VERTICAL MAGNETIC INTENSITY AND

INDUCED POLARIZATION AND RESISTIVITY

ELECTRICAL GEOPHYSICAL SURVEY

Johnson Camp Area

Cochise County, Arizona

For

Cyprus Mines Corporation

October 1968

By

Heinrichs Geoexploration Company
P. O. Box 5671 Tucson, Arizona 85703

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GENERAL LOCATION MAP
of
JOHNSON CAMP AREA
for
CYPRUS MINES CORPORATION

ARIZONA

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GEOPHYSICAL ENGINEERS
SYDNEY VANCOUVER

INTRODUCTION

At the request of Mr. Robert Clayton of Cyprus Mines Corporation, Heinrichs Geoexploration Company conducted a combined induced polarization-magnetic survey over a portion of the Johnson Camp Area, Cochise County, Arizona. Field work was done during the interim September 19 to September 28, 1968.

A total of three spreads of induced polarization coverage were obtained on a line separation of about 1,000 feet and a dipole spacing of 750 feet. This gives a total surface electrical coverage of 27,000 feet of which 15,750 feet is subsurface plotted data.

The lines were oriented approximately on a N68W bearing on a grid established by Mr. Clayton and designed to cross the magnetic low more or less normal to its apparent strike trend. Details of location with respect to the land net and workings are shown on the plan map accompanying this report.

The induced polarization work was done with the dual frequency system utilizing sending frequencies of 0.05 and 3.0 Hz. The electrode configuration used was the symmetrical collinear dipole-dipole array which, on a 750 foot dipole spacing, typically gives resolvable penetration within the zone from about 200 feet to between 900 to 1,200 feet below surface.

The magnetic coverage consists of a 500 foot square grid five stations E-W by 11 stations N-S. The magnetic readings were obtained with an Askania torsion type vertical intensity component magnetometer having a sensitivity of about three gammas.

The purpose of this survey was to validate precisely with a more sensitive magnetometer, a magnetic low delineated previously by Cyprus with a less sensitive magnetometer. The low was verified and subsequently investigated by I. P. to determine its possible sulfide relationship. Also, several electrically responsive structures were delineated which represent effects caused by resistivity interfaces or fundamental contrasts in the rock resistivities involved.

Electrical data are presented on sectional data sheets, one for each spread, showing resistivity, percent frequency effect (PFE), and metallic conduction factor (MCF) contoured in sections. Surface projected electrical anomalism plus the contoured magnetic data is shown on "Vertical Intensity Magnetic and Induced Polarization Location and Interpretation Plan". For additional details as to interpretation theory and presentation of the electrical data see the appended "Basis of the Induced Polarization Method".

Heinrichs personnel involved in the field work were H. Moulinet, Magnetometer operator; M. Critchley, I. P. crew chief, B. Terrill, B. Gaul, and S. Chavez technical assistants. Report and interpretation are by Chris L. Ludwig, Senior Geophysicist with the assistance of the Tucson Geoex staff.

CONCLUSIONS, RECOMMENDATIONS, AND INTERPRETATION

As shown on the plan, a definite magnetic low of about 200 gammas occurs in the southwest corner of Section 24 and has a NE-SW trend. Past work in the area by Cyprus has indicated a relation between copper sulfide mineralization and magnetic lows and therefore further investigation of this low trend with I. P. to determine its possible sulfide association was considered worthwhile.

No definite I. P. response which directly correlates with the magnetic low was encountered. However, there is some very weak and questionable response near the magnetic low which could be related. This anomalism shows on Lines A and B near their centers and suggests a source perhaps deeper than 750 feet and being only slightly polarizable.

Line A shows a very pronounced steeply dipping resistivity interface near 7.5 NW that also shows somewhat subdued near 7.5 NW Line B. This interface is likely a rock type change (fault ?) and may be directly or indirectly causing the magnetic low.

Northwest of the electrical interface there is definite nearer surface (within 500 feet) I. P. anomalism on Lines A and B. The best defined anomalism is seen between 7.5 and 15 NW Line A and indicates a near surface steeply dipping source less than 750 feet in width and with possible fringing effects to the NW. A similar anomaly is noted on Line B alos between 7.5 and 15 NW but the fringe to the NW is more complicated and shows another equally strong narrow anomaly near 30 NW. This nearer surface anomalism is within the area of numerous shafts and surface workings and may be reflecting the mineralization in this area.

Line C is enough different from Line A and B that a structural change between lines B and C is indicated. Line C shows only gradational resistivity variations rather than sharp interfaces. Very weak near surface I. P. anomalism is noted between 0 and 7.5 NW and deeper very weak anomalism is seen NW of 30 NW.

None of this I. P. anomalism suggests strong sulfide. Unless the sulfide actually occurs in several very narrow zones, the anomalism indicates an overall integrated average of one percent total sulfide by volume across the width indicated. Technically, this amount could be caused by some geometric system of occurance which included economic concentrations, however, drilling is not recommended unless there is other supporting encouraging data, at least on a relative basis. Care must be taken in keeping in mind the compartively large volumes represented by each I. P. sample or reading.

It is suggested that further I. P. coverage be obtained mainly to the southwest of the existing coverage to determine if the definite I. P. anomalism increases in strength in that direction or is limited in extent.

In the NW corner of the Section 24 there is an arcuate magnetic high that may be reflecting a magnetite bearing skarn zone or a dike and is perhaps worth further investigation.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig

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Sr. Geophysicist

APPROVED: W E Heinrichs Jr
Walter E. Heinrichs
President and General Manager

October 31, 1968
Tucson, Arizona

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BASIS OF THE INDUCED POLARIZATION METHOD

The induced polarization method is based on the electrical properties exhibited by electronic or metallic conductors embedded in an ionic or electrolytic conducting matrix. These properties are noticed in that the potential across a block of this dual conduction mode material will increase with time, approaching a constant value, when a constant current is made to flow through the block. This phenomenon occurs because at the boundaries between the two conductor types, electrolytic ions have to give up or take on electrons thereby requiring an additional force (overvoltage) over that which would be needed with only one mode of conduction; showing up as a building of potential across the block with time as more ions are backed up. This potential approaches a constant value when an equilibrium is established between the ions backed up at the boundaries and those flowing across the boundaries. Therefore, from the preceeding discussion, it is seen that the gross effect is quite similar to the charging of a leaky capacitor and for most applications, it is proper to use this model as a guide. These capacitive-like properties are normally measured by one of three different field techniques.

In the time domain (pulse) method, a steady direct current is imposed in the ground for a few seconds and abruptly terminated so that the resulting capacitive-like voltage decay (discharge) curve can be measured or recorded. Usually, the voltage decay curve is integrated with respect to time to give the area under the decay curve in units of volt-seconds. This value is then normalized by the primary voltage measured while the steady current is on. The more area determined, the more capacitance or polarization the ground exhibits.

In the frequency domain (dual frequency) method, the percentage difference between the impedance (AC resistance) offered to a lower and higher frequency is measured. A capacitor offers a lower impedance to a higher frequency than it does to a lower frequency, therefore, the percentage difference between the impedances will increase with increased polarization.

A third technique is to measure the phase angle or delay between an introduced current wave-form and the received voltage wave. This phase delay also increases as polarization increases.

Almost all metallic lustered minerals, including most sulfides, for example: pyrite, chalcopyrite, chalcocite, bornite, and molybdenite are electrical conductors. The rocks and groundwater, with which they permeate or are permeated, are also ionic conductors; therefore, if an electrical current is made to flow through a sulfide deposit, it will polarize and often can be detected by the three methods described above.

The induced polarization property is not entirely unique with sulfides since magnetite, graphite (which are both metallic lustered) and some clays will exhibit it; however, with sufficient geological and geophysical data, effects due to sulfides can generally be interpreted apart from non-sulfide anomalism. The type of sulfide however, say pyrite, as distinct from chalcopyrite, cannot yet be distinguished with present induced polarization techniques since all types give quite similar response.

The I.P. technique was developed primarily for porphyry type deposits and is perhaps the only reliable means of detecting hidden disseminated sulfides. However, the I.P. method works just as well or perhaps better on semi-massive to massive sulfides, contrary to some of the earlier thinking, for it generally gives increased response with increased volume percentage of sulfide.

FIELD TECHNIQUES AND INTERPRETATION

For routine exploration, we prefer and use the dual frequency system because of its greater simplicity of instrumentation, operation, and greater accuracy as well as simplicity of interpretation. However, all three methods give basically the same results and the choice is either a matter of opinion or highly technical reasons and therefore should be left to the particular application and the geophysicist's discretion.

The two frequencies we most commonly use are 0.05 and 3.0 cycles per second, or so called "D.C." and "A.C." modes respectively. Other frequencies are available with our equipment and are occasionally used when desired. The usual frequency range used is from about 0.01 cps to 10 cps. The lower frequency limit is due to naturally existing, time-varying, telluric (natural earth) currents, and electrode polarization. The upper limit is determined by electromagnetic coupling effects which increase rapidly with increasing frequency.

In our standard reconnaissance field practice, five equally spaced collinear current electrodes are placed in the ground by burying aluminum foil in pits wetted with brine to insure good electrical contact. Observations are made using a symmetrical dipole-dipole electrode configuration where the distance (a) between adjacent receiver (potential) electrode pairs (or dipoles) is kept equal to the distance between adjacent sender (or current) electrode pairs. Generally the receiving dipole is separated by one to six dipole units ("n" separation) from the sending dipole. Figures 1 and 2 indicate this configuration and resulting data plotting positions. A precisely controlled square wave current is sent through a sending dipole at 0.05 and 3.0 cycles per second from which, at the receiving dipole, a "D.C." and an "A.C." voltage is measured respectively. By knowing the geometry involved (the dipole length or spacing and the separation distance between the two receiving-sending dipole pairs), along with the two voltages, an apparent "D.C." and an "A.C." resistivity can be calculated. From these apparent resistivities, their percentage difference is determined, thus giving the Percent Frequency Effect (PFE). A third quantity porportional to PFE and inversely porportional to "D.C." resistivity, called Metallic Conduction Factor (MCF) is computed in order to somewhat normalize PFE for variations in ground conductivity purely as a technical interpretational aid. Formulas for these various quantities are given on page 5.

Selection of electrode spacings [(a) in Fig. 1] is determined by the objectives to be reached in a given survey. This spacing will range from very small (50 ft. or less) for very detailed and shallow surveys, up to 1,000 ft., or occasionally more, for broad, deep reconnaissance work. Other factors involved in the selection of spacing are concerned with the anticipated physical geometry of any possibly existing mineral occurrence. This includes consideration of expected depth of burial to the top of the deposit, the dimensions of the deposit itself, its orientation, strike and dip, etc., as well as its expected electrical properties.

In general, the greater the dipole spacing and "n" separation, the greater the depth penetration and the less the resolution. An average rule of thumb, with a good contrast of electrical properties, using the symmetrical co-linear dipole-dipole system, and having data from 1 through 4 in "n" separations, is that two times the dipole length is the maximum depth of detectable penetration for a body having two or three of its dimensions large in relation to the dipole spacing. However, a body having two or three of its dimensions less than the dipole spacing, and buried more than one spacing probably will not be detectable. A zone, regardless of orientation, having a dimension less than 0.1 the dipole spacing likely will not be detected. Also, zones differing by less than about 30% in electrical conductivity will not be very easily resolved by resistivity measurements, but may still be detected if a polarization contrast exists.

To illustrate the above in more concrete terms, consider a dipole spacing of 1,000 ft. for the following: An overburden of more than 2,000 ft. would likely not allow enough current penetration into bedrock to detect even a large and highly mineralized zone in the bedrock. Also, a sulfide zone lying completely within 200 ft. of the surface generally would not be detected. A spherical or elongated cylindrical body whose diameter is much less than 1,000 ft. would be just out of the range of detectability. A dike-like or sill-like zone whose width is less than

100 ft. probably would not be detected regardless of how it lies relative to the spread.

So far, only the maximum and minimum limits of detection and resolution relative to the various geological and geometrical configurations have been discussed, thus omitting optimum conditions. Generally, we attempt to make the dipole spacing one or two times the expected depth to the target in order to obtain a good electrical response. Of course, where it is suspected that the zone has a good depth extent, say two or three dipole spacings, as is typical of most porphyry type copper deposits, a spacing considerably more than two times the expected depth to sub-outcrop can be used to obtain broader and more rapid coverage, as long as we do not exceed the width. Because of these factors, we usually use 500 to 1,000 ft. dipole spacings in prospecting for porphyry-type deposits.

The field data are interpreted after plotting the PFE, MCF and resistivity as in Figures 1 and 2. These values are then contoured in sections, the resistivity and metallic conduction factor logarithmically (because of the usual large variations in magnitude) and the percent frequency effect on a constant interval. This two dimensional method of plotting gives an additional advantage over the standard profile methods in that easily recognizable patterns are associated with various subsurface geometrical configurations and that lateral variations can be separated from vertical effects. See the four appended examples of plotted field and theoretical sectional data sheets.

It should be realized that there is no definite relation between the vertical scale on these plots and actual subsurface depth. The data point values are a complexly weighted average of the electrical contrast distribution in the vicinity of the sending-receiving dipole pair and contain depth as well as lateral information. About all that can be said is that by increasing the dipole length and the dipole separation ("n" separation) more volume of ground is being affected and therefore more depth penetration.

There are cases where the depth to a subsurface feature can be determined fairly precisely as in the two horizontal layer situation. The field data is compared with theoretical type curves for various resistivity contrasts between the top and bottom layer and various thickness of the top layer until a close match is found. This enables the depth to the bottom layer in the field to be determined as well as the true resistivity of both layers. A major limitation of this interpretational technique is that only a few simple geometric cases related to a relatively few numbers of layers have been theorectically developed. However, extremely valuable information can still be derived in alluvial and lake bed applications for depth to bedrock and groundwater purposes, etc.

In interpreting PFE's, values of 0 to 4% are usually considered background, 4 to 8% marginally anomalous, and 8 to 40% plus definitely anomalous, but they must be considered in light of the associated resistivity. Very low resistivities give an increased background frequency effect due to an electromagnetic inductive coupling interference phenomenon that must be corrected for. The MCF tends to correct any high resistivity increased background effects, but tends to amplify the electromagnetic frequency effects making a correction imperative.

<u>FORMULAS</u>: PFE = $[\rho_{dc}/\rho_{ac}-1]\ 100$

Where PFE is Percent Frequency Effect, ρ_{dc} is the apparent resistivity at the lower frequency and ρ_{ac} is the higher frequency apparent resistivity.

$$\rho = 2\pi V K_n / I$$

Where ρ is either ρ_{dc} or ρ_{ac} depending on frequency of the current I which is measured in amperes. The potential V, arising from I, is measured in volts. K_n is the geometric factor given by:

$$K_n = \tfrac{1}{2}an(n+1)(n+2)$$ (Only for dipole-dipole arrays.)

