A Geophysical Report On

An Induced Polarization Survey

Phoenix Property, near Greenwood

Greenwood Mining Division, British Columbia

(49°, 118°, S.W.)

For

San Jacinto Explorations Limited

Claim Group Surveyed:	Brandon L2382	Brandon Fr. L2403
	Marshall L2388	Marshall Fr. L2404
	Little Annie L2389	Little Brown L2390
	Custer Fr. L1605	Tio Buracho 1 to 6 inclusive
	Glenside Fraction	Tio Buracho Fraction

Supervision and Report by: P.E. Walcott, P. Eng.,
Consulting Geophysicist.

and

A.R. Dodds, B. Sc.,
Geophysicist.

November 7th to 25th, 1966

82E/2E

882

A GEOPHYSICAL REPORT ON

AN INDUCED POLARIZATION SURVEY

PHOENIX PROPERTY, NEAR GREENWOOD

GREENWOOD MINING DIVISION, BRITISH COLUMBIA

(49°, 118°, S.W.)

FOR

SAN JACINTO EXPLORATIONS LTD.

BY

HUNTEC LIMITED

TORONTO, ONTARIO

JANUARY, 1967

Insert to be included in:

"A Geophysical Report on an Induced Polarization Survey, Phoenix Property near Greenwood, Greenwood Mining Division, B.C., for San Jacinto Explorations Ltd., by Huntec Ltd., dated January, 1967."

STATEMENT OF COSTS

I, H. H. Shear, do state and swear that I directly supervised San Jacinto Explorations Limited's part in this survey and that our costs involved were as follows:

Field work completed November 7 - 27, 1966 - 15 days

Contract price paid to Huntec Limited - $4,860/25 day month based on field work which included all costs including report writing,

$\frac{4,860}{25}$ X $194.40/field day x 15 = $ 2,916.00

Men supplied as assistants to Huntec crew -

Joseph Horovatin, Greenwood, B.C.
15 days X $20/day = 300.00

Robin Foreshaw, Greenwood, B.C.
15 days X $20/day = 300.00

Direct cost of San Jacinto Explorations Limited $ 3,516.00

Respectfully submitted,

H. H. Shear, P. Eng.

Penticton, B.C.
February 8, 1967.

INTRODUCTION

Between November 7th and 25th, 1966, Huntec Limited carried out an Induced Polarization (I.P.) survey over a property held by San Jacinto Explorations Limited. This property, referred to as the Phoenix property is located in the Greenwood area of British Columbia.

The survey was conducted along picket lines turned off at right angles every 400 feet from a north-south baseline and chained at 100 foot intervals.

Reconnaissance chargeability (the I.P. response parameter) measurements were made every 200 feet using the "pole-dipole electrode array" method of surveying with an electrode separation of 400 feet. Where necessary, additional measurements were made at appropriate station intervals using multiple electrode spacings to further examine possible anomalies.

Simultaneous readings of resistivity were made in addition to these chargeability measurements and in all 4.87 miles of reconnaissance and 6.40 miles of detail surveying were completed.

The reconnaissance data are presented in contoured form on plans of the line grid at a scale of 1" to 300 feet, while data from the detail surveying are presented in profile form. The profile scales are one inch to 200 feet, one inch to 5 milliseconds and 2 inches per logarithmic cycle for distance, chargeability and resistivity respectively.

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Property and Location

This property of San Jacinto Explorations Limited is in the Greenwood Mining Division of British Columbia, and is located approximately 3 miles east of Greenwood (49°11'80SW).

The property is at an elevation of 4400 feet and lies on the north side of Providence Lake, access to which is by 1/2 mile of gravel road from the old mining town of Phoenix.

The property surveyed is covered by the following group of mineral leases and claims:

Brandon	L2382
Brandon Fr.	L2403
Marshall	L2388
Marshall Fr.	L2404
Little Annie	L2389
Little Brown	L2390
Custer Fr.	L1605
Tio Buracho	1 to 6 inclusive
Tio Buracho Fraction	
Glenside Fraction	

Purpose

The purpose of the survey was to try and locate by the Induced Polarization method, the presence of any mineralized deposits on the property.

