is chalcopyrite or other metallic copper minerals; consequently, priorities should be given to induced polarization anomalies with such geochemical expressions and it can probably be assumed that chargeability anomalies lacking a geochemical signature are caused mainly by pyrite or magnetite.

For ease of reference the main chargeability anomaly peaks located within the anomalous area north of the geophysical "contact" (high chargeability/normal chargeability) have been labelled zones A, B, C, D and E on the chargeability contour plan, plate IV. Of these anomalies the south ends of zones A and B are located in the region of the most interesting geochemical anomalies mapped north of line 15N. However, there are no apparent significant anomalies related to zones C, D and E considering the extent of these zones.

VI - 1a) Zone A

The zone A anomaly peak located on line 39N within the area of the best geochemical anomaly was covered by detailed work completed along this line from about 58W to 80W. Detailing carried out using the equispaced three array and an electrode spacing of 50 feet located the anomaly axis of the zone between 74 + 25W and 75 + 00W on this line where the depth of cover is estimated to be less than 10 feet. The amplitude of the anomaly here could be caused by polarizable material of a concentration of 2% - 5% average by volume, but a directly correlating apparent resistivity "low" noted using the 50 feet array might be an indication of near massive metallic sulphides over a narrow width.

To test this anomaly peak by drilling the following drill hole location is suggested:

Collar at station 73 + 25W on line 39N and drill west along the line at an inclination of 45 degrees for a distance of about 200 feet.

However, in view of the shallow depth of cover indicated (less than 10 feet) trenching should be considered as a possible means of testing the zone.

If mineralization of interest is located within Zone A on line 39N then the zone should also be checked by drilling on line 48N where detailing has also been completed. The geochemical expression of the zone here is not nearly as strong as it is at the south end of the zone discussed above, but a somewhat greater depth of cover or capping might contribute towards lowering the amplitude of the geochem anomaly. On line 48N where the main chargeability anomaly axis is located at 73 + 25W the estimated depth of cover is in the order of 15 feet - 20 feet.

A suggested drill hole location for testing this anomaly peak is as follows:

Collar at station 72 + 25W on line 48N and drill west along the line at an inclination of 45 degrees for a distance of at least 200 feet.

A concentration of 3% - 6% average by volume of polarizable material could give rise to the amplitude of response noted here. In this case there is no correlating apparent resistivity "low" to suggest the possibility of a near massive concentration of polarizable material.

VI - 1b) Zone B

Detailing of this zone on line 39N using the 50 feet electrode spacing three array resolved three individual anomaly peaks between stations 66W and 71" with the peaks located at 67W, 68 + 25W and 69 + 75W. A showing mapped in this area is probably an indication of the type of mineralization which is responsible for these closely spaced anomaly peaks. The depth to the source material of an indicated concentration of 3% - 6% average by volume is in the order of 15 feet.

On line 39N the geochemical anomaly correlates directly with the chargeability peak at 68 + 25W. A drill hole to check the polarizable material here should be located as follows:

Collar at station 67 + 25W and drill west along the line for a distance of at least 200 feet at an inclination of 45 degrees.

VI - 1c) Zone C

A maximum apparent chargeability of 111.0 milliseconds was obtained over Zone C in the course of detailing this anomaly on line 39N using the equispaced three array and electrode spacings of 50 feet. The anomaly axis is located at 62 + 75W.

Source material of a concentration of 5% - 10% average by volume which comes to the surface could produce the type of response noted here. The causative body appears to have a width in the order of 50 feet - 60 feet.

The lack of a directly correlating geochemical anomaly on this chargeability response suggesting at surface source material, would indicate something other than chalcopyrite as the polarizable material.

Zone C was also detailed on line 48N where the source material is located at, or near, surface between stations 60 + 50W and 63 + 50W.

Trenching on line 39N is suggested as a means of checking the source of zone C.

VI - 1d) Zone D

Zone D located in the northeast corner of the grid lacks any significant geochemical expression considering the areal extent of the zone, and the fact that the source material is at a depth of less than 10 feet from the surface.

The zone was detailed on line 48N where the main concentration of polarizable material is located between stations 49W and 52W. A concentration of 4% - 8% average of volume is possible here considering the amplitude of the response noted.

VI - 1e) Zone E

This anomaly is situated in the northwest corner of the survey area with the anomaly peak of 93.0 milliseconds observed using the 50 feet spacing three array being centered at 89 + 75W. Disseminated polarizable material of a concentration of 5% - 10% average by volume coming to within a few feet of surface and having the form of a tabular body about 150 feet wide could produce the type of response noted here.

The chargeability anomaly lacks the association of any significant geochemical anomaly and is, therefore, likely caused by disseminated pyrite and/or magnetite.

Trenching is suggested for checking this zone on line 51N.

VI - 1f) Miscellaneous Zones

South of the geophysical "contact" described earlier in this discussion of the results there are three small chargeability anomalies with correlating geochemical anomalies located on claim AD-45 and centered on about line 33N at 42 + 75W, 49 + 75W and 53 + 50W. At the two latter locations polarizable material of a concentration of 1.5% - 3% average by volume is indicated to come to within a few feet of surface. At 42 + 75W the depth of cover appears to be about 35ft. - 40 ft., but the concentration of polarizable material is about the same as for the other two anomaly peaks.

On claim AD-58 a chargeability anomaly was partially mapped. This zone is open towards the south off the present grid but it terminates within the claim towards the north. Detailed work was completed across the zone on line 0, the south boundary of the claim, where the maximum chargeability had been noted during the reconnaissance survey. The 50 feet spacing three array coverage located a chargeability peak of 56.0 milliseconds centered at 17 + 50W. Polarizable material of a concentration of 3% - 6% average by volume centered at a depth of about 50 feet and coming to within 10 feet of the surface, could produce this type of response. Anomalous geochemical samples were noted several hundred feet north and northwest of the I.P. anomaly, but the zone lacks direct correlation as it is presently mapped.

Trenching between 17W and 18W should reveal the source of the chargeability anomaly.

In the southeast corner of the grid on claim AD-59 a low amplitude chargeability anomaly was noted on lines 12S and 15S between stations 40W and 50W. Some detailed work was carried out on line 15S across the zone using the 100 feet spaced three array. The source material which comes to within 50 feet of the surface at station 48 + 50W appears to be dipping towards the east. A concentration of polarizable material of 1% - 2% average by volume is indicated. An extensive geochemical anomaly located west and northwest of this zone and down slope from the I.P. anomaly could be related to the mineralization causing this anomaly. To check the I.P. anomaly source the following drill hole is suggested:

Collar at station 47W on line 15S and drill west along the line at an inclination of 45 degrees for a distance of about 200 feet.

The extensive geochemical anomaly just mentioned in relation with the previous zone appears to coincide with reconnaissance chargeability values in the order of 10.0 - 12.0 milliseconds in an area with background values of 5.0 - 6.0 milliseconds (see plate IV), but these values were obtained using a 200 feet dipole and a pole-dipole separation of 200 feet. The data obtained using the second

reconnaissance spacing ($a=200$, $n=2$) shows a more uniform background of about 15.0 milliseconds with the result that there no longer is a distinct anomaly. Depth calculations carried out along the I.P. - geochem anomaly yield depths of cover of 70 feet - 120 feet and true chargeabilities of the underlying material of about 15.0 milliseconds which, in many rock types, is a normal response but which also could indicate polarizable material of a concentration of 0.5% - 1% average by volume.

VI - 1g) Summary

The area covered by the present survey can be divided into two distinct areas geophysically speaking. The area north of line 30N which is nearly all anomalous suggesting the presence of widespread mineralization, and the remainder of the area which has few anomalies and low normal background polarization responses.

The large anomalous area at the north end of the grid is related to the main geological contact here along which widespread disseminated mineralization consisting of pyrite, chalcopyrite and magnetite, has been noted and the low background area to the south of this is probably reflecting the area underlain by the granitic rocks.

