84-#378 - 12290

PHOENIX GEOPHYSICS LIMITED

REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY SURVEY ON THE ALLENDALE LAKE PROPERTY

GREENWOOD & OSOYOOS MINING DIVISIONS
BRITISH COLUMBIA

FOR

ALLENDALE RESOURCES CORPORATION

LATITUDE: 49°23'N LONGITUDE: 119°21'W
N.T.S. 82E/6

CLAIMS: Lynx 1-4, Fox 1-6

OWNER: R. BECHTEL, F. BECHTEL, ALLENDALE RESOURCE CORP.

BY

Paul A. Cartwright, B.Sc.,
Geophysicist

Dated: 16 December 1983

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PART A

1) INTRODUCTION

An Induced Polarization and Resistivity Survey has been completed on the Allendale Lake Property, Greenwood & Osoyoos Mining Divisions, British Columbia, on behalf of Allendale Resources Corp., property operators.

The property is located 18 kilometers east of the community of Okanagan Falls, B.C. Access is via 25 kilometers of gravel road from Highway # 97 at Okanagan Falls.

The following geological description of the project area has been provided by Kerr, Dawson and Associates Ltd., consultants to Allendale Resource Corp.

> "The principal rock type on the property is a coarse-grained, porphyritic, mafic-rich Tertiary Syenite Stock. Geological mapping and interpretation indicates that the northern portion of the stock is very fresh, massive and unaltered, with minimal structural features. The southern portion of the stock is altered, with evidence of increasing structural features, and intrusive activity. Geological interpretation suggests that the basin of the broad arcuate valley, located on Line 4+00N at 1+00W, may be the center of later structural and/or intrusive activity."

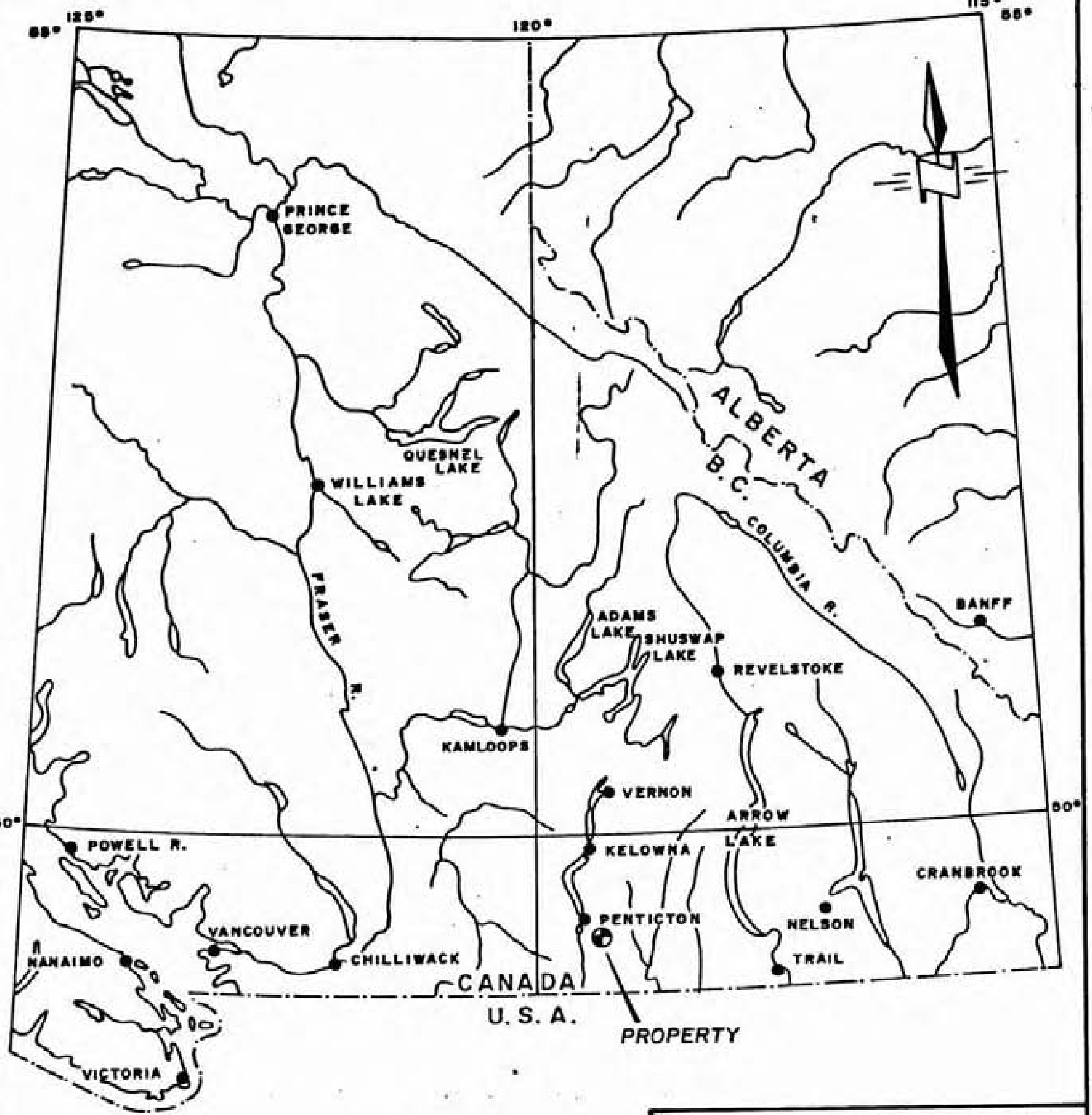
Previous work included drilling in the area of known copper-silver showings, with no significant results. During 1983 Kerr, Dawson and Associates Ltd. completed a comprehensive program of soil sampling, ground magnetometer surveying and geological mapping over the property.

Objective of the present IP and Resistivity Survey was to investigate areas of interest in the southcentral area of the claim block, as outlined by the geochemistry, geological mapping and magnetics.

A Phoenix Model IPV-1 IP and Resistivity receiver unit was used in conjunction with a Phoenix Model IPT-1 IP and Resistivity transmitter powered by a 2.0 kw motor generator. IP effect is recorded directly as Percent Frequency Effect (P.F.E.) at operating frequencies of 4.0 Hz and 0.25 Hz. Apparent resistivity values are normalized in units of ohm-meters, while Metal Factor values are calculated according to the formula: M.F.= (P.F.E. x 1000) / Apparent Resistivity.

Dipole-dipole array was utilized to make all of the measurements, with a basic interelectrode distance of 50 meters. Four dipole separations were recorded in every case. Number of line kilometres surveyed during the present survey was 13.4 line kilometers.

Field work was carried out during late September and early October 1983, under the supervision of D. Labrecque, geophysicist crew leader. His certificate of qualification is included with this report.



LOCATION MAP

ALLENDALE LAKE PROPERTY

OSOYOOS & GREENWOOD M.D., B.C.

Date: Nov. 1982.	Scale: 1" = 64 Miles
Dwn by: W.G.	Dwg no. 283-1

2) DESCRIPTION OF CLAIMS

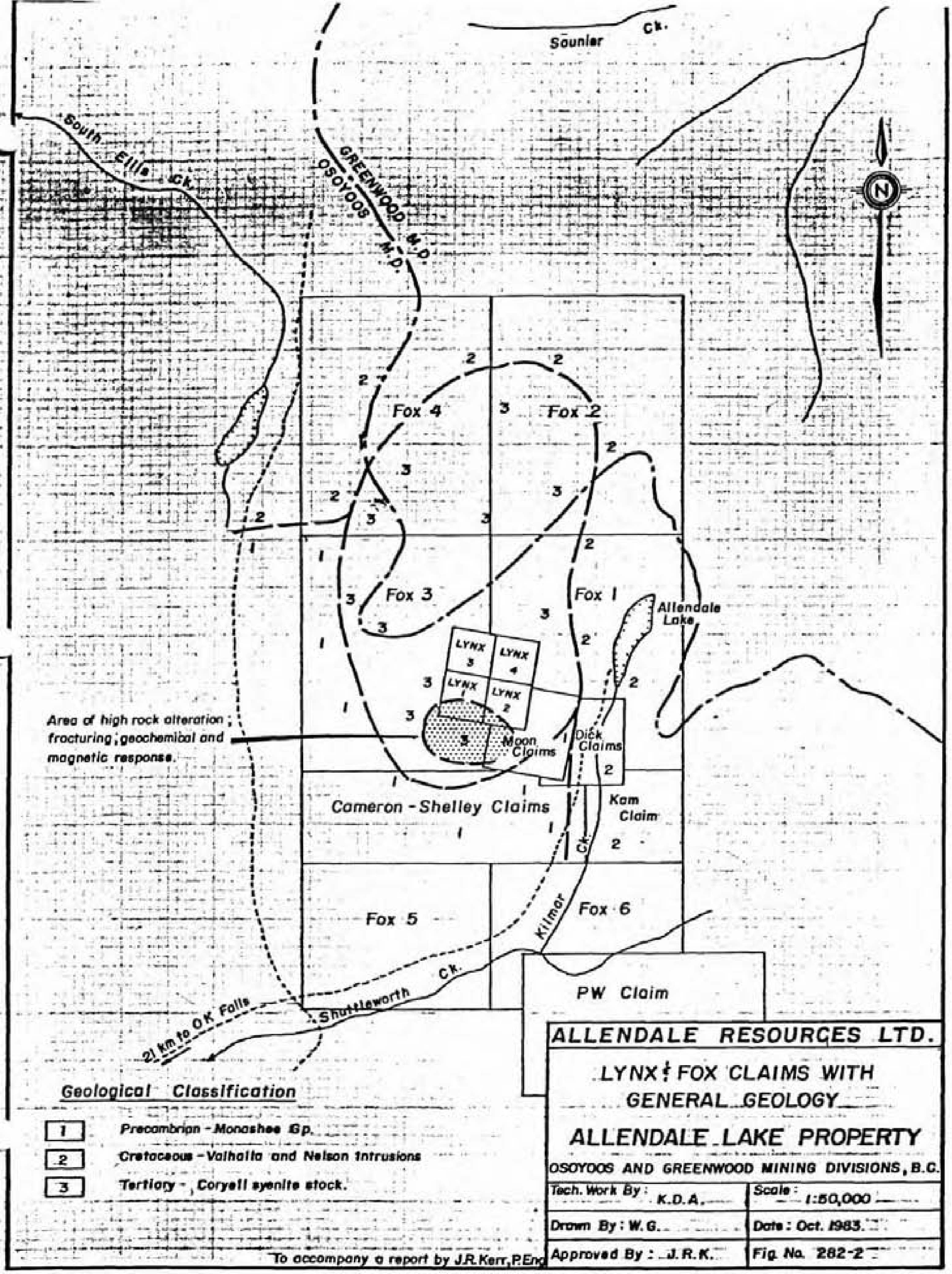
The following claim information was provided by Mr. John Kerr of Kerr, Dawson and Associates Ltd.

