4779

92H/15E, 92I/2E

92H/15E, 92I/2E

GEOPHYSICAL REPORT

on an

INDUCED POLARIZATION SURVEY

on the

DOR CLAIM GROUP

ASPEN GROVE AREA, NICOLA M.D., B.C.

SEPTEMBER-OCTOBER, 1973

DOR CLAIM GROUP : 11.2 miles S 50° E of the Town of Merritt, B.C.

50° 120° SW

N.T.S. : 92 I/2E, 92 H/15E

Written For : Tanjo Mines Ltd. (N.P.L.)
520 - 602 W. Hastings Street
Vancouver, B.C.

By : David G. Mark, Geophysicist
Geotronics Surveys Ltd.
514 - 602 W. Hastings Street
Vancouver, B.C.

November 7, 1973

TABLE OF CONTENTS

	Page
SUMMARY	(i)
CONCLUSIONS	(ii)
RECOMMENDATIONS	(iii)
INTRODUCTION AND GENERAL REMARKS	1
PROPERTY AND OWNERSHIP	1
LOCATION AND ACCESS	2
PHYSIOGRAPHY	2
HISTROY OF PREVIOUS WORK	3
GEOLOGY	4
General Geology	
Property Geology	
Mineralization	
INSTRUMENTATION AND THEORY	7
SURVEY PROCEDURE	10
TREATMENT OF DATA	11
Induced Polarization	
Resistivity	
Self-Potention	
Composite Map	
DISCUSSION OF RESULTS	12
Chargeability	
Resistivity	
Self-Potential	
Compilation of Results	
SELECTED BIBLIOGRAPHY	19
RESUME - Howard Larson	20
GEOPHYSICIST'S CERTIFICATE	21
ENGINEER'S CERTIFICATE	22

MAPS - at end of report

#1	LOCATION MAP, fig. 1	1" = 134 miles
#2	CLAIM MAP, fig. 2	1" = 2000 ft.

MAPS - in pocket

#3	INDUCED POLARIZATION SURVEY CHARGEABILITY - Data & Contours, sheet 1	1" = 400'
#4	INDUCED POLARIZATION SURVEY RESISTIVITY - Data & Contours, sheet 2	1" = 400'
#5	INDUCED POLARIZATION SURVEY SELF-POTENTIAL - Data, sheet 3	1" = 400'
#6	INDUCED POLARIZATION SURVEY Profiles, sheet 4	1" = 400'
#7	Compilation of Anomalies, sheet 5	1" = 400'

SUMMARY

From the end of September to the beginning of October, 1973, a time-domain induced polarization survey was carried out over the southern portion and the northern portion of the Dor Claim Group. The property is located on and around Courtney Lake which is 11 miles southeast of Merritt, B.C. The purpose of the survey was to delineate specific areas of possible copper mineralization within the anomalous zones defined by the previous work on the property.

The property is found within the Thompson Plateau. The terrain is largely that of grassy rolling plains broken by a few wooded hills. The elevation varies from 3500 feet to 4000 feet. The main water source is Courtney Lake.

The Dor claims are mainly underlain by volcanic rocks of the Nicola Group. North of the lake is a small intrusive plug of the Coast Intrusions and bordering the plug on the east is vesicular basalt.

The mineralization on the property consists of chalcocite and malachite within Nicola andesites. One zone of mineralization occurs south of the lake and was known previously as the Copper Star prospect. The other zone occurs in the northeast corner of the property.

The IP survey was carried out using a time-domain portable unit, a Wenner array, and a 200-foot electrode spacing. The chargeability and resistivity values were calculated,

plotted, contoured, and profiled. The self-potential values were plotted and profiled.

The survey revealed IP anomalies over both mineralized zones as well as additional areas. Some of these correlated with resistivity lows and others with resistivity highs. The self-potential results were relatively inconclusive.

CONCLUSIONS

1. The Dor claims contain 2 known zones of copper mineralization which occur as malachite and chalcocite within shears within a red andesite or along the red andesite contact. One is south of Courtney Lake and is referred to as Zone A and the second one is northeast of Courtney Lake and is known as Zone B.

2. The magnetic survey revealed that Zone A occurs within a large magnetic high trending N 20° E. The high was interpretted by the writer in his previous report to be reflecting an augite andesite porphyry. But from the geological mapping done by Sookochoff, the high may be reflecting a red andesite. Zone B occurs on and around much smaller magnetic highs.

3. The VLF-EM survey revealed several conductive zones on the property. The majority of these are probably shear zones or faults. Some of these strike through Zones A and B.

4. The soil geochemistry survey indicated several zones of possible copper mineralization, the major ones being Zones A and B. Two other zones were labelled C and D. This survey indicated one A to be of greatest economic interest.

5. The results of the IP survey (IP and resistivity) in correlation with the results from previous surveys have also indicated Zone A to be of primary interest. The part of the zone that carries the greatest probability of copper mineralization is that area between the highway and the known mineralization. Here there is excellent correlation between the results of all the previous surveys. The eastern part of Zone A is of secondary interest.

6. In order of decreasing interest, Zones B, C, D, and E also carry a fair probability of the occurrence of copper mineralization. All 4 zones are characterized by the correlation of IP and copper soil geochemistry anomalies.

7. The SP results were quite erratic. Only one anomaly was considered definite and it correlated with a small IP anomaly and a small copper soil geochemistry anomaly. Therefore, it could well be reflecting a zone of copper sulphides that is probably small.

RECOMMENDATIONS

1) Consideration should be given to acquiring the mineral rights to the areas south of Zone A and north and east of Zone B.

2) It is recommended to test all zones with at least 16 percussion drill holes to a depth of about 200 feet.

The percussion drill is recommended because of the high number of holes. The location of the holes are as plotted on sheet 5 and are numbered in order of priority. As the results of the holes are received it is expected that the order of priority will be changed and that some of the holes may not be drilled.

3) The main SP anomaly should be diamond drilled but only after 2) is carried out. The hole should be collared at (L-80S, 53E) and dip towards the west at -45°.

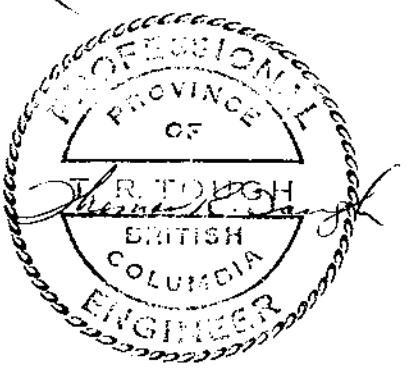
4) Dependent on 1) and 2) and in order of priority, all surveys should be extended south of Zone A, east and north of Zone B, north of Zone C and east and south of Zone E. The IP survey should be extended west of Zone A, south of Zone B, and east of Zone D.

Respectfully submitted,

GEOTORNICS SURVEYS LTD.

David G. Mark
Geophysicist

November 7, 1973



GEOPHYSICAL REPORT
on an
INDUCED POLARIZATION SURVEY
on the
DOR CLAIM GROUP
ASPEN GROVE AREA, NICOLA M.D., B.C.

INTRODUCTION AND GENERAL REMARKS

This report discusses the survey procedure, compilation of data, and interpretation of results of a time-domain induced polarization survey carried out on the Dor Claim Group in the Aspen Grove Area from the end of September to the beginning of October, 1973.

The field work was supervised and carried out by H.A. Larson, geophysicist and 3 assistants. The number of line miles completed was 10 and the areas surveyed are as shown on figure 2.

The object of the survey was to delineate specific areas of possible copper mineralization within anomalous zones defined by previously carried-out magnetic, VLF-EM and soil geochemistry surveys, and by geological work done by L. Sookochoff, geological engineer.

PROPERTY AND OWNERSHIP

The property consists of 34 contiguous mineral claims called the DOR 1-34 and are wholly owned by Tanjo Mines Ltd. (N.P.L.) of Vancouver, B.C. They are as on the

the table below and as shown on Figure 2.

DOR Claim Group (34)

Name	Record No.	Expiry Date
Dor 1 - 26	40717-40742	May 16, 1974
Dor 27 - 34	40965-40972	June 3, 1974

LOCATION AND ACCESS

The Dor Claims cover an area of ground around Courtney Lake which is about 11 miles S 50° E of the town of Merritt. By highway, the distance is about 13.5 miles. The geographical coordinates of the property are 50° 00' N latitude and 120° 36' W longitude.

