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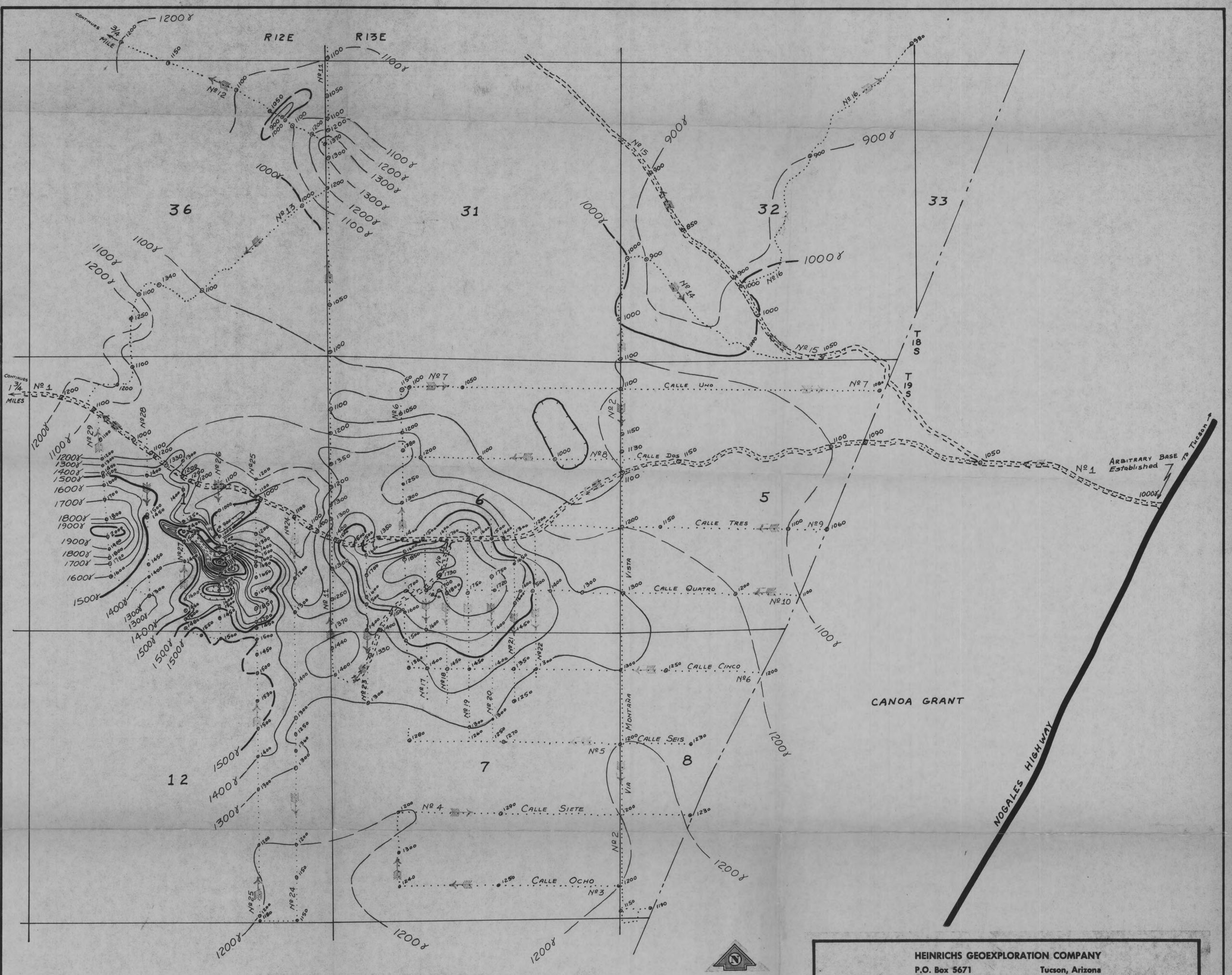
Esperanza Wash

Magnetic &

I. P.



INFORMATION

Data obtained by Continuous Recording
Total Intensity Mobile Magnetometer

= = = = = Trail road

Nº 5 ⟶ Number, location & Direction of Traverse

γ Gamma symbol

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

MAGNETIC SURVEY
ESPERANZA WASH PROJECT
FOR
THOMAS W. MITCHAM

SCALE: 1" = 1000	CONTOUR INTERVAL: 100 γ	REVISIONS
	DATA BY: J.W.M.	
DATE: 2-61	SHEET 1 OF 1	
DRAWN BY: E.G.H.	DRAWING NO.:	FILE:

MAGNETIC RECONNAISSANCE
in the

ESPERANZA WASH AREA

PIMA COUNTY, ARIZONA

for

DR. THOMAS MITCHAM

February 1961

by
HEINRICHS GEOEXPLORATION COMPANY
P. O. BOX 5671 Tucson, Arizona

TABLE OF CONTENTS

	Page
Introduction	1
Conclusions & Recommendations	1
Interpretation of Magnetics	2
Procedures	7

Map--magnetic contours & location----------Back Pocket

Magnetic records----------In original copy only Back Pocket

INTRODUCTION

By authorization of Dr. Thomas Mitcham, Heinrichs GEOEXploration Company made a magnetic survey in the Esperanza Wash Area of Pima County, Arizona. This was accomplished with a mobile magnetometer and the work was concentrated in Sections 5, 6, 7 and 8 of T19S, R13E with some coverage in Section 32, T18S, R13E and Sections 25, 26, 35 and 36, T18S, R12E. Existing roads were driven as well as some cross-country traversing. Magnetic records for this survey were made on February 4, 1961. Additional detailed coverage in Section 1, T19S, R12E and Section 6, T19S, R13E was obtained on February 14, 1961.

CONCLUSIONS & RECOMMENDATIONS

The general area shows considerable anomalous deviation, especially near the hills in Sections 25, 26, 35 and 36, T18S, R12E. Most of the anomalies found in these sections can be directly related to the volcanics which have been mapped as Tertiary basalt.

An anomaly of potential significance and importance was found, centered in the southwest quarter of Section 6, T19S, R13E. If, after geologic inferences have been drawn, it is decided that the area in Section 6 merits continuing consideration and investigation, we recommend that prior to any drilling program the anomalous area be checked by the induced polarization

method which would delineate areas of disseminated sulfide. The additional work on February 14, 1961, to get detail and to close off this anomaly to the west, also picked up two more significant anomalies in Section 1, which will need to be considered in the light of what is learned or inferred by future operations in Section 6.

INTERPRETATION

Record #1 is a cross-country traverse in a westerly direction across the area of interest. There is a small anomaly about 1000 ft. west of the start of the record. This feature is unusual on otherwise relatively uniform data but is old scrap metal or other artificial interference. This was later checked as a matter of curiosity and found to have no extent on either side of the road.

There is a gradual rise westerly for about 2 miles, from the start of the record. This would normally be interpreted as thinning of alluvium over bedrock and is probably the case here. However, there is a broad anomalous high centered about 2½ miles west of the start which appears to be a buried intrusive and the gradual rise approaching this may indicate extensive flanks of this. The anomalous high just mentioned was crossed by several later profiles and resultant data is presented in contour form on the accompanying map. This anomaly is discussed in some detail at the end of this section of the report.

Not far west of the line between Range 12E and Range 13E the record level returns to what is considered normal background. This is followed by another broad high of lesser amplitude than the first anomaly and indicates another bedrock high. The remainder of this record was made northwest of the immediate area of interest and although it contains many anomalies they are mentioned only briefly. The road had by now turned northwest and was approaching and entering outcrops and hills. These are volcanic at least in cover, and this is reflected on the record. If interest extends in the future to this region the record should be more carefully studied for further interpretation, and more magnetic coverage obtained.

Record #2 shows a gradual slow climb in level to between Calles Quatro and Cinco then drops lower again. This is related to the magnetic high to the west.

Record #3, #4 & #5 show only minor level changes which help to give a regional picture but show no isolated anomalism of particular interest.

Record #6 has more coverage over the major anomalism.

Record #7, #8 & #9 show minor regional level changes. #8 at the end has started to rise as it approaches the north flank of the anomaly.

Record #10 & #11 show more coverage over the major anomalism. #11 also has minor anomalism associated with a trend projected

easterly from basaltic hills in Section 36.

Record #12 shows considerable anomalism due to basalt hills. Well out of area of present interest.

Record #13 shows level changes and anomalism associated with the hills to the northwest.

Record #14, #15 & #16 show regional variations.

Records #17 through #23 were all run south across the anomaly in Section 6 for detail and to be sure the high was well located.

Record #24 crossed the south half of Section 1 and all of Section 12. A deep, broad high shows on this line about opposite the east quarter of Section 12.

Record #25 shows that in Section 12 the suggestion of a deep magnetic high found on #24 is still present but slightly more intense and therefore likely more shallow to the west. Just after crossing into Section 1 there is a sudden rise in level after which it drops off gradually to the lowest level on the record, just south of the road. A change in rock type is indicated with an intrusion between, possibly of volcanic origin, as evidenced by the next two records.

Record #26 & #27 each have sudden, sharp and high anomalies that are related and show a NW-SE strike, but little dip. The level on the north side is 200-300 gammas lower than the south side. A major fault is indicated, filled with a highly magnetic body which may be contact metamorphic minerals but which is more

likely a volcanic dike, possibly andesite. On Record #27 the magnetic profile indicates the cause of the peak of the high is very near surface and about 1000' ± south of the road. Possibly outcrop could be found in the vicinity, or, if not, shallow drilling could locate it easily. However, if mineralization is associated with this anomaly it may be on the flanks, at contacts with surrounding rocks, rather than on the magnetic high itself. This anomaly should be investigated but we suggest it be after the anomaly in Section 6 has been given prior consideration, or during a program that combines both.

Record #28 shows a deep high with the level starting to climb at the end, which is also where #29 starts.

Record #29 has a broad, moderately deep anomaly very similar to the one in Section 6. More coverage will be needed to the west to learn more about this as to whether this profile crosses near the high or is only on the east flank of a larger feature.

In general the magnetic profiles show three things:

1. Long broad variations up or down on a regional basis, generally indicating thickening or thinning of alluvial cover over bedrock or basement.

2. Erratic anomalism around outcropping hills in Sections 26, 35 & 36. There are peculiar features to this. For one thing the sharp deviations commonly associated with andesite are not found. Since the hills are supposedly basalt this can be

accounted for by basalt being a more homogeneous mix than andesite. The most striking feature, however, is the fact that looking through the anomalism the general overall level drops sharply. This indicates that the area in mass relationship contains even less magnetite than the alluvial covered surrounding countryside. To account for this we offer this postulation--the basalt is a thin veneer, the hills are underlain by low-susceptibility limestones or sediments, or the main composition of the hills is tuff or latite.

3. Isolated anomalies. A major one is centered in the southwest quarter of Section 6. This is a buried feature with a deviation of over 800 gammas and a closure of about 500 gammas. The main portion of it underlies about ¼ section and estimates of depth to the cause indicate as much as 1000 - 1200 ft. but possibly as little as 500 ft. Several theories can be discussed as to its cause. If the strike of the hills in Sections 26, 35 and 36 is projected southwest into Section 6 it would pass through the northeast portion. Thus there would have to be a bend in the strike line or a fault for the cause of this anomaly to be related to the hills. A factor which further mitigates against this possible relationship is the fact that this is a high from a buried cause while around the outcropping hills the level is actually lower. A better possibility is that it represents a buried intrusive. Another possibility to consider is that it is an expression of magnetite from contact metamorphism.

Faults can be postulated in several directions crossing here: one NW-SE roughly along Esperanza wash, one nearly north-south which truncates the outcrops in the east of Section 36, and one striking NE-SW. Any of these, or especially if two such intersected here, could have a high local magnetite content. In conjunction with this, the smaller,shallow anomaly in Section 1 may have an important bearing.

PROCEDURES

The instrument is a Gulf licensed flux-gate type, total intensity magnetometer mounted on a Dodge Powerwagon. Variations in the total earth's field are continuously recorded on chart paper on a recorder geared to the vehicle drive. Record is made at whatever speed the vehicle can be driven, according to terrain conditions. On this project most of the existing roads and trails across and around the area of interest were traversed, as well as some off road work. A total of about 38 miles of record were made. For the purpose of getting considerable detail the recorder was set to record on scales of 100 ft. to the inch horizontally and 100 gammas per half inch vertically. The charts are to be read looking lengthwise with higher values to the right. This type of recorder allows for 10 effective chart widths by letting the trace cross the paper and continue again from the other side as necessary. To avoid confusion, values have been plotted at intervals on the records. An arbitrary

base level was picked at the start and assigned a value of 1000 gammas. Each dot on the paper represents an interval along the ground of 5 ft. Certain natural and cultural features noted in passing were marked on the records for control. Basic control was from a base map of the subdivision in Sections 5, 6, 7 & 8 and the Twin Buttes Topographic Quadrangle.

HEINRICHS GEOEXPLORATION COMPANY

John W. Marlatt

John W. Marlatt, Geologist

February 17, 1961
P. O. Box 5671
Tucson, Arizona

INDUCED POLARIZATION INVESTIGATIONS

Esperanza Wash Area

Pima County, Arizona

for

Dr. Thomas W. Mitcham

February & March
1961

by

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

TABLE OF CONTENTS

	Page
Introduction	1
Conclusions & Recommendations	1
Method	3
Procedure	4
Interpretation	6

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

In Pocket:

Induced Polarization Anomaly Plan Map.

INTRODUCTION

During the months of February and March 1961, Heinrichs GEOEXploration Company conducted induced polarization investigations in the Esperanza Wash Area over portions of Section 32, T18S, R13E, Sections 5, 6 and 8, T19S, R13E and Sections 1 and 2 T19S, R12E. This work was performed at the request of Dr. Thomas W. Mitcham, and consisted of three observed lines requiring 7 electrode spreads and totaling 37,500 ft. of profile traverse.

The crew consisted of Mr. F. A. Seward, Jr. geophysicist in charge; Mr. H. L. Andres, field engineer; Mr. D. Graff, electronics technician; Mr. J. King, field assistant; Mr. C. S. Ludwig, computer.

CONCLUSIONS AND RECOMMENDATIONS

1. The work has indicated at least two anomalies that are interpreted as probably due to disseminated sulfide mineralization but with certain reservations. These anomalies are certainly worthy of further detailed investigation. The reservations are: that the very low resistivity in this area contributes to somewhat erratic metal factors; the percent frequency effects and/or metallic conduction factors are not sufficient order of magnitude above background to be considered as undeniably due to disseminated sulfides.

2. Line #3 probably crosses the magnetic anomaly in Section 6 south of the main mineralized zone and this anomaly should be further delineated by a series of five north-south lines of at least one spread each using 500 ft. dipoles with 1,000 feet between lines centered about 1,500 ft. north of the south line of Section 6 beginning about 500 ft. east of the west side of Section 6 and moving progressively eastward. Then upon correlating the known geology with the magnetic and I. P. data a suitable drill target might be located.

3. The anomalous zone on Line #2 should also be given detailed attention by a series of four N 45° E lines of 500 ft. dipoles 1000 ft. apart centered on a line running S 45° E from the NW Cor. Section 5 starting at that corner and progressing southeast. A north south line 500 ft. east of and parallel to the east sideline of Sections 5 and 32 might also be worthy of consideration.

4. It might be advisable to briefly investigate the other indicated but questionable anomalies on Lines #2 and #3 by single spreads across the anomalous zones.

5. In summary the results and reported anomalies can be considered to be probable if not definitely conclusive of disseminated sulfide mineralization and further investigation is recommended to aid in drill hole location.

METHOD

The induced polarization method is based on the somewhat peculiar electrical properties of sulfide particles, and more particularly those of iron, copper and lead. Sulfide particles react to electrical currents much in the manner of miniature capacitors. A rock mass containing sulfide particles will offer a lower impedence to an alternating current than its resistance to a direct current. Hence when a direct current is applied across a pair of current electrodes in the vicinity of a disseminated sulfide body, the potential drop between two potential electrodes some given distance from the current electrodes will be greater than when an alternating current is applied to the first two electrodes. Three separate quantities are computed from the data acquired in the field. The first is the D.C. resistivity. The second is the percent frequency effect. The third quantity is the so called "metallic conduction factor" (a misnomer) which is simply the frequency effect divided by the D.C. resistivity.

The property of induced polarization is not entirely unique to sulfide particles but with sufficient geological knowledge, anomalism due to sulfides can be normaly interpreted apart from that possibly due to graphite, magnetite, clay particles, etc.

In field practice five equally spaced co-linear current electrodes are set. Observations are made in accordance with

the dipole-dipole or Eltran configuration mode of operation in which the distance between the receiver or potential electrodes is equal to the distance between each pair of current electrodes and the separation between the center of each potential electrode set-up from the center of each pair of current electrodes is some multiple of the electrode spacing.

PROCEDURE

Line #1 was a reconnaissance line employing 1000 ft. electrode spacing. The center was located about 2,700 ft. NE of the SW Cor. Sec. 6 at a road intersection and the line was run about N 45° E - S 45° W across the section. It was obvious from examination of the data that due to a very low surface resistivity the area did not lend itself to examination with 1000 ft. electrode spacing. Accordingly subsequent work was carried out using 500 ft. spacing.

Line #2 consisted of two spreads of 500 ft. dipoles centered on about the common sideline of sections 5 and 6 and extending 4,500 ft. east and west from this point and run east-west just south of the north boundary lines of Sections 5 and 6. The two spreads were overlapped one additional dipole to provide repeat information in the area of immediate interest.

Line #3 consisted of four spreads of 500 ft. dipoles extending from about 1,000 ft. east of the Canoa Land Grant boundary fence traversing about N 82° westerly across portions

of Sections 8, 5 and 6 thence about N 76° W across portions of Sections 1 and 2. For purposes of plotting the line crosses the side line between sections 6 and 1 about 200 ft. west of station 8.5 W and about 700 ft. north of the SW Cor. Sec. 6.

Lines #2 and #3 were reconnaissance lines planned on the basis of anomalisim observed on Line #1 and on magnetic anomalism observed in an earlier mobile magnetic survey made by Heinrichs GEOEXploration Company.

In addition to the problem of very low surface resistivity particularly in the eastern part of the area examined, there was a high telluric noise level especially on certain days. The National Bureau of Standards CRPL radio warning service reports a magnetic storm due to increased solar activity on February 16 and 17, the days on which data was obtained on Line #1.

Terrain is essentially gentle and vegetation medium to light. Cattle in the area caused some trouble in wire breakage.

The data is presented in "section". The D.C. resistivity is plotted above the horizontal line representing the spread layout and the percent frequency effect as a superscript to this value. The metal factor (MCF) is plotted below the line. It should be emphasized that the presentation has no linear vertical scale and that the points are plotted at the intersection of 45° lines extending from the center of sender and receiver positions as a matter of convenience. The actual depths of the profiles are an indeterminant function of the D. C. resistivity. In general it can be said that the data acquired will be from a depth

of from 0.2 to 2.0 times the dipole spacing. The data is contoured "logarithmically", again as a matter of convenience in interpretation only.

INTERPRETATION

Line #1. Following computation of the data on line #1 it became apparent that most of the data acquired must be considered questionable at best. However, a moderately strong anomalous zone between stations 4N and 5N was considered to be valid and of significant interest. Several factors contributed to the questionability of the data on this line including the low surface resistivity, the 1,000 ft. dipole spacing and as was subsequently learned, high telluric noise induced by increased solar activity at the time the line was run. Re-examination of the data with these facts taken into account and in light of data later obtained indicates the possibility of additional significant anomalism from 4S through 5N and particularly from 2S to 4S. However, the data must be considered somewhat erratic due to the above stated factors and it is not possible to make a definite interpretation.

Line #2 was run east-west across the zone of most intense and definite anomalism on Line #1 using 500 ft. dipoles, and yielded information of a much more definite and consistent nature. This line showed anomalism from 2.5E to 0.5W with the highest

intensity between 1.5E and 2E and between 0 and .5W. This data correlated with the anomalous zone observed on Line #1. A second questionably anomalous zone appears from 3.0 to 3.5W extending possibly to 2.5W.

Line #3 was run westerly across the magnetic anomalies in Sections 6 and 1 with excellent correlation of results. The line crossed the magnetic anomaly in the south half of Section 6 on the south slope of the high at about the 1700 gamma level. Moderately strong induced polarization anomalism was observed between 7W and 7.5W with moderate anomalism extending to 6.5W and 8W and possibly to 9W. A second zone of questionable anomalism is observed between 9.5 and 10.5W and another zone is apparently beginning to appear at the west end of the line between 13.5W and 14W. Of very significant interest is the data obtained across the sharp magnetic high in Section 1 between 10W and 12W. It will be noted that no significant metal factor or percent frequency anomalism effect appears in the data other than the questionable anomalism reported between 9.5W and 10.5W. On the other hand a very marked decrease in apparent resistivity appears immediately associated with the magnetic anomaly. If the magnetic information were not available and in lieu of other geologic data this low resistivity zone might conceivably be interpreted as a major water course or channel, but in light of the available information, the anomalous source is obviously a body of high electrical conductance and magnetic susceptibility but contains

no disseminated sulfide mineralization. Little is known about the conductivity of specific volcanic rock types other than the fact that flows and epithermal dikes are normaly relatively good conductors and the source of this resistivity and magnetic anomaly is tentatively interpreted as a volcanic intrusion or flow, possibly an andesite (?).

Respectfully submitted

HEINRICHS GEOEXPLORATION COMPANY

Franklin A. Seward, Jr.

Franklin A. Seward, Jr.
Geophysicist

March 17, 1961
P. O. Box 5671
Tucson, Arizona

TABLE OF CONTENTS

Supplement #1

	Page
Introduction----------	1
Conclusions & Recommendations----------	2
Procedure----------	3
Interpretation----------	4

Sectional Data Sheets-----Line #4, Line #5, Line #6

In Pocket:

Induced Polarization Anomaly Plan Map--Revised.

SUPPLEMENT # 1
To A Report On

INDUCED POLARIZATION INVESTIGATIONS
Esperanza Wash Area
Pima County, Arizona

April 1961

INTRODUCTION

Following completion of I. P. Surveys in March 1961 and subsequent interpretation of data, additional work was requested by Dr. Mitcham to substantiate the validity of initial results and better delineate possible mineralization in the zone of interest.