"The property consists of ten mineral claims, four located by the two-post method, and six located by the Modified Grid System (MGS) of staking. The following provides information regarding legal description of each claim:

Name	Type of Claim	Rec. No.	No. Units	Mining Div.	Expiry Date
Lynx 1	2-post	15423	1	Osoyoos	10 June 1986
Lynx 2	2-post	15424	1	Osoyoos	10 June 1986
Lynx 3	2-post	1422	1	Osoyoos	16 July 1986
Lynx 4	2-post	1423	1	Osoyoos	16 July 1986
Fox 1	M.G.S.	3103	20	Greenwood	21 June 1987
Fox 2	M.G.S.	3104	20	Greenwood	21 June 1987
Fox 3	M.G.S.	3105	20	Greenwood	21 June 1987
Fox 4	M.G.S.	3106	20	Greenwood	21 June 1987
Fox 5	M.G.S.	1892	20	Osoyoos	20 Sept. 1984
Fox 6	M.G.S.	1893	20	Osoyoos	20 Sept.1984

The Lynx 1 & 2 claims are recorded in the name of Robert Bechtel, and the Lynx 3 & 4 are recorded in the name of Florence Bechtel (nee Niddery). These claims are under agreement to Allendale Resource Corp. The Fox 1-6 claims are recorded in the name of Allendale Resource Corp.

The Moon and Dick claims were located after location of the Lynx claims, and prior to location of the Fox claims. These claims are in good standing, and are recorded in the name of Knie Resources Ltd. Therefore, the portion of these claims falling within the Fox claims will take precedence over that portion of the Fox claims. The Cameron, Shelley, Kam, and P.W. claims were staked after location of the Fox 1-4 claims, and prior to location of the Fox 5 & 6 claims. Therefore,the portion of these claims falling within the Fox 5 & 6 claims will take precedence over that portion of the Fox 5 & 6 claims. At the time of my title search (Sept., 30,1983), the Cameron, Shelley, Kam and P.W. claims were in good standing and were located in the name of individuals. Many of the claim posts have been located in the field, having been tied into the grid system; therefore, the accompanying representation of the claims is considered relatively accurate (Fig. 282-2)."


Sounier Ck.
South Ellis Ck.
GREENWOOD M.D.
OSOYOOS M.D.
Fox 4
Fox 2
Fox 3
Fox 1
Allendale Lake
LYNX 3
LYNX 4
LYNX 1
LYNX 2
Area of high rock alteration; fracturing, geochemical and magnetic response.
Moon Claims
Dick Claims
Cameron - Shelley Claims
Kam Claim
Ck.
Kilmor
Fox 5
Fox 6
PW Claim
Shuttleworth Ck.
21 km to OK Falls
Geological Classification
1 Precambrian - Monashee Gp.
2 Cretaceous - Valhalla and Nelson Intrusions
3 Tertiary - Coryell syenite stock.
ALLENDALE RESOURCES LTD.
LYNX & FOX CLAIMS WITH GENERAL GEOLOGY
ALLENDALE LAKE PROPERTY
OSOYOOS AND GREENWOOD MINING DIVISIONS, B.C.
Tech. Work By: K.D.A.
Scale: 1:50,000
Drawn By: W.G.
Date: Oct. 1983.
Approved By: J.R.K.
Fig. No. 282-2
To accompany a report by J.R. Kerr, P.Eng

3) PRESENTATION OF DATA

The Induced Polarization and Resistivity results are shown on the following data plots in the manner described in the notes accompanying this report. (Part B)

LINE	ELECTRODE INTERVAL	DWG. NO.
11+00N	50 meters	5836-1
10+00N (B)	50 meters	5836-2
10+00N	50 meters	5836-3
8+00N	50 meters	5836-4
7+00N	50 meters	5836-5
6+00N	50 meters	5836-6
5+00N	50 meters	5836-7
4+00N	50 meters	5836-8
3+00N	50 meters	5836-9

Also enclosed with this report is Dwg. I.P.P.-B-3031, a plan map of the Allendale Lake Property Grid at a scale of 1:5000. The definite, probable and possible Induced Polarization anomalies are indicated by bars, in the manner shown on the legend,on this plan map as well as on the data plots. These bars represent the surface projection of the anomalous zones as interpreted from the location of the transmitter and receiver electrodes when the anomalous values were measured.

Since the Induced Polarization measurement is essentially an averaging process, as are all potential methods, it is frequently difficult to exactly pinpoint the source of an anomaly. Certainly, no anomaly can be located with more accuracy than the electrode interval length; i.e., when using 50 meter electrode intervals the position of a narrow sulphide body can only be determined to lie between two stations 50 meters apart. In order to definitely locate,and fully evaluate, a narrow, shallow source it is necessary to use shorter eletrode intervals. In order to locate sources at some depth, larger electrode intervals must be used, with a corresponding increase in the uncertainties of location. Therefore, while the center of the indicated anomaly probably corresponds fairly well with source, the length of the indicated anomaly along the line should not be taken to represent the exact edges of the anomalous material.

The topographic, claim and grid information shown on Dwg. I.P.P.-B-3031 has been taken from maps made available by the staff of Kerr, Dawson and Associates Ltd.

4) DISCUSSION OF RESULTS

The Induced Polarizaton and Resistivity data collected over the Allendale Lake grid are characteized by high magnitude background IP effects, combined with relatively high magnitude apparent resistivity values. This indicates that the grid is generally underlain by rock types which contain some disseminated sulphides, and/or magnetite. A number of zones of more concentrated mineralization are interpreted to lie within this mineralized matrix, and these zones are shown on Plan Map DWG No.-I.P.P.-B-3031. Each of the zones is discussed separately below.

ZONE A

This anomalous IP zone is outlined striking across the western portion of all of the grid lines, although the feature is wider and displays higher magnitude IP effects over the more northerly lines. The trend is open both towards the north and south. Substantialy higher than background IP effects mark the presence of the zone, particularly at its northern end. As high apparent resistivity values are noted coincident with the interesting IP effects, the source of the zone appears to be disseminated mineralization, buried less than 50 meters sub-surface.

ZONE B

Moderately anomalous IP effects coincident with lower than background resistivity values constitute Zone B. The source of the response is indicated to be in the order of 50 meters sub-surface. Like Zone A, this zone is undefined north of Line 11+00N.

Previous drilling may have already tested Zone B,in the vicinity of Line 10+00N (B), Station 2+00W.

ZONE C

This short anomalous IP zone is best outlined by the data recorded on Line 6+00N, between Station 3+50W and Station 2+50W, where higher than background IP readings are evident, together with somewhat lower resistivity measurements. The source is probably quite shallow, certainly less than 50 meters sub-surface, and is less than 50 meters in width.

ZONE D, ZONE E

These features strike parallel to each other, in a north-south direction, across the eastern portion of the grid lines. The two zones are interpreted to merge into a single trend on the most southerly three lines surveyed. The limits of the anomalous material are undefined towards the north, east and south. Data recorded on Line 7 + 00N, displays anomalous results eastward to the vicinity of Station 8+50E, where the response is still open to the east.

Zone D and Zone E are made up of broad regions of disseminated material, as indicated by the relatively high apparent resistivity values measured; however, narrower zones of lower resistivity, i.e., more conductive material, are indicated to lie within the confines of the zones. The northern end of Zone D appears to display the most anomalous results.

5) SUMMARY AND RECOMMENDATIONS

The Induced Polarization and Resistivity survey on the Allendale Lake Property has detected five zones of anomalous IP effects. Drilling is recommended to test the sources of all five zones, at the locations noted below. Priority for drilling, as well as final collar locations, should be established after correlating the positons of the IP zones with other geological, geochemical and geophysical information.

ZONE A

A drill hole located so as to pass approximately 50 meters below Line 10+00N (B), Station 6+00W, would test one of the more anomalous responses seen in IP Zone A.

ZONE B

Diamond drill hole #5, a previously completed hole, may have already tested this IP zone, especially if the hole was drilled towardsthe west. If it is felt the source of IP Zone B was not intersected by DDH #5, a drill hole located so as to pass approximately 100 meters beneath Line 10+00N (B), Station 2+50 W would be recommended.

ZONE C

The most anomalous signature recorded within IP Zone C is evident on Line 6+00N. A drill hole collared so as to pass approximately 25 meters beneath Station 3+00W on Line 6+00N is recommended.

ZONE D

A drill hole located to pass approximately 50 meters beneath line 11+00N, Station 0+25E is recommended to test one of the more definitely anomalous features of IP Zone D.

ZONE E

It is recommended that this zone be tested by a drill hole spotted to pass approximately 50 meters beneath Line 7+00N, Station 1+90E.

PHOENIX GEOPHYSICS LIMITED

Paul A. Cartwright

PAUL A. CARTWRIGHT, B.Sc.,
Geophysicist.

Dated: 16 December 1983

ASSESSMENT DETAILS

PROPERTY: Allendale Lake	**MINING DIVISION:** Greenwood & Osoyoos
SPONSOR: Allendale Resources Corp.	**PROVINCE:** British Columbia

LOCATION: 14 kilometers east of Okanagan Falls, B.C.