Geological Environment

The oldest rocks in the general area constitute an assemblage of mixed sedimentary and volcanic origin. The sedimentary rocks are argillite and limestone and are, in part at least, of Carboniferous age. The volcanic rocks are latite and andesite, and are believed to be chiefly flows. Both sedimentary and volcanic rocks were intruded in Mesozoic time by igneous rocks that include bodies of peridotite, pyroxenite, gabbro, diorite and larger masses of granodiorite. Tertiary sediments and volcanic flows unconformably overlie the fore-mentioned sedimentary and igneous rocks in the vicinity of Phoenix.

Most of the Paleozoic sedimentary and volcanic rocks have been metamorphosed. They have been partly to completely silicified to form jasperoid and chert over wide areas. In addition the limestones have been partly to completely replaced by lime silicate minerals, notably epidote and garnet. In places these lime silicate rocks contain sufficient sulphides to constitute low grade ore.

Most of the Mesozoic rocks have been altered. The occurrence of chlorite, epidote and sericite is widespread. Sericitization is particularly common along mineral bearing fissures in granodiorite. Ultrabasic intrusions, most probably periodite, have been altered to serpentine.

Mineral deposits in the area are of three types:

(a) Deposits of chalcopyrite, pyrite and magnetite occurring with the lime silicate minerals.

(b) Deposits of pyrrhotite, pyrite and arsenopyrite occurring near the margins of bodies of granodiorite and diorite.

(c) Quartz veins, bearing pyrite, galena, sphalerite and chalcopyrite and reportedly assaying high in gold and silver, occurring in and around bodies of granodiorite.

SURVEY SPECIFICATIONS

The survey was carried out using a Huntec pulse-type Induced Polarization unit, comprised basically of a transmitter, receiver and motor generator.

In this system a gasoline motor, coupled to a 2.5 kw, 400 cycle three-phase generator allows the transmitter to provide a maximum of 2.5 kilowatts d.c. to the ground at a cycling rate of 1.5 seconds "current on" and 0.5 seconds "current off", with the pulses reversing continuously in polarity.

The data recorded in the field consist of careful measurements of the current (I) in amperes flowing through electrodes C_1 and C_2, the primary voltage (V_p) appearing between the potential electrodes, P_1 and P_2, during the "current on" part of the cycle and a secondary or overvoltage (V_s) appearing between P_1 and P_2 during the "current off" part of the cycle. The apparent chargeability (M_a) in milliseconds is calculated by dividing the secondary voltage by the primary voltage and multiplying by 400 which is the sampling time in milliseconds of the receiver unit. The apparent resistivity (ρ_a) is proportional to the ratio of the primary voltage and the measured current, the proportionality factor depending on the geometry of the array used. The resistivity and chargeability obtained are called "apparent" as they are values which that portion of the earth sampled would have if it were homogeneous.

As the earth sampled is usually inhomogeneous, the calculated apparent resistivity and apparent chargeability are functions of the actual resistivity and chargeability of the rocks.

The survey was carried out using the "pole-dipole electrode array" system. In this system the current electrode (C_1) and the two potential electrodes, P_1 and P_2, are moved in unison along the survey lines. The spacing between C_1 and P_1 is kept constant for each traverse, at a figure roughly equal to the depth to be explored by that traverse. The second current electrode (C_2) is kept fixed at "infinity".

Thus, on a traverse with a spacing of 400 feet, a body lying at a depth of 200 feet will produce a strong response, whereas one at a depth of 400 feet will produce a weaker one. By running subsequent traverses at different electrode spacings, more precise estimates can be made of depth to the top of causative bodies, as well as more information on the geometry and extent of the bodies.

The "pole-dipole electrode array" with a 400 foot electrode separation was used over the entire survey area to try and detect zones of sulphide mineralization. Subsequent detail work was then done with 50, 100, 200 and 400 foot electrode separations respectively along certain lines as deemed necessary to give additional information for the selection of drilling targets.