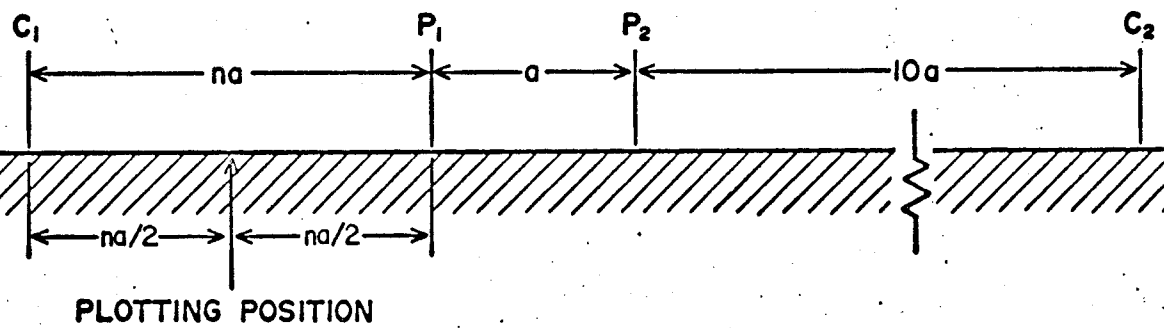
In most cases the anomaly peaks are reflecting polarizable material which comes to the surface, or within a few feet of the surface, so that any copper zone should have a related geochemical signature. On the basis of associated geochemical anomalies and

anomalous chargeability zones followup targets can be selected. For most anomalous zones of interest trenching can be considered because of the limited cover present; drill hole locations have been suggested for most I.P. anomalies considered significant.

Respectfully submitted,

Peer Norgaard, P.Eng.,
Geophysicist

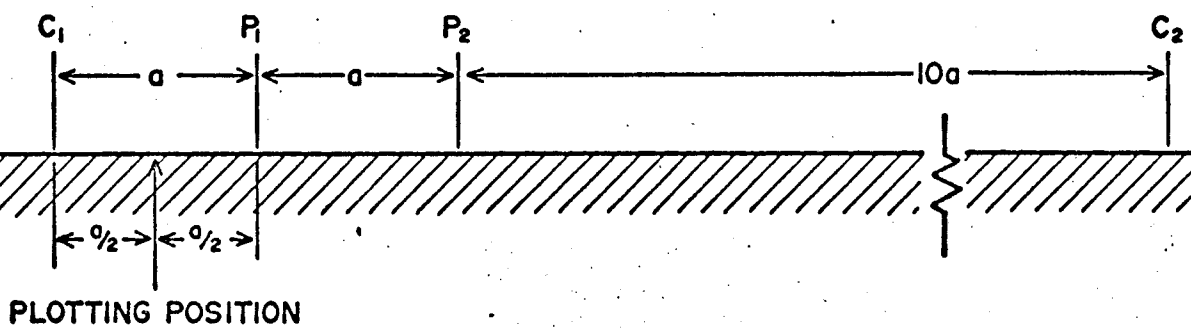
POLE-DIPOLE ELECTRODE ARRAY



a = Dipole Length

$n = 1, 2, 3, \dots$

EQUISPACED THREE ELECTRODE ARRAY



3
FIG. 3

POLE-DIPOLE ELECTRODE CONFIGURATIONS.

INSTRUMENT SPECIFICATIONS

1. Newmont Receiver:

Electrical -

Primary Voltage Range	300 microvolts to 30V Accuracy $\pm 3\%$
Input Impedance	300 K ohms
Chargeability (M) Reading Range	0-100 and 0-300 milliseconds Accuracy $\pm 5\%$
Curve Factor (L) Reading Range	0-100 and 0-300 milliseconds Accuracy $\pm 5\%$
Delay Time Before Integration	0.45 seconds
SP and VLF Noise Compensation	Manual: ± 1.5 volts Automatic: 1mV range ± 10 mV total 30 volt range ± 10 volt total
Power Supply	Internal rechargeable nickel cadmium batteries. Rated life 45 hours/charge.
Temperature Range	-20° to 130° F (-29° C to $+55^{\circ}$ C)
Humidity Range	to 100% non-condensing

NOTE: A time reference signal is remotely obtained from the received primary signal to give coherent detection.

Automatic SP corrections are applied during each reading period using a memory circuit.

Mechanical:

Weight	13 $\frac{1}{2}$ lbs. (6.1 kg) including batteries.
Dimensions	14" x 11" x 6 $\frac{1}{2}$ " (32.5 cm x 28 cm x 16.5 cm).

INDUCED POLARIZATION TRANSMITTER

2.5 KW System

Output	300-5000 volts DC in 8 steps 3 amps maximum
Input	3 phase 400 cps 115 volt 2.75 KVA
Output	2 ranges
Current Meter	0-1.5 amps and 0-3 amps $\pm 2\%$
Dummy Load	2 Level - 1750 watts and 500 watts
Size	21" x 17" x 11 $\frac{1}{2}$ " (53.1 cm x 43.2 cm x 29.2 cm)
Weight	Console 50 lbs. (22.7 kg) Shipping weight 75 lbs. (34.0 kg).

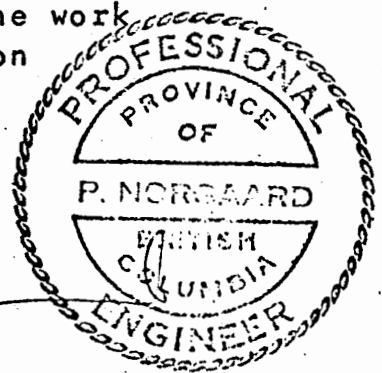
MOTOR GENERATOR SET

Output	2.75 KW, 120 volts 400 cycle 3 phase 13.8 amps/phase
Engine	Briggs and Stratton 6 HP at 3600 RPM
Fuel	Capacity: 0.92 Imperial Gals. (4.1 litres). Consumption: Approx. 1.2 lbs/KWH (.5 kg/KWH)
Alternator	6000 RPM Belt Driven. Sealed bearing, rotating field.

STATEMENT OF QUALIFICATIONS

I, Peer Norgaard, of 749B Springland Drive, Ottawa 8, Ontario, hereby certify that:

1. I attended the University of Toronto for studies in Engineering Physics, Geophysics Option, during the period 1955 to 1959.
2. I am a member in good standing of the Association of Professional Engineers of Ontario and a non-resident member of the Association of Professional Engineers of the Province of British Columbia.
3. I am a member of the Society of Exploration Geophysicists, The Canadian Exploration Geophysical Society and of The Canadian Institute of Mining and Metallurgy.
4. I have been practicing my profession continuously for the past twelve years and am currently a Senior Geophysicist and Manager of Ground Geophysical Surveys at Geoterrex Limited, having its head office at 1312 Bank Street, Ottawa 1, Ontario.
5. I have no direct or indirect interest in the property, nor do I anticipate receiving any such interest.
6. This report is based on my supervision of the work including a personal visit to the property on July 25, 1970.



Peer Norgaard

Expiry Date. November 26, 1971.

January 15, 1971.

Peer Norgaard, P.Eng.

Statement of Expenses

With an Affidavit by Y. Eda
Chief Geologist of the Work

Mitsubishi Metal Mining Co., Ltd.