For access, Highway No. 5 passes southerly through the western end of the Claim group. A rancher's dirt road leaves the highway to the immediate north of Courtney Lake and another to the immediate south of Courtney Lake and give access to the eastern part of the property.

PHYSIOGRAPHY

The Aspen Grove area is located within the physiographic unit known as the Thompson Plateau which is part of the Interior Plateau system. The terrain varies from rolling, grassy plains to wooded hills. Elevation varies from about 3500 feet to 4000 feet giving a relief of 500 feet.

Poplar and alder are found in the low swampy areas and spruce and alder on the hills.

Water supply is excellent since Courtney Lake is found within the center of the property and Quilchena Creek flows southerly about 1 mile east of the Claim Group.

Climate of the area is semi-arid with an annual precipitation being not much more than 10 inches. Temperatures vary from below zero in winter to the high 90's in summer.

HISTORY OF PREVIOUS WORK

1. Prior to 1915, trenches, pits and adits were dug in the area now covered by the Dor Claims. In addition, 45 tons of hand-sorted ore was shipped from the Copper Star property also covered by the Dor claims.

2. In 1960, a diamond drill hole was drilled on what is now the Dor 29 claim. No results are available.

3. The Dor Claims were staked in May of 1969.

4. In the spring of 1970, a VLF-EM survey was carried out over a portion of the property by Klyceptor International Air Surveys Ltd.

5. During May, 1972, a combined magnetic and VLF-EM survey was completed over almost all of the property by Geotronics Surveys Ltd.

6. During August, 1973 a soil geochemistry survey was carried out by Geotronics Surveys Ltd.

7. During October 1972, Laurence Sookochoff, consulting geological engineer, examined and mapped the northern and southern showings.

GEOLOGY

The property was examined in 1972 by L. Sookochoff. His geological description of the area and the property is repeated here for the reader's convenience.

A. General Geology

"A northerly trending band of Nicola rocks ranging from eight to twenty-five miles wide stretches from near the U.S. border in the south to beyond Kamloops Lake in the north. Within the Nicola rocks, which are comprised of volcanic flows, conglomerates, argillites, tuffs, breccias and limestones, are more recent formations of sedimentary rocks as well as stocks and plugs of Coast and Copper Mountain intrusives. These intrusives are believed to have supplied the mineralizing solutions for such deposits as Copper Mountain and Craigmont.

"Within the belt of Nicola rocks are northerly trending faults and fracture zones which all appear to be associated with the Allison Fault zone. The Allison Fault is projected thirty-eight miles south to the Princeton area and conceivably reaches Copper Mountain south of Princeton, but is obscured by a capping of the younger Princeton group of sedimentary rocks.

"Scattered mineralized showings are also found within this belt. Some of these showings have had ore shipped from them in the early 1900's and some are presently being reassessed and developed.

"The Dor group of claims lies at the northern end of the Aspen Grove Copper Camp. This Camp lies in a belt of Nicola rocks and stretches from Missezula Lake to the south, and Courtney Lake to the north. This belt contains a number of copper showings."

B. Property Geology

"The claims cover an area of predominantly Nicola volcanics which are comprised of varicoloured andesites and porphyritic flows. A plug of Coast Intrusive granite lies to the north of Courtney Lake. The granite is bounded on the east by a Tertiary vesicular basalt.

"A small area of the property was mapped to determine the control and/or trend of the mineralization on the property. The sampled area was on the Dor 19, 20, 29 and 30 mineral claims to the south of Courtney Lake. Two adits, two pits and numerous trenches were found in the mapped area. These were workings that had been excavated prior to 1915 on surface mineralization and/or on shear zones in search for mineralization.

"An augite porphyry, which was used as a marker unit in this area, strikes northwesterly and dips to the south east. Shear zones along the contact of this unit contain

malachite and chalcocite. A grab sample from an adit along this shear assayed 0.18% Cu. A northwesterly striking shear zone adjacent to the contact also contains malachite and chalcocite mineralization. A grab sample from this shear zone assayed 0.70% Cu.

"Relatively heavy hematite and/or epidote is assoiated with the mineralization and appears to have been a guide for the excavation of pits and open cuts in the absence of other encouraging signs.

"To the northeast of Courtney Lake three shallow shafts, the deepest is ten feet, have been excavated in an andesite. Northerly trending shear or fracture zones are exposed in these shafts along with calcite stringers, malachite and chalcocite."

C. Mineralization

"Malachite and/or chalcocite mineralization are found in most of the workings on the property. The mineralization occurs within fracture zones, on fracture planes and in quartz veins.

"Malachite staining is an indication of chalcocite mineralization which in itself was masked by either the shear zones or obscured by being finely disseminated within the andesite.

SURVEY PROCEDURE

The IP survey was to have been carried out over anomalous zones previously established by the magnetic and VLF-EM surveys.

Unfortunately, it was no longer possible to follow the old survey lines as only portions of the grid were still visible. For this reason a second base line was chained and flagged at 100-foot intervals along line 35 E between lines 10 S and 25 S. This base line was run about N 10° W from a point 900 feet N 80° E of station 25 S, 20 E of the old grid. The cross lines were flagged at 200-foot intervals.

The survey was run using a Wenner array with a 200-foot electrode spacing. Measurements were taken every 200 feet.

The lines to the south of Courtney Lake were run from the old base line and are as shown on sheets 1 to 3.

Non-polarizing, unglazed, porous pots with a copper electrode and a copper sulphate electrolyte were used for the potential electrodes. Stainless steel stakes were used for the current electrodes. The charge time for each reading throughout the survey was eight seconds and the voltage used to drive the current into the ground was primarily 400 volts.

TREATMENT OF DATA

1. Induced Polarization

The IP results were normalized by dividing the integrated IP reading in millivolt-second by the impressed emf (or primary voltage) in millivolts and multiplied by 1000 to get what is generally referred to as chargeability in millivolt-seconds/volt or milliseconds. These results were then plotted on sheet 1 and profiled on sheet 4.

2. Resistivity

To get the resistivity value in ohm-meters, the primary voltage is divided by the current and multiplied by 383 meters (which is a geometric factor peculiar to the Wenner array with an electrode spacing of 200 feet). The results were then plotted on sheet 2 and profiled on sheet 4 with the chargeability data.

3. Self-potential

SP readings from an IP survey are often erratic because of the residual voltage left in the ground from previous IP pulses and therefore do not reflect the true ground potential. For this reason, it is meaningless to calculate and plot the self-potential from the self-potential gradient readings and often, the gradient readings themselves add little to the geological picture.

However, since the SP readings have had a definite value on some previous surveys interpreted by the writer, they were plotted on sheet 3 and profiled with the chargeability and resistivity in sheet 4.

4. Composite Map

A composite map was drawn of the results of all of the surveys so far carried out on the Dor claims. This was done to aid in the correlative interpretation between the various surveys. The composite results are shown on sheet 5.

DISCUSSION OF RESULTS

1) Chargeability

The chargeability values were contoured at an interval of 2 msecs. (milliseconds) from 8 msecs and up. The anomalous threshold value was chosen to be 10 msecs. The value, 8 msecs, was felt to be possibly an indicator of mineralization and therefore is called the sub-anomalous threshold value and its contour is dashed in.

The chosen threshold values produce several anomalies, the main ones being around the 2 known zones of mineralization. It is possible the writer has chosen the threshold values to be too low. However, it must be considered that much of the IP survey was carried out over areas established anomalous by previous surveys.

2. Resistivity

The resistivity map was contoured at an interval of 100 ohm-meters. The 300-ohm-meter contour was left out since it is background and consequently would detract from the interpretability. The 100- and 200-ohm-meter contours were dashed in and the contours 400 ohm-meters and above were drawn in solid.

As a result there are 3 major resistivity highs, one minor one, and 5 resistivity lows.

The known mineralization is found in the western side of 2 of the major resistivity highs. The third resistivity high is located to the immediate southeast of the lake. No known mineralization occurs around this resistivity high. The minor resistivity high occurs to the north of the lake and no known mineralization occurs around it either.

The writer feels that the resistivity highs are reflecting a certain rock-type. Perhaps the rock-type is a different volcanic flow. All highs strike northerly.

Three of the resistivity lows are associated with IP anomalies as will be discussed below.

3. Self-Potential

The interpretation for the self-potential is taken from the profiles on sheet 4.

As was pointed out above, SP readings from an IP survey are quite erratic and on this survey this proves to be no different. Only one anomaly is definite.