INTERPRETATION PROCEDURES

Induced Polarization interpretation procedures have been most completely developed in situations of horizontal layering and for bodies of large lateral extent such as porphyry coppers. The complex problem of resolving the combined effects of depth, width and dip and true chargeability of steeply dipping bodies, together with the physical characteristics of overburden and country rocks, have not been completely solved theoretically. The interpreter must, therefore, use empirical solutions plus experience gained from surveys over known bodies in other areas in addition to existing type curves.

The interpretation submitted in this report indicates three anomalous zones plus other small anomalies which could correspond partly to disseminated sulphide mineralization. The actual bodies, if existent, are probably narrower than the indicated zones as shown on the accompanying maps. Estimates of depth to the top of mineralization have been made by virtue of the pole-dipole electrode data. Drill holes have been spotted based on these depths and positions of the probable causative body.

Estimates of the average percentage sulphide present by volume have been made. These do not take into account the possibility of some response being caused by magnetite which probably occurs on the properties. They are, however, minimum estimates as they are based on the values of observed chargeabilities and not on the true chargeabilities

of the anomalies themselves. They are necessarily approximate as the relationship between chargeability and percentage sulphide is affected by such things as grain size, resistivity contrast, quantity and nature of absorbed water, degree of interconnection of mineralization and other factors. The rule-of-thumb used in this interpretation, based on past experience, is that 1% by volume of sulphide mineralization corresponds to between 5 and 15 milliseconds of true chargeability.

DISCUSSION OF RESULTS

The Induced Polarization survey, as performed with a 400 foot electrode separation, is generally characterized by a moderately high chargeability background above which three anomalous zones, one rather large, and other anomalous conditions are discernible.

The outlines of these zones are simple and of maximum extent as determined by the 400 foot electrode separation, but they could conceivably be narrower and more complex. These are shown on the accompanying map as Zones 1, 2 and 3 respectively.

The other anomalous conditions are restricted to occurrences on one line only and are generally associated with old trench work. These are also shown on the accompanying map.

The resistivity survey, which was done simultaneously with the I.P. survey, appears to reflect changes in topography, depth to bedrock and overburden conductivity. However, lower resistivity values, indicating higher conductivity, are obtained with the higher chargeability readings in most cases.

A contoured map of a magnetometer survey supplied by the client indicates the presence of a number of magnetic highs. As some of these highs are coincident with high chargeability values, it would appear that some of the I.P. response could be attributable to magnetite.

Detail Induced Polarization work using electrode separations of 50, 100, 200, 400 and 600 feet respectively was done over the anomalous readings on Lines 0, 2N, 4N, 8N, 16N and 24N to give additional information for the selection of drilling and/or trenching targets.

The results, as shown on the accompanying profiles, generally exhibit the highest response with the smaller electrode separations. They lead to the interpretation that the anomalous readings are probably caused by shallow bodies of disseminated sulphide and/or magnetite mineralization.

Trenching and drilling are therefore recommended to test the nature of these anomalous zones. The locations and objectives of this trenching and drilling are best explained by discussing the respective zones.

Zone 1

This zone would appear to have an average sulphide content by volume of 1/2 to 1 1/2% with the mineralization possibly extending some 150 feet deep in places.

Although the extent of previous work in the area of this zone, which covers the old Marshall property, is unknown to the writer, trenching is recommended as the best method of evaluating the shallow mineralization indicated by the higher response on the 50, 100 and 200 foot electrode spacings. The locations for suggested trenching are shown on the contoured map of the data.

In addition, shallow drilling should be undertaken for further investigation. For this purpose three boreholes are recommended. They are:

Hole #1

This angle hole, preferably 60°, of minimum length 200 feet, should be collared on Line 0 and drilled westwards so as to intersect 8+50W at 100 feet perpendicularly below the surface. This hole has been recommended to test the existence of a shallow causative body of 1 to 3% sulphide mineralization by volume indicated by the chargeability peaks on the 50, 100, 200 and 400 foot spacings.

Hole #2

This angle hole, preferably 60°, of minimum length 200 feet, should be collared on Line 4N and drilled westwards so as to intercept 3W at 100 feet perpendicularly below the surface. This hole has been recommended to test the existence of a shallow causative body of 1 to 3% sulphide mineralization by volume indicated by the chargeability peaks on the 100, 200 and 400 foot electrode spacings.