The work consisted of three lines striking N 30° E, 1000ft. apart across the magnetic anomaly in the south half of Section 6 and the I. P. anomalism previously reported on Lines #1 and #3. A 500 foot electrode spacing was used as on Lines #2 and #3 and a total of 18,000 ft. of profile traverse were observed. The work was performed by the same crew as that involved in the first phase survey.

This supplementary report and the resultant conclusions and recommendations is confined to the geophysical investigations in the south half of Section 6.

CONCLUSIONS AND RECOMMENDATIONS

1.) The exceptionally low resistivity in the area of interest precludes a discrete interpretation of the I. P. data and it must be concluded that the additional three lines across the magnetic anomaly and the I. P. anomalism observed on Line #3 do not add substantial definition to the original interpretation. The percent frequency effects are not of a sufficient order of magnitude as to be definitely attributable to sulfide involvement and the best that can be said for the data is that the observed anomalism, though weak in character, may be indicative of the existence of a disseminated sulfide body in the vicinity of and related to the magnetic anomaly in the south half of Section 6. It should be further stated that the I. P. data in no way detracts from the possibility of the existence of such a body for the reason that the information obtained could possibly be restricted entirely to the (thick?) low resistivity alluvial layer.

2.) At least two drill holes would be required to test the validity of the I. P. data. The first and most obvious location based on the magnetics and to some extent the induced polarization information would be at the center of Line #4 which approximately coincides with the top of the magnetic anomaly, I. P. anomalism on Line #4, and the I. P. anomalism observed on Line #3 projected north.

A second hole based entirely on the most intense I. P.

anomalism observed at the south ends of Lines #4, #5 and #6 might be located between 2.0S and 2.5S on Line #5 which is about 2500 ft. south of the first location. It should be anticipated that depth to bedrock may be well in excess of 500 ft.

3.) Additional valuable information may be gleaned from a reinterpretation of the I. P. data based on evaluation of the results of drilling. In this respect the total sulfide content of bedrock should be accurately determined. Some log should also be kept of the magnetite content of the alluvial overburden as well as that of the bedrock. To aid in metalization studies, geochemical analysis of bedrock drill core samples, possibly using copper and/or molybdenum, should be considered.

PROCEDURE

Line #4 was centered at Station 1^S on Line #1 near the center of the magnetic anomaly in the south half of Section 6 and run N 30° E - S 30° W from this point. The center of Line #5 was located about 1,000 ft. S 60° E of the center of Line #4 at the southeast edge of the magnetic high and the line was parallel to #4. The center of Line #6 was located about 1,000 ft. N 60° W of the center of Line #4 and also parallel thereto.

The Bureau of Standards CRPL Radio Warning Service reported no expected magnetic distrubance during the period in which the I. P. work was done and telluric noise was found to be at a very low level. Artificial noise was experienced on Line #8 between

.5N and 1.0N and is attributed to the grounding of an east-west power line in the vicinity. Lines #5 and #6 also crossed this power line, without any disturbing effects being observed.

INTERPRETATION

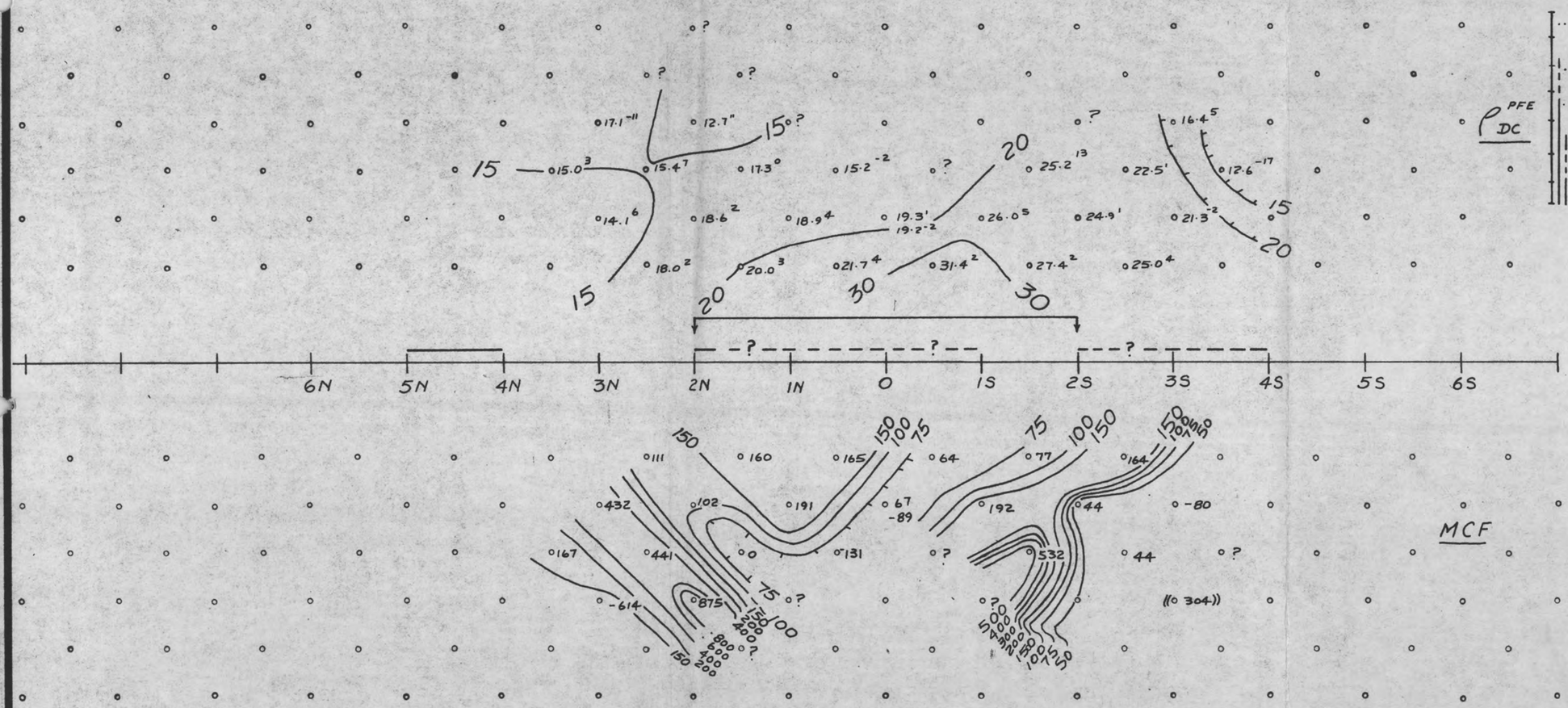
At first observation a very definite pattern persists in the metallic conduction factors throughout the three lines. This pattern can only be considered to be a function of a continuous geologic relationship. The northern ends of the three lines exhibit some degree of horizontal "layering" in the MCF's while the southern ends indicate to a more or less extent a semblence of a vertical contact or facies.

Line #4 is possibly the least definite of interpretation with anomalous MCF's and PFE's occuring primarily in only the second separation at the north end and only a slight suggestion of a vertical contact possibly existing between 0.5S and 1.0S and between 2.5S and 3.0S.

Line #5 is of the same general character with "horizontal" anomalism existing in the first and second separation from possibly 0.5S to 1.5N or more and a more definite vertical "boundary" anomalism between 2.0S and 2.5S.

Line #6 shows the horizontal feature existing from about 0^n to the north in the second and third separation and the vertical feature expressed from about 1.5S to 2.5S.

Respectfully submitted
HEINRICHS GEOEXPLORATION COMPANY
Franklin A. Seward, Jr
Franklin A. Seward, Jr
HEINRICHS GEOEXPLORATION COMPANY
Geophysicist



INFORMATION

- End of Line. No Anomaly
- Weak or Questionable
- Moderate Anomaly
- Moderate to Strong Anomaly
- Strong Anomaly

C.I. = Logarithmic

(( )) Indicates questionable data.

TRANSMITTER ELECTRODE SPREAD

SECTIONAL DATA SHEET
ESPERANZA WASH PROJECT
for
T. W. MITCHAM

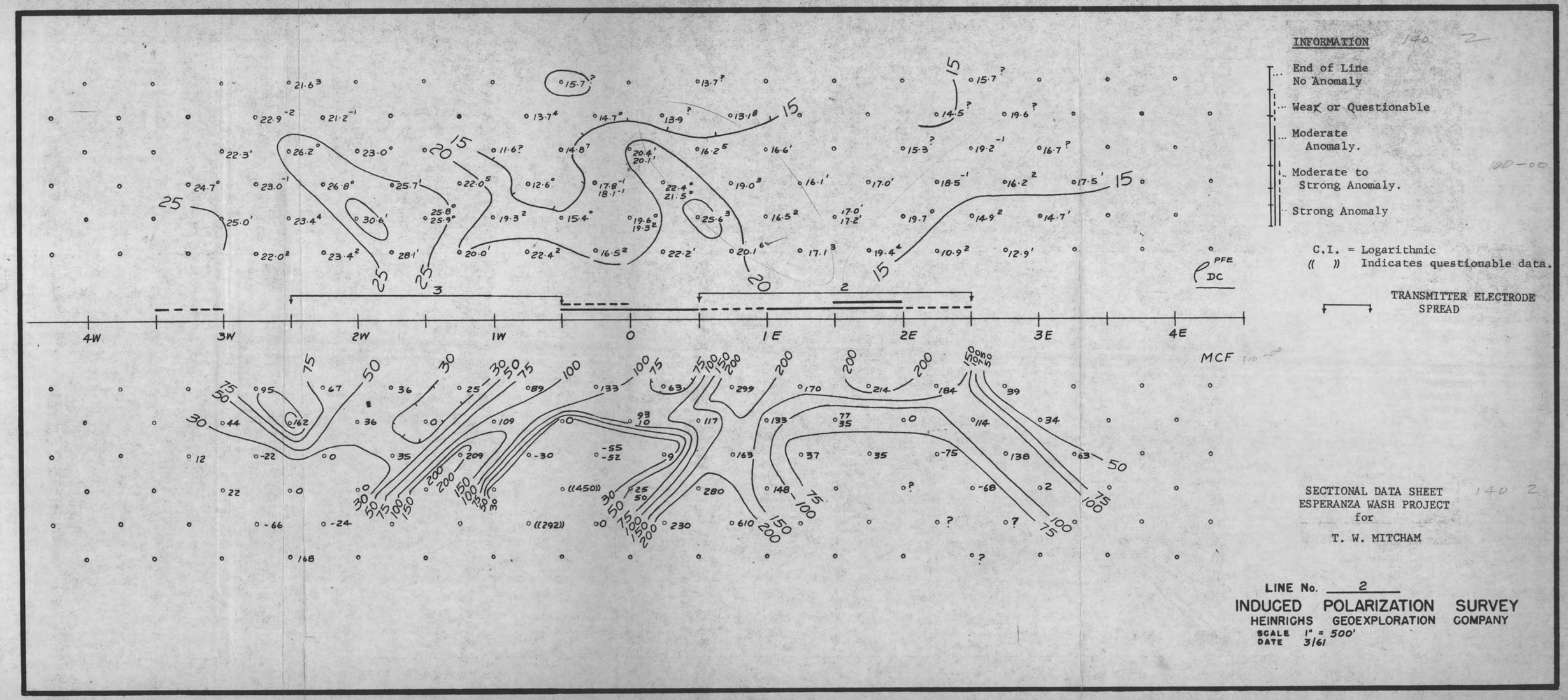
LINE No. 1

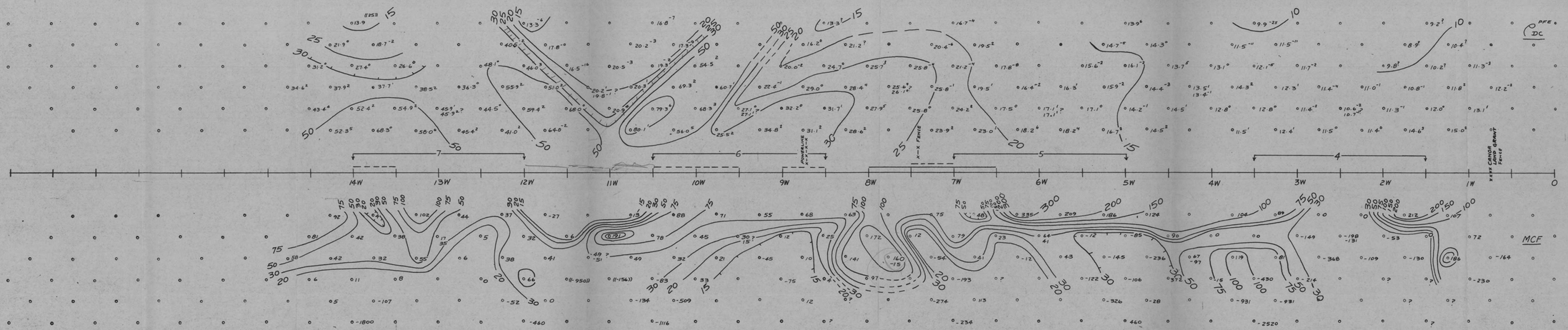
INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 1000'

DATE 3/61


INFORMATION
End of Line No Anomaly
Weak or Questionable
Moderate Anomaly.
Moderate to Strong Anomaly.
Strong Anomaly
C.I. = Logarithmic
(( )) Indicates questionable data.
TRANSMITTER ELECTRODE SPREAD
PFE
DC
MCF
4W
3W
2W
1W
0
1E
2E
3E
4E
SECTIONAL DATA SHEET
ESPERANZA WASH PROJECT
for
T. W. MITCHAM
LINE No. 2
INDUCED POLARIZATION SURVEY
HEINRICHS GEOEXPLORATION COMPANY
SCALE 1" = 500'
DATE 3/61



INFORMATION

- End of Line. No Anomaly
- Weak or Questionable
- Moderate Anomaly
- Moderate to Strong Anomaly
- Strong Anomaly

C.I. = Logarithmic

(( )) Indicates questionable data.

TRANSMITTER ELECTRODE SPREAD

SECTIONAL DATA SHEET
ESPERANZA WASH PROJECT
for
T. W. MITCHAM

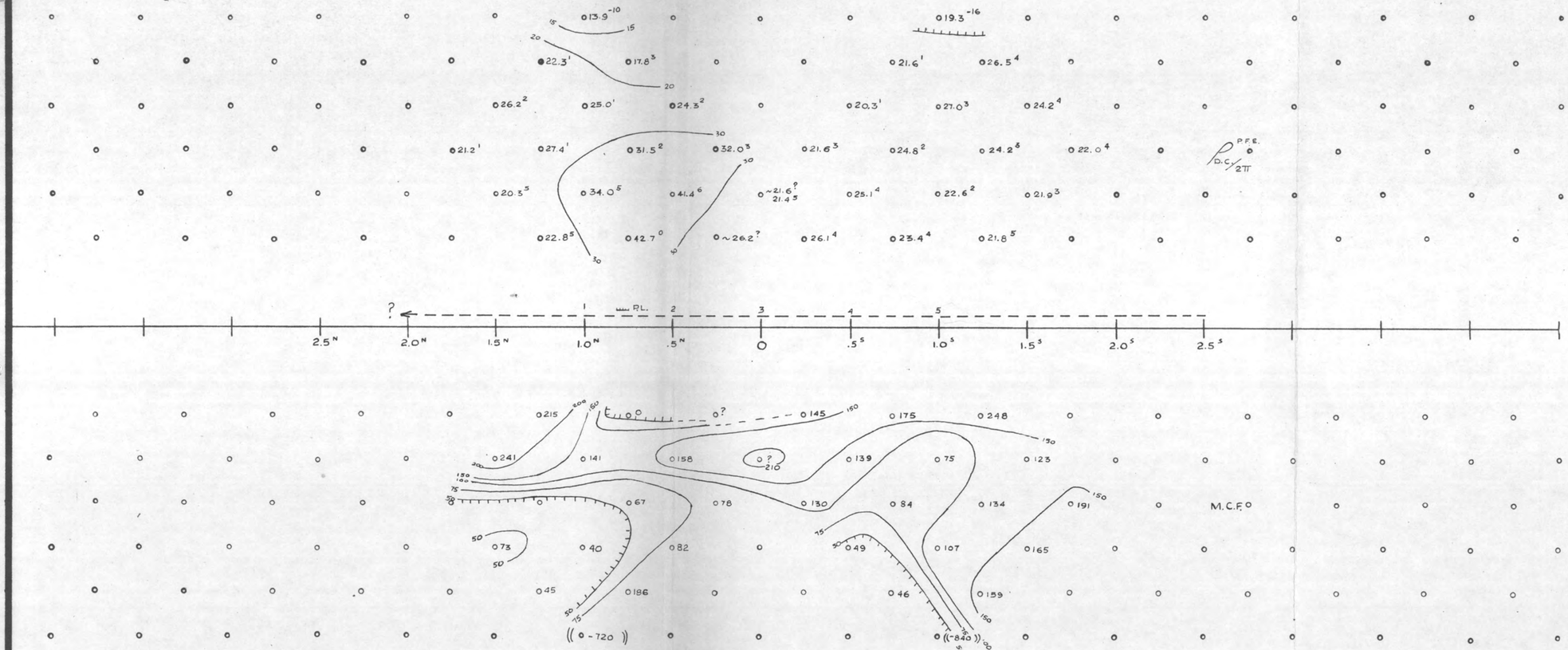
LINE No. 3

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE 5/61



END OF LINE
NO ANOMALY

WEAK OR QUESTIONABLE

MODERATE ANOMALY

MODERATE TO STRONG ANOMALY

STRONG ANOMALY

C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

SECTIONAL DATA SHEET

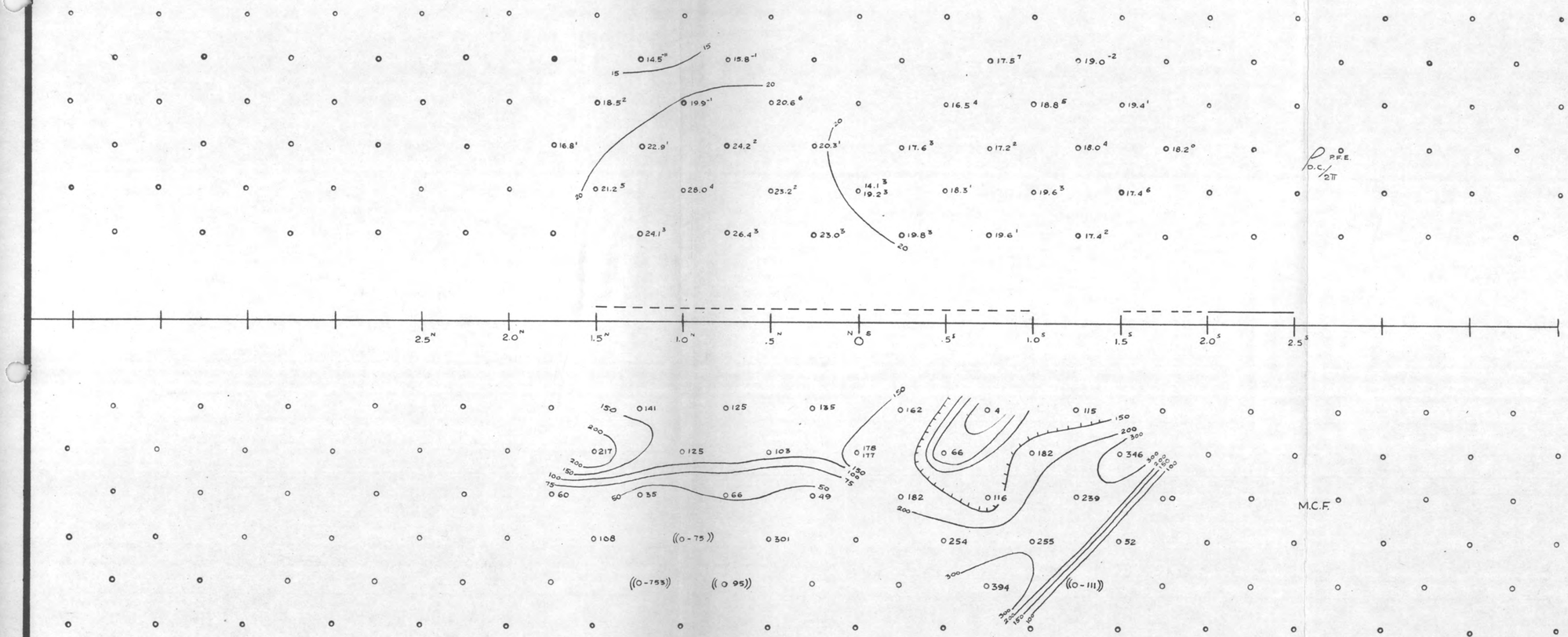
ESPERANZA WASH PROJECT
for
T. W. MITCHAM