Where "a" is the dipole spacing in feet and "n" is the number of dipoles separating the sending and receiving dipoles; this gives, for apparent resistivity:

$$\rho = [2\pi V/I][\tfrac{1}{2}an(n+1)(n+2)]$$

from which we see that ρ is in units of ohm-feet. However, the apparent resistivity usually is plotted: $\rho/2\pi$

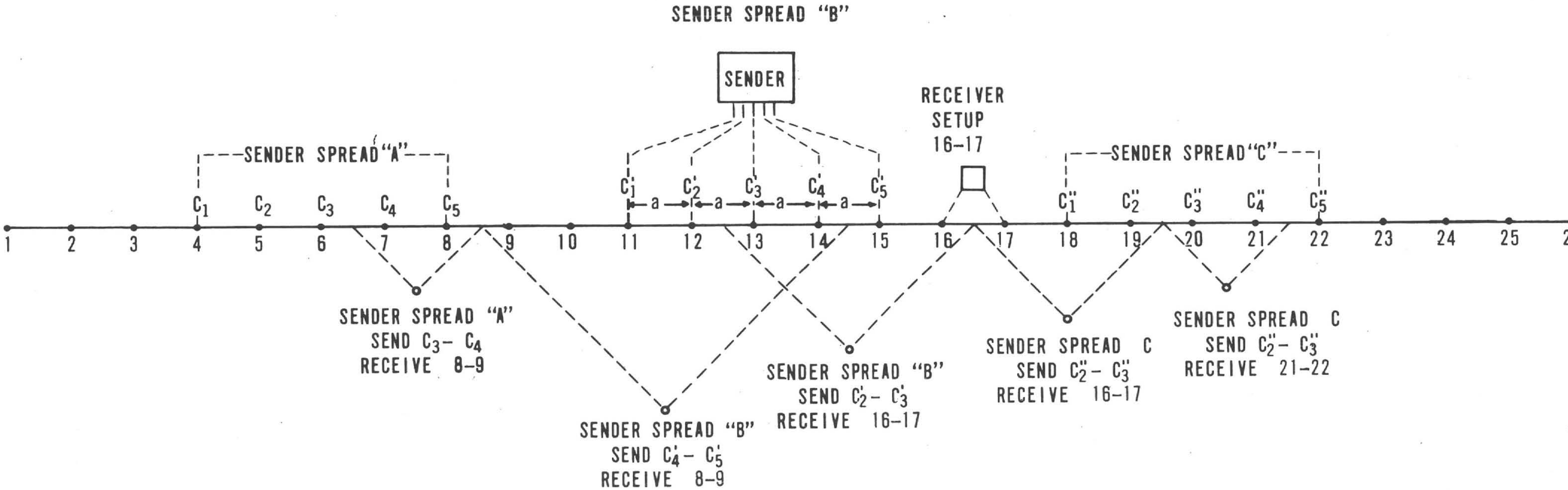
$$\rho/2\pi = VK_n/I = [V/I][\tfrac{1}{2}an\ (n+1)(n+2)]$$

$$MCF = 1000 \times PFE/[\rho_{dc}/2\pi]$$

Where MCF is the Metallic Conduction Factor and $\rho_{dc}/2\pi$ is apparent "D.C." resistivity.

References:
1. Wait, James R., "Overvoltage Research and Geophysical Applications", Pergamon Press, 1959.
2. "Mining Geophysics", Society of Exploration Geophysicists, Vol. I, Case Histories, October 1966.

Published by W. E. Heinrichs, Jr., et al., Engineering and Mining Journal, September 1967.



SCHEMATIC DIAGRAM ILLUSTRATING THE METHOD OF OBTAINING AND PLOTTING DIPOLE-DIPOLE I.P. DATA

Diagram shows three separate current electrode spreads along a traverse line. In normal procedure, there are three dipole separations between current electrode spreads. The receiver setups are moved outwards from the ends of each current electrode spread usually until three dipole spacings separate the potential electrode setup from the near end of the spread. Current is "sent" to each possible pair of electrodes for each receiver setup. For instance, in Sender Spread "B" when the receiver setup is between 14 and 15 only $C'_3 - C'_2$ and $C'_2 - C'_1$ can be "sent" so that data at 1 and 2 dipole separations is obtained respectively When the receiver is setup between 16 and 17; $C'_5 - C'_4$, $C'_4 - C'_3$, $C'_3 - C'_2$ and $C'_1 - C'_2$ are sent and data is obtained for 3, 4, 5 and 6 dipole separations respectively. Each sender spread provides 33 data points.

Fig. 1

(DATA POINTS OBTAINED FROM THE THREE SPREADS OF FIGURE 1)

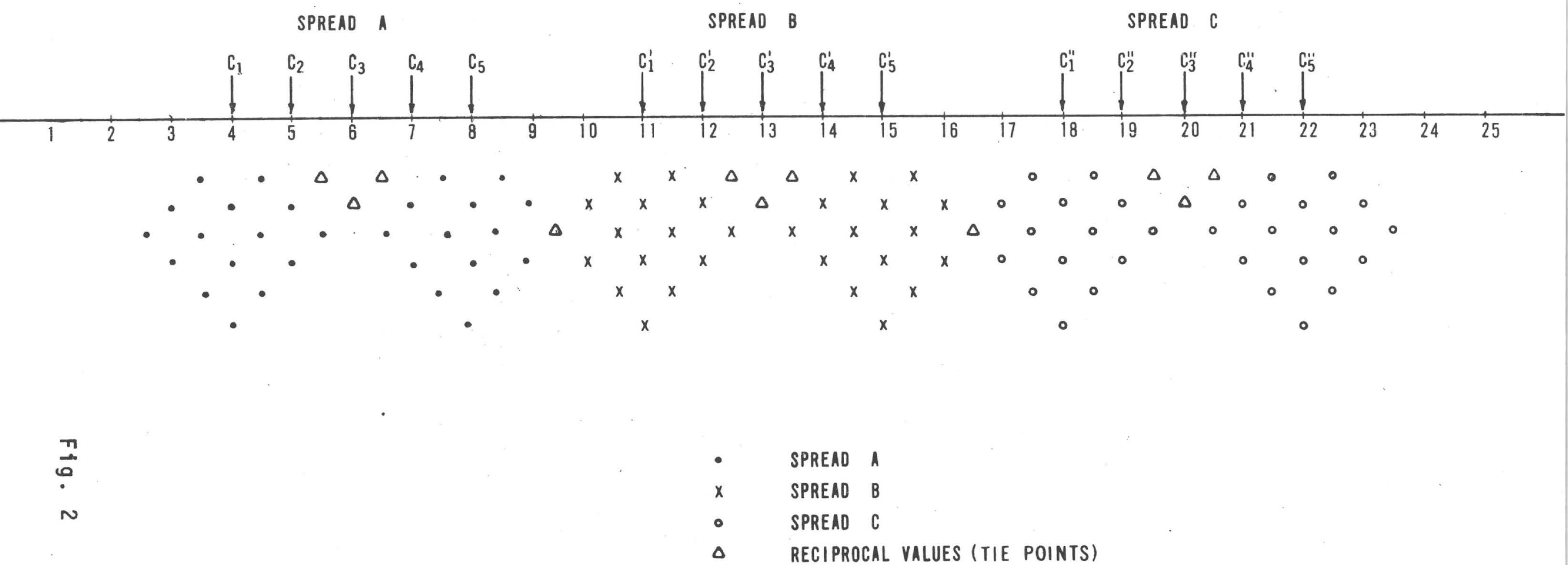
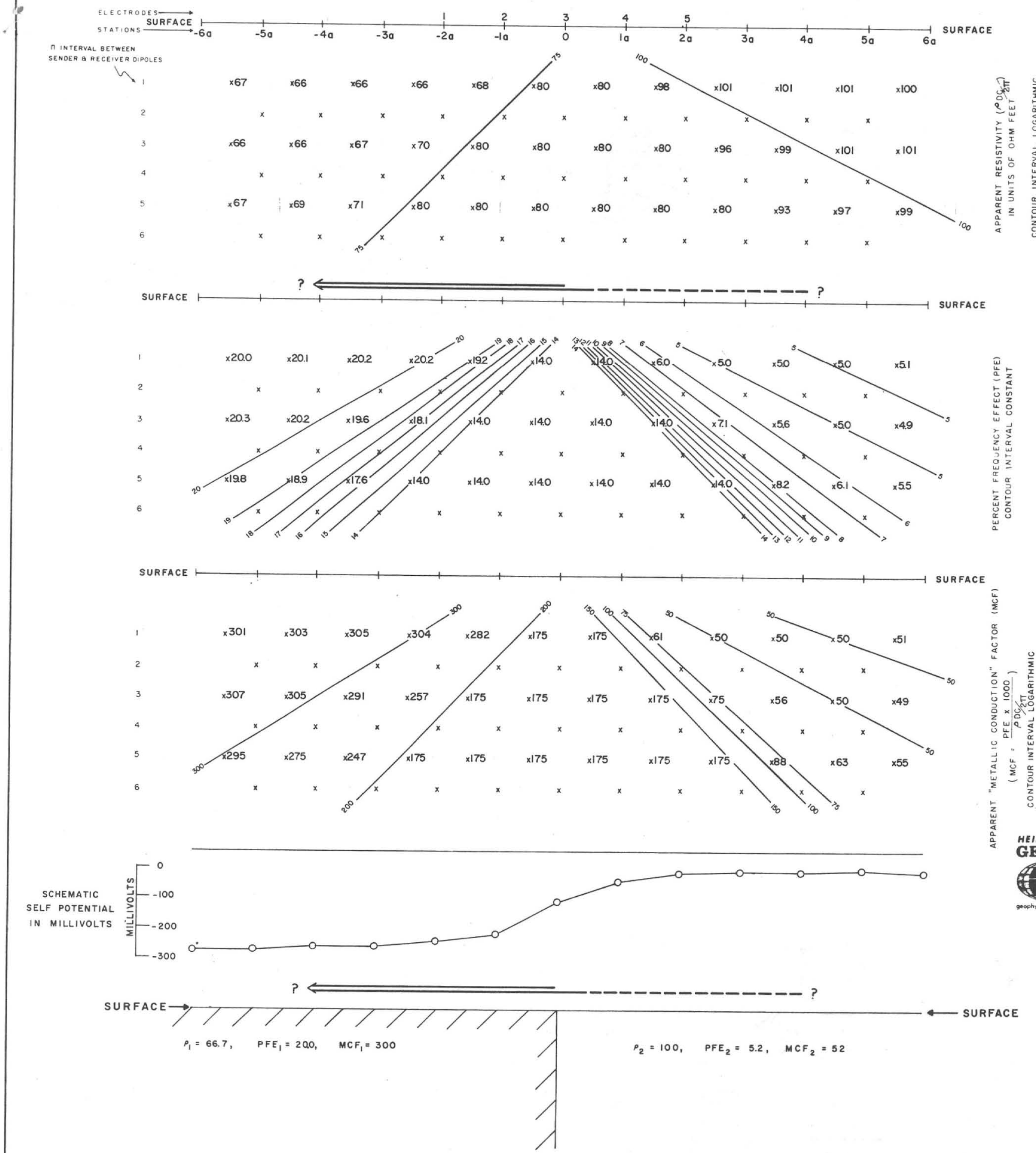
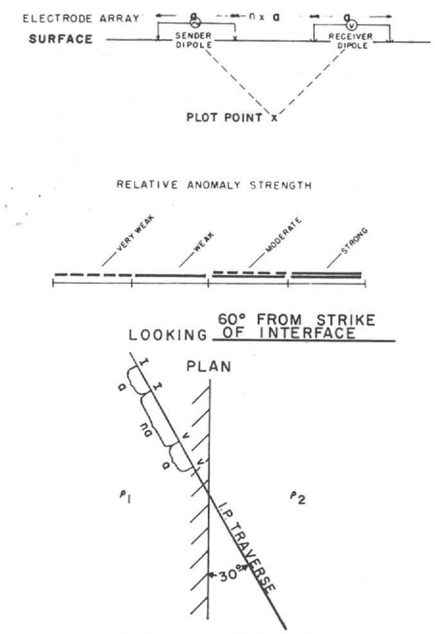