TYPE OF SURVEY: Induced Polarization and Resistivity

OPERATING MAN DAYS: 11	**DATE STARTED:** 25 Sept/1983
EQUIVALENT 8 HR. MAN DAYS: 33	**DATE FINISHED:** 9 Oct/1983
CONSULTING MAN DAYS: 4	**NUMBER OF STATIONS:** 280
DRAFTING MAN DAYS: 5	**NUMBER OF READINGS:** 1554
TOTAL MAN DAYS: 42	**KILOMETERS OF LINE SURVEYED:** 13.4

CONSULTANTS:

Paul A. Cartwright, 4238 W. 11th Avenue, Vancouver, B.C.

FIELD TECHNICIANS:

D.Labrecque, 524 Rue Taschereau, Rouyn, Quebec.

Y.Nadeau, 2873 W.13th Avenue, Vancouver, B.C.

DRAUGHTSMEN:

R. Wakaluk, 7886 Vivian Drive, Vancouver, B.C.

PHOENIX GEOPHYSICS LIMITED

Paul A. Cartwright

Paul A. Cartwright, B.Sc.
Geophysicist.

Dated: 16 December 1983

STATEMENT OF COST

ALLENDALE RESOURCES LTD.
ALLENDALE LAKE PROPERTY, GREENWOOD & OSOYOOS M.D., B.C.
INDUCED POLARIZATION AND RESISTIVITY SURVEY

CREW: D. LABRECOUE, Y. NADEAU

PERIOD: Sept. 25,1983 to October 9,1983

11 Operating Days	@ $675.00		$ 7,425.00
1 Travel Standby Day	@ $350.00		350.00
1 Sick Day	@ N.C.		NC
1.5 Standby Days	@ N.C.		NC

EXPENSES:

Airfares (pro-rated)	$ 202.00	
Air Frt. (pro-rated)	112.50	
Meals	630.0	
Fuel	34.35	
Salt for electrodes	4.80	
	$ 983.65	
+15%	147.55	1,131.20
		$ 8,906.20

PHOENIX GEOPHYSICS LIMITED

Paul A.Cartwright,B.Sc.
Geophysicist

Dated: 16 December 1983

CERTIFICATE

I, Paul A. Cartwright, of the City of Vancouver, Province of British Columbia, do hereby certify:

1. I am a geophysicist residing at 4238 W. 11th Avenue, Vancouver, B.C.

2. I am a graduate of the University of British Columbia, B.C., with B.Sc. Degree.

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

4. I have been practising my profession for 13 years.

5. I have no direct or indirect interest, nor do I expect to receive any interest directly or indirectly, in the property or securities of Allendale Resources Corp. or any affiliate.

6. The statements made in this report are based on a study of published geological literature and unpublished geological literature and unpublished private reports.

7. Permission is granted to use in whole or in part for assessment and qualification requirements but not for advertising purposes.

DATED AT VANCOUVER, B.C. this 16th day of December 1983.

Paul A. Cartwright, B.Sc.

CERTIFICATE

I, Doris Labrecque, of the City of Rouyn, Province of Quebec, do hereby certify that:

1. I am a geophysical crew leader residing at 524 Rue Taschereau, Rouyn, P.Q.

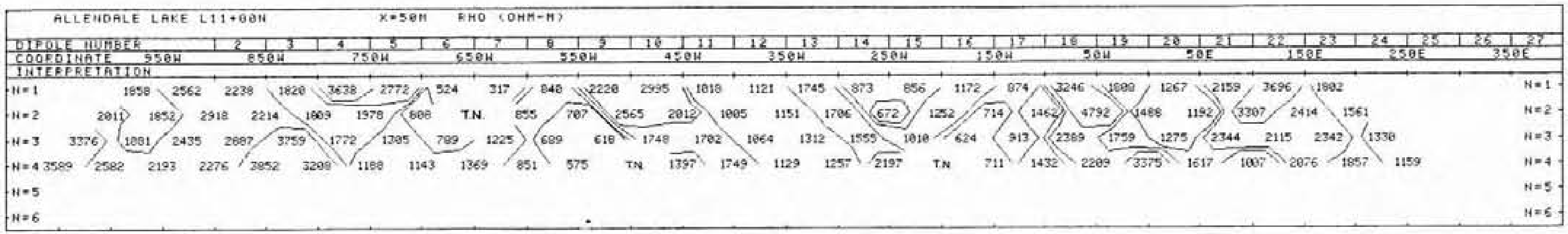
2. I have been practising my vocation about six yers.

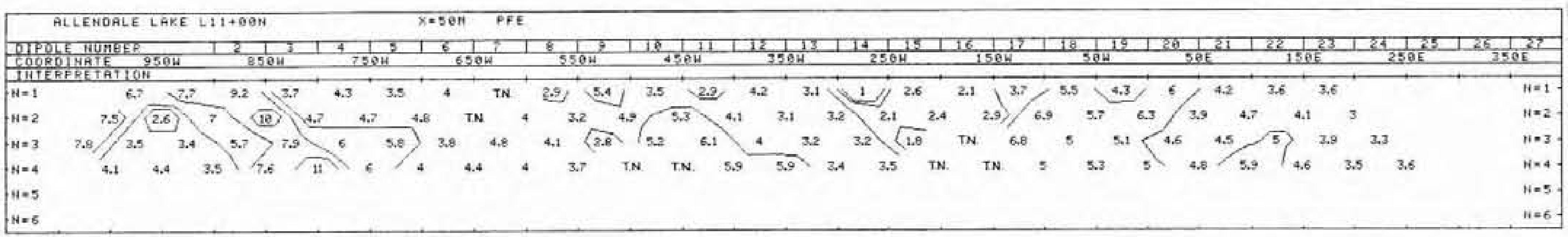
3. I am presently employed as a geophysical crew leader by Phoenix Geophysics Limited, of 200 Yorkland Blvd., Willowdale, Ontario.

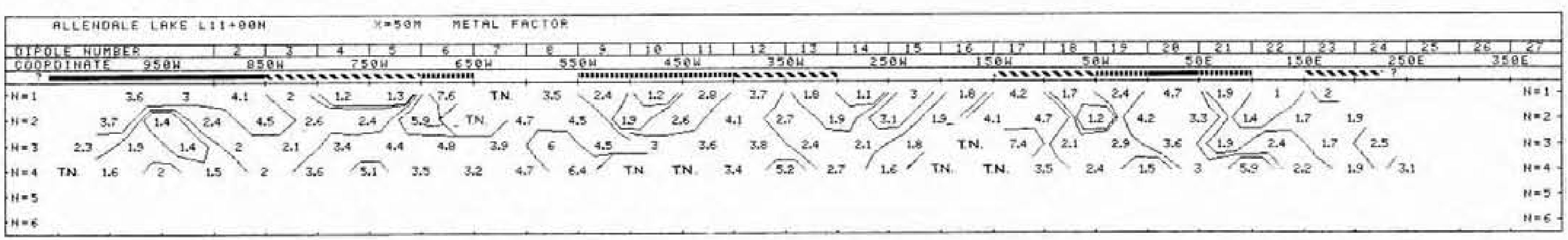
Doris Labrecque

Doris Labrecque.

DATED AT VANCOUVER, B.C.
this 16th day of December 1983.







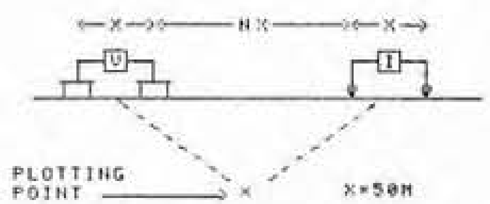
DWG. NO.-I P-5836-

ALLENDALE RESOURCES CORP.

ALLENDALE LAKE PROPERTY

OSOYOOS AND GREENWOOD M.D., B.C.