The anomaly is located on L-80S at 51E and reaches a positive high of plus 56 mvs. (millivolts). It correlates with a small IP anomaly and a small soil geochemistry anomaly. It therefore is quite probable that the causitive source is somewhat massive copper sulphides with some dissemination in the wallrock.

Some small SP anomalies are found in the area of the northern mineralized zone. Another is found on L-10 S at 45E to the immediate west of an IP and soil geochemistry anomaly.

4. Compilation of Results

In the following discussion, the anomalous ones will be identified by the same letters used in the writer's soil geochemistry report.

a) Zone A

The main anomalous area is that labelled Zone A and occurs from about 36 E to the baseline and is open on both the north and south ends. The southern known mineralization occurs approximately within Zone A's center.

The most important correlation the writer feels is that between IP and soil geochemistry anomalies. Where these correlate is found the best probablity for the occurrence of copper sulphides.

The best correlation within Zone A appears to be the one located to the immediate east of the highway. Here an IP anomaly of high intensity (20 msecs.) correlates with the western part of a copper soil geochemistry anomaly. Within the center of the geochemistry anomaly is a resistivity low. In addition a VLF-EM anomaly of high intensity correlates directly with the IP anomaly and the western edge of the resistivity low. Another VLF-EM anomaly correlates with the eastern edge of the same resistivity low. There is no definite correlation with the magnetics. Part of the zone correlates with a magnetic high and part with a magnetic low.

As a result of these correlations a very probable interpretation is that the various anomalies are reflecting a zone of copper sulphides. As is often the case, the supposed mineralized zone is of relatively high conductivity. This is shown by the resistivity low and the VLF-EM highs on the western and eastern edges of the resistivity low. The copper soil geochemistry anomaly shows that at least some of the mineralization maybe copper. The IP anomaly on the western edge of the zone may indicate pyritization in addition to copper sulphides.

The IP anomaly to the immediate east of the zone may also indicate pyritization. Within the latter mentioned IP anomaly occurs the main showing.

The mineralized zone as indicated by the above-mentioned anomalies appears to strike about N 25° E, is about 1000 feet wide and is open on the north and south ends. In addition, the zone appears to widen towards the south.

Other parts of Zone A that are fairly indicative of copper sulphides are centered at (L-80S, 22E) and (L-90S, 32E). Both have excellent correlation between IP and copper soil geochemistry.

b) Zone B

The northern known mineralization occurs within this zone. It is characterized by the correlation of an IP anomaly, a copper soil geochemistry anomalous zone, and a resistivity high. In addition, three small VLF-EM anomalies strike northerly through Zone B. The magnetics do not produce any definite correlation.

It is quite likely that a zone of sulphide mineralization is being reflected by the various survey methods. As in Zone A, the copper soil geochemistry shows that at least some of the mineralization maybe copper. The IP anomaly indicates that it is fracture filling or disseminated. The resistivity high within this zone probably is reflecting a different rock-type that is the host-rock for the mineralization. The VLF-EM anomalies could well be reflecting shear zones.

Zone B also appears to be striking north. The geochemistry shows the length of the zone to be at least 2400 feet long. It is open on the east end and perhaps the north end.

To the immediate west of this zone is found an IP anomaly about 1000 feet by 400 feet and striking in an easterly direction.

There is no copper soil geochemistry anomaly or anomalies from other geophysical methods that correlate with the IP anomaly. It must be remembered, however, that there being no correlation with copper soil geochemistry does not preclude copper mineralization. The reason is that the IP in this case is exploring at most to a 150-foot depth and the soil geochemistry is exploring only to the top of the bedrock which in this case is probably only a few 10's of feet.

c) Zone C

This zone is characterized by the correlation of an IP anomaly and a copper soil geochemistry anomaly. It appears to strike north, is at least 500 feet long, 200 feet wide, and is open on the north end.

d) Zone D

This zone is centered at about (L-25S, 20E) and is characterized by good correlation between an IP anomaly,

a resistivity low, and a copper soil geochemistry anomaly. Furthermore, there is fair correlation with a VLF-EM anomaly.

It is difficult to ascertain what the strike and dimensions of this zone are since it occurs on the western edge of the IP survey.

e) Zone E

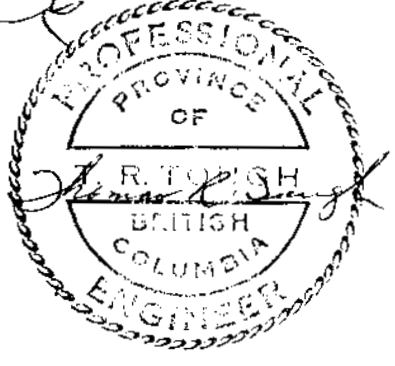
This anomalous zone is composed of an IP anomaly, a resistivity low, a magnetic low, a VLF-EM anomaly and a few isolated copper soil geochemistry anomalies. It is also difficult to ascertain the size and strike of this zone since it is found on the eastern edge of the survey area.

Respectfully submitted,

GEOTRONICS SURVEYS LTD.

David G. Mark,
Geophysicist

November 7, 1973



SELECTED BIBLIOGRAPHY

Cockfield, W.E. - Geology and Mineral Deposits of Nicola Map Area, British Columbia. Geol. Survey of Can. Mem. 249, 1948.

Hings, D.L. - Geophysical Report No. EM-70-106 for Tanjo Mines Ltd. (N.P.L.) DOR Claim Group. Klyceptor International Air Surveys Ltd. June, 1970.

Kelley, Sherwin F. - Report on the Hope and Dor Mineral Claims near Merritt, B.C. for Tanjo Mines Ltd. April 1970.

Kelley, Sherwin F. - Supplemental Report to Tanjo Mines Ltd. (N.P.L.) on the Hope and DOR Mineral Claims - Merritt, B.C. July, 1970.

Rice, H.M.A. - Geology & Mineral Deposits of the Princeton Map Area, British Columbia. Geol. Surv. of Canada, Mem. 243, 1960.

Mark, David G. - Geophysical Report on Magnetic & VLF-EM Surveys, DOR Claim Group, Aspen Grove Area, Nicola M.D., B.C. Geotronics Surveys Ltd., May 30, 1972.

Mark, David G. - Geochemical Report on a Soil Sample Geochemistry Survey, DOR Claim Group, Aspen Grove Area, Nicola M.D., B.C. Geotronics Surveys Ltd., August, 1972.

SELECTED BIBLIOGRAPHY

Sookochoff, Laurence - Geological Report on the DOR Claim Group of Tanjo Mines Ltd. (N.P.L.) Nicola M.D., B.C. T.R. Tough & Associates Ltd. December 6, 1972.

Resume of
Professional and Technical Experience
of
Howard Larson, Geophysicist

Education

1971 Graduate of the University of British Columbia with a Bachelor's degree in Science (B.Sc.) in geophysics.

Experience

August 1971 to Present	Geotronics Surveys Ltd. Geophysicist in both mining and engineering geophysics.
May 1970 to September 1970	Tri-Con Exploration Surveys Ltd. Field Supervisor in geophysics.
May 1969 to September 1969	Atlas Explorations Ltd. Geochemical analyst and geophysical operator.
May 1968 to September 1968	Coast Eldridge Engineers and Chemists. Chemist's assistant on geochemical rock assays and soil samples.

Location of experience is British Columbia, Yukon, and the Northwest Territories.

Types of geophysical surveys experience are single and multi-channel seismic, induced polarization, resistivity, self-potential, magnetometer (air and ground), various types of electromagnetic, radiometric and soil sampling.

GEOPHYSICIST'S CERTIFICATE

I, David G. Mark, of the City of Vancouver, in the Province of British Columbia, do hereby certify:

That I am a Consulting Geophysicist of Geotronics Surveys Ltd., with offices at 514 - 602 West Hastings Street, Vancouver, B.C.

I further certify that:

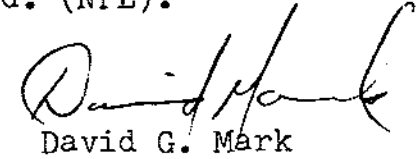
1. I am a graduate of the Unversity of British Columbia (1968) and hold a B.Sc. degree in Geophysics.

2. I have been practising my profession for the past four years and have been active in the mining industry for the past seven years.

3. I am an associate member of the Society of Exploration Geophysicists and a member of the European Association of Exploration Geophysicists.

