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May 21, 1965

Mr. Matt Slavin  
United Geophysical Corporation  
P. O. Box M  
2650 E. Foothill Road  
Pasadena, California 91109

Dear Matt:

It was good to hear from you and I, too, regret the briefness of our visit at S. E. G. Somehow, we never get to tarry in L. A. lately.

In addition to representing various other manufacturers in most exploration geophysical equipment, we are now ourselves among the "experts" in I. P. instrumentation--including research, development, construction and sales of all types including the best for the application and any reasonable custom specification. Same goes for resistivity and E. M. equipment.

We represent Jalander vertical component fluxgate magnetometers and adapt them to continuous recording.

Attached is some relative literature and price lists, etc. Delivery is anywhere from 90 days to off the shelf depending on what and when. Let us know if we can help further.

By the way, the MoMag is still doing fine.

Best personal regards,

Sincerely,

HEINRICHS GEOEXPLORATION COMPANY

Walter E. Heinrichs, Jr.  
President & General Manager

WEH:jh  
Enclosures



**UNITED GEOPHYSICAL CORPORATION**

PASADENA · HOUSTON · TULSA · CALGARY · PARIS · SAN JOSE · RIO DE JANEIRO · TRIPOLI

P. O. BOX M. 2650 E. FOOTHILL BLVD., PASADENA, CALIFORNIA 91109  
SYCAMORE 5-0421 · MURRAY 1-0294

May 19, 1965

Mr. Walter E. Heinrichs, Jr.  
Geinrichs Geoexploration Company  
Box 5671  
Tucson, Arizona



Dear Walt:

We have an inquiry from some of our people for information on induced polarization instrumentation.

I believe that you represent several manufacturers of mining exploration equipment; we would certainly appreciate a catalog of your various equipment items including price and delivery information.

It was nice to see you during the SEG meeting last November even if it was just to say hello. Possibly you will get out here for a little longer chat one of these days - I hope so.

Best personal regards,

*Walt*  
Matt Slavin

MS:jz

5/21/65

*Dear Matt: Good to hear from you & I too regret the brevity of our visit at SEG. Somehow, we never get to hang in L.A. lately. In addition to representing various other manufacturers in most exploration geophysical equipment, we are now ourselves among the experts in I.P. instrumentation - the best for the application including research, development, construction and sales of all types, including any reasonable custom specification. Same goes for resistivity & E.M. equipment. We represent Salander vert. component fluxgate magnetometers and adapt them to continuous recording. Attached is some relative literature & price lists etc. Delivery is anywhere from 90 days to off the shelf depending on what is needed. Let us know if we can help further. By the way, the man is still doing fine. Regards, HGeox by!*

INDUCED POLARIZATION SURVEY  
Woolsey Peak District  
BUTTE MINE AREA

Maricopa County, Arizona

for

DUVAL CORPORATION

May 1965

by

HEINRICHS GEOEXPLORATION COMPANY  
P. O. Box 5671 Tucson, Arizona

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In Map Pocket:

Induced Polarization Survey Plan Map

Sectional Data Sheets      Lines 1 and 2

## INTRODUCTION

From April 29 through May 8, 1965, Heinrichs Geoexploration Company, at the request of the Duval Corporation undertook and completed an induced polarization and resistivity survey over a portion of the Butte Mine Area, located in the Woolsey Peak district of Maricopa County, Arizona.

The survey was run using the dual frequency induced polarization method. Frequencies employed here were 3 cps. or so-called A.C. and .05 cps D.C. A total of 31,000 line feet were covered yielding 21,000 ft. of subsurface information. A dipole-dipole electrode array with a spacing of 1,000 ft. was used in an attempt to obtain reconnaissance subsurface information to a depth in excess of 1,000 ft.

The data are plotted on sectional data sheets showing the apparent resistivity, percent frequency effect and metallic conduction factor contoured in vertical section. Self potential is plotted in profile. The line locations are presented on an I. P. location plan.

GEOEX personnel involved in this project were Fred, M. Johnson, Geophysicist; Malcom D. Godfrey and John Beeler, technicians.

## CONCLUSIONS AND RECOMMENDATIONS

1. Induced polarization shows typical unmineralized background response from the alluvium, basaltic material, and granitic material.

2. The resistivity shows the contacts between the basaltic and granitic material and between the granitic and the deepening alluvium.

3. Self potential shows nothing of interest to indicate possible oxidizing sulfides.

4. The data in the vicinity of these I. P. lines show no porphyry type sulfide mineralization to a depth in excess of 1,000 ft.

