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GEOPHYSICAL SUPPLEMENT No. 1 (I. P.)

Atlas Valley Project
Trend Claim Group
Pima County, Arizona

for

Dr. Thomas W. Mitcham

February 1962

by

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

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Resistivity Profile
Percent Frequency Effect Profile
Metallic Conduction Profile
Self Potential Profile

Lines 6 & 7
Sectional Data Sheet
Resistivity Profile
Percent Frequency Effect Profile
Metallic Conduction Profile
Self Potential Profile

INTRODUCTION

In February 1962 Heinrichs Geoexploration Company extended the induced polarization coverage of part of the Trend Claim Group, Atlas Valley, Pima County, Arizona. Two NE - SW profiles were read in sections 19 & 20, T11S, R8E parallel to former profile No. 3 and bracketing it 1000 ft. north and 1000 ft. south. A 500 ft. electrode spacing was used and each profile was an overlapping end-on-end spread totaling 9500 ft. in length.

CONCLUSIONS AND RECOMMENDATIONS

The lack of strong correlation and extension from Line 3 to Lines 4, 5, 6 & 7 adds some doubt to the importance of the original anomalism obtained on Line 3.

Based on this, and the better control from the three drill holes and the nearby known production, we are forced to recommend any immediate further attention be concentrated around the area of Line 1, where we have our highest I. P. readings. Strong anomalism at drill hole #3 decreased rapidly with depth until the increase at the 5th separation. The basalt contact to the west and fault contact to the east may influence these data considerably and may partially explain why no sulfides were encountered in this hole to 474 ft. On the other hand, the effects increase with depth around Hole #1 -- especially at the 3rd and 4th separation. Although, this could be at least

partly due to water table, post mineral rock contacts, and magnetite and other surface float, or other unknown causes, it somehow still seems possible to be due to sulfides at depth below 440 ft. Similar magnitude deeper I. P. effects noted on Lines 2 and 3 are a little smaller and/or weaker and are from deeper separation readings involving slightly higher resistivities. Therefore we also conclude these effects to be located shallower on line 1 than on lines 2 and 3.

Somehow, the lack of positive-consistent-strong results is generally discouraging. Perhaps we have been trying to process too large a volume on too broad a basis. In this light, a spread or spreads parallel to Line 1 or across its western end should be informative toward deciding whether or not to deepen hole #1. Or, alternatively, the latter might be considered directly. If more I. P. work is done, five hundred foot dipoles would give greater detail and resolution but might not be deep enough and therefore 750 ft. dipoles are considered safer, at least until greater knowledge is obtained and greater detail needed. A spread might also be considered across the mag anomaly in SW Sec. 17.

INTERPRETATION

1. Except for local variations the over all resistivities on Lines 1, 2 & 3 showed a definite increase to the east, especially with depth, and some indication of possible minor

up-turn to the west. This general situation is more or less confirmed by Lines 4, 5, 6, & 7, especially on 6 & 7. Thus, we have a sort of resistivity " trough" with the lowest over all resistivities on the south end of the area. These are probably due to a combination effect from the basalt-andesite hills, water table, faulting in the basalt-andesite, and possibly the contact underlying the basalt-andesite and/or associated faulting and mineralization along or below it.

2. Polarization effects on Lines 4, 5, 6, & 7 are mainly of background magnitude, or at best very weak. We believe the decreased polarization effects noted between these and Lines 1, 2 & 3 is due to a combination of greater reading resolution and decreased penetration on 500 ft. dipoles versus 750 ft. dipoles, much quieter interference noise conditions and better ground coupling from wetter ground during the period of running the 500 ft. spreads. Therefore, the previously interpreted anomalism on lines 1, 2 & 3 must now be somewhat down graded from our former statement:" probability of sulfides causing stronger readings". The only definite polariztion and resistivity correlation obtained on all 7 lines seems to be mainly related to faulting and/or contacts. A very weak indication of possible increased polarization effects on both the extreme east and west ends of lines 4, 5, 6 & 7 also correlates somewhat with the above mentioned resistivity "trough" interpretation.

Otherwise, overall on these four lines, except locally along possible faults or other local effects, there may be a slight general decrease in polarization effects with depth. Similarly comparing general relative polarization effects on the first three lines, Line 1 increases somewhat with depth and to the west, Line 2 decreases with depth and to the west, and Line 3 increases very slightly on the east, especially with depth and somewhat on the west also, although the overall effect is a decrease with depth.

3. Self potential level generally increases weakly and erratically to the west on Lines 1, 2, 3 and 5 and also to the east on Lines 4 & 6. Furthermore, the east end of Lines 1 & 3 show a weak suggestion of possible reversal back up to the east. Obviously these effects seem to correlate mostly with a combination effect of the topography, faulting, contacts and the altered premineral rocks. The latter especially seem to show up well as a definite smooth S. P. low on the east end of Line 6, with a somewhat similar inference on the east ends of Lines 1 & 3 and possibly 2.

4. In trying to correlate possible sulfide indications, we are left with: (a) extremely weak I. P. effects along faulting and/or contacts and on the extreme east and west ends of Lines 4, 5, 6 & 7. (b) definite fault and/or contacts on Lines 1, 2 & 3 with associated resistivity and polarization effects, but with the latter not well tied. (c) Questionably tied I.P. effects

at depth centered at station 0.75E on Line 2, around drill hole #1 and between drill holes 2 & 3 on Line 1 and coming up to the east from the west end of Line 3. (d) The S. P. low, especially on the east end of Line 6.

Since the latter correlates with very weak PFE's and MCF's obtained on Line 6 it is interpreted to be definitely sulfides, but a very minor amount. It is now questioned if the shallow faulting indications, especially on the interior of the lines, relates to very much if any sulfides. We were originally quite skeptical of the double parenthesis values shown on Lines 1 & 2. However, if we have detected any significant possible concentrations of sulfides at depth at all, it now appears they would have to relate to these questioned values as well as the zone coming up to the east from the west end of Line 3. This may be borne out in that there is some suggested indication of the known sulfides at 400 ft. in drill hole #2 in the data from this area. A question then is why the stronger and shallower I. P. indications on the west end of Line 1 where drill hole #1 is 40 ft. deeper and no sulfides are reported? Actually since many things can account for depth discrepancies of the order of +/- 25%, unless hole #1 were below 550 ft. we cannot be absolutely certain that these data are not due to sulfides.

5. Although sulfides cannot be related directly to magnetics, and the deeper magnetic effects here are severely and erratically masked by the basalt, some possible indirect factors

are noted. The small low and broader low crossed by the west half of Line 3, extend just barely or not at all to Lines 4, 5, 6 & 7. These correlate somewhat with the I. P. anomalism on Line 3. If sulfides are involved, this could be an indication of why much less I. P. effect was noted on Lines 4, 5, 6, & 7. Also, the mag. lows near station 4W on Lines 5 & 7 and station 0.5E on Line 4 have a weak I. P. correlation. Of course some of the mag. picture is affected by the control used and to some extent may be graphic rather than real. Another correlation noted is the SW fault (?) lineation extending along strike from the smooth mag. high in the SW corner of Sec. 17.

Respectfully submitted,

HEINRICHS GEOEXPLORATION CO.

Walter E. Heinrichs, Jr.
President & General Manager

February 13, 1962
P. O. Box 5671
Tucson, Arizona

GEOPHYSICAL INVESTIGATIONS

ATLAS VALLEY PROJECT
TREND CLAIM GROUP

Pima County, Arizona

for

Dr. Thomas W. Mitcham

June 1961

by

HEINRICHS GEOEXPLORATION COMPANY
P. O. BOX 5671 TUCSON, ARIZONA

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Sectional Data Sheets, Line #1, #2 & #3

Map #1----------Magnetic Profile----------In Pocket

Map #2----------Induced Polarization---------In Pocket

Original Mobile Magnetic Records------Separate Cover

INTRODUCTION

During the period June 23 through July 1, 1961, Heinrichs Geoexploration Company conducted induced polarization and reconnaissance mobile magnetic surveys over portions of the Trend Claim Group in the Atlas Valley area in Sections 17, 18, 19, 20, 29 and 30,T 11S, R 8 E. This work was performed at the request of Dr. Thomas W. Mitcham. The induced polarization work consisted of three observed lines totaling 27,000 ft. of profile traverse. The magnetic work included 14 miles of profile traverse.

CONCLUSIONS AND RECOMMENDATIONS

1. Resistivities increase to the north and to the east. Basement (?) intrusives outcrop to the east and the northerly increase is interpreted as a thinning of volcanics (decrease in depth to basement) or with the possibility offered that this effect could be the result of a lithologic change in the volcanics.

2. Polarization effects are strongest in the vicinity of an apparent fault zone possibly indicative of (massive?) sulfides?

3. Polarization effects are generally stronger west of this fault zone and generally seem to increase to the north or northwest.

4. The anomalous zone was not terminated on the west by Lines #1 and #3 but apparently was by Line #2. It might eventually be desirable to extend these lines to the west.

5. We are not certain of the exact significance of the relative difference in effects noted on the three lines. Generally, Line #1 is fairly anomalous though somewhat erratic, Line #2 a little less anomalous, but more consistent and Line #3 most anomalous and consistent. Of course, 3,000' between lines is quite a distance and could involve considerable geologic changes or differences. Thus the effects could be from one broad feature or could be from two or three separate and distinctly different features. However, we believe the probability of sulfides causing the stronger readings noted is good on all three lines.

6. At this stage, we believe the degree of I. P. effect and general indications and geologic inferences are sufficient to require that drill hole confirmation be obtained at the center of greatest effect on Line #3. Ideally, it would be desirable to close off the important areas on all sides, especially North and South and particularly to the North, and in more detail. This likely would provide more positive interpretation and possibly a better and more accurately located drill target site. Obviously this would involve the bare risk that the causes are not due to sulfides.

PROCEDURES

A 750 ft. electrode spacing was selected as optimum to produce the desired coverage and detail.

Line #1 was centered at the south end center monument of Trend #43 and run S 65° W - N 65° E along the end lines of the group. Line #2 was centered at the common corner of Trend claims 55, 56, 64 and 65 and run along the common end lines. Line #3 was centered at the common end center of Trend 80 and 89 and run along the end lines.

Line #1 was first run on June 22 and 23. The data appeared to be somewhat erratic and the line was repeated on June 28. It was later learned, from reports of the National Bureau of Standards CRPL Radio Warning Service, that an intense solar Geomagnetic storm was occuring during the time of the first running of this line and this probably accounted for the variable tellurics and resultant data erraticism. (See CRPL report which is attached).

The only problem of high A.C. noise level was at the east end of Line #1 where it crossed a north-south power line.

Rugged terrain contributed to the extra time required to conduct this survey, as also did the project's location which involved some 3 to 3½ hours travel time daily.

INTREPRETATION

The observed polarization effects on all three lines are unusually large and must be considered to be anomalous. The surface resistivities are very low at the western ends of the lines and increase abruptly on the eastern end of the lines

indicating a sharp lithologic boundary. A marked resistivity low trough appearing on lines #1 and #3 is interpreted as a fault zone. In general the resistivities increase to the north and east. The metal factors and frequency effects increase to the north and west. This suggests the possibility that the volcanics thin to the north and that if the anomalous polarization effects can be attributed to sulfides, then mineralization becomes more intense to the north and west. It should be emphasized that the low resistivities encountered, particularly on Line #1 provide for very small potential difference observations often approaching the background noise level and that this fact must be considered as a possible source of at least some of the anomalous polarization effects. However, a comparison of these results with those obtained in other similar low resistivity areas, shows that the effects in this area are from two to three times larger. It is therefore a good probability that they are due to sulfide mineralization.

Line #1 had an average resistivity of only 10 ohm ft./2pi for the west half and of 32 for the east half. A distinct resistivity trough with a resistivity of about 6 appears between 1.5 and 2.25E indicative of a major fault zone in this area. East of 2.25 the resistivity increases abruptly and represents the exposed basement rocks on the up side of the fault. The strongest polarization effects occur from about 1.5E to 0 E-W with moderate effects extending west an unknown distance.

Line #1 passed through the collars of three drill holes, A.V. #1 located at I.P. station 1.5W, A.V. #3 at about .9E and A.V. #2 at about 2.4E. Holes #1 and #3 were terminated in post mineral andesite and basalt at depths of 440 and 474 ft. respectively. Hole #2 passed from post mineral andesite and basalt through a fault zone to pre mineral dacite porphyry at about 280 ft. Sulfide mineralization of about 0.7% is reported in the core at 398 ft. The line did not extend far enough east to absolutely determine the relative effects due to the slightly mineralized dacite east at the fault. However, if penetration through the low resistivity andesite was accomplished, the effects west of the fault are then indicative of stronger sulfide involvement. One factor that would possibly have aided in determining whether observed effect were due to disseminated magnetite in, or other physical properties of, the andesite, or to mineralization in the basement, would have been to use an electrode spacing smaller than the known thickness of the andesite.

The eastern limits of Line #2 did not extend to the east as far as either Line #1 or Line #3. The average resistivity of both ends of the line was about 22 ohm ft./2pi, possibly indicative of a shallower depth to basement although this could be indicative of a lithologic change in the surface volcanics. The sharp resistivity trough does not appear on this line and it is tentatively thought that it did not extend to the east far enough

to cross the fault. A broad resistivity low does extend from about 0 to 1.5E or 2.25E and conceivably could be the reflection of the fault zone in this area. This low generally corresponds to the zone of most intense polarization effects. These effects, while not as large in magnitude as those on Line #1, are nevertheless anomalous and somewhat more consistent and therefore tentatively ascribed to sulfides.

Line #3 had an average resistivity of 19 ohm ft./2pi for the west half and of 32 for the east half. A resistivity trough somewhat broader than that seen on Line #1 is centered between .75E and 1.5E and is thought to be the northerly extension of the fault. Polarization was strongest over this fault zone although the entire length of this line showed relatively moderate to fairly strong anomalism.

MAGNETICS

On June 24, 1961 the mobile magnetometer was run over the roads and trails on and around the Trend claim group. Ten records were made for a total of 14 profile miles. A map was furnished with this report showing the coverage of the traverses and with the magnetic profiles transposed from the records to the map.

As expected, the volcanic rocks of the area give rise to an erratic magnetic picture. This makes interpretation difficult and with this and the sparsity of coverage obtained, the following general conclusions seem presently justified.

1. The southern part of the claim group has many bedrock exposures and the alluvium is everywhere thin in this area. Bedrock is volcanic--andesite and basalt--but the profile magnetic record is actually surprisingly relatively smooth for these rock types.

