PHOENIX GEOPHYSICS LIMITED

REPORT ON THE

INDUCED POLARIZATION AND RESISTIVITY SURVEY

ON THE

COOPER CREEK PROJECT

SLOCAN MINING DISTRICT

KASLO AREA, BRITISH COLUMBIA

FOR

SMD MINING COMPANY LIMITED

N.T.S. 82K/3

Latitude: 50°09'30"N Longitude: 117°10'W

BY

Paul A. Cartwright, B.Sc.

October 5, 1981

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1) Introduction

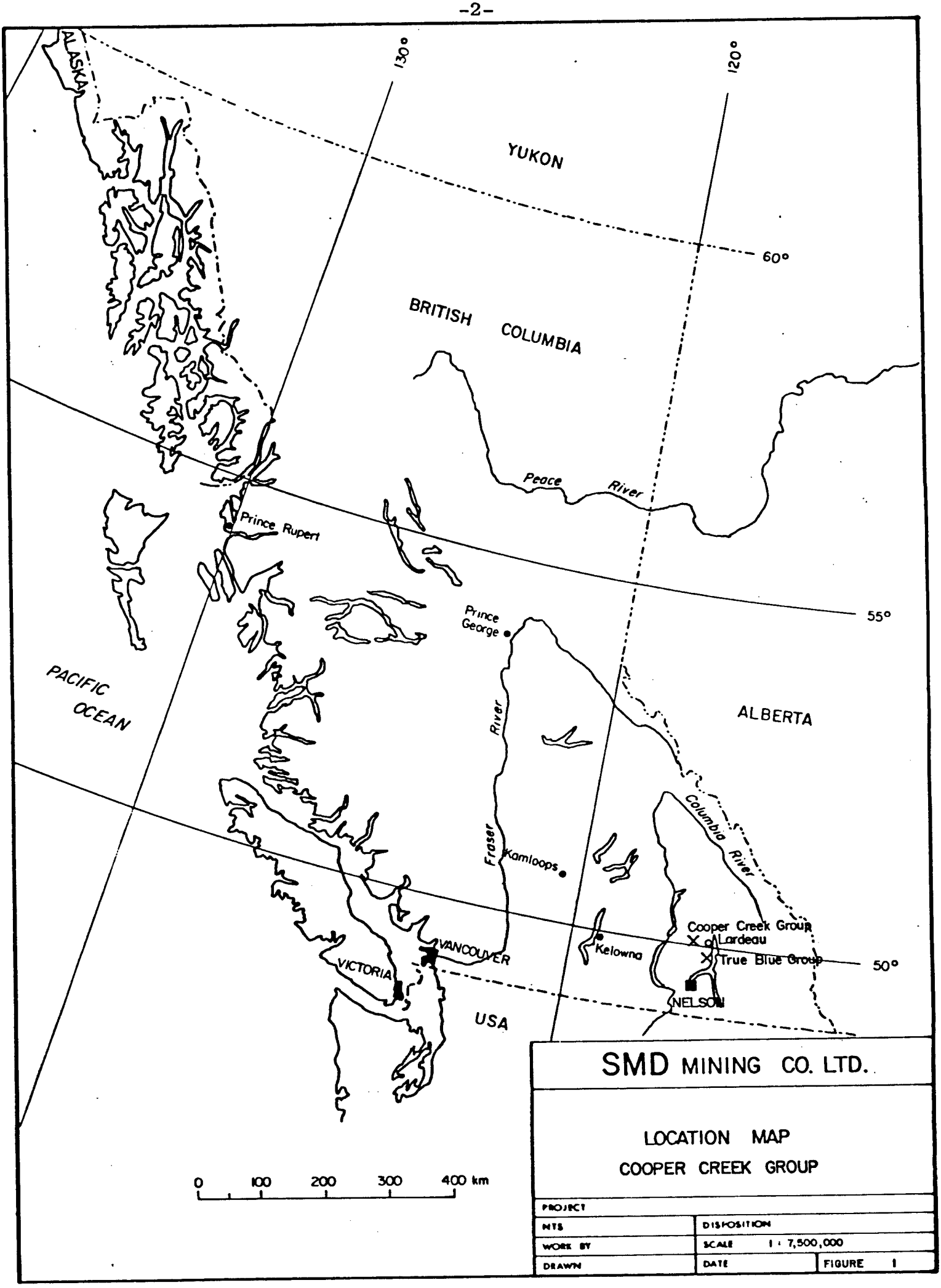
An Induced Polarization and Resistivity Survey has been completed on the Cooper Creek Project for SMD Mining Co. Ltd.

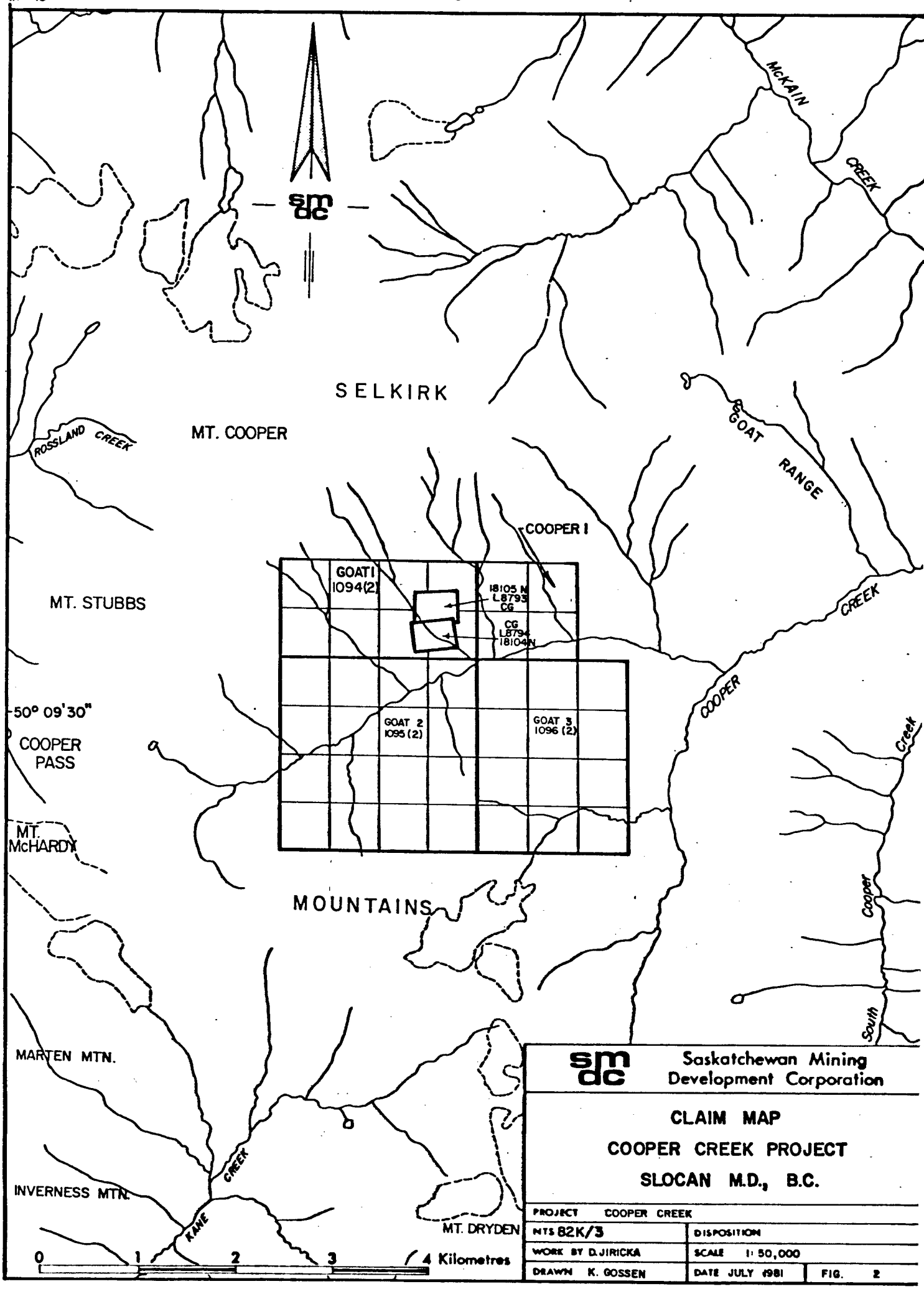
The property is situated approximately 15 kilometers west of the community of Lardeau, which is on the northern end of Kootenay Lake. Access is via paved highway from Nelson to Lardeau, and then via helicopter to the claim group.

A Cu-Zn showing was originally discovered on the property in 1905, in an area of intermediate to felsic composition Kaslo Volcanics. Recently, a number of companies have carried out geological mapping, geochemical surveys, as well as magnetic and electro-magnetic surveys.

The present IP survey was planned in order to detect any metallic mineralization not outlined by previous work, and to further evaluate the source of a geochemical anomaly .

Field work was carried out during early July 1981 using a Phoenix Model IPV-1 IP and Resistivity Receiver unit in conjunction with a Phoenix Model IPT-1 IP and Resistivity transmitter unit, recording the polarizability as percent frequency effect (P.F.E.) between frequencies of 4.0 Hertz and 0.25 Hertz. Apparent resistivity measurements are normalized in units of ohm-meters, while metal factor values are calculated according to the formula: M.F. = (PFEX1000)/Resistivity. Dipole-dipole array was used exclusively, with a basic inter-electrode distance of 50 meters except in one case where 25 meter dipoles were utilized.


ALASKA
130°
120°
YUKON
60°
BRITISH COLUMBIA
Peace River
Prince Rupert
55°
Prince George
PACIFIC OCEAN
Fraser River
ALBERTA
Columbia River
Kamloops
Cooper Creek Group
Lardeau
True Blue Group
Kelowna
VANCOUVER
VICTORIA
NELSON
USA
50°
0 100 200 300 400 km
SMD MINING CO. LTD.
LOCATION MAP
COOPER CREEK GROUP
PROJECT
NTS
DISPOSITION
WORK BY
SCALE 1 : 7,500,000
DRAWN
DATE
FIGURE 1



Saskatchewan Mining Development Corporation

CLAIM MAP
COOPER CREEK PROJECT
SLOCAN M.D., B.C.

PROJECT COOPER CREEK		
NTS 82K/3	DISPOSITION	
WORK BY D.JIRICKA	SCALE 1:50,000	
DRAWN K. GOSSEN	DATE JULY 1981	FIG. 2

Four dipole separations were recorded.

Field work was carried out under the supervision of Mr. Peter Gardner, geophysical crew leader, whose certificate is attached to this report.

2) Description of Claims

The Cooper Creek Project consists of the following claims:

CLAIM NAME	UNITS	RECORD NO.	RECORD DATE
Perth	RCG	18105N	9 October/74
Pyrite	RCG	18104N	9 October/74
Goat 1	8	1094	9 February/79
Goat 2	16	1095	9 February/79
Goat 3	12	1096	9 February/79
Cooper 1	4	2617	6 July/81

Property owner is Mr. Otto Janout of White Rock, B.C. Operator is SMD Mining Co. Ltd.

3) Presentation of Results

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

LINE	ELECTRODE INTERVAL	DWG. NO.
7+86N	50 meters	I.P. 5805-1
6+62N	50 meters	I.P. 5805-2
5+64N	50 meters	I.P. 5805-3
4+97N	50 meters	I.P. 5805-4
4+49N	50 meters	I.P. 5805-5
3+75N	50 meters	I.P. 5805-6
3+16N	50 meters	I.P. 5805-7
2+00N	50 meters	I.P. 5805-8
1+00N	50 meters	I.P. 5805-9
1+00N	25 meters	I.P. 5805-10
0+50S	50 meters	I.P. 5805-11
1+50S	50 meters	I.P. 5805-12
2+50S	50 meters	I.P. 5805-13

Also enclosed with this report is Dwg. I.P.P.-B-3005, a plan map of the Cooper Creek Grid at a scale of 1: 2,500. 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.

The topographic, grid and claim information shown on Dwg. I.P.P.-B-3005 has been taken from maps made available by the staff of SMD Mining Co. Ltd.