5. The data obtained show nothing to warrant further detailing of the information obtained on the reconnaissance induced polarization survey.

## INTERPRETATION

Line 1: Was centered 1,575 ft. south and 1,250 ft. east of Section Corner 11, 12, 14, 13, T 2 S, R 7 W and was run on a true E-W bearing. The data obtained on this line shows the expected background response from granitic material.

Line 2A: Was centered 180 ft. south of Section corner 11, 12, 13, 14, T 2 S, R 7 W and run on a north-south bearing, following the section line. The data obtained on this line shows a contact between the deepening alluvium and the underlying bedrock in the vicinity of the No. 2 electrode. The alluvium is deepening to the north.

Line 2B: Was centered 7,000 ft. south of center electrode line 2A, with a normal 3N separation between electrode No. 5, Line 2B and electrode No. 1, Line 2A. This line was run north and south following the section line and tying in data with Line 2A. The data obtained on this line shows a contact between the basaltic material and the granitic material in the vicinity of electrode No. 4.

Respectfully submitted,  
HEINRICHS GEOEXPLORATION COMPANY

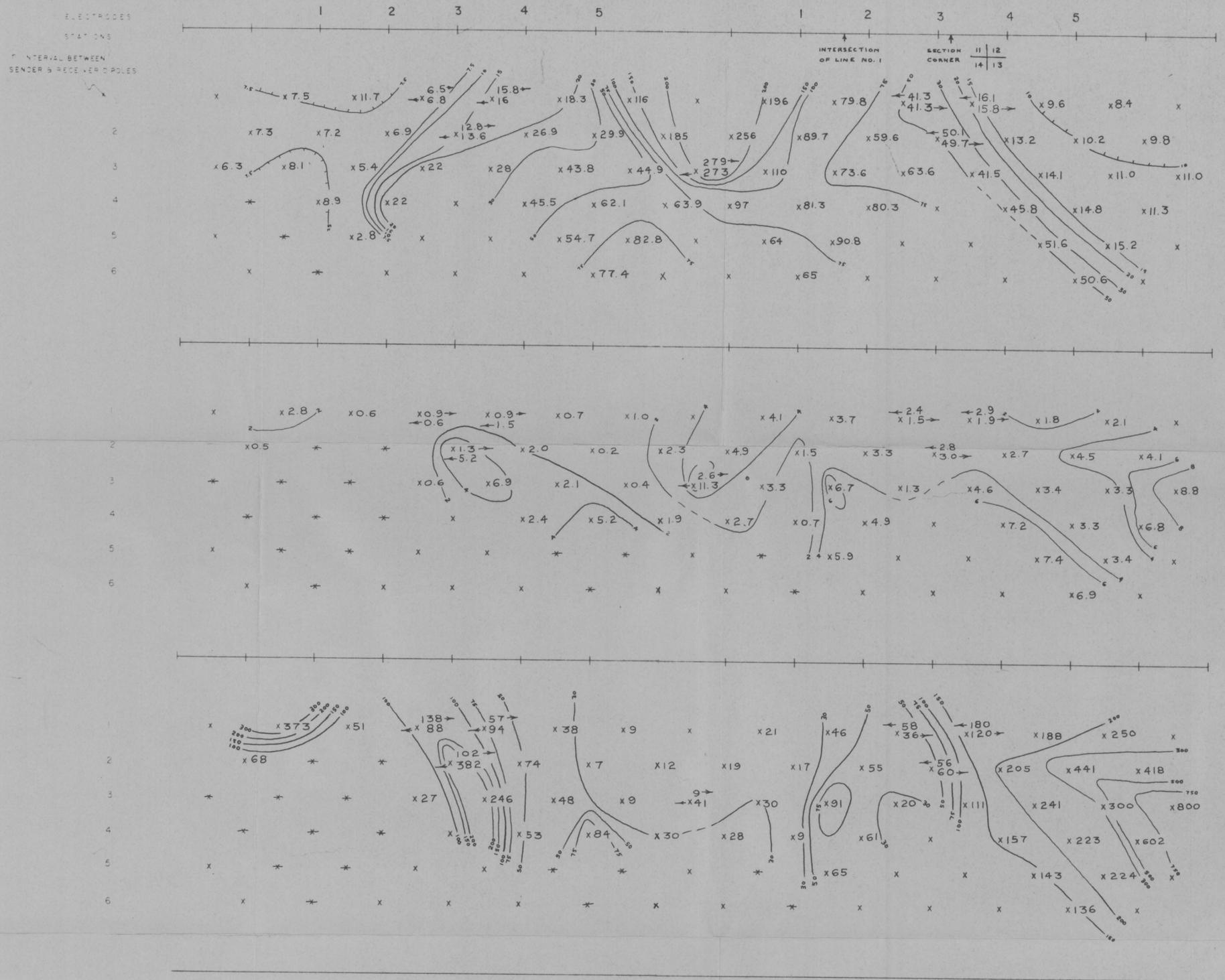
*Fred M. Johnson*

Fred M. Johnson  
Geophysicist

*Chris S. Ludwig*

Chris S. Ludwig  
Sr. Geophysicist

May 14, 1965  
P. O. Box 5671  
Tucson, Arizona

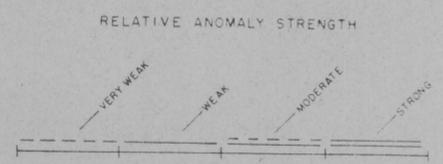
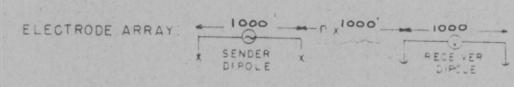


APPARENT RESISTIVITY ( $\rho_a$ )  
IN UNITS OF OHM FEET  
CONTOUR INTERVAL LOGARITHMIC  
SENDER FREQUENCY: 0.05 C.P.S.

PERCENT FREQUENCY EFFECT (PFE)  
CONTOUR INTERVAL CONSTANT  
SENDER FREQUENCIES: 0.05 & 3.0 C.P.S.