Fig. 2



EXPLANATION



VERTICAL INTERFACE

SECTIONAL DATA SHEET

LINE NO. ——

INDUCED POLARIZATION TRAVERSE

SCALE: 1" = a

DATE: ——

FOR ——

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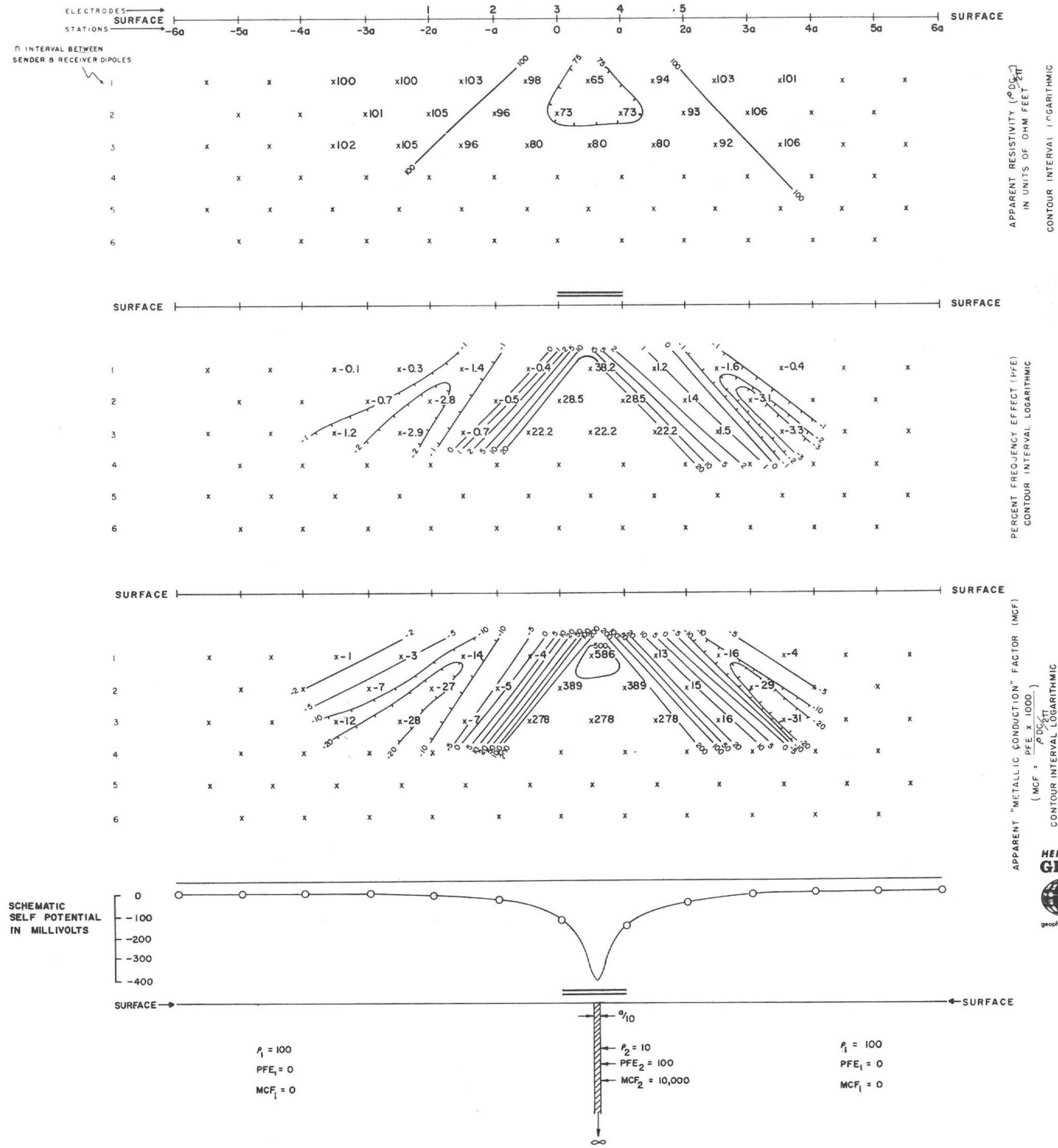
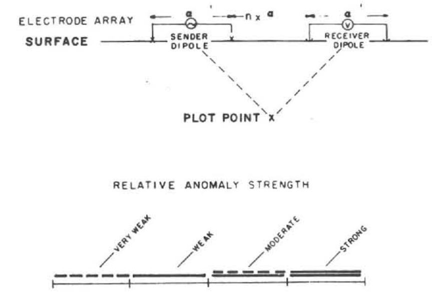
THEORETICAL INDUCED POLARIZATION TRAVERSE ACROSS A VERTICAL INTERFACE AT 30° – DIPOLE-DIPOLE ELECTRODE ARRAY.



EXPLANATION



LOOKING NORMAL TO STRIKE

VERTICAL

TABULAR BODY

SECTIONAL DATA SHEET

LINE NO. ——

INDUCED POLARIZATION TRAVERSE

SCALE: 1" = a   DATE: ——

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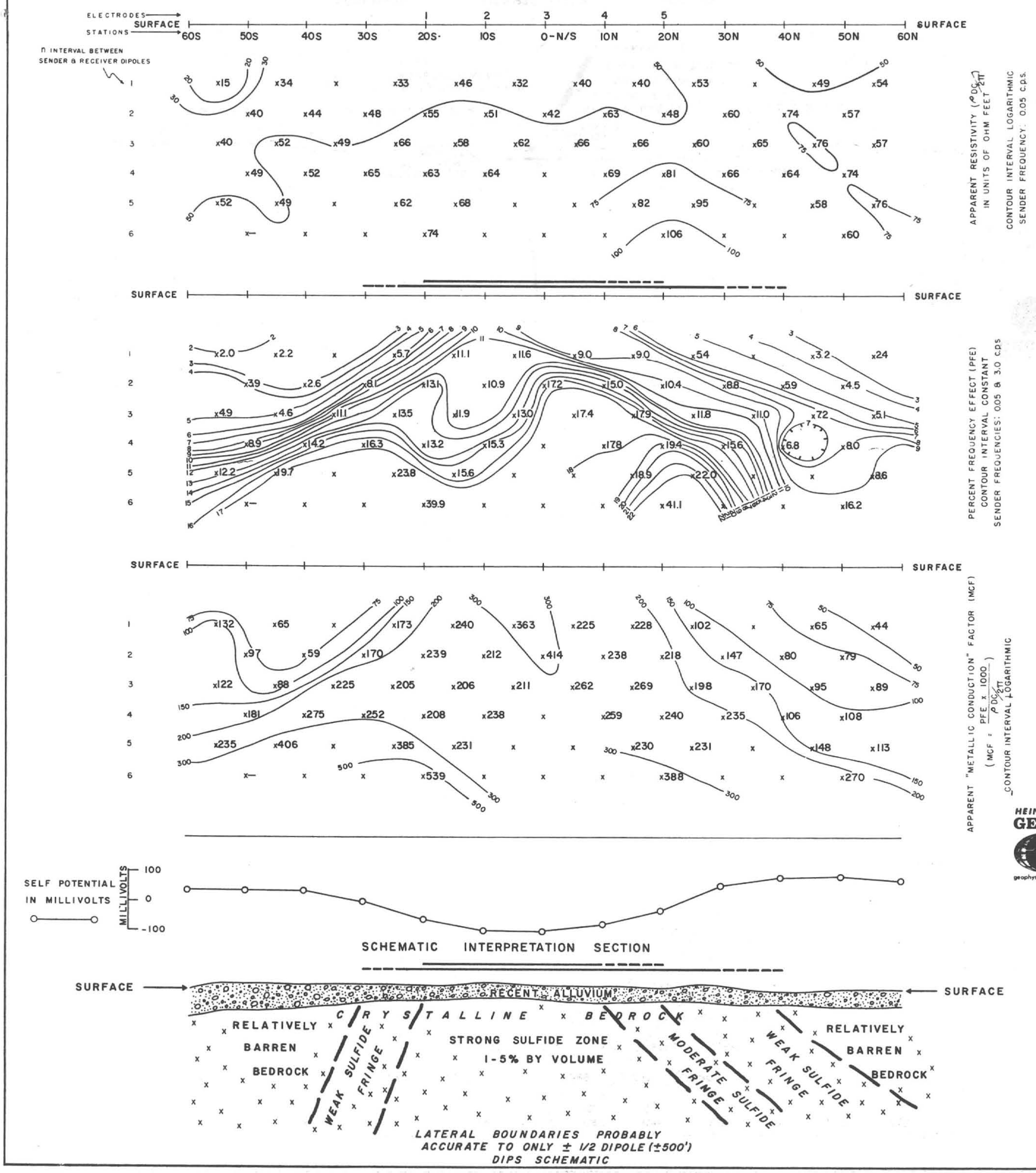
THEORETICAL DIPOLE-DIPOLE INDUCED POLARIZATION RESPONSE OVER A CONDUCTIVE VERTICAL TABULAR SULFIDE BODY CROSSED NORMAL TO THE STRIKE [HAVING A THICKNESS OF 1/10 THE ELECTRODE SPACING (a), A RESISTIVITY CONTRAST OF 10:1, A BACKGROUND RESISTIVITY (ρ_1) OF 100, A BACKGROUND PFE_1 OF 0, AND A PFE_2 OF 100 IN THE SULFIDE ZONE]



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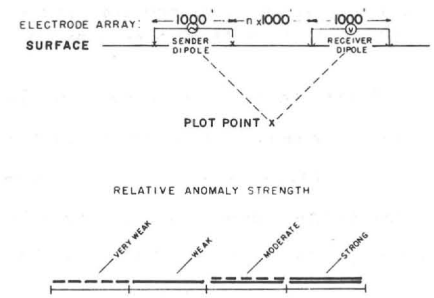

LOOKING WEST

PIMA MINING DISTRICT
PIMA COUNTY, ARIZONA

SECTIONAL DATA SHEET
LINE NO. —
INDUCED POLARIZATION TRAVERSE

SCALE: 1" = 1000' DATE: —

FOR ______

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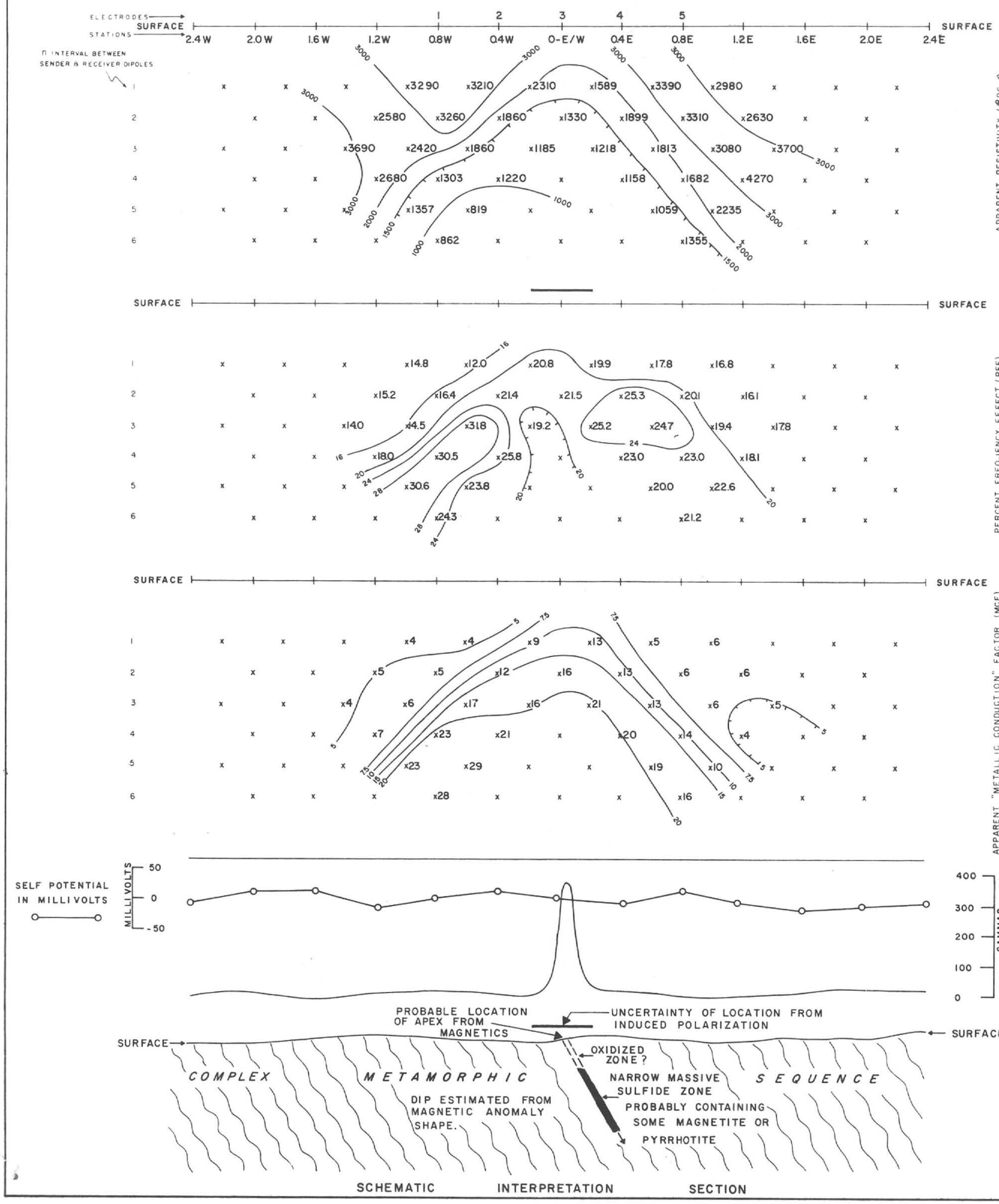
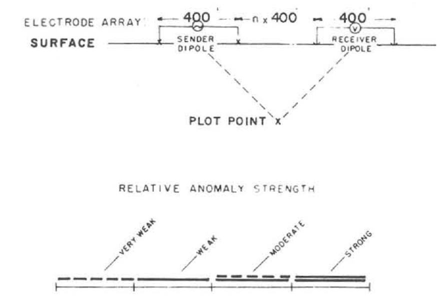
ACTUAL FIELD EXAMPLE OF INDUCED POLARIZATION TRAVERSE OVER DISSEMINATED PORPHYRY TYPE SULFIDE MINERALIZATION



EXPLANATION



LOOKING NORTH

MASSIVE SULFIDE VEIN

APPALACHIAN SULFIDE DISTRICT

SECTIONAL DATA SHEET

LINE NO. —

INDUCED POLARIZATION TRAVERSE

SCALE: 1" = 400' DATE: —

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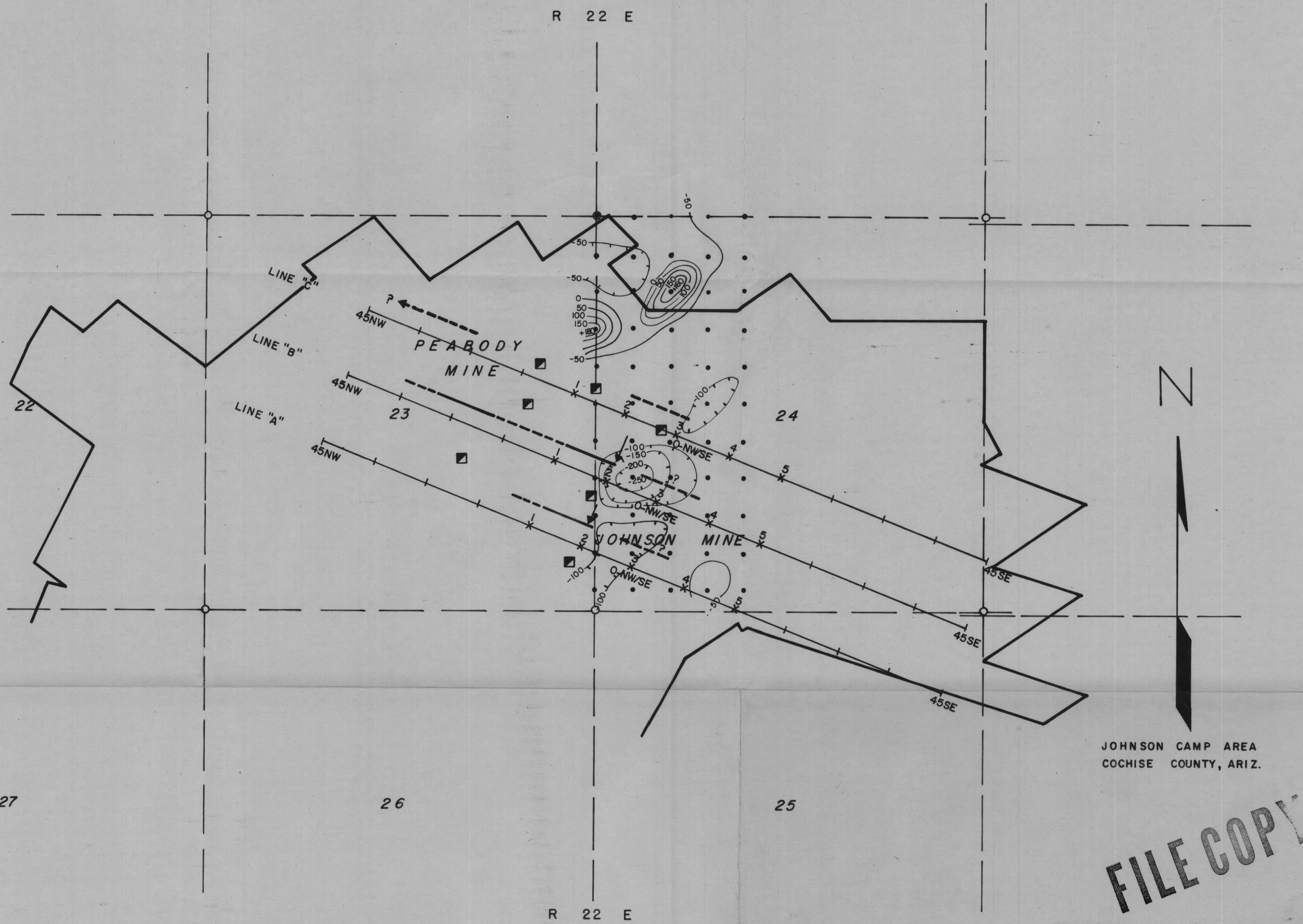
ACTUAL FIELD EXAMPLE OF COMBINED INDUCED POLARIZATION, RESISTIVITY, MAGNETIC AND SELF POTENTIAL SURVEY ACROSS A NARROW-STEEPLY DIPPING MASSIVE SULFIDE VEIN.