2. The northern-central part has more alluvial cover in places but the highest degrees of anomalism were found here.

3. Three features warrant some focus of attention:

On Record #2, the first break in magnetic level, just west of the ¼ corner 20/29 is the most positive fault indication on any of the profiles.

Records #6 & #9 cross a major magnetic high in alluvial covered ground near the common corner of Trend 95, 96, 104, 105.

Off the claim area to the east, on the main road south of the windmill (Record #8) there is a major magnetic low, quite distinctive from the rest of this record.

CONCLUSIONS

1. Because of the terrain and rock types no further reconnaissance magnetic work is justified.

2. As specific zones of interest are developed by other means, i.e. geology, other geophysics, drilling, etc., closely spaced hand magnetometer profile lines could show faults, contacts and dips and be of considerable value.

3. There are several subtle suggestions of layering with a westward dip. Possibly there are a series of flows or sills and some basement movement has tilted them. On the other hand, there are also some easterly dip indications.

4. Not enough coverage was obtained to enable any practical contouring. Obviously however, the central part of the claim group is a magnetic high and the northwest portion is, in general, a somewhat magnetically low area.

5. The sharp magnetic high on the west end of Record #10 appears to be a small andesite dike, probably extending north from the hill just to the south.

6. Most of the anomalism detected is probably due to segregations of more magnetic materials in different stages of the volcanic emissions. Other occasional variations may be due to structural and formational changes but without more information we cannot separate them.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

Franklin A. Seward
Geophysicist

John W. Marlatt
J. W. Marlatt
Geologist

July 13, 1961
P. O. Box 5671
Tucson, Arizona

CRPL-Jb' 313 CRPL RADIO WARNING SERVICE 6/28/61
Boulder, Colorado

Geomagnetic Forecast through July 5, 1961

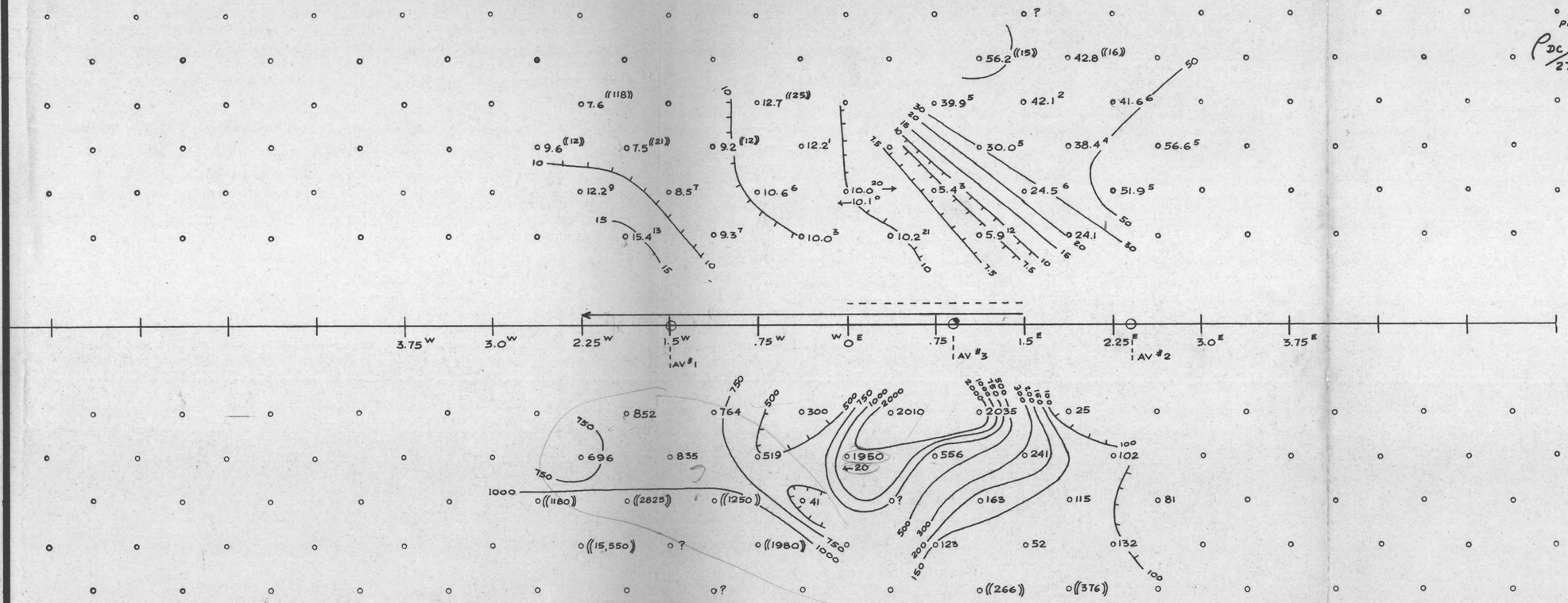
An increase in magnetic activity is expected June 30-July 2 based on 27-day recurrence. Otherwise the period is expected to be quiet.

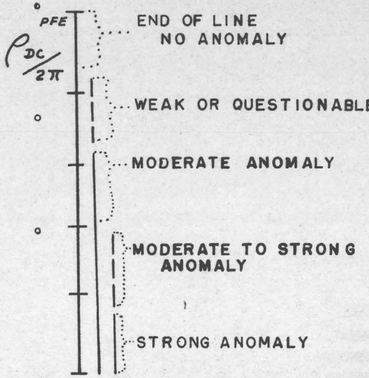
Record of Geomagnetic Activity Index, "A" -Belvoir

June 21-27: 39-40-08-07-08-04-08**

Storm (Belvoir) June 20, 18XX UT (GB) to June 23, 03XX UT.

**In recent months the middle 33% of A-Belvoir values has been in the range ~9 to ~15. The "A" figure is one which increases in value with increasing degree of magnetic disturbance; A's <05 are very quiet, A's >25 are definitely disturbed.





C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M.C.F.

SECTIONAL DATA SHEET

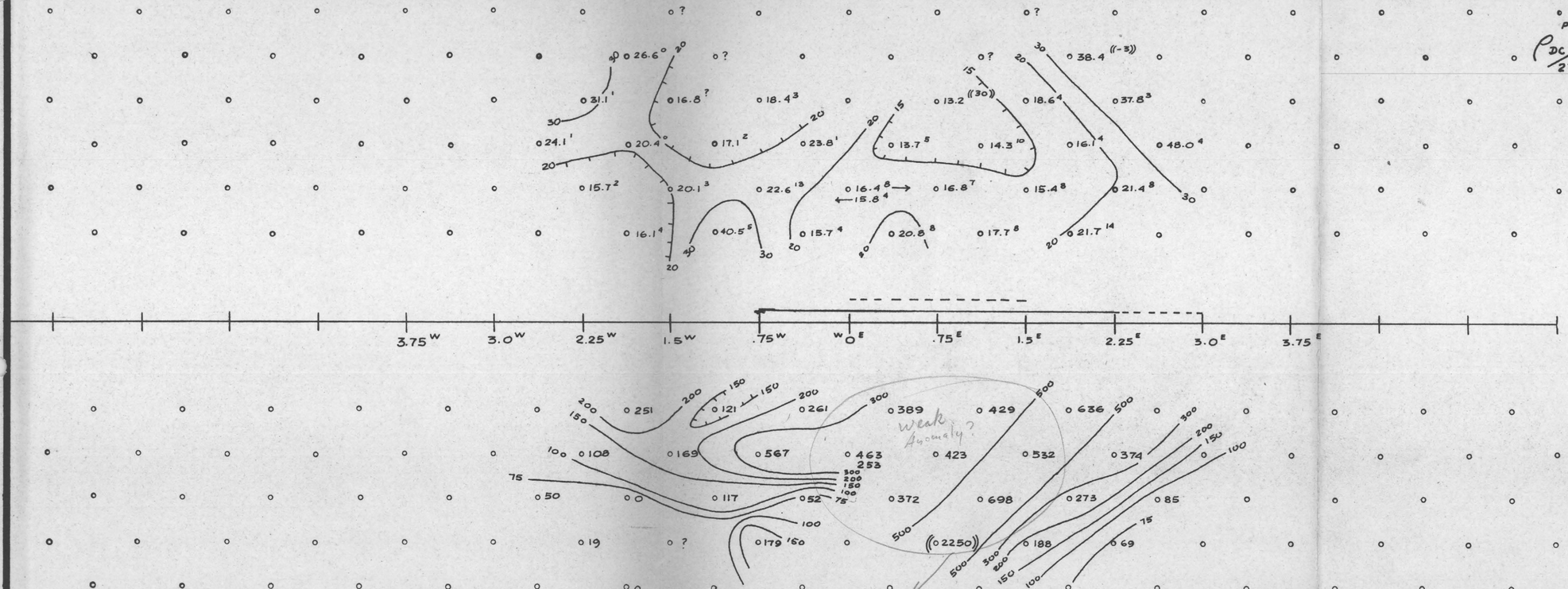
LINE No. 1

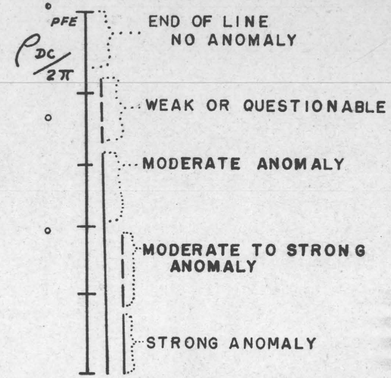
INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 750'

DATE July 1961





C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M.C.F.

SECTIONAL DATA SHEET

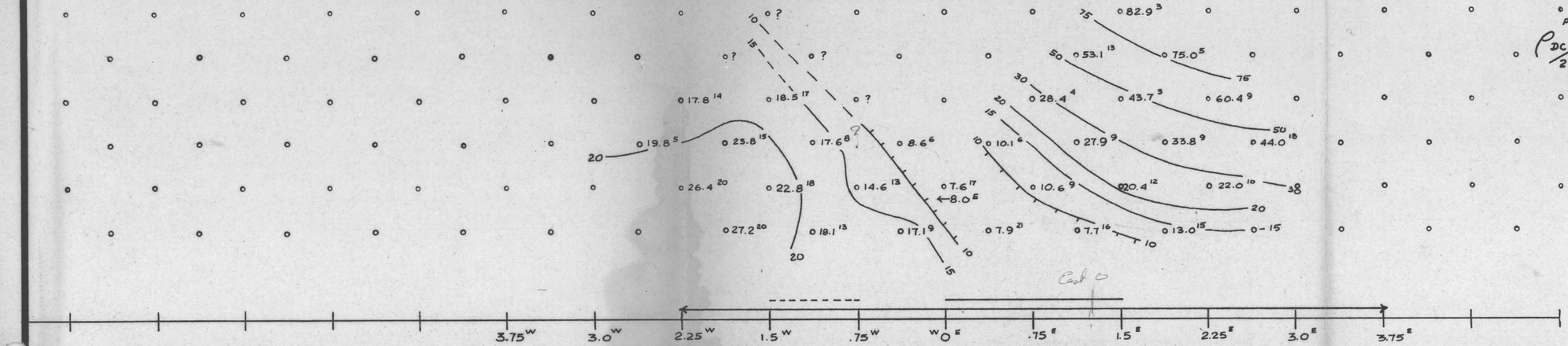
LINE No. 2

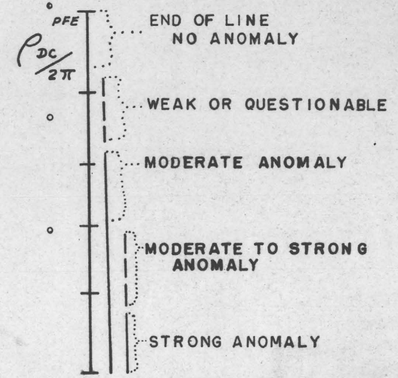
INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 750'

DATE July 1961





C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M.C.F.

SECTIONAL DATA SHEET

LINE No. 3

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 750'

DATE July 1961

R. 8 E.

T. 11 S.

To Red Rock

To Silverbell

x Windmill

LINE #3

LINE #2

LINE #1

Trail road

No 8... Number, location & Direction of Traverse by Mobile Magnetometer

Drill hole

END OF LINE NO ANOMALY

WEAK OR QUESTIONABLE

MODERATE ANOMALY

MODERATE TO STRONG ANOMALY

STRONG ANOMALY

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

INDUCED POLARIZATION SURVEY
ATLAS VALLEY PROJECT
FOR
T. W. MITCHAM

TREND CLAIM GROUP
PIMA COUNTY, ARIZONA

SCALE: 1" = 400'	CONTOUR INTERVAL:	REVISIONS
	DATA BY: J. W. M. & F. A. S.	
DATE: JUNE 1961	SHEET 2 OF 2	
DRAWN BY: I. B	DRAWING NO.:	FILE:

Call Don McMillan
at
298-3412

He wants to come in
Today.

12/2/64
3 P.M. 3:30
5:30
W. 2 hrs.
Guggenheim Bros.

R. 8 E.

T. 11 S.

To Red Rock

To Silverbell

X Windmill

No. 1

No. 2

No. 3

No. 4

No. 5

No. 6

No. 7

No. 8

No. 9

No. 10

OH AV-1

OH AV-2

OH AV-3

Vertical scale for profiles : 1" = 400'

INFORMATION

Data obtained by Continuous Recording
Total Intensity Mobile Magnetometer

- Trail road
- No. 5... Number, location & Direction of Traverse
- 45 Claim number
- Magnetic profiles – look at them either northwest or southwest
- Geologic contact
- OH AV-1 Drill hole

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

MAGNETIC SURVEY
ATLAS VALLEY PROJECT
FOR
T. W. MITCHAM

TREND CLAIM GROUP
PIMA COUNTY, ARIZONA

SCALE: 1" = 400'	CONTOUR INTERVAL:	REVISIONS
	DATA BY: J. W. M.	
DATE: JUNE 1961	SHEET 1 OF 2	
DRAWN BY: I. B	DRAWING NO.:	FILE:

GEOPHYSICAL SUPPLEMENT No. 1 (I. P.)

Atlas Valley Project
Trend Claim Group
Pima County, Arizona

for

Dr. Thomas W. Mitcham

February 1962

by

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

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The lack of strong correlation and extension from Line 3 to Lines 4, 5, 6 & 7 adds some doubt to the importance of the original anomalism obtained on Line 3.