APPARENT "METALLIC CONDUCTION" FACTOR (MCF)  
( $MCF = \frac{\rho_a}{PFE} \times 1000$ )  
CONTOUR INTERVAL LOGARITHMIC

EXPLANATION



LOOKING WEST

BUTTE MINE AREA

SECTIONAL DATA SHEET

LINE NO. 2A & 2B

INDUCED POLARIZATION TRAVERSE

HEINRICH'S GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: MAY 1965

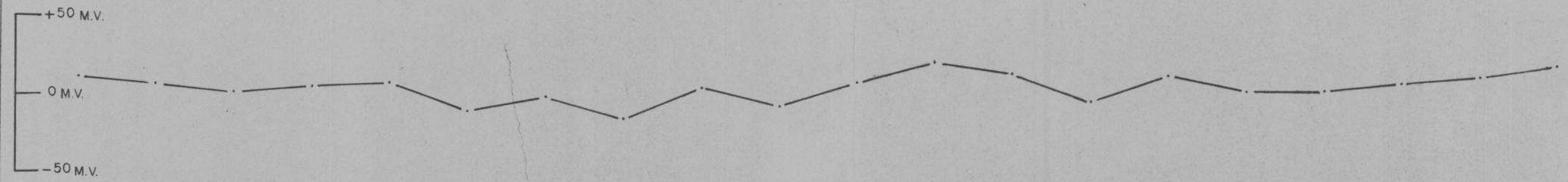
FOR

DUVAL CORPORATION

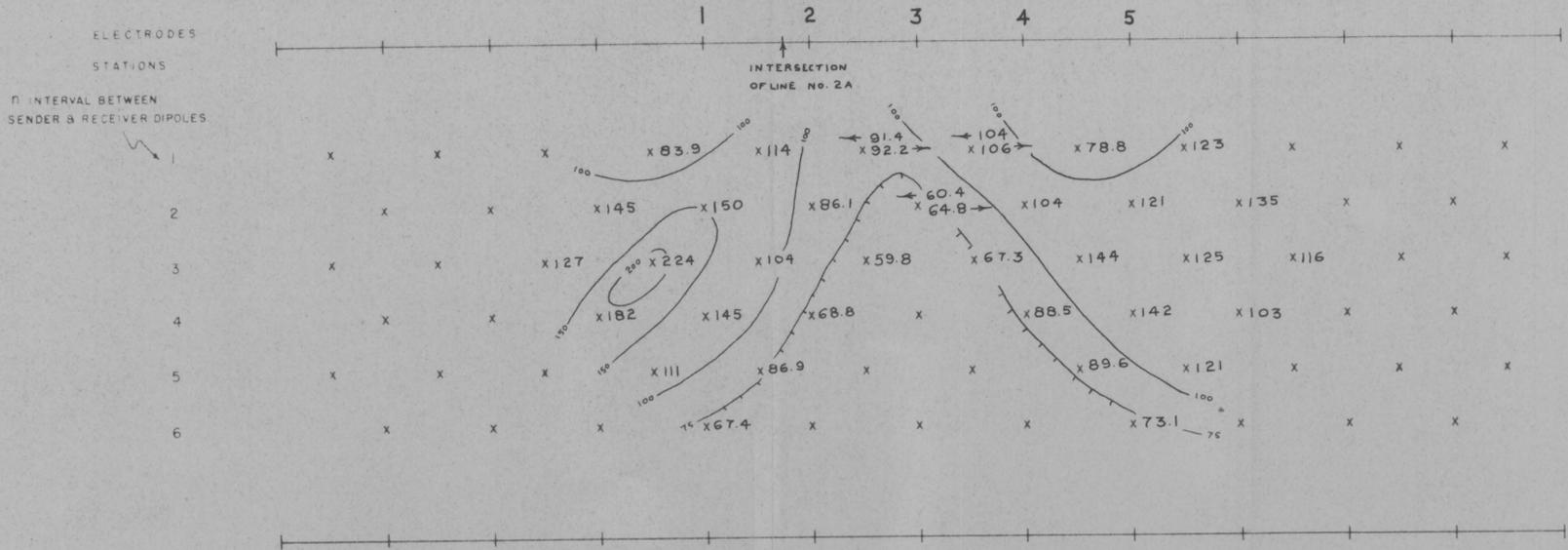
2 B

2 A

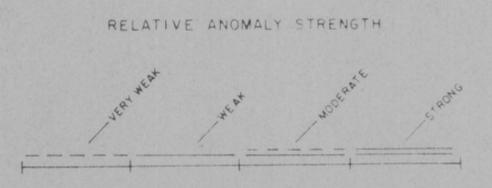
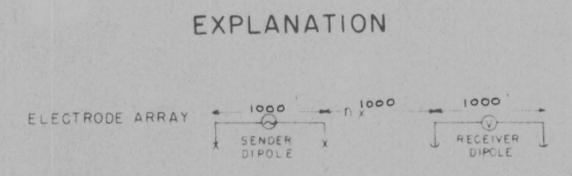
SELF POTENTIAL