LINE No. 4

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'
DATE APRIL 1961



END OF LINE
NO ANOMALY

WEAK OR QUESTIONABLE

MODERATE ANOMALY

MODERATE TO STRONG
ANOMALY

STRONG ANOMALY

C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE
DATA

SECTIONAL DATA SHEET

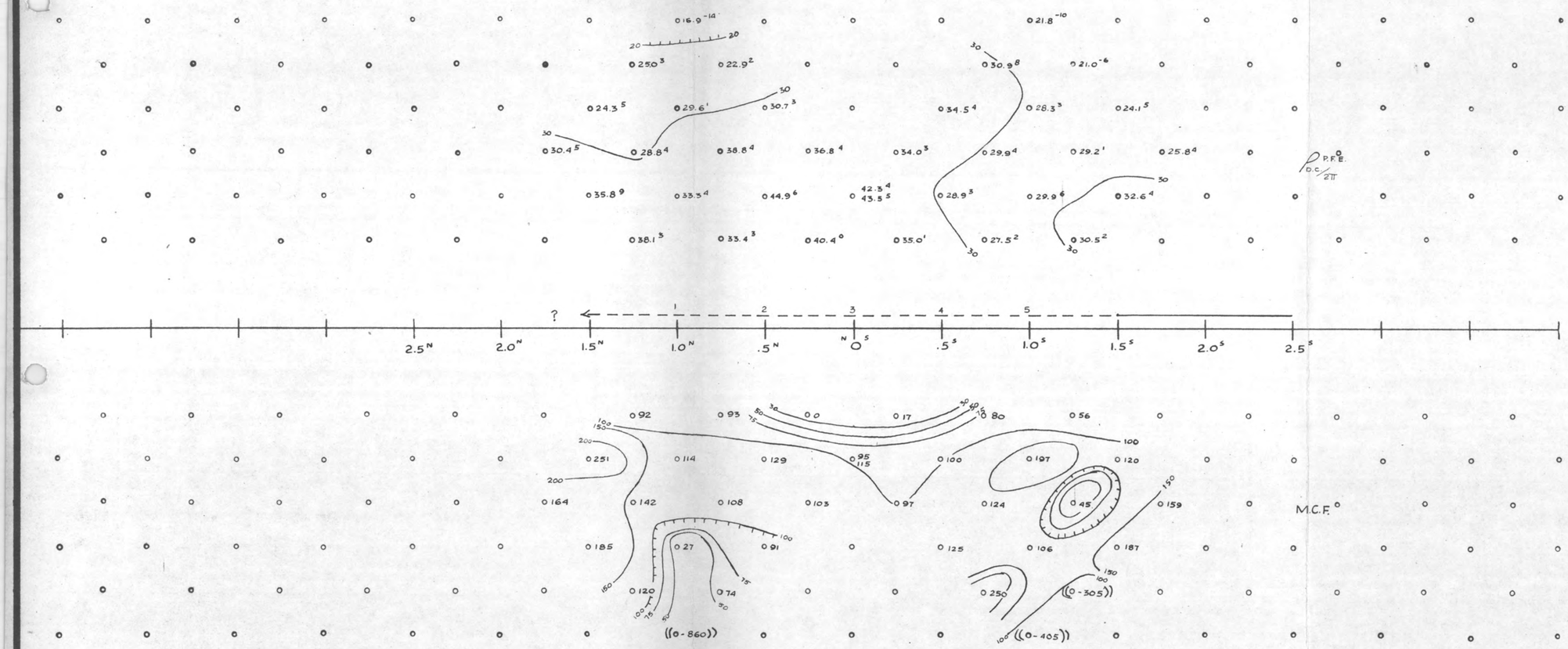
ESPERANZA WASH PROJECT
for
T. W. MITCHAM

LINE No. 5

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'
DATE APRIL 1961



END OF LINE
NO ANOMALY

WEAK OR QUESTIONABLE

MODERATE ANOMALY

MODERATE TO STRONG ANOMALY

STRONG ANOMALY

C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

SECTIONAL DATA SHEET

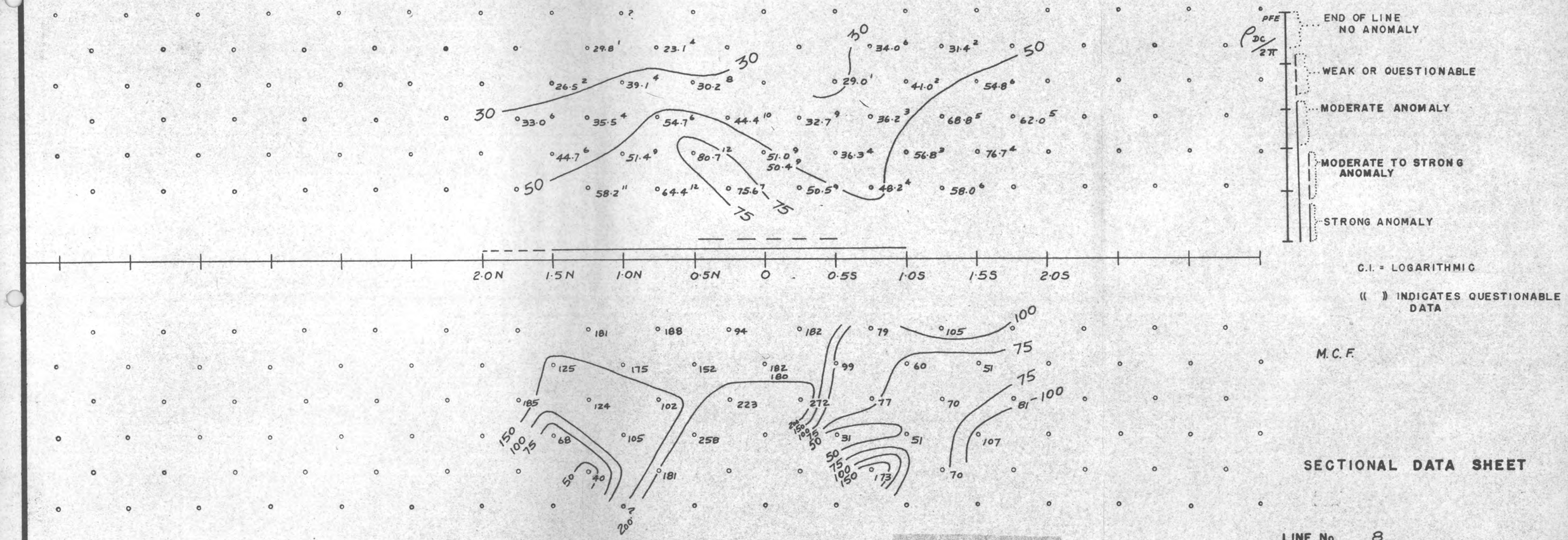
ESPERANZA WASH PROJECT
for
T. W. MITCHAM

LINE No. 6

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'
DATE APRIL 1961



C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M.C.F.

SECTIONAL DATA SHEET

LINE No. 8

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

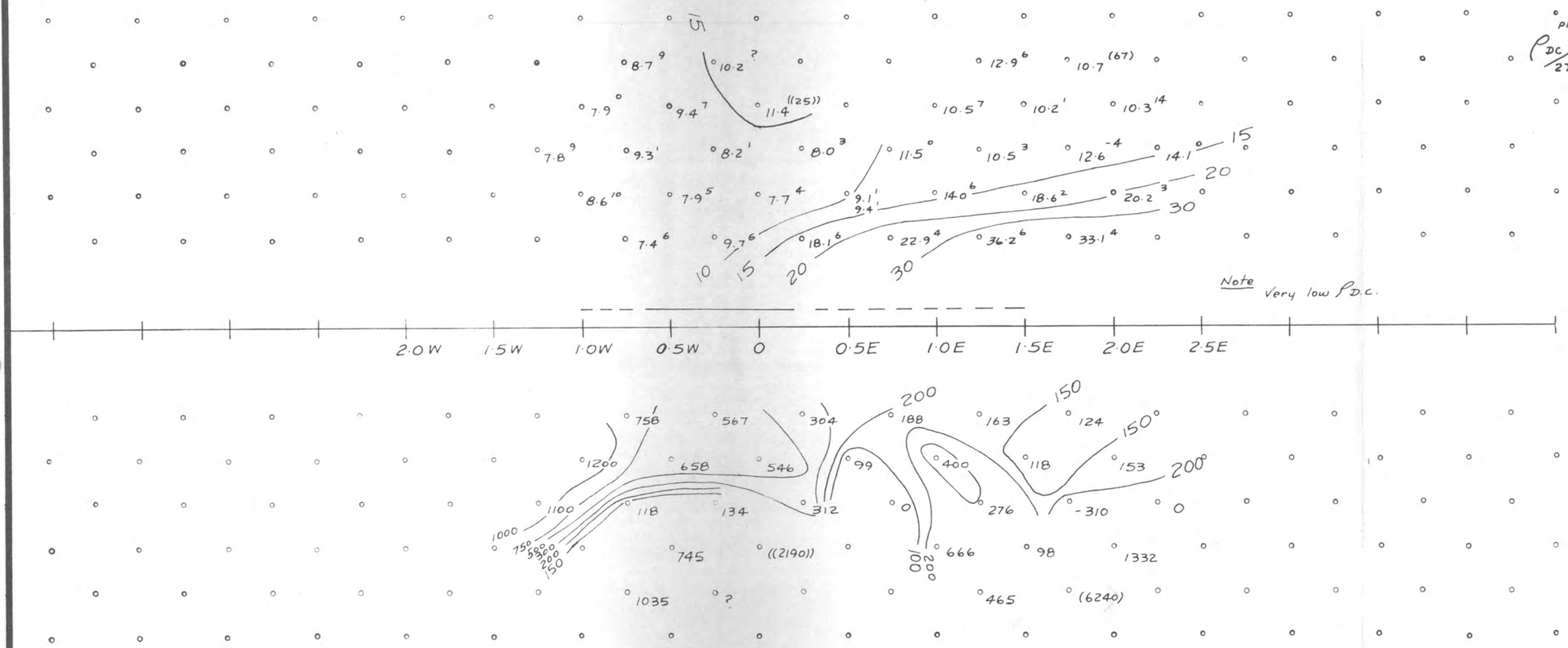
SCALE 1" = 500'

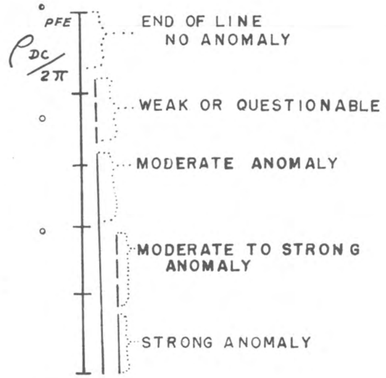
DATE MAY, 1961

ESPERANZA WASH PROJECT

for

T.W. MITCHAM





C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M. C. F.

SECTIONAL DATA SHEET

ESPERANZA WASH PROJECT

T.W. MITCHAM

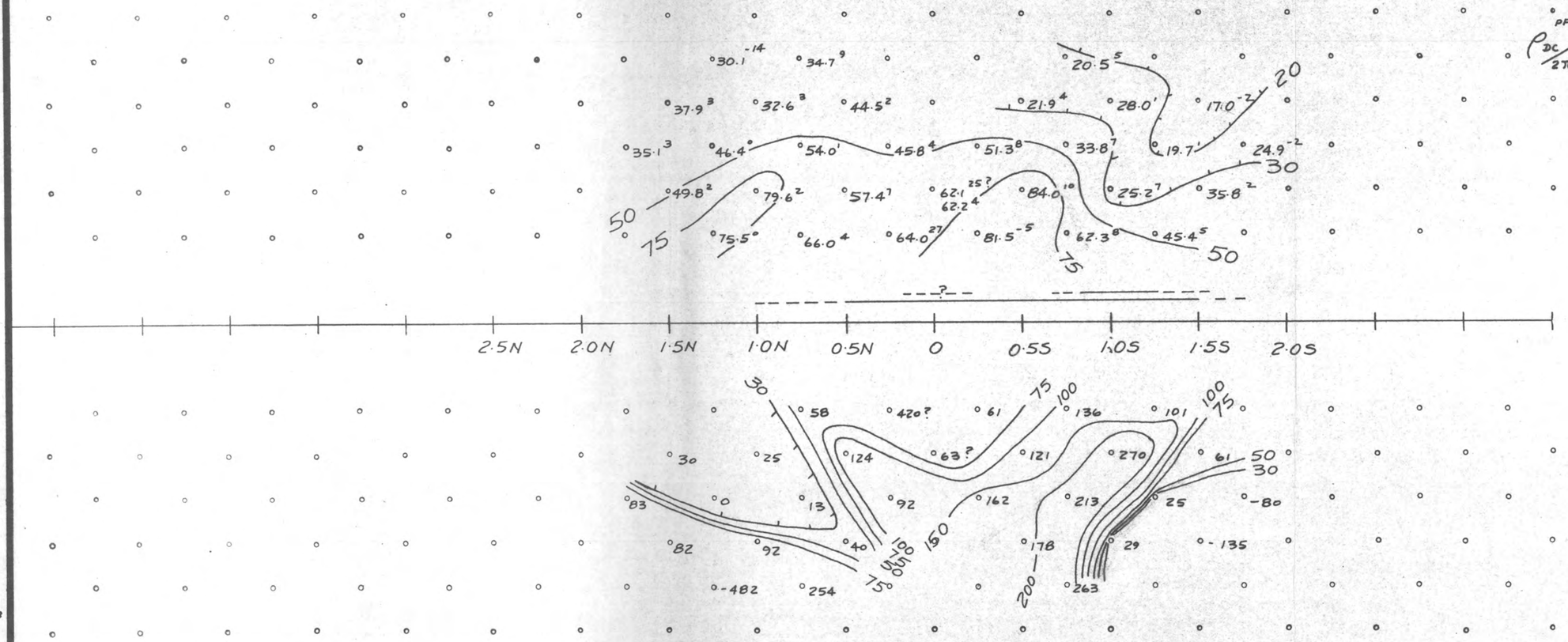
LINE No. 7

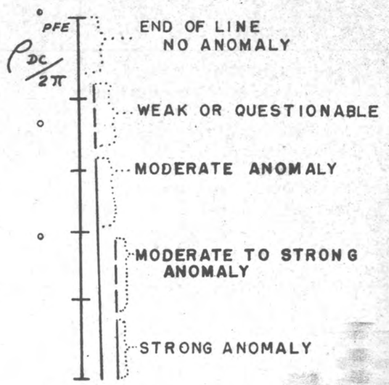
INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE MAY, 1961





C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M. C. F.

SECTIONAL DATA SHEET

LINE No. 9

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

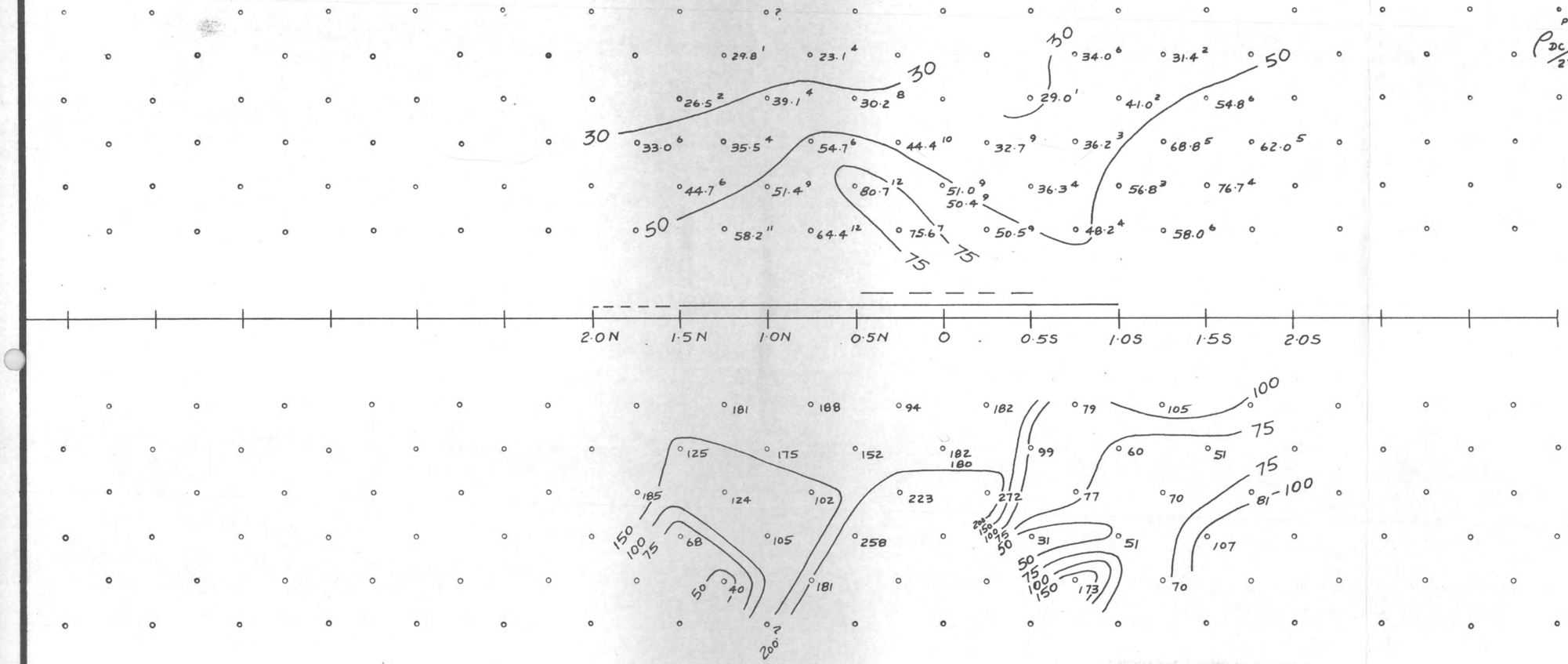
SCALE 1" = 500'

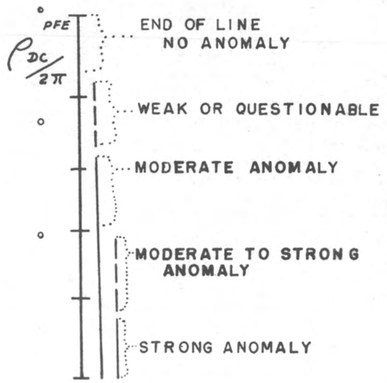
DATE MAY, 1961

ESPERANZA WASH PROJECT

for

T.W. MITCHAM





C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M. C. F.

SECTIONAL DATA SHEET

ESPERANZA WASH PROJECT

for

T.W. MITCHAM

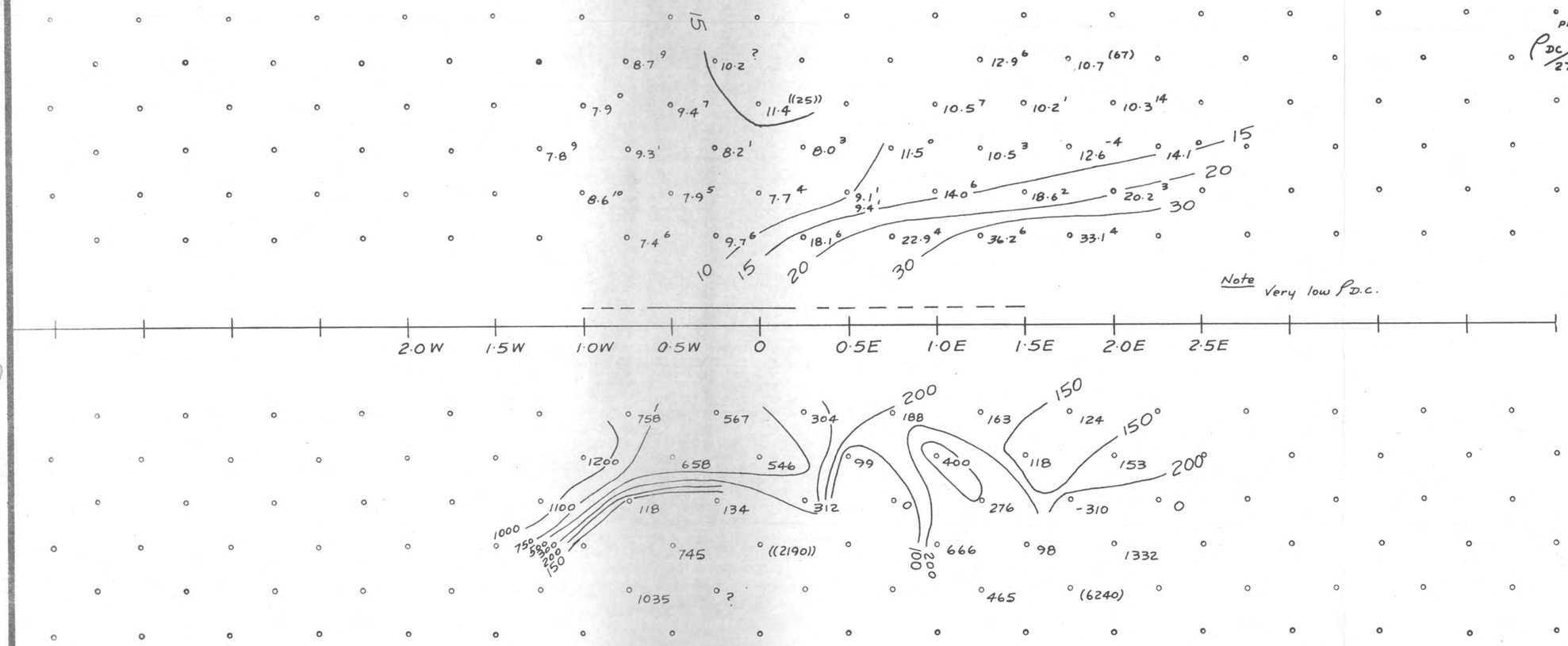
LINE No. 8

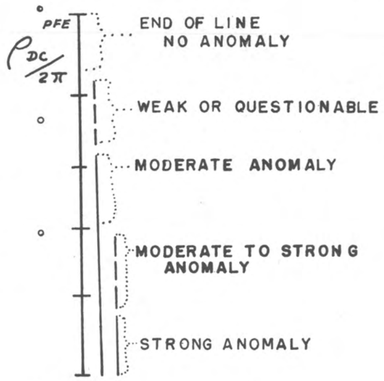
INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE MAY, 1961





C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M. C. F.