Based on this, and the better control from the three drill holes and the nearby known production, we are forced to recommend any immediate further attention be concentrated around the area of Line 1, where we have our highest I. P. readings. Strong anomalism at drill hole #3 decreased rapidly with depth until the increase at the 5th separation. The basalt contact to the west and fault contact to the east may influence these data considerably and may partially explain why no sulfides were encountered in this hole to 474 ft. On the other hand, the effects increase with depth around Hole #1-- especially at the 3rd and 4th separation. Although, this could be at least

partly due to water table, post mineral rock contacts, and magnetite and other surface float, or other unknown causes, it somehow still seems possible to be due to sulfides at depth below 440 ft. Similar magnitude deeper I. P. effects noted on Lines 2 and 3 are a little smaller and/or weaker and are from deeper separation readings involving slightly higher resistivities. Therefore we also conclude these effects to be located shallower on line 1 than on lines 2 and 3.

Somehow, the lack of positive-consistent-strong results is generally discouraging. Perhaps we have been trying to process too large a volume on too broad a basis. In this light, a spread or spreads parallel to Line 1 or across its western end should be informative toward deciding whether or not to deepen hole #1. Or, alternatively, the latter might be considered directly. If more I. P. work is done, five hundred foot dipoles would give greater detail and resolution but might not be deep enough and therefore 750 ft. dipoles are considered safer, at least until greater knowledge is obtained and greater detail needed. A spread might also be considered across the mag anomaly in SW Sec. 17.

INTERPRETATION

1. Except for local variations the over all resistivities on Lines 1, 2 & 3 showed a definite increase to the east, especially with depth, and some indication of possible minor

up-turn to the west. This general situation is more or less confirmed by Lines 4, 5, 6, & 7, especially on 6 & 6. Thus, we have a sort of resistivity " trough" with the lowest over all resistivities on the south end of the area. These are probably due to a combination effect from the basalt-andesite hills, water table, faulting in the basalt-andesite, and possibly the contact underlying the basalt-andesite and/or associated faulting and mineralization along or below it.

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Otherwise, overall on these four lines, except locally along possible faults or other local effects, there may be a slight general decrease in polarization effects with depth. Similarly comparing general relative polarization effects on the first three lines, Line 1 increases somewhat with depth and to the west, Line 2 decreases with depth and to the west, and Line 3 increases very slightly on the east, especially with depth and somewhat on the west also, although the overall effect is a decrease with depth.

3. Self potential level generally increases weakly and erratically to the west on Lines 1, 2, 3 and 5 and also to the east on Lines 4 & 6. Furthermore, the east end of Lines 1 & 3 show a weak suggestion of possible reversal back up to the east. Obviously these effects seem to correlate mostly with a combination effect of the topography, faulting, contacts and the altered premineral rocks. The latter especially seem to show up well as a definite smooth S. P. low on the east end of Line 6, with a somewhat similar inference on the east ends of Lines 1 & 3 and possibly 2.

4. In trying to correlate possible sulfide indications, we are left with: (a) extremely weak I. P. effects along faulting and/or contacts and on the extreme east and west ends of Lines 4, 5, 6 & 7. (b) definite fault and/or contacts on Lines 1, 2 & 3 with associated resistivity and polarization effects, but with the latter not well tied. (c) Questionably tied I.P. effects

at depth centered at station 0.75E on Line 2, around drill hole #1 and between drill holes 2 & 3 on Line 1 and coming up to the east from the west end of Line 3. (d) The S. P. low, especially on the east end of Line 6.

Since the latter correlates with very weak PFE's and MCF's obtained on Line 6 it is interpreted to be definitely sulfides, but a very minor amount. It is now questioned if the shallow faulting indications, especially on the interior of the lines, relates to very much if any sulfides. We were originally quite skeptical of the double parenthesis values shown on Lines 1 & 2. However, if we have detected any significant possible concentrations of sulfides at depth at all, it now appears they would have to relate to these questioned values as well as the zone coming up to the east from the west end of Line 3. This may be borne out in that there is some suggested indication of the known sulfides at 400 ft. in drill hole #2 in the data from this area. A question then is why the stronger and shallower I. P. indications on the west end of Line 1 where drill hole #1 is 40 ft. deeper and no sulfides are reported? Actually since many things can account for depth discrepancies of the order of +/- 25%, unless hole #1 were below 550 ft. we cannot be absolutely certain that these data are not due to sulfides.

5. Although sulfides cannot be related directly to magnetics, and the deeper magnetic effects here are severely and erratically masked by the basalt, some possible indirect factors

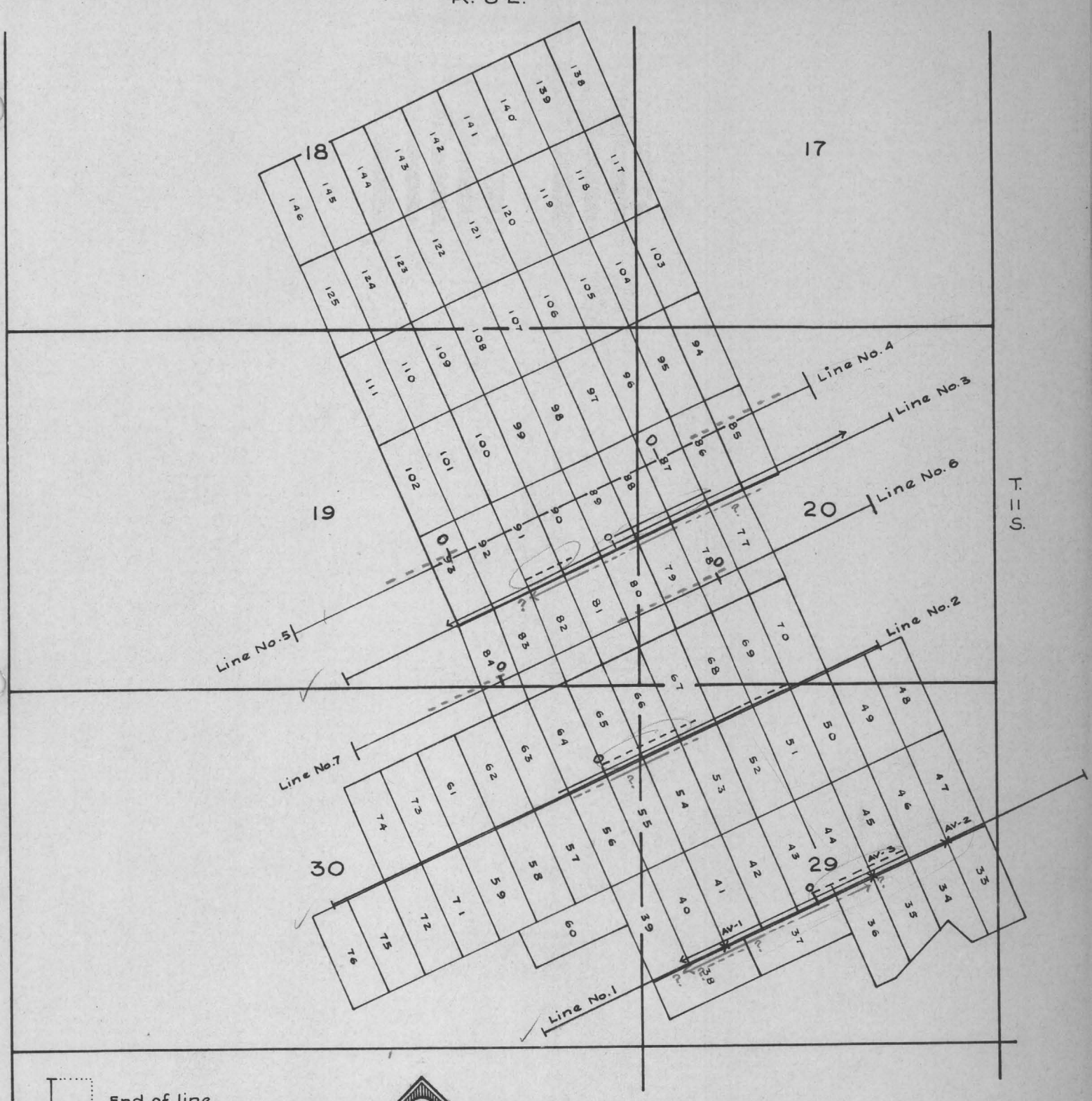
are noted. The small low and broader low crossed by the west half of Line 3, extend just barely or not at all to Lines 4, 5, 6 & 7. These correlate somewhat with the I. P. anomalism on Line 3. If sulfides are involved, this could be an indication of why much less I. P. effect was noted on Lines 4, 5, 6, & 7. Also, the mag. lows near station 4W on Lines 5 & 7 and station 0.5E on Line 4 have a weak I. P. correlation. Of course some of the mag. picture is affected by the control used and to some extent may be graphic rather than real. Another correlation noted is the SW fault (?) lineation extending along strike from the smooth mag. high in the SW corner of Sec. 17.

Respectfully submitted,

HEINRICHS GEOEXPLORATION CO.

Walter E. Heinrichs, Jr.
President & General Manager

February 13, 1962
P. O. Box 5671
Tucson, Arizona



End of line no anomaly

Weak or questionable

Moderate anomaly

Moderate to strong anomaly

Strong anomaly

1 interpretation 2/62

INDUCED POLARIZATION SURVEY
LOCATION MAP
TREND GROUP
ATLAS VALLEY
Pima County, Arizona

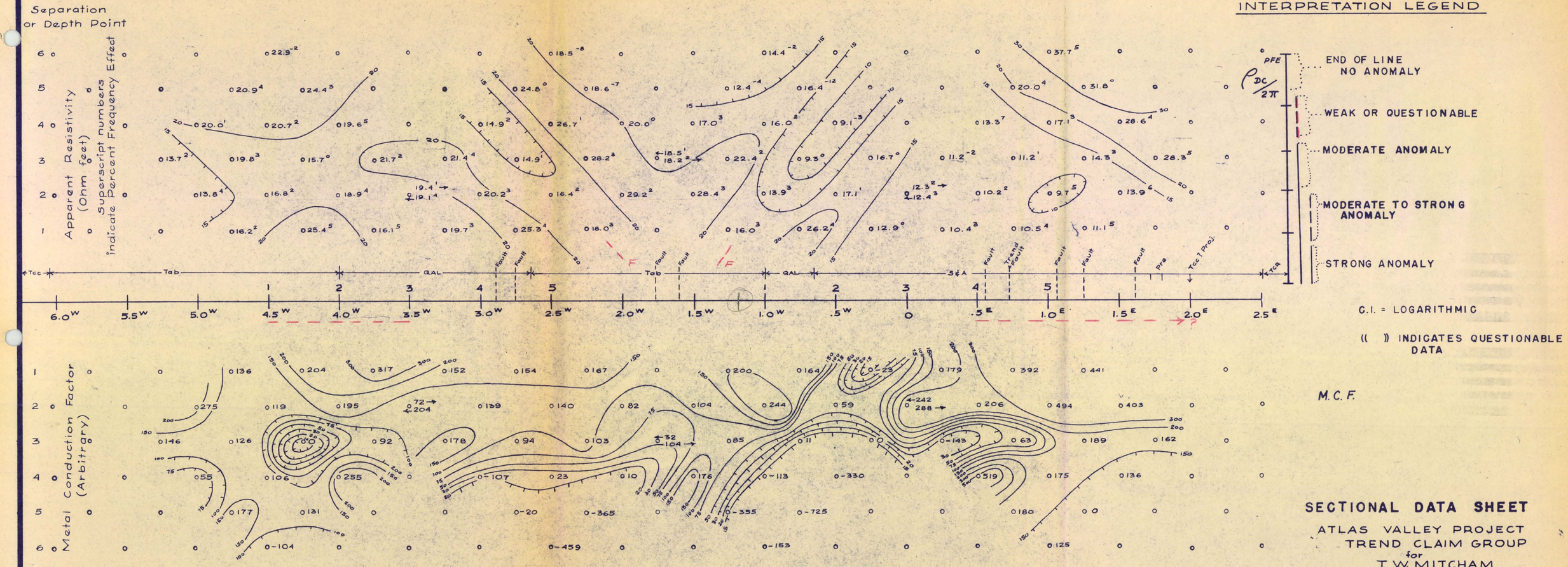
for

T. W. MITCHAM

by

HEINRICHS GEOEXPLORATION CO.

Date: February 1962 Scale: 1" = 2000'



INTERPRETATION LEGEND

- END OF LINE NO ANOMALY
- WEAK OR QUESTIONABLE
- MODERATE ANOMALY
- MODERATE TO STRONG ANOMALY
- STRONG ANOMALY

C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M.C.F.

LEGEND

Qt	Travertine	Tsb	Silver Bell FM
Qal	Alluvium	Tcc	Claflin Ranch FM
Tvc	Volcanic Conglomerate	S&A	Shallow & altered
Tab	Andesite Basalt	Pre	Premineral rocks
Tcr	Cat Mtn. Ryolite		