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 50m electrode intervals the position of a narrow sulphide body can only be determined to lie between two stations 50m apart. In order to definitely locate, and fully evaluate a narrow, shallow source, it is necessary to use shorter electrode 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 centre 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.

4) Discussion of Results

The Induced Polarization and Resistivity results from the Cooper Creek grid suggest that the area is largely underlain by very competent rocks, which are uniformly mineralized with up to several percent of metallic sulfides. This interpretation is suggested by the very high magnitude apparent resistivity values which are recorded over much of the grid, in conjunction with quite high magnitude polarizability (P.F.E.) values.

Several zones of lower than background apparent resistivity measurements, together with higher than normal polarizability readings are evident within the highly resistive, but polarizable mass mentioned previously. These anomalous

IP and Resistivity zones are discussed separately below.

Zone A -This anomalous IP zone is indicated to extend across all of the Cooper Creek grid lines in close proximity to the baseline. Depth to the top of the source appears to be less than one dipole length (50 meters) in every instance, although it is probable that the mineralization involved becomes more concentrated at depth, along the eastern margin of the zone. Data from Line 100N in particular displays patterns which point to the above interpretation. Computer programs developed by Dr. W. Pelton of Phoenix Geophysics Ltd. were used to model both the polarizability (P.F.E.) data, and the resistivity data acquired on Line 100N, which was measured using both 50 meter and 25 meter dipole lengths. These programs find the two dimensional tabular source, which best "fits" the field data. In the case of the 25 meter dipole polarizability data from Line 100N, the calculated source is in the order of 100 meters wide, 12 meters deep, and is centered at Station 0+40E (Fig. 3). True resistivity of the source is estimated to be only moderately low. The 50 meter dipole resistivity data, on the other hand, required a relatively conductive tabular source 25 meters wide to be buried approximately 22 meters sub-surface to obtain reasonably good correlation between observed and calcualted data sets. One potential source of error, which may be affecting the 50 meter resistivity modeling results, is the fact that the target is complex with an area of moderately low resistivity values being

COMPUTED INTERPRETATION

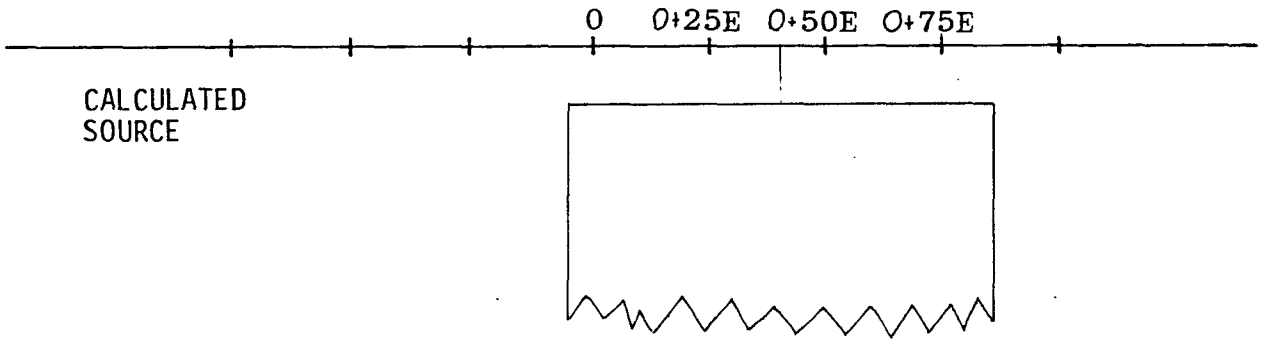
PROPERTY: Cooper Creek, B.C.
LINE: 400N
SPONSOR: SMD Mining Co. Ltd.
DATA: P.F.E.
A = 25 meter

OBSERVED DATA

		5.0	5.8	6.9	8.6	7.4	3.4	3.0	3.7
	4.2	5.8	7.1	8.6	9.7	8.7	6.9	6.1	4.8
5.6	5.3	7.0	7.7	8.4	11.0	9.6	9.1	7.6	5.0
5.1	6.3	6.1	7.2	8.3	8.1	11.0	10.0	9.6	8.6	5.4

CALCULATED DATA

		4.9	4.9	5.5	6.1	5.8	6.1	5.8	4.9
	4.8	4.8	5.9	7.8	8.5	8.5	8.2	6.3	4.8
4.7	4.7	6.0	8.5	9.9	8.9	9.8	9.0	6.5	4.7
4.7	4.7	6.0	8.8	10.1	8.4	8.2	9.9	9.3	6.6	4.7



PARAMETERS OF
CALCULATED SOURCE

CENTER: 0+40E ± 1.5%
DEPTH: 12m ± 24%
WIDTH: 90m ± 31%
DEPTH
EXTENT: GRT 50m ± Fixed

RES BODY: 250ohn-m ± Fixed
RES OVBN: 5000ohm-m ± Fixed
RES HOST: 5000ohm-m ± Fixed
IP BODY: 11.2 PFE ± 23%
IP HOST: 5.0 PFE ± Fixed

Figure 3

COMPUTED INTERPRETATION

PROPERTY: Cooper Creek, B.C.

LINE: 100N

SPONSOR: SMD Mining Co. Ltd.

DATA: Resistivity ohm-meters

A = 50 meters

OBSERVED DATA

5700. 5516. 2714. 3058. 1378. 3355. 5250. 4486.

5391. 5202. 3293. 1734. 804. 1031. 2695. 4539. 3646.

4750. 5056. 3939. 1959. 871. 686. 1140. 2723. 4829. 2692.

3241. 4433. 4370. 2316. 970. 735. 767. 1425. 2787. 3694. 2639.

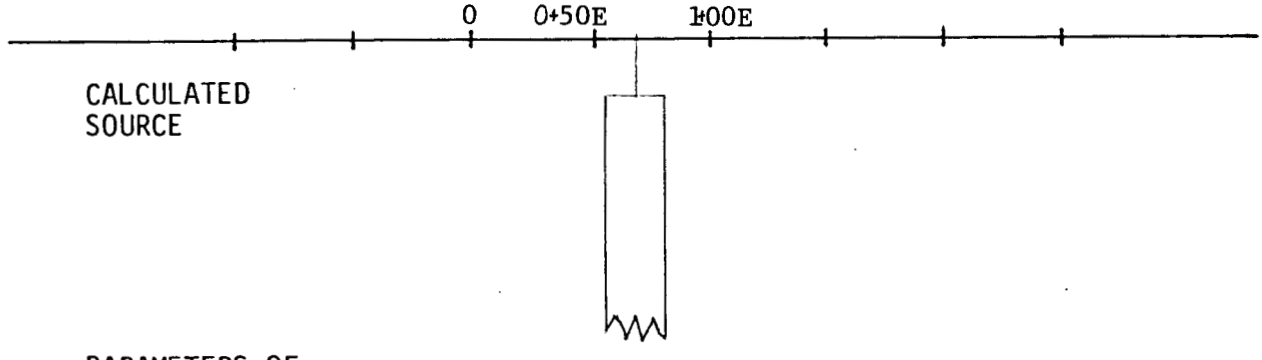
CALCULATED DATA

4429. 4596. 4846. 2583. 1817. 4322. 4728. 4431.

4674. 4761. 5860. 2239. 829. 1081. 3553. 5481. 4679.

4863. 4860. 6638. 2181. 835. 739. 1063. 3067. 6143. 4890.

5031. 5006. 7044. 2187. 898. 868. 865. 1105. 2976. 6523. 5090.



PARAMETERS OF
CALCULATED SOURCE

CENTER:	067E	±	0.6%
DEPTH:	22m	±	10%
WIDTH:	25m	±	Fixed
DEPTH EXTENT:	GRT 100m	±	Fixed

RES BODY:	18 ohm-m	±	43%
RES OVBN:	4500 ohm-m	±	Fixed
RES HOST:	4500 ohm-m	±	Fixed
IP BODY:		±	
IP HOST:		±	

Figure 4

evident immediately to the west of the center of the main resistivity low. The net result would be that the computed model would indicate lower true resistivity values than would otherwise be the case.

It is the author's understanding that Zone A has been drilled-tested by a diamond drill hole collared at Station 0 + 05E on Line 100N, and drilling at 45°east. Apparently this hole intersected scattered disseminated and stringered metallic sulphides of up to 10% by volume of rock.

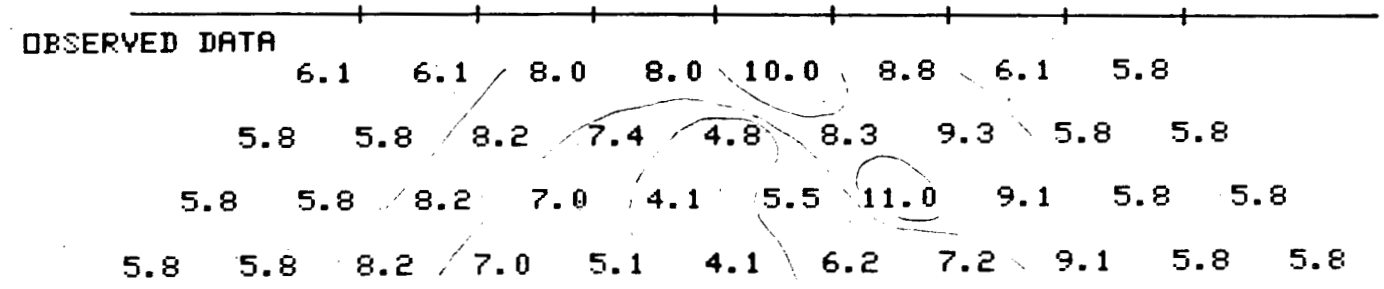
Zone B - Anomalous polarizability readings coincident with moderately lower than background apparent resistivity values mark this trend, which is interpreted to strike obliquely across the western side of the grid, from the region of Line 2 + 00N to the vicinity of Line 4 + 97N. The zone is open towards the west on all lines.

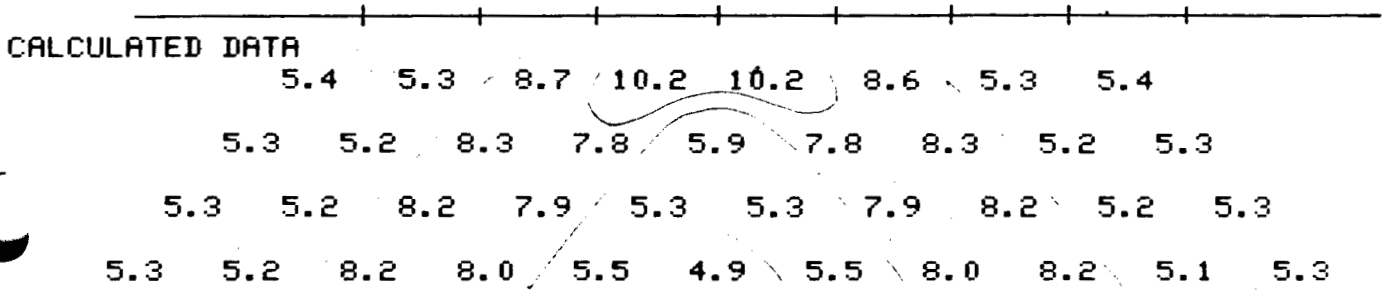
The source of IP Zone B is indicated to be closer to the surface than is the case of IP Zone A. It may be that the former zone consists of marginally more concentrated mineralization than the latter, as indicated by somewhat lower apparent resistivity values.

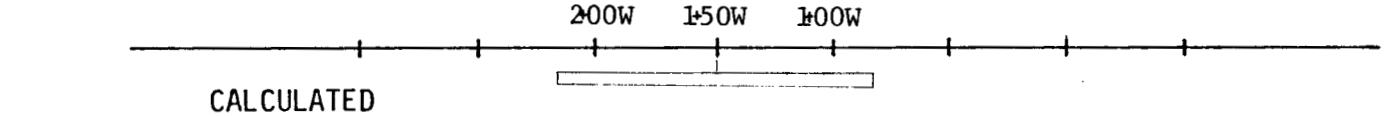
Polarizability data from Line 4 + 49N was manually filtered and then modelled using W. Pelton's programs, and the results are shown on Figure 5. A reasonably good fit is obtained if the model is a very thin, flat lying slab approximately 100 meters in width. This suggests that the source of Zone B may be plunging towards the south at a shallow angle; however, more data would be required

COMPUTED INTERPRETATION

PROPERTY: Cooper Creek, B.C.
LINE: 4+49N
SPONSOR: SMD Mining Co. Ltd.
DATA: P.F.E.
A = 50 m.