SECTIONAL DATA SHEET

ESPERANZA WASH PROJECT

for

T.W. MITCHAM

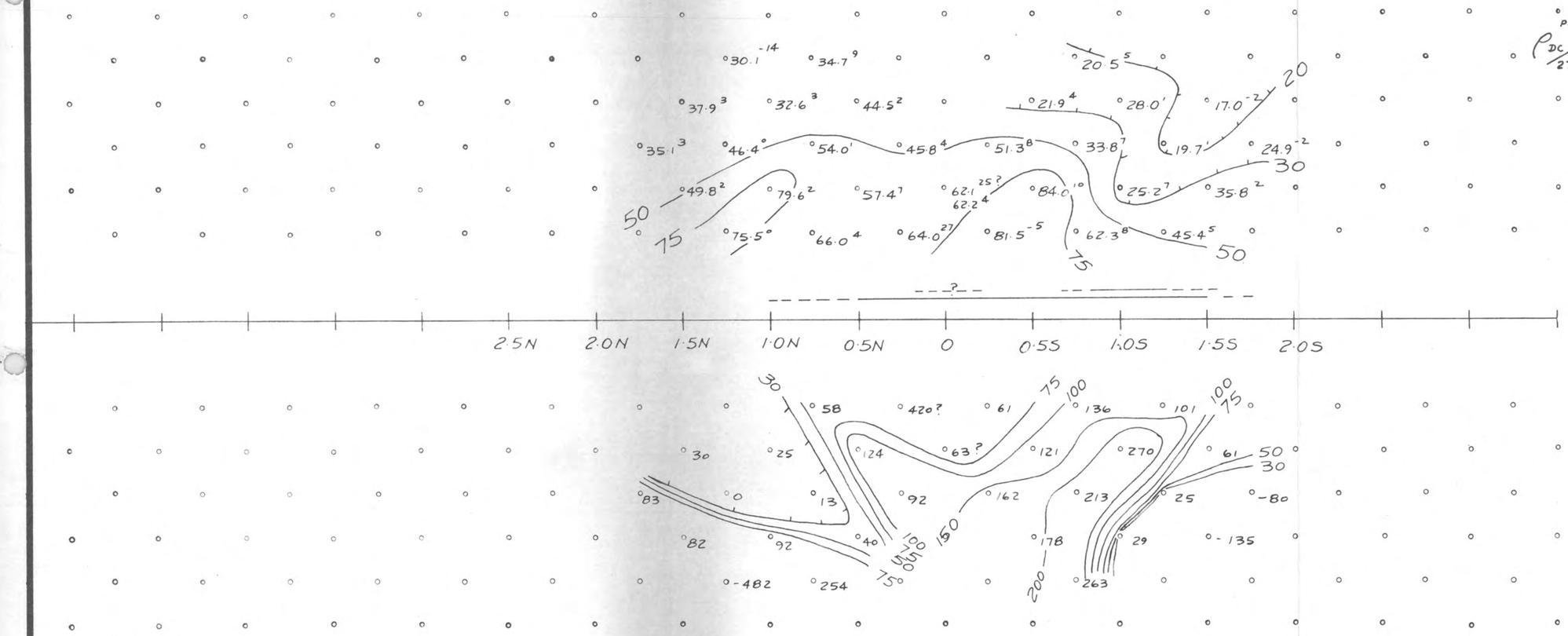
LINE No. 7

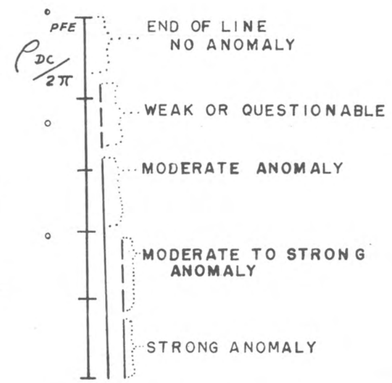
INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE MAY, 1961





C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M.C.F.

SECTIONAL DATA SHEET

LINE No. 9

INDUCED POLARIZATION SURVEY

HEINRIGHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE MAY, 1961

ESPERANZA WASH PROJECT

for

T.W. MITCHAM

TABLE OF CONTENTS

Supplement #2

	Page
Introduction	1
Conclusions & Recommendations	1
Procedure	2
Interpretation	3

Sectional Data Sheets
Line #7, Line #8, Line #9

In Pocket
Induced Polarization Anomaly Plan Map---Revised

Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
WALTER E. HEINRICHS, JR.
DEC. 31, 1967
ARIZONA, U. S. A.

Walter E. Heinrichs, Jr.

SUPPLEMENT # 2

INDUCED POLARIZATION INVESTIGATION
and
RESULTS OF AN EXPERIMENTAL SELF POTENTIAL PROFILE

Esperanza Wash Area
Pima County, Arizona

May 1961

INTRODUCTION

During May, 1961 three additional reconnaissance I. P. lines were run over areas of magnetic anomalism at the request of Dr. T. W. Mitcham. The lines were run over magnetic anomalies "B", "C" and "E" using a 500 ft. electrode spacing and totalling 18,000 ft. of observed profile traverse. Because of exceptionally low resistivities observed over anomaly "E" and the resultant somewhat erratic frequency and metallic conduction effects we repeated this line at our own expense, moving the center one electrode spacing to the southeast. Also one 2,000 ft. self potential line was run north-south across magnetic anomaly "B".

CONCLUSIONS AND RECOMMENDATIONS

The I. P. effects over magnetic anomalies "B", "C" and "E" are the strongest and most distinct so far observed on the project. Although they are still not strong or definite enough to positively indicate sulfides, we feel the chances are at least much improved if not actually good.

The most significant results were obtained over magnetic anomalies "B" and "C". However, based solely on the I.P. results alone, the data over "E" is such that we do not recommend dropping ground in this area without more negative information or over riding circumstances.

Relatively, "B" and "C" areas are about a toss up, except "B" appears possibly shallower and has a correlating weak, but hopefully sulfide indicating, self potential low. To date, our best correlation relates to the magnetic highs. However, we should emphasize that continual consideration of the lows and slope intercepts should not be ignored.

PROCEDURE

Line #7 was originally centered just north of the ¼ Cor. on the south line of Sec. 35 and run N 50° W - S 50° E for the repeat survey.

Line #8 was centered 600 ft. E and 650 ft. S of the west ¼ Cor. Sec. 1 and run north-south across Anomaly "C".

Line #9 was centered at the point of maximum magnetic intensity of Anomaly "B" and run north-south.

The self potential profile was also centered on Anomaly "B" and run north-south a distance of 1,000 ft. on either side from the center, on 50 ft. intervals to 400 ft. and 100 ft. intervals from 400 to 1,000 ft.

INTERPRETATION

Line #7 very unexpectedly encountered the lowest resistivities observed in the area and this resulted in erratic frequency and MCF effects. All previous data had indicated a general regional resistivity increase to the west with some occasional anomalous lows and highs of limited extent which have been previously discussed. Experience in other areas has indicated that both acidic and basic volcanics even where exposed and weathered, can have normal to relatively high resistivities. Therefore some situation other than the presence of fresh or even normally weathered volcanics must at least be considered as the possible cause of this anomalism. It is conceivable that a trachyte or latite sill or flow might weather or be otherwise altered to clay, which could give rise to such low resistivities. Gouge or clay in a flat easterly dipping thrust fault could also account for this picture. Also the line could have been oriented parallel to and immediately over or adjacent to a gouge filled normal fault. Regardless of the cause of the abnormally low resistivities it can be stated that the source is likely fairly shallow becoming deeper to the southeast; that electrical penetration was limited to this depth, and that the somewhat anomalous if erratic polarization effects are subject to question regarding whether they represent valid sulfide effects.

Line #8 shows distinct anomalism from about 1.0S to about 1.0N or even 1.5N and a bare suggestion of possible continuation to the north. The strongest anomalism centers about over the mag high or a little to the north.

Line #9 also shows distinct anomalism, but not quite so strong as Line #8. This could be partly because the causative feature is somewhat narrower and/or smaller and/or dips more nearly vertical. At least the indications suggest a rather sharp drop off on both sides, but especially to the north. The strongest anomalism centers near the mag high, or a little to the south. This slight tendency to the south may or may not correlate with the indicated southerly mag extension.

It is interesting to note that the sharp resistivity low observed on Line #3 at station 11W does not appear on Line #9 except possibly towards the southern end. This suggests that the course or strike of this feature is predominently north-south. The fact that the resistivity low on Line #3 is bounded on both sides by marked rather narrow anomalous resistivity highs, was not previously discussed. Also there is a resistivity high bounding the north edge and the low on Line #3, which further supports this interpretation.

Previously we suggested that porous permeable extrusive or epithermal volcanics could provide for the exceptionally low resistivities observed on Line #3 and such may be the case. However, latest evidence indicates that a more plausible

explanation would be contact effects due either to a fault zone or intrusive contact metamorphism.

The S. P. line showed a total variation of about 35 millivolts. Ordinarily, experience in this region indicates background may be about 25 to 30 millivolts. Topography also gives some variation on occasions and we do have a little involved here. However, the anomalism does not quite properly match that to be expected from topography, but the S.P. low does almost exactly match the position of the mag. high. This could represent a weak indication of sulfide, and if so, would also confirm the magnetic indications of relatively shallow depth, because true residual S. P. effects usually cannot be obtained from much deeper than about 200 feet.

Respectfully submitted,

HEINRICHS GEOEXPLORATION CO.

Franklin A. Seward Jr.

Franklin A. Seward, Jr.
Geophysicist

Approved:

Walter E. Heinrichs, Jr.

May 27, 1961
P. O. Box 5671
Tucson, Arizona

TABLE 6. PROCEDURE SHEET FOR

INTERPRETATION OF PROFILE ACROSS MAGNETIC ANOMALY

ARISING FROM ASSUMED TABULAR-SHAPED BODY

Name of Anomaly or Ore Deposit: Esperanza - "B"

Profile Number: ____

Description, location, etc.: ____

RESULTS OF INTERPRETATION

Depth (subsurface) ____ (no. 12)

Dip, δ = ____ (no. 13 or 19)

Thickness, t = ____ (no. 14 or 21)

Coordinates of apex: x = ____

y = ____

STEP-BY-STEP TABULATION

Quantity	Reference
1. T_o = 50,950 gammas	Regional maps such as those of U.S. Coast and Geodetic Survey
2. I_o = 59°25'	
3. α = 107°30'	Magnetic contour map
4. I_o' = 60°	Chart 1 (with nos. 2 and 3)
5. T_o'/T_o = .980	Chart 2 (with nos. 2 and 3)
6. T_o' = 49,931 gammas	Multiply: no. 5 times no. 1
7. A = 1800 γ gammas	Magnetic profile
8. θ = -20°	Superposition of magnetic profile over standard curves (Charts 3 - 6)
9. y'_{apex} = 305	
10. z = 220'±10' (below level of observations)	
11. Ht. of observations above ground level: 0	
12. Depth to apex from surface of ground: 220'±	Subtract: no. 10 - no. 11
13. δ = 50° S	Table 1
14. t = ____	Table 1

JOS 14 June/61

DEMAGNETIZATION CORRECTIONS

15. Estimated k_{true} _____	
16. K = _____	Chart 7 (with no. 15)
17. β'' = _____	Table 2
18. β' = _____	Chart 8 (with nos. 16 and 17)
19. δ_{corr} = _____	$\delta = I_o' - \beta'$ (no. 4 - no. 18)
20. C_t = _____	Chart 9 (with nos. 17 and 16)
21. t_{corr} = _____	Multiply: no. 14 by no. 20

X - X - X - X - X - X - X - X

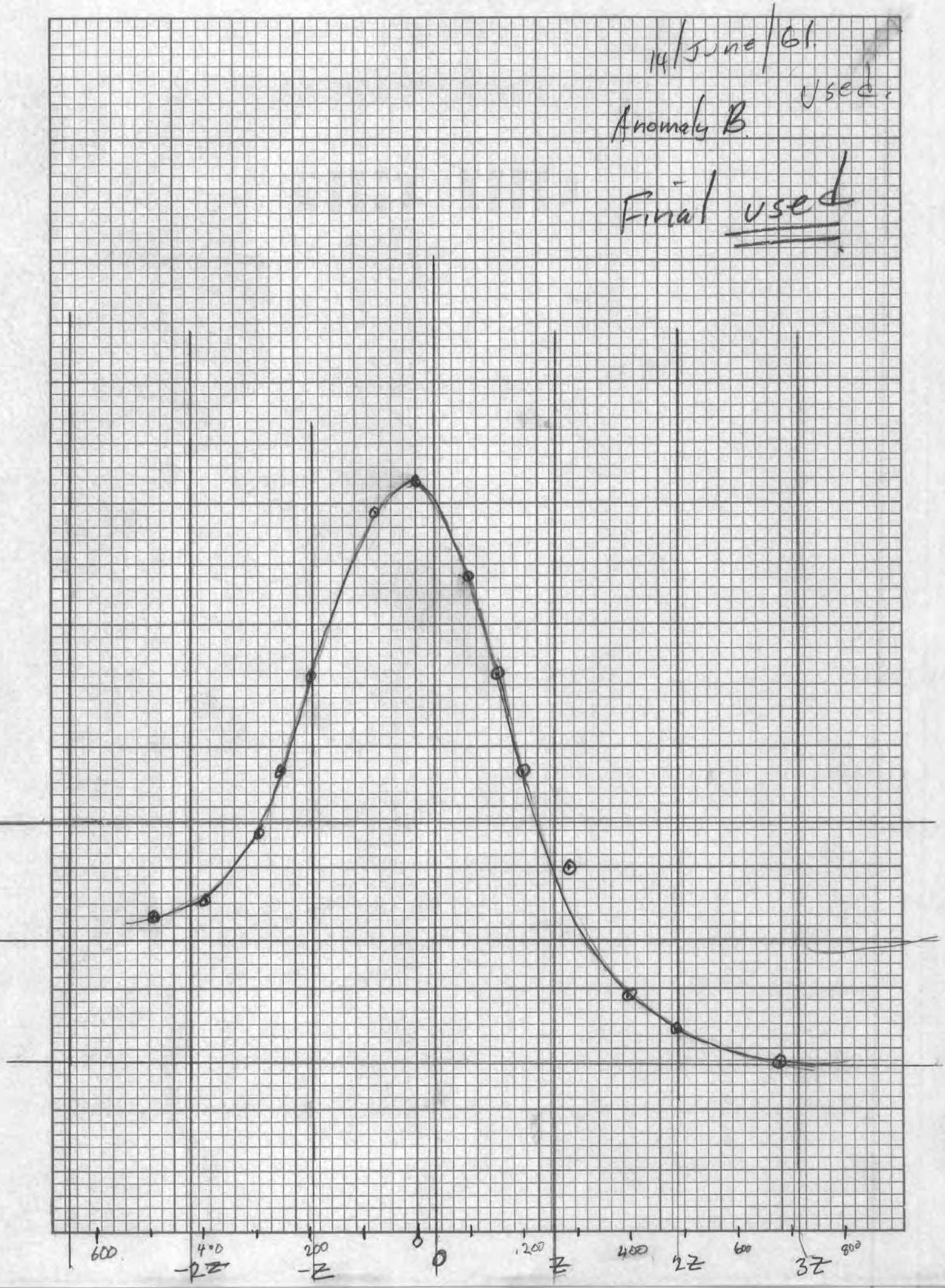
REMARKS

14/June/61.

Used.

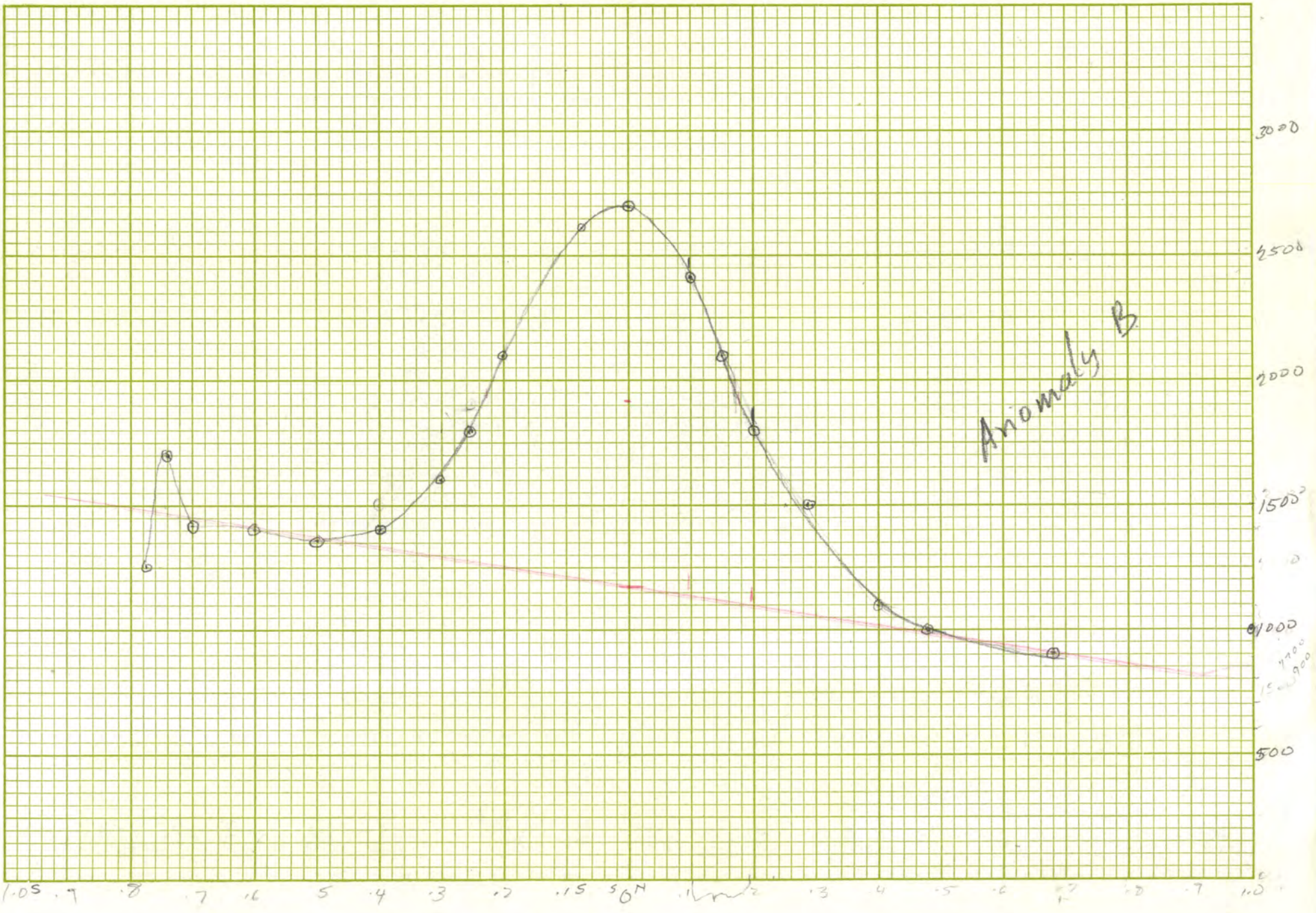
Anomaly B.