NOTE: INDUCED POLARIZATION ANOMALY ONLY INDICATES A STEEP BUT UNKNOWN DIP. DEPTH TO SULFIDES PROBABLY BETWEEN 200 AND 400 FEET BASED ON ROUNDED APPEARANCE OF INDUCED POLARIZATION ANOMALY AND LACK OF SELF POTENTIAL RESPONSE.



NOTE: THIS BASE MAP OVERLAYS CYPRUS MINES CORP. MAP NO. JX-2000.

LEGEND

CONTOUR INTERVAL = 50 GAMMAS

• INDICATES MAGNETIC STATION

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

I.P. LINE NO. → ② STATIONS — INTERFACE — ELECTRODES

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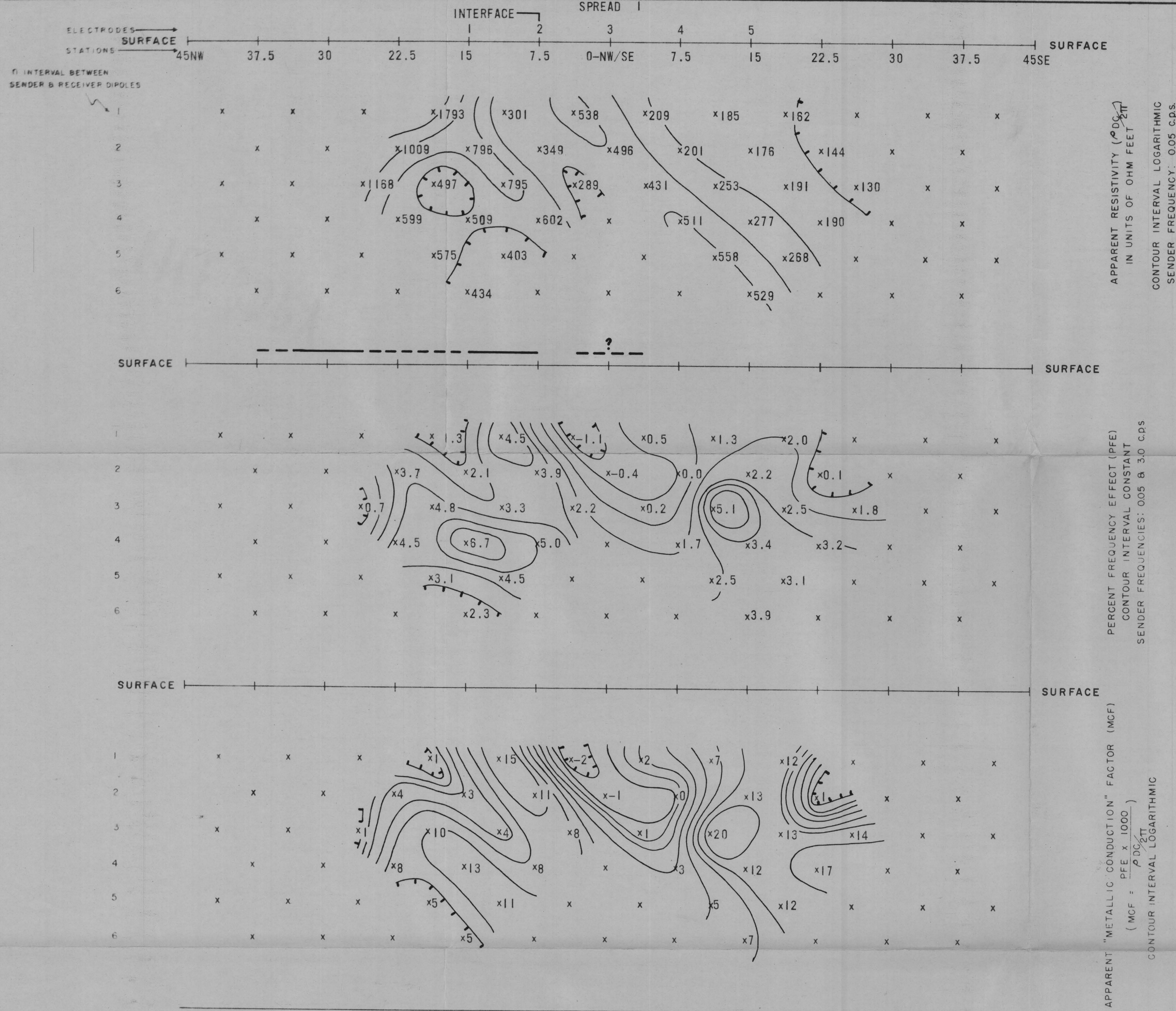
VERTICAL INTENSITY MAGNETIC & INDUCED POLARIZATION LOCATION & INTERPRETATION PLAN

FOR

CYPRUS MINES CORP.

SCALE 1" = 1000'	DRAWN BY H.R.M.	DATE SEPT. 1968



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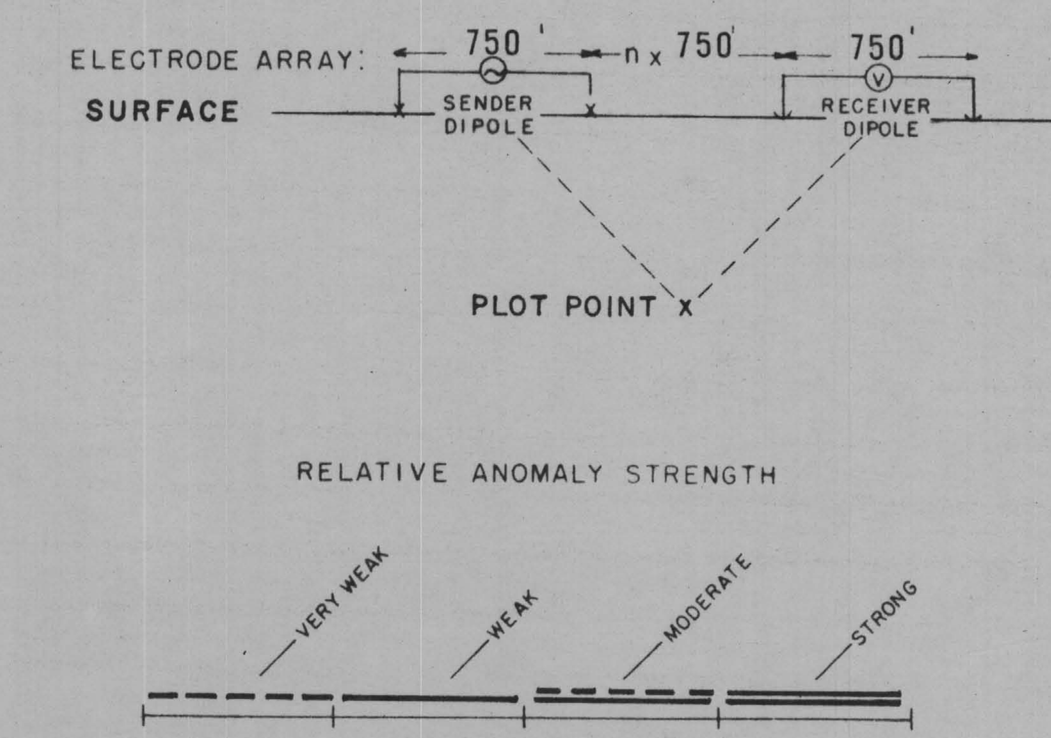

LOOKING N 22° E

FILE COPY

JOHNSON CAMP AREA

SECTIONAL DATA SHEET

LINE NO. B (SPREAD 1)

INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 750' DATE: SEP 1968

FOR

CYPRUS MINES CORP.

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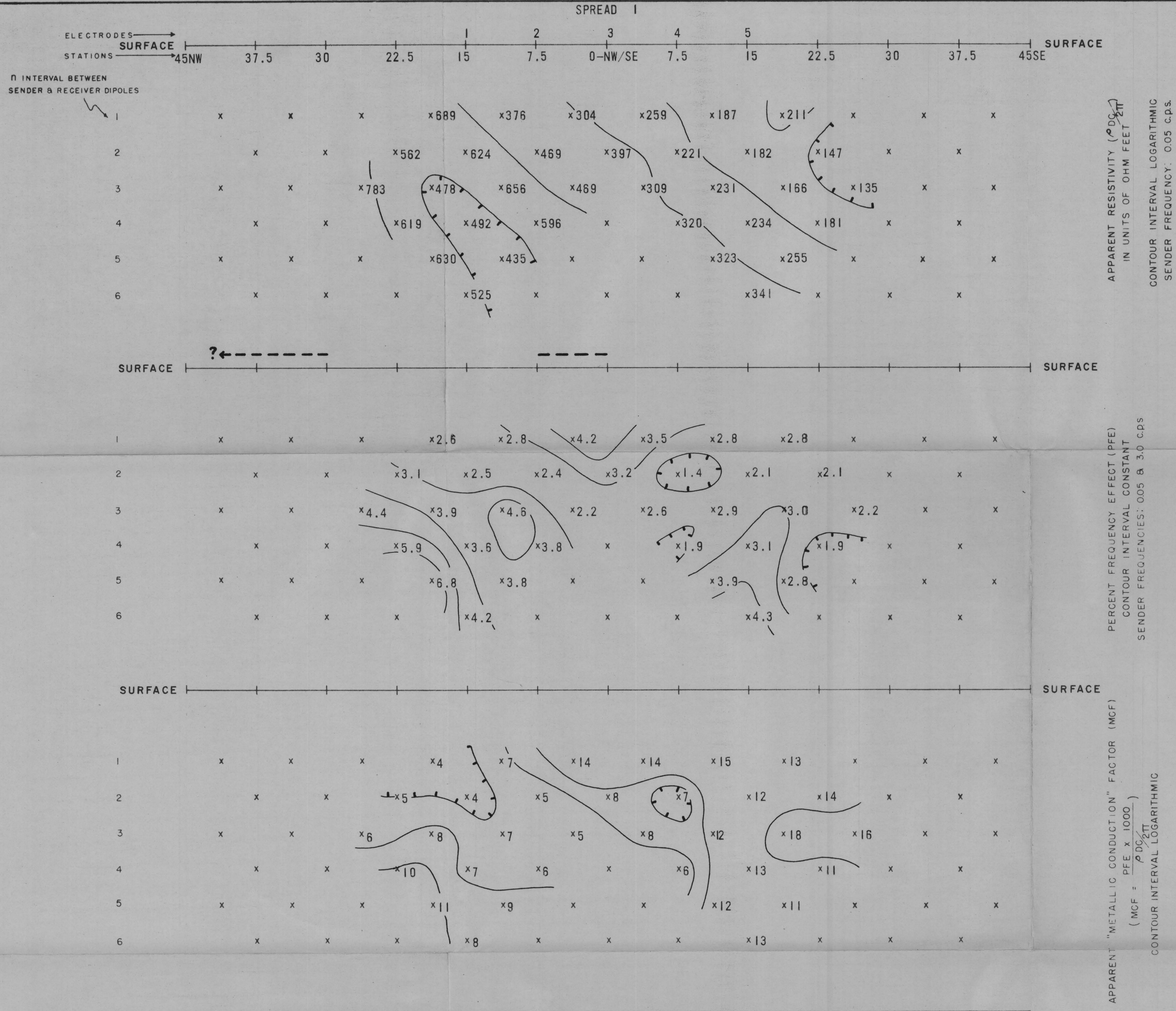

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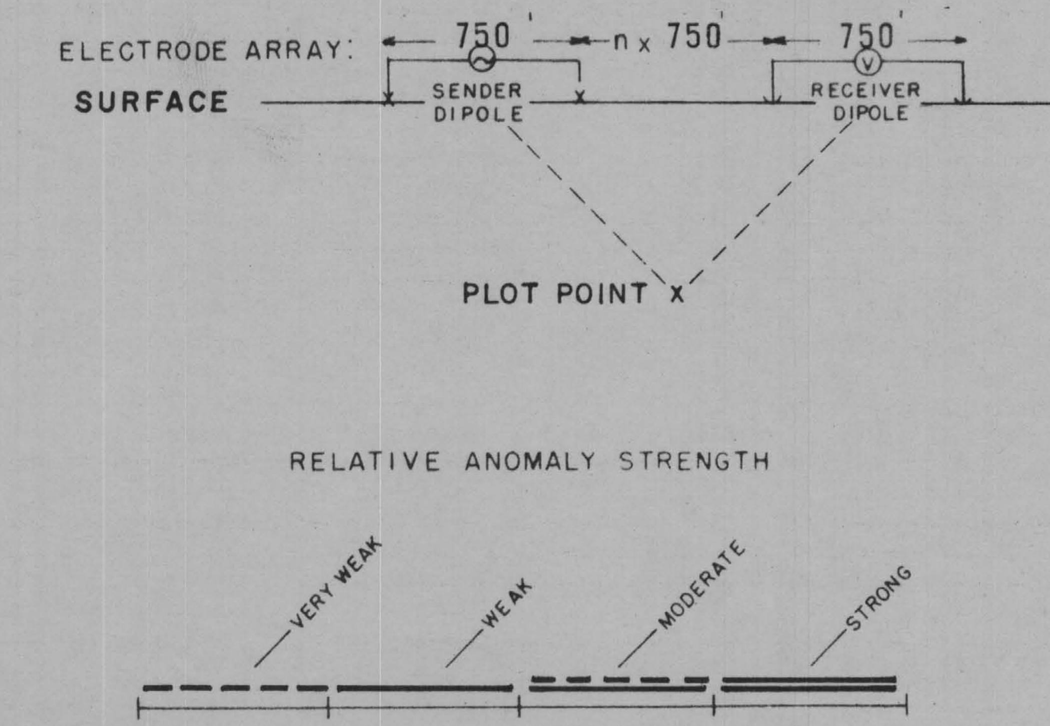