CALCULATED SOURCE

PARAMETERS OF CALCULATED SOURCE

CENTER:	150W	±	1%
DEPTH:	10m	±	65%
WIDTH:	130m	±	15%
DEPTH EXTENT:	5m	±	GRT 100%

RES BODY:	254 ohm-m	±	GRT 100%
RES OVBN:	3000 ohm-m	±	Fixed
RES HOST:	3000 ohm-m	±	Fixed
IP BODY:	12 P.F.E.	±	47%
IP HOST:	5.5 P.F.E.	±	Fixed

Figure 5

to close off the responses obtained on Line 3 + 75N, Line 3 + 16N, and Line 2 + 00N before this interpretation could be relied upon.

Several attempts were made to model the apparent resistivity data obtained on Line 4 + 49N, in the vicinity of Zone B, but a good "fit" could not be achieved. This may have been due to the relatively large number of arbitrary points the interpreter was forced to add to the data, both to completely close off the western margin of the anomaly, and to eliminate contamination from another low resistivity zone further east.

Zone C - is indicated to trend roughly perpendicular to the grid from the eastern end of Line 3 + 75N to beyond the eastern end of Line 7 + 86N. It is possible the source of the response is discontinuous in the area of Line 5 + 64N, or that the zone swings to the east at this point, beyond the range of effective IP coverage.

Because all of the individual anomalies are open towards the east, it is not possible to comment on the possible width of the zone, although the depth to the top certainly appears to be less than one dipole length (50m), and is probably less than 25 meters sub-surface. Apparent resistivity values recorded within what may be the center of the zone suggest a source at least as conductive as the other two zones discussed previously.

A Cu-Zn showing is present just to the north of Line 4 + 49N, between Station 2+00E and Station 2+25E.

While the IP and Resistivity coverage is not complete in this area, the patterns that were measured suggest the possible presence of a very near-surface, very narrow target of moderate polarizability and conductivity.

5) Summary and Conclusions

The Induced Polarization and Resisitivity survey on the Cooper Creek grid has outlined three zones of anomalously high polarizability, and lower than background resistivity, set within highly resistive background rocks, which most probably contain a uniform amount of disseminated sulphides.

Zone A apparently has been drill-tested in the vicinity of Line 100N and up to 10% metallic mineralization has been reported as disseminated and stringered sulphides over approximately 25 meters.

Zone B is open towards the west while Zone C is open towards the east. Additional IP coverage would be required to more completely define the sources of these responses before drill locations could be decided upon. In the case of Zone C, extremely rugged terrain may prevent additional data collection. However, the data which is available over Zone B and Zone C suggests the sources of these trends are at least as concentrated as the mineralization outlined in Zone A.

A more quantative evaluation could be made by testing cores from the diamond drill hole which passed

through Zone A, in order to better determine true polarizability and resistivity.

PHOENIX GEOPHYSICS LTD.

Paul A. Cartwright, B.Sc.,
Geophysicist.

5 October 1981

ASSESSMENT DETAILS

PROPERTY: Cooper Creek Project

MINING DIVISION: Slocan

SPONSOR: SMD Mining Co. Ltd.

PROVINCE: British Columbia

LOCATION: Kaslo Area

TYPE OF SURVEY: Induced Polarization and Resitivity

OPERATING MAN DAYS: 22.5

DATE STARTED: 2 July 1981

EQUIVALENT 8 HR. MAN DAYS: 33.75

DATE FINISHED: 10 July 1981

CONSULTING MAN DAYS: 6

NUMBER OF STATIONS: 198

DRAFTING MAN DAYS: 6

NUMBER OF READINGS: 1693

TOTAL MAN DAYS: 40.75

KILOMETERS OF LINE SURVEYED: 8.9

CONSULTANTS:

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

FIELD TECHNICIANS:

Peter Gardner, 393 Connaught Avenue, Willowdale, Ontario.

Ian Brogden , 200 Yorkland Avenue, Willowdale, Ontario.

Ben Polzer, 200 Yorkland Avenue, Willowdale, Ontario.

DRAUGHTSMEN:

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

PHOENIX GEOPHYSICS LIMITED

Paul A. Cartwright

Paul A. Cartwright, B.Sc.,
Geophysicist.

DATED: 5 October 1981

STATEMENT OF COST

SMD MINING CO. LTD. - IP AND RESISTIVITY SURVEY NORTHWEST OF KASLO, BRITISH COLUMBIA

PERIOD: 2 July 1981 - 10 July 1981

CREW: P. Gardner, I. Brogden, B. Polzer

7.5	Operating Days @ 655.00/day	$ 4,912.50
1.5	Bad Weather days @ 385.00/day	577.50
Mobilization-Demobilization		1,950.00
Fuel		31.62
		$ 7,471.62

PHOENIX GEOPHYSICS LIMITED

Paul A. Cartwright

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

5 October 1981

CERTIFICATE

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

1. I am a geophysicist residing at 4238 West 11th Avenue, Vancouver, British Columbia.

2. I am a graduate of the University of British Columbia, Vancouver, B.C., with a 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 11 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 SMD Mining Co. Ltd., or any affiliate.

6. The statements made in this report are based on a study of published 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 5th day of October 1981.

Paul A. Cartwright

Paul A. Cartwright, B.Sc..
Geophysicist.

CERTIFICATE

I, Peter Gardner, of the City of Toronto, Province of Ontario, do hereby certify that:

1. I am a geophysical crew leader, residing at 393 Connaught Avenue, Willowdale, Ontario.

2. I am a graduate of Radio College of Canada in Electronics Technology.

3. I have been practicing my vocation about four years.

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

DATED AT VANCOUVER, B.C.
this 5th day of October 1981.

Peter Gardner.

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. are the most useful values in 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) betwen 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 (ΔV) 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 (ΔV) the change in potential will be too small to be measurable. The symbol "TL" on the data plots indicates this situation.

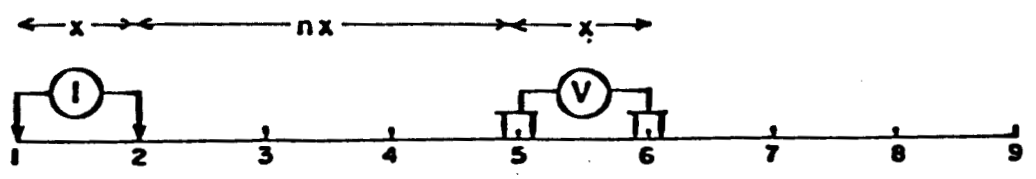
In some situations spurious noise, either man made or natural, will render it impossible to obtain a reading. The symbol "N" on the data plots indicates a station at which it is too noisy to record a reading. If a reading can be obtained, but for reasons of noise there is some doubt as to its accuracy,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

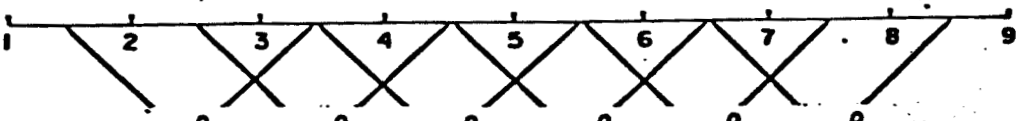
PHOENIX GEOPHYSICS LIMITED.

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



Stations on line

x = Electrode spread length
n = Electrode separation



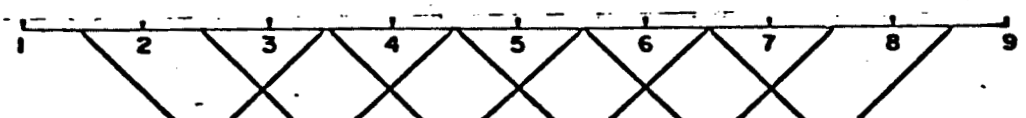
n - 1 — ρ 1,2-3,4 ρ 2,3-4,5 ρ 3,4-5,6 ρ 4,5-6,7 ρ 5,6-7,8 ρ 6,7-8,9

n - 2 — ρ 1,2-4,5 ρ 2,3-5,6 ρ 3,4-6,7 ρ 4,5-7,8 ρ 5,6-8,9

n - 3 — ρ 1,2-5,6 ρ 2,3-6,7 ρ 3,4-7,8 ρ 4,5-8,9

n - 4 — ρ 1,2-6,7 ρ 2,3-7,8 ρ 3,4-8,9

Apparent Resistivity



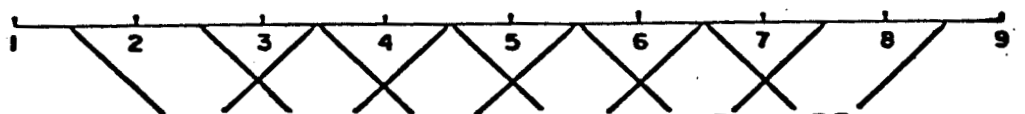
n - 1 — M.F. 1,2-3,4 M.F. 2,3-4,5 M.F. 3,4-5,6 M.F. 4,5-6,7 M.F. 5,6-7,8 M.F 6,7-8,9

n - 2 — M.F. 1,2-4,5 M.F. 2,3-5,6 M.F. 3,4-6,7 M.F. 4,5-7,8 M.F. 5,6-8,9

n - 3 — M.F. 1,2-5,6 M.F. 2,3-6,7 M.F. 3,4-7,8 M.F 4,5-8,9

n - 4 — M.F. 1,2-6,7 M.F. 2,3-7,8 M.F. 3,4-8,9

Apparent Metal Factor



n - 1 — F.E. 1,2-3,4 F.E. 2,3-4,5 F.E. 3,4-5,6 F.E. 4,5-6,7 F.E. 5,6-7,8 F.E. 6,7-8,9

n - 2 — F.E. 1,2-4,5 F.E. 2,3-5,6 F.E. 3,4-6,7 F.E. 4,5-7,8 F.E. 5,6-8,9

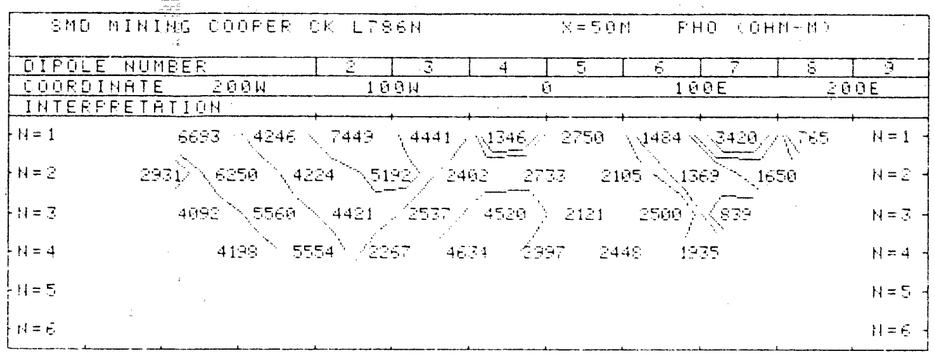
n - 3 — F.E. 1,2-5,6 F.E. 2,3-6,7 F.E. 3,4-7,8 F.E. 4,5-8,9