SECTIONAL DATA SHEET

ATLAS VALLEY PROJECT
TREND CLAIM GROUP
for
T. W. MITCHAM

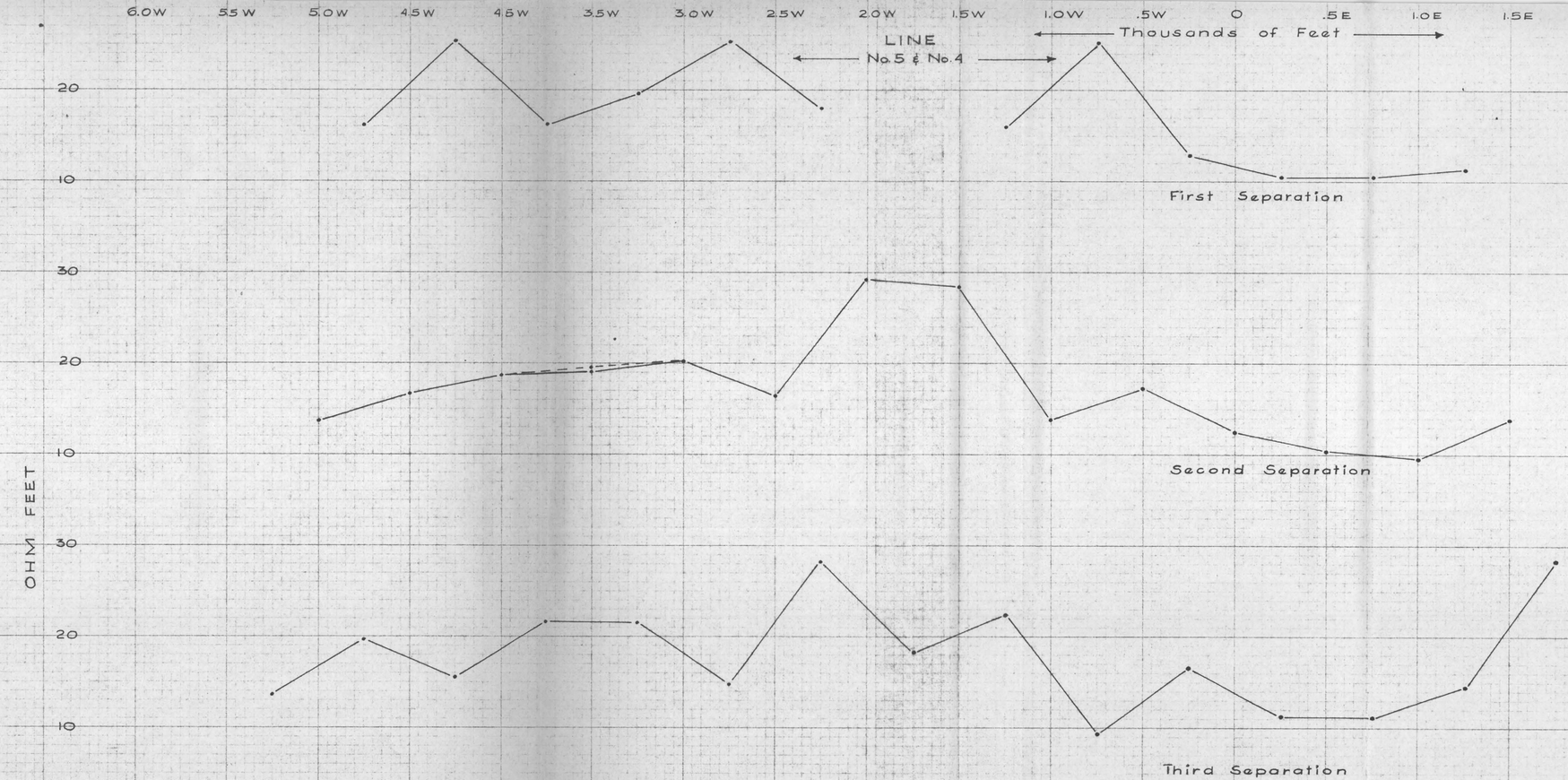
LINE No. 4 & 5

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'
DATE Feb. 1962

Geology from T.W. Mitcham

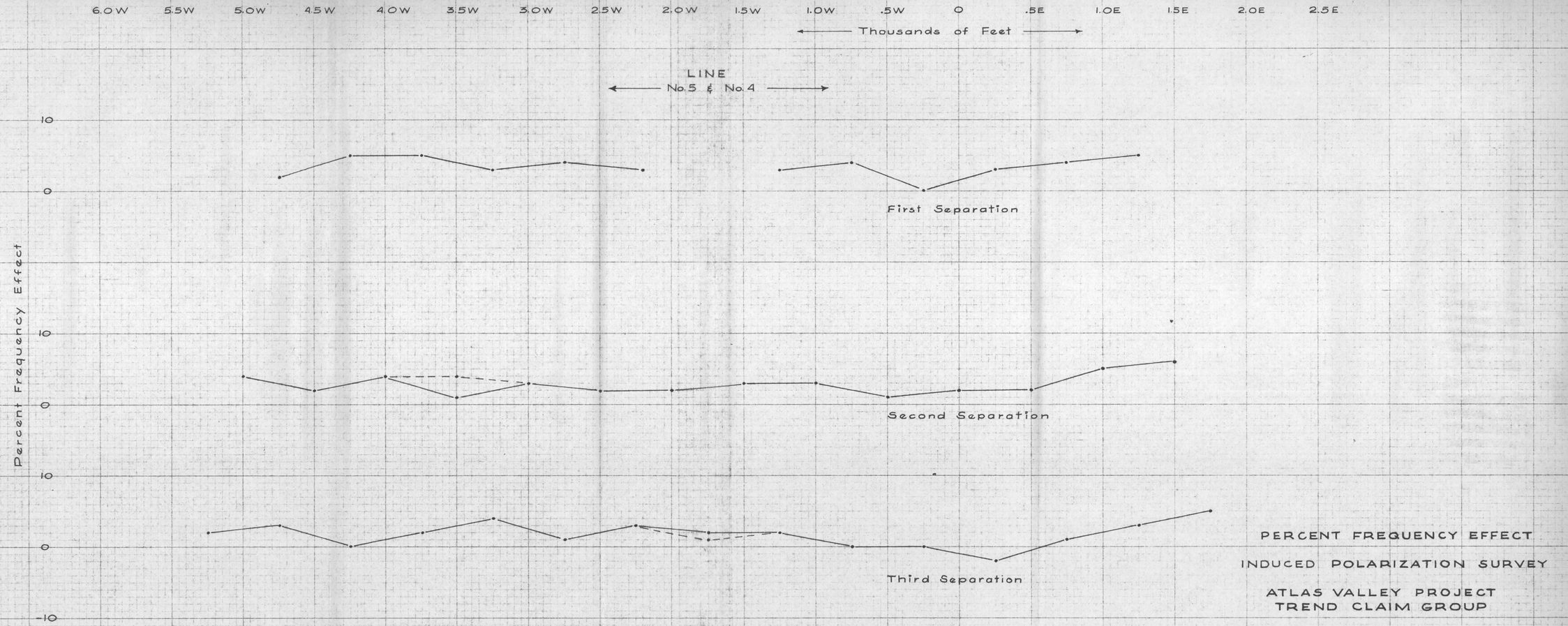


RESISTIVITY

INDUCED POLARIZATION SURVEY

ATLAS VALLEY PROJECT
TREND CLAIM GROUP

Date: February 1962 Scale: 1" = 500'



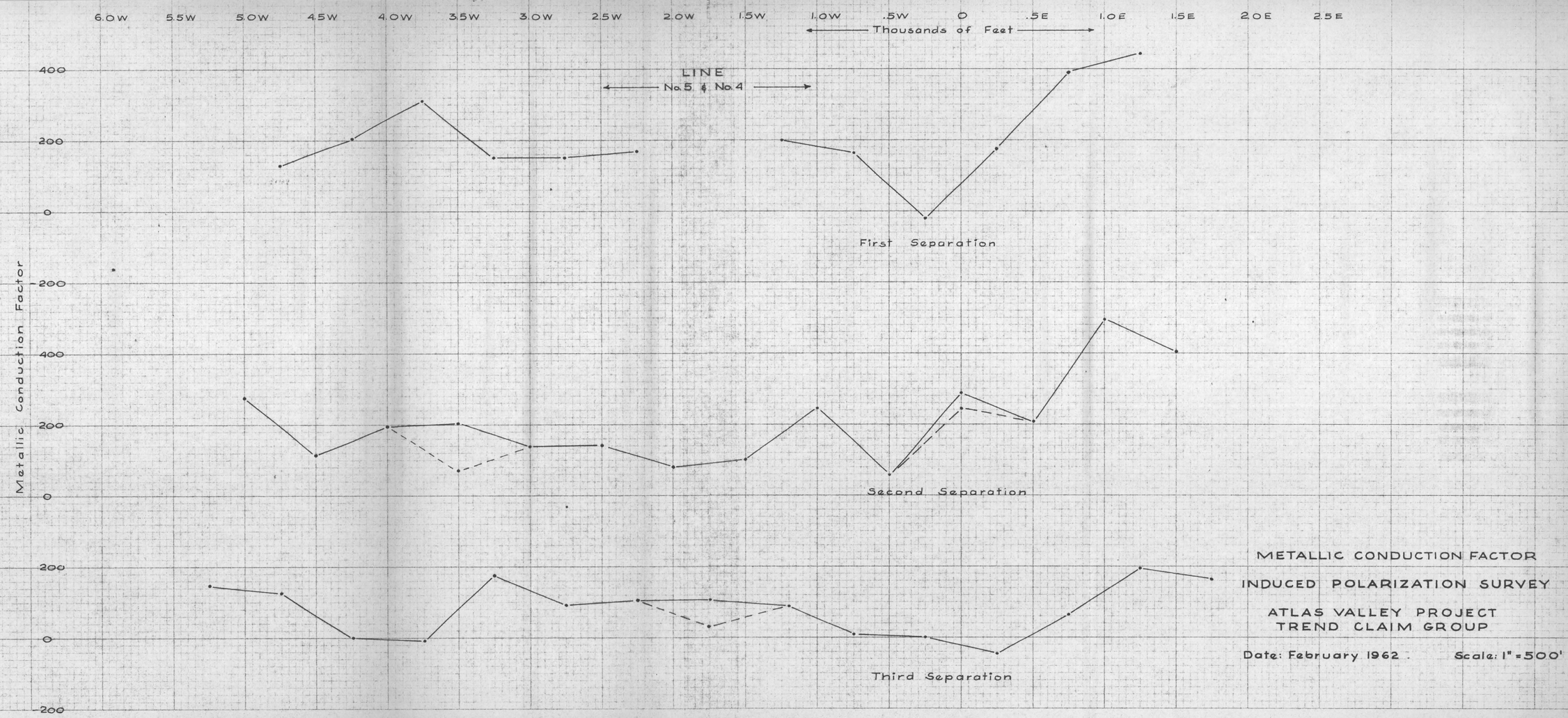
PERCENT FREQUENCY EFFECT

INDUCED POLARIZATION SURVEY

ATLAS VALLEY PROJECT
TREND CLAIM GROUP

Date: February 1962 Scale: 1" = 500'

K+E STANDARD @ CROSS SECTION
10 X 10 TO THE INCH
KEUFFEL & ESSER CO.
MADE IN U.S.A.

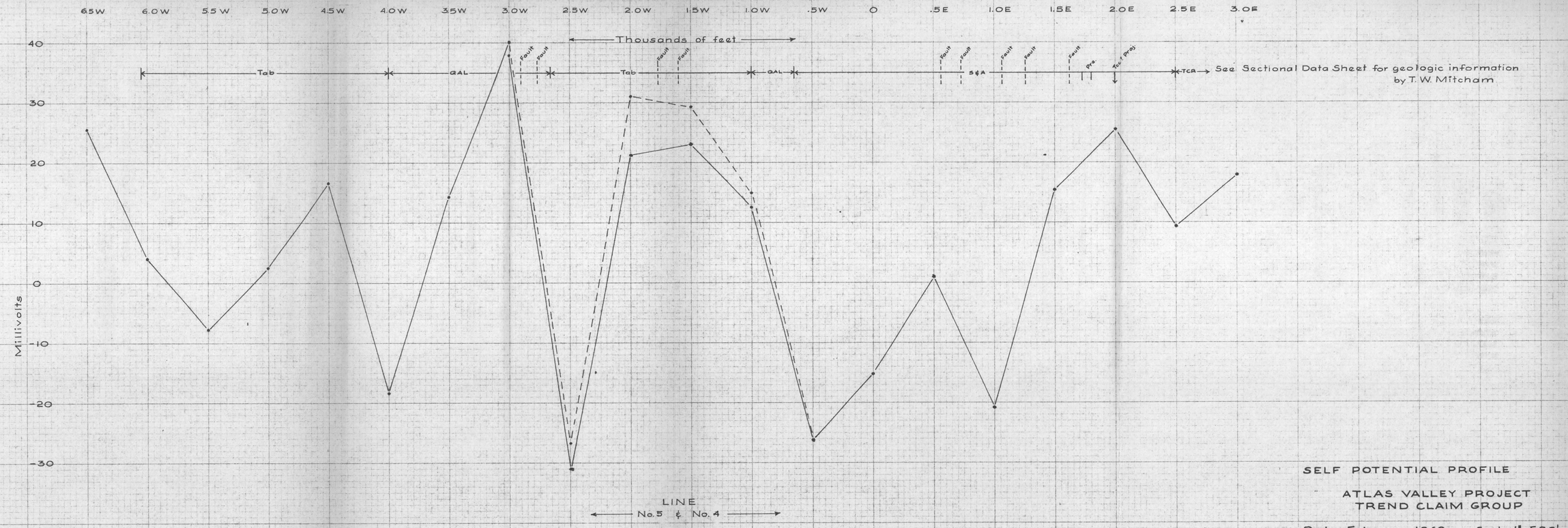


METALLIC CONDUCTION FACTOR

INDUCED POLARIZATION SURVEY

ATLAS VALLEY PROJECT
TREND CLAIM GROUP

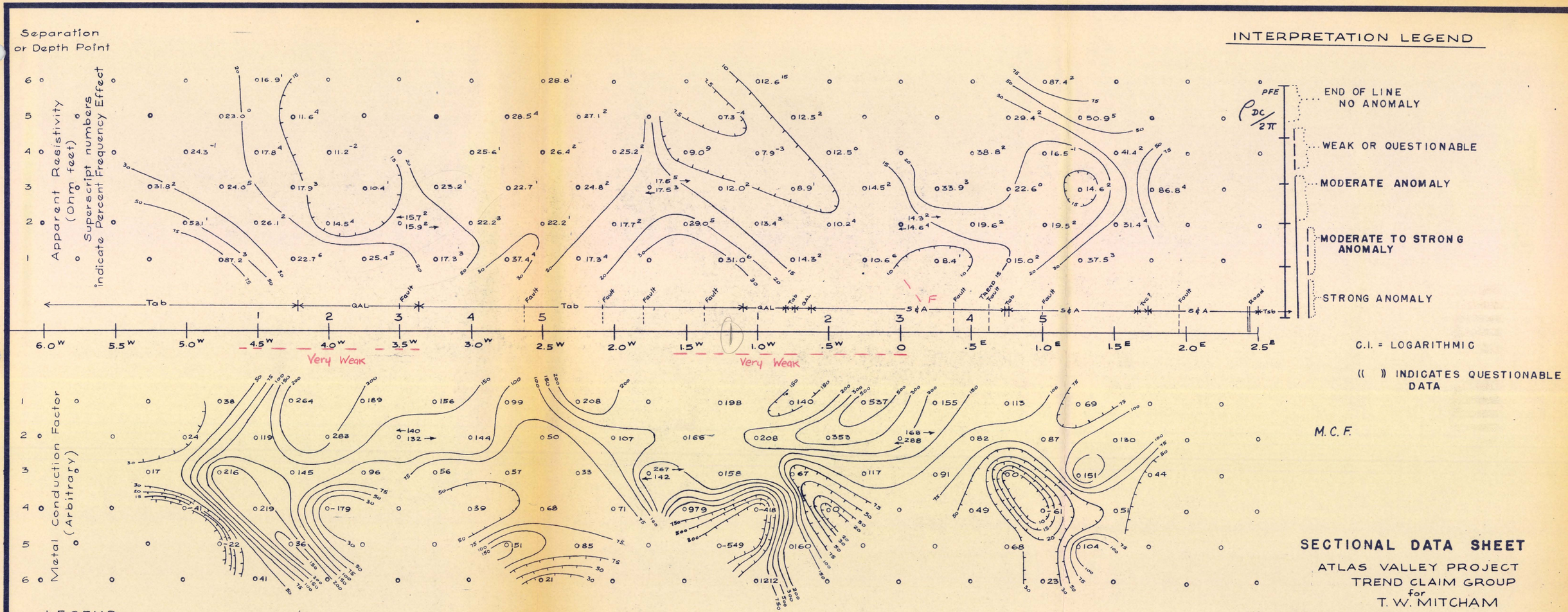
Date: February 1962 . Scale: 1" = 500'



SELF POTENTIAL PROFILE

ATLAS VALLEY PROJECT
TREND CLAIM GROUP

Date: February 1962 Scale: 1"=500'



INTERPRETATION LEGEND

$\frac{\rho_{DC}}{2\pi}$ PFE

- END OF LINE NO ANOMALY
- WEAK OR QUESTIONABLE
- MODERATE ANOMALY
- MODERATE TO STRONG ANOMALY
- STRONG ANOMALY

C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M.C.F.