		Receipt No.
Professional Charge for I.P. Survey	\$ 9,056.57	No. 1
Tent and Radio Rental	220.00	No. 2
Jeep Rental	286.00	No. 3
Helicopter	3,250.00	No. 4
Catering for I.P. Crew	1,632.00	No. 5
Prospector's Salary (Line Cutting)	168.00	No. 6
Helper's Salary (Line Cutting)	98.00	No. 7
Catering for Line Cutting Crew	238.00	No. 5
TOTAL	\$ 14,948.57	

Breakdown of Expenses for Individual Claim Groups

No. 1 Group: 5 of 18 Claims Applied
 $\$14,948.57 \times 5/18 = \$4,152.38$

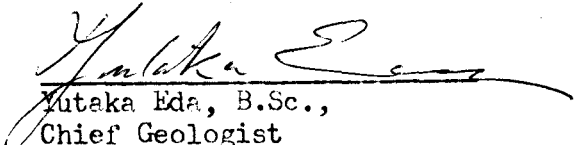
No. 2 Group: 5 of 18 Claims Applied
 $\$14,948.57 \times 5/18 = \$4,152.38$

No. 3 Group: 4 of 18 Claims Applied
 $\$14,948.57 \times 4/18 = \$3,321.90$

No. 4 Group: 4 of 18 Claims Applied
 $\$14,948.57 \times 4/18 = \$3,321.90$

These amounts, if accepted, are good for two years for each Claim Group.

January 15, 1971


Yutaka Eda, B.Sc.,
Chief Geologist

INVOICE:

GEOTERREX LIMITED

INTERNATIONAL RESOURCES and ENGINEERING

300 BANK STREET

OWA 1, ONTARIO

area code(613)-731-9571

cable address GEOTERREX

TO:

Mitsubishi Metal Mining Co. Ltd.,
404 - 900 West Hastings St.,
VANCOUVER 1, B.C.

DETAILS

15 January, 1971.

RE: Induced Polarization Surveys in Yukon Territory.

Mobilization-Demobilization

\$1,765.00 U.S.

Survey Charge July 1 - August 6, 1970

11,442.50 U.S.

\$13,207.50 U.S.

This charge is prorated as follows:

AD Mineral Claim Group:

\$9,056.57 U.S.

KL Mineral Claim Group:

\$4,150.93 U.S.

Payment Received with Thanks.

Receipt No. 1

IRON-MCMYNN LIMITED
MINING CONTRACTORS

619 - 475 HOWE ST.
VANCOUVER 1, B.C.

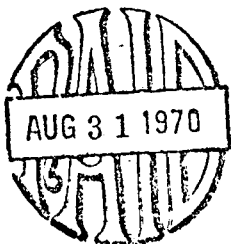
Rent to: Mitsibishi Mining
404-700 West Hastings
Vancouver, B.C.

Inv. 753
Date Out: July 1, 1970.
Date In: July 31, 1970.
Rental Period: 1 month

Receipt No. 2

3	Tents c/w Flys	50.00 ea.	150.00
1	315 Pump 200 ft. suction hose	75.00 mon.	75.00
2	Oil Stoves Hose c/w fittings Carburators	20.00 mon.	20.00
1	Propane Cook Stove	50.00 mon.	50.00
1	Oil Stove C/W Carburator	10.00 mon.	<u>10.00</u>

Total \$305.00



TERPRISES LTD.

BOX 1125, WHITEHORSE, Y.T.

PHONE 688-2188

SUBSIDIARIES:
AIRS LTD.
ETRONICS LTD.

INVOICE

EXPEDITING
AIRCRAFT CHARTER
CATERING
RADIO COMMUNICATIONS

Mitsubishi Metal Mining Co. Ltd.
#404 - 900 West Hastings Street
Vancouver 1, B. C.

DATE July 1, 1970

No. A 1214

DESCRIPTION		AMOUNT
<i>Receipt No. 2</i>		
re:	rental of SB-60 radio July, 1970	135.00
TOTAL		135.00

JUL 29 1970

MAKE CHEQUES PAYABLE TO TERRIKON ENTERPRISES LTD.

THE TORONTO-DOMINION BANK

499 GRANVILLE & PENDER STS.
VANCOUVER 2, B.C.

S-16

Aug 31 1970

PAY TO THE
ORDER OF

CAMERON-McMANN LTD

\$ 305.00

Three Hundred and Five

DOLLARS

499 GRANVILLE ST.
VANCOUVER 2, B.C.

SHIGEKI YABUTA OR NORITAKA SATO

S. Yabuta

⑆95120⑈004⑆ 910 9⑈86975⑈

⑈0000030500⑈

Receipt No. 2.

Radio \$135.00 (This amount was paid by check included in Receipt
No. 5)

Tent 305.00
TOTAL \$440.00

50% of the above amount was spent for I.P. Survey

50% x \$440.00 = \$220.00

NOT FOR ORIGINAL C463061

Room 404-900-4111
VAN. B.C.

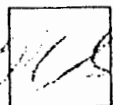
Receipt No. 3
THIS IS YOUR
ORIGINAL INVOICE
CECI EST VOTRE
FACTURE ORIGINALE

SETTLEMENT IS DUE UPON
RECEIPT. AS NO STATEMENT
WILL BE RENDERED

VEUILLEZ RÉGLER SUR RÉCEPTION
DE CETTE FACTURE. AUCUN ÉTAT
DE COMPTE NE VOUS SERA ENVOYÉ.



VEUILLEZ RETOURNER
CE BILLET AVEC VOTRE
REMISE AFIN QUE VOTRE
COMPTE SOIT CRÉDITÉ



AUTHORISATION POUR CLAUSE D'EXONÉRATION
DE DOMMAGE PAR COLLISION

THANK YOU - MERCI

RENTED BY
LOUÉ PAR: *[Signature]*

RENTAL AGREEMENT
CONTRAT DE LOCATION

C463061

SHOW RENTAL AGREEMENT NO. ON ALL CORRESPONDENCE
MENTIONNER LE NO. DE CONTRAT DE LOCATION DANS TOUTE
CORRESPONDANCE.

YUKON AUTO RENTALS LTD.
BOX 2132
WHITEHORSE, YUKON

PREPARED BY - PRÉPARÉ PAR
[Signature]

UNIT NUMBER - NO DU VÉHICULE	CAR CHECKED IN AT (CITY) LIEU DE RETOUR (VILLE)	DATE & TIME - DATE & HEURE
OWNING CITY - VILLE PROP.	STATION	IN ARRIVÉE <i>Aug 11/70</i>
CAR MAKE - MARQUE	CAR RENTED AT (CITY) AUTO LOUÉE À (VILLE)	DATE & TIME - DATE & HEURE
LANDROVER 4X4	WHR -	OUT DÉPART <i>JUNE 2 10:30 PM</i>
LICENSE NO. - PLAQUES	PROV.	CAR TO BE CHECKED IN AT LIEU DE DESTINATION
1014	YT	STATION
MILEAGE DETERMINED BY READING FACTORY INSTALLED ODOMETER	HOURS @ \$	TIME HEURE
PARCOURS DÉTERMINÉ PAR LA LECTURE DE L'ODOMÈTRE POSÉ À L'USINE	DAYS @ \$20.00	DAY
MILEAGE IN LECTURE À L'ARRIVÉE	WEEKS @ \$120.00	MO.
18189	10	YEAR
MILEAGE OUT LECTURE AU DÉPART	SEMAINES	AN
14500		
MILES DRIVEN PARCOURS EN MILES	MILES @ 13.00 PER MILE	
3689	PAR MILE	59024
DEPOSIT - DÉPÔT	SUB TOTAL	179024
\$ TRUCK	SUB SOUS	-35864
	SUB - TOTAL	133220
	INTERCITY FEE	
	FRAIS INTER-CITÉS	
	RENTAL CHARGE	
	FRAIS DE LOCATION	
	% TAX TAXE	
	COLLISION DAMAGE WAIVER	
	FRAIS D'EXONÉRATION DE DOMMAGES PAR COLLISION	100.00
	TOTAL CHARGE	143470
	TOTAL DES FRAIS	
	LESS: GAS/REPAIRS	
	MOINS: ESSENCE / RÉPARATION	
	AMOUNT DUE	
	MONTANT DÙ	
	NET DUE - IN CANADIAN \$	143470
	FRAIS NET - EN \$ CANADIEN	
	EXCHANGE RATE	143470
	TAUX D'ÉCHANGE	
	IN YOUR CURRENCY	
	MONNAIE ÉTRANGÈRE	
	REFUND RECEIVED BY	
	REMBOURSEMENT REÇU PAR	
	(SIGNATURE)	
	COMPUTED BY - COMPTÉ PAR	
	CASH REFUND - REMBOURSEMENT COMPTANT	
	GAS - REP - GAZ	
	POSTED - DRB - ENTRÉ	
	DAY / MONTH / MOIS	

THE TORONTO-DOMINION BANK ✓ 1-13
 499 GRANVILLE & PENDER STS.
 VANCOUVER 2, B.C.
 AUG 31 1970
 PAY TO THE ORDER OF VOLVO AUTO RENTALS LTD \$1,434.70
 One thousand four hundred and 70/100 — 02/100 DOLLARS
 SHIGEKI YABUTA OR NORITAKA SATO
 1:951200004: 910 986975 00000151702

Receipt No. 3.