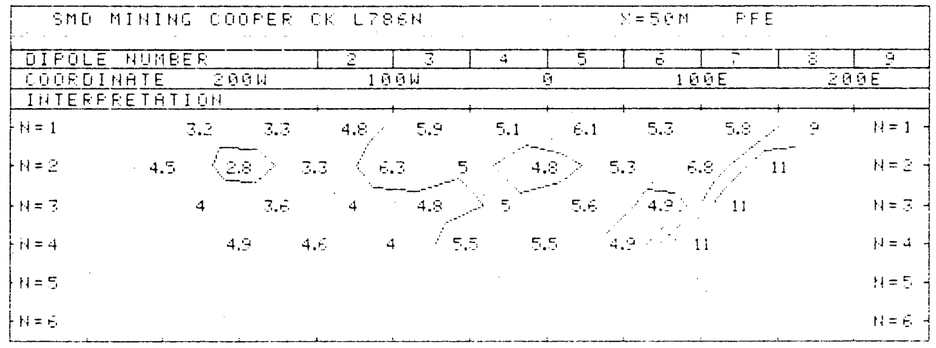
n - 4 — F.E. 1,2-6,7 F.E. 2,3-7,8 F.E. 3,4-8,9

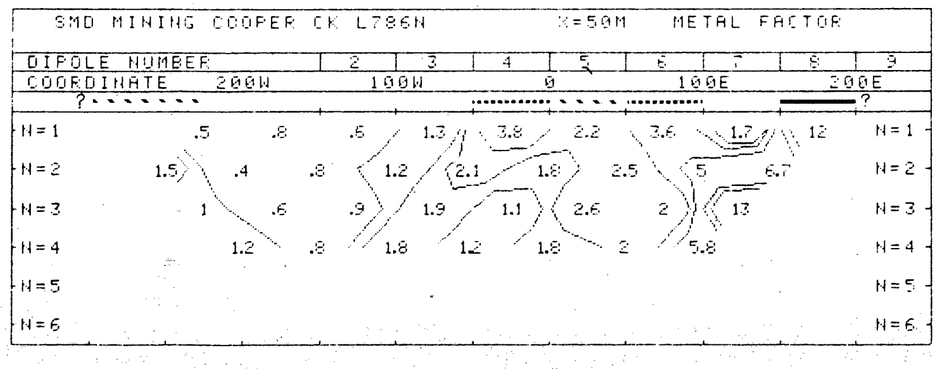
Apparent Percent Frequency Effect

Fig. A

DWG. NO.-I.P.-5805-1





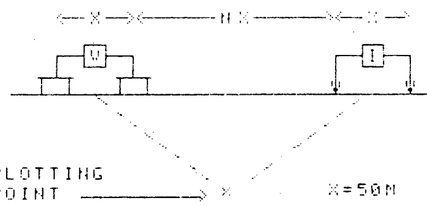


SMD MINING CO.LTD.

COOPER CK GRID-SLOCAN M.D.

PASLO-B.C.

LINE NO -786N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE .....
POSSIBLE - - - - - -

FREQUENCY (HERTZ)
4.0.0.25

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

DATE SURVEYED: JULY 1981

APPROVED

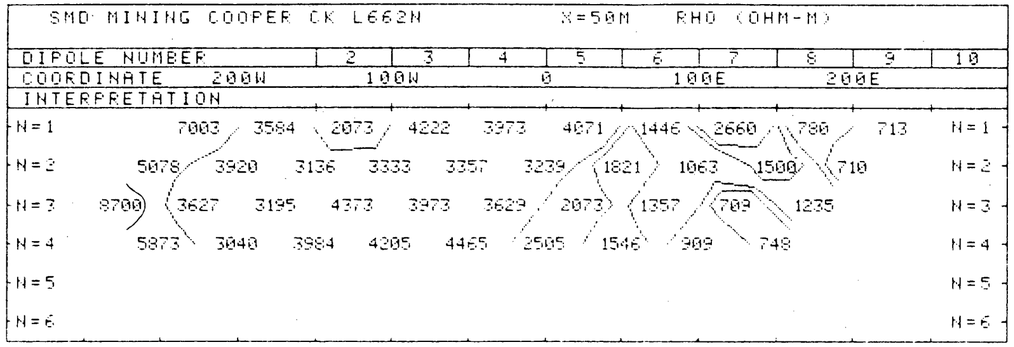
Pac

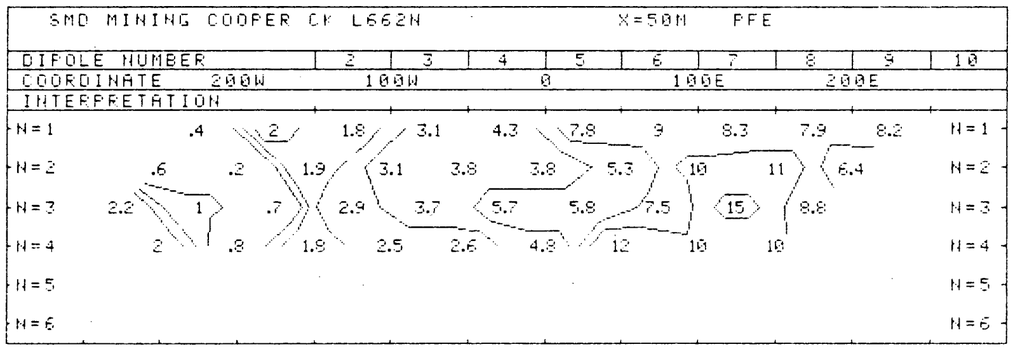
DATE SEPT 24/81

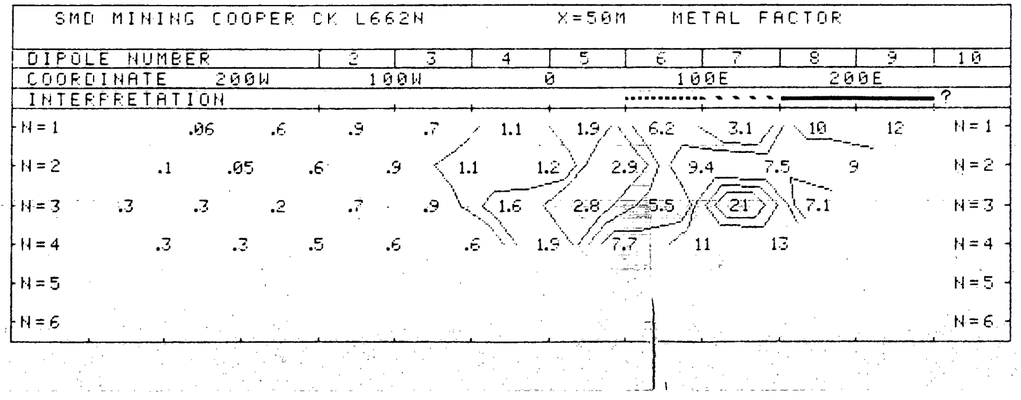
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







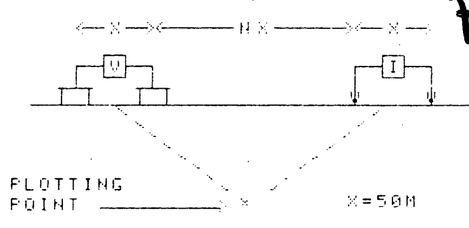
DWG. NO.-I.P.-5805-2

SMD MINING CO.LTD.

COOPER CK GRID: SLOCAN M D

KASLO: B.C

LINE NO -662N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

FREQUENCY (HERTZ)
4.0:0.25

NOTE- CONTOURS AT LOGARITHMIC INTERVALS. 1,-1.5 -2,-3,-5,-7 5,-10

DATE SURVEYED: JULY 1981

APPROVED

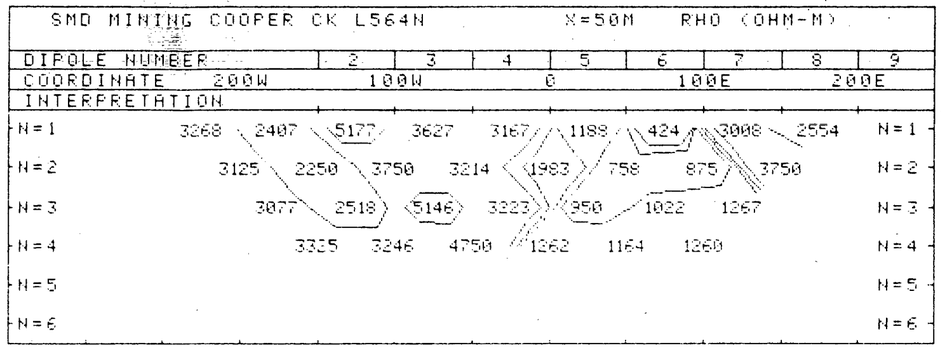
PAC

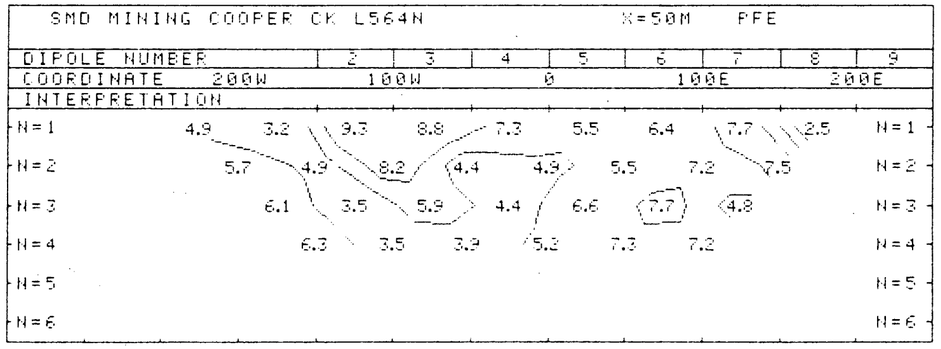
DATE SEPT 24/81

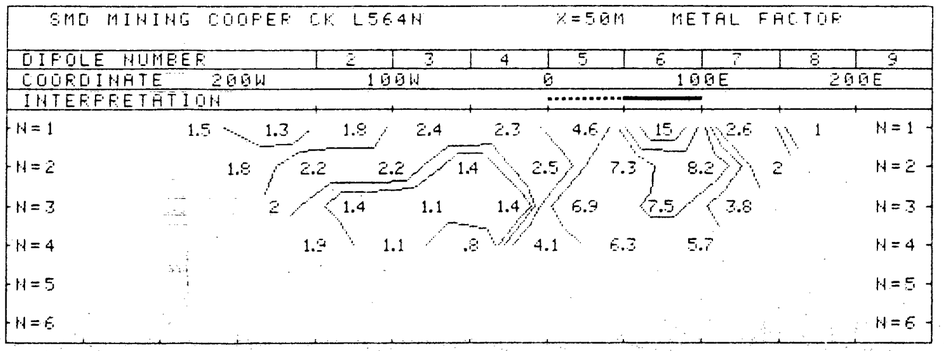
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







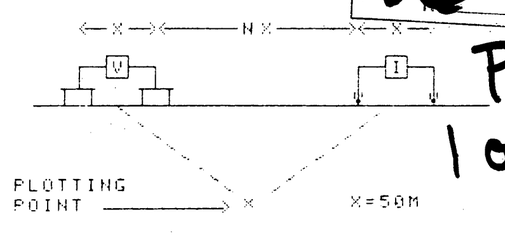
DWG NO -I.P.-5805-3

SMD MINING CO.LTD.

COOPER CK GRID/SLOCAN M D

KASLO, B.C.