LINE NO.-11+00N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

NOTE- CONTOURS AT LOGARITHMIC INTERVALS 1,-1.5 -2,-3,-5,-7.5,-10

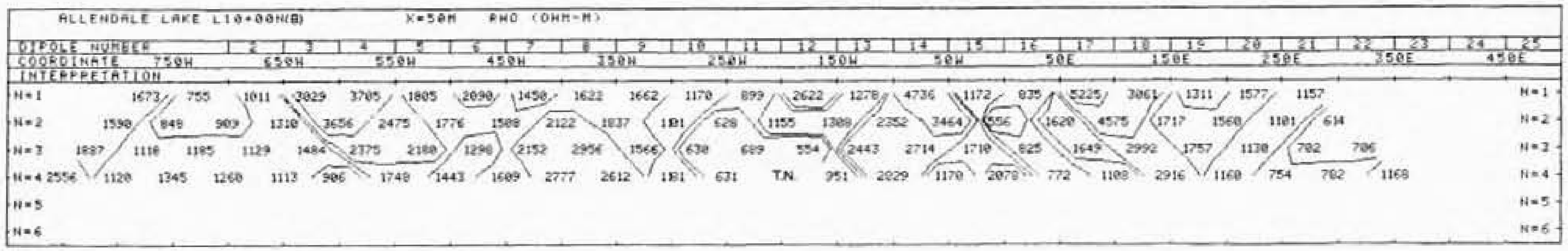
DATE SURVEYED OCT 1983

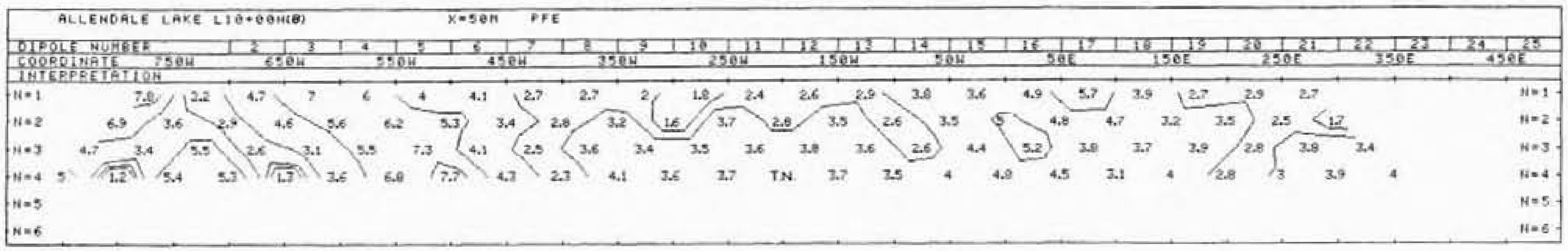
APPROVED Pac

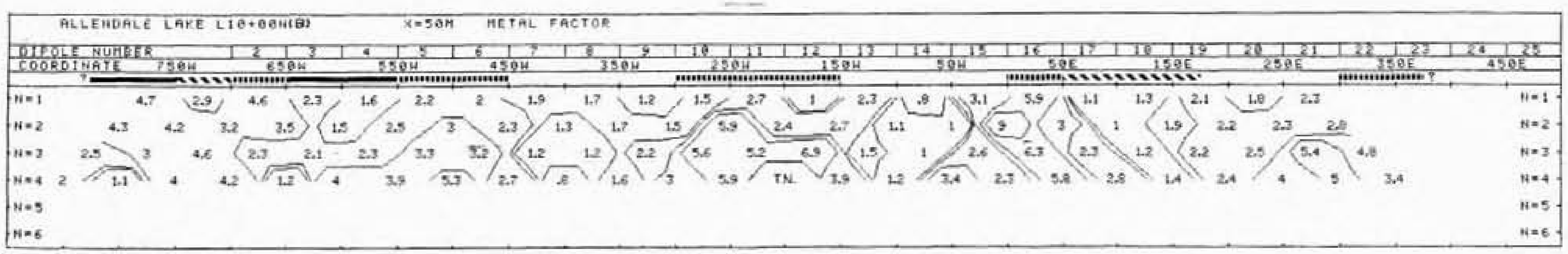
DATE Dec. 12/83

PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY







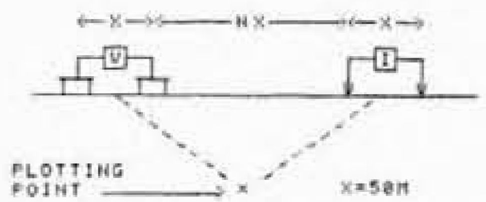
DWG. NO -I P -5836-2

ALLENDALE RESOURCES CORP.

ALLENDALE LAKE PROPERTY

OSOYOOS AND GREENWOOD M.D. ;B.C.

LINE NO.-10+00N(B)



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

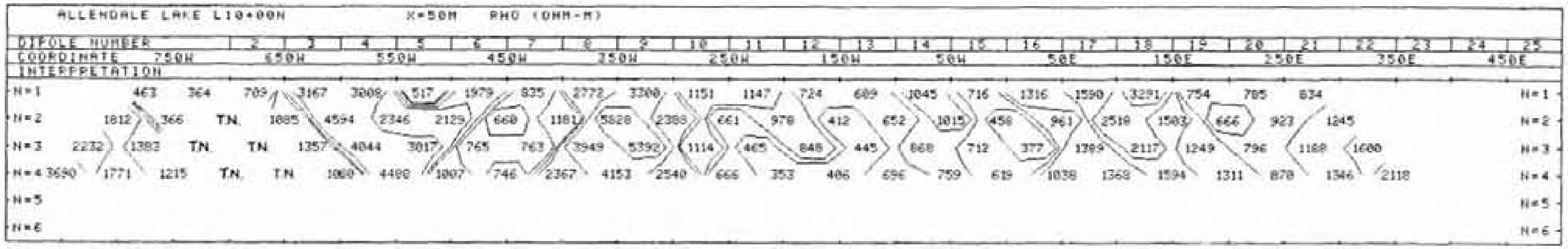
DATE SURVEYED OCT 1983
APPROVED PAc

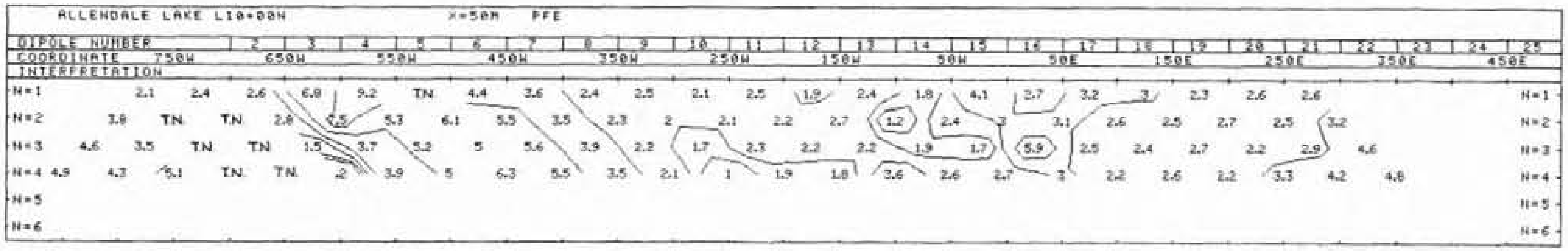
NOTE- CONTOURS AT LOGARITHMIC INTERVALS 1,-1.5 -2,-3,-5,-7.5,-10

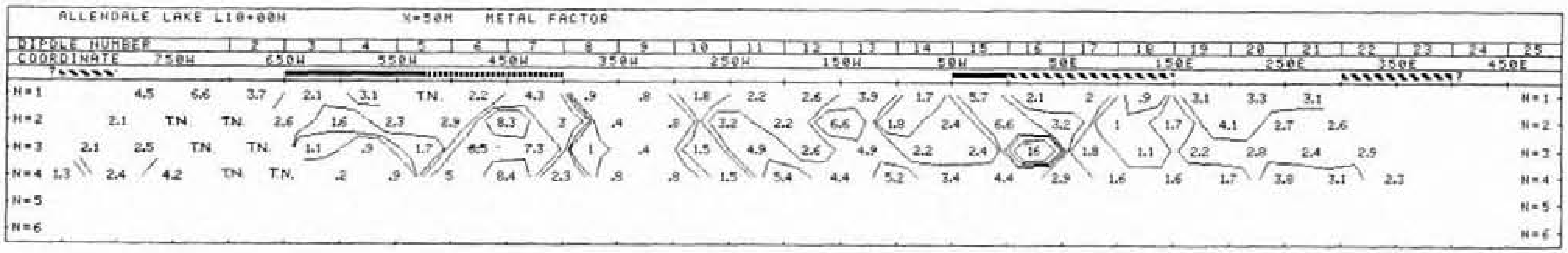
DATE Dec 12/83

PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION
AND RESISTIVITY SURVEY







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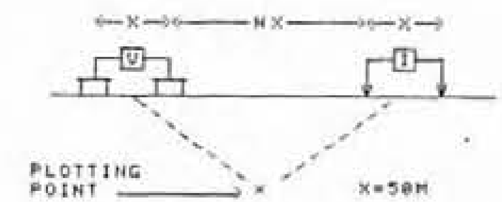
ALLENDALE RESOURCES CORP.

ALLENDALE LAKE PROPERTY

OSOYOOS AND GREENWOOD M.D., B.C.

LINE NO.-L10+00N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

DATE SURVEYED OCT 1983

APPROVED

PAC

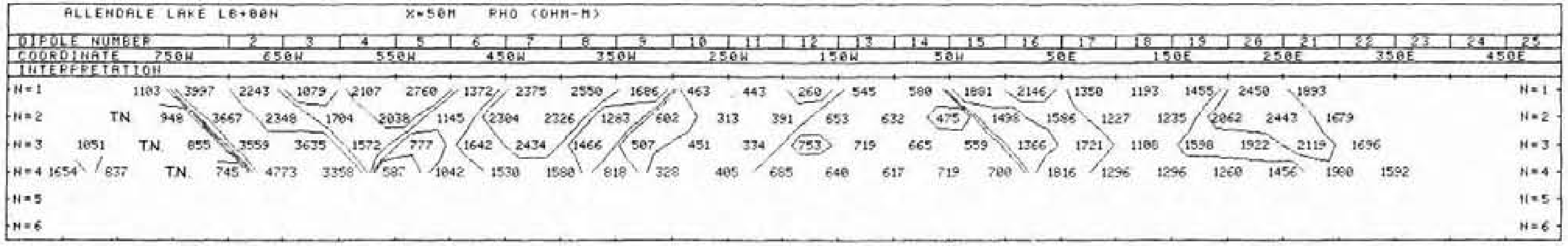
NOTE- CONTOURS AT LOGARITHMIC INTERVALS, 1,-1.5 -2,-3,-5,-7.5,-10

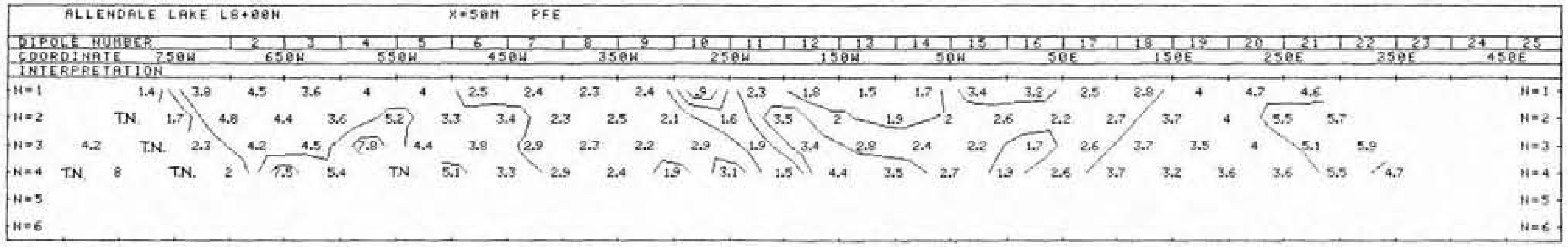
DATE DEC 12/83

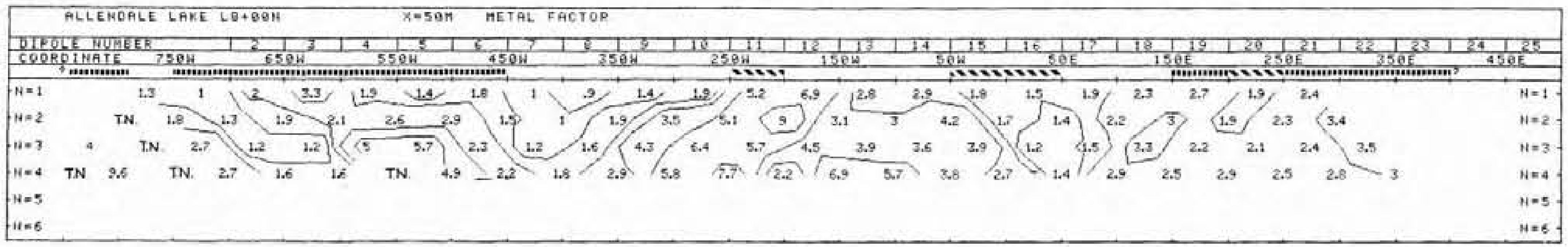
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







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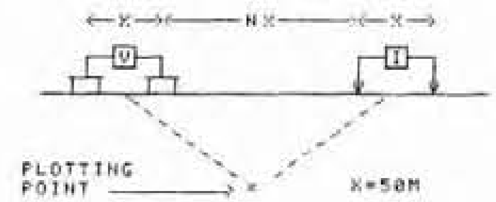
ALLENDALE RESOURCES CORP.