\$1,434.70 was spent for Jeep Rental

20% of the above amount was spent for I.P. Survey

20% x \$1,434.70 = \$286.00

KLONDIKE HELICOPTERS

HANGAR NO. 1, INTERNATIONAL AIRPORT
CALGARY 67, ALBERTA, CANADA

Receipt No. 4

SOLD TO • Mitsubishi Metal Mining Co.Ltd.
404-900 West Hastings St.
Vancouver 1, B.C.

August 11, 1970

ACCOUNTS DUE WHEN RENDERED
CUSTOMER'S ORDER NUMBER

SHIP VIA

DATE SHIPPED

PAYABLE AT PAR CALGARY

AIRCRAFT

TRIP NO.

CF-UAI, YTP

QUANTITY

PART NUMBER

DESCRIPTION

PRICE

AMOUNT

PILOT: J. McNulty, T. Churcott

TO: Charge for charter of one Hiller SL4 helicopter as per
authorized Daily flight reports attached.

UAI #16348-16350, 22051, 22052, 22054, 22056-22068, 22071,
#22072, #22073-22075

YTP #2161

FLYING: June 19, 23-28, July 1-13, 17, 18-21, 1970

YTP 3:00 hrs. @ \$130.00 per hr. \$ 390.00
(fuel supplied by charterer)

UAI 118:30 hrs. @ \$130.00 per hr. \$15,405.00
(fuel supplied by charterer)

RECORD OF ACTUAL HOURS FLOWN ON FIRST MONTH
OF CONTRACT.

LESS: Minimum for the first 30 day period already
billed on invoice #4470

\$13,000.00

TOTAL INVOICE

\$ 2,795.00

AUG 31 1970 Note: CF-YTP subbed for UAI on June 19, 1970

THE TORONTO-DOMINION BANK

499 GRANVILLE & PENDER STS.
VANCOUVER 2, B.C.

PAY TO THE
ORDER OF

KLONDIKE HELICOPTERS

\$ 2,500.00

DOLLARS

SHIGEKI YABUTA OR NORITAKA SATO

S. Yabuta

⑆95120⑈004⑆ 910 9⑈86975⑈

⑈0000279500⑈

Receipt No. 4

25 hours were spent for I.P. Survey

@ \$130.00/hour x 25 hours = \$3,250.00

No. 13

THE TORONTO-DOMINION BANK

499 GRANVILLE & PENDER STS.
VANCOUVER, B.C.

PAY TO THE
ORDER OF

KLONDIKE HELICOPTERS

\$ 14,816.85

Fourteen thousand, eight hundred & sixteen ⁸⁵/₁₀₀ DOLLARS

ACCOUNT CODE NUMBER

986-995

S. Yabuta

⑆95120⑈004⑆

⑈0001481685⑈

WHOLLY OWNED SUBSIDIARIES:

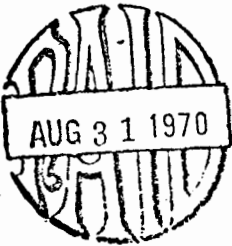
OBE AIR SERVICES LTD.
TERRIKON ELECTRONICS LTD.

INVOICE

EXPEDITING
AIRCRAFT CHARTER
CATERING
RADIO COMMUNICATIONSMitsubishi Metal Mining
404 - 900 West Hastings Street
Vancouver, B. C.

DATE August 27, 1970

No. A 1457

DESCRIPTION	AMOUNT
CORRECTED INVOICE re: catering Aishihik Lake camp July 13 - July 19 56 man days @ \$17.00 per day as per contract Receipt No. 5 	952.00 TOTAL 952.00

MAKE CHEQUES PAYABLE TO TERRIKON ENTERPRISES LTD.

ENTERPRISES LTD.

BOX 1125, WHITEHORSE, Y.T.

PHONE 668-2188

WHOLLY OWNED SUBSIDIARIES:
 CANADIAN AIR SERVICES LTD.
 TERRIKON ELECTRONICS LTD.

INVOICE

EXPEDITING
 AIRCRAFT CHARTER
 CATERING
 RADIO COMMUNICATIONS

DATE July 16, 1970

Mitsubishi Metal Mining Co. Ltd.,
 #404 - 900 W. Hastings St.,
 Vancouver 1, B.C.

No. A 2125

DESCRIPTION	AMOUNT
Re: Catering Hopkins Lake Camp June 29 - July 12	
45 man days @ \$7.00 per day 96 man days @ \$17.00 per day 1 casual units @ \$3.50	315.00 1632.00 <u>3.50</u>
	1950 50 954 <u>2162 50</u>
Receipt No. 5	
	
TOTAL	1950 50

MAKE CHEQUES PAYABLE TO TERRIKON ENTERPRISES LTD.

No. 8

THE TORONTO-DOMINION BANK

499 GRANVILLE & PENDER STS.
VANCOUVER, B.C.

July 29 19 70

PAY TO THE
ORDER OF

TERRIKON ENTERPRISES LTD

\$ 2,910.⁶⁴/₁₀₀

Two thousand nine hundred & ten ⁶⁴/₁₀₀ DOLLARS

ACCOUNT CODE NUMBER

986.775

J. Yabuta

⑆95120⑈004⑆

⑈0000291064⑈

Receipt No. 5

For I.P. Crew:

@ \$17.00/day-person x 4 persons x 24 days = \$1,632.00

For Line Cutting Crew:

@ \$17.00/day-person x 2 persons x 7 days = \$238.00

Time Sheet

Date July 31 '70

Name _____ No. _____

Name W R LEWIS

[illegible]

THE TORONTO-DOMINION BANK ✓

499 GRANVILLE & PENDER STS.
VANCOUVER, B.C.

July 31 1970

W.R. LEWIS' SAVING ACCOUNT 201119

\$ 540.15

Five hundred and forty and 15/100 DOLLARS

ACCOUNT CODE NUMBER

986 975

S. Yabuta

⑆95120⑈004⑆

⑈0000054018⑈

Receipt No. 6

Prospector for Line Cutting

\$24.00/day x 7 days = \$168.00

Time Sheet

Date July 31 '70

Name

Receipt No. 7

Name F. TERANISHI

[illegible]