LEGEND

Qt	Travertine	Tsb	Silver Bell FM
Qal	Alluvium	Tcc	Claflin Ranch FM
Tvc	Volcanic Conglomerate	S&A	Shallow & altered
Tab	Andesite Basalt	Pre	Premineral rocks
Tcr	Cat Mtn. Ryolite		

SECTIONAL DATA SHEET

ATLAS VALLEY PROJECT
TREND CLAIM GROUP
for
T. W. MITCHAM

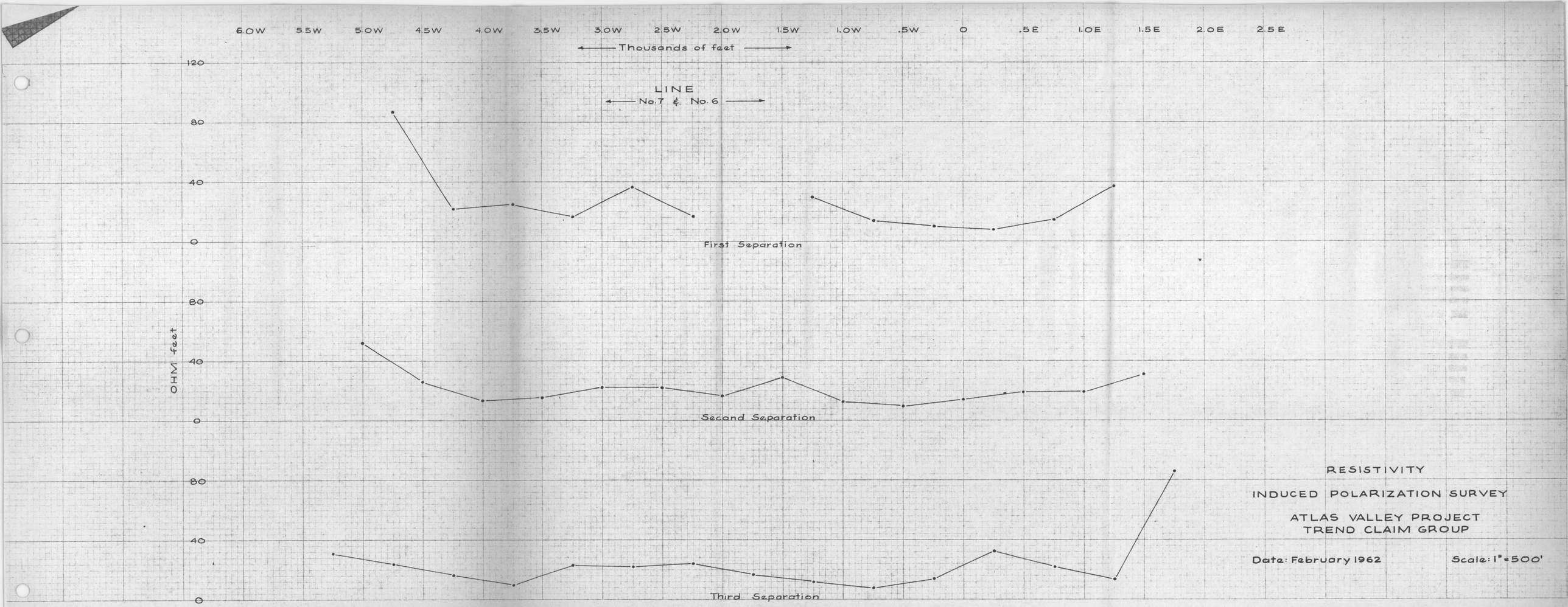
LINE No. 6 & 7

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'
DATE Feb. 1962

Geology from T. W. Mitcham



RESISTIVITY

INDUCED POLARIZATION SURVEY

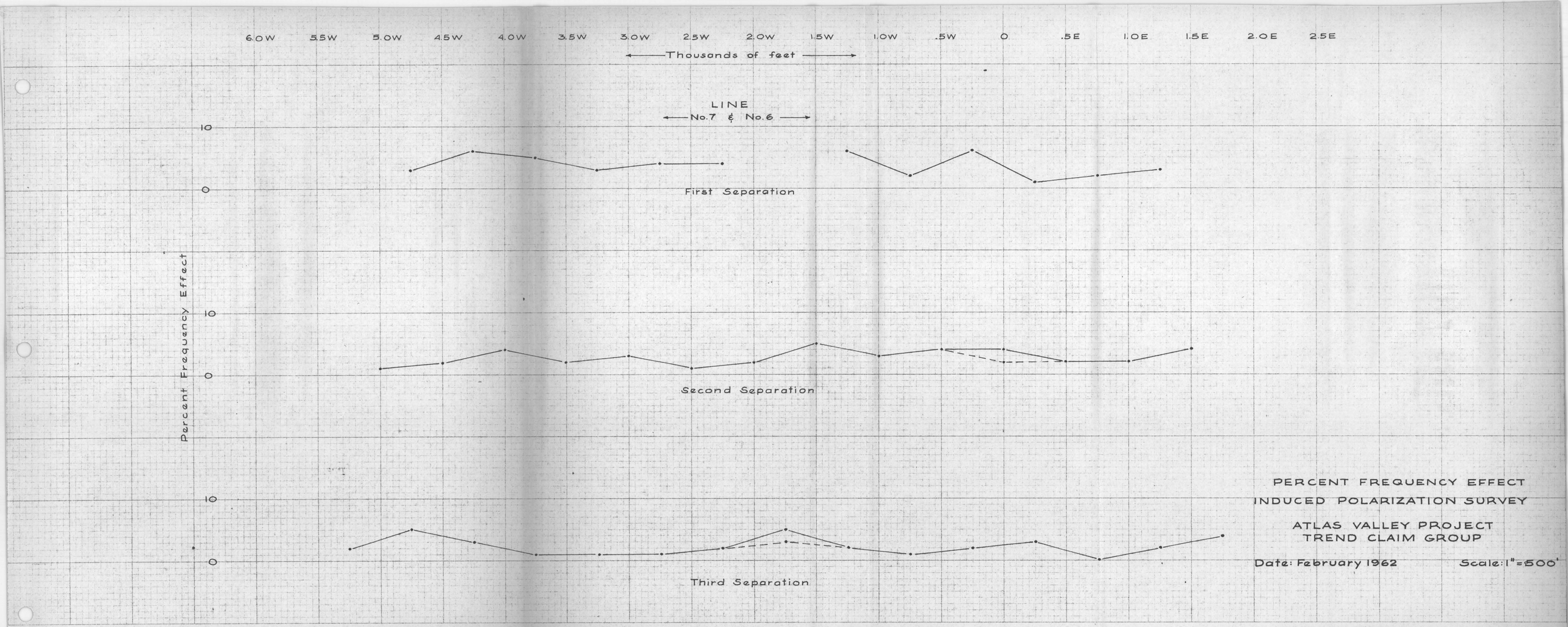
ATLAS VALLEY PROJECT
TREND CLAIM GROUP

Date: February 1962 Scale: 1"=500'

K+E STANDARD @ CROSS SECTION
10 X 10 TO THE INCH

KEUFFEL & ESSER CO.
MADE IN U.S.A.

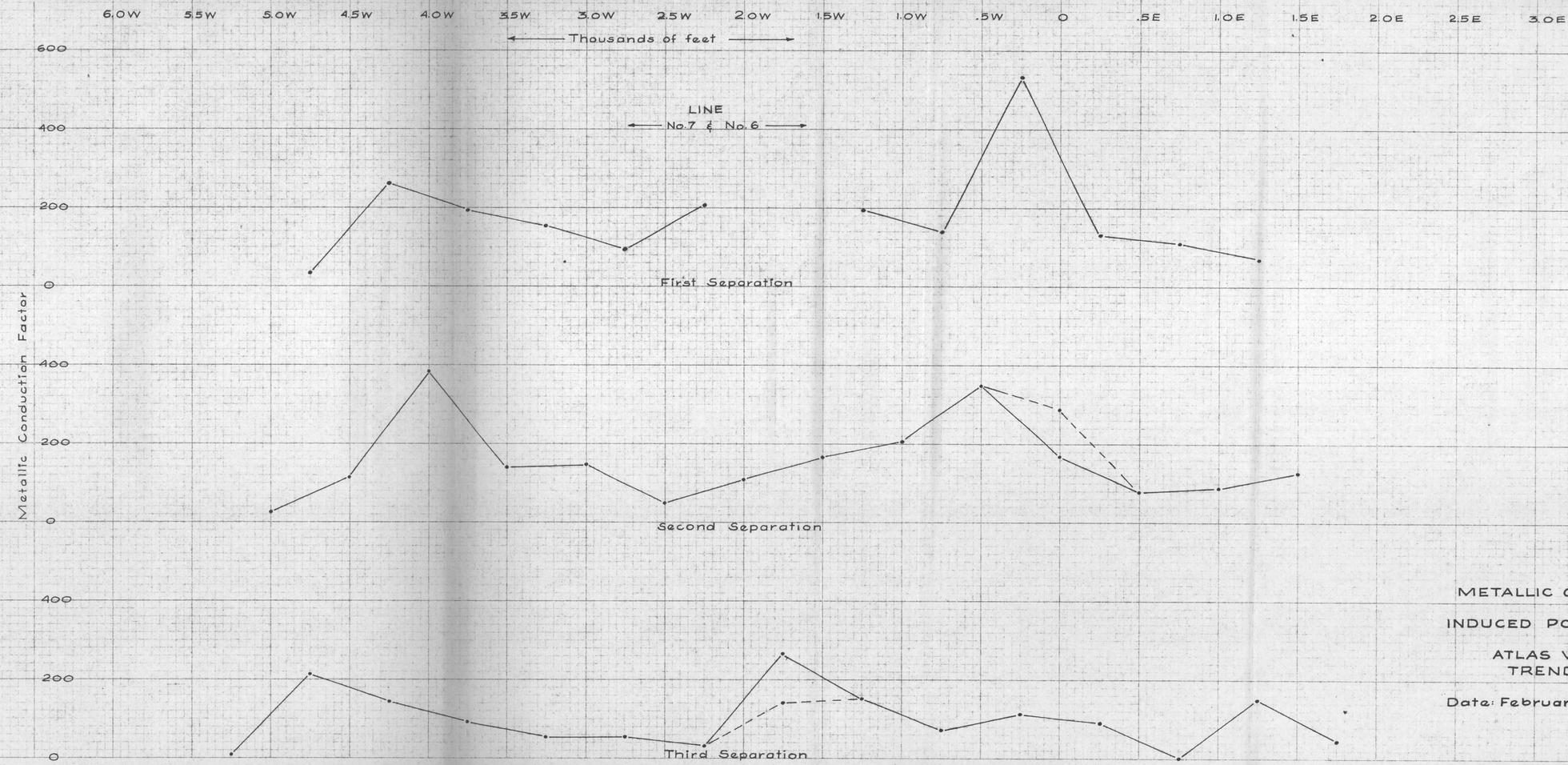
K+E STANDARD @ CROSS SECTION
10 X 10 TO THE INCH



PERCENT FREQUENCY EFFECT
INDUCED POLARIZATION SURVEY

ATLAS VALLEY PROJECT
TREND CLAIM GROUP

Date: February 1962 Scale: 1"=500'

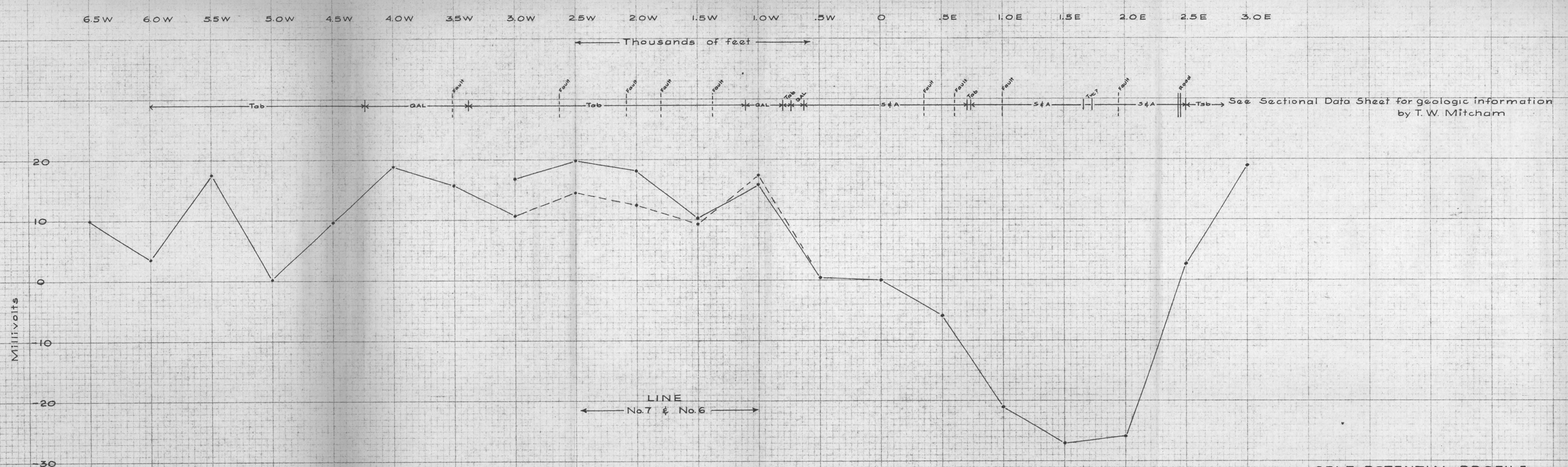


METALLIC CONDUCTION FACTOR

INDUCED POLARIZATION SURVEY

ATLAS VALLEY PROJECT
TREND CLAIM GROUP

Date: February 1962 Scale: 1"=500'