ALLENDALE LAKE PROPERTY

OSOYOOS AND GREENWOOD M.D. (B.C.

LINE NO.-8+00N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

NOTE- CONTOURS AT LOGARITHMIC INTERVALS. 1,-1.5 -2,-3,-5,-7.5,-10

DATE SURVEYED OCT 1983

APPROVED Pac

DATE Dec 12/83

PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY

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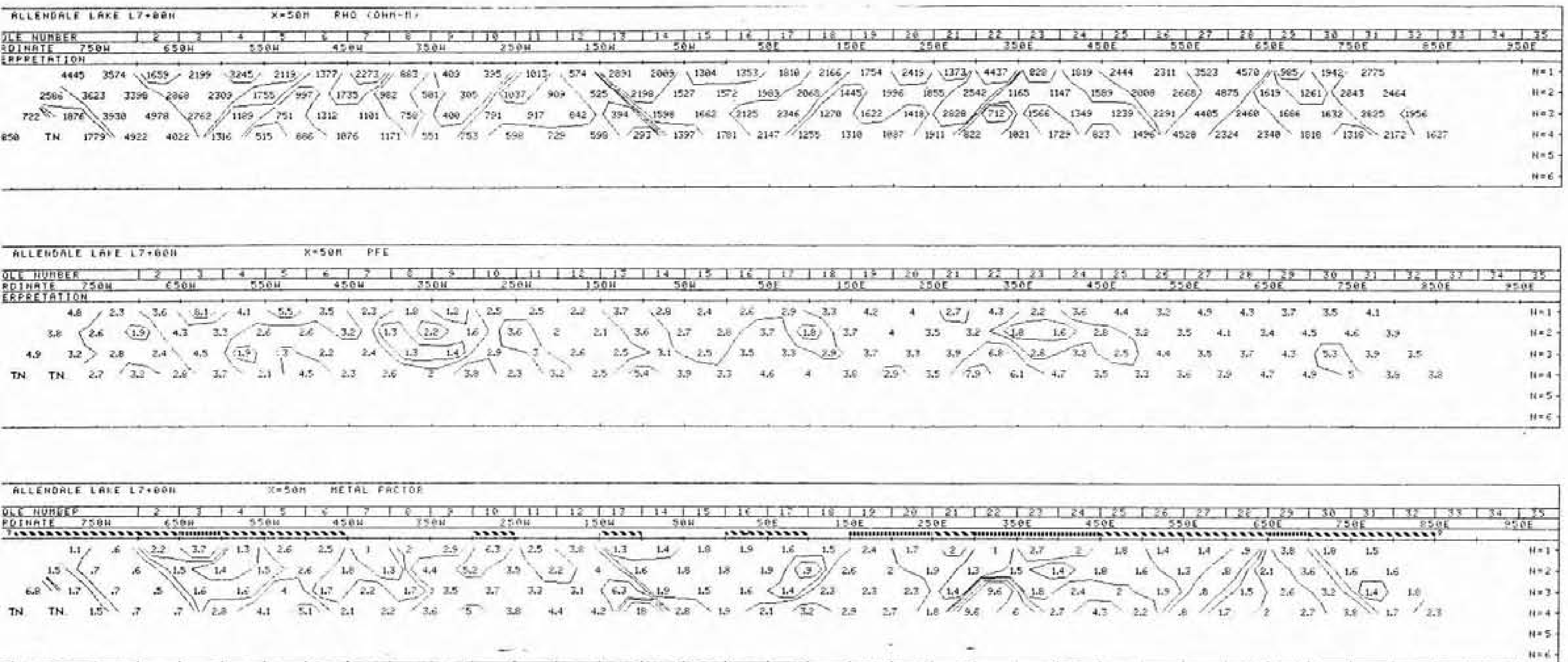
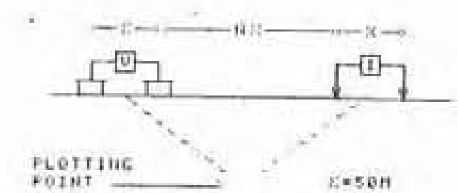


ALLENDALE RESOURCES CORP.

ALLENDALE LAKE PROPERTY

OSOYOOS AND GREENWOOD M.D./B.C.

LINE NO -L7+00N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

NOTE- CONTOURS AT LOGARITHMIC INTERVALS 1,-1.5 -2,-3,-5,-7.5,-10

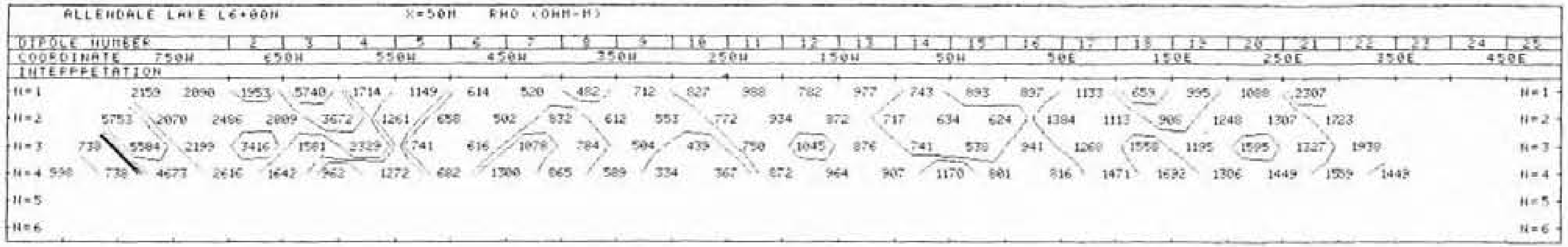
DATE SURVEYED OCT 1983
APPROVED
Pac
DATE DEC 12/83

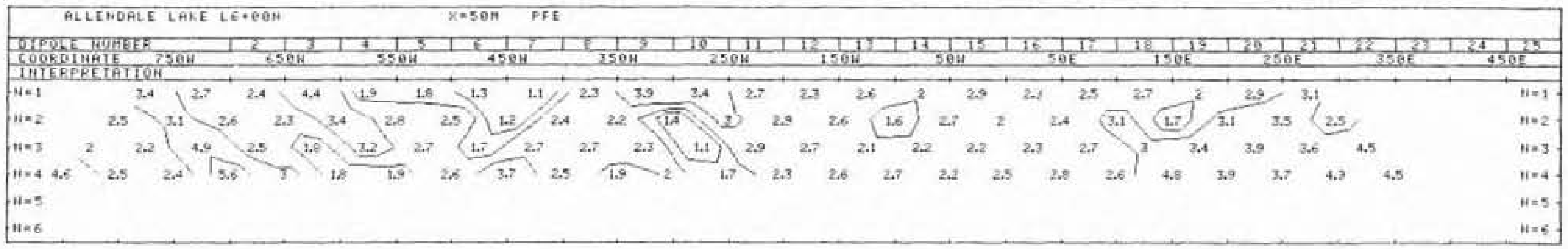
PHOENIX GEOPHYSICS LTD.

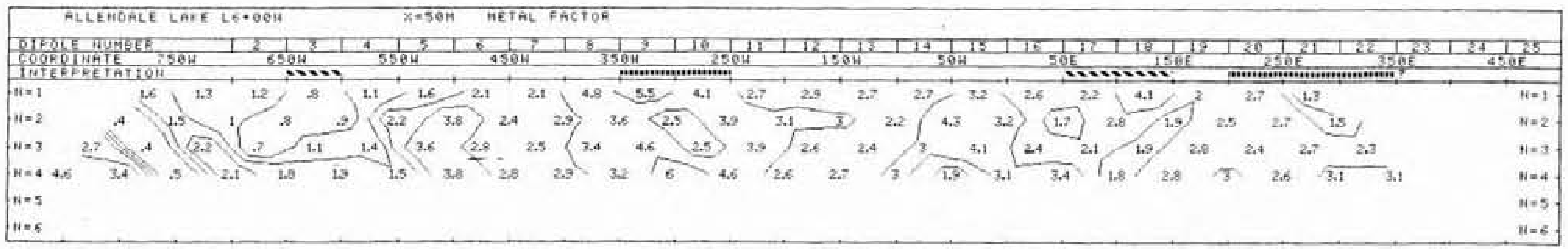
INDUCED POLARIZATION
AND RESISTIVITY SURVEY

12290
Part 1 of 2

DWG. NO.-I.P.-5636-6





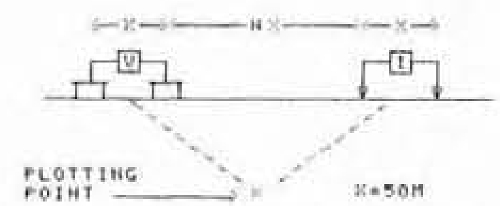


ALLENDALE RESOURCES CORP.