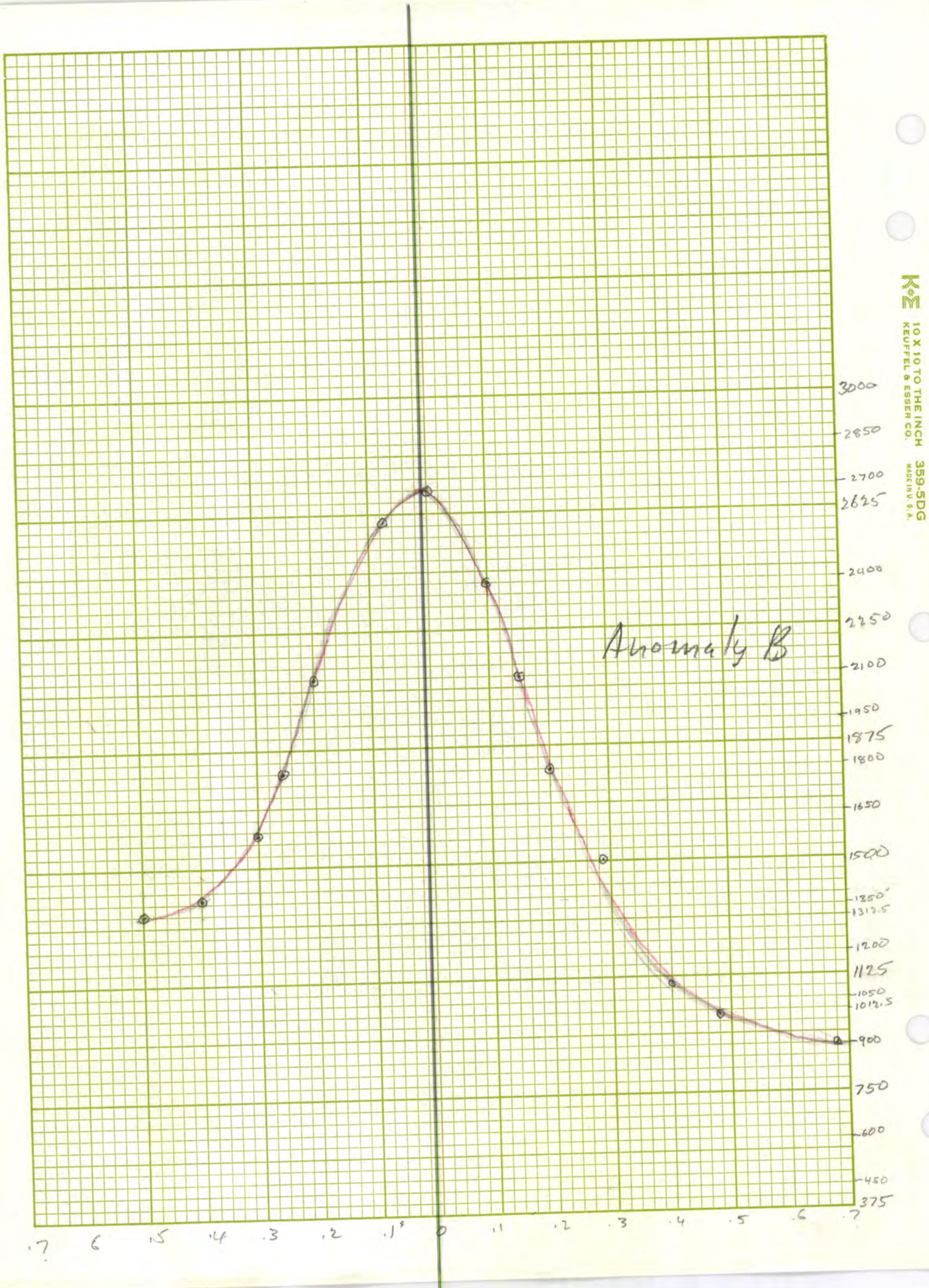
Final <u>used</u>



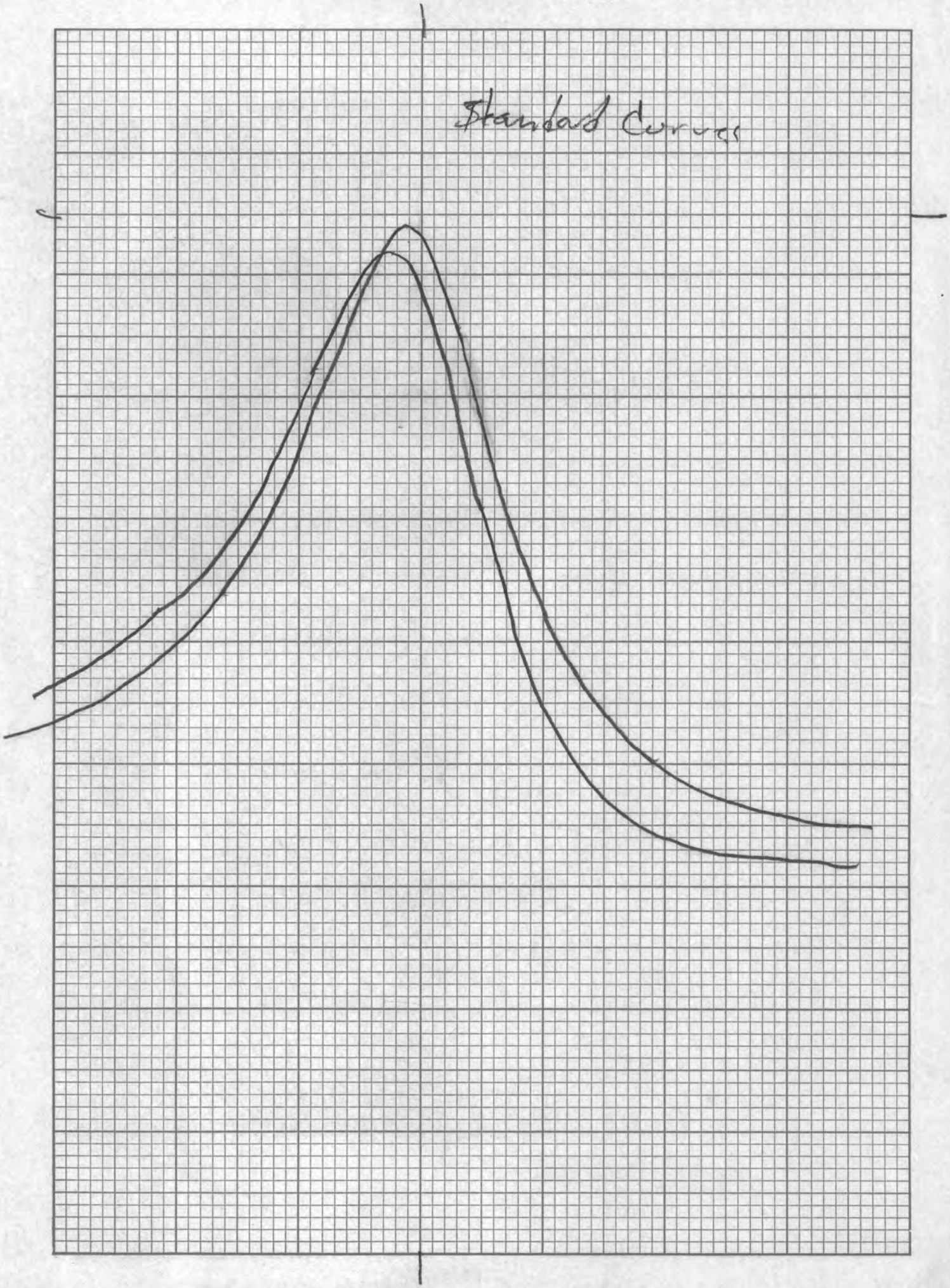
K+E 10 X 10 TO THE INCH 359-5DG
KEUFFEL & ESSER CO. MADE IN U.S.A.

K+E 10 X 10 TO THE INCH 359-5DG
KEUFFEL & ESSER CO. MADE IN U.S.A.

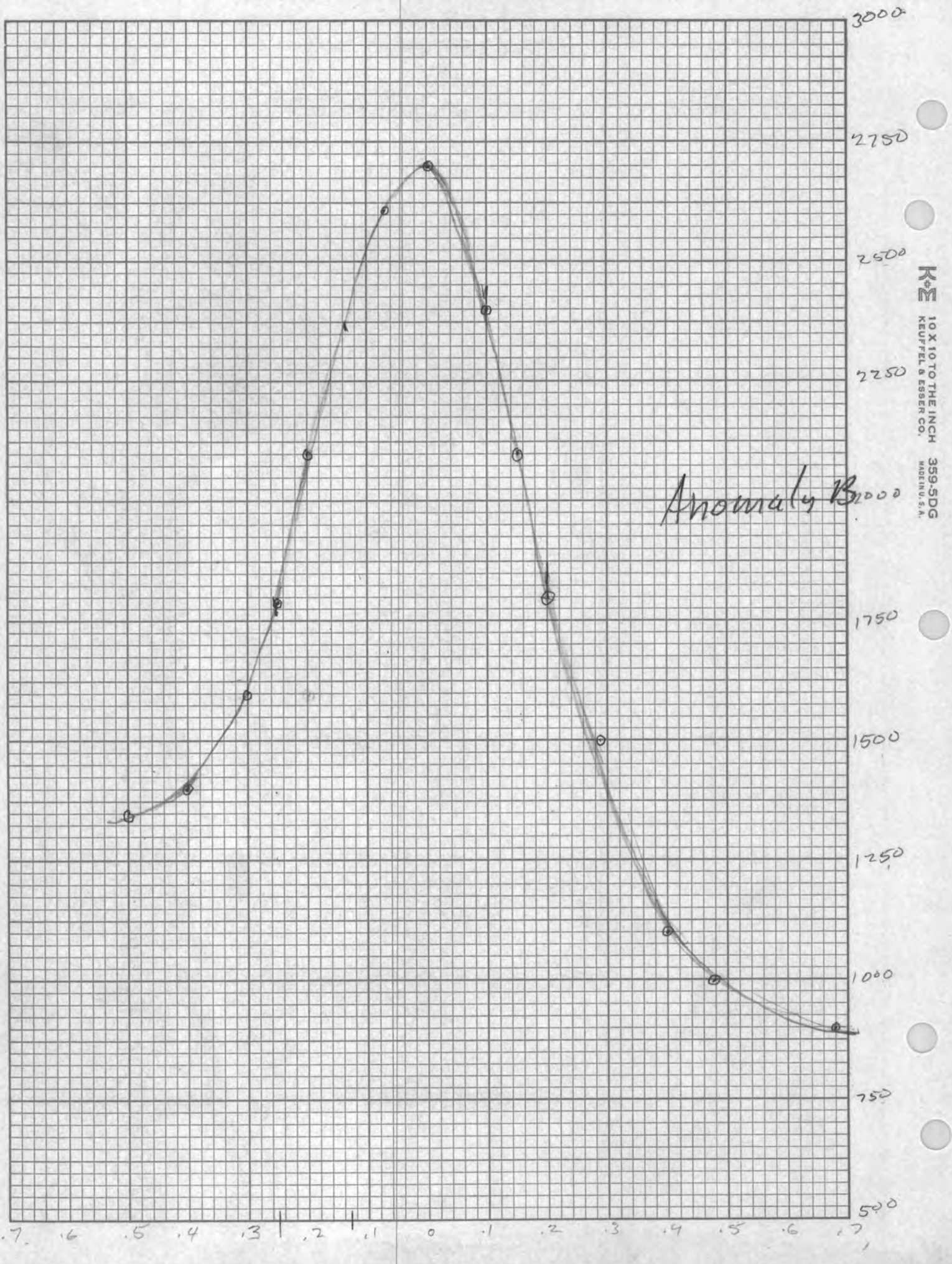


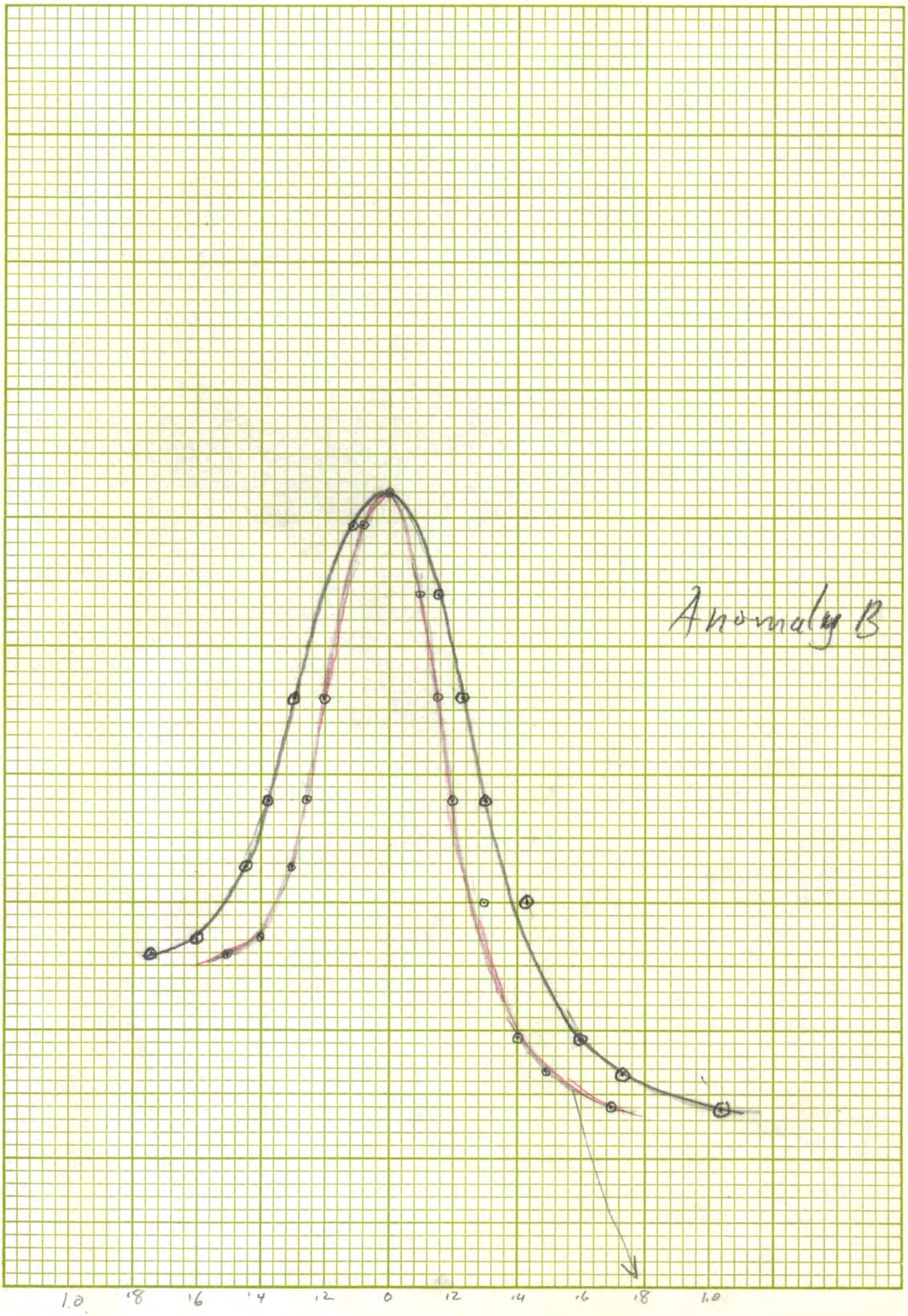

Anomaly B
3000
2850
2700
2625
2400
2250
2100
1950
1875
1800
1650
1500
1350
1312.5
1200
1125
1050
1012.5
900
750
600
450
375
.7
.6
.5
.4
.3
.2
.1
0
.1
.2
.3
.4
.5
.6
.7
K+E 10 X 10 TO THE INCH 359-5DG
KEUFFEL & ESSER CO. MADE IN U.S.A.

Standard Curves



K+E 10 X 10 TO THE INCH 359-5DG
KEUFFEL & ESSER CO. MADE IN U.S.A.


3000
2750
2500
2250
2000
1750
1500
1250
1000
750
500
.7 .6 .5 .4 .3 .2 .1 0 .1 .2 .3 .4 .5 .6 .7
Anomaly B
K+E 10 X 10 TO THE INCH 359-5DG
KEUFFEL & ESSER CO. MADE IN U.S.A.



K+E 10 X 10 TO THE INCH 359-5DG
KEUFFEL & ESSER CO. MADE IN U.S.A.

5/July/61.

Esperanza DDH#1

Sample #	TT#	
310'	100.	40
293'	120	≮ 40
215'	137	<40
71'	139.	<40.

32,550'
END OF RECORD I IS A POINT
IN T18S R12E SEC. 27
WASH 28,370'
25480' N.W.
25,030' OLD CAMP
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A.

AOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR: DR. THOMAS MITCHUM

RECORD NO. 2 DATE 2-4-81

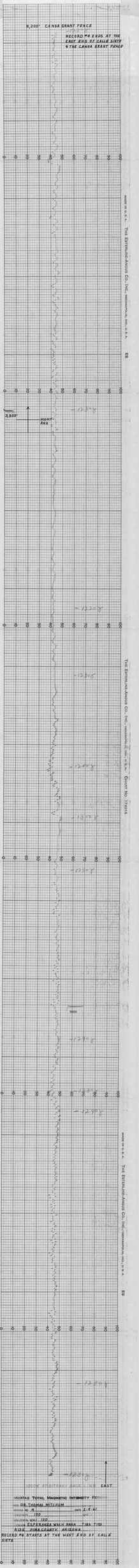
SENSITIVITY 100 GAMMAS /½ in. S.D.

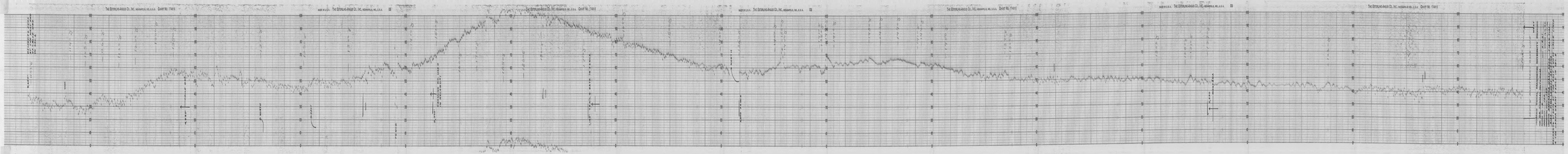
HORIZONTAL SCALE 100 FT./in.

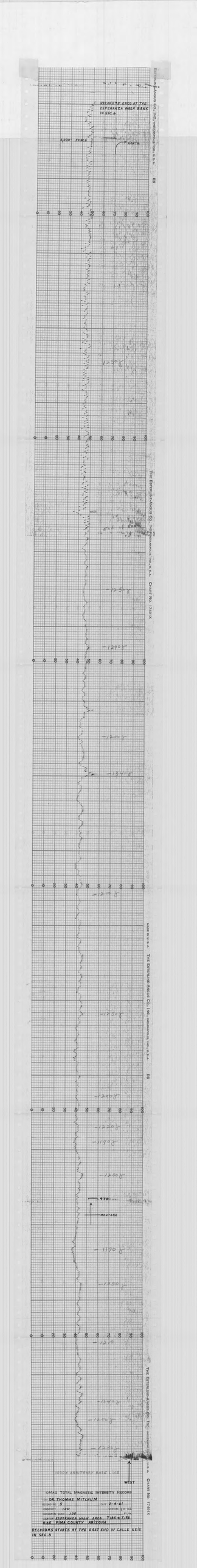
LOCATION ESPERANZA WASH AREA T18S & T19S R13E PIMA COUNTY ARIZONA

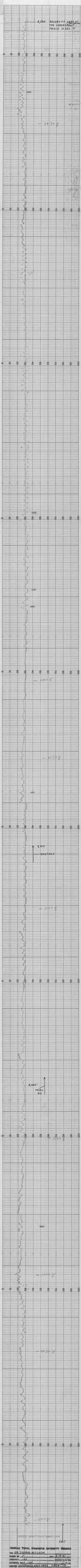
SOUTH ON MONTANA FROM JUNCTION OF CALLE UNO AND MONTANA TO CALLE NUEVE ON SOUTH SEC. LINE OF SEC. 8

LINE RECORDED EAST OF THE WEST END OF CALLE SANTA
Chart No. 17805
NORTH
WEST FENCE
The Brown-Allied Co. Inc. Minneapolis, Minn. U.S.A.
WEST
EAST
WEST IN CALLE VERDE
EAST
NORTH IN MONTANA
The Brown-Allied Co. Inc. Minneapolis, Minn. U.S.A.
Chart No. 17805
WEST
NORMAL TOTAL MAGNETIC INTENSITY PROFILE
DR. THOMAS MUCKSON
LOCATION: SANTA FE, N.M.
DATE: 1-8-64
OPERATOR: [illegible]
LOCATION: KAFERBACH MOON AREA - T.24 N. T.19 R.
RIO ARRIBA COUNTY
RECORD PLACEMENT AT THE END OF CALLE VERDE & THE CANON VERDE FENCE IN THE SOUTH END OF SECT.
The Brown-Allied Co. Inc. Minneapolis, Minn. U.S.A.
Chart No. 17805


5,200' CANDA GRANT FENCE
RECORD #4 ENDS AT THE EAST END OF CALLE SIXTY & THE CANDA GRANT FENCE
MONT-ANA
-12,200 γ
-12,250 γ
-12,300 γ
-12,350 γ
-12,400 γ
-12,450 γ
-12,500 γ
-12,550 γ
-12,600 γ
100' ARBITRARY BASE LINE
EAST
MOMAG TOTAL MAGNETIC INTENSITY RECORD
DR. THOMAS MITCHUM
DATE 2-5-61
CONTROL 102
CONTROL 101 102
ESPERANZA WASH BASE TIES
ESE PIMA COUNTY ARIZONA
RECORD #4 STARTS AT THE WEST END OF CALLE SIXTY
MADE IN U.S.A. THE EDITHLINE-ANSON CO., INC. WASHINGTON, MO., U.S.A.
E8
THE EDITHLINE-ANSON CO., INC. WASHINGTON, MO., U.S.A. CHART NO. 17881X



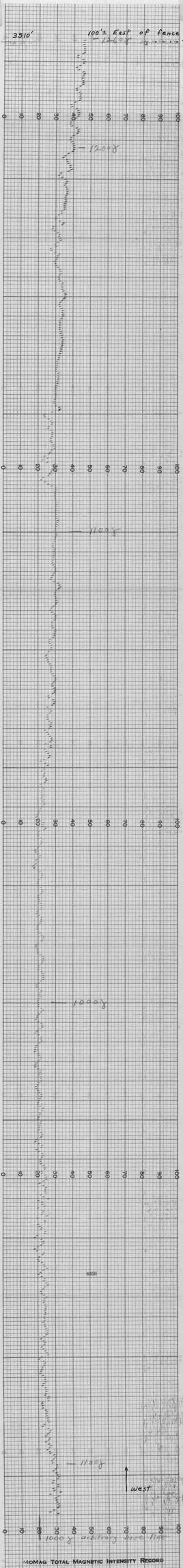

RECORDS ENDS AT THE ESPERANZA WALK BANK IN SEC. 6
8000' FENCE
NORTH
1250γ
1290γ
1340γ
1170γ
MONTANA
1170γ
1210γ
WEST
DATA ADJUSTED FOR BASE LINE
DRAG TOTAL MAGNETIC INTENSITY RECORD
DR. THOMAS MITCHUM
DATE: 2-8-61
INSTRUMENT: IRD
SENSITIVITY: 10γ
SPEED: 1" = 10'
LOCATION: ESPERANZA WALK AREA T18S R7E
FILE: PIMA COUNTY, ARIZONA
RECORDS STARTS AT THE EAST END OF CALLE SEIS IN SEC. 8
THE EDTHELIN-ANGUS CO., INC. MEDFORD, MASS., U.S.A.
CHART NO. 17481X



NORTHWEST CORNER OF THE NORTHWEST QUARTER OF SECTION 2 T.14 S. R.3 E.

EAST

NORTHWEST CORNER OF THE NORTHWEST QUARTER OF SECTION 2 T.14 S. R.3 E.



MOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR DR. THOMAS MITCHUM

RECORD NO. 8 DATE 2-9-61

SENSITIVITY 100 GAMMAS / 6 in. S.S.

HORIZONTAL SCALE 100 FT./IN.

LOCATION ESPERANZA WASH AREA

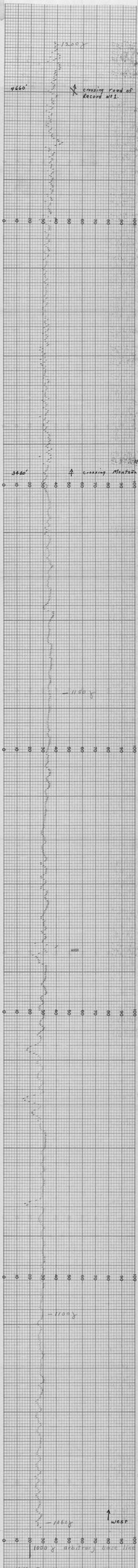
T18S & T19S, R13E, Pima COUNTY, ARIZONA

West on Calle Dos from Montana Vista across part of Section 6.

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X

MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES

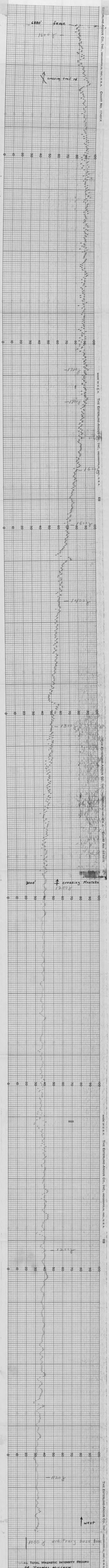
THE ESTERLINE-ANGUS

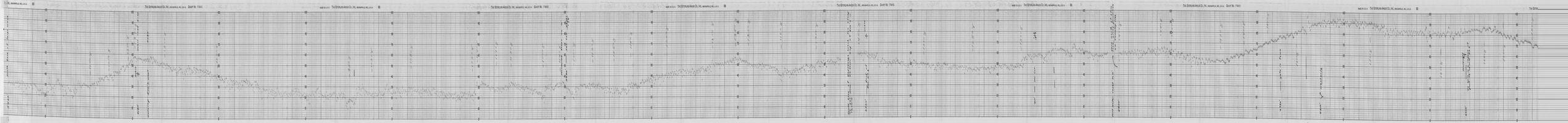


MOMAG TOTAL MAGNETIC INTENSITY RECORD

OBS.	DR. THOMAS MITCHUM
RECORD NO.	2 DATE 2-5-61
SENSITIVITY	100 GAMMA/1/4 IN.
HORIZONTAL SCALE	100 FT./IN.
LOCATION	ESPERANZA WASH AREA
	T18S & T17S, R15E, Pima Co., Arizona

WEST on Calle Tres from Canada Grant Ranch across Sec. 5 & part of Sec. 6.