Hole #3

This angle hole, preferably 50°, of minimum length 300 feet, should be collared on Line 16N and drilled westwards so as to

intercept 8W at 125 feet perpendicularly below the surface. This hole has been recommended to test the existence of a shallow causative body of 1 to 3% sulphide mineralization by volume indicated by the chargeability peaks on the 100, 200 and 400 foot electrode spacings.

Zone 2

The causative source or sources of this zone appear to be at greater depth than those of Zone 1, so trenching does not appear feasible. Therefore, an angle hole, preferably 50°, of minimum length 450 feet is recommended to test the existence of a possible shallow body of 1 to 2% sulphide mineralization by volume indicated by the chargeability peaks on the 100, 200, 400 and 600 foot spacings. This hole should be collared on Line 0 and drilled westward so as to intersect 24+50W at 250 feet perpendicularly below the surface.

Zone 3

The outline of this zone is not well confirmed as insufficient work was done to support its existence. However, detail work done on Line 24N indicates the possible existence of a shallow causative body of 1 to 2% sulphide content by volume. Accordingly an angle hole, preferably 60°, of minimum length 400 feet should be collared on Line 24N and drilled westwards so as to intersect 29+50E at 250 feet perpendicularly below the surface.

SUMMARY AND RECOMMENDATIONS

Between November 7th and 25th, 1966, Huntec Limited carried out an Induced Polarization (I.P.) survey over a property held by San Jacinto Explorations Limited and located in the Greenwood area of British Columbia.

The survey indicated the presence of three possible zones of mineralization, together with other anomalous conditions of more limited extent. Multiple electrode spacing work done over these zones suggests that both shallow and deeper sources are present.

Trenching or drilling, as indicated, has been recommended to test the nature of the interpreted mineralization in each zone. The locations of five boreholes have been suggested as described in the previous section.

Should the results of this drilling be encouraging an extended drilling program can be planned without requiring further surveying. However, further Induced Polarization work is required if it is considered desirable to fully outline the anomalous zones.

Respectfully submitted,

HUNTEC LIMITED

Andrew R. Dodds, B. Sc.
Geophysicist

for. Peter E. Walcott, P. Eng.,
Consulting Geophysicist

APPENDIX

Claim Group Surveyed

The property surveyed is covered by the following group of mineral leases and claims:

Brandon	L2382
Brandon Fr.	L2403
Marshall	L2388
Marshall Fr.	L2404
Little Annie	L2389
Little Brown	L2390
Custer Fr.	L1605
Tio Buracho	1 to 6 inclusive
Tio Buracho Fraction	
Glenside Fraction	

Miles Surveyed

The survey comprised two phases: reconnaissance (covering all lines once with one electrode separation) and detail (re-surveying selected lines with different electrode separations). The number of line-miles of readings taken in each phase was as follows:

	Line-miles	Stations
Reconnaissance	4.87	145
Detail	6.40	297
Total	11.27	442

Man-days Required

The number of 8-hour man-days required to complete the survey was:

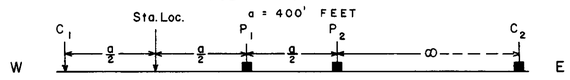
	Man-days
Operating geophysical equipment	56
Interpretation and report writing	4

Man-days required cont'd	Man-days
Drafting	6
Typing	1

Personnel Employed on Survey

Name	Occupation	Address	Dates
P. E. Walcott	Consulting Geophysicist	Rexdale, Ontario	Jan. 4, 5, 1967
A. R. Dodds	Geophysicist	1450 O'Connor Dr., Toronto 16, Ont.	Jan. 18, 19, 1967
W. Mairs	Geophysical Operator	"	Nov. 7-25, 1966
H. Ford	"	"	"
J. Horovatin	Helper	Greenwood, B. C.	"
R. Forshaw	"	"	"
H. Ricketts	Drafting	1450 O'Connor Dr., Toronto 16, Ont.	Jan. 9-11, 1967
P. Tapson	"	"	Jan. 9-11, 1967
L. Brunton	Typing	"	Jan. 23, 1967