4. This report is compiled from data obtained from an induced polarization survey carried out by H.A. Larson, geophysicist, during September and October, 1973, on the Dor Claim Group, and pertinent data from published maps and reports as listed under Selected Bibliography.

5. My interest in Tanjo Mines Ltd. (NPL) and its properties is limited solely to 5000 shares. I have no interest either directly or indirectly in any other securities or company associated with Tanjo Mines Ltd. (NPL).



David G. Mark
Geophysicist

November 7, 1973

ENGINEER'S CERTIFICATE

I, Thomas R. Tough, of the City of Vancouver in the Province of British Columbia, do hereby certify that:

I am a Consulting Geologist and an Associate with T.R. Tough & Associates Ltd., with offices at 519 - 602 West Hastings Street, Vancouver, B.C.

I further certify that:

1. I am a graduate of the University of British Columbia (1965) and hold a B.Sc. degree in Geology.

2. I have been practising in my profession for the past eight years and have been active in the mining industry for the past fifteen years.

3. I am registered with the Association of Professional Engineers of British Columbia.

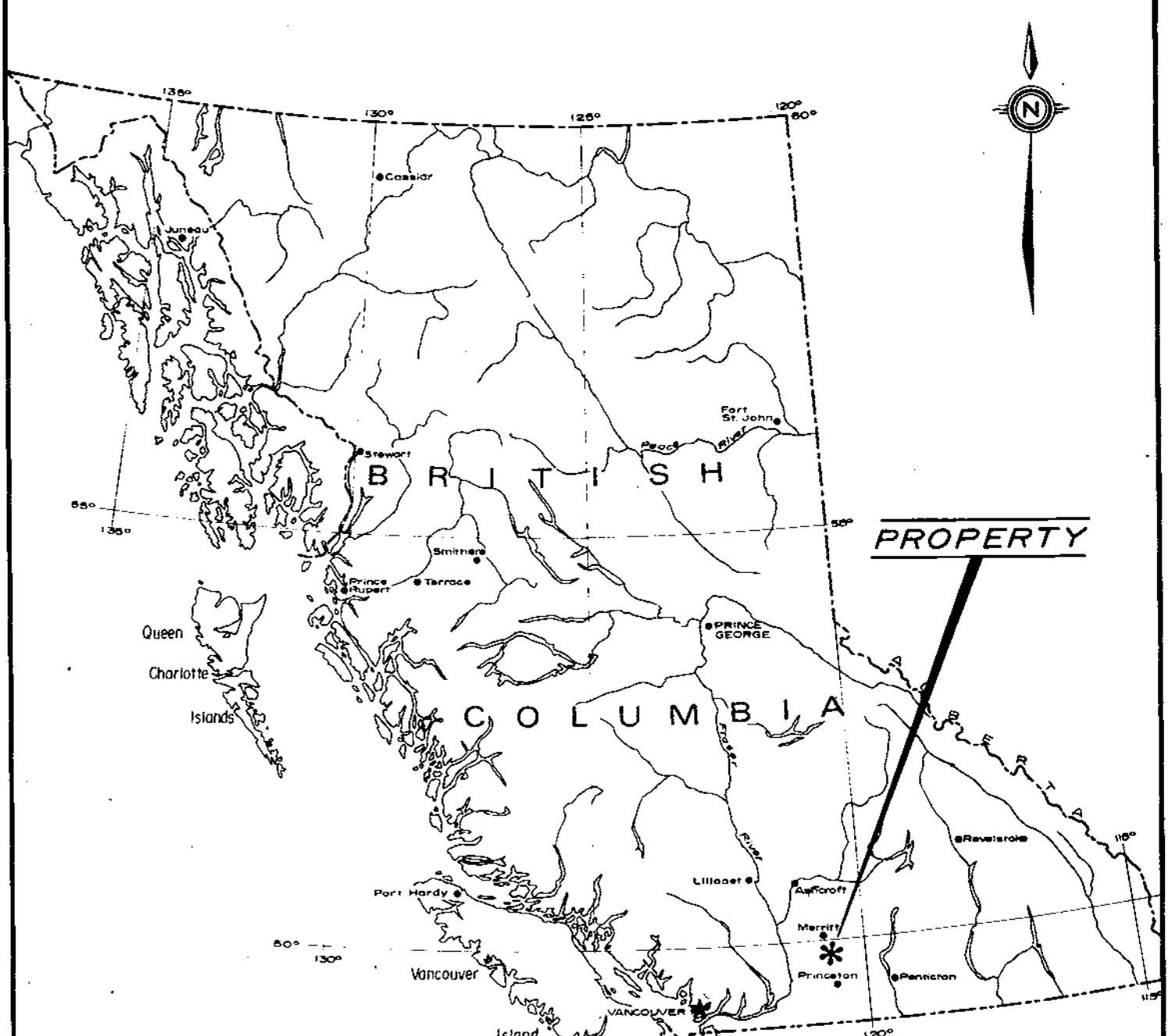
4. I have studied the accompanying report dated November 7, 1973, on an induced polarization survey, submitted by Geotronics Surveys Ltd., written by David G. Mark, Geophysicist, and concur with findings therein.

5. I have no direct or indirect interest whatsoever in the property described herein, nor in the securities of Tanjo Mines Ltd. (N.P.L.) and do not expect to receive any interest therein.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA T. R. TOUGH

Thomas R. Tough, P. Eng.
Consulting Geologist

November 7, 1973



Department of
Mines and Petroleum Resources

ASSESSMENT REPORT

NO. 4779 #1

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
T.R. TOUGH

FIG. 1

TANJO MINES LTD. (N.P.L.)
DOR CLAIM GROUP
NICOLA M.D., B.C.

LOCATION MAP

SCALE: 1" = 136 miles

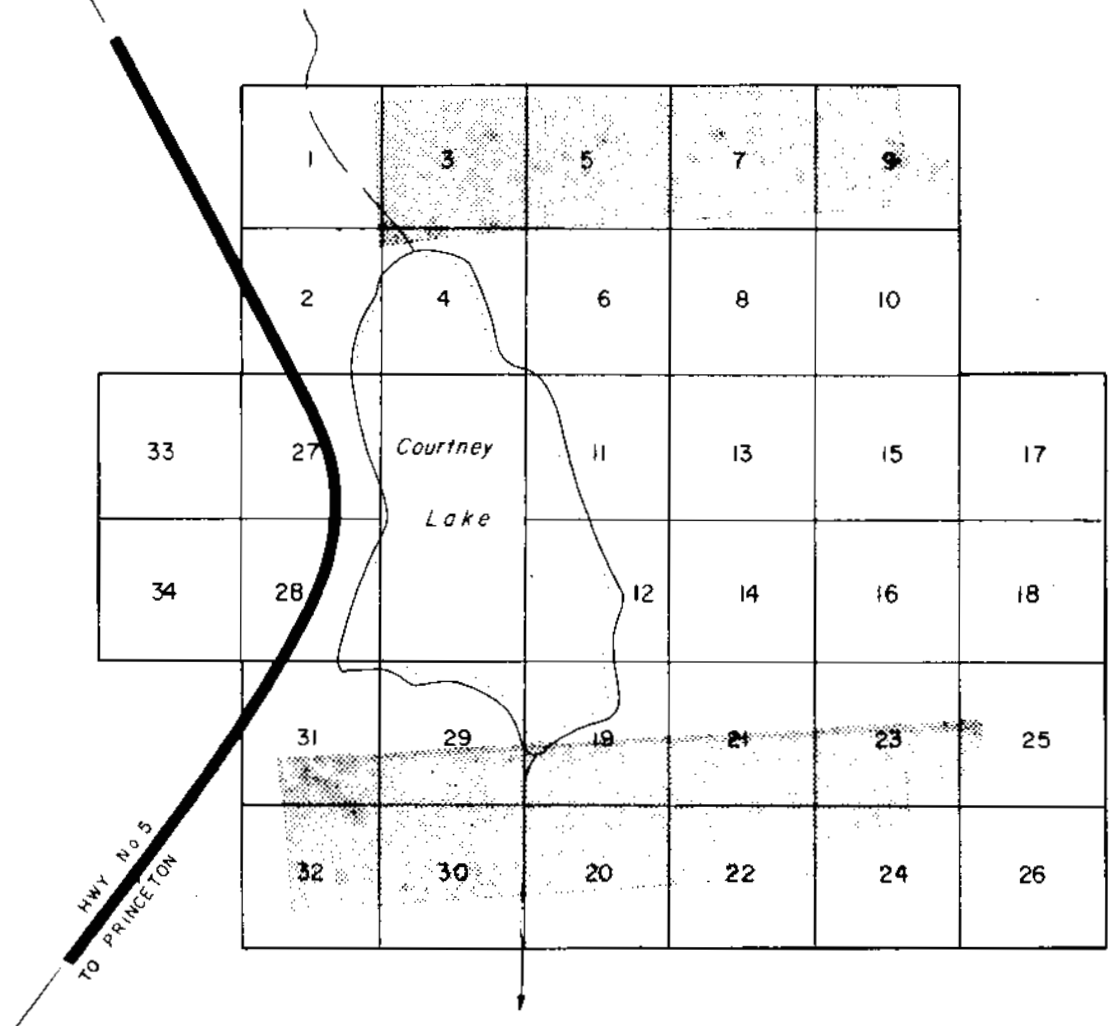
ALTAIR drafting services ltd.