4000 gamma
tracing trail
-1750 γ
-1750 γ
-1750 γ
-1750 γ
-1750 γ
3000 γ
crossing Montana
-1750 γ
-1750 γ
-1750 γ
1000 γ arbitrary base line
WEST
The Electrical Research Co. Inc. Washington, D.C.
Chart No. 70203
Total Magnetic Intensity Record
Dr. Thomas Nicholas
Scale 1" = 1000 γ
Speed 1" = 1 min.
Date 1944
Location Southern Wind Area
Time & Date Fixed on Arrival
West from Cent. Grant Knob on Cath. Quartz sheet Sec. 8 & 9 of Sec. Section 4.



MOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR: DR. THOMAS MITCHUM

RECORD NO. 13 DATE 2-4-61

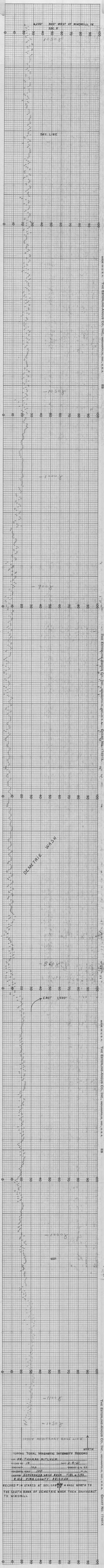
SENSITIVITY 100 GAMMAS /½ In. S.D.

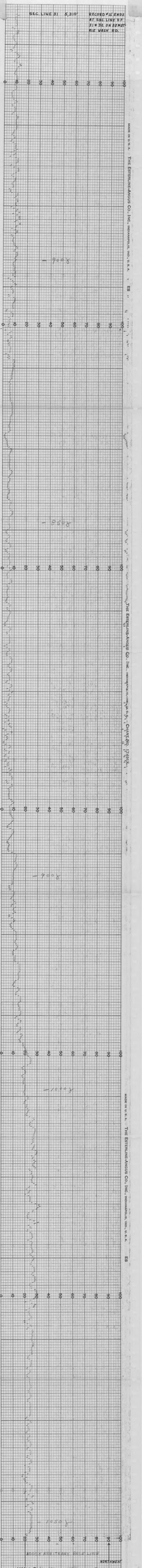
HORIZONTAL SCALE 100 FT./In.

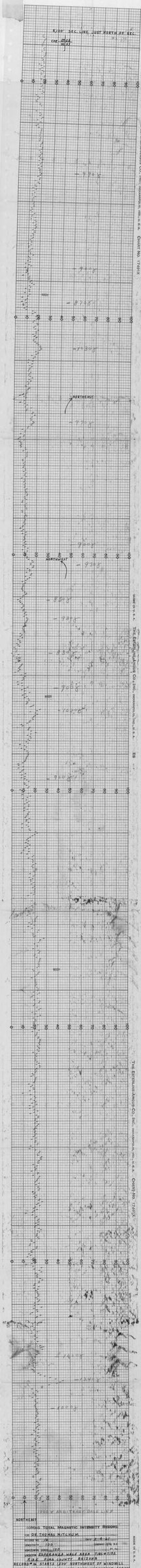
LOCATION ESPERANZA WASH AREA T18S & T19S R13E PIMA COUNTY ARIZONA

RECORD #13 STARTS AT THE SEC. LINE OF 36 & 31 + RUNS SOUTHWEST ACROSS SEC. 36 TO ESPERANZA WASH RD. WHICH IS RECORD #1

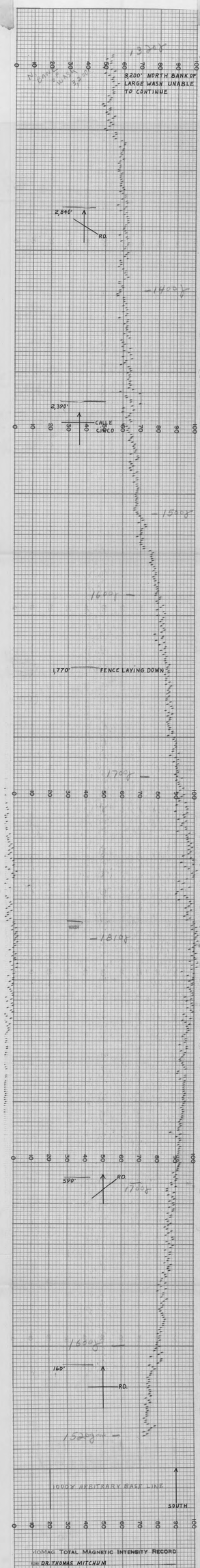
-930 γ
8,300' ROAD ENDS IN MIDDLE OF SEC. 26
NEAR A LARGE FEEDING TROUGH
west of
-850 γ
THE ESTERLINE-ANGUS
-1100 γ
-1200 γ
-1280 γ
1000 γ ARBITRARY BASE LINE
NORTHWEST
MOMAG TOTAL MAGNETIC INTENSITY RECORD
FOR: DR. THOMAS MITCHUM
RECORD NO. 12 DATE 2-4-61
SENSITIVITY 100 GAMMAS
HORIZONTAL SCALE 100 FT./In.
LOCATION ESPERANZA WASH AREA T18S & T19S R13E PIMA COUNTY ARIZONA
RECORD #12 STARTS ON SEC. LINE BETWEEN 36 & 31 & RUNS ALONG A ROAD ON THE NORTH SIDE OF HILLS TO A POINT IN THE MIDDLE OF SEC. 26


N.250' - 300' WEST OF WINCHELL IN
SEC. 8
SEC. LINE
DEMETRIE WALSH
EAST 1920'
NORTH
TOTAL MAGNETIC GRADIENT RECORD
PE Thomas Mitchell
RECORD #18 STARTS AT SEC. LINE 1920' EAST & 4945' NORTH TO
THE SIXTH RANK OF DEMETRIE WASH TREE SOUTHEAST
TO WINCHELL
The Edmund Scott Co., Inc. Washington, D.C. U.S.A.
Chart No. 71891


SEC. LINE 31 X 319'
RECORD FILE #03
AT SEC. LINE 31
31 X 30 ON DEMETRIE WASH RD.
MADE IN U.S.A. THE EDITHLINE-ANGUS CO. INC. INDIANAPOLIS, IND. U.S.A.
-700 γ
-800 γ
-900 γ
-1000 γ
-1100 γ
-1200 γ
ABOUT ATHLETICS BEAT LINE
NORTHWEST
MOMAG TOTAL MAGNETIC INTENSITY RECORD
FOR DR. THOMAS MITCHUM
FIELD NO. 1 DATE 2-5-61
BASE NO. 120 GRID N 55
BASE INT. 120 GRID E 75
OPERATOR DRS. 120 PM
LOCATION DEMETRIE WASH AREA 1 MILE NW OF
RECORD FILE STAKE'S AT THE WINDMILL IN SEC 5 & GOES UP DEMETRIE WASH RD. AS FAR AS SEC. LINE 19 SEC 31 X 22.
THE EDITHLINE-ANGUS


8,000' SEC. LINE JUST NORTH OF SEC. CYP. 22
NORTHEAST
NORTHEAST
1000' ABOVE TRACK DATA LINE
NORTHEAST
SOMAG TOTAL MAGNETIC INTENSITY RESONS
ON DE-THOMAS MITCHUM
DATE 8-8-61
SCALE 1" = 1000'
SENSITIVITY 10 G
SENSITIVITY 100 G
LOCATION SUGARLOAF WASH AREA TUMAYITE
PIMA COUNTY ARIZONA
RECORD 1" STARTS 1000' NORTHWEST OF WINDMILL
ON DEMETRIE WASH RD. AND GREN NORTHERNY ACROSS
SEC. 22
THE EDITH-ALLEN CO., INC. INDIANAPOLIS, IND. U.S.A.
CHART NO. 17981X
MADE IN U.S.A.

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A.
THE ESTERLINE-ANGUS CO., INC., INDIANAPOLI

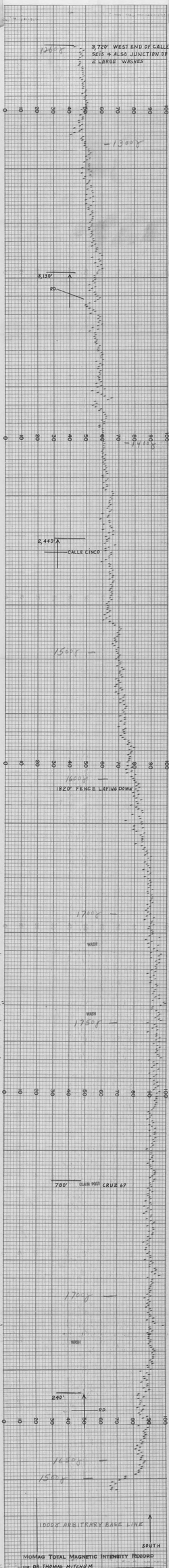


MOMAG TOTAL MAGNETIC INTENSITY RECORD

NAME DR. THOMAS MITCHUM
RECORD NO 18 DATE 2-19-61
SENSITIVITY 100 GAMMA/CM. 0.1% B.D.
HORIZONTAL SCALE 100 VERTICAL SCALE
LOCATION ESPERANZA WASH AREA T.19S. R.18E
PIMA COUNTY ARIZONA

GOING SOUTH FROM RD. ON SOUTH BANK OF ESPERANZA WASH 2,120' EAST OF SEC. LINE 1 & 6 800' EAST OF GATE IN SEC. 6 T.19S. R.18E PIMA COUNTY ARIZONA

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES
THE ESTERLINE-ANGUS



MOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR DR. THOMAS MITCHUM

RECORD NO. 12 DATE 2-19-61

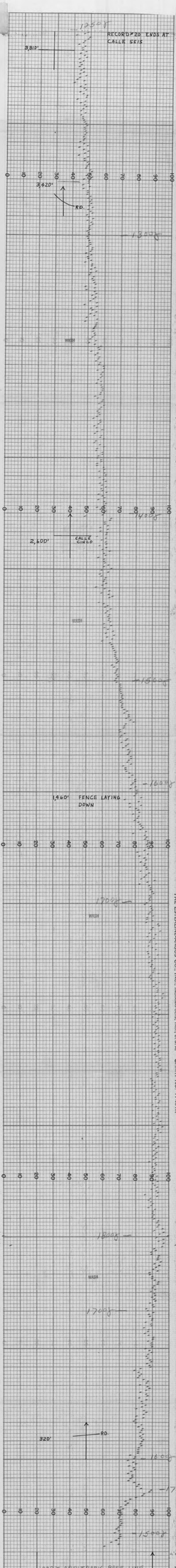
SENSITIVITY 100 GAMMAS / in. S.D.

HORIZONTAL SCALE 100 ft./in.

LOCATION ESPERANZA WASH AREA T13S R18E PIMA COUNTY ARIZONA

GOING SOUTH FROM SOUTH BANK OF ESPERANZA WASH 2,512' EAST OF SEC. LINE 1 & 6 1,200' EAST OF GATE IN SEC. 6 T13S R18E

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17481X
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A.



MOMAG TOTAL MAGNETIC INTENSITY RECORD

OBS. DR. THOMAS MITCHUM

RECORD NO. 20 DATE 2-28-81

SENSITIVITY 100 GAMMA/IN. RD.

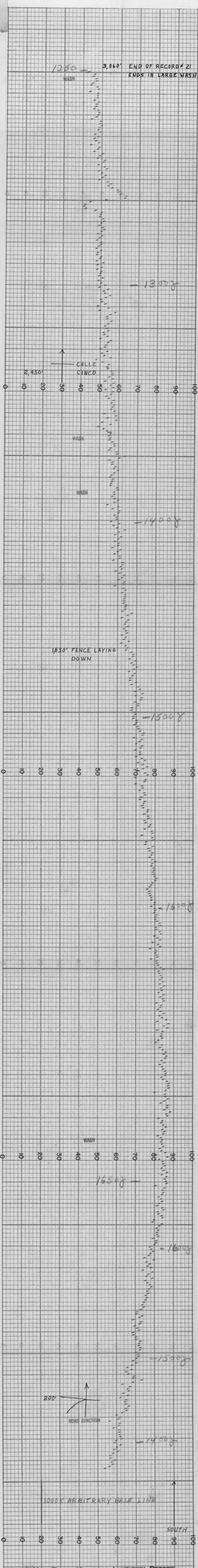
HORIZONTAL SCALE 100 FT/IN.

LOCATION ESPERANZA WASH AREA T17S R13E

PIMA COUNTY, ARIZONA

GOING SOUTH FROM SOUTH BANK OF ESPERANZA WASH 2,920' EAST OF SEC. LINE 1 & 6 1,680' EAST OF GATE IN SEC. 6 T17S R13E

MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. E8
THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS



TOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR DR. THOMAS MITCHUM

RECORD NO. 21 DATE 2-14-81

SENSITIVITY 100 SUMMING 3 TO 5.5

HORIZONTAL SCALE 100 FT/IN

LOCATION ESPERANZA WASH AREA T12S R13E

PIMA COUNTY ARIZONA

GOING SOUTH FROM SOUTH BANK OF ESPERANZA WASH 3,320' EAST OF SEC. 1 & 2,800' EAST OF GATE IN SEC. 6 T12S R13E

MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X

MoMag Total Magnetic Intensity Record

FOR: DR. THOMAS MITCHUM

RECORD NO. 22 DATE 2-14-61

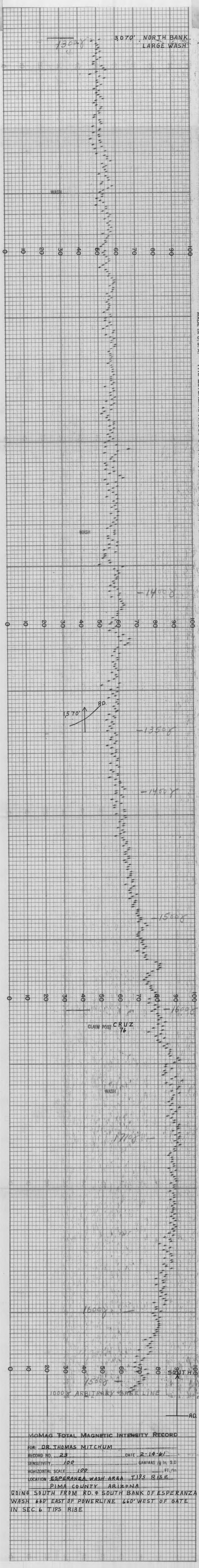
SENSITIVITY 100 GAMMAS /½ In. S.D.

HORIZONTAL SCALE 100 FT./In.

LOCATION ESPERANZA WASH AREA T19S R13E PIMA COUNTY ARIZONA

GOING SOUTH FROM SOUTH BANK OF ESPERANZA WASH 3,720' EAST OF SEC. LINE 1 & 6 2,400' EAST OF GATE IN SEC. 6 T19S R13E

MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X



MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. ES
THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. CHART NO. 17491X

MoMag Total Magnetic Intensity Record

FOR: DR. THOMAS MITCHUM

RECORD NO. 24 DATE 2-14-61

SENSITIVITY 100 GAMMAS / ½ In. S.D.

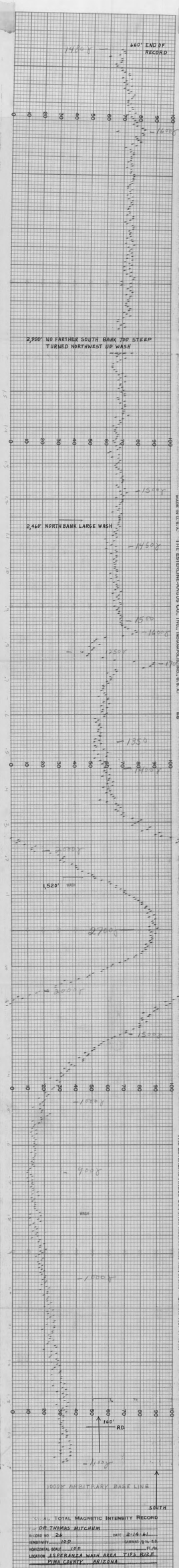
HORIZONTAL SCALE 100 FT./In.

LOCATION ESPERANZA WASH AREA T19S R12E
PIMA COUNTY ARIZONA

0 10 20 30 40 50 60 70 80 90 100

GOING SOUTH FROM RD. & SOUTH BANK OF ESPERANZA WASH 1,980' WEST OF GATE 660' WEST SEC. LINE 1 & 6 T19S R12E

NORMAL TOTAL MAGNETIC INTENSITY PROFILE
TO BE TAKEN BETWEEN
SOUTH BORE AT WORK AND NORTH BORE AT WORK
BORING NORTH FROM SOUTH AT LINE 10 WEST OF TRAVELLING



TOTAL TOTAL MAGNETIC INTENSITY RECORD

DR. THOMAS MITCHUM

RECORD NO. 26 DATE 2-16-61

SENSITIVITY 100 GAMMAS 2 in. S.S.

HORIZONTAL SCALE 100 FT. IN.

LOCATION ESPERANZA WASH AREA TIPS RIDGE

PIMA COUNTY ARIZONA

GOING SOUTH FROM SOUTH BANK OF ESPERANZA WASH 1,980' WEST OF SEC. LINE 2 & 6

NIOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR: DR. THOMAS MITCHUM

RECORD NO. 27 DATE 2-14-61

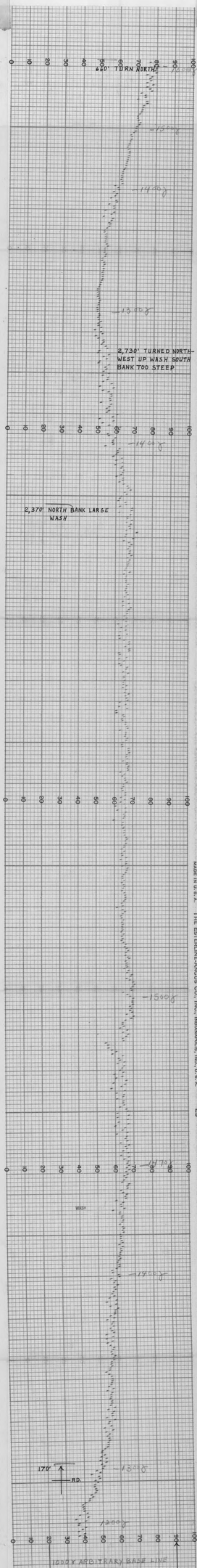
SENSITIVITY 100 GAMMAS /½ In. S.D.

HORIZONTAL SCALE 100 FT./In.

LOCATION ESPERANZA WASH AREA T19S R12E PIMA COUNTY ARIZONA

RECORD #27 STARTS IN WASH AT APPROXIMATELY SOUTH ¼ SEC. LINE OF SEC. 1 T19S R12E

MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES
CHART NO. 17491X
THE ESTERLINE-ANGUS CO., INC., INDIANAPOL



MOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR: DR. THOMAS MITCHUM

RECORD NO. 28 DATE 2-17-61

SENSITIVITY 100 GAMMAS / 2 IN. S.D.

HORIZONTAL SCALE 100 FT./IN.

LOCATION ESPERANZA WASH AREA 7 1/2S R12E

PIMA COUNTY ARIZONA

RECORD #28 STARTS AT SOUTH BANK ESPERANZA WASH 3,300' WEST OF SEC. LINE 14 & 15

MOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR: DR. THOMAS MITCHUM

RECORD NO. 29 DATE 2-14-61

SENSITIVITY 100 GAMMAS / ½ In S.D.

HORIZONTAL SCALE 100 FT./In.

LOCATION ESPERANZA WASH AREA T19S R12E

PIMA COUNTY ARIZONA

TURN NORTH FROM WASH 3,960' FROM SEC. LINE 1 & 6

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X ES MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A.