SELF POTENTIAL PROFILE

ATLAS VALLEY PROJECT
TREND CLAIM GROUP

Date: February 1962 Scale: 1"=500'

Prepared: 26/Sept/62 and mailed to TWM

Atlas Valley
Line # 4
East end

Project: Electrical surveys
Survey data of Jan. 29, 1962
by Heinrichs Geoexploration Company

Sender electrode dipoles	Receiver electrode dipoles	V_{DC} in millivolts	I in milliamps
2 - 3	0.5 - 1.0 E	12.26	1600
1 - 2	"	3.61	1600
3 - 4	1.0 - 1.5 E	12.20	1590
2 - 3	"	2.96	1580
1 - 2	"	1.29	1570
4 - 5	1.5 - 2.0 E	13.00	1600
3 - 4	"	2.83	1590
2 - 3	"	1.30	1580
1 - 2	"	0.76	1560
4 - 5	2.0 - 2.5 E	4.06	1590
3 - 4	"	1.66	1580
2 - 3	"	0.98	1560
1 - 2	"	0.65	1550
4 - 5	2.5 - 3.0 E	3.30	1590
3 - 4	"	1.66	1580
2 - 3	"	1.04	1560
1 - 2	"	0.77	1550

Atlas Valley
Line # 4
West end

Project : Electrical Surveys
Survey data of Jan. 29., 1962
by Heinrichs Geoexploration Company

Sender electrode dipoles	Receiver electrode dipoles	V_{dc} in millivolts	I in milliamps
3-4	0.5 - 1.0W	14.80	1580
4-5	"	3.54	1570
2-3	1.0 - 1.5W	30.00	1580
3-4	"	4.90	1580
4-5	"	1.90	1570
1-2	1.5 - 2.0W	18.20	1570
2-3	"	3.94	1560
3-4	"	1.05	1560
4-5	"	0.51	1550
1-2	2.0 - 2.5W	8.05	1560
2-3	"	2.54	1560
3-4	"	0.90	1550
4-5	"	0.53	1550
1-2	2.5 - 3.0W	2.06	1560
2-3	"	0.96	1560
3-4	"	0.40	1560
4-5	"	0.29	1550

Atlas Valley
Line # 5
East end

Project: Electrical Surveys
Survey data of Jan. 30, 1962
by Heinrichs Geoexploration Company

Sender electrode dipoles	Receiver electrode dipole	V_{dc} in millivolts	I in milliamps.
2 - 3	3.0 - 2.5 W	21.80	1575
1 - 2	"	5.35	1570
3 - 4	2.5 - 2.0 W	28.00	1580
2 - 3	"	5.54	1560
1 - 2	"	2.35	1560
4 - 5	2.0 - 1.5 W	19.80	1570
3 - 4	"	4.49	1560
2 - 3	"	1.62	1550
1 - 2	"	0.81	1550
4 - 5	1.5 - 1.0 W	7.99	1560
3 - 4	"	3.08	1550
2 - 3	"	1.43	1550
1 - 2	"	0.72	1550
4 - 5	1.0 - 0.5 W	2.03	1560
3 - 4	"	1.09	1550
2 - 3	"	0.58	1550
1 - 2	"	0.36	1550

Atlas Valley
Line # 5
West end

Project: Electrical surveys
Survey data of Jan. 30, 1962
by Heinrichs Geoexploration Company

Sender electrode dipoles	Receiver electrode dipoles	V_{DC} in millivolts	I in milliamps
3-4	4.0-4.5 W	18.13	1600
4-5	"	5.35	1600
2-3	4.5-5.0 W	28.60	1600
3-4	"	5.32	1600
4-5	"	2.44	1600
1-2	5.0-5.5 W	18.23	1600
2-3	"	4.70	1590
3-4	"	1.74	1580
4-5	"	1.09	1580
1-2	5.5-6.0 W	3.86	1590
2-3	"	2.19	1570
3-4	"	1.14	1570
4-5	"	0.77	1570
1-2	6.0-6.5 W	1.52	1580
2-3	"	1.10	1560
3-4	"	0.65	1550
4-5	"	0.45	1550

Atlas Valley
Line # 6
East end

Project: Electrical Surveys
Survey data of Jan. 31, 1962
by Heinrichs Geoexploration Company

Sender electrode dipoles	Receiver electrode dipoles	V_{DC} in millivolts	I in milliamps
2-3	0.5 - 1.0 E	9.90	1590
1-2	"	4.13	1560
3-4	1.0 - 1.5 E	17.70	1590
2-3	"	5.65	1560
1-2	"	3.89	1550
4-5	1.5 - 2.0 E	43.40	1560
3-4	"	5.60	1550
2-3	"	2.58	1540
1-2	"	2.23	1550
4-5	2.0 - 2.5 E	9.07	1560
3-4	"	1.67	1545
2-3	"	0.95	1550
1-2	"	0.96	1540
4-5	2.5 - 3.0 E	9.96	1550
3-4	"	2.38	1550
2-3	"	1.67	1550
1-2	"	1.78	1540

Atlas Valley
Line # 6
West end

Project: Electrical Surveys
Survey data of Jan. 31, 1962
by Heinrichs Geoexploration Company

Sender electrode dipoles	Receiver electrode dipoles	V_{dc} in millivolts	I in milliamps
3-4	0.5-1.0W	12.17	1620
4-5	"	4.15	1600
2-3	1.0-1.5W	16.30	1610
3-4	"	2.89	1600
4-5	"	1.65	1600
1-2	1.5-2.0W	35.40	1610
2-3	"	3.60	1600
3-4	"	1.01	1600
4-5	"	0.71	1590
1-2	2.0-2.5W	8.23	1600
2-3	"	1.35	1560
3-4	"	0.44	1560
4-5	"	0.40	1575
1-2	2.5-3.0W	2.00	1600
2-3	"	0.50	1560
3-4	"	0.23	1560
4-5	"	0.25	1560

Atlac Valley
Line # 7
East end

Project : Electrical Surveys
survey data of Feb. 2, 1962
by Heinrichs Geoexploration Company

Sender electrode dipoles	Receiver electrode dipoles	V_{DC} in millivolts	I in milliamps
2-3	3.0 - 2.5W	19.40	1560
1-2	"	4.45	1560
3-4	2.5 - 2.0W	42.30	1580
2-3	"	6.29	1575
1-2	"	2.60	1560
4-5	2.0 - 1.5W	19.70	1590
3-4	"	6.25	1570
2-3	"	2.54	1560
1-2	"	1.42	1550
4-5	1.5 - 1.0W	4.94	1560
3-4	"	2.76	1550
2-3	"	1.47	1550
1-2	"	0.91	1550
4-5	1.0 - 0.5W	1.97	1570
3-4	"	1.40	1550
2-3	"	0.86	1550
1-2	"	0.57	1545

Atlas Valley
Line # 7
West end

Project : Electrical Surveys
Survey data of Feb. 1, 1962
by Heinrichs Geoexploration Company

Sender electrode dipoles	Receiver electrode dipoles	V_{DC} in millivolts	I in milliamps
3-4	4.0 - 4.5 W	28.20	1575
4-5	"	4.40	1560
2-3	4.5 - 5.0 W	25.60	1575
3-4	"	4.07	1560
4-5	"	1.16	1550
1-2	5.0 - 5.5 W	96.90	1550
2-3	"	7.25	1550
3-4	"	1.79	1550
4-5	"	0.62	1550
1-2	5.5 - 6.0 W	14.75	1550
2-3	"	2.67	1550
3-4	"	0.99	1550
4-5	"	0.37	1550
1-2	6.0 - 6.5 W	3.54	1550
2-3	"	1.35	1550
3-4	"	0.73	1550
4-5	"	0.34	1550

May 31, 1966

Guggenheim Exploration Company
6737 East Opatas Place
Tucson, Arizona

ATTENTION: Mr. Don McMillan

Gentlemen:

At your request, additional induced polarization coverage was obtained at the trend claim group on May 17, 1966. One spread of 1000' dipoles was run along the northwesterly bearing line shown on the enclosed location map. Mr. Ron Palmer was the geophysical crew chief, Mr. Rod Reuter was sender operator, and Mr. Steve DeHanas, technical assistant.

In addition to the field work, polarization tests of six core samples were performed. After prolonged soaking to stabilize the specimens and approximate natural conditions, we found that the mineralfized dacite had about two to six times greater metallic response than the basalt and andesite specimens. No large resistivity contrast was noted.

The apparent anomaly at approximately 2 NW is likely due to severe electromagnetic coupling effects. Application of appropriate corrections for electromagnetic coupling results in degrading all metal factors over the entire spread to non-anomalous values. It was felt that an additional spread would also be subject to this problem and therefore, we have discontinued the survey.

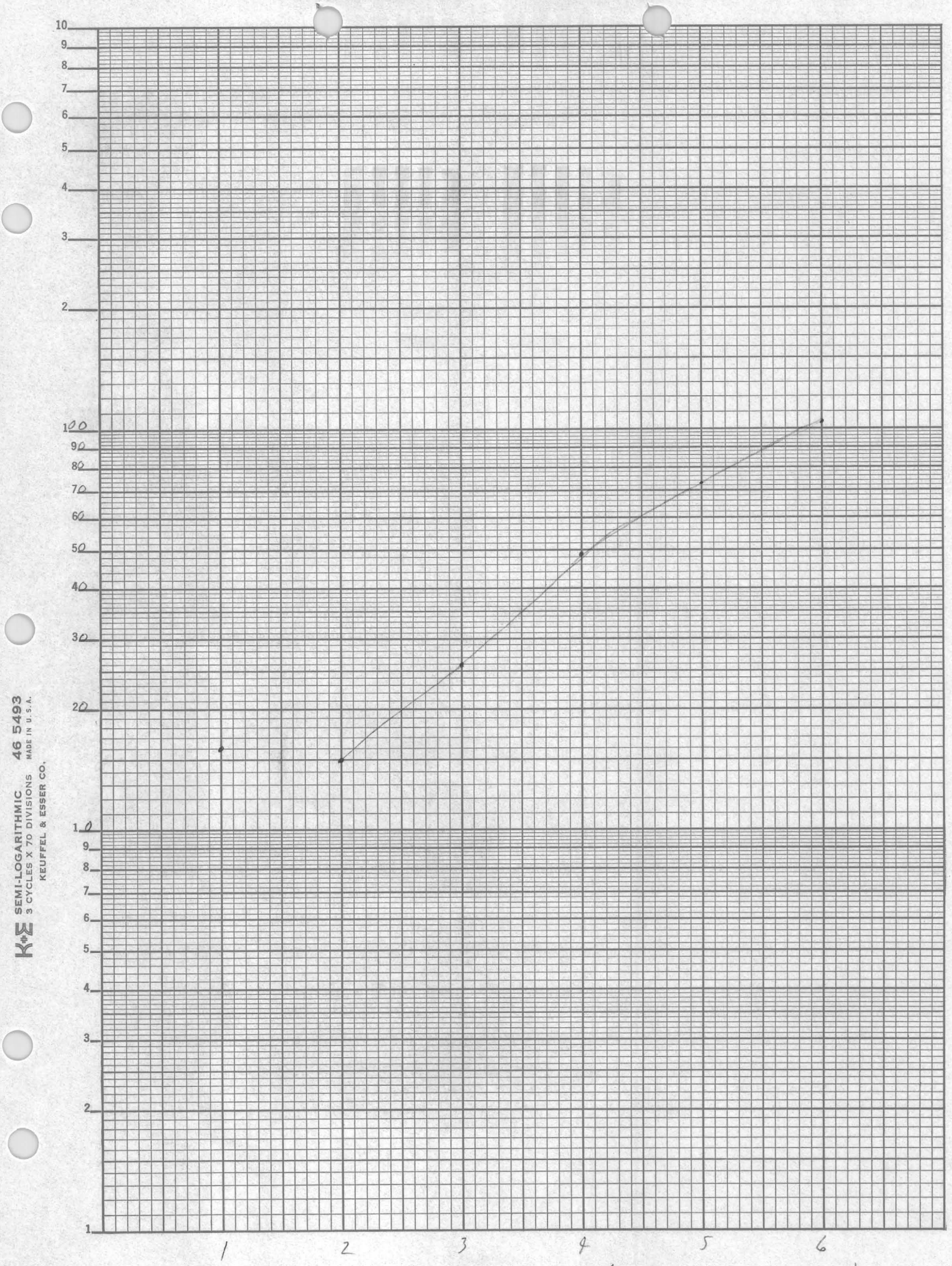
A rather poorly defined contact has been derived from the resistivity profile at about 4 SE. An attempt was made to arrive at a depth to basalt bottom from the resistivity data with poor results. The self potential data obtained was featureless.