120°36'

50° 00'

TO MERRITT

HWY No 5
TO PRINCETON



SURVEY AREA

FIG. 2
TANJO MINES LTD. (N.P.L.)
DOR CLAIM GROUP
NICOLA M.D, B.C.
CLAIM MAP

SCALE 1"= 2000 FT.

COST BREAKDOWN
on an
INDUCED POLARIZATION SURVEY
on the
DOR CLAIM GROUP
ASPEN GROVE AREA, NICOLA M.D., B.C.
September-October, 1973

Geophysicist - 15 days @ $125.00/day	$ 1,875.00
I.P. Crew - 3 men @ $40.00/day/man for 15 days	1,800.00
Instrument Rental - 15 days @ $60.00/day	900.00
Geophysicist mapping and report	1,000.00
Engineering fees	300.00
TOTAL	5,875.00

Declared before me at the City of Vancouver, in the Province of British Columbia, this 14th day of December, 1973, A.D.

Joan Paul Sub - mining Recorder

A Commissioner for taking Affidavits for British Columbia or
A Notary Public in and for the Province of British Columbia,

Geotronics Surveys Ltd.

INSTRUMENTATION AND THEORY

The instrument used was a Model A-2 portable time-domain pulse type manufactured by Sabre Electronic Insturments Ltd., Burnaby, B.C. A 12-volt lead acid storagebattery (rechargeable) was used as a power supply. This unit has a transmitter power output of 330 watts normal and up to 400 watts with fully charged battery. Output voltage is 400, 800 or 1,200 volts with selection by a switch. The time of pulse length is 1 to 12 seconds, variable, delay time is 250 milliseconds and integration time is 1 second. The self-potential buckout is operated manually by a ten turn precision pot with a range of $\pm$ 1 volt.

There are basically two methods of IP surveying, frequency-domain and time domain. Both methods are dependent on a current flowing across an electrolyte-electrode interface or an electrolyte-clay particle interface, the former being called electrode polarization and the latter being called membrane polarization.

In time-domain electrode polarization, a current is caused to flow along electrolyte-filled capillaries within the rock. If the capillaries are blocked by certain mineral particles that transport current by electrons (most sulphides, some oxides, graphite), ionic charges build up at the particle electrolyte interface, positive ones where the current enters the particle, and negative ones where it leaves. This accumulation of charge creates a

voltage that tends to oppose the current flow across the interface. When this current is stopped the created voltage slowly decreases as the accumulated ions diffuse back into the electrolyte. Thus is produced the induced polarization effect.

In membrane polarization a similar effect occurs. A charged clay particle attracts oppositely charged ions from the electrolyte in the capillary around the particle. If a current is forced through the capillary, the charged ions are displaced. When the current is stopped, the ions slowly diffuse back to the same equalibrium state as before the current flow. This explains IP anomalies where no metallic-type minerals exist.

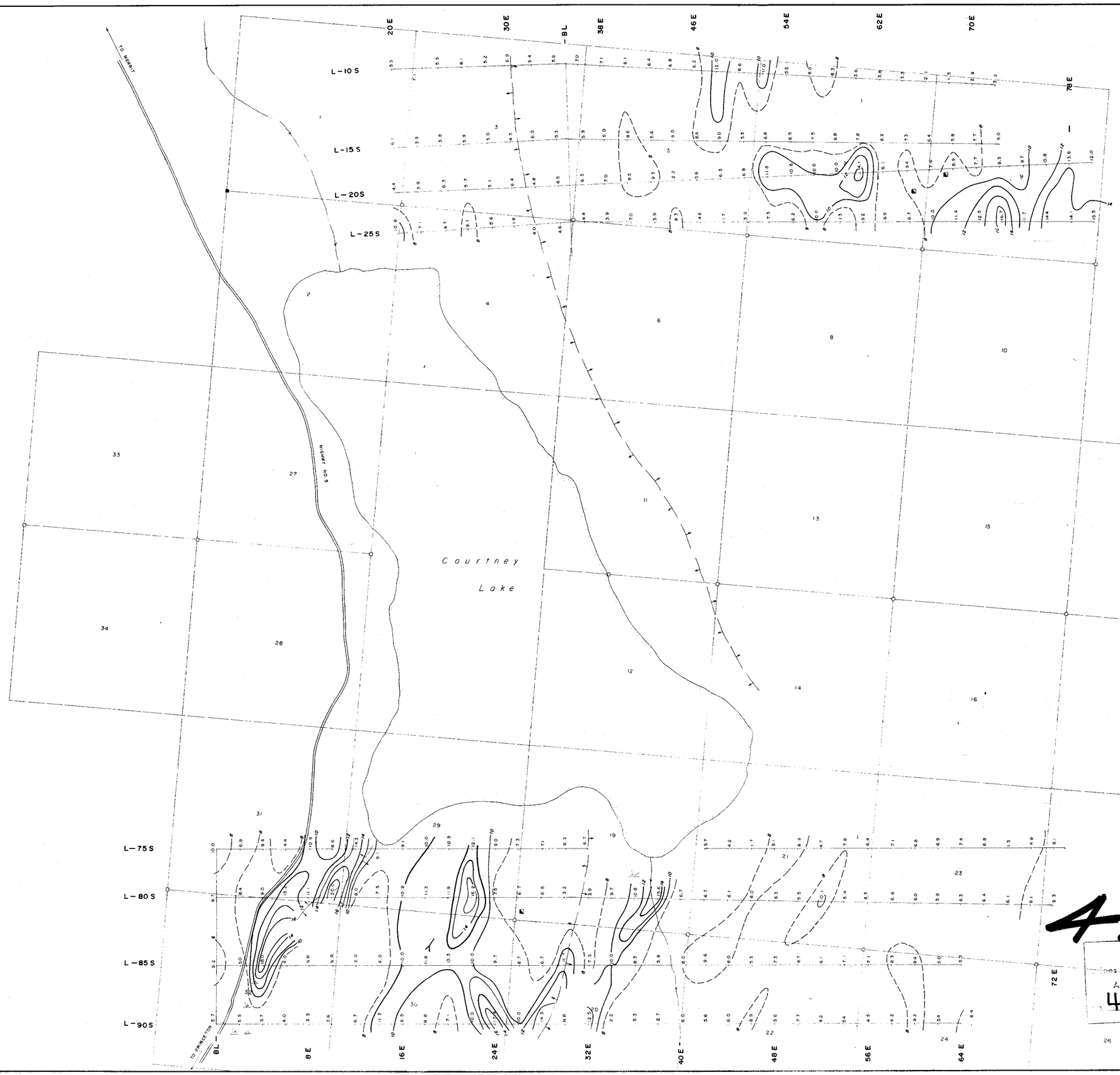
Frequency-domain IP is based on the fact that the resistance produced at the electrolyte-charged particle interface decreases with increasing frequency. Two parameters commonly used for measuring frequency-domain induced polarization are frequency effect and metal factor. The one used for time-domain measurements is chargeability (as in this survey).

In the process of carrying out an IP survey, two other geophysical methods are used and measured. These are self-potential (SP) and resistivity. The SP, its phenomenon described in the following paragraph, must be nulled by the IP receiver in order to obtain

accurate IP measurements. The resistivity value is calculated from the voltage and current readings obtained while measuring the IP effect and therefore can be utilized to determine how resistive (or conductive) the ground is.