LOOKING N 22° E

FILE COPY

JOHNSON CAMP AREA

SECTIONAL DATA SHEET

LINE NO. C (SPREAD 1)

INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 750' DATE: SEP 1988

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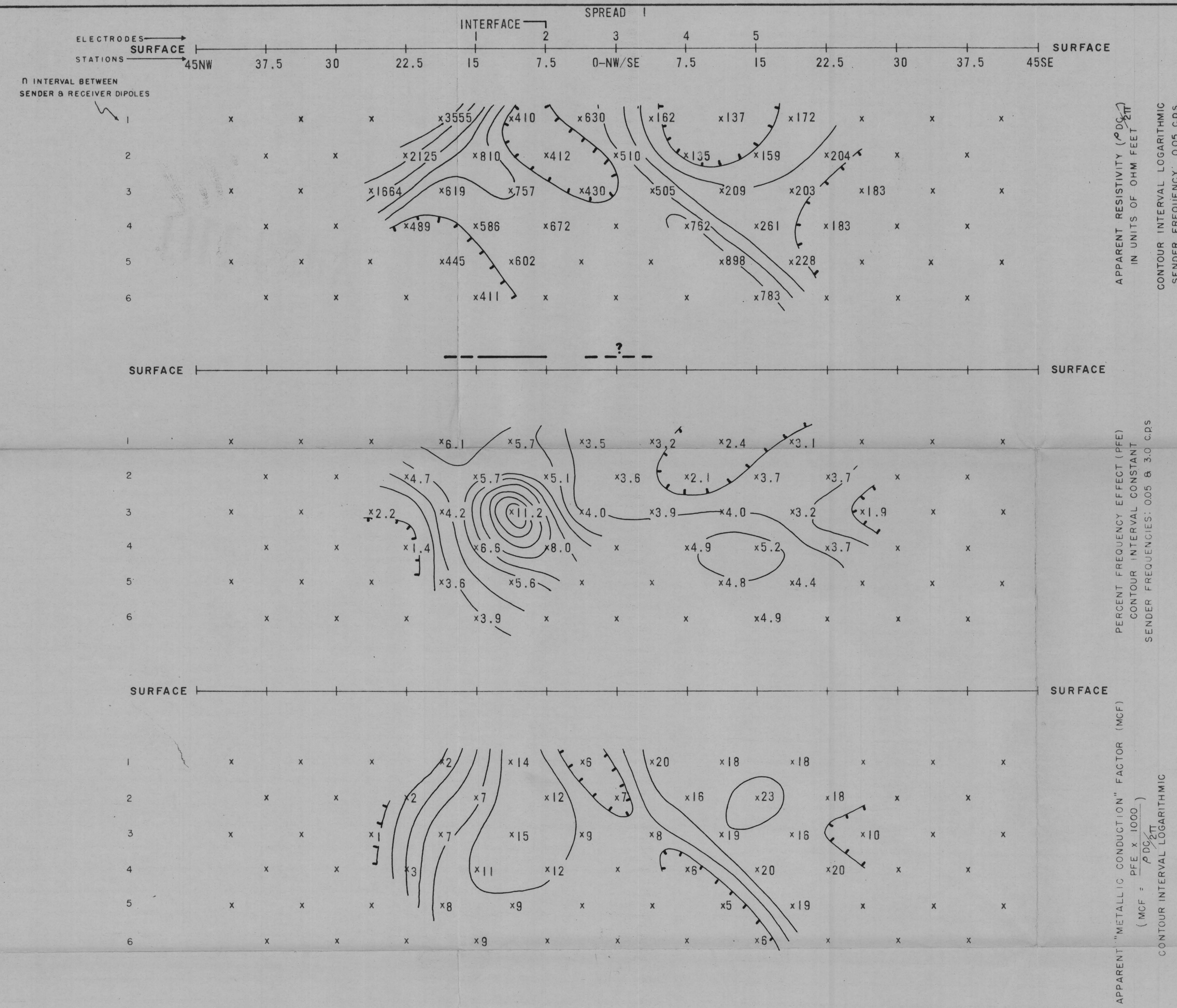

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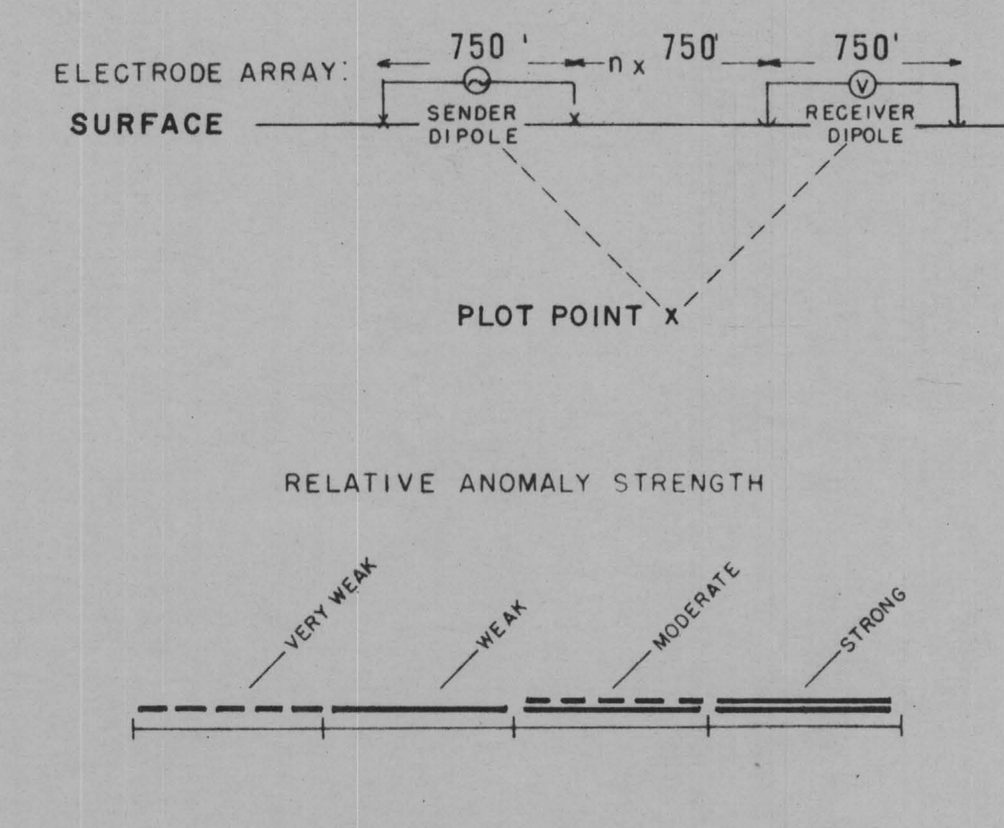

LOOKING N 22° E

FILE COPY

JOHNSON CAMP AREA

SECTIONAL DATA SHEET

LINE NO. A (SPREAD 1)

INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 750' DATE: SEP 1968

FOR

CYPRUS MINES CORP.

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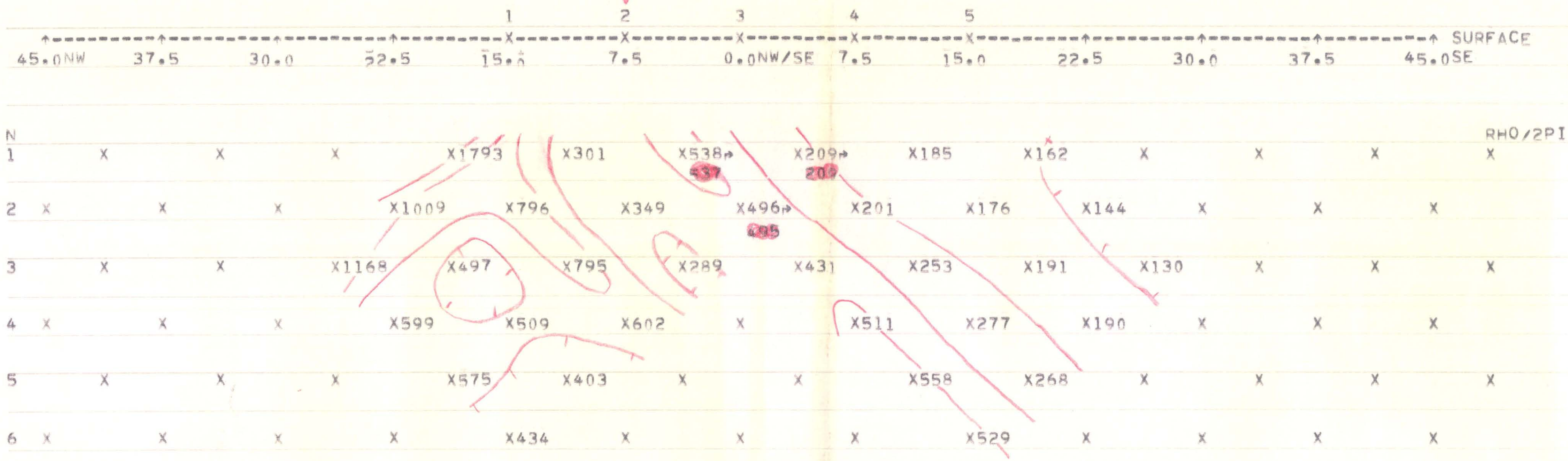
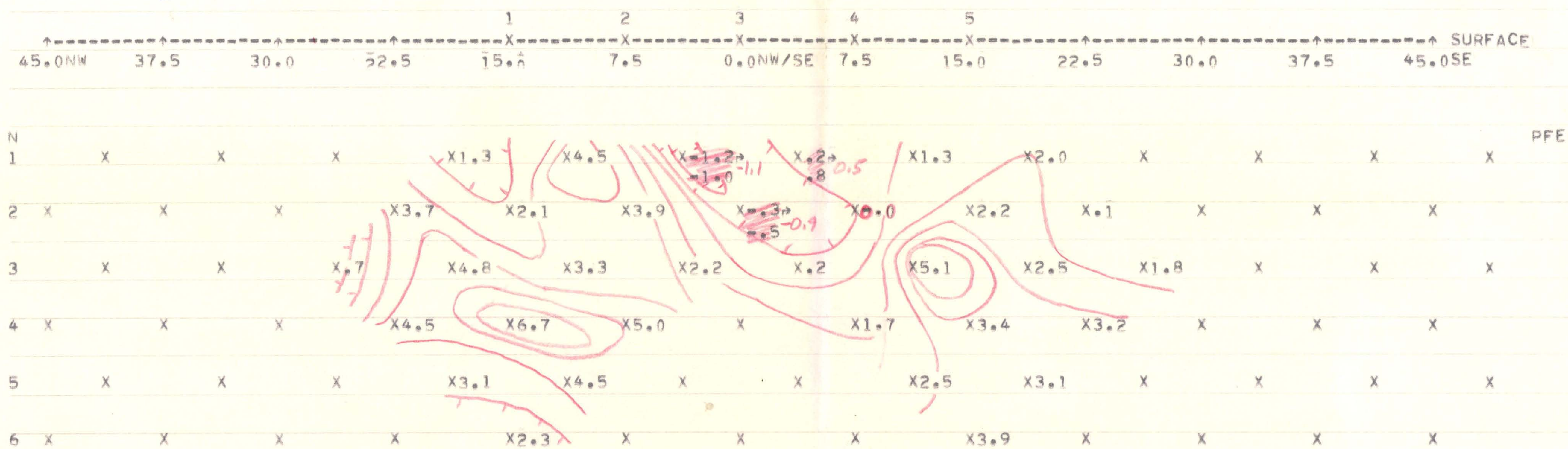
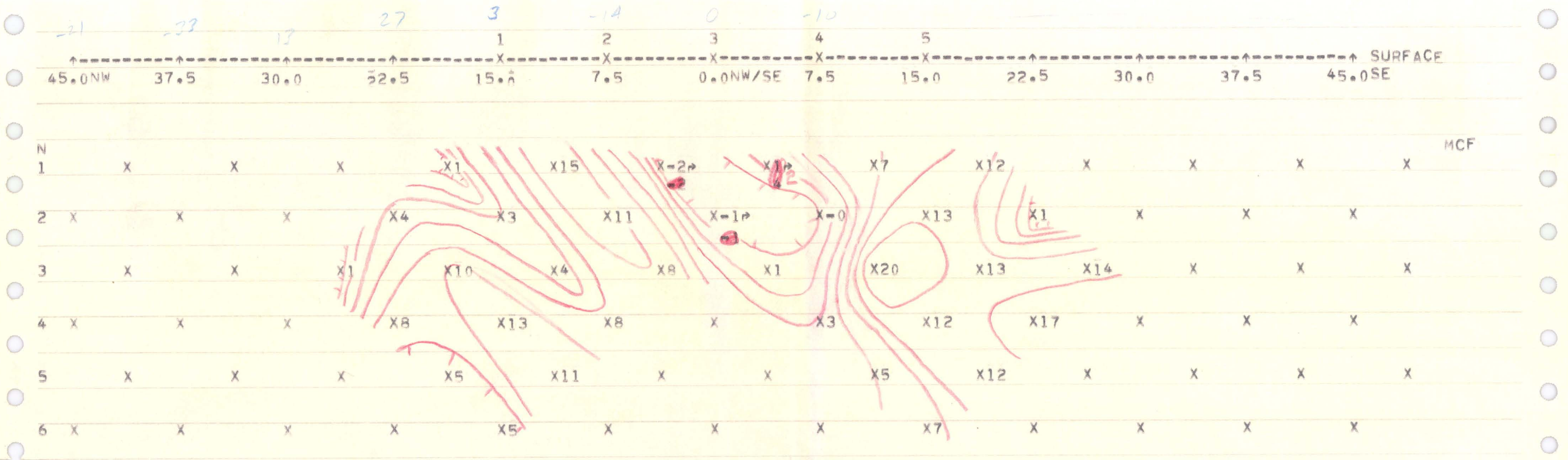
HEINRICHS GEOEX B299-68 LINE B SPREAD 1 LOOKING N22E 9-26-68 A= 750 FEET