No. 27

THE TORONTO-DOMINION BANK

499 GRANVILLE & PENDER STS.
VANCOUVER, B.C.

July 31 19 70

PAY TO THE ORDER OF E. TERANISHI SAVING A/c #751-881

\$ 341.75

Three hundred & forty one 75/100 DOLLARS

ACCOUNT CODE NUMBER

986 975

S. Yabuta

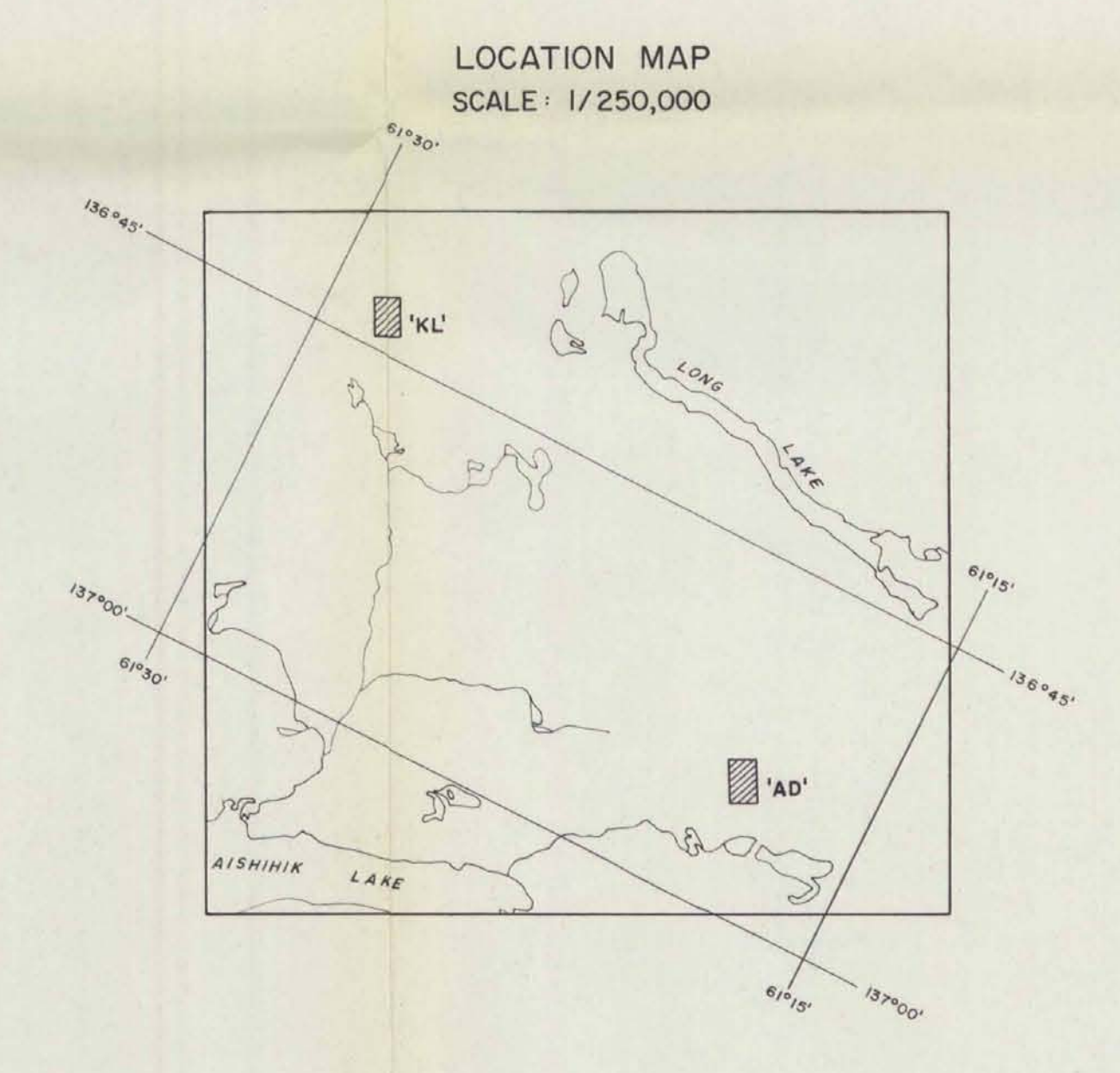
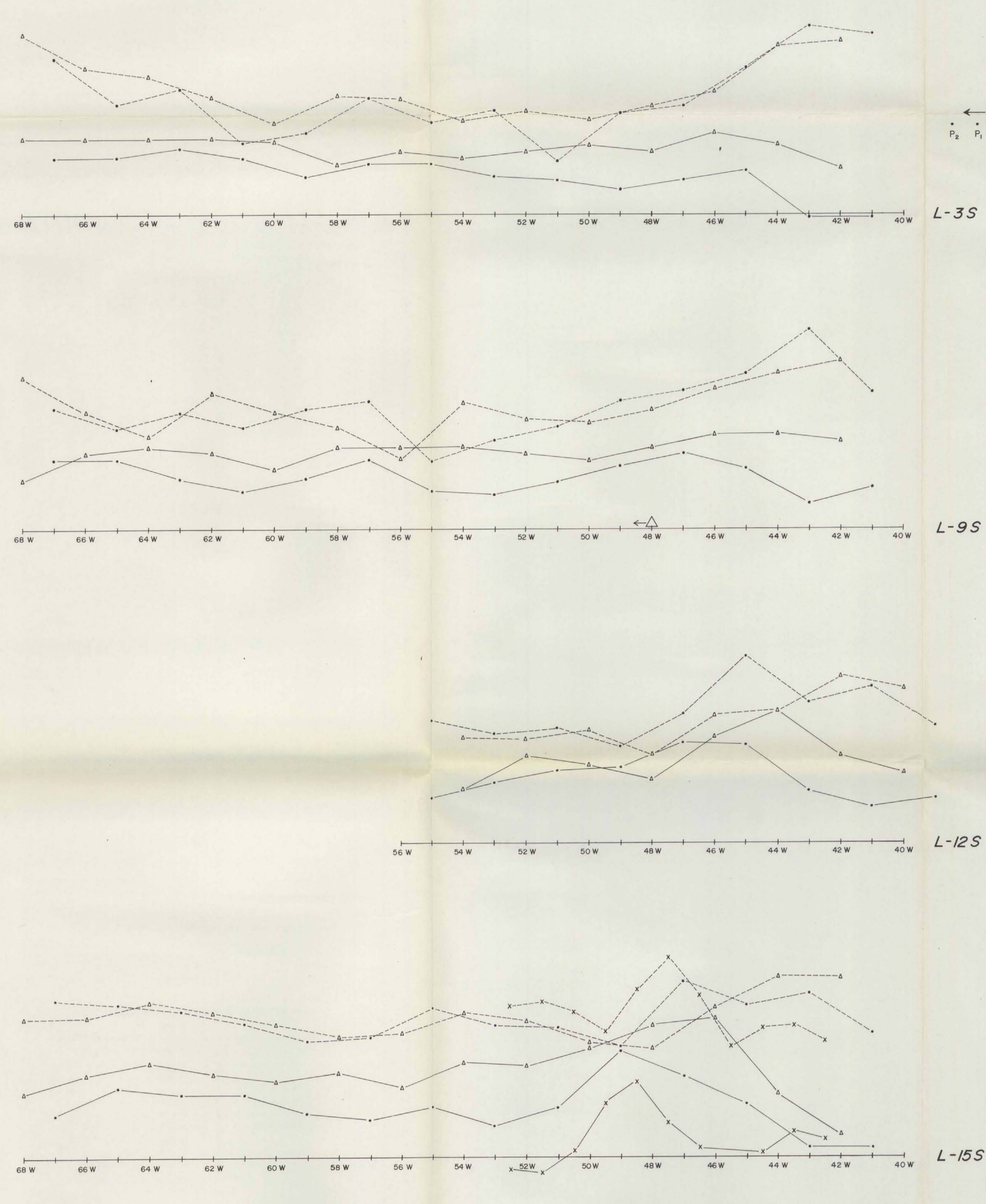
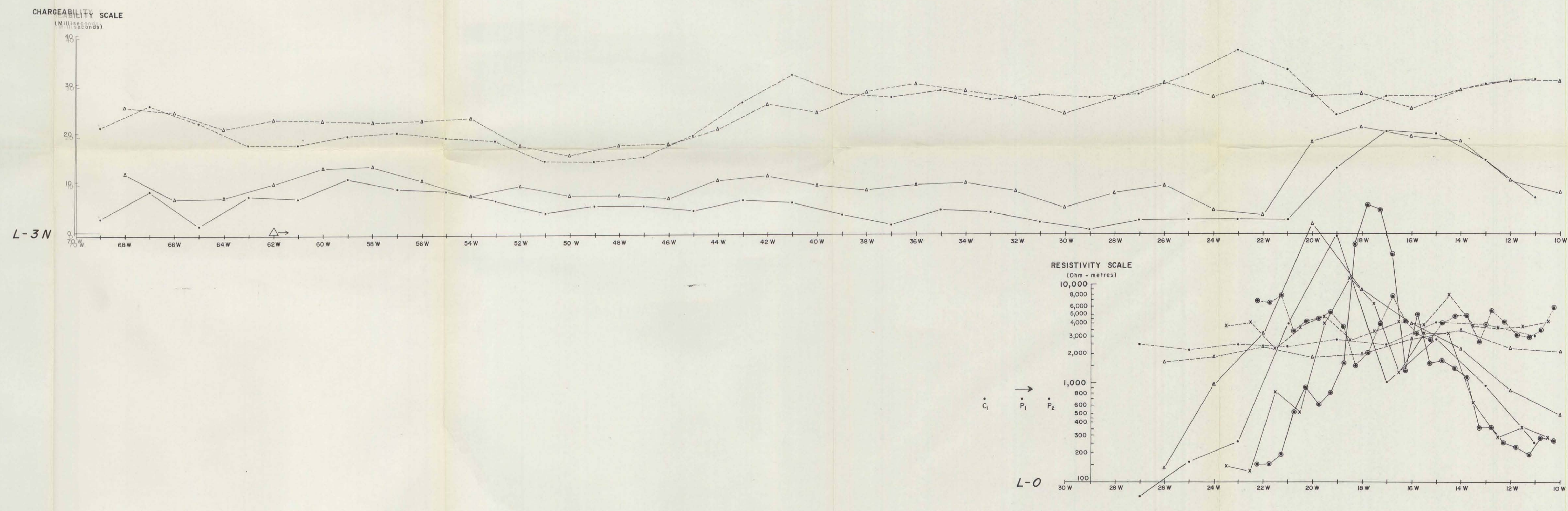
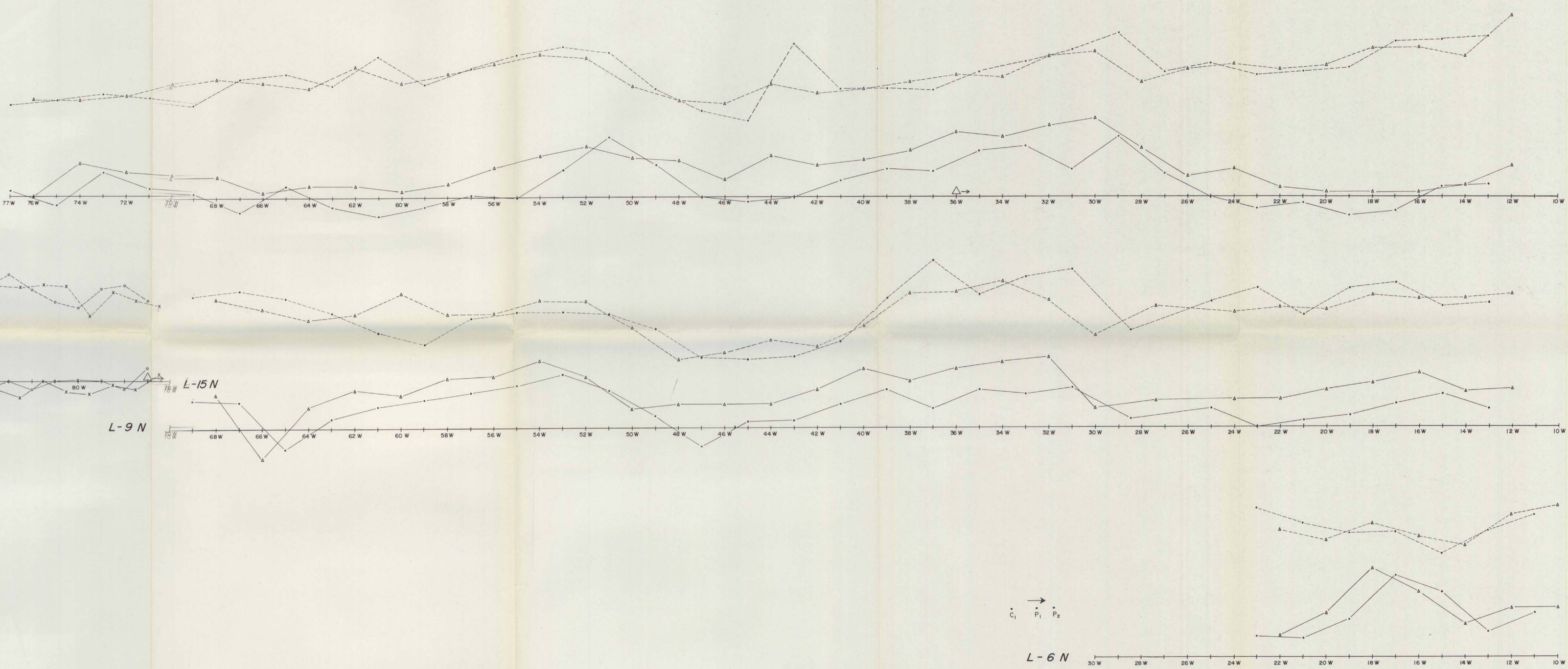
⑆95120⑈004⑆