POLE - DIPOLE ARRAY



Configuration reversed for lines 0 + 00, 4 + 00 N, 8 + 00N (28W - 4W), 16 + 00N, 24 + 00N (4E - 10E)

LEGEND

- Old shaft
- Old trenchwork
- Recommended trenchwork
- Outline of interpreted anomalous zone
- I.P. anomaly

N

BASELINE

6+00 E | 9+00 E | 12+00 E | 15+00 E | 18+00 E | 21+00 E | 24+00 E | 27+00 E | 30+00 E | 33+00 E | 36+00 E | 39+00 E

TIGER - L.3548

ZONE 3

L-32+00N

L. 993 S

CUSTER Fr. - L.160 S

L-24+00N

DENVER - L. 2875

GLENSIDE Fr.

L-20+00N

ZONE 1

BRANDON - L. 2382

L-16+00N

BRANDON Fr.

L. 2403

LITTLE ANNIE L. 2389

LITTLE BROWN L. 2390

L. 1239

L-12+00N

L-8+00N

MARSHALL - L. 2388

MARSHALL Fr.

L-4+00N

L. 2383

L. 865

L-0+00

ZONE 2

L. 2387

L. 2385

L. 2386

L. 1705

30+00 W | 27+00 W | 24+00 W | 21+00 W | 18+00 W | 15+00 W | 12+00 W | 9+00 W | 6+00 W | 3+00 W | 0+00 | 3+00 E | 6+00 E

SAN JACINTO EXPLORATIONS LIMITED (N.P.L.)

INDUCED POLARIZATION SURVEY

PHOENIX PROPERTY

GREENWOOD MINING DIVISION, B.C.

APPARENT CHARGEABILITY CONTOURS WITH INTERPRETATION

CONTOUR INTERVAL: 2·0 milliseconds

SCALE: 1 inch = 300 feet

To accompany report by

882

A. R. Dodds, B.Sc., Geophysicist

HUNTEC LIMITED, Toronto, Canada. - January, 1967

PH-573-1/66

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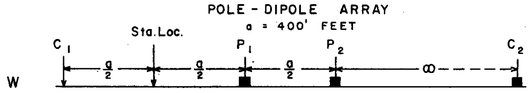
POLE - DIPOLE ARRAY
a = 400' FEET



Configuration reversed for lines 0 + 00, 4 + 00N,
8 + 00N (28W - 4W), 16 + 00N, 24 + 00N (4E - 10E)

N

BASELINE

6+00 E
9+00 E
12+00 E
15+00 E
18+00 E
21+00 E
24+00 E
27+00 E
30+00 E
33+00 E
36+00 E
39+00 E

TIGER - L.3548

L-32+00N

L. 993 S

CUSTER Fr. - L.160 S

L-24+00N

GLENSIDE Fr.

L-20+00N

DENVER - L. 2875

BRANDON - L. 2382

L-16+00N

L-16+00N

BRANDON Fr.

L. 2403

LITTLE ANNIE L. 2389

LITTLE BROWN L. 2390

L. 1239

L-12+00N

L-8+00N

MARSHALL - L. 2388

MARSHALL Fr.

L-4+00N

L. 2383

L. 865

L-0+00

L. 2387

L. 1705

L. 2385

L. 2386

30+00 W
27+00 W
24+00 W
21+00 W
18+00 W
15+00 W
12+00 W
9+00 W
6+00 W
3+00 W
0+00
3+00 E
6+00 E

PH-573-1/66

SAN JACINTO EXPLORATIONS LIMITED (N.P.L.)

INDUCED POLARIZATION SURVEY
PHOENIX PROPERTY
GREENWOOD MINING DIVISION, B.C.