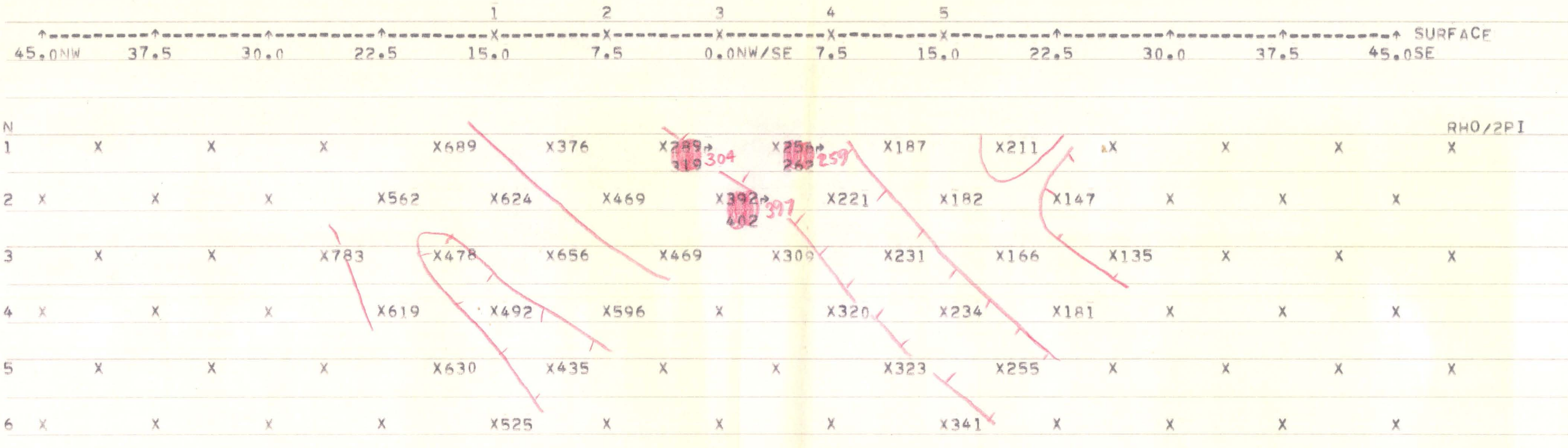


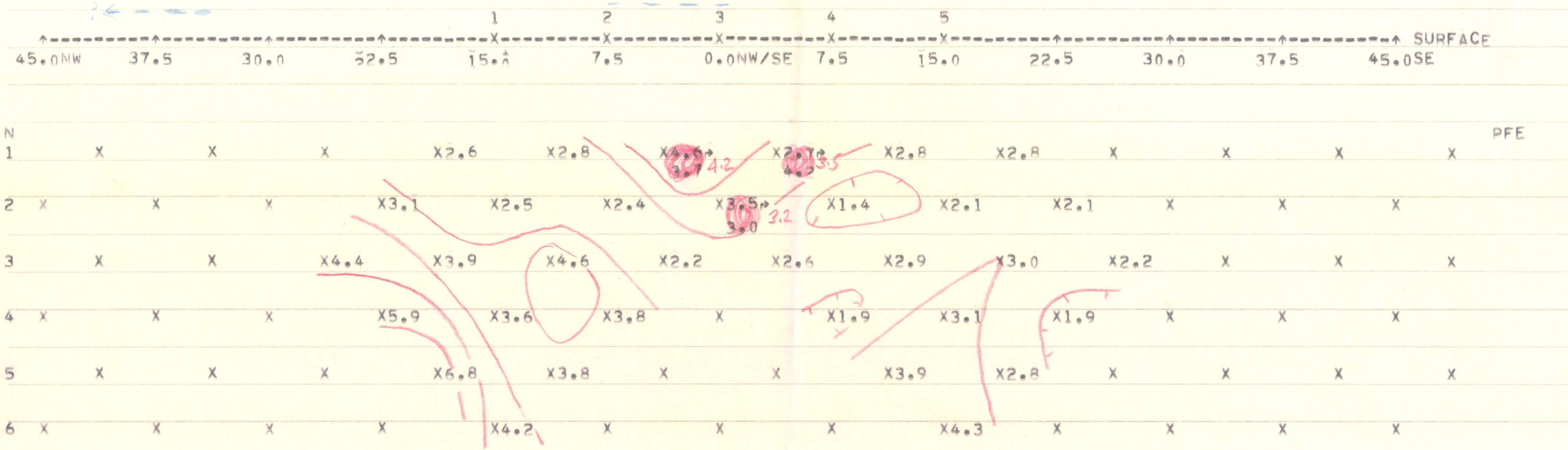


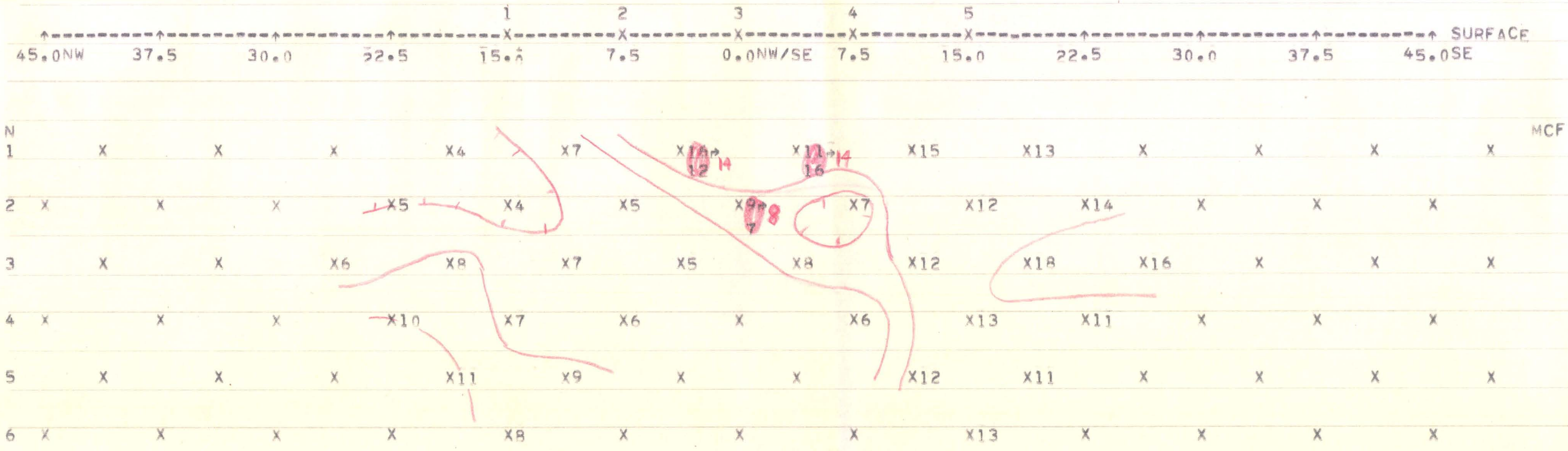


-21 -23 13 27 3 -14 0 -10
1 2 3 4 5
SURFACE
45.0NW 37.5 30.0 22.5 15.0 7.5 0.0NW/SE 7.5 15.0 22.5 30.0 37.5 45.0SE
MCF
N
1 X X X X1 X15 X-2 X1 X7 X12 X X X X
2 X X X X4 X3 X11 X-1 X-0 X13 X1 X X X
3 X X X X1 X10 X4 X8 X1 X20 X13 X14 X X X
4 X X X X8 X13 X8 X X3 X12 X17 X X X
5 X X X X5 X11 X X X5 X12 X X X X
6 X X X X X5 X X X X7 X X X X

HEINRICHS GEOEX   8299-68   LINE C   SPREAD 1   LOOKING N22E   9-27-68   A= 750 FEET






1 2 3 4 5
SURFACE
45.0NW 37.5 30.0 22.5 15.0 7.5 0.0NW/SE 7.5 15.0 22.5 30.0 37.5 45.0SE
N
MCF
1 X X X X4 X7 X10 12 14 X11 16 14 X15 X13 X X X X
2 X X X X5 X4 X5 X9 7 8 X7 X12 X14 X X X
3 X X X6 X8 X7 X5 X8 X12 X18 X16 X X X
4 X X X X10 X7 X6 X X6 X13 X11 X X X
5 X X X X X11 X9 X X X12 X11 X X X X
6 X X X X X8 X X X X13 X X X X

HEINRICHS GEOEX   B299-68   LINE A   SPD 1   LOOKING N22E   9-28-68   A= 750 FEET

↓INT

```
                                  1        2        3         4        5
  ↑---------↑---------↑---------↑---------X---------X---------X---------X---------X---------↑---------↑---------↑---------↑ SURFACE
45.0NW    37.5      30.0      22.5      15.0      7.5      0.0NW/SE  7.5      15.0      22.5      30.0      37.5      45.0SE

N                                                                                                               RHO/2PI
1     X         X         X        X3555     X410      X425→     X162→     X137      X172      X         X         X         X
                                                        436 630    162
2  X         X         X        X2125     X810      X412      X510→     X135      X159      X204      X         X         X
                                                              509
3     X         X        X1664     X619      X757      X430      X505      X209      X203      X183      X         X         X
4  X         X         X        X489      X586      X672      X         X762      X261      X183      X         X         X
5     X         X         X        X445      X602      X         X         X898      X228      X         X         X         X
6  X         X         X        X         X411      X         X         X         X783      X         X         X         X
```

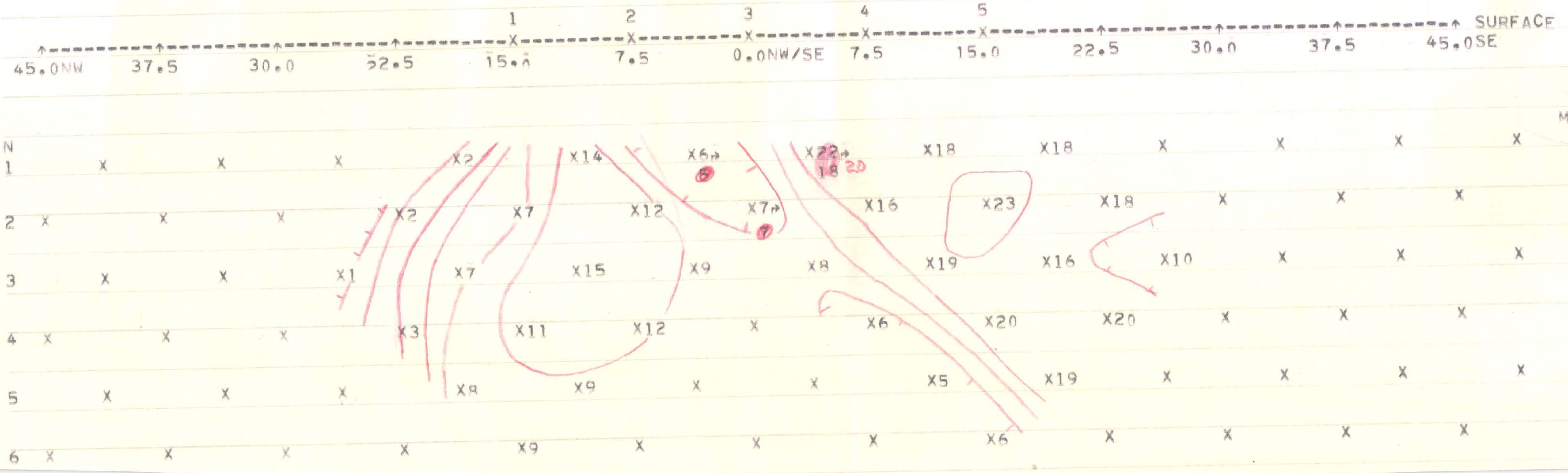
?

```
                                  1        2        3         4        5
  ↑---------↑---------↑---------↑---------X---------X---------X---------X---------X---------↑---------↑---------↑---------↑ SURFACE
45.0NW    37.5      30.0      22.5      15.0      7.5      0.0NW/SE  7.5      15.0      22.5      30.0      37.5      45.0SE

N                                                                                                               PFE
1     X         X         X        X6.1      X5.7      X3.6→     X3.5→     X2.4      X3.1      X         X         X         X
                                                        3.4 3.5    2.9 3.2
2  X         X         X        X4.7      X5.7      X5.1      X3.5→     X2.1      X3.7      X3.7      X         X         X
                                                              3.6
3     X         X        X2.2      X4.2      X11.2     X4.0      X3.9      X4.0      X3.2      X1.9      X         X         X
4  X         X         X        X1.4      X6.6      X8.0      X         X4.9      X5.2      X3.7      X         X         X
5     X         X         X        X3.6      X5.6      X         X         X4.8      X4.4      X         X         X         X
6  X         X         X        X         X3.9      X         X         X         X4.9      X         X         X         X
```

Anomaly Strength Code

Very Weak - - - -   Weak ———


SURFACE
1 2 3 4 5
45.0NW 37.5 30.0 22.5 15.0 7.5 0.0NW/SE 7.5 15.0 22.5 30.0 37.5 45.0SE
MCF
N
1 X X X X2 X14 X6 X22 18 20 X18 X18 X X X X
2 X X X X2 X7 X12 X7 X16 X23 X18 X X X
3 X X X1 X7 X15 X9 X8 X19 X16 X10 X X X
4 X X X X3 X11 X12 X X6 X20 X20 X X X
5 X X X X8 X9 X X X5 X19 X X X X
6 X X X X X9 X X X X6 X X X X

JOB 299-68 LINE B SPREAD 1

LOOKING N22E DATE 26-9-68 A= 750'

CENTER 0.0 LABEL NW-SE FREQ. 3

COUPLING Yes

30 Sep 68
RC

Dump + Mines at -15.0

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Johnson Camp (Cyprus)

LINE B HALF NW SP. 1 DATE 25-8-68

PAGE 1

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-0-7.50	-7.5 →	-15.0	-15.0 →		-22.5	-22.5 →			-30.0
RANGE	300	1000	300	1000	300	100	3000	300	300	100
DC 1	180 181	464 464	106 108	260 260	755 755	240 260	1550 1550	1710 1730	680 695	260 260
DC 2	180 181	464 464	106 108	260 260	755 755	240 260	1550 1550	1710 1730	680 695	260 260
DC 3	180 181		106 108			240 260			680 695	260
DC 4										
DC 5										
DC 6	1	1	2	1	2	3	1	2	3	4
DC 7										
DC 8										
DC AVG.	180.5	464	107	260	755	250	1550	1720	6875	260
AC 1	175.0	458.0	105.0	243.0	71.0	23.9	1495.0	164.5	65.0	24.2
AC 2	"	"	"	"	"	"	"	"	"	"
AC AVG.										
S.P.	-13.8	+17.0		+23.8			-13.5			
AC NOISE	.08	.10		.08			.12			
POT RES.	3K	26K		3K			3K			