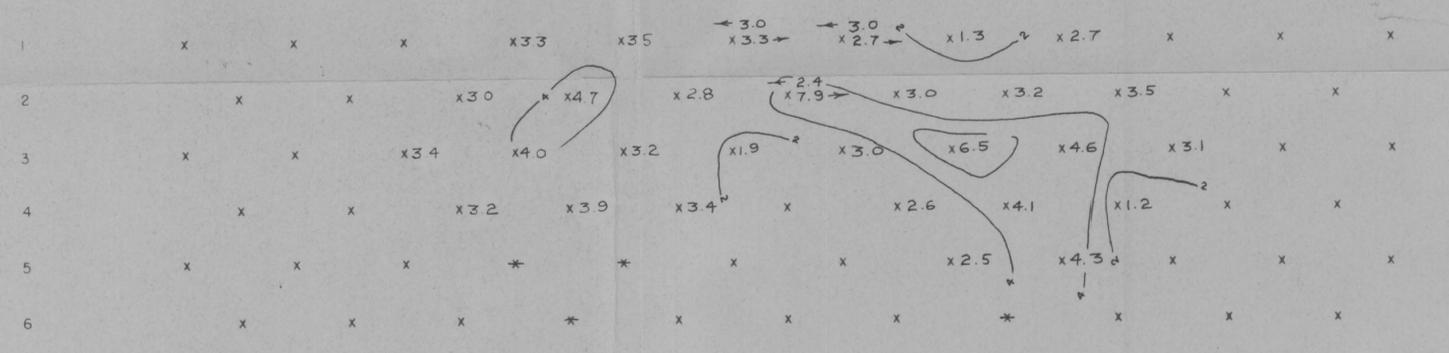
Scan  
Geox-6



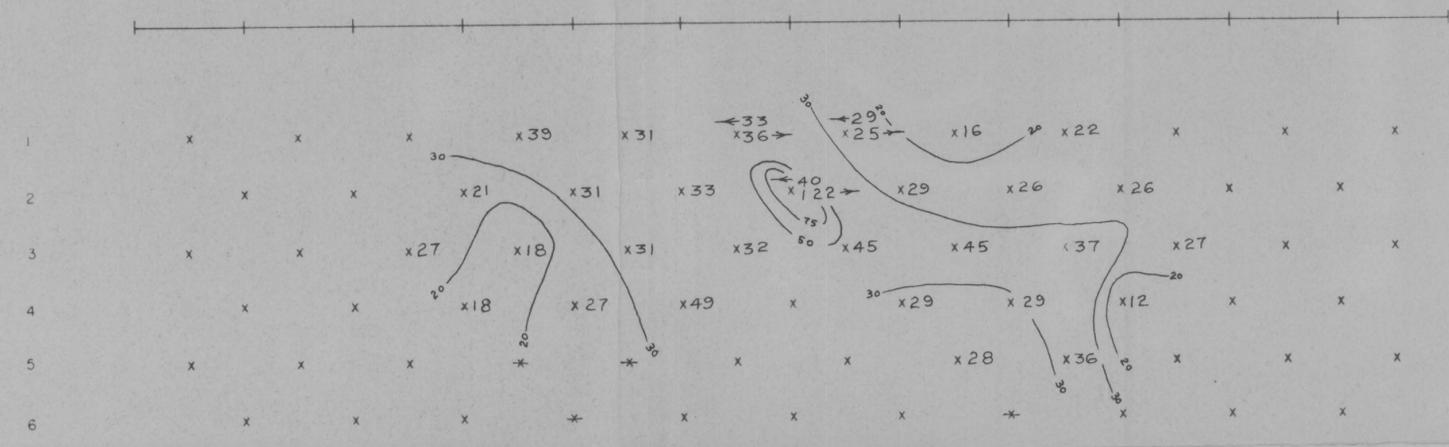
APPARENT RESISTIVITY ( $\rho_{DC}$ )  
IN UNITS OF OHM FEET  
CONTOUR INTERVAL LOGARITHMIC  
SENDER FREQUENCY 0.05 C.P.S.



LOOKING NORTH



PERCENT FREQUENCY EFFECT (PFE)  
CONTOUR INTERVAL CONSTANT  
SENDER FREQUENCIES: 0.05 & 3.0 C.P.S.