ALLENDALE LAKE PROPERTY

OSOYOOS AND GREENWOOD M.D., B.C.

LINE NO.-6+00N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

DATE SURVEYED: OCT 1983

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NOTE- CONTOURS AT LOGARITHMIC INTERVALS 1,-1.5 -2,-3,-5,-7.5,-10

DATE Dec 12/83

PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY

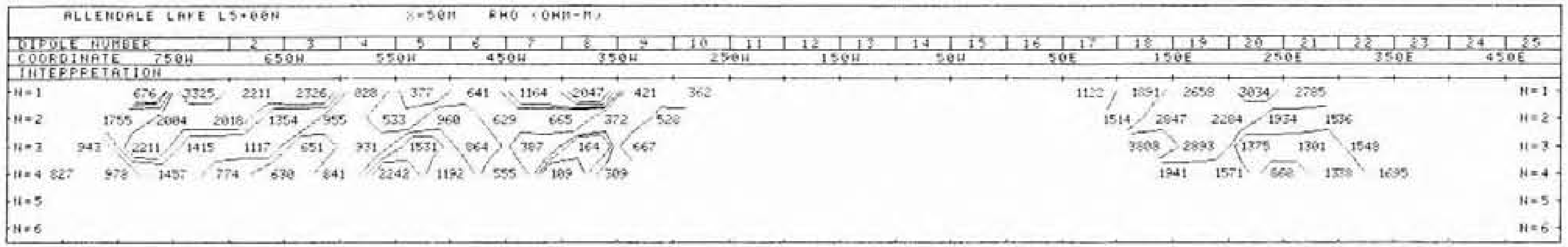
DWG NO -I P-5836-

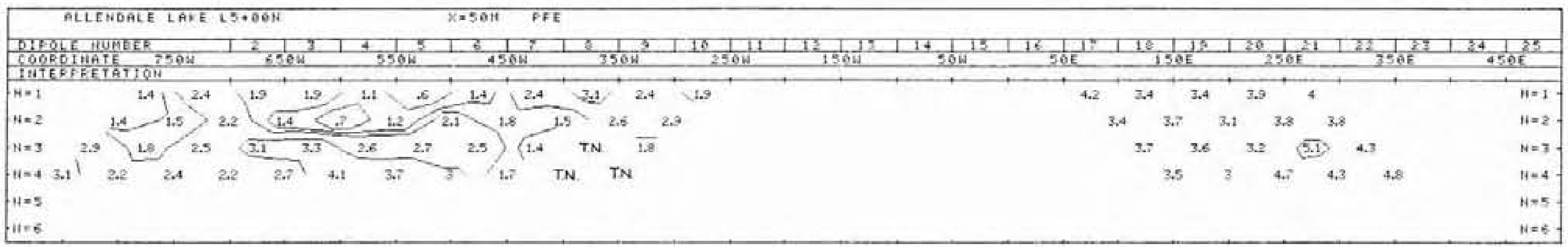
ALLENDALE RESOURCES CORP.

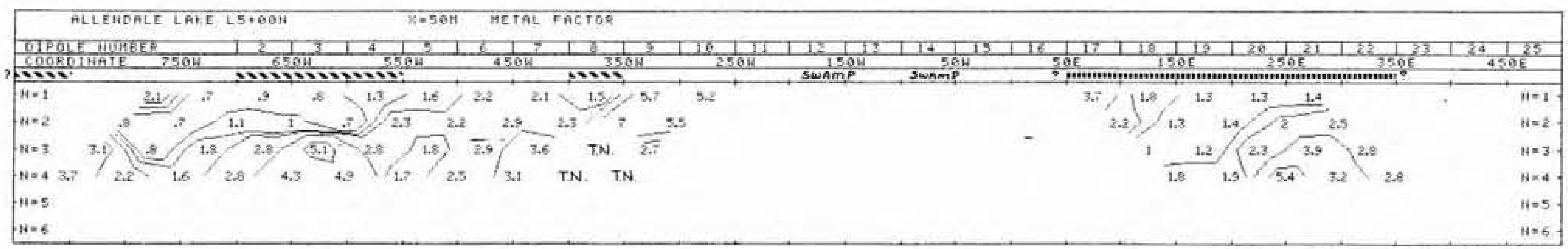
ALLENDALE LAKE PROPERTY

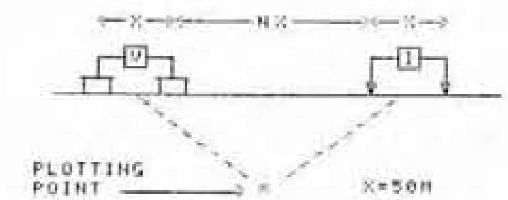
OSOYOOS AND GREENWOOD M.D. B.C.

LINE NO. -5+00N









SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

DATE SURVEYED OCT 1983
APPROVED PAC

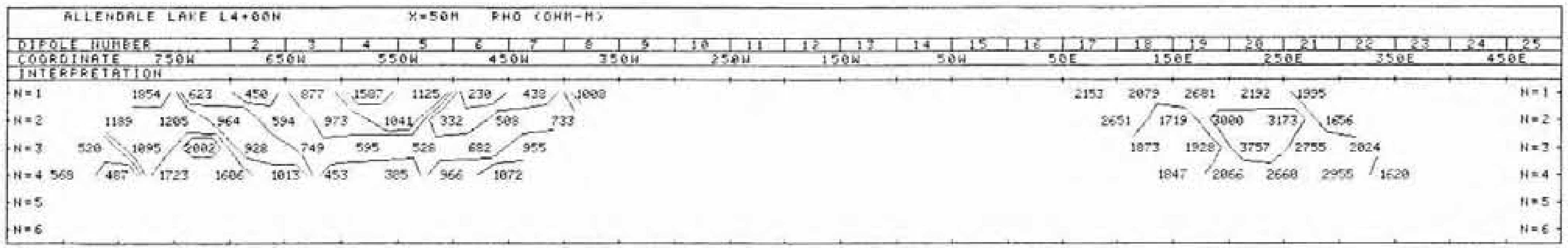
NOTE- CONTOURS AT LOGARITHMIC INTERVALS 1,-1.5 -2,-3,-5,-7.5,-10

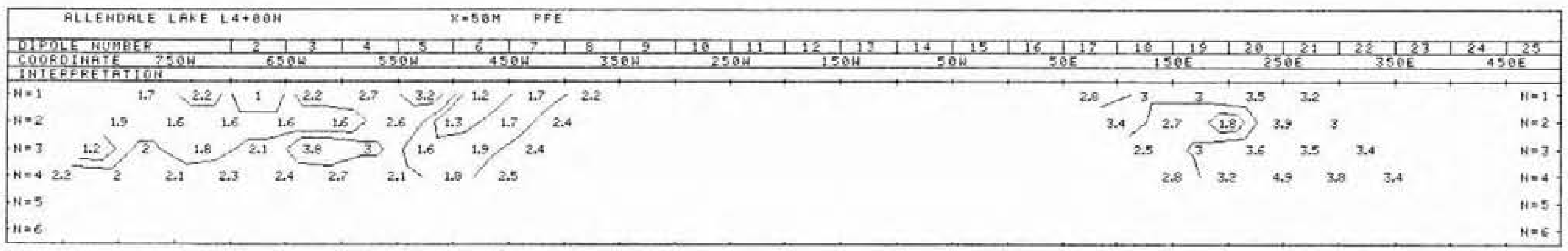
DATE Dec 12/83

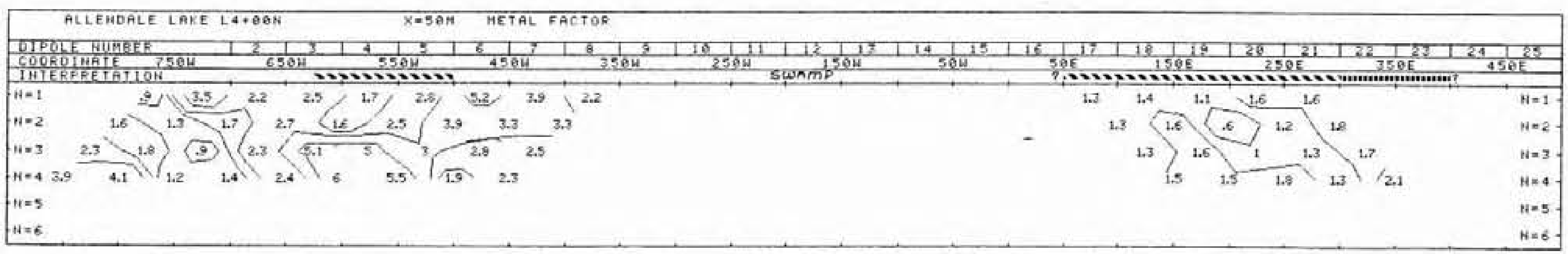
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION
AND RESISTIVITY SURVEY

DWG NO -I P-5836-8





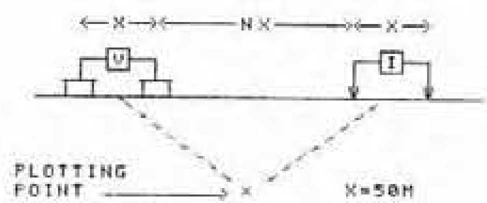


ALLENDALE RESOURCES CORP.

ALLENDALE LAKE PROPERTY

OSOYOOS AND GREENWOOD M.D., B.C.