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PAGE 2

PROJECT Johnson Camp (Cyprus)

LINE B HALF NW SP. 1 DATE 25-9-68

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
RECEIVE	-30.0 →			-37.5	-37.5 →			45.0		1-2
RANGE	300	100	100	30	300	100	30	30		300
DC 1	216 220	420 440	220 220	940 1050	101 101	258 260	140 144	66 68		1945 1945
DC 2	216 220	420 440	220 220	940 1050	101 101	258 260	140 144	66 68		1945 1845
DC 3	216 221	420 440		940 1050		258 260	140 144	66 68		
DC 4				0010						
DC 5				1990						
DC 6	2	3	4	5	3 4	4	5	6		
DC 7										
DC 8										
DC AVG.	218	430	220	9.95	101	259	142	67		
AC 1	205.5	40.1	20.2	9.30	98.0	24.2	13.45	6.4		190.0
AC 2	"	"	20.1	"	"	"	"			"
AC AVG.										
S.P.	-46.2				+12.3					
AC NOISE	.07				.10					
POT RES.	1K				800 Ω					

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PAGE 1

PROJECT CYPRESS

LINE 8 HALF NW SP. 1 DATE

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-75	75-150	→	150-225	→	→	225-300	→	→	→
RANGE										
VOLTAGE	620v	460v	620v	640v	460v	620v	780v	640v	460v	620v
CURRENT	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
RECEIVE	300-375	→	→	→	375-450	→	→	→		1-2
RANGE										
VOLTAGE	780v	640v	460v	620v	780v	640v	460v	620v		780v
CURRENT	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A		2.0A

FREQUENCIES 1.0 .05

SENDER NO. 6644-5

OPERATOR 57

RECEIVER NO. 3641

OPERATOR 17

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT *Johnson Camp (Cypress)*

LINE *B* HALF *SE* SP. *1* DATE *26-9-6*

PAGE *3*

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-0- 0+7.5	+7.5 →	+15.0	+15.0 →	→	+22.5	+22.5 →	→	→	+30.0
RANGE	1000	300	300	300	100	100	300	100	100	100
DC 1	464 464	1805 1805	107 107	160 160	440 425	380 363	139 140	380 380	217 219	220 221
DC 2	464 464	1805 1805	107 107	160 160	440 425	380 363	139 140	380 380	217 219	220 221
DC 3					440 425	380 363	139 140		217 219	220 221
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	455.0	174.0	104.0	153.0	41.9	35.9	132.5	36.0	20.1	21.0
AC 2		175.0	〃	〃	〃	〃	〃	〃	〃	〃
AC AVG.										
S.P.	-9.9									
AC NOISE	.06			.05			.07			
POT RES.	400Ω									

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PAGE 4

PROJECT Johnson Camp (Cyprus
LINE B HALF 5E SP. 1 DATE 26-9-68

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE	+30.0 →			+37.5	37.5 →			+45.0		4-5
RANGE	100	30	30	30	30	30	10	30		300
DC 1	300 320	165 165	119 120	136 139	110 115	80 84	641 679	80 83		194 194
DC 2	300 320	165 165	119 120	137 138	110 115	80 84	640 680	80 83		194 198
DC 3	300 320	165	119 120	137 138	110 115	80 84	640 680	80 83		
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	30.0	15.6	11.2	13.0	10.7	7.7	6.2	7.6		188.0
AC 2	"	"	"	"	"	"	"			"
AC AVG.										
S.P.	~~0~~									
AC NOISE	.06				.06					
POT RES.										

PAGE 2

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT CYPRESS

LINE B HALF W SP. 1 DATE

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-75	75-150	→	150-225	→	→	225-300	→	→	→
RANGE										
VOLTAGE	760v	620v	760v	440v	620v	760v	600v	440v	620v	760v
CURRENT	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE	300-375	→	→	→	375-450	→	→	→		4-5
RANGE										
VOLTAGE	600v	440v	620v	760v	600v	440v	620v	760v		600v
CURRENT	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A	2.0A		2.0A

FREQUENCIES 3.0 .05

SENDER NO. 6844-5

OPERATOR 57

RECEIVER NO. 36411

OPERATOR 17

COMMENTS:

HEINRICHS GEOEX   B299-68   LINE B   SPREAD 1   LOOKING N22E   9-26-68   A= 750 FEET

2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	I	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	
180	464	106	260	755	240	1550	1710	680	260	DC	216	420	220	940	101	258	140	66	1945	LEFT
181	464	108	260	755	260	1550	1730	695	260		220	440	220	1050	101	260	144	68	1945	SIDE
											216									
											220									
											216									
											221									
1	1	2	1	2	3	1	2	3	4	N	2	3	4	5	3	4	5	6		
180.5	464.0	107.0	260.0	75.50	25.00	1550.0	172.0	68.75	26.00	DCA	218.1	43.00	22.00	9.950	101.00	25.90	14.20	6.700	194.5	
175.0	458.0	105.0	243.0	71.00	23.90	1495.0	164.5	65.00	24.20	AC1	205.5	40.10	20.20	9.300	98.00	24.20	13.45	6.400	190.0	
175.0	458.0	105.0	243.0	71.00	23.90	1495.0	164.5	65.00	24.20	AC2	205.5	40.10	20.10	9.300	98.00	24.20	13.45	6.400	190.0	
175.0	458.0	105.0	243.0	71.00	23.90	1495.0	164.5	65.00	24.20	ACA	205.5	40.10	20.15	9.300	98.00	24.20	13.45	6.400	190.0	
208.8	536.8	495.1	300.8	349.4	289.2	1793.1	795.9	795.3	601.5	RHO	1009.2	497.4	509.0	402.9	1168.4	599.2	574.9	434.0	1.028	DC CAL
.8	-1.0	-.5	4.5	3.9	2.2	1.3	2.1	3.3	5.0	PFE	3.7	4.8	6.7	4.5	.7	4.5	3.1	2.3	.977	AC CAL
4	-2	-1	15	11	8	1	3	4	8	MCF	4	10	13	11	1	8	5	5		

2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	I	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	
464	1805	107	160	440	380	139	380	217	220	DC	300	165	119	136	110	80	641	80	1940	RIGHT
464	1805	107	160	425	363	140	380	219	221		320	165	120	139	115	84	679	83	1940	SIDE
														137			640		1940	
														138			680		1945	
														137			640			
														138			680			
1	1	2	1	2	3	1	2	3	4	N	2	3	4	5	3	4	5	6		
464.0	180.5	107.0	160.0	43.25	37.15	139.5	38.00	21.80	22.05	DCA	31.00	16.50	11.95	13.76	11.25	8.200	6.599	8.150	194.1	
455.0	174.0	104.0	153.0	41.90	35.90	132.5	36.00	20.10	21.00	AC1	30.00	15.60	11.20	13.00	10.70	7.700	6.200	7.600	188.0	
455.0	175.0	104.0	153.0	41.90	35.90	132.5	36.00	20.10	21.00	AC2	30.00	15.60	11.20	13.00	10.70	7.700	6.200	7.600	188.0	
455.0	174.5	104.0	153.0	41.90	35.90	132.5	36.00	20.10	21.00	ACA	30.00	15.60	11.20	13.00	10.70	7.700	6.200	7.600	188.0	
537.9	209.3	496.2	185.5	200.6	430.7	161.7	176.2	252.7	511.2	RHO	143.8	191.3	277.1	558.3	130.4	190.1	267.8	529.1	1.030	DC CAL
-1.2	.2	-.3	1.3	-.0	.2	2.0	2.2	5.1	1.7	PFE	.1	2.5	3.4	2.5	1.8	3.2	3.1	3.9	.969	AC CAL
-2	1	-1	7	-0	1	12	13	20	3	MCF	1	13	12	5	14	17	12	7		

JOB 299-68 LINE A SPREAD 1

LOOKING N22E DATE 28-9-68 A= 750'

CENTER 0.0 LABEL NW-SE FREQ. 3.0

COUPLING Yes

30 Sep 68
Rc

Mines & Dumps
at -22.5

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Johnson Camp (Cyprus)

LINE A HALF NW SP. 1 DATE 28-9-6[illegible]

PAGE 1

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0+0 0-25.0	-7.5 →	→ -15.0	-15.0 →	→	→ -22.5	-22.5 →	→	→	→ -30.0
RANGE	300	3000	300	1000	300	100	3000	300	300	30
DC 1	104 104	950 950	800 830	437 437	155 153	260 290	2250 2300	216 216	110 116	215 215
DC 2	104 104	950 950	800 830	437 437	155 153	260 290	2250 2300	216 216	110 116	215 215
DC 3					155 153	260 290	2250 2300		110 116	215
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	99.0	900.0	17.0	405.0	143.5	25.9	2100.0	200.0	99.5	19.5
AC 2	"	"	"	"	"	"	"	"	"	"
AC AVG.										
S.P.	—	+ ↗		— ↙			→ ↗			
AC NOISE	.06	.16		.14			.25			
POT RES.	10K	7K		6K			8K			

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PAGE 2

PROJECT Johnson Camp (Cyprus)

LINE A HALF NW S.P. 9 DATE 28-9-68

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
RECEIVE	-30.0 →			-37.5	-37.5 →			-43.0		1-2
RANGE	1000	100	100	30	300	100	30	10		300
DC 1	340 340	660 660	440 435	110 110	106 107	260 262	195 185	460 480		960 960
DC 2	340 340	660 660	440 435	110 110	106 107	260 261	195 185	460 480		960 960
DC 3			440 435		106 107	260 262	195 185	460 480		960
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	318.0	62.0	40.2	10.2	102.0	25.2	17.95	4.43		94.0
AC 2	"	"	"	"	"	"	"	"		"
AC AVG.										
S.P.	- ↓				- ↓					
AC NOISE	.12				.08					
POT RES.	5K				4K					

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Cyprus

LINE A HALF NW SP. 1 DATE:

PAGE 1

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-75	75-150	→	150-225	→		225-300	→		
RANGE										
VOLTAGE	810V	600V	810V	850V	600V	810V	950V	850V	600V	810V
CURRENT	1.5A	3.5A	1.5A	2.5A	3.5A	1.5A	1.5A	2.5A	3.5A	1.5A
SEND	1-2	2-3	3-4	4-5	1-2	2-5	3-4	4-5		Cal
RECEIVE	300-375	→			375-450	→				1-2
RANGE										
VOLTAGE	950V	850V	600V	810V	950V	850V	600V	810V		600V
CURRENT	1.5A	2.5A	3.5A	1.5A	1.5A	2.5A	3.5A	1.5A		1.0A

FREQUENCIES 3.0 .05

SENDER NO. 6644-5

OPERATOR 71

RECEIVER NO.

OPERATOR 17

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PAGE 3

PROJECT Johnson Camp (Cyprus)

LINE A HALF SE SP. 1 DATE 28-9-64

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0+0 0+7.50	+7.5 →	→ +15.0	+15.0 →	→	→ +22.5	+22.5 →	→	→	→ +30.0
RANGE	1000	300	300	300	100	100	300	100	100	100
DC 1	402 402	173 174	820 820	206 206	363 363	325 325	110 111	600 595	220 228	240 250
DC 2	402 402	173 174	820 820	206 206	363 363	325 325	110 111	600 595	220 228	240 250
DC 3		173 174					110 111		220 228	240 250
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	382.0	165.0	28.0	198.0	35.0	30.8	105.5	56.7	21.2	23.0
AC 2	"	"	"	"	"	"	"	"	"	"
AC AVG.										
S.P.	—	+↓		+↓			+↑			
AC NOISE	.15	.06		.07			.07			
POT RES.	2K	10K		8.5K			7K			

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Johnson Camp (Cypress
LINE A HALF SE SP. 1 DATE 28-9-68

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE	+30.0 ———	———	———	→ +37.5	+37.5	———	———	→ +45.0		4-5
RANGE	100	100	30	30	30	30	30	30		300
DC 1	320 337	320 290	140 140	165 165	115 120	135 140	70 70	90 90		965 965
DC 2	320 337	320 290	140 140	165 165	115 120	135 140	70 70	90 90		965 965
DC 3	320 337	320 290			115 120	135 140	70	90		
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	31.2	29.0	13.1	15.5	11.3	13.05	6.60	8.45		95.0
AC 2	"	29.2	"	"	11.4	"	"	"		"
AC AVG.										
S.P.	− ↓				+ ↓					
AC NOISE	.06				.09					
POT RES.	5K				6K					

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT CYPRESS

LINE 2 HALF SE SP. 1 DATE

PAGE 2

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-75	75-150	⟶	150-225	⟶	⟶	225-300	⟶	⟶	⟶
RANGE										
VOLTAGE	940v	800v	900v	600v	800v	940v	760v	600v	800v	940v
CURRENT	1.5A	2.5A	1.5A	3.5A	2.5A	1.5A	1.5A	3.5A	2.5A	1.5A
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE	300-375	⟶	⟶	⟶	375-450	⟶	⟶	⟶		4-5
RANGE										
VOLTAGE	760v	600v	800v	940v	760v	600v	800v	940v		500v
CURRENT	1.5A	3.5A	2.5A	1.5A	1.5A	3.5A	2.5A	1.5A		1.0A

FREQUENCIES 3.0 .05

SENDER NO. 6644-5

OPERATOR 57

RECEIVER NO. 3641

OPERATOR 17

COMMENTS:

HEINRICHS GEOEX   B299-68   LINE A   SPD 1   LOOKING N22E   9-28-68   A= 750 FEET

1.500	3.500	1.500	2.500	3.500	1.500	1.500	2.500	3.500	1.500	I	1.500	2.500	3.500	1.500	1.500	2.500	3.500	1.500	1.000	
104	950	800	437	155	260	2250	216	110	215	DC	340	660	440	110	106	260	195	460	960	LEFT
104	950	830	437	153	290	2300	216	116	215		340	660	435	110	107	262	185	480	960	SIDE
1	1	2	1	2	3	1	2	3	4	N	2	3	4	5	3	4	5	6		
104.00	950.0	81.50	437.0	154.0	27.50	2275.0	216.0	113.00	21.50	DCA	340.0	66.00	43.75	11.00	106.5	26.10	19.00	4.700	96.00	
99.00	900.0	77.00	405.0	143.5	25.90	2100.0	200.0	99.50	19.50	AC1	318.0	62.00	40.20	10.20	102.0	25.20	17.95	4.430	94.00	
99.00	900.0	77.00	405.0	143.5	25.90	2100.0	200.0	99.50	19.50	AC2	318.0	62.00	40.20	10.20	102.0	25.20	17.95	4.430	94.00	
99.00	900.0	77.00	405.0	143.5	25.90	2100.0	200.0	99.50	19.50	ACA	318.0	62.00	40.20	10.20	102.0	25.20	17.95	4.430	94.00	
162.5	636.2	509.4	409.7	412.5	429.7	3554.7	810.0	756.7	671.9	RHO	2125.0	618.7	585.9	601.6	1664.1	489.4	445.3	411.2	1.042	DC CAL
2.9	3.4	3.6	5.7	5.1	4.0	6.1	5.7	11.2	8.0	PFE	4.7	4.2	6.6	5.6	2.2	1.4	3.6	3.9	.979	AC CAL
18	5	7	14	12	9	2	7	15	12	MCF	2	7	11	9	1	3	8	9		