APPARENT "METALLIC CONDUCTION" FACTOR (MGF)  
(MGF =  $\frac{\rho_{DC}}{PFE \times 1000}$ )  
CONTOUR INTERVAL LOGARITHMIC

BUTTE MINE AREA

SECTIONAL DATA SHEET

LINE NO. 1

INDUCED POLARIZATION TRAVERSE

HEINRICH'S GEOEXPLORATION COMPANY

SCALE: 1" = 1000'

DATE: MAY 1965

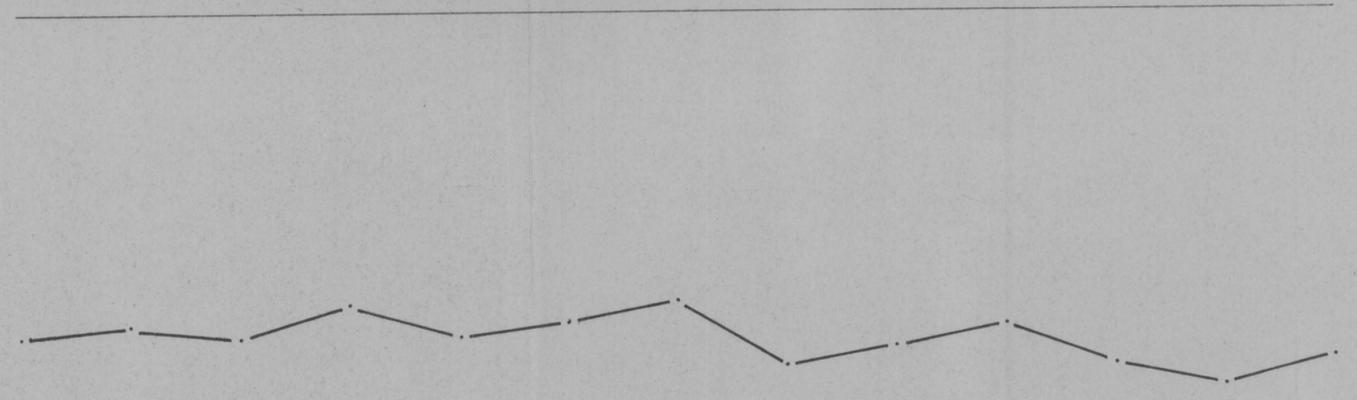
FOR

DUVAL CORPORATION

+50 M.V.

0 M.V.

-50 M.V.



Scan  
Geox-5