LINE NO.-L4+00N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

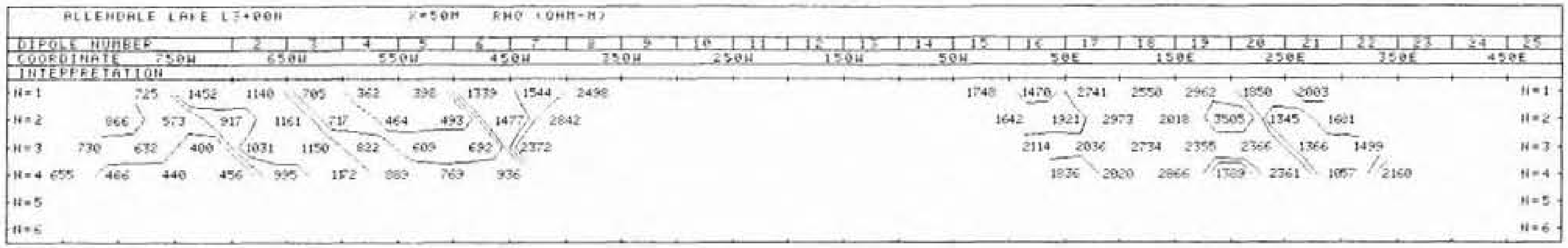
NOTE- CONTOURS AT LOGARITHMIC INTERVALS 1,-1.5 -2,-3,-5,-7.5,-10

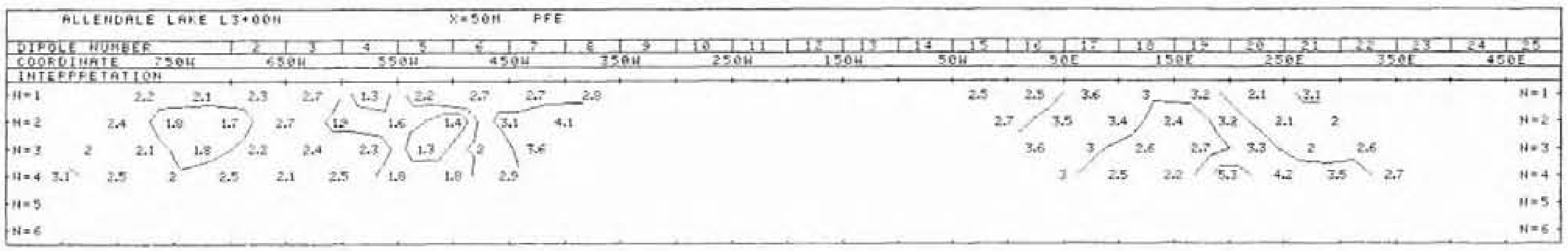
DATE SURVEYED OCT 1983
APPROVED PAC

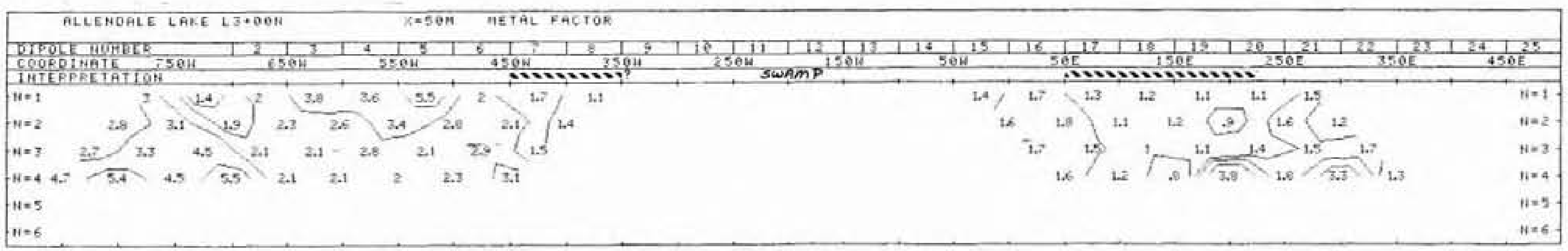
DATE DEC 12/83

PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY







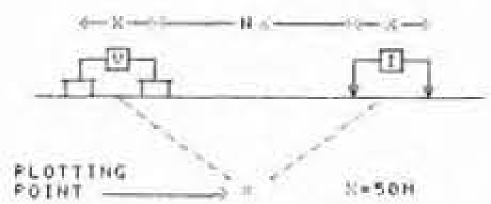
DWG NO -I P-5836-

ALLENDALE RESOURCES CORP.

ALLENDALE LAKE PROPERTY

OSOYOOS AND GREENWOOD M.D., B.C.

LINE NO -7+00N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

DATE SURVEYED OCT 1983
APPROVED PAC

NOTE- CONTOURS AT LOGARITHMIC INTERVALS 1,-1.5 -2,-3,-5,-7.5,-10

DATE Dec 13/83

PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PART B

PHOENIX GEOPHYSICS LIMITED

NOTES ON THE THEORY, METHOD OF FIELD OPERATION
AND PRESENTATION OF DATA
FOR THE INDUCED POLARIZATION METHOD

Induced Polarization as a geophysical measurement refers to the blocking action or polarization of metallic or electronic conductors in a medium of ionic solution conduction.

This electro-chemical phenomenon occurs wherever electrical current is passed through an area which contains metallic minerals such as base metal sulphides. Normally, when current is passed through the ground, as in resistivity measurements, all of the conduction takes place through ions present in the water content of the rock, or soil, i.e., by ionic conduction. This is because almost all minerals have a much higher specific resistivity than ground water. The group of minerals commonly described as "metallic", however, have specific resistivities much lower than ground waters. The induced polarization effect takes place at those interfaces where the mode of conduction changes from ionic in the solutions filling the interstices of the rock to electronic in the metallic minerals present in the rock.

The blocking action or induced polarization mentioned above, which depends upon the chemical energies necessary to allow the ions to give up or receive electrons from the metallic surface, increases with the time that a d.c. current is allowed to flow through the rock; i.e., as ions pile up against the metallic interface the resistance to current flow increases. Eventually, there is enough polarization in the form of excess ions at the interfaces, to appreciably reduce the amount of current flow through the metallic particle. This polarization takes place at each of the infinite number of solution-metal interfaces in a mineralized rock.

When the d.c. voltage used to create this d.c. current flow is cut off, the Coulomb forces between the charged ions forming the polarization cause them to return to their normal position. This movement of charge creates a small current flow which can be measured on the surface of the ground as a decaying potential difference.

From an alternate viewpoint it can be seen that if the direction of the current through the system is reversed repeatedly before the polarization occurs, the effective resistivity of the system as a whole will change as the frequency of the switching is changed. This is a consequence of the fact that the amount of current flowing through each metallic interface depends upon the length of time that current has been passing through it in one direction.

The values of the per cent frequency effect or F.E. are a measurement of the polarization in the rock mass. However, since the measurement of the degree of polarization is related to the apparent resistivity of the rock mass, it is found that the metal factor values or M.F. can be useful values determining the amount of polarization present in the rock mass. The MF values are obtained by normalizing the F.E. values for varying resistivities.

The Induced Polarization measurement is perhaps the most powerful geophysical method for the direct detection of metallic sulphide mineralization, even when this mineralization is of very low concentration. The lower limit of volume per cent sulphide necessary to produce a recognizable IP anomaly will vary with the geometry and geologic environment of the source, and the method of executing the survey. However, sulphide mineralization of less than one per cent by volume has been detected by the IP method under proper geological conditions.

The greatest application of the IP method has been in the search for disseminated metallic sulphides of less than 20% by volume. However, it has also been used successfully in the search for massive sulphides in situations where, due to source geometry, depth of source, or low resistivity of surface layer, the EM method cannot be successfully applied. The ability to differentiate ionic conductors, such as water-filled shear zones, makes the IP method a useful tool in checking EM anomalies which are suspected of being due to these causes.

In normal field applications the IP method does not differentiate between the economically important metallic minerals such as chalcopyrite, chalcocite, molybdenite, galena, etc., and the other metallic minerals such as pyrite. The Induced Polarization effect is due to the total of all electronic conducting minerals in the rock mass. Other electronic conducting materials which can produce an IP response are magnetite, pyrolusite, graphite, and some forms of hematite.

In the field procedure, measurements on the surface are made in a way that allows the effects of lateral changes in the properties of the ground to be separated from the effects of vertical changes in the properties. Current is applied to the ground at two points in distance (X) apart. The potentials are measured at two points (X) feet apart, in line with the current electrodes is an integer number (n) times the basic distance (X).

The measurements are made along a surveyed line, with a constant distance (nX) between the nearest current and potential electrodes. In most surveys, several traverses are made with various values of (n); i.e., (n) = 1, 2, 3, 4, etc. The kind of survey required (detailed or reconnaissance) decides the number of values of (n) used.

In plotting the results, the values of apparent resistivity, apparent per cent frequency effect, and the apparent metal factor measured for each set of electrode positions are plotted at the intersection of grid lines, one from the center point of the current electrodes and the other from the center point of the potential electrodes. (See Figure A) The resistivity values are plotted at the top of the data profile, above the metal factor values. On a third line, below the metal factor values, are plotted the values of the percent frequency effect. The lateral displacement of a given value is determined by the location along the survey line of the center point between the current and potential electrodes. The distance of the value from the line is determined by the distance (nX) between the current and potential electrodes when the measurement was made.

The separation between sender and receiver electrodes is only one factor which determines the depth to which the ground is being sampled in any particular measurement. The plots then, when contoured, are not section maps of the electrical properties of the ground under the survey line. The interpretation of the results from any given survey must be carried out using the combined experience gained from field results, model study results and the theoretical investigations. The position of the electrodes when anomalous values are measured is important in the interpretation.

In the field procedure, the interval over which the potential differences are measured is the same as the interval over which the electrodes are moved after a series of potential readings has been made. One of the advantages of the Induced Polarization method is that the same equipment can be used for both detailed and reconnaissance surveys merely by changing the distance (X) over which the electrodes are moved each time. In the past, intervals have been used ranging from 25 feet to 2000 feet for (X). In each case, the decision as to the distance (X) and the values of (n) to be used is largely determined by the expected size of the mineral deposit being sought, the size of the expected anomaly and the speed with which it is desired to progress.

The diagram in Figure A demonstrates the method used in plotting the results. Each value of the apparent resistivity, apparent metal factor, and apparent per cent frequency effect is plotted and identified by the position of the four electrodes when the measurement was made. It can be seen that the values measured for the larger values of (n) are plotted farther from the line indicating that the thickness of the layer of the earth that is being tested is greater than for the smaller values of (n); i.e., the depth of the measurement is increased.