1.500	2.500	1.500	3.500	2.500	1.500	1.500	3.500	2.500	1.500	I	1.500	3.500	2.500	1.500	1.500	3.500	2.500	1.500	1.000	
402	173	820	206	363	325	110	600	220	240	DC	320	320	140	165	115	135	70	90	965	RIGHT
402	174	820	206	363	325	111	595	228	250		337	290	140	165	120	140	70	90	965	SIDE
1	1	2	1	2	3	1	2	3	4	N	2	3	4	5	3	4	5	6		
402.0	173.5	82.00	206.0	36.30	32.50	110.5	59.75	22.40	24.50	DCA	32.85	30.50	14.00	16.50	11.75	13.75	7.000	9.000	96.50	
382.0	165.0	78.00	198.0	35.00	30.80	105.5	56.70	21.20	23.00	AC1	31.20	29.00	13.10	15.50	11.30	13.05	6.600	8.450	95.00	
382.0	165.0	78.00	198.0	35.00	30.80	105.5	56.70	21.20	23.00	AC2	31.20	29.20	13.10	15.50	11.40	13.05	6.600	8.450	95.00	
382.0	165.0	78.00	198.0	35.00	30.80	105.5	56.70	21.20	23.00	ACA	31.20	29.10	13.10	15.50	11.35	13.05	6.600	8.450	95.00	
624.9	161.8	509.8	137.2	135.4	505.2	171.8	159.2	208.9	761.7	RHO	204.2	203.2	261.1	897.7	182.6	183.2	228.5	783.4	1.036	DC CAL
3.6	3.5	3.5	2.4	2.1	3.9	3.1	3.7	4.0	4.9	PFE	3.7	3.2	5.2	4.8	1.9	3.7	4.4	4.9	.984	AC CAL
6	22	7	18	16	8	18	23	19	6	MCF	18	16	20	5	10	20	19	6		

JOB 299-68 LINE C SPREAD 1

LOOKING N22E DATE 27-9-68 A= 750'

CENTER 0.0 LABEL NW-SE FREQ. 3.0

COUPLING Yes

9.30.68

Pe

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Johnson Camp (Cyprus)

LINE C **HALF** NW **SP.** 1 **DATE** 27-9-68

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0+0- 0-7.50	-7.5 →	→ -15.0	-15.0 →	→	→ -22.5	-22.5 →	→	→	→ -30.0
RANGE	1000	1000	300	1000	300	100	1000	300	300	100
DC 1	280 280	340 340	1050 1095	401 401	125 125	481 519	4410 4410	165 168	700 700	318 318
DC 2	280 280	340 340	1050 1095	401 401	125 125	481 519	4410 4410	165 168	700 700	318 318
DC 3			1050 1095			481 519		165 168		
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	2630	321.0	102.0	382.0	119.5	47.9	421.0	159.0	65.5	30.0
AC 2	"	"	"	"	"	"	"	"	"	"
AC AVG.										
S.P.	—	+ ↑		— ↓			— ↑			
AC NOISE	.07	.09		.08			.06			
POT RES.	7K	5K		3.5K			4K			

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PAGE 4

PROJECT Johnson Camp (Cyprus

LINE C HALF NW SP. 1 DATE 27-9-69

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
RECEIVE	-30.0 →			→ -37.5	-37.5 →			→ -45.0		1-2
RANGE	300	100	100	30	100	100	30	30		300
DC 1	90 90	500 519	260 265	130 135	501 501	340 320	189 195	100 100		960 960
DC 2	90 90	500 519	260 265	130 135	501 501	340 320	189 195	100 100		960 960
DC 3		500 519	260 265	130 135	501	340 320	189 195	100		
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	85.5	48.0	24.8	12.5	47.0	30.5	17.6	9.4		94.0
AC 2	"	"	"	"	"	"	"	"		"
AC AVG.										
S.P.	+ ↑					+ ↓				
AC NOISE	.08									
POT RES.	3K									

PAGE 2

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT CYPRESS

LINE C HALF W SP. 1 DATE

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-75	75-150	→	150-225	→	→	225-300	→	→	→
RANGE										
VOLTAGE	800v	680V	800v	950v	680v	800V	700v	950v	680v	800v
CURRENT	2.5A	2.6A	2.5A	2.5A	2.5A	2.5A	1.5A	2.5A	2.5A	2.5A
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
RECEIVE	300-375	→	→	→	375-450	→	→	→		1-2
RANGE										
VOLTAGE	700v	950v	680v	800v	700v	950v	680v	800v		450V
CURRENT	1.5A	2.5A	2.5A	2.5A	1.5A	2.5A	2.5A	2.5A		1.0A

FREQUENCIES 3.0 .05

SENDER NO. 6644-5

OPERATOR SM

RECEIVER NO. 3641

OPERATOR IM

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Johnson Camp (Cyprus

LINE C HALF SE SP. 1 DATE 27-9-68

PAGE 1

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0+0 — 0+750	+7.50 →	+15.0	15.0 →		22.5	+22.5 →			30.0
RANGE	300	300	100	300	100	30	300	100	30	30
DC 1	185 186	221 216	640 616	200 200	480 461	194 201	225 226	380 398	195 206	100 105
DC 2	185 186	221 216	640 616	200 200	480 461	194 201	225 226	380 398	195 200	100 105
DC 3		221 216	640 616		480 461	194 201	225 226	380 398	195 200	100 105
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	175.0	211.0	60.0	192.5	45.9	19.1	217.0	37.7	19.0	9.85
AC 2	"	210.0	60.1	"	"	19.0	"	"	"	"
AC AVG.										
S.P.	—	— ↑		+ ↑			− ↓			
AC NOISE	.06	.07		.04			.05			
POT RES.	3K	9K		4K			1.5K			

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PAGE 2

PROJECT Johnson Camp (Cyprus)

LINE C HALF SE SP. 1 DATE 27-9-61

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE	+30.0 →			+37.5	+37.5 →			+45.0		A-5
RANGE	100	30	30	10	30	30	10	10		300
DC 1	399 383	184 171	100 100	580 600	150 138	95 99	620 624	380 400		960 960
DC 2	399 383	184 171	100 100	580 600	150 138	94 100	620 625	380 400		960 960
DC 3	399 383	184 171		580 600	150 138	93 101	620 625	380 400		
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	37.9	17.05	9.6	5.62	13.95	9.4	5.99	3.70		95.0
AC 2	"	"	9.6	"	"	"	"	"		"
AC AVG.										
S.P.	− ↓				+ ↑					
AC NOISE	.04				.05					
POT RES.	4K				10K					

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Cyprus

LINE C HALF SE ½ SP. 1 DATE 9-27

PAGE 1

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-75	75-150	→	150-225	→	→	225-300	→	→	→
RANGE										
VOLTAGE	740V	800V	740V	720V	800V	740V	840V	560	800V	740V
CURRENT	1.5A	2.0A	1.5A	2.5A	2.0A	1.5A	2.5A	2.0A	2.0A	1.5A

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		Cal
RECEIVE	300-375	—	—	—	375-450	—	—	—		4-5
RANGE										
VOLTAGE	840V	720A	800	740V	840V	720V	800V	740V		320V
CURRENT	2.5A	2.5A	2.0A	1.5A	2.5A	2.5A	2.0A	1.5A		1.0A

FREQUENCIES 3.0 .05

SENDER NO. 6644 -5

OPERATOR 71

RECEIVER NO. 3641

OPERATOR 17

COMMENTS:

300.81

HEINRICHS GEOEX B299-68 LINE C SPREAD 1 LOOKING N22E 9-27-68 A= 750 FEET

2.500	2.500	2.500	2.500	2.500	2.500	1.500	2.500	2.500	2.500	I	1.500	2.500	2.500	2.500	1.500	2.500	2.500	2.500	1.000	
280	340	1050	401	125	481	4410	165	700	318	DC	90	500	260	130	501	340	189	100	960	LEFT
280	340	1095	401	125	519	4410	168	700	318		90	519	265	135	501	320	195	100	960	SIDE
1	1	2	1	2	3	1	2	3	4	N	2	3	4	5	3	4	5	6		
280.0	340.0	107.2	401.0	125.0	50.00	441.0	166.5	70.00	31.80	DCA	90.00	50.95	26.25	13.25	50.10	33.00	19.20	10.000	96.00	
263.0	321.0	102.0	382.0	119.5	47.90	421.0	159.0	65.50	30.00	AC1	85.50	48.00	24.80	12.50	47.00	30.50	17.60	9.400	94.00	
263.0	321.0	102.0	382.0	119.5	47.90	421.0	159.0	65.50	30.00	AC2	85.50	48.00	24.80	12.50	47.00	30.50	17.60	9.400	94.00	
263.0	321.0	102.0	382.0	119.5	47.90	421.0	159.0	65.50	30.00	ACA	85.50	48.00	24.80	12.50	47.00	30.50	17.60	9.400	94.00	
262.5	318.7	402.2	375.9	468.7	468.7	689.1	624.4	656.2	596.2	RHO	562.5	477.7	492.2	434.8	782.8	618.7	630.0	525.0	1.042	DC CAL
4.2	3.7	3.0	2.8	2.4	2.2	2.6	2.5	4.6	3.8	PFE	3.1	3.9	3.6	3.8	4.4	5.9	6.8	4.2	.979	AC CAL
16	12	7	7	5	5	4	4	7	6	MCF	5	8	7	9	6	10	11	8		

1.500	2.000	1.500	2.500	2.000	1.500	2.500	2.000	2.000	1.500	I	2.500	2.500	2.000	1.500	2.500	2.500	2.000	1.500	1.000	
185	221	640	200	480	194	225	380	195	100	DC	399	184	100	580	150	95	620	380	960	RIGHT
185	216	616	200	461	201	226	398	200	105		383	171	100	600	138	99	625	400	960	SIDE
																94				
																100				
																93				
																101				
1	1	2	1	2	3	1	2	3	4	N	2	3	4	5	3	4	5	6		
185.0	218.5	62.80	200.0	47.05	19.75	225.5	38.90	19.75	10.250	DCA	39.10	17.75	10.000	5.900	14.40	9.680	6.225	3.900	96.00	
175.0	211.0	60.00	192.5	45.90	19.10	217.0	37.70	19.00	9.950	AC1	37.90	17.05	9.600	5.620	13.95	9.400	5.990	3.700	95.00	
175.0	210.0	60.10	192.5	45.90	19.00	217.0	37.70	19.00	9.950	AC2	37.90	17.05	9.600	5.620	13.95	9.400	5.990	3.700	95.00	
175.0	210.5	60.05	192.5	45.90	19.05	217.0	37.70	19.00	9.950	ACA	37.90	17.05	9.600	5.620	13.95	9.400	5.990	3.700	95.00	
289.1	256.1	392.5	187.5	220.5	308.6	211.4	182.3	231.4	320.3	RHO	146.6	166.4	234.4	322.7	135.0	181.5	255.3	341.2	1.042	DC CAL
4.6	2.7	3.5	2.8	1.4	2.6	2.8	2.1	2.9	1.9	PFE	2.1	3.0	3.1	3.9	2.2	1.9	2.8	4.3	.990	AC CAL
16	11	9	15	7	8	13	12	12	6	MCF	14	18	13	12	16	11	11	13		

September 19, 1968

HEINRICHS GEOEXPLORATION COMPANY

806 WEST GRANT ROAD, TUCSON, ARIZONA, 85703. P.O. BOX 5671. PHONE: (AREA CODE 602) 623-0578

Cyprus Mines Corp.
P. O. Box 4368
Tucson, Arizona 85717

Attn: Mr. Robert Clayton

Re: Magnetic and Induced Polarization work, Johnson Camp, Cochise County, Arizona

Gentlemen:

Confirming our conversation with Mr. Clayton on September 16, 1968 at our Tucson office, we herewith propose for our mutual understanding and agreement as follows:

Beginning on or about September 19, 1968, GEOEX will commence work and ultimately furnish complete I. P. and magnetic equipment using our standard power I. P. instruments and an Askania Gfz torsion magnetometer to obtain data along lines as designated by you and flagged on the job site.

Charges will be at the rate of $150.00, $250.00 or $300.00 per ten hour prorated day for a two man magnetic crew and/or three or five man I.P. crew respectively, based on a 50 hour work week. Vehicle charges will be $12.00 per day plus $0.12 per mile per vehicle and one or two vehicles will be used. Directly related supplies, communications, living and other direct incidentals charged at our cost. Final compilation, interpretation and report is $150.00 per Tucson staff day.

Mobilization and demobilization, travel, excessive weather delay and standby charges are one half the daily rate. Breakdown of our equipment in excess of one hour per day will be made up or not charged.

Field personnel are to be an experienced and qualified geophysical technician in charge of one, two or four technical assistants and/or helpers.

Others of our technical staff are involved as needed and/or are supplied as requested and mutually agreed upon.

All property permits, brushing and trespassing-liability and related costs incurred on behalf of client assumed by client. Charges for extra equipment and personnel employed if mutually desired, are extra.

GEOEX will save client harmless from all Workmen's Compensation, Public Liability and Property Damage Liability incurred by GEOEX employees.

We acknowledge receipt of a base print left by you for planning purposes. Progress plotting in plan can be done on this in the field, however, we will need for our final report, an appropriate reproducible base map furnished by you and a copy of same is hereby requested to be sent to our Tucson office.

Preliminary reports or copies of rough field plotting sheets will be available as work progresses.

Payments due on presentation. Billings may be submitted periodically with final statement after completion of final report.

Indication of your understanding and approval of the above by executing as provided below on the attached copy of this letter and returning it to us, will be most appreciated.

Sincerely yours,
HEINRICHS GEOEXPLORATION CO.

E. G. Heinrichs

E. Grover Heinrichs
Vice President

EGH:jh

Date: 9-23-68

Accepted by: J. G. Hansen

Title: Vice President

cc: enclosed