LINE NO.-564N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE ....
POSSIBLE - - - - - -

FREQUENCY (HERTZ)
4 0/0 25

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

DATE SURVEYED JULY 1981

APPROVED

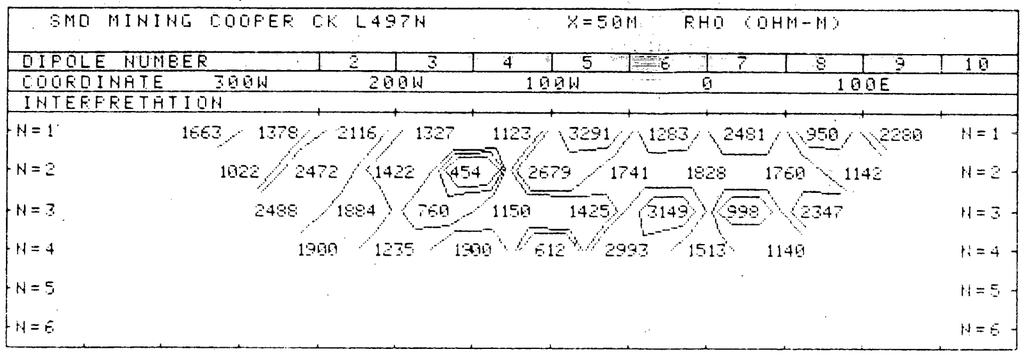
Pac

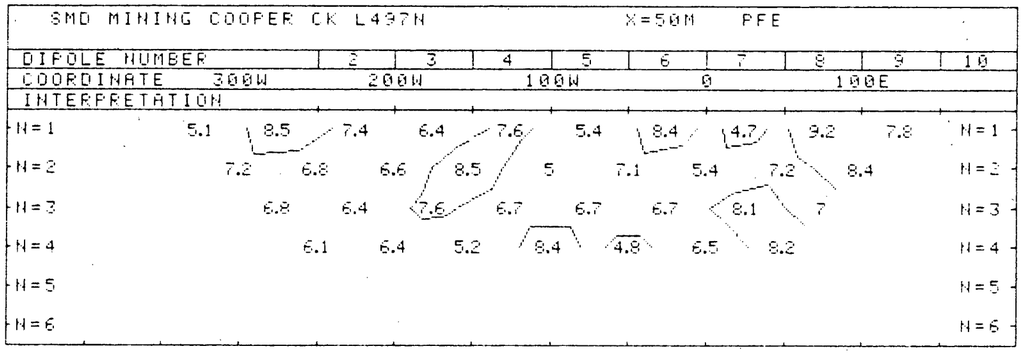
DATE SEPT 24/81

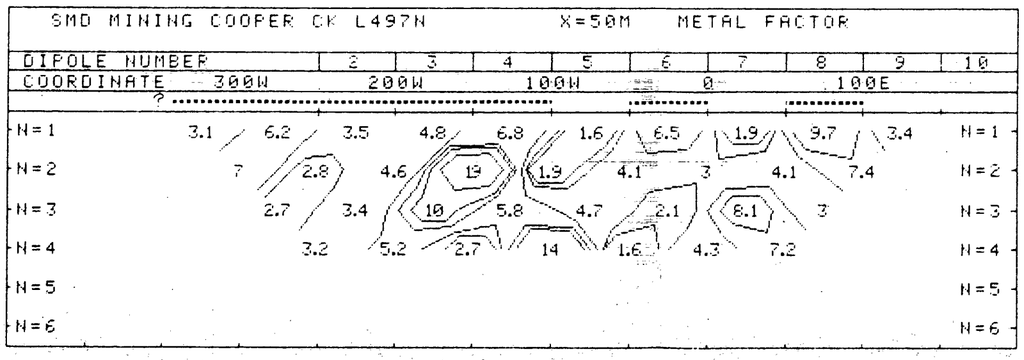
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







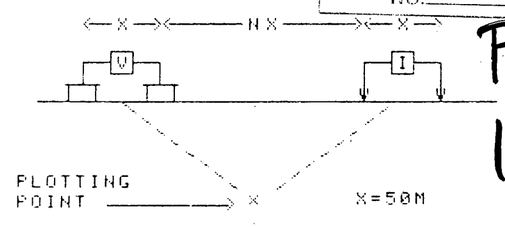
DWG. NO.-I P.-5805-4

SMD MINING CO.LTD.

COOPER CK. GRID: SLOCAN M.D

KASLO, B.C

LINE NO.-497N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE ....
POSSIBLE - - - - - - -

FREQUENCY (HERTZ)
4.0/0.25

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

DATE SURVEYED: JULY 1981

APPROVED

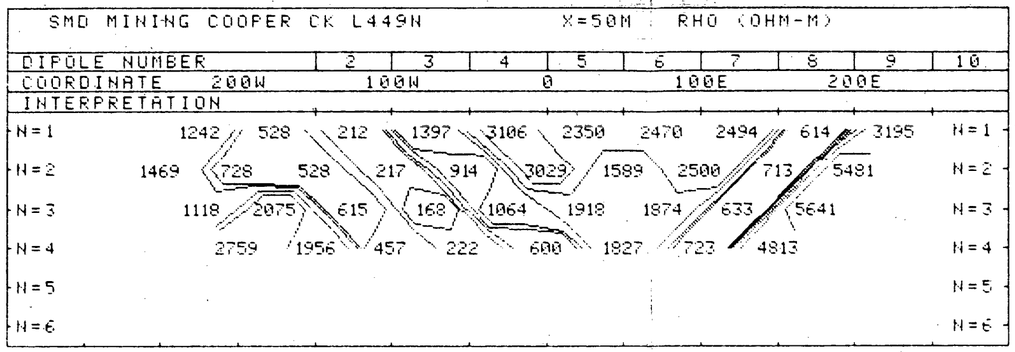
PAC

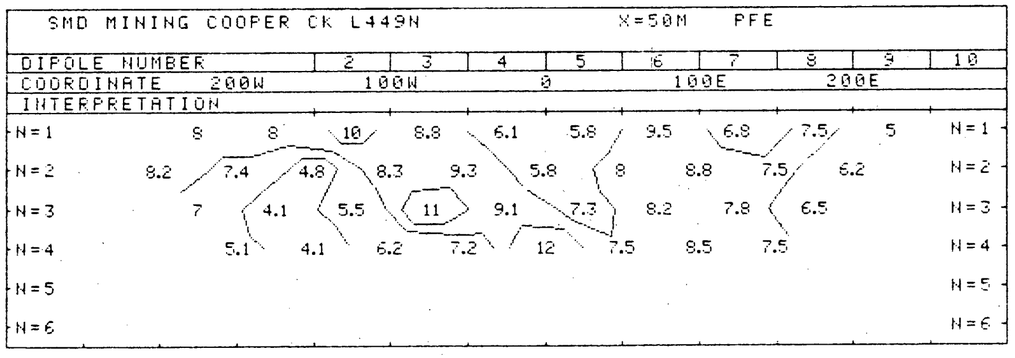
DATE SEPT 24/81

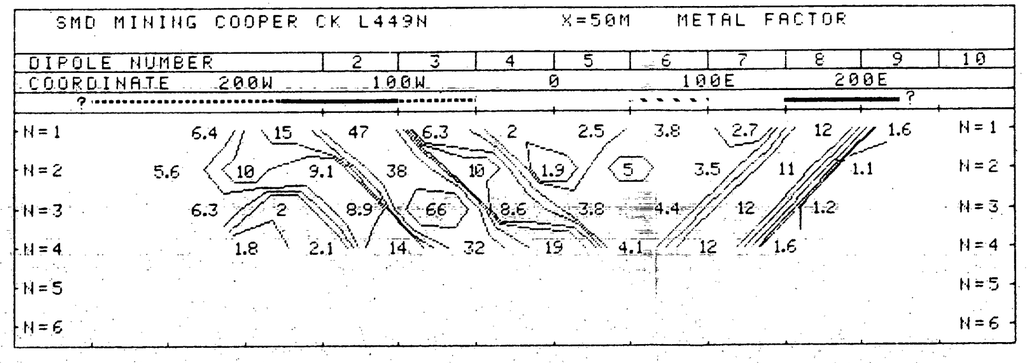
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







DWG. NO.-I.P.-5805-5

SMD MINING CO.LTD.

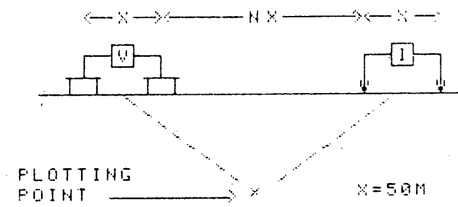
COOPER CK.GRID:SLOCAN M.D

KASLO,B.C

LINE NO.-449N

9697

PART 1&2



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE ....
POSSIBLE - - - - - - -

FREQUENCY (HERTZ)
4.0/0.25

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

DATE SURVEYED JULY 1981

APPROVED

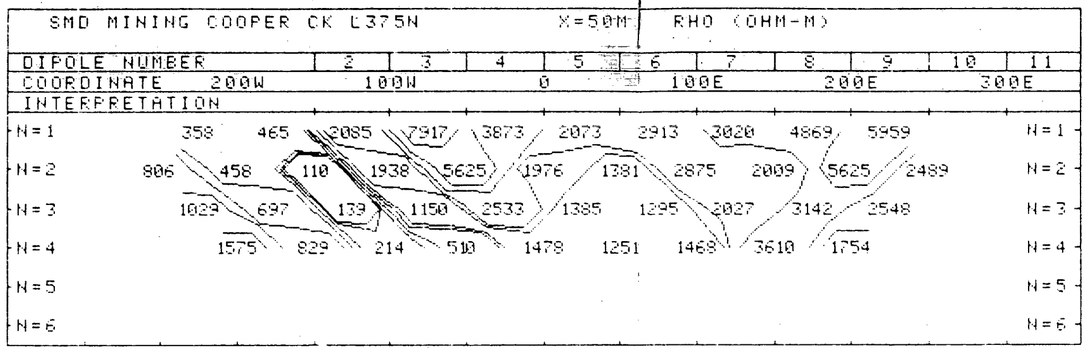
PAC

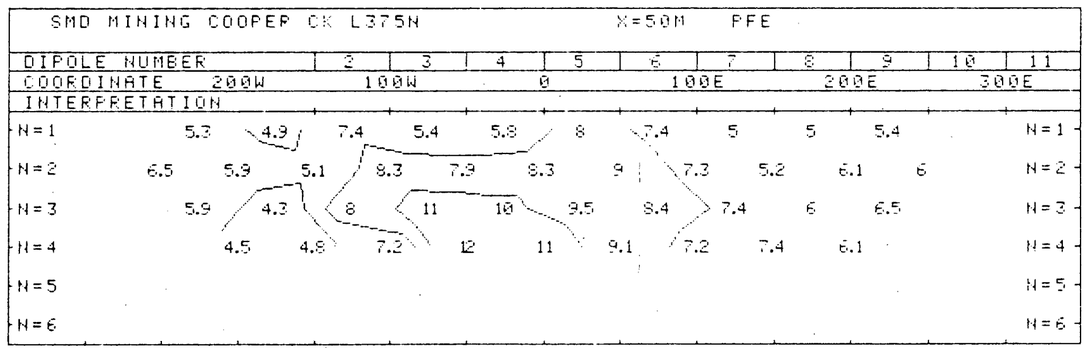
DATE SEPT 24/81

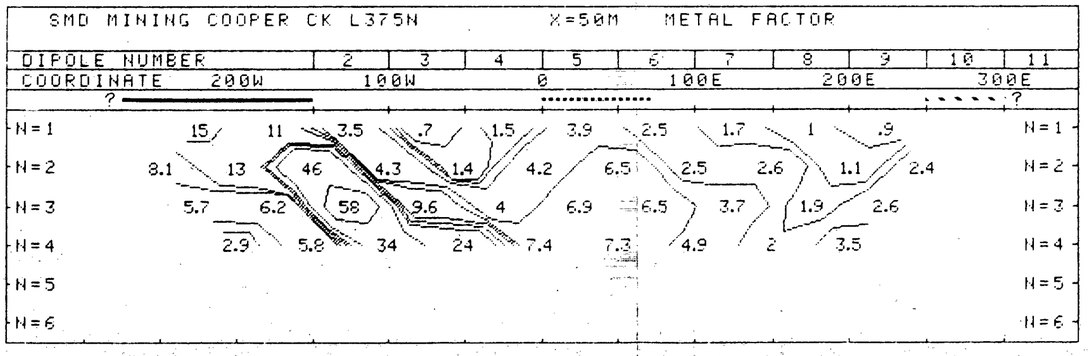
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







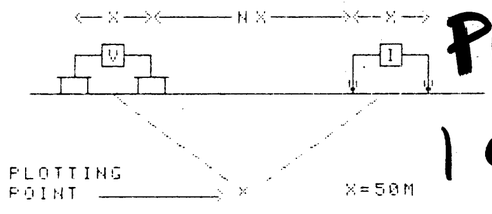
DWG. NO.-I.P.-5805-6

SMD MINING CO.LTD.