Self-potentials are produced in the crust of the earth from a variety of processes that are chemical, physical and electromagnetic inductive. Sulphide bodies produce a potential from chemical processes that range in magnitude from a few tens of millivolts to several hundred millivolts and, in rare cases, above 1,000 millivolts. The causes of sulphide self-potentials is not fully understood or agreed upon by geophysicists. However, the more accepted theory is that the 'battery action' is caused by a difference in pH in the upper ground water electrolytes (more acidic) and the lower ground water electrolytes (less acidic) and is abetted by the oxidation of sulphides near the surface forming acids that, therefore, increase the contrast. The current caused by the potential flows from the apex of the sulphide body to some point at depth (terminus of deposit or point of minimum acidity), into the wall rock, back to the surface and back into the sulphide apex. A negative pole is thus created at ground surface and, therefore, except for a few rare cases, sulphide bodies are reflected by negative anomalies.

The gradient of the self-potential (millivolts/electrode spacing in feet) is what is measured in an IP survey.



PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. R. TOUGH

LEGEND

- SURVEY LINE
- CLAIM POST (ASSUMED, LOCATED)
- CLAIM BOUNDARY
- 16 DOR CLAIM NO.
- SHAFT
- RIDGE
- CREEK

CONTOURS : ---8--- SUB-ANOMALOUS

10,12,14,16 ANOMALOUS

READINGS ARE IN MILLISECONDS

INSTRUMENTATION

INSTRUMENT	:	TIME DOMAIN
ARRAY	:	WENNER
ELECTRODE SPACING	:	200 feet
UNITS	:	MILLISECONDS

4779 M3

TO ACCOMPANY GEOPHYSICAL REPORT OF [illegible], GEOPHYSICIST

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
4779 MAP #3

GEOTRONICS SURVEYS LTD.

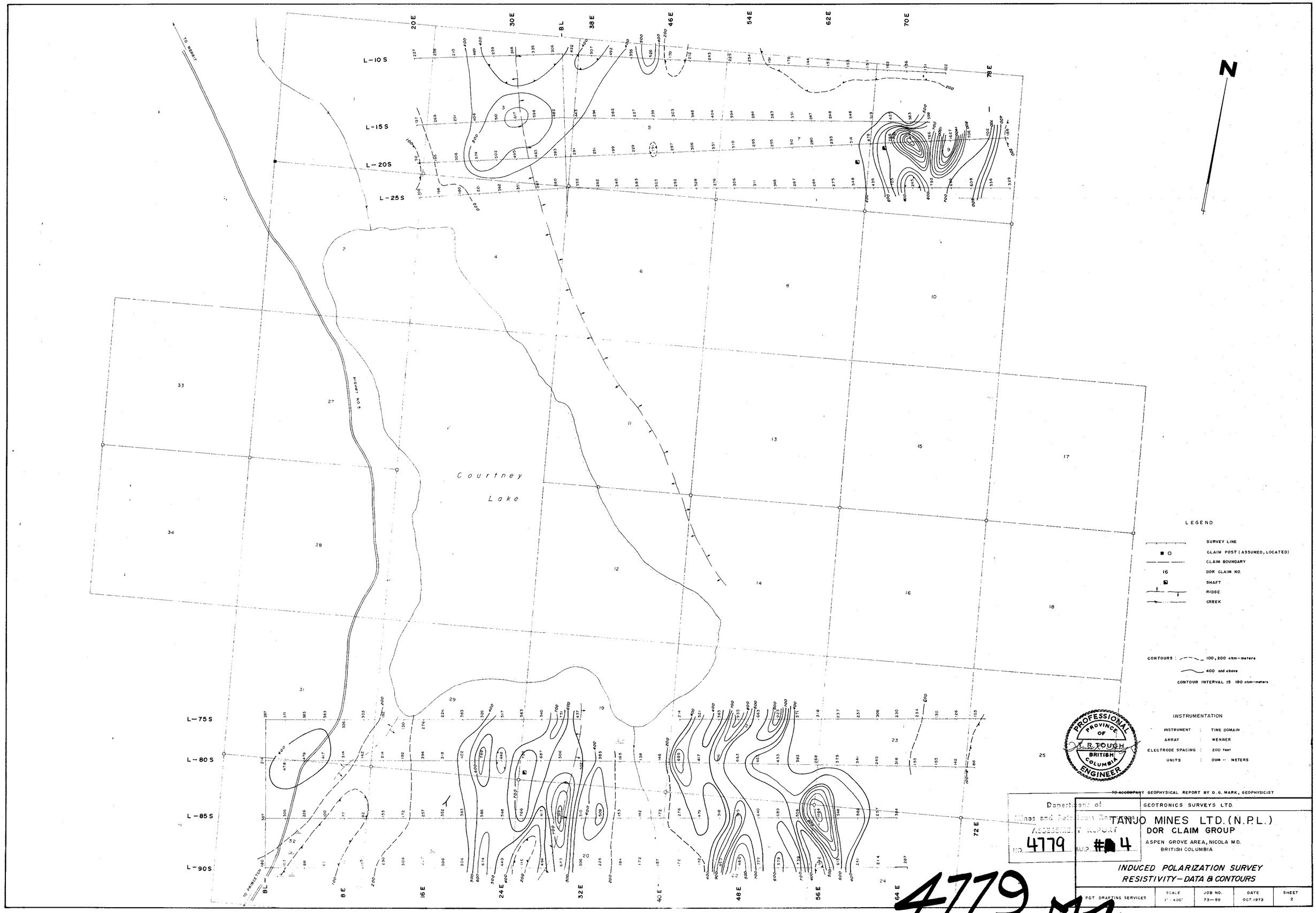
TANJO MINES LTD. (N.P.L.)

DOR CLAIM GROUP

ASPEN GROVE AREA, NICOLA M.D.
BRITISH COLUMBIA

INDUCED POLARIZATION SURVEY
CHARGEABILITY-DATA & CONTOURS

PDT DRAFTING SERVICES	SCALE 1"=400'	JOB NO. 73-59	DATE OCT. 1973	SHEET 1



LEGEND

- SURVEY LINE
- CLAIM POST (ASSUMED, LOCATED)
- CLAIM BOUNDARY
- 16 DOR CLAIM NO.
- SHAFT
- RIDGE
- CREEK

CONTOURS : 100, 200 ohm-meters

400 and above

CONTOUR INTERVAL IS 100 ohm-meters

INSTRUMENTATION

INSTRUMENT	:	TIME DOMAIN
ARRAY	:	WENNER
ELECTRODE SPACING	:	200 feet
UNITS	:	OHM - METERS

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. R. TOUGH

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, GEOPHYSICIST

Department of Mines and Petroleum Resources

ASSESSMENT REPORT NO. 4779 MAP #4

GEOTRONICS SURVEYS LTD.

TANJO MINES LTD. (N.P.L.)