⑈0000034175⑈

Receipt No. 7

Helper for Line Cutting

\$14.00/day x 7 days = \$98.00



INDUCED POLARIZATION SURVEY
FOR
MITSUBISHI METAL MINING COMPANY LIMITED

"AD" AREA

YUKON

PLATE I

PROFILE PLAN

ELECTRODE CONFIGURATION : POLE DIPOLE C_1 P_1 P_2

SCALES

HORIZONTAL 1 INCH = 200 FEET
APPARENT CHARGEABILITY 1 INCH = 100 MILLISEC
APPARENT RESISTIVITY LOGARITHMIC AS SHOWN
EFFECTIVE DC PULSE 1/2 TIMING SEQUENCE : 3 : 3 : 1
ON OFF INTGR.

N.B. : LINES ARE NOT SPACED TO SCALE

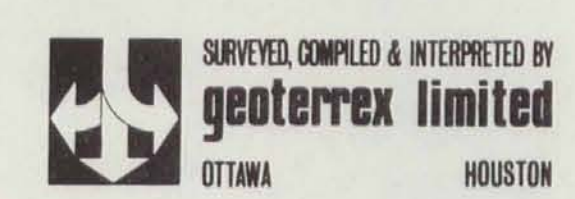
LEGEND

APPARENT CHARGEABILITY	APPARENT RESISTIVITY
○	○
●	●
×	×
△	△
○	○
●	●
×	×
△	△

△ = EXPANDER POSITION

TO ACCOMPANY REPORT BY P. NORGARD
AUGUST 1970

GEOTERREX PROJECT No. 85-15



"AD" AREA

YUKON

PLATE II

PROFILE PLAN

ELECTRODE CONFIGURATION : POLE DIPOLE

SCALES

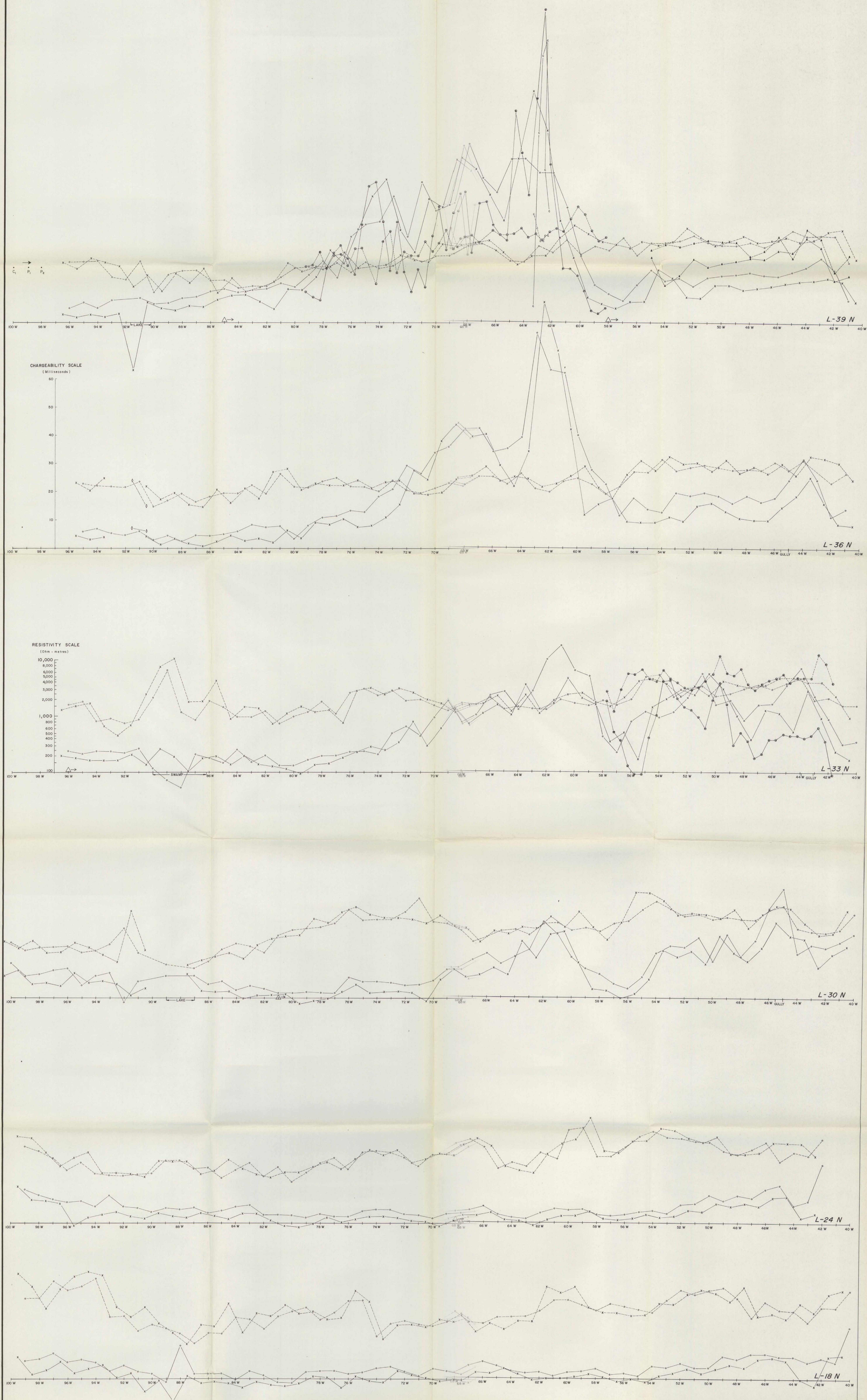
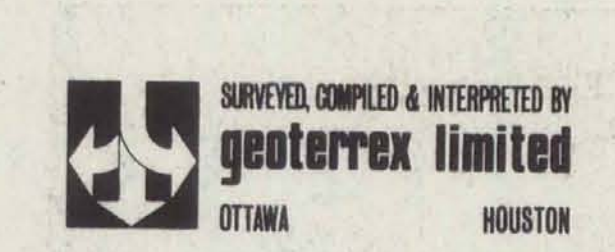
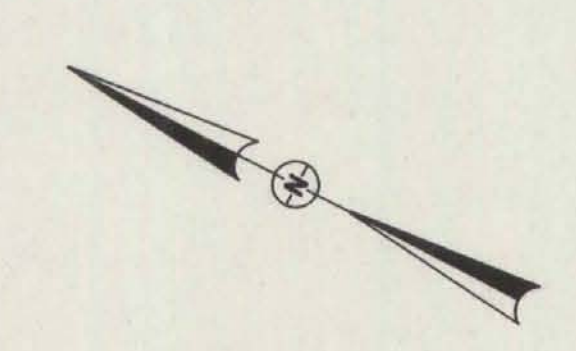
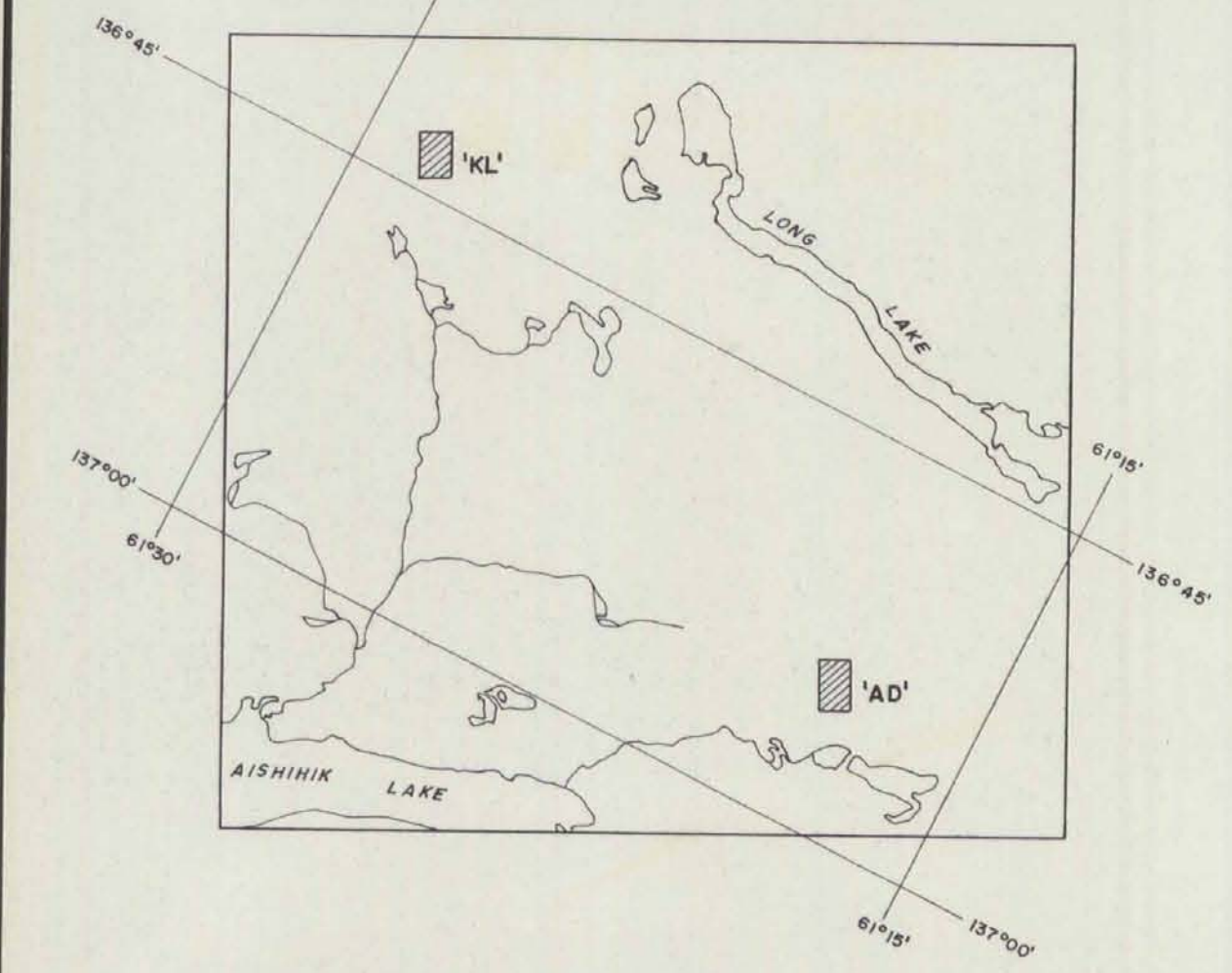
HORIZONTAL 1 INCH = 200 FEET
APPARENT CHARGEABILITY 1 INCH = 100 MILLISECONDS
APPARENT RESISTIVITY LOGARITHMIC AS SHOWN
EFFECTIVE "DC" PULSE UP TIMING SEQUENCE: 3 : 3 : 1
ON OFF INTGR.
N.B. LINES ARE NOT SPACED TO SCALE