Very truly yours,
HEINRICHS GEOEXPLORATION COMPANY

Paul A. Head
Research Geophysicist

APPROVED: _____
E. Grover Heinrichs
Vice President

PAH:jc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9
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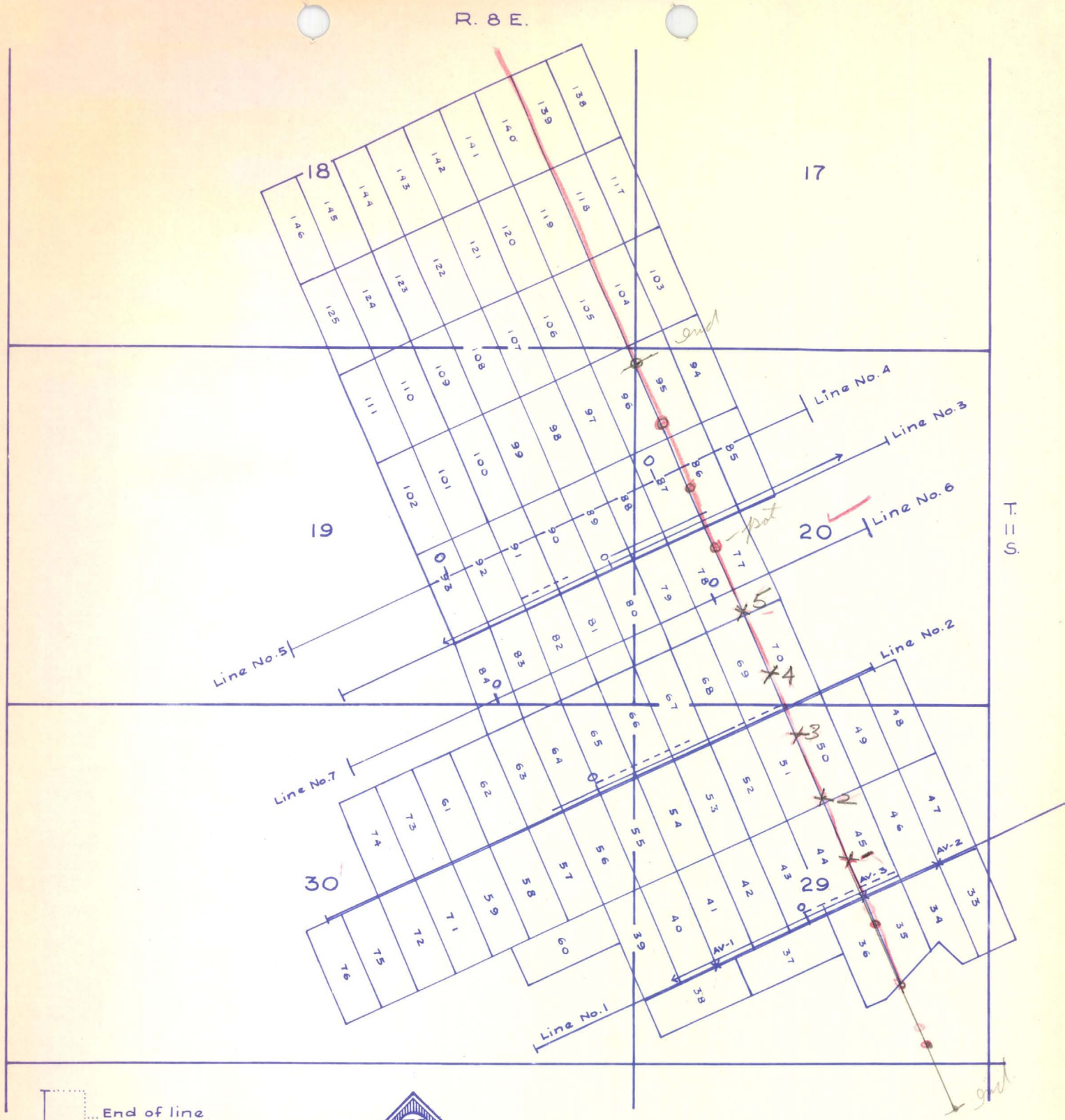
SEMI-LOGARITHMIC 46 5493
3 CYCLES X 70 DIVISIONS MADE IN U.S.A.
KEUFFEL & ESSER CO.
5/20/66
Guggenheim



INDUCED POLARIZATION SURVEY
LOCATION MAP
TREND GROUP
ATLAS VALLEY
Pima County, Arizona

for

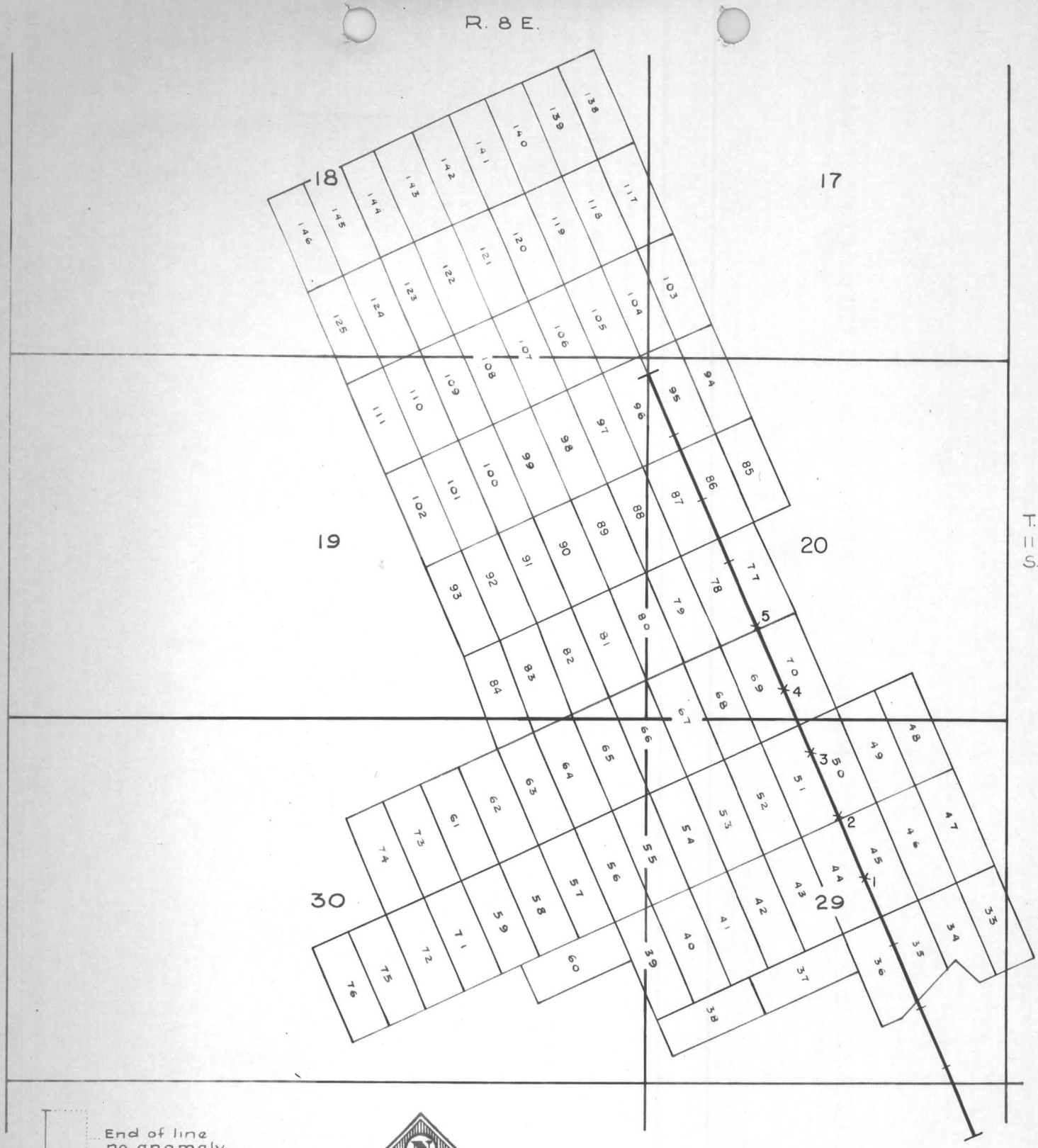
T.W. MITCHAM ?

by

HEINRICHS GEOEXPLORATION CO.

Date: ~~February 1962~~ May 1966

Scale: 1" = 2000'



INDUCED POLARIZATION SURVEY
LOCATION MAP
TREND GROUP
ATLAS VALLEY
Pima County, Arizona

for

GUGGENHEIM EXPLORATION CO.

by

HEINRICHS GEOEXPLORATION CO.

Date: MAY 1966 Scale: 1"=2000'

INDUCED POLARIZATION SENDER NOTES

project: Guggenheim Line: Line #1 South East Date: 5/17/66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	0-1000	1000-2000	→	2000-3000	→	→	3000+4000	→	→	→	4000-5000	→
Current Time	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667
Range												
TOTAL Current	3667	3667	3667	3667	3667	3667	3667	3667	3667	3667	3667	3667
Send	3-4	4-5	1-2	2-3	3-4	4-5		CAL 2 AMPS				
Receive	→	→	5000+6000	→	→	→						
Current Time	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667						
Range												
TOTAL Current	3667	3667	3667	3667	3667	3667						

INDUCED POLARIZATION SENDER NOTES

project: Guggenheim Line: Line #1 northwest Date: 5/17/66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	0-1000	1000-2000	→	2000-3000	→	→	4000-5000	→	→	→	5000-6000	→
CURRENT ~~Time~~	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667	3000 + 667
Range												
TOTAL Current	3667	3667	3667	3667	3667	3667	3667	3667	3667	3667	3667	3667
Send	2-3	1-2	4-5	3-4	2-3	1-2		CAL				
Receive	→	→	6000-7000	→	→	→						
CURRENT ~~Time~~	3000 + 667	3000 + 667										
Range												
TOTAL Current	3667	3667										

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: Guggenheim Line: 1 5E 1/2 Int.Cal _____ Date: 5-17-66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		cal
Rec.	0-1M	1M-2	2m →	2m-3	m ←	→	3m-4m	←		→		2-3
Time	100	100	10	100	10	10	30	10	10	3		300
DC-1	30.8 33.7	23.8 23.4	4.64 6.42	24.6 26.1	6.08 3.74	2.02 3.46	15.0 14.5	4.39 4.88	2.50 2.46	1.97 1.42		209 209
DC-2	31.8 33.6	23.8 23.4	4.59 6.30	24.6 26.2	6.10 3.77	2.12 3.30	15.1 14.6	4.40 4.86	2.54 2.44	2.02 1.34		418
Σ												
DC-3	31.8 33.6	23.9 23.3	4.52 6.28	24.6 26.2	6.10 3.72	2.38 3.18	15.0 14.6	4.46 4.80	2.58 2.42	2.06 1.30		209 209
Dc-4	31.6 33.6	23.9 23.3	6.38 4.42	24.6 26.2	6.12 3.80	2.54 3.00	15.0 14.5	4.54 4.70	2.59 2.41	2.07 1.29		418
Σ			6.42 4.38			2.90 2.70						
DC-AV	65.37	47.21	10.56	50.77	9.85	5.61	29.59	9.28	4.99	3.38		
AC-1	30.8	23.0	5.20	24.8	4.78	2.64	14.4	4.43	2.40	1.60		208
AC-2	31.8	23.0	5.20	24.8	4.78	2.64	14.4	4.44	2.40	1.60		208
Σ												416
S. P.	-26.4	-7.0	~~+~~	+6.7			+19.5					
AC-N	.18	.16	~~.14~~	.14			.15					
Pot.Res.												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Guggenheim Line: L SE 1/2 Int.Cal Date: 5-17-66

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
Rec.	4-m	5m	→	→	5m	6m	→	→				
Time	10	10	10	3	10	10						
DC-1	6.64 6.50	4.52 3.64	3.70 2.58	3.10 1.74	5.62 3.66	4.34 2.90	4.30 1.80	2.92 1.98				
DC-2	6.64 6.44	4.52 3.76	3.74 2.56	2.92 1.86	5.50 3.64	4.24 2.98	4.22 1.84	2.98 1.96				
Σ				2.96 1.64	5.48 3.90	4.18 2.88	4.24 1.80	2.92 1.88				
DC-3	6.68 6.40	4.44 3.76	3.52 2.78	2.96 1.92	5.44 3.98	4.24 2.94	4.02 2.04	1.70 3.22				
Dc-4	6.80 6.28	4.60 4.74	3.64 2.64	2.88 1.88	5.10 4.00	~~4.42~~ 2.04		1.48 3.38				
Σ	6.44 6.24			3.12 1.50	5.08 4.06							
DC-AV	13.13	8.38	6.28	4.76	9.20	7.16	6.02	4.72				
AC-1	6.34	3.95	2.97	2.20	4.34	3.32	2.78	2.20				
AC-2	6.34	3.95	2.97	2.20	4.34	3.32	2.78	2.20				
Σ												
S. P.	+10.7				-13.4							
AC-N	.30				.40							
Pot.Res.												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: Guggenheim Line: 1 NW 1/2 Int.Cal Date: 5-17-66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		Cal
Rec.	100	100	10	100	30	10	100	10	3	3		2-3
Time												300
DC-1	29.8 29.0	30.4 30.2	6.80 5.04	33.8 34.6	7.0 7.8	2.61 2.44	30.0 30.2	5.26 4.96	2.18 1.93	1.28 0.72		210 211
DC-2	29.8 29.0	30.4 30.2	4.90 5.90	33.8 35.0	6.8 7.5	2.50 2.48	30.2 30.2	5.22 4.96	2.24 1.92	1.38 0.72		210 211
Σ			5.00									
DC-3	29.8 29.0	30.4 30.2	5.82 4.90	33.8 35.0	6.8 7.5	2.58 2.38	30.2 30.2	5.36 5.00	2.32 1.87	1.42 0.56		
Dc-4			5.02 5.68	33.8 35.2	6.9 7.4	2.62 2.38		5.34 4.86	2.34 1.88	1.44 0.63		
Σ												
DC-AV	58.8	60.6	10.69	68.71	14.43	4.99	60.36	10.26	4.18			421
AC-1	28.0	29.4	5.08	33.0	6.9	2.34	29.2	4.88	1.93	0.95		204
AC-2	28.0	29.4	5.08	33.0	6.8	2.34	29.2	4.88	1.93	0.95		204
Σ												408
S. P.	-23.9	-1.0		+5.9			+15.4					
AC-N	.05	.04	.04	.04			.03					
Pot.Res.												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Guggenheim Line: 1 NW 1/2 Int.Cal _____ Date: 5-17-66

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
Rec.												
Time	10	3	3	3	10	3	3	1				
DC-1	3.82 4.82	1.80 1.82	1.25 0.76	1.06 2.36	3.28 1.90	2.08 1.32	1.08 1.28	0.62 0.87				
DC-2	3.80 5.02	1.74 1.88	1.30 0.64	1.07 2.40	3.44 1.70	2.54 1.18	1.06 1.49	0.61 0.91				
Σ						2.20 1.08						
DC-3	3.68 5.12	1.74 1.88	1.42 0.62	1.16 2.52	1.40 3.98	2.45 1.24	0.97 1.50	0.57 0.90				
Dc-4	3.60 5.20	1.75 1.86	1.36 0.56	1.26 1.60	4.08 1.16	2.45 1.32	0.92 1.54	0.52 0.88				
Σ												
DC-AV	8.73	3.61	2.00	3.46	5.83	3.63	2.44	1.47				
AC-1	4.20	1.67	0.88	0.55	2.41	1.67	1.09	0.63				
AC-2	4.20	1.66	0.88	0.56	2.40	1.68	1.09	0.64				
Σ												
S. P.	-8.0				+16.6							
AC-N	.14				.06							
Pot.Res.												