ORIGINAL MAGNETIC RECORDS

№ 30 thru 65 inclusive

ESPERANZA WASH PROJECT

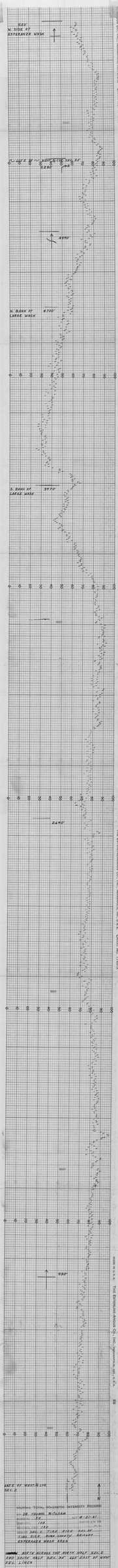
for

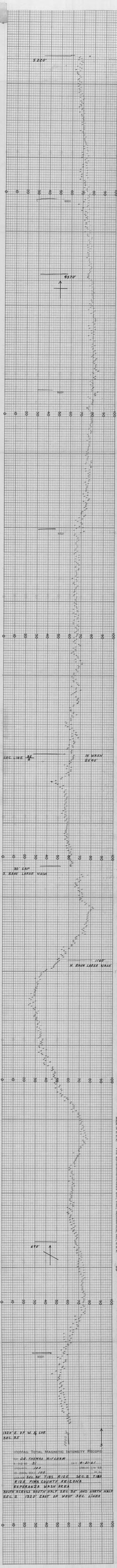
Dr. Thomas Mitcham

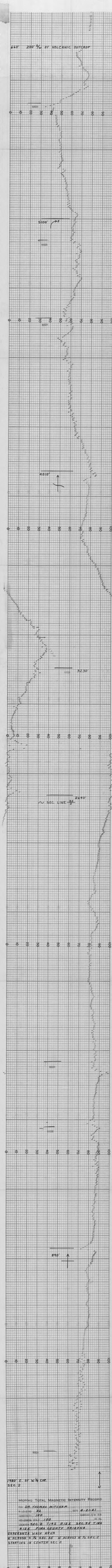
by

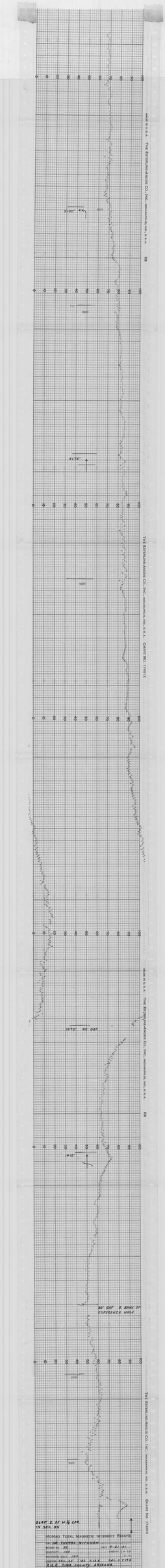
Heinrichs Geoexploration Company

April 1961


The Eberbach-Amsco Co., Inc. Ann Arbor, Mich. U.S.A. Chart No. 17481X
525'
W. SIDE OF
REFERENCE WASH
E. LIP OF
5280'
4700'
W. BANK OF
LARGE WASH
4700'
E. BANK OF
LARGE WASH
4970'
2490'
9920'
NOTE OF WESTERN CHG
SEC. 2
N
MONAS-TOTAL MAGNETIC INTENSITY RECORD
DR. TRAVIS MILLAGAN
DATE 8-27-57
REGISTER
CONTROL
ELEVATION
TIME
SPEED
SEC. 2 TIME SIZE
TIME SIZE RUN SURVEY ARIZONA
REFERENCE WASH AREA
NOTE: BOTH ACROSS THE NORTH HALF SEC. 2
AND SOUTH HALF SEC. 34 ARE EAST OF WEST
SEC. LINES


5220'
9370'
SEC. LINE
N. BRANCH LARGE WASH
N. BRANCH LARGE WASH
4970'
1320' E. OF W. SEC. LINE
SEC. 35
MAGNETIC TOTAL MAGNETIC INTENSITY FIELDS
DR. THOMAS MITCHAM
21
APR.
NE. NW. T.16S. R.12E. SEC. 2 T.16S
R.12E. PIMA COUNTY, ARIZONA
REPERANZA WASH AREA
SOUTH ACROSS SOUTH HALF SEC. 2 AND SOUTH HALF
SEC. 2 1320' EAST OF WEST SEC. LINES
THE EDTRON-ARGUS CO., INC. INDIANAPOLIS, IND. U.S.A.
CHART NO. 17681X
MADE IN U.S.A.


MADE IN U.S.A. THE EUTHELIAN-ARGUS CO., INC., MINNEAPOLIS, MINN., U.S.A.
THE EUTHELIAN-ARGUS CO., INC., MINNEAPOLIS, MINN., U.S.A. COURT NO. 174815
450' 200' % BY VOLCANIC OUTCROP
5000'
4800'
3250'
2640'
SEC. LINE
850'
1980' E. OF W. & COR. SEC. 2
MOVING TOTAL MAGNETIC INTENSITY RECORD
DR. THOMAS MITCHAM
SEC. 2 T.19S R.12E SALT LAKE
FORM GEOPHY. RESEARCH
REFERENCE WALK ARCH
N. BOUNDARY N. & N. SEC. 2 W. BOUNDARY W. & W. SEC. 2
STARTING N. CENTER SEC. 2


MADE IN U.S.A. THE BRISTOL-ALLEN CO., INC. WATERBURY, CONN., U.S.A.
2200' E.
1000
1000
4175'
1000
CHART No. 17815
MADE IN U.S.A. THE BRISTOL-ALLEN CO., INC. WATERBURY, CONN., U.S.A.
1870' NO. OF DAM
1000
1610'
30' OFF S. BANK OF
EXPERIENCE WASH
1000
1000
CHART No. 17815
CLOSE E. OF W. ½ CAR.
IN SEC. 32
HORMAG TIDAL MAGNETIC INTENSITY RECORD
BY DR. THOMAS WITCHER
BORN No. 32 BORN No. 9-24-34
BORNED ... 1.00 BORNED ... 1.00
BORNED No. 1.00
BLACK WALNUT TREE NEAR ... SEC. 21 FIRE
BLACK WALNUT ... ARKANSAS
EXPERIENCE WASH AREA
ACROSS S.W. SEC. 32 AND N.W. SEC. 21 ALONG
E. OF W. SEC. LINES

3300' E. OF W. 1/4 COR.
SEC. 2

MOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR: DR. THOMAS MITCHAM — DATE 4-21-61

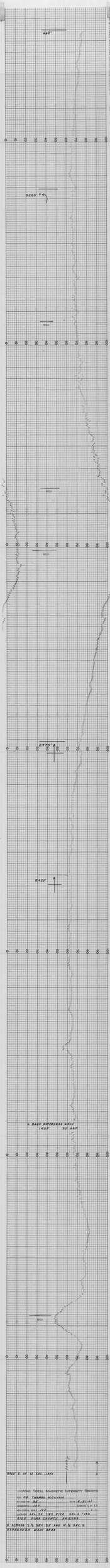
RECORD NO. 34 — GAMMAS ½ in. S.M.

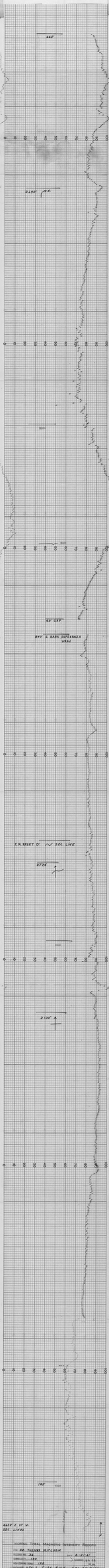
SENSITIVITY 100

HORIZONTAL SCALE 100

LOCATION SEC. 2 T19S R12E SEC. 35
T18S R12E PIMA COUNTY ARIZONA

N. ACROSS N. ½ SEC. 2 AND ACROSS S. ½ SEC. 35
3300' E OF W. SEC. LINES ESPERANZA WASH AREA


The Ritter-Ansco Co., Inc. Minneapolis, Minn. U.S.A.
Chart No. 17484-1
The Ritter-Ansco Co., Inc. Minneapolis, Minn. U.S.A.
Chart No. 17484-X
The Ritter-Ansco Co., Inc. Minneapolis, Minn. U.S.A.
NORMAL TOTAL MAGNETIC INTENSITY RECORD
TO BE THERMAL INSTRUMENT
RECORDED BY
DATE
LOCATION
SECTION
LOCATION
SEC. 1 TWP. 2 S. R. 3 E. G. & S. R. B. & M.
PIMA COUNTY, ARIZONA
S. BASIN DIFFRACTS WEST
S. BASIN DIFFRACTS WEST
TRUE N. OF W. SEC. LINES


THE EPPENBACH-ANDER CO., INC. MONMOUTH, ORE., U.S.A.
CHART NO. 7181X
MADE IN U.S.A.
THE EPPENBACH-ANDER CO., INC. MONMOUTH, ORE., U.S.A.
CHART NO. 7181X
THE EPPENBACH-ANDER CO., INC. MONMOUTH, ORE., U.S.A.
CHART NO. 7181X
440'
2200'
800'
40' 65'
BAR. S. BARR, EPPENBACH WASH
F.N. VEILET 10° ~ SEC. LINE
2720
1000
2100' A
180'
1000
HEAT E. W. W.
SEC. LINES
RECORD TOTAL MAGNETIC INTENSITY RECORD
BY DR. THOMAS MILCRAM
DATE 30 A. 21.47
DIRECTION 180
DIRECTION 180 108
DIRECTION SEC. 2 T.17 R.10 E SEC. 26 T.18 R.10 E
ROAD TUMA COUNTY BRIDGE
N. BOREAS W. N. LEAD 2 MOD N. BOREAS 2 S. SEC. 32
EPPENBACH WASH MEDA

MOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR: DR. THOMAS MITCHAM

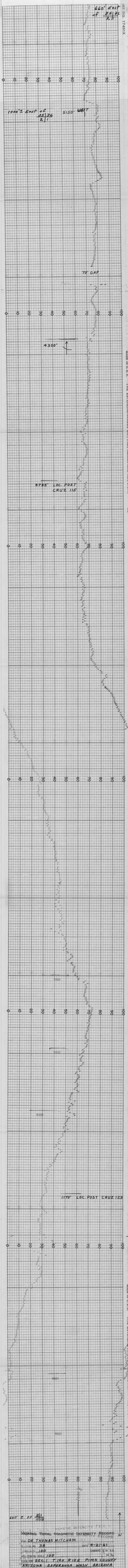
RECORD NO. 37 DATE 4-21-61

SENSITIVITY 100 GAMMAS / ½ in S.D.

HORIZONTAL SCALE 100 FT./In.

LOCATION SEC. 35 T18S R12E, SEC. 2 T19S R12E, SEC. 1 T19S R12E PIMA COUNTY ARIZONA

S. ACROSS S. ½ SEC. 35 AND N. ½ SEC. 2 THEN E. 660' IN SEC. 2


660' EAST OF 8/21/26 Z.I.
CHART NO. 17481X
1000'± EAST OF 8/21/26 Z.I.
5150' WEST
70' GAP
4300'
3795' LOC. POST CRUZ 115
THE ESTERLINE-ANGUS CO., INC. INDIANAPOLIS, IND. U.S.A.
MADE IN U.S.A.
1170' LOC. POST CRUZ 123
600' E. OF 8/1/12
MAGNETIC TOTAL MAGNETIC INTENSITY RECORD
FOR DR THOMAS MITCHAM
SCALE 1:1 38
DATE 8-21-61
LOCATION LOB
DATE 11-14-61
DIRECTION 100
SECT. 7 T.18 S. R.18 E. PIMA COUNTY ARIZONA SAHUARITA WASH ARIZONA
N. ACROSS SEC. 7 TO SEC. LINE 1

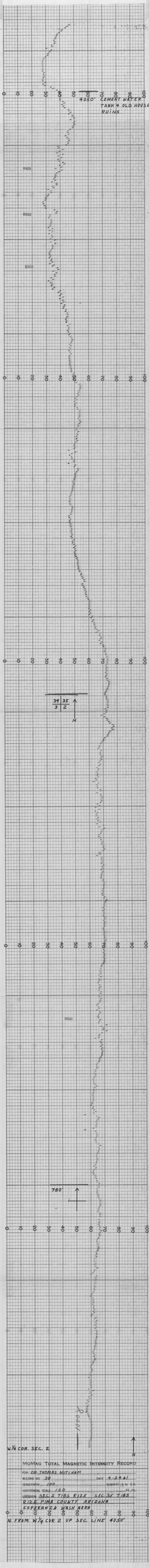
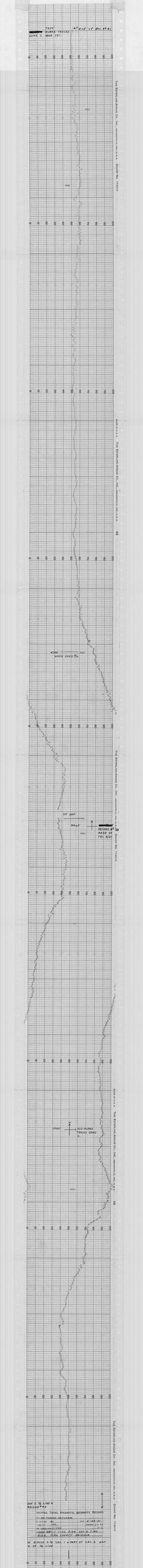
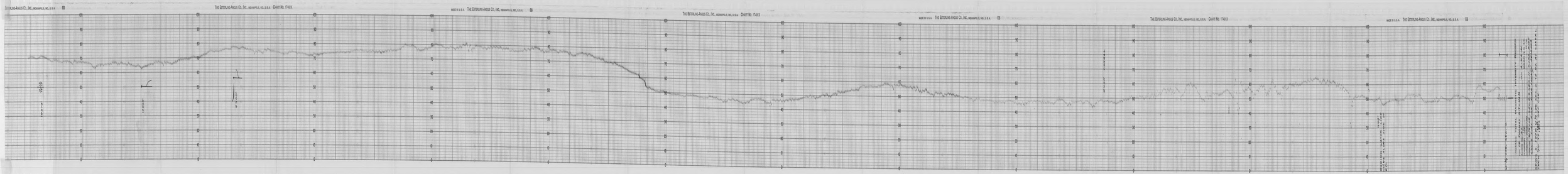
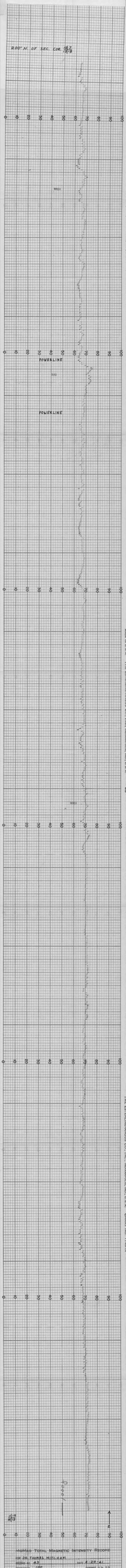


CHART NO. 17491X
THE EBTHLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A.
MADE IN U.S.A.
4050' CEMENT WATER TANK & OLD HOUSE RUINS
WASH
39 35
3 2
N
780'
W¼ COR. SEC. 2
MOMAG TOTAL MAGNETIC INTENSITY RECORD
FOR: DR. THOMAS MITCHAM
RECORD NO. 39
DATE 4-29-41
SENSITIVITY 100
QUANTITY 1 IN 5.5
HORIZONTAL SCALE 100
LOCATION SEC. 2 T18S R12E SEC. 35 T18S
R12E PIMA COUNTY ARIZONA
ESPERANZA WASH AREA
N. FROM W¼ COR. 2 VP SEC. LINE 4050'

9270'
S. BANK ESPERANZA WASH
8600'
THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X
MADE IN U.S.A.
6380'
E
OLD MOMAG TRACKS
5720'
E.
OLD S. MOMAG TRACKS
5220' E. 1/4 COR. SEC. 2
50' GAP
WASH
W. 1/4 COR SEC. 2
1000'
E
MOMAG TOTAL MAGNETIC INTENSITY RECORD
FOR: DR. THOMAS MITCHUM
RECORD NO. 40 DATE 4-24-61
SENSITIVITY 100 GAMMAS / ½ In S.D.
HORIZONTAL SCALE 100 FT./In.
LOCATION SEC. 2 T19S R12E SEC. 1 T19S R12E
PIMA COUNTY ARIZONA
E. ACROSS SEC. 2 AND PART OF SEC. 1 ON 1/4 LINE


The Electrodynamics Co., Inc. Monrovia, Calif. U.S.A. Chart No. 17XXX
SCALE 1: 600 (FT)
ASSOC. DATA SHEET
SEE DATA SHEET
OF GAP
RECORD #
FEB. 4/2
FIELD SUMMER
TRACE ZONES
MAG. 5.5% LINE
RELIEF
HORIZONTAL TOTAL MAGNETIC INTENSITY RECORD
DATE
TIME
DIST.
SCALE
DATA
TIME
DIST.
SCALE
DATA
W. ELEVAT. 5.5% LIN. 1 MINUT OF ARC.
E. ELEV. 5% LINE


THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A.
CHART NO. 17A313
MADE IN U.S.A.


200' N OF SEC. COR. 6&7 18/8
POWERLINE
POWERLINE
THE EDTHEUNAUGUS CO., INC. MINNEAPOLIS, MINN. U.S.A.
CHART NO. 17181X
MADE IN U.S.A.
HORIZ. TOTAL MAGNETIC INTENSITY RECORD
OF DR. THOMAS MCCLARY
RECD BY: A.B.
DATE: 4-20-61
MAGNETIC: 10E
DIURNAL: 3N 3.5
MAGNETIC COORD.: 10E
LOCATION: SEC. 12 T12S R10E COCONINO
MOGOLLON RIM (PINE CREEK) ARIZONA
E. TERM 1800 TP 18/8
4.5 18/8
N

MoMag TOTAL MAGNETIC INTENSITY RECORD

FOR: DR. THOMAS MITCHUM

RECORD NO. 44 DATE 4-24-61

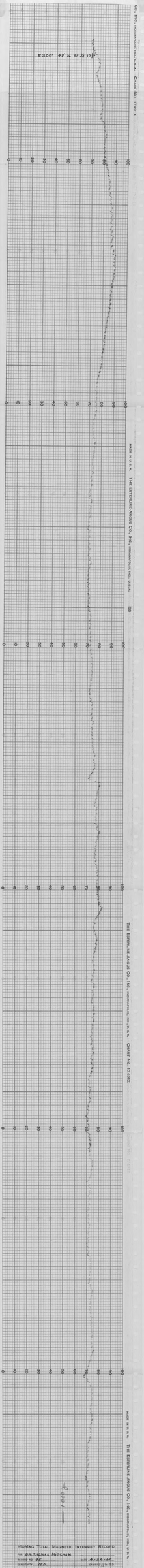
SENSITIVITY 100 GAMMAS /½ In S.D.

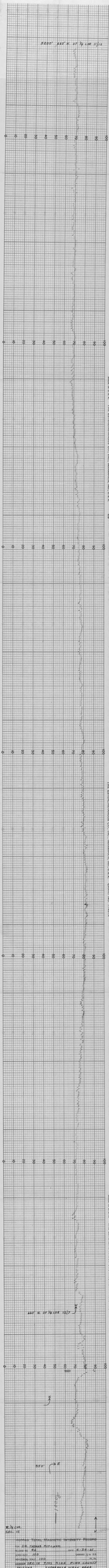
HORIZONTAL SCALE 100 FT./In.

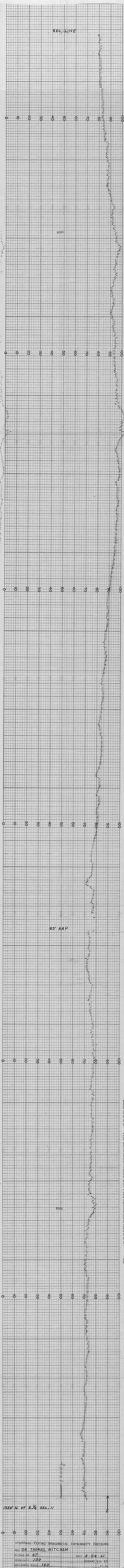
LOCATION SEC. 12 T19S R12E PIMA COUNTY ARIZONA ESPERANZA WASH AREA

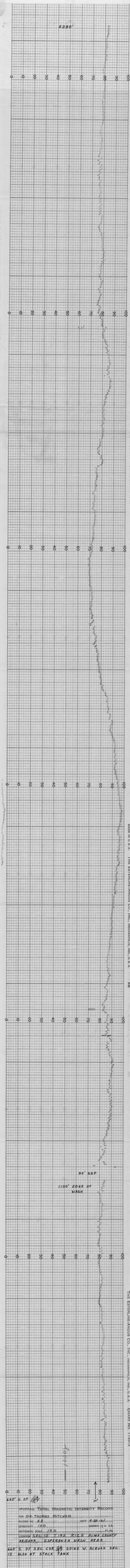
N. FROM 11 12 / 14 13 TO W ¼ COR SEC. 12

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. CHART NO. 17491X
MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A.
ES

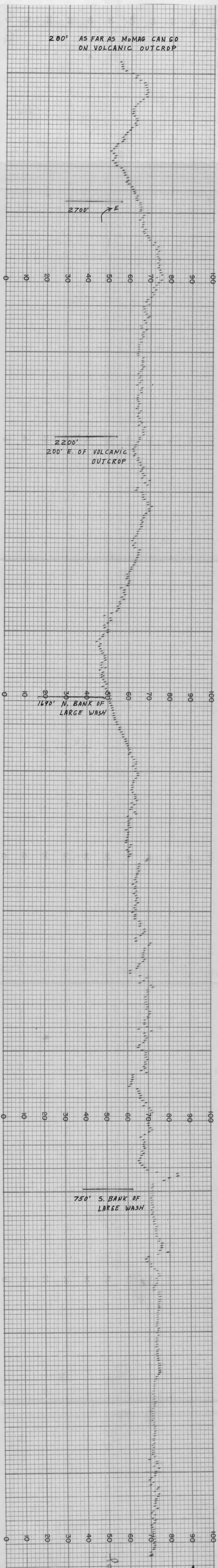

MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC. INDIANAPOLIS, IND., U.S.A. ES
THE ESTERLINE-ANGUS CO., INC. INDIANAPOLIS, IND., U.S.A. CHART NO. 17681X
MAGNAG TOTAL MAGNETIC INTENSITY RECORD
FOR DR. THOMAS MITCHAM
RECORD NO. 92 DATE 9-29-61
SENSITIVITY 120 SPEED 1 IN 12
VERTICAL SCALE 100 PLOT
WHERE SEC. 16 FIRE RISE RUNS ALONG
ARIZONA ESTRANZA WASH AREA
FROM W.½ TO E.½ COR. SEC. 16 ALONG ½ LINE


The Esterline-Angus Co. Inc. Indianapolis, Ind. U.S.A.
Chart No. 7181X
5200' 660' N. of ¼ Cor. 11/12
The Esterline-Angus Co. Inc. Indianapolis, Ind. U.S.A.
The Esterline-Angus Co. Inc. Indianapolis, Ind. U.S.A.
Chart No. 7181X
660' N. of ¼ Cor. 12/7
The Esterline-Angus Co. Inc. Indianapolis, Ind. U.S.A.
3500'
N
E.¼ Cor.
Sec. 12
N
Normal Total Magnetic Intensity Record
Co. Indian Refining
Well No. #2
Lease Ida
Location 660' N. of ¼ Cor. Sec. 12 T20S R18E
Elevation 1820
Date 8-26-48
Drilling Co. R.R.
Remarks Sec. 12 T20S R18E Pink County
Arizona Esterline Angus Meter
Taken 8-26-48 660' East & 5200' N. Region
Sec. 12