LEGEND

APPARENT CHARGEABILITY	APPARENT RESISTIVITY
○ = 25'	○ = 1
● = 50'	● = 100'
× = 1	× = 1
○ = 100'	○ = 2
○ = 1	○ = 3
○ = 100'	○ = 4
○ = 1	○ = 200'
○ = 1	○ = 1
○ = 1	○ = 2
△ = EXPANDER POSITION	

LOCATION MAP

SCALE: 1/250,000



"AD" AREA

YUKON

PLATE III

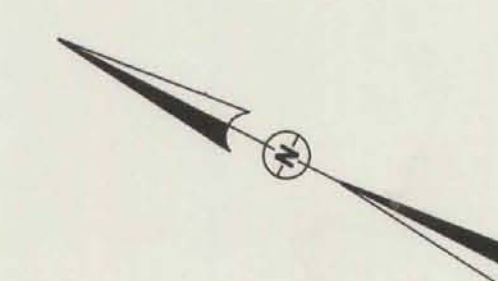
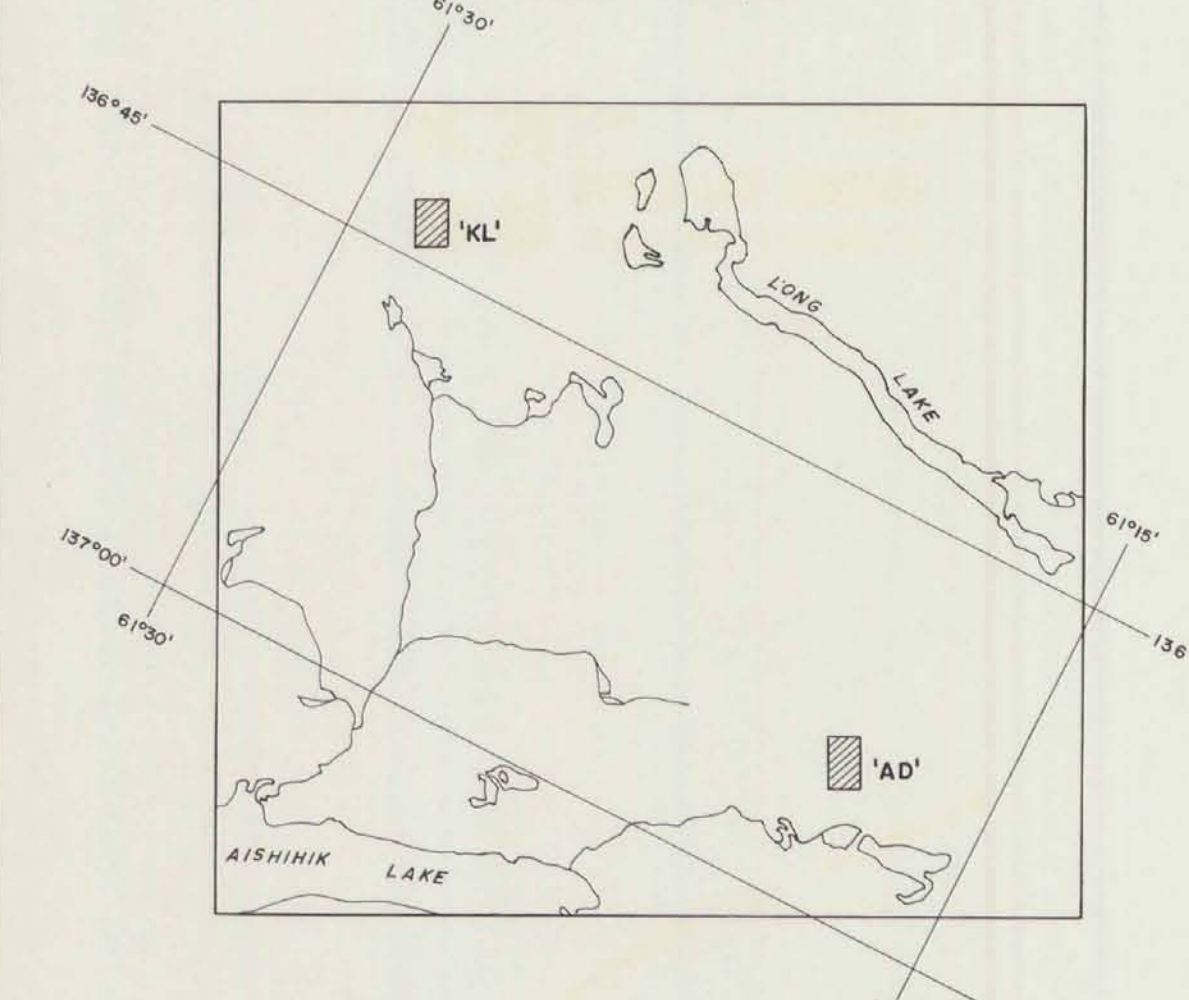
PROFILE PLAN

ELECTRODE CONFIGURATION : POLE DIPOLE $\overbrace{C_1 \quad n a}^{\text{---}} \quad \overbrace{0 \quad a}^{\text{---}}$

HORIZONTAL 1 INCH = 200 FEET
 APPARENT CHARGEABILITY 1 INCH = 100 MILLISECONDS
 APPARENT RESISTIVITY LOGARITHMIC AS SHOWN
 EFFECTIVE "DC. PULSE LP" TIMING SEQUENCE: 3 : 3 : 1
 ON OFF INTR
 N.B. LINES ARE NOT SPACED TO SCALE

[illegible]

LOCATION MAP
SCALE: 1/250,000



"AD" AREA

YUKON

PLATE IV

CHARGEABILITY CONTOUR MAP

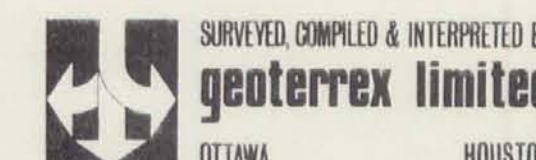
SCALE 1 INCH = 200 FEET

ELECTRODE CONFIGURATION : POLE DIPOLE
ELECTRODE SPACING : $a = 100$, $n = 1$ (LINES 60N-15N)
 $a = 200$, $n = 1$ (LINES 15N-15S)

CONTOUR INTERVAL 5 MILLISECONDS

EFFECTIVE DC PULSE IP TIMING SEQUENCE: 3 : 3 : 1
ON OFF INTG.

"CONTACT"
EXPANDER POSITION
SECTION DETAILED
DEPTH CALCULATION
APPROXIMATE OUTLINE OF
GEOCHEMICAL ANOMALY (Cu)



TO ACCOMPANY REPORT BY P. NORGAARD
AUGUST 1970
GEOTREX PROJECT NO. 85-15