COOPER CK GRID:SLOCAN M O

PASLO:B C

LINE NO.-375N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE ....
POSSIBLE `.`.`.`.`.`.`.

FREQUENCY (HERTZ)
4.0/0.25

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

DATE SURVEYED: JULY 1981

APPROVED

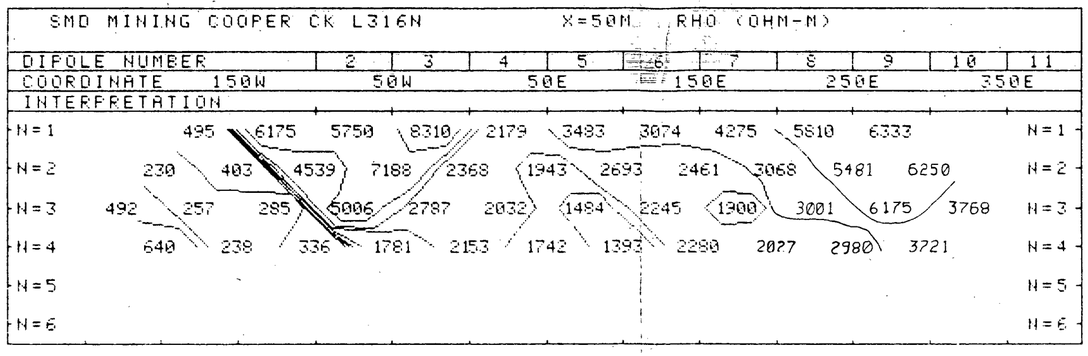
PAC

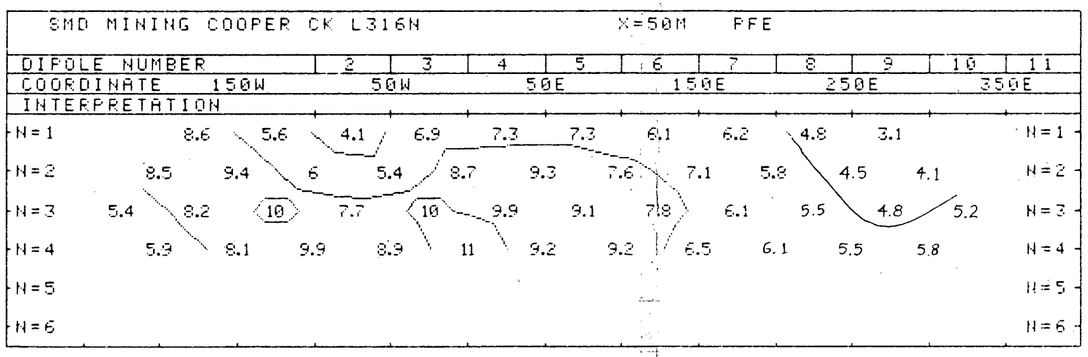
DATE SEPT 24/81

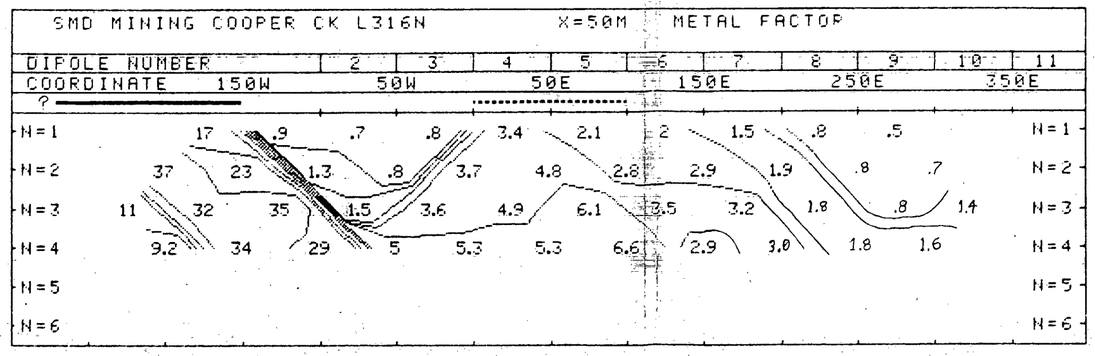
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







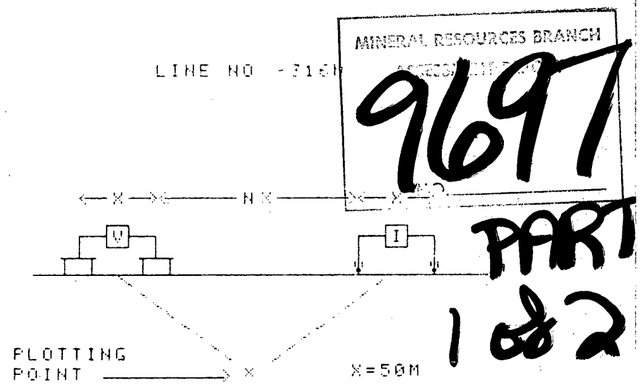
DWG NO.-I P-5805-7

SMD MINING CO.LTD.

COOPER CK GRID, SLOCAN M.D

B.C.

LINE NO -316N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE .....
POSSIBLE - - - - - -

FREQUENCY (HERTZ)
4.0/0.25

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

DATE SURVEYED JULY 1981

APPROVED

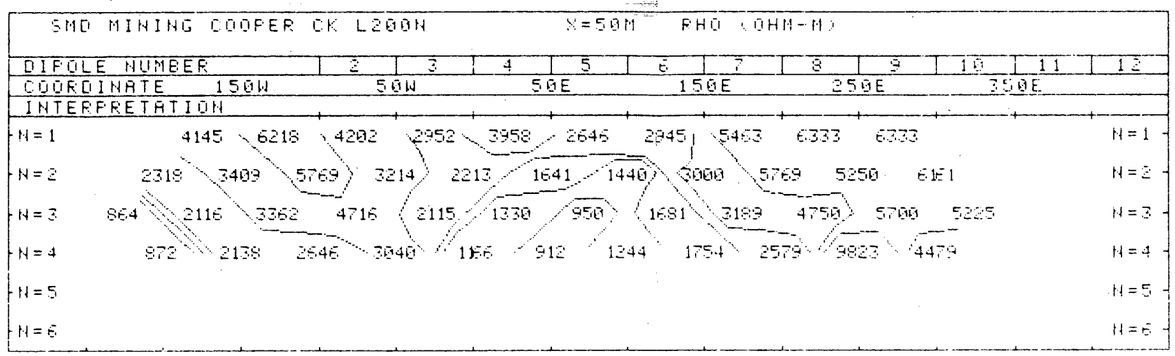
PAC

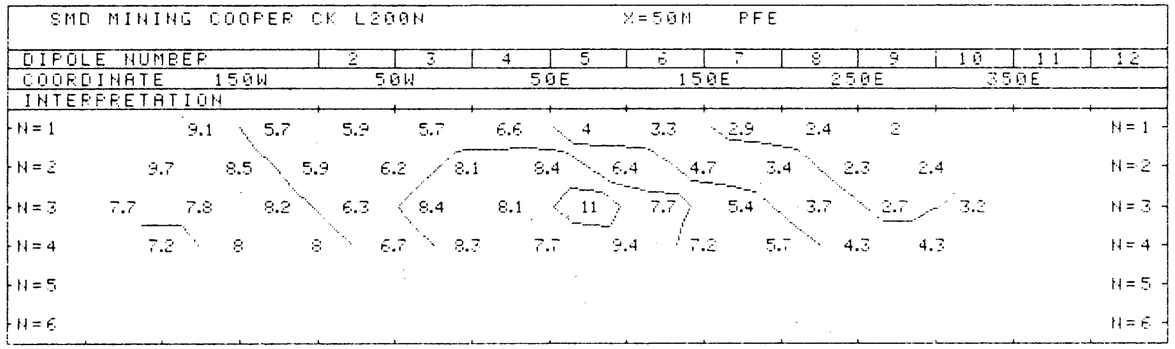
DATE SEPT 24/81

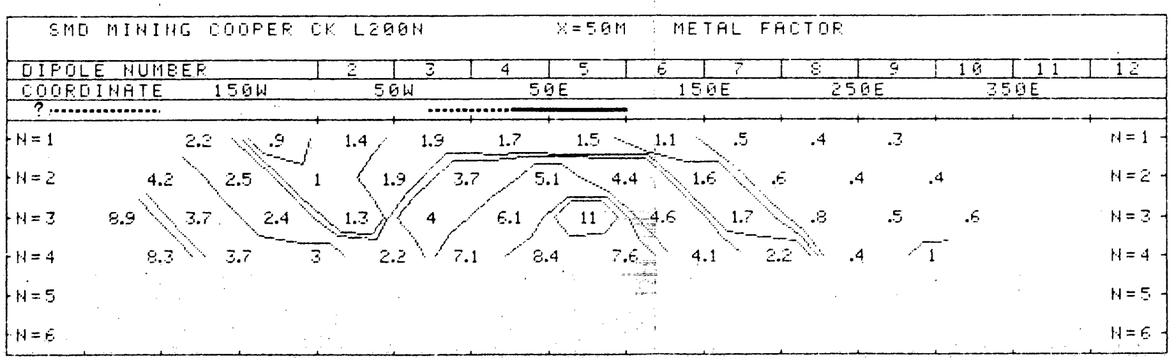
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







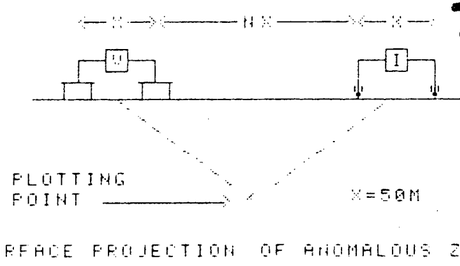
DWG. NO.-I P-5805-8

SMD MINING CO.LTD.

COOPER CK GRID:SLOCAN M.D.

KASLO:B C

LINE NO -200N



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE ....
POSSIBLE - - - - - - -

FREQUENCY (HERTZ)
4 0.0.25

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

DATE SURVEYED: JULY 1981

APPROVED

PAC

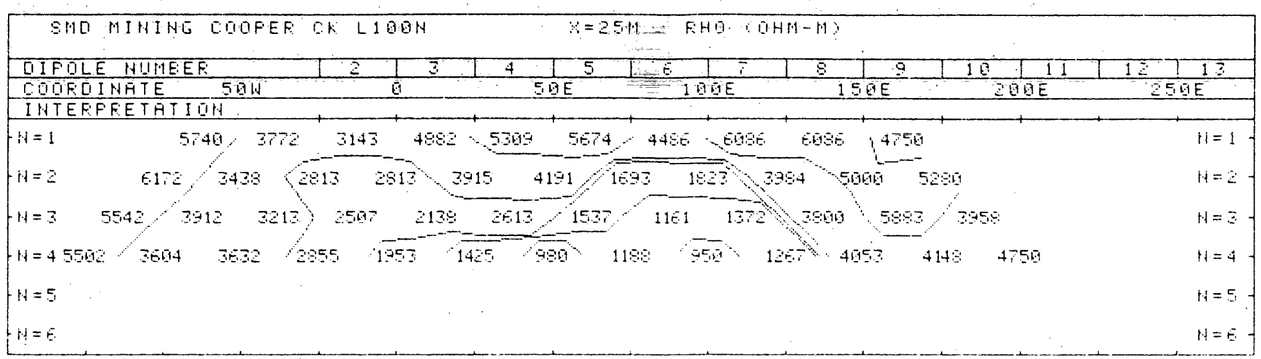
DATE SEPT 24/81

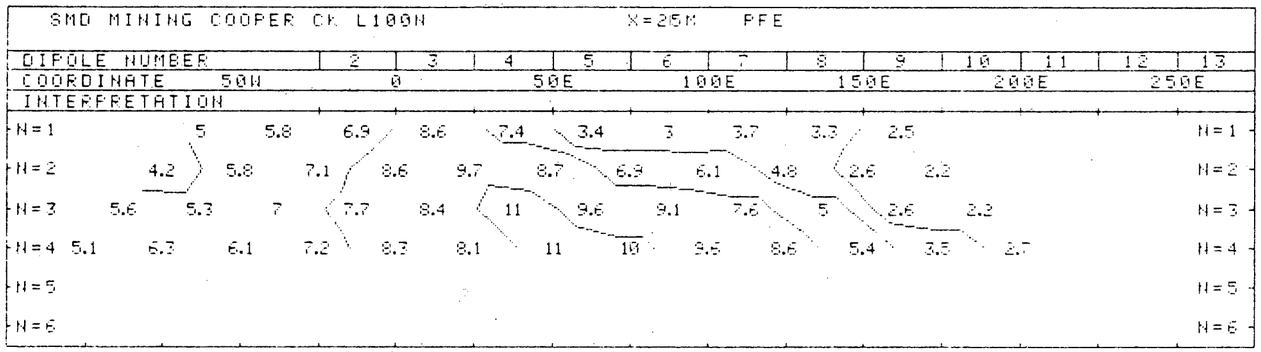
PHOENIX GEOPHYSICS LTD.