The IP measurement is basically obtained by measuring the difference in potential or voltage (Δ V) obtained at two operating frequencies. The voltage is the product of the current through the ground and the apparent resistivity of the ground. Therefore, in field situations where the current is very low due to poor electrode contact, or the apparent resistivity is very low, or a combination of the two effects; the value of (Δ V) the change is potential will be too small to be measurable. The symbol "TL" on the data plots indicates this situation.

In some situations spurious noise, either man-made or natural, will render it impossible to obtain a reading. The symbol "N" on the data plots indicates a station at which it is too noisy to record a reading. If a reading can be obtained, but for reasons of noise there is some doubt as to its accuracy, the reading is bracketed in the data plot ( ).

In certain situations negative values of Apparent Frequency Effect are recorded. This may be due to the geologic environment or spurious electrical effects. The actual negative frequency effect value recorded is indicated on the data plot; however, the symbol "NEG" is indicated for the corresponding value of Apparent Metal Factor. In contouring negative values the contour lines are indicated to the nearest positive value in the immediate vicinity of the negative value.

The symbol "NR" indicates that for some reason the operator did not attempt to record a reading, although normal survey procedures would suggest that one was required. This may be due to inaccessible topography or other similar reasons. Any symbol other than those discussed above is unique to a particular situation and is described within the body of the report.

PHOENIX GEOPHYSICS LIMITED

METHOD USED IN PLOTTING DIPOLE-DIPOLE INDUCED POLARIZATION AND RESISTIVITY RESULTS

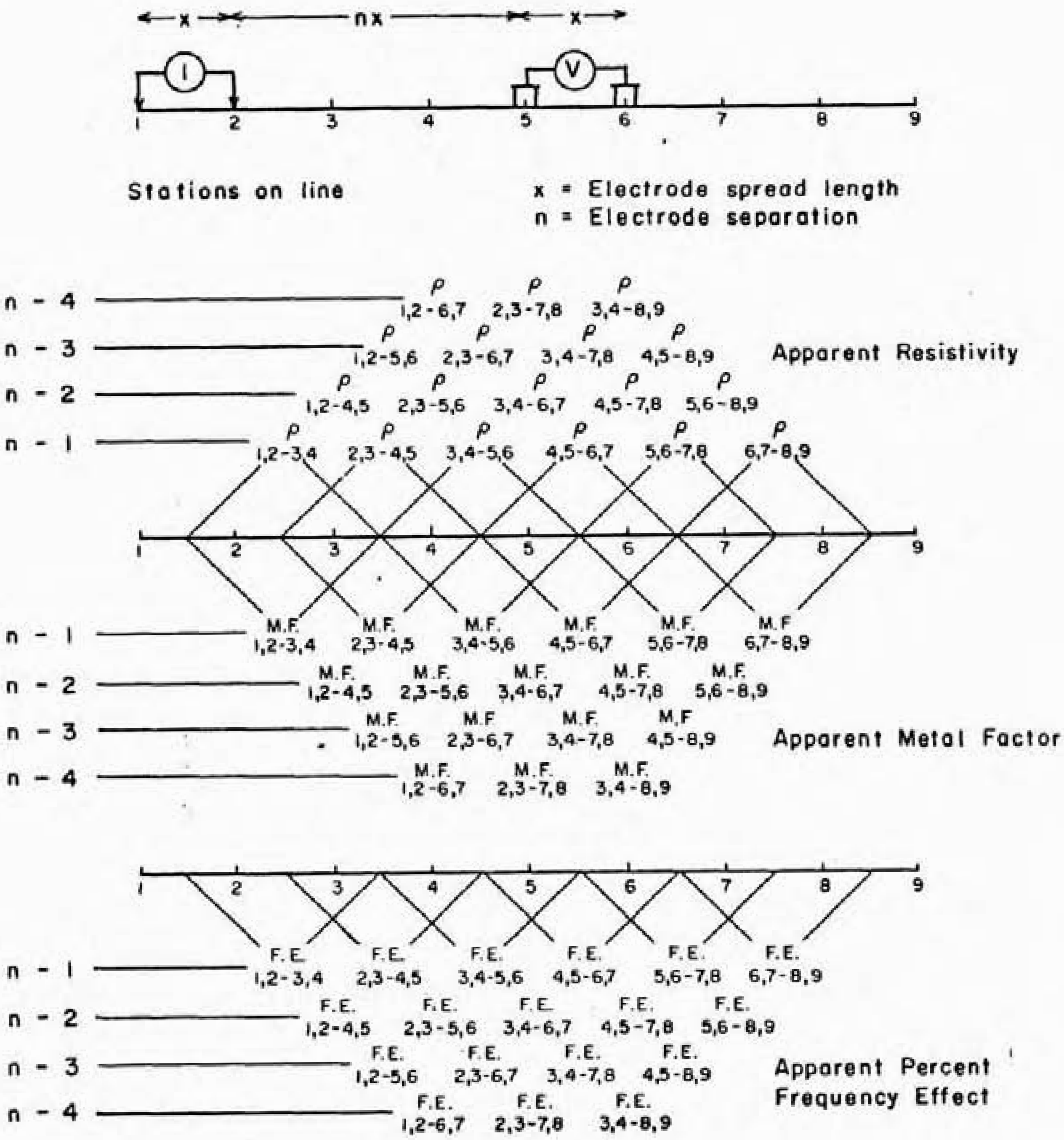


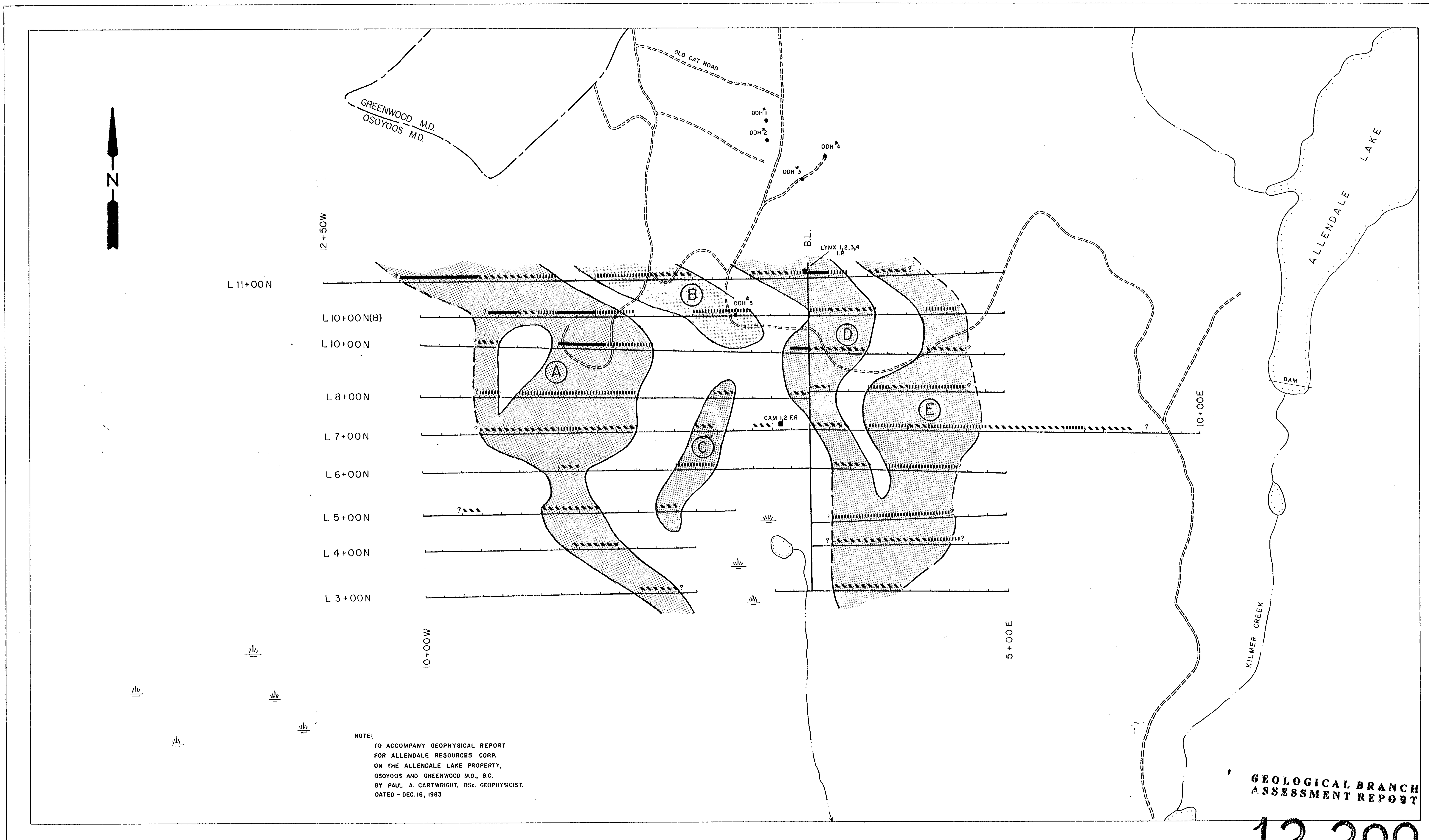
Fig. A

DWG. NO. –

PHOENIX GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP



12,290

PART 1 OF 2

ALLENDALE RESOURCES CORP.

ALLENDALE LAKE PROPERTY

OSOYOOS AND GREENWOOD M.D., BRITISH COLUMBIA

SCALE

100m 0 100m 200m

1:5000

SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ———

PROBABLE ┅┅┅

POSSIBLE ⟋⟋⟋

NUMBER AT END OF ANOMALIES INDICATE SPREAD USED.

– ANOMALOUS I.P. ZONE

DRAWN: R.G.W.

DATE: DEC. 6, 1983

APPROVED: P.A.C.

DATE: DEC. 14, 83

DWG. NO.-I.P.P.-B-3031