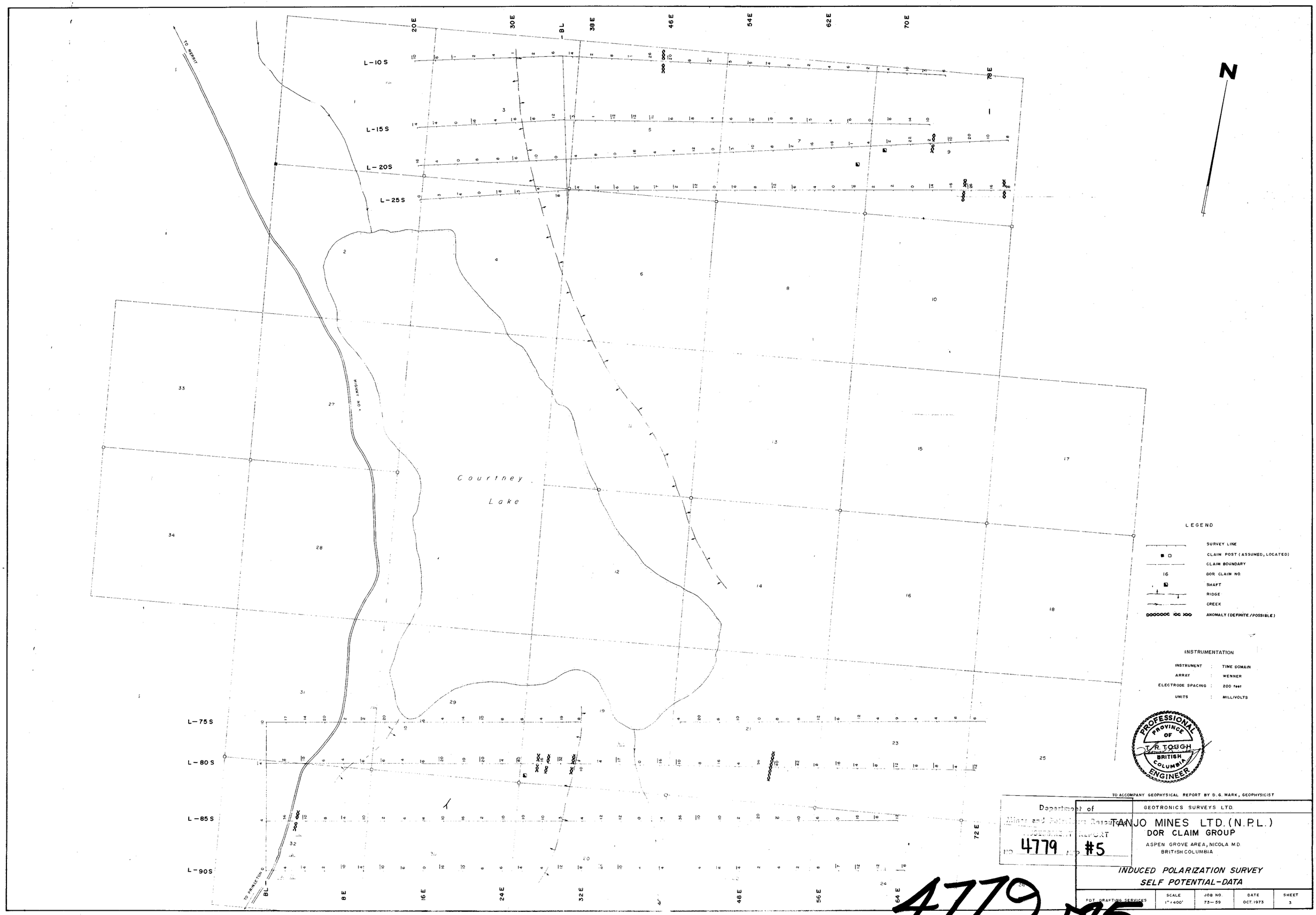
DOR CLAIM GROUP

ASPEN GROVE AREA, NICOLA M.D.
BRITISH COLUMBIA

INDUCED POLARIZATION SURVEY RESISTIVITY - DATA & CONTOURS

PDT DRAFTING SERVICES	SCALE	JOB NO.	DATE	SHEET
	1" = 400'	73-59	OCT. 1973	2

4779 M4



LEGEND

- SURVEY LINE
- CLAIM POST (ASSUMED, LOCATED)
- CLAIM BOUNDARY
- 16 DOR CLAIM NO.
- SHAFT
- RIDGE
- CREEK
- ANOMALY (DEFINITE/POSSIBLE)

INSTRUMENTATION

INSTRUMENT	:	TIME DOMAIN
ARRAY	:	WENNER
ELECTRODE SPACING	:	200 feet
UNITS	:	MILLIVOLTS

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T.R. TOUGH

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, GEOPHYSICIST

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
4779 #5

GEOTRONICS SURVEYS LTD.

TANJO MINES LTD. (N.P.L.)

DOR CLAIM GROUP

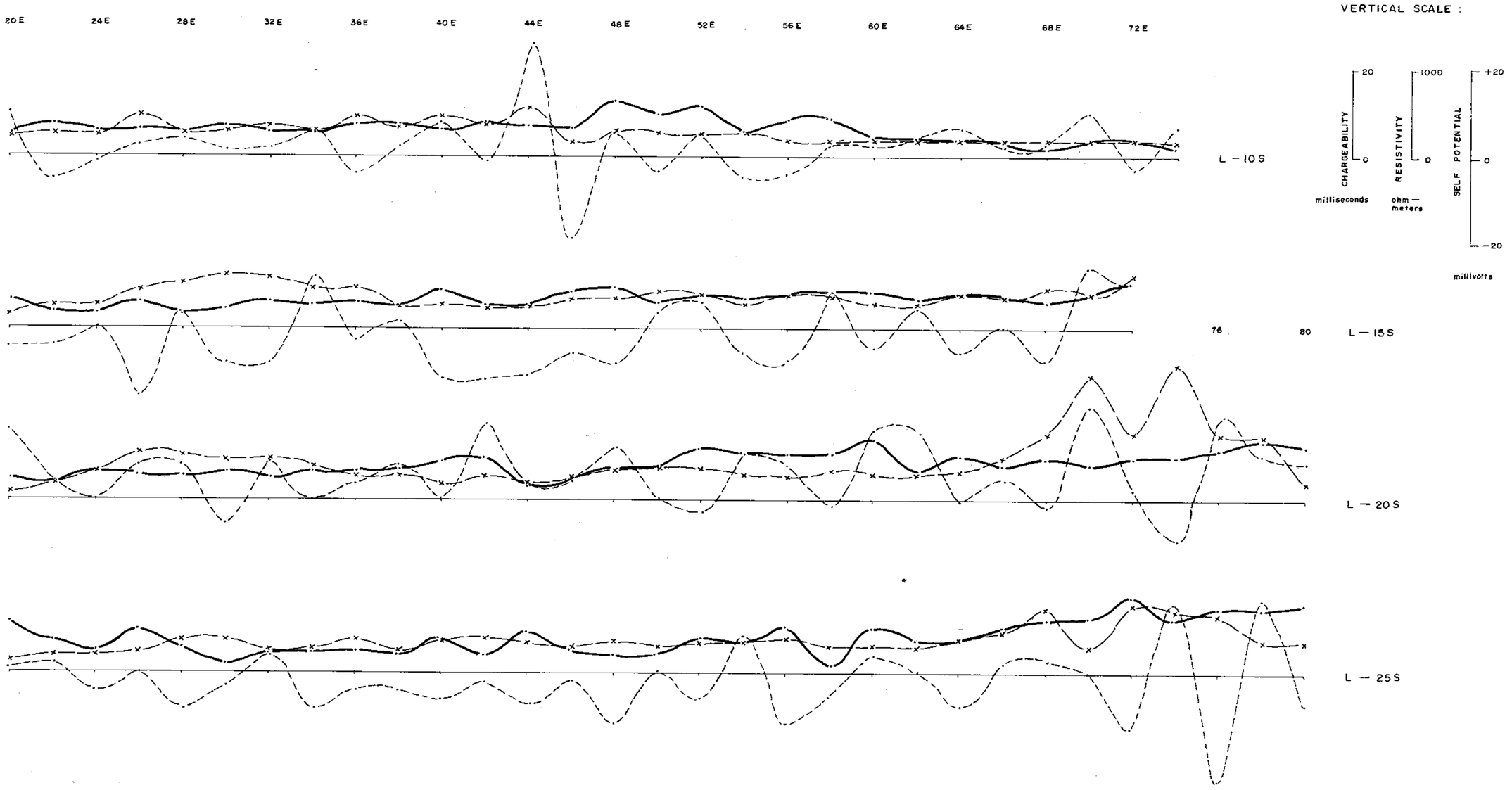
ASPEN GROVE AREA, NICOLA M.D.
BRITISH COLUMBIA