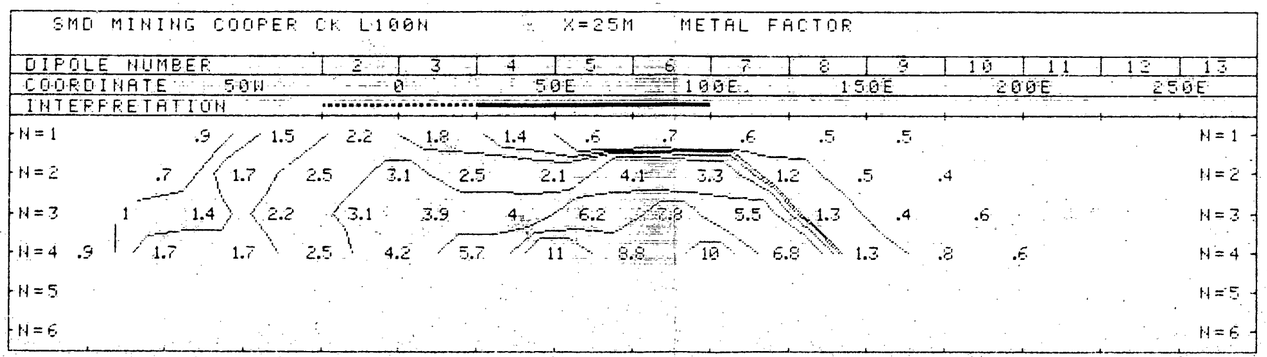
INDUCED POLARIZATION

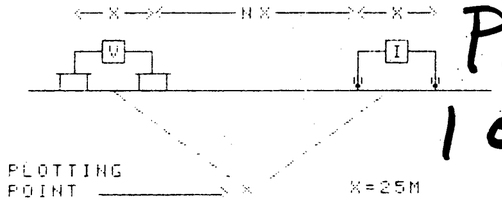
AND RESISTIVITY SURVEY

DWG NO.-I.P.-5805-10









SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

FREQUENCY (HERTZ)
4 0.0.25

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

DATE SURVEYED: JULY 1981

APPROVED

Pac

DATE SEPT 24/81

SMD MINING CO.LTD.

COOPER CK GRID: SLOCAN M.D.

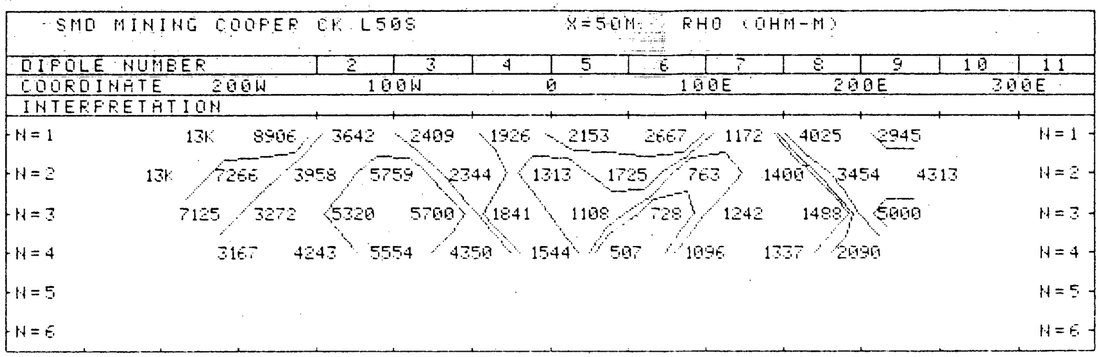
KASLO, B.C.

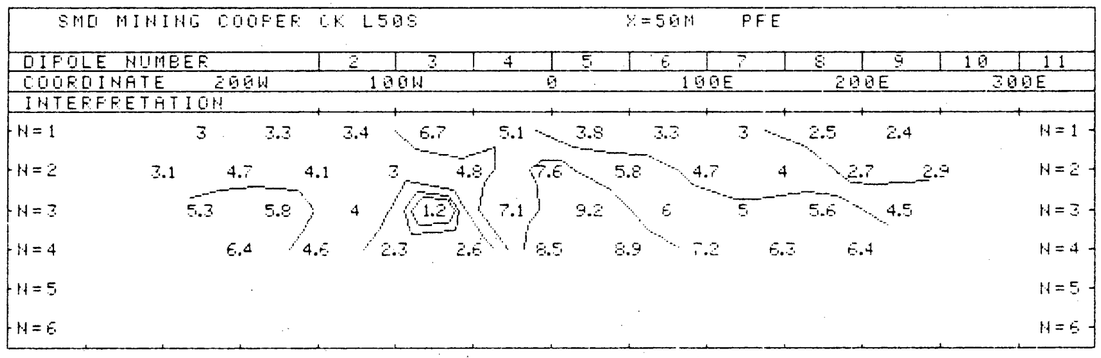
LINE NO. -100N

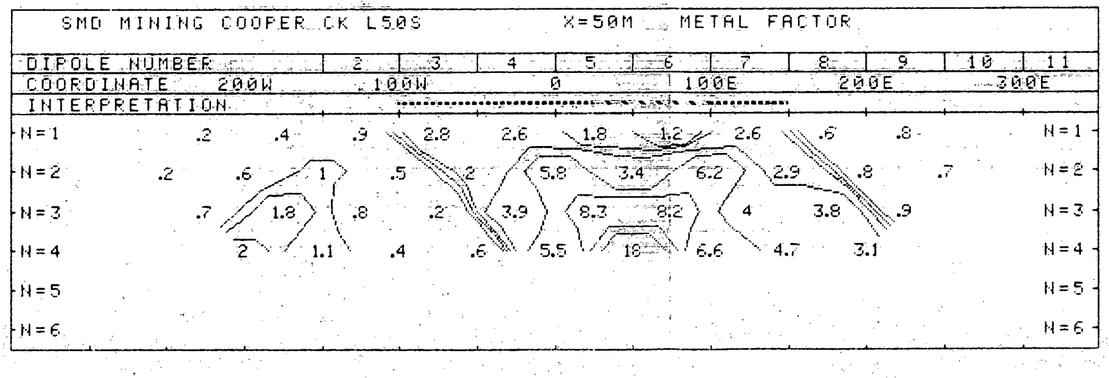
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







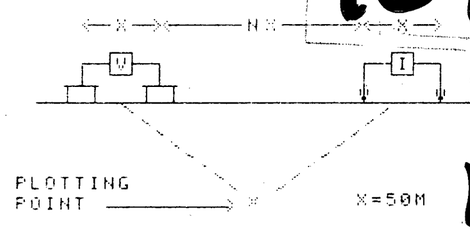
DWG. NO.-I.P.-5805-11

SMD MINING CO.LTD.

COOPER CK GRID;SLOCAN M.D.

KASLO,B.C.

LINE NO.-50S



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE ....
POSSIBLE - - - - - - -

FREQUENCY (HERTZ)
4.0/0.25

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

DATE SURVEYED JULY 1981

APPROVED

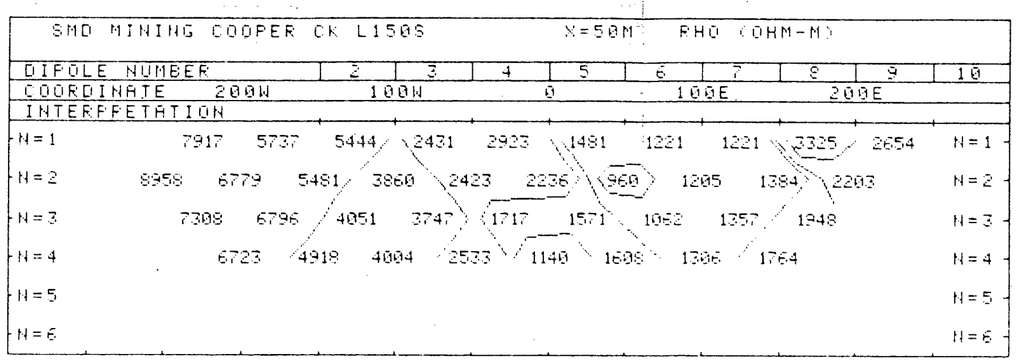
Pac

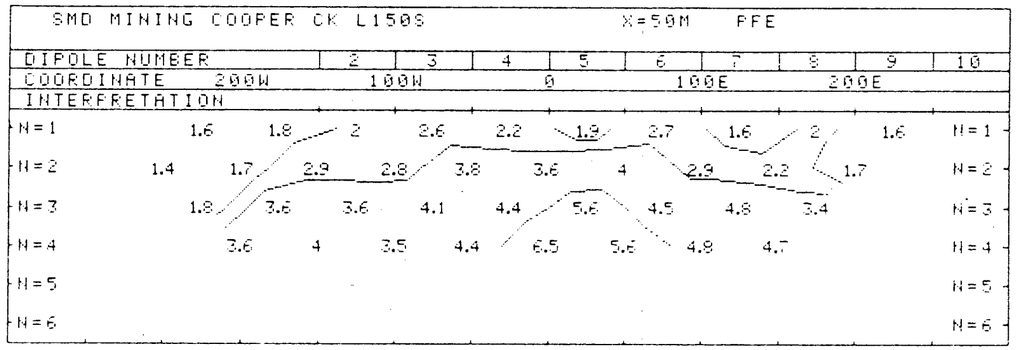
DATE SEPT 24/81

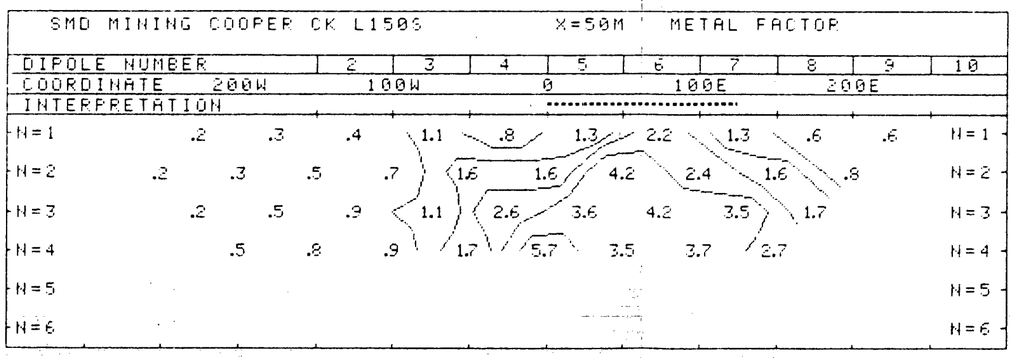
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







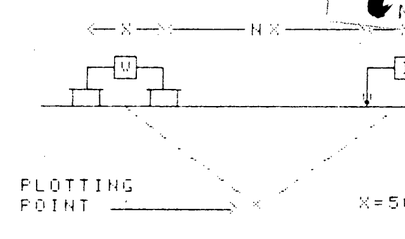
DWG. NO. -I P.-5805-12

SMD MINING CO. LTD.

COOPER CK. GRID: SLOCAN M D

KASLO, B. C.