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project Guggenheim Line 1 NW/2 Field date 5-17-66 Data page 1 Comp. date 5-18 . Comp by R.P.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-1000 →	1000-2000 →		2000-3000 →		→	3000-4000 →		→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	3367	→	→	→	→	→	→	→	→	→		
(E) Vdc (avg)	58.8	60.6	10.69	68.71	14.43	4.99	60.36	10.26	4.18	2.06		
(F) DCcal	.475											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρdc=ExFxGx10^3/D	23	24	17	28	22	19	23	16	16	16		
(I) Vac Σ	56.0	58.8	10.16	66.0	13.70	4.68	58.4	9.76	3.86	1.90		
(J) AC noise x 2	.05	.04		.04			.03					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.969											
(M) ρ dc/ρac=ExL/K	1.017	0.999	1.019	1.009	1.021	1.033	1.002	1.019	1.049	1.051		
(N) PFE=(M-1)(10^2)	1.7	-0.1	1.9	0.9	2.1	3.3	0.2	1.9	4.9	5.1		
(O) MCF=(M-1)(10^5)/H	74	-4	112	32	95	173	9	119	306	319		
	-23.9	-1.0		+5.9			+15.4					

Project Line Field date Data page Comp. date Comp by

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2			cal	
(B) Receive	4000-5000	→	→	→	5000-6000	→	→	→			0-1000	
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	→	→	→	→	→	→	→	→			2000	
(E) Vdc (avg)	8.73	3.61	2.00	3.46	5.23	3.63	2.44	1.47			421	
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	14	14	16	47	20	28	33	32				
(I) Vac Σ	8.40	3.33	1.76	1.11	4.81	3.35	2.18	1.27			408	
(J) AC noise x 2	.14				.06							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K	1.007	1.050	1.101	1.	1.054	1.050	1.085	1.122				
(N) PFE=(M-1)(10^2)	0.7	5.0	10.1		5.4	5.0	8.5	12.2				
(O) MCF=(M-1)(10^5)/H	50	357	631		270	179	258	381				
	-8.0				+16.6							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

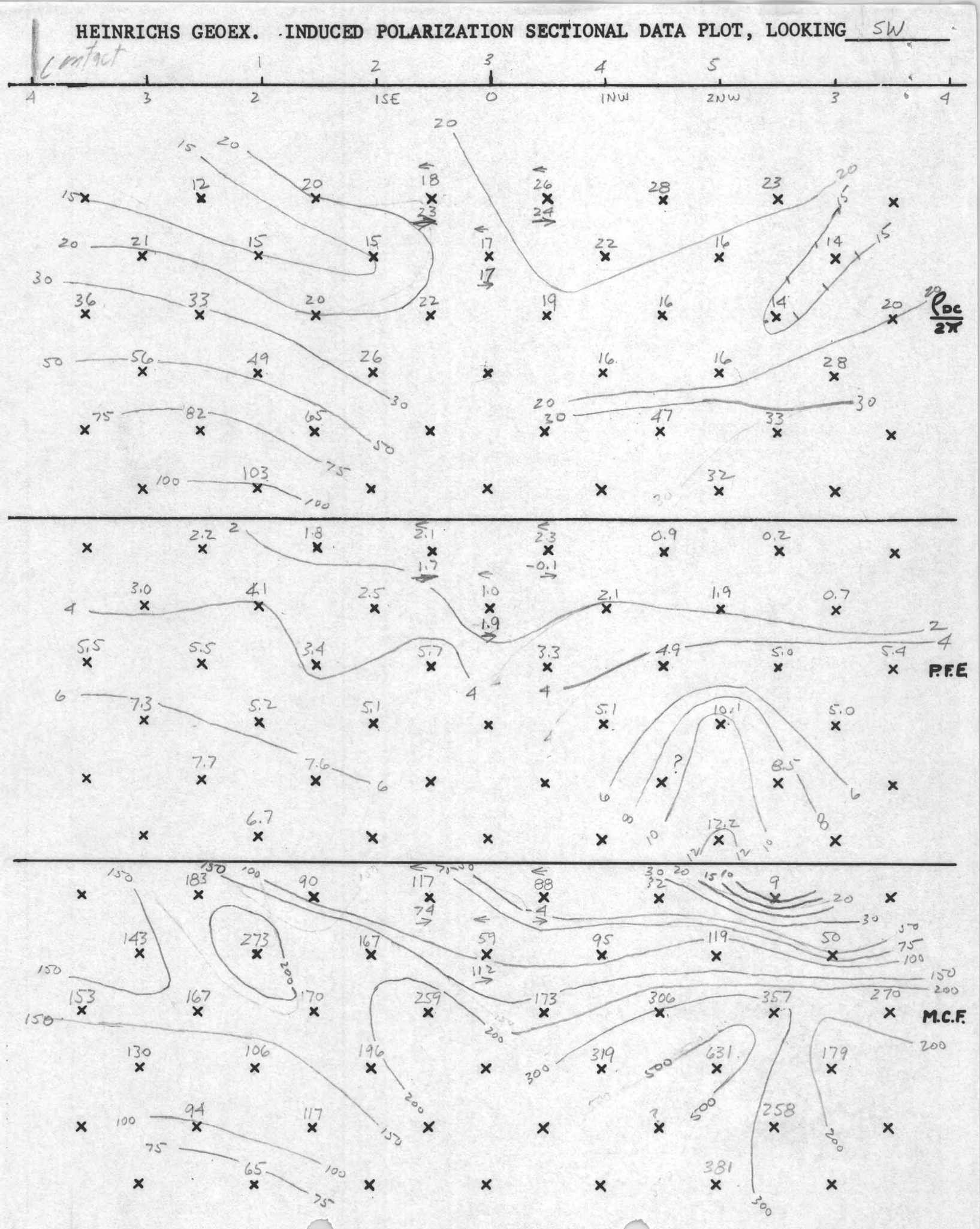
Project Guggenheim Line 1-5E½ Field date 5-17-66 Data page 2 Comp. date 5-18-66. Comp by R.P.

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-1000	1000-2000	→	2000-3000	→	→	3000-4000	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	3667	→	→	→	→	→	→	→	→	→		
(E) Vdc (avg)	65.37	47.21	10.56	50.77	9.85	5.61	29.59	9.28	4.99	3.38		
(F) DCcal	478											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	26	18	17	20	15	22	12	15	20	26		
(I) Vac Σ	63.60	46.0	10.40	49.6	9.56	5.28	28.8	8.87	4.80	3.20		
(J) AC noise x 2	.18	.16		.14			.15					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.995											
(M) ρ dc/ρac=ExL/K	1.023	1.021	1.010	1.018	1.025	1.057	1.022	1.041	1.034	1.051		
(N) PFE=(M-1)(10^2)	2.3	2.1	1.0	1.8	2.5	5.7	2.2	4.1	3.4	5.1		
(O) MCF=(M-1)(10^5)/H	188	117	59	90	167	259	183	273	170	196		
	-26.4	-7.0		+6.7			+19.5					

Project _____ Line _____ Field date _____ Data page _____ Comp. date _____ Comp by _____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		cal		
(B) Receive	4000-5000	→	→	→	5000-6000	→	→	→		0-1000		
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	3667	→	→	→	→	→	→	→		2000		
(E) Vdc (avg)	13.13	8.38	6.28	4.76	9.20	7.16	6.02	4.72		418		
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	21	33	49	65	36	56	82	103				
(I) Vac Σ	12.68	7.90	5.94	4.40	8.68	6.64	5.56	4.40		416		
(J) AC noise x 2	.30				.40							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K	1.030	1.055	1.052	1.076	1.055	1.073	1.077	1.067				
(N) PFE=(M-1)(10^2)	3.0	5.5	5.2	7.6	5.5	7.3	7.7	6.7				
(O) MCF=(M-1)(10^5)/H	143	167	106	167	153	136	194	65				
	+10.7				-13.4							

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING SW



AREA Atlas Valley LINE # 8 a = 1000 ' SCALE: 1" = 1000 ' DATE: 5-18-66

HEINRICHS GEOEXPLORATION COMPANY
P. O. BOX 5671 TUCSON, ARIZONA

DATE OUT 5-13-66

I. P INVENTORY

DATE IN _____

CREDIT CARDS _____

VEHICLE No: 1- Jeep

CREW No: _____

	MAJOR COMPONENTS	GEOX NO.	DESCRIPTION
	SENDER	MK 4	1
	RECEIVER	MK I	1
	~~CURRENT MONITOR~~		
	~~GENERATOR MONITOR~~	~~JEEP~~	1
	GENERATOR	JEEP	
	SIMPSON METER	260?	
	~~BATTERY CHECKER~~ (EICO) BATTERIES		
	TRANSCEIVERS	13, 15, 17	3
	POROUS POTS		3
	REELS	5, 23, 25, 26	4
	REEL HANDLES		3
	AUTO REELER W/V BELTS		1
	WIRE	8000'	

MISC. EQUIPMENT & SUPPLIES

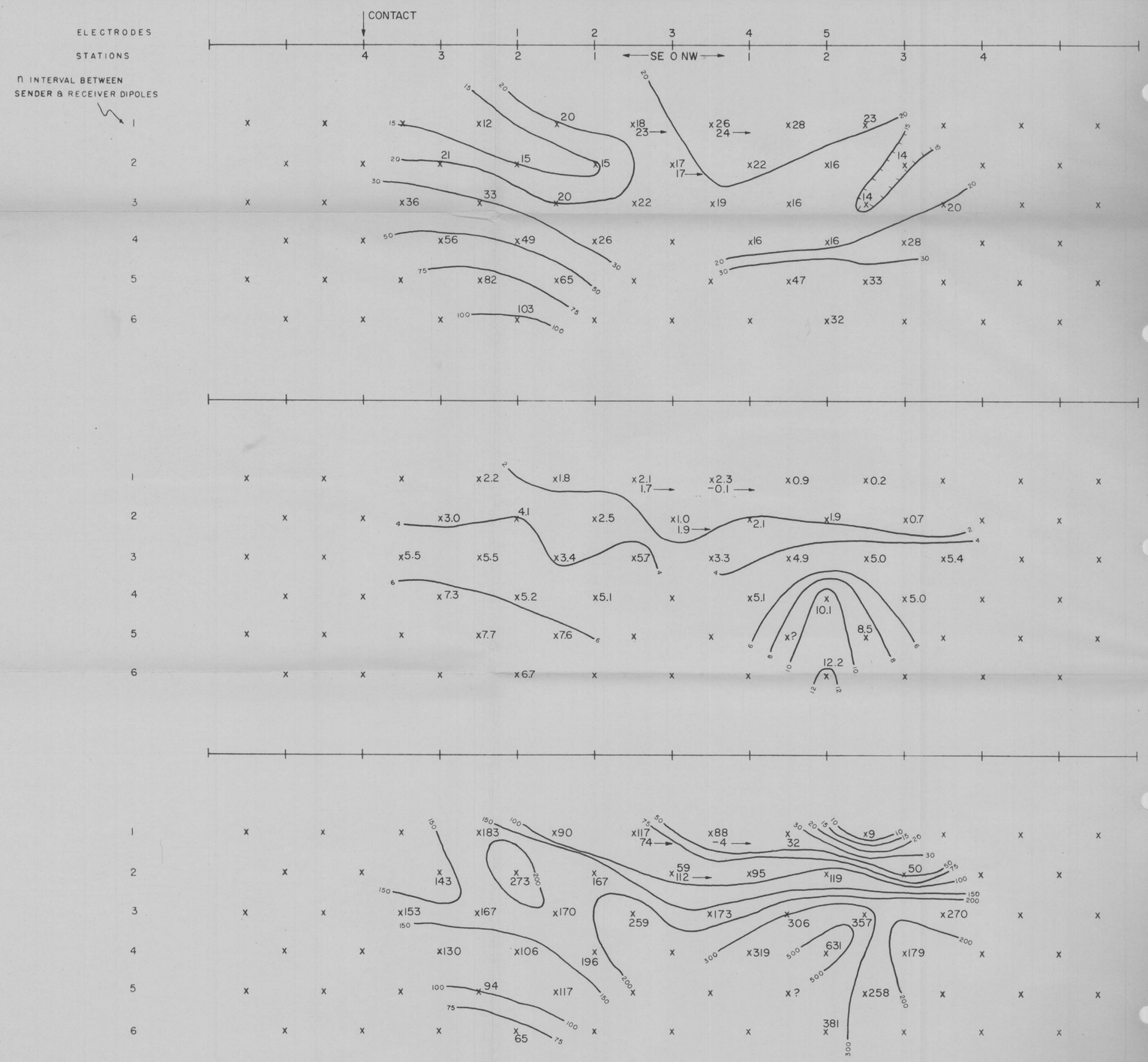
✓	RESISTOR (CALIBRATED)	✓	P. POT CONTAINER
✓	CAPACITORS	✓	SATURATED $CuSO_4$ JUG
✓	CONNECTOR LEADS	✓	TARP
✓	A) GENERATOR TO ~~MONITOR~~	✓	RAGS
✓	B) ~~MONITOR~~ TO SENDER	✓	OIL FOR GENERATOR
✓	G) POT LEADS (2)	✓	300' CHAIN
	~~HATCHET~~	✓	JUMPER CABLES
1	PICK	✓	TOOL BOX
	~~G PICK~~	4	FOIL
2	SHOVELS		$CuSO_4$ CRYSTALS
	~~FUNNEL~~	✓	SALT
✓	5 GAL. GAS SPOUT	✓	FLAGGING
✓	5 GAL. WATER CANS (DRINKING)	✓	BRUNTON COMPASS
✓	SPARE PARTS BOX - FUSES (SENDER & RECEIVER)	✓	~~CANTEENS~~
			~~WATER CAN PACK BOARDS~~
		✓	ELECTRICAL TAPE
		✓	SOLDERING IRON - SOLDER
		✓	STEEL WOOL.

ALSO:

	SECTIONAL DATA SHEETS
	RECEIVER NOTES
	SENDER NOTES
	COMPUTATION SHEETS
	TIME TICKETS
	CREW SHEETS
	INDUSTRIAL COMMISSION FORMS
	STATIONERY
	NOTE PADS
	CLIP BOARD

RECEIVED BY L. E. Palmer

PROJECT Guggenheim



APPARENT RESISTIVITY ($\rho_a = \frac{DC}{2\pi I}$) 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)

$(MCF = \frac{PFE \times 1000}{\rho_{DC}/2\pi I})$

CONTOUR INTERVAL LOGARITHMIC

EXPLANATION

ELECTRODE ARRAY: 1000' — n x 1000' — 1000'

SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING SW

ATLAS VALLEY
PIMA COUNTY, ARIZONA
SECTIONAL DATA SHEET
LINE NO. 8
INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: MAY 18, 1966

FOR

GUGGENHEIM EXPLORATION CO.

HEINRICHS GEOEX
GEOPHYSICAL SURVEYS
TUCSON ARIZONA