APPARENT RESISTIVITY CONTOURS

Contours at logarithmic intervals of
400, 600, 800, 1000, 1500, 2000, 3000 ohm meters

SCALE: 1 inch = 300 feet

To accompany report by
A. R. Dodds, B.Sc., Geophysicist

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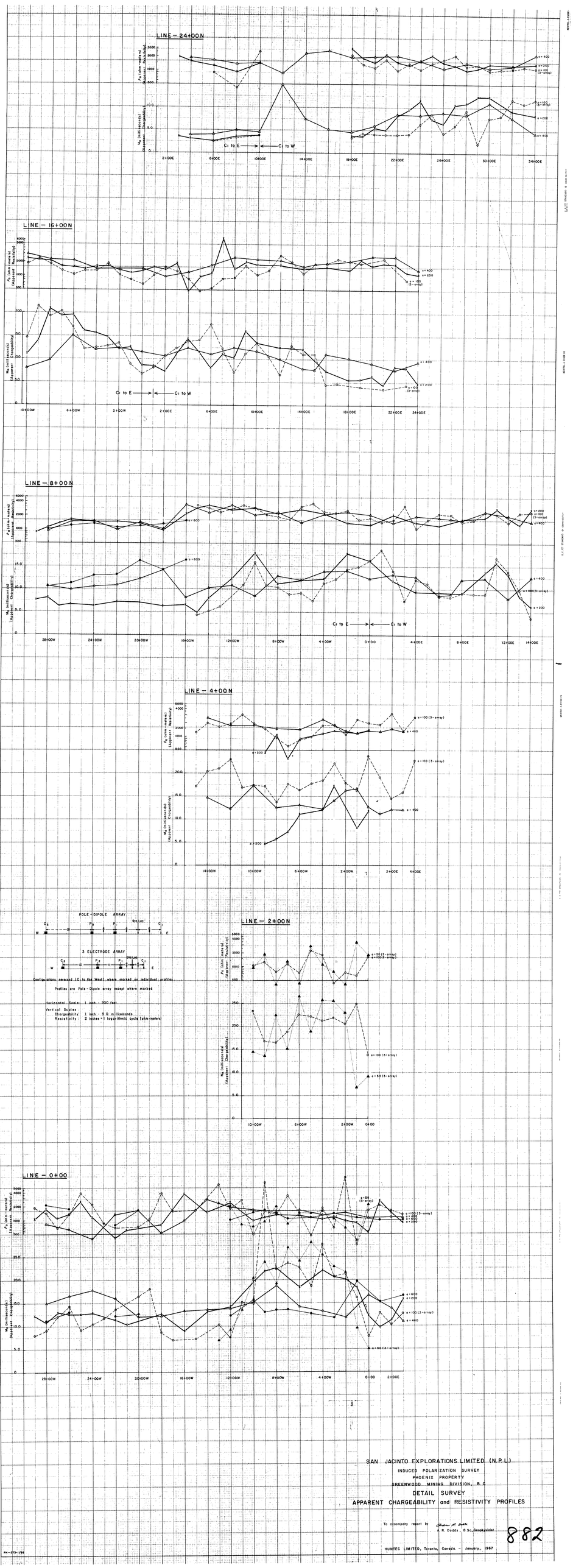
HUNTEC LIMITED, Toronto, Canada. - January, 1967


LINE – 24+00N
LINE – 16+00N
LINE – 8+00N
LINE – 4+00N
LINE – 2+00N
LINE – 0+00
C1 to E
C1 to W
POLE-DIPOLE ARRAY
3 ELECTRODE ARRAY
Configurations reversed (C1 to the West) where marked on individual profiles.
Profiles are Pole-Dipole array except where marked
Horizontal Scale 1 inch = 800 feet
Vertical Scales
Chargeability 1 inch = 5.0 milliseconds
Resistivity 2 inches = 1 logarithmic cycle (ohm-meters)
SAN JACINTO EXPLORATIONS LIMITED (N.P.L.)
INDUCED POLARIZATION SURVEY
PHOENIX PROPERTY
GREENWOOD MINING DIVISION, B.C.
DETAIL SURVEY
APPARENT CHARGEABILITY and RESISTIVITY PROFILES
To accompany report by
A.R. Dodds, B.Sc. Geophysicist
HUNTEC LIMITED, Toronto, Canada – January, 1967
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