LINE NO. -150S



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE ....
POSSIBLE - - - - - - -

FREQUENCY (HERTZ)
4 0/0.25

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

DATE SURVEYED: JULY 1981

APPROVED

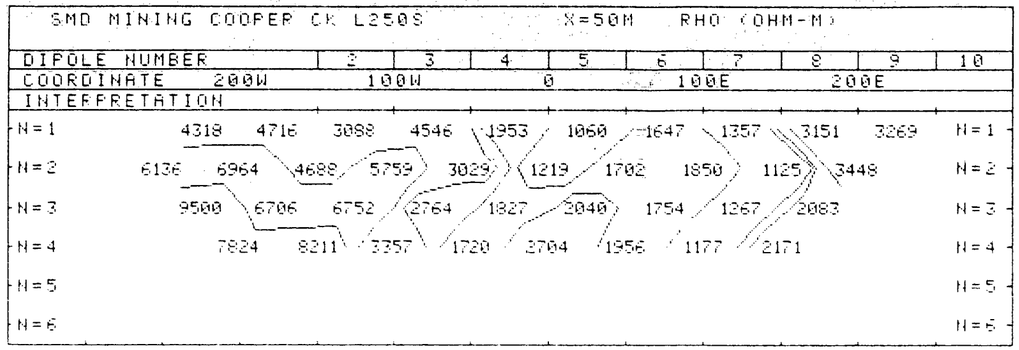
PAC

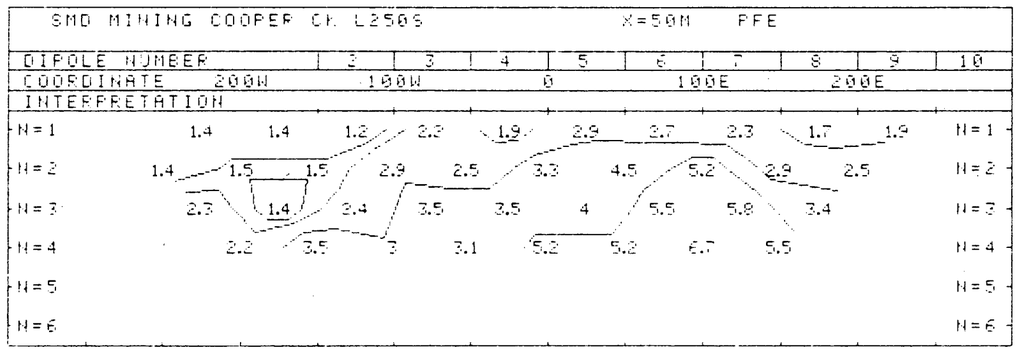
DATE SEPT 24/81

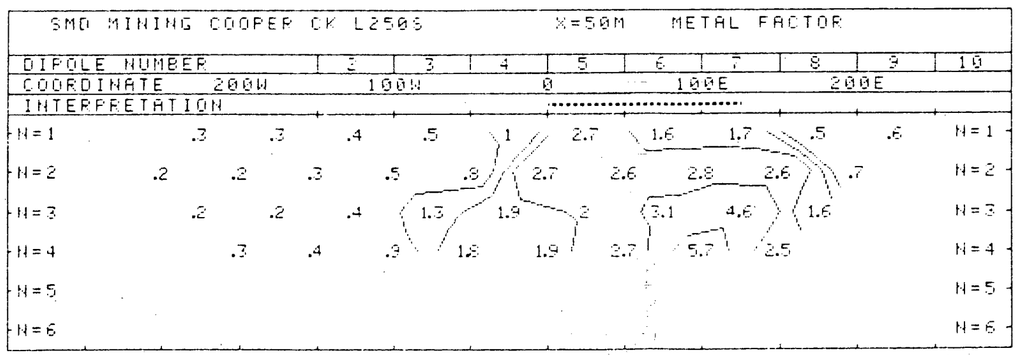
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







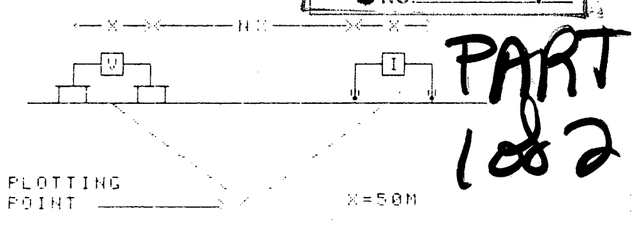
DWG. NO.-I.P.-5805-13

SMD MINING CO.LTD.

COOPER CK GRID:SLOCAN M D

KASLO:B C

LINE NO -2500S



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————
PROBABLE ....
POSSIBLE - - - - - - -

FREQUENCY (HERTZ)
4.0/0.25

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

DATE SURVEYED JULY 1981

APPROVED

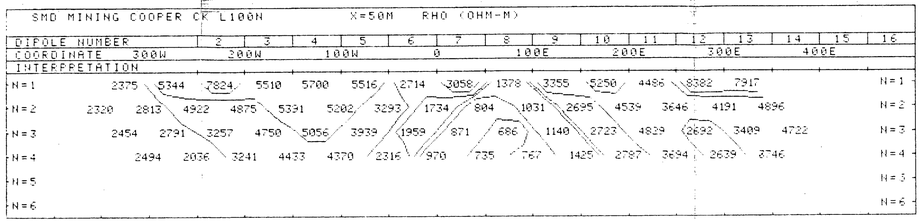
PAC

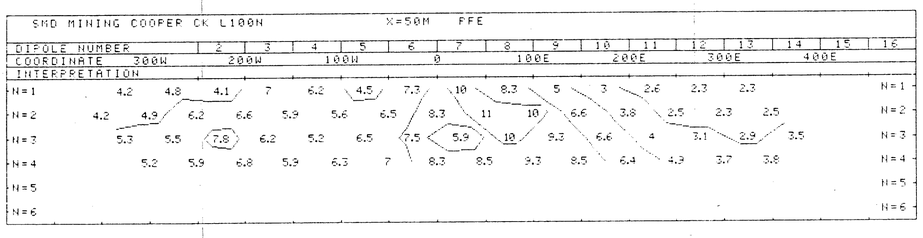
DATE SEPT 24/81

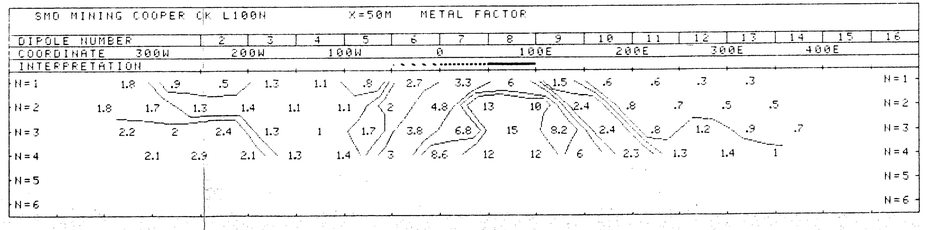
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY







DWG. NO. -I.P.-5805-9

SMD MINING CO.LTD.

COOPER CK.GRID-SLOCAN M.D.

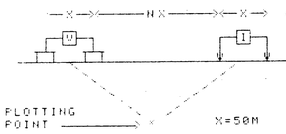
KASLO, B.C.

LINE NO -100N

MINISTRY OF ENERGY MINES & PETROLEUM RESOURCES BRANCH

9697

PART 1 of 2



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——————

PROBABLE ....

POSSIBLE - - - - - -

FREQUENCY (HERTZ)
4.0.0.25

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

DATE SURVEYED JULY 1981

APPROVED

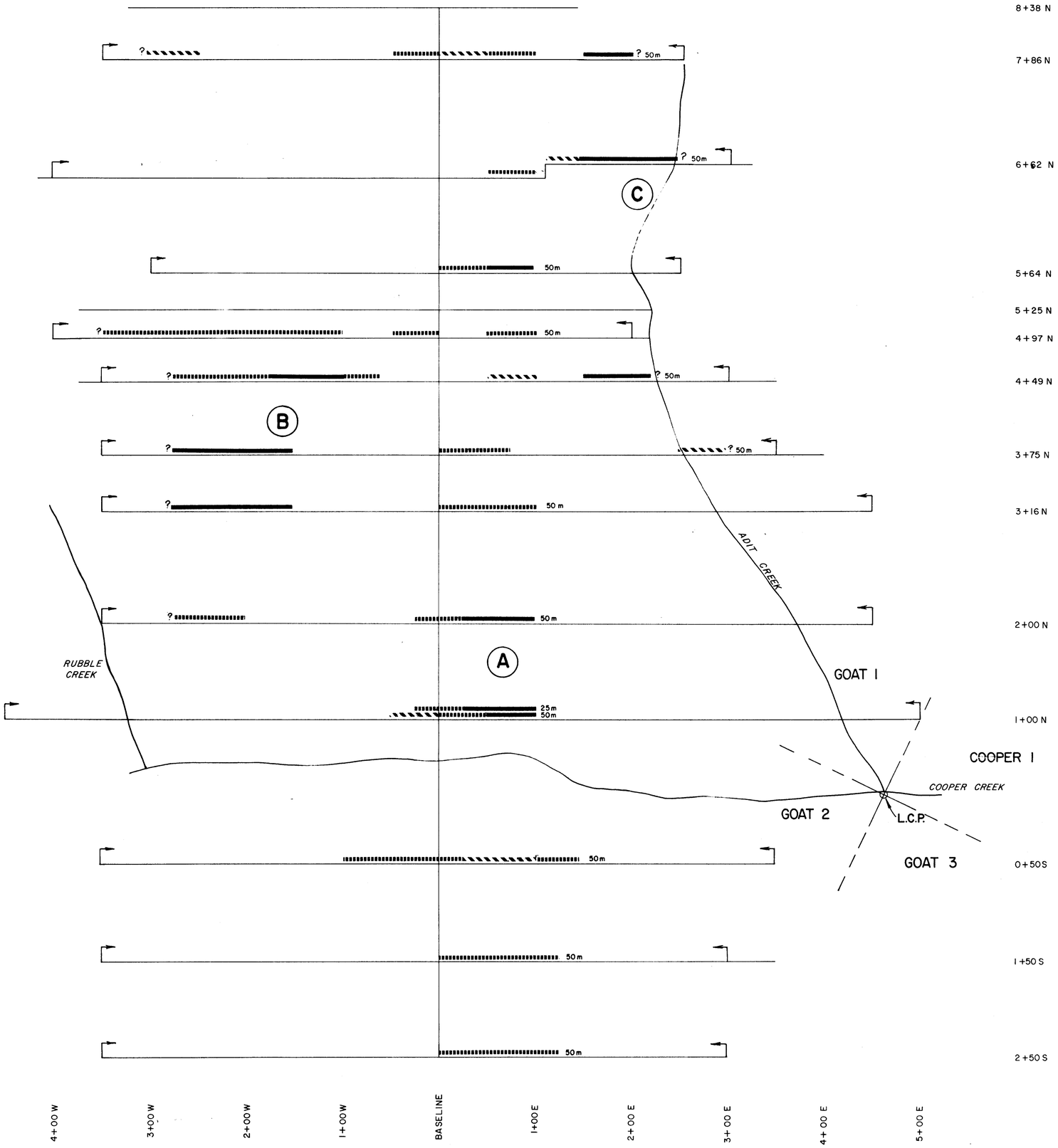
Pac

DATE SEPT 24/81

PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION

AND RESISTIVITY SURVEY



N

PHOENIX GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP

0 25 50 100 200m

LIMIT OF IP COVERAGE (OUTER ELECTRODES)

CENTER OF ANOMALOUS IP ZONE

NO. 9697

PART 1 of 2

APPROVED: T'A-

DATE: SEPT. 24, 1981.

SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE

PROBABLE

POSSIBLE

NUMBER AT END OF ANOMALIES INDICATES SPREAD USED.

SMD MINING CO. LTD.

PROJECT COOPER CREEK	
NTS 82K/3	DISPOSITION
WORK BY D. JIRICKA	SCALE 1:2500
DRAWN R.G.W.	DATE SEPT. 24, 81.

DWG. NO.- I.P.P.-B-3005