INDUCED POLARIZATION SURVEY
SELF POTENTIAL-DATA

PDT DRAFTING SERVICES	SCALE	JOB NO.	DATE	SHEET
	1" = 400'	73-59	OCT. 1973	3

4779 MS

NORTH AREA



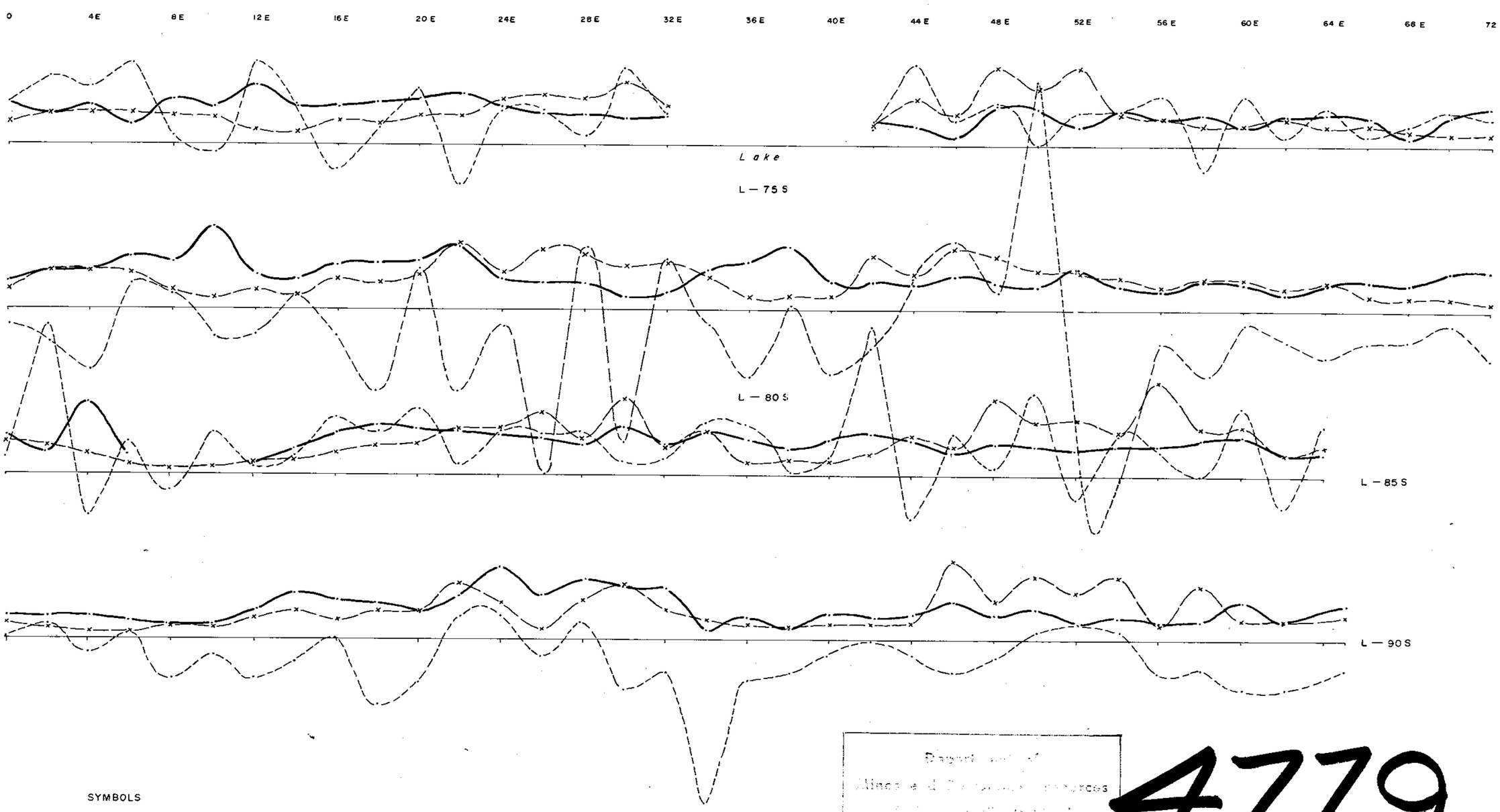
VERTICAL SCALE :

CHARGEABILITY 20 0 milliseconds

RESISTIVITY 1000 0 ohm – meters

SELF POTENTIAL +20 0 –20 millivolts

SOUTH AREA



SYMBOLS

CHARGEABILITY

RESISTIVITY

SELF POTENTIAL

INSTRUMENTATION

INSTRUMENT	:	TIME DOMAIN
ARRAY	:	WENNER
ELECTRODE SPACING	:	200 feet

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, GEOPHYSICIST

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA J. R. TOUGH

GEOTRONICS SURVEYS LTD.

TANJO MINES LTD. (N.P.L.)

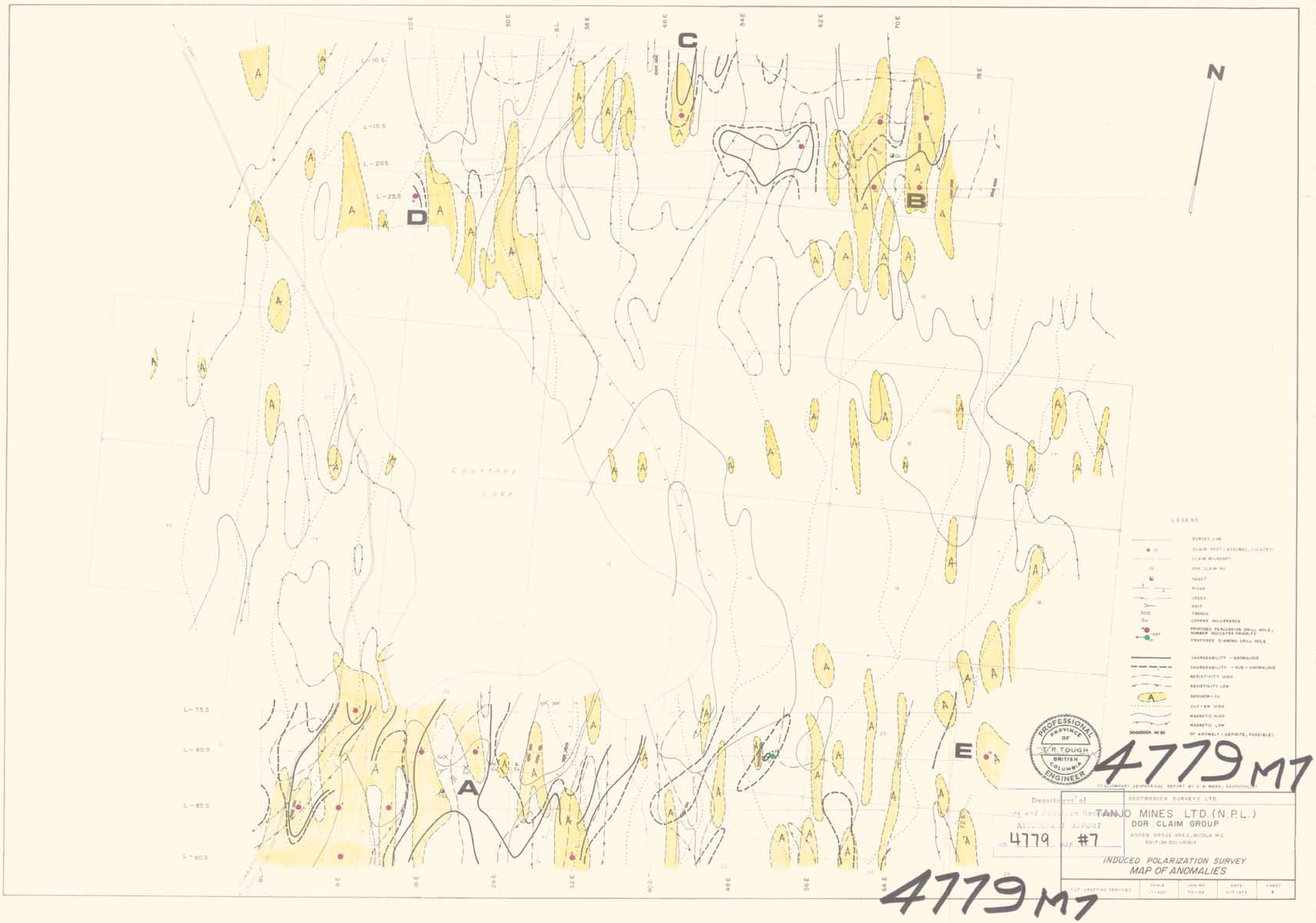
DOR CLAIM GROUP

ASPEN GROVE AREA, NICOLA M.D.
BRITISH COLUMBIA

INDUCED POLARIZATION SURVEY PROFILES

M6

PDT DRAFTING SERVICES	SCALE 1" = 400'	JOB NO. 73–59	DATE OCT. 1973	SHEET 4



PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J.A.R. TOUGH

4779 M7

Department of ... and Petroleum Resources
ASSESSMENT REPORT
4779 Map #7

GEOTRONICS SURVEYS LTD.

TANJO MINES LTD. (N.P.L.)
DOR CLAIM GROUP
ASPEN GROVE AREA, NICOLA M.D.
BRITISH COLUMBIA

INDUCED POLARIZATION SURVEY
MAP OF ANOMALIES

JOB	SCALE	JOB NO.	DATE	SHEET
GGT GRAPHIC SERVICES	1"=400'	73-80	OCT 1973	8

4779 M7