SEC. LINE
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC. INDIANAPOLIS, IND., U.S.A.
E8
THE ESTERLINE-ANGUS CO., INC. INDIANAPOLIS, IND., U.S.A. CHART NO. 17461X
80' GAP
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC. INDIANAPOLIS, IND., U.S.A.
E8
1328' N. OF E¼ SEC. 11
MAGNETIC TOTAL MAGNETIC INTENSITY RECORD
FOR DR. THOMAS MITCHAM
BUILDING NO. 87
DATE 4-24-61
SENSITIVITY 100
SERIAL NO. 14-E4
MOVING RATE 100
LOCATION SEC. 12 T1S R2E PIMA COUNTY
ARIZONA ESTERLINE VERT. HERR
1328' N. OF E¼ OF SEC. 11 SAME X. ACROSS SEC. 12
THE ESTERLINE-ANGUS


8280'
THE EUTHALIA-ANSCO CO., INC. INDIANAPOLIS, IND. U.S.A. CHART NO. 17801X
MADE IN U.S.A.
30' GAP
1100' EDGE OF WASH
THE EUTHALIA-ANSCO CO., INC. INDIANAPOLIS, IND. U.S.A. CHART NO. 17801X
MONTHLY TOTAL MAGNETIC INTENSITY RECORD
FOR DR. THOMAS MITCHUM
BORN IN AR. DATE 4-30-54
ASSIGNED 180 DRAWING 14-56
RECORDED BY JAN 1-14-56
LOCATION SCALE 1" = 1/8 MILE SUMMIT COUNTY
ARIZONA SUPERSTITION WASH AREA
660' S. OF SEC. CORE 4 GOING W. ACROSS SEC. 12 ELSO AT STACK TANK

THE EDITH MACARTHUR CO., INC. WISCONSIN, U.S.A.
CHART NO. 17681X
MADE IN U.S.A.
THE EDITH MACARTHUR CO., INC. WISCONSIN, U.S.A.
CHART NO. 17681Y
MADE IN U.S.A.
THE EDITH MACARTHUR CO., INC. WISCONSIN, U.S.A.
CHART NO. 17681Z
MADE IN U.S.A.
THE EDITH MACARTHUR CO., INC. WISCONSIN
MOMAG TOTAL MAGNETIC INTENSITY RECORD
ON DR. THOMAS MULCAHY
SCALE 1" = 2.5
DATE 4-24-61
SCALE 1" = 100
DATUM 122
DATUM 5.4 GS
SPOKES DIV. 120
DATUM PUR
LOCATION SEC. 12 T.19 S. R.14 E. PIMA COUNTY
ARIZONA, APPROXIMATELY 1.5 MILES
FROM NO. 1 ALONG SEC. LINE TO NO. 14



MOMAG TOTAL MAGNETIC INTENSITY RECORD

FOR: DR. THOMAS MITCHAM

RECORD NO. 50 DATE 4-25-61

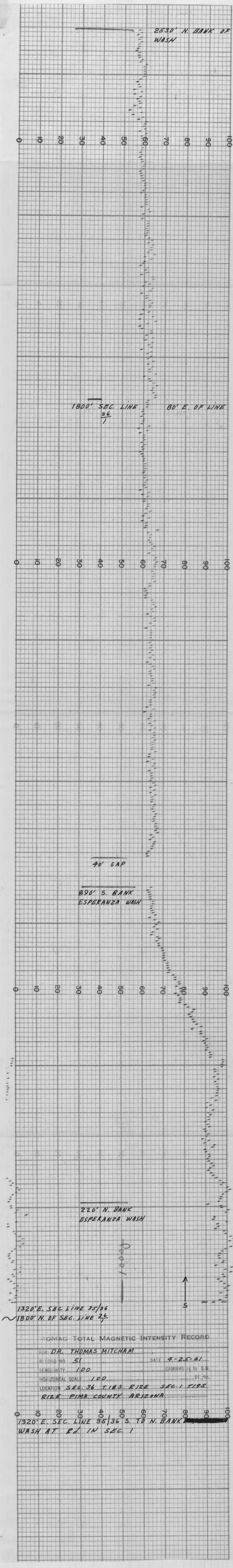
SENSITIVITY 100 GAMMAS /½ In S.D.

HORIZONTAL SCALE 100 FT./In.

LOCATION SEC. 36 T18S R-12E PIMA COUNTY ARIZONA ESPERANZA WASH AREA

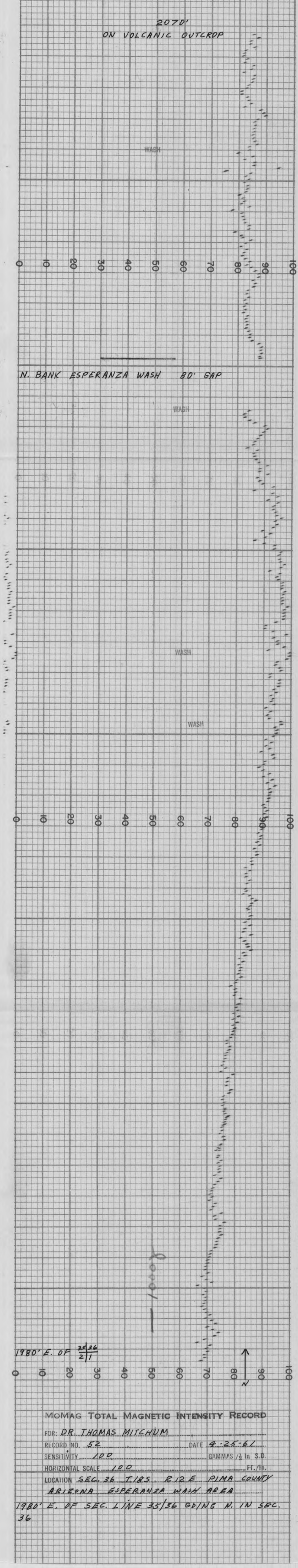
N. UP SEC. 36 FROM 660' E. OF COR.

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. CHART NO. 17491X MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. ES



THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X

MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES

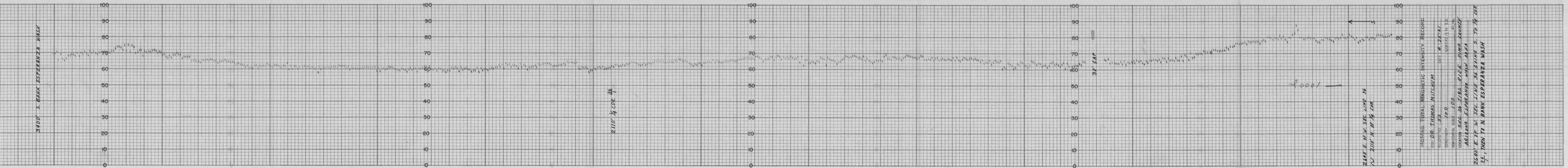


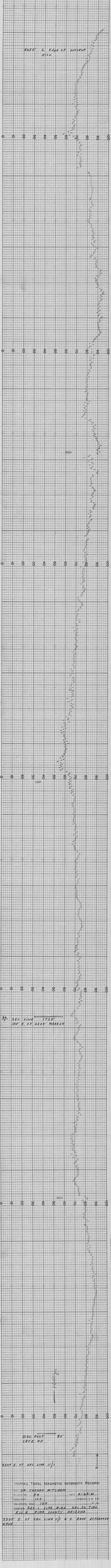
MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. ES
S, IND., U. S. A. CHART NO. 17491X

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X

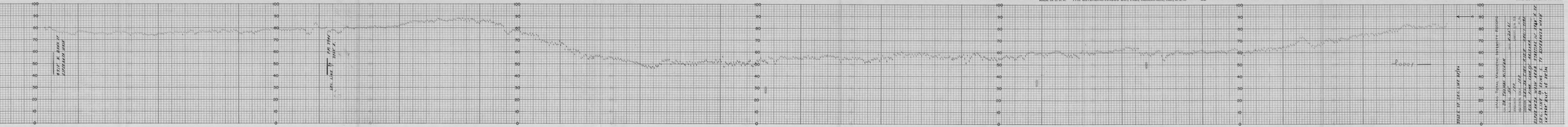
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES

THE ESTERLINE-ANGUS CO., INC., INDIANAPOL




CO., INC. ABBANAPOLIS, IND. U.S.A. CHART NO. 1726-X
BASE: S. EDGE OF SHIPPER BLDG.
MADE IN U.S.A. THE EXTRA-LINE ANGUS CO., INC. ABBANAPOLIS, IND. U.S.A.
SEC. LINE 1726'
100' E. OF 3000' MARKER
MADE IN U.S.A. THE EXTRA-LINE ANGUS CO., INC. ABBANAPOLIS, IND. U.S.A.
DISC POST 85'
CRUZ 02
3335' E. OF SEC. LINE 11/1
TOTAL MAGNETIC INTENSITY RECORD
DR. THOMAS MITTMAN
F.A.
DATE 8-23-61
SER.
COMPUTED BY
CHECKED BY
PAD
SEC. 1, T.19 R.18S. SEC. 36, T.18S.
PIMA COUNTY, ARIZONA
3335' E. OF SEC. LINE 11/1 + S. EDGE SHIPPER BLDG.
N

MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. ES



MoMag Total Magnetic Intensity Record

FOR: DR. THOMAS MITCHAM

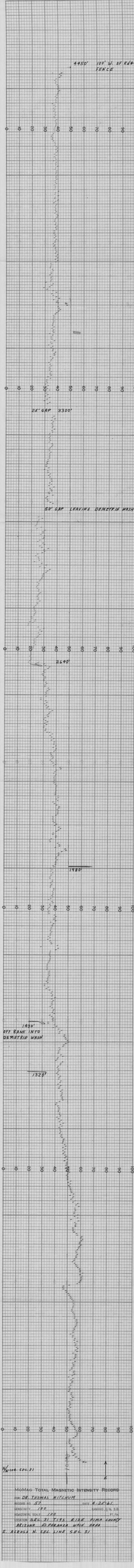
RECORD NO. 56 DATE 4-25-61

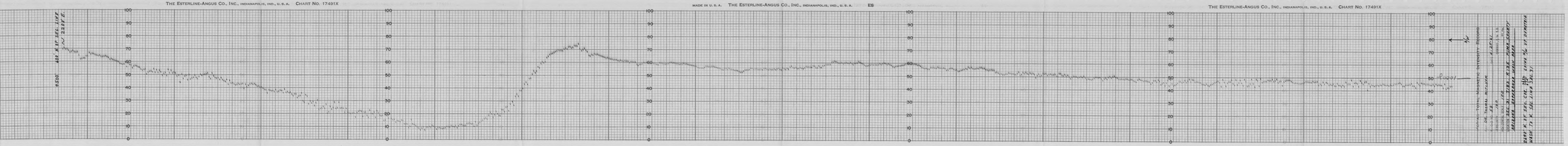
SENSITIVITY 100 GAMMAS /½ In. S.D.

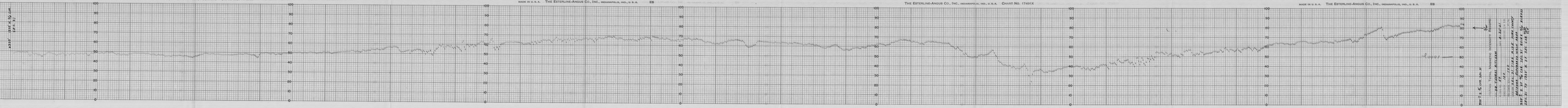
HORIZONTAL SCALE 100 FT./In.

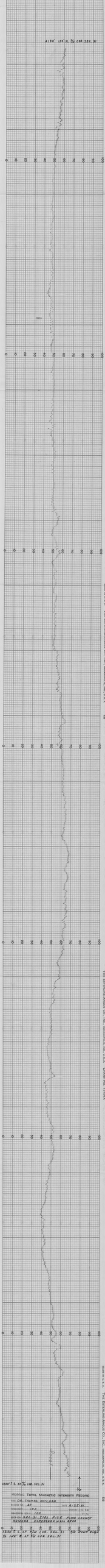
LOCATION SEC. 1 T19S R12E SEC. 36 T19S R12E PIMA COUNTY ARIZONA

N. FROM N. BANK ESPERANZA WASH 1345' S. OF SEC. LINE 36/1


4950' 100' W. OF R/W FENCE
25' GAP 3300'
50' GAP LEAVING DEMETRIE WASH
2690'
1980'
1950'
OFF RANG INTO DEMETRIE WASH
1320'
W/O 1200-SEC. 21
MADE IN U.S.A. THE EDTERLIN-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES
THE EDTERLIN-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17591X
MADE IN U.S.A. THE EDTERLIN-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES
MOMAG TOTAL MAGNETIC INTENSITY RECORD
FOR DR. THOMAS MITCHUM
RECORD NO. 57 DATE 6-25-61
SENSITIVITY 1PR GAUGE 1/4, 3/8
MAGNETIC SCALE 1PR FILM
LOCATION SEC. 21-T15S. R13E. FIRST COUNTY
ARIZONA. APPROXIMATE WHAT. SEEN
E. ALONG N. SEC. LINE SEC. 21
N
E

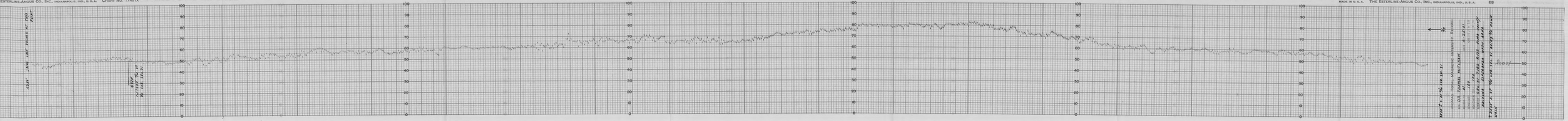

THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. CHART NO. 17491X
MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. ES
THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. CHART NO. 17491X
100
90
80
70
60
50
40
30
20
10
0
Poor
Operator: TEXAS-MAGNOLIA INTERPRETATION RECORD
Well: DR. THOMAS MCGAHAN
Location: SE
Elevation: 1,128
Drilling Contractor: SEC. 31 - T2S - R13E - TUSCALOOSA CO.
Remarks: DRILLING STOPPED AT 1,128 FT. IN SHALE
DATE: 1-8-57 SEC. 31 T 2S R 13E


THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. CHART NO. 17491X
MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. ES
THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. CHART NO. 17491X
MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. ES
100
90
80
70
60
50
40
30
20
10
0


MAGNAC TOTAL MAGNETIC INTENSITY RECORD
DR. THOMAS MICHAEL
AZ
R. 2 E. G.
JOB
LOC
SEC. 31
SEC. 31
The Ritter-Adams Co. Inc. Bennington, Vermont, U.S.A.
Chart No. 17401X
Made in U.S.A.

ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. CHART NO. 17491X

MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. ES



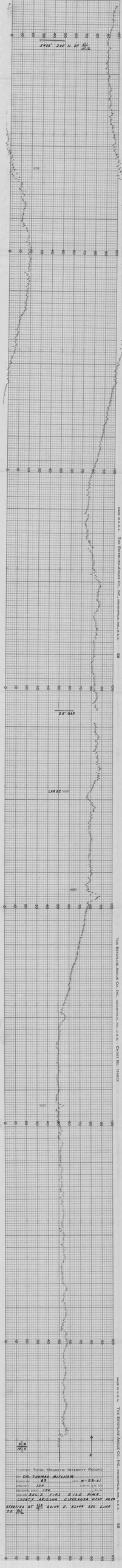
THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. CHART NO. 17491X

MADE IN U. S. A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U. S. A. ES

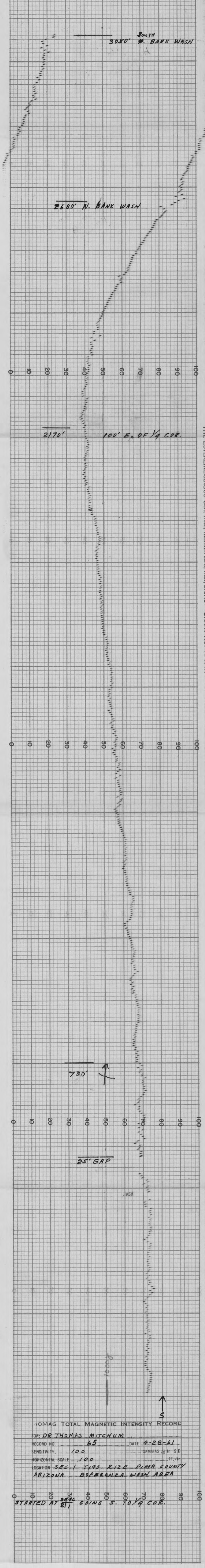
THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X ES

MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A.

THE


2400' 200' N. OF SEC. LINE
2.5' GAP
LARGE
N
E
3/8
10/2
TOTAL MAGNETIC INTENSITY RECORD
DR. THOMAS MITCHAM
63
A-28-A1
JAN.
TRAVERSE BASE: 1.25
SEC. 2 T.1S. R.12 DWR.
COUNTY ARIZONA, CHEROKEE MINE MAP
STARTING AT 1/4 ALONG S. SIDE SEC. LINE TO SEC.
THE EUTECTIC-ARGUS CO. INC. INDIANAPOLIS, IND. U.S.A.
MADE IN U.S.A.
E8
CHART NO. 17691X

5550' RD. W. OF SEC. LINE
CHART NO. 17491X
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A.
WASH
1320' N. OF 2|1 12|11
MOMAG TOTAL MAGNETIC INTENSITY RECORD
DR. THOMAS MITCHAM
DATE 4-28-61
64
GAMMAS ½ In. S.D
SENSITIVITY 100
HORIZONTAL SCALE 100
FT./In.
LOCATION
1320' N. OF 2|1 12|11 GOING WEST ACROSS SEC. 2
W



THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 17491X
MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES

MAGNETIC RECONNAISSANCE
in the

ESPERANZA WASH AREA

PIMA COUNTY, ARIZONA

for

DR. THOMAS MITCHAM

February 1961

by
HEINRICHS GEOEXPLORATION COMPANY
P. O. BOX 5671 Tucson, Arizona

TABLE OF CONTENTS

	Page
Introduction	1
Conclusions & Recommendations	1
Interpretation of Magnetics	2
Procedures	7

Map--magnetic contours & location----------Back Pocket

Magnetic records----------In original copy only
Back Pocket

INTRODUCTION

By authorization of Dr. Thomas Mitcham, Heinrichs GEOEXploration Company made a magnetic survey in the Esperanza Wash Area of Pima County, Arizona. This was accomplished with a mobile magnetometer and the work was concentrated in Sections 5, 6, 7 and 8 of T19S, R13E with some coverage in Section 32, T18S, R13E and Sections 25, 26, 35 and 36, T18S, R12E. Existing roads were driven as well as some cross-country traversing. Magnetic records for this survey were made on February 4, 1961. Additional detailed coverage in Section 1, T19S, R12E and Section 6, T19S, R13E was obtained on February 14, 1961.

CONCLUSIONS & RECOMMENDATIONS

The general area shows considerable anomalous deviation, especially near the hills in Sections 25, 26, 35 and 36, T18S, R12E. Most of the anomalies found in these sections can be directly related to the volcanics which have been mapped as Tertiary basalt.

An anomaly of potential significance and importance was found, centered in the southwest quarter of Section 6, T19S, R13E. If, after geologic inferences have been drawn, it is decided that the area in Section 6 merits continuing consideration and investigation, we recommend that prior to any drilling program the anomalous area be checked by the induced polarization

method which would delineate areas of disseminated sulfide. The additional work on February 14, 1961, to get detail and to close off this anomaly to the west, also picked up two more significant anomalies in Section 1, which will need to be considered in the light of what is learned or inferred by future operations in Section 6.

INTERPRETATION

Record #1 is a cross-country traverse in a westerly direction across the area of interest. There is a small anomaly about 1000 ft. west of the start of the record. This feature is unusual on otherwise relatively uniform data but is old scrap metal or other artificial interference. This was later checked as a matter of curiosity and found to have no extent on either side of the road.

There is a gradual rise westerly for about 2 miles, from the start of the record. This would normally be interpreted as thinning of alluvium over bedrock and is probably the case here. However, there is a broad anomalous high centered about 2½ miles west of the start which appears to be a buried intrusive and the gradual rise approaching this may indicate extensive flanks of this. The anomalous high just mentioned was crossed by several later profiles and resultant data is presented in contour form on the accompanying map. This anomaly is discussed in some detail at the end of this section of the report.

Not far west of the line between Range 12E and Range 13E the record level returns to what is considered normal background. This is followed by another broad high of lesser amplitude than the first anomaly and indicates another bedrock high. The remainder of this record was made northwest of the immediate area of interest and although it contains many anomalies they are mentioned only briefly. The road had by now turned northwest and was approaching and entering outcrops and hills. These are volcanic at least in cover, and this is reflected on the record. If interest extends in the future to this region the record should be more carefully studied for further interpretation, and more magnetic coverage obtained.

Record #2 shows a gradual slow climb in level to between Calles Quatro and Cinco then drops lower again. This is related to the magnetic high to the west.

Record #3, #4 & #5 show only minor level changes which help to give a regional picture but show no isolated anomalism of particular interest.

Record #6 has more coverage over the major anomalism.

Record #7, #8 & #9 show minor regional level changes. #8 at the end has started to rise as it approaches the north flank of the anomaly.

Record #10 & #11 show more coverage over the major anomalism. #11 also has minor anomalism associated with a trend projected

easterly from basaltic hills in Section 36.

Record #12 shows considerable anomalism due to basalt hills. Well out of area of present interest.

Record #13 shows level changes and anomalism associated with the hills to the northwest.

Record #14, #15 & #16 show regional variations.

Records #17 through #23 were all run south across the anomaly in Section 6 for detail and to be sure the high was well located.

Record #24 crossed the south half of Section 1 and all of Section 12. A deep, broad high shows on this line about opposite the east quarter of Section 12.

Record #25 shows that in Section 12 the suggestion of a deep magnetic high found on #24 is still present but slightly more intense and therefore likely more shallow to the west. Just after crossing into Section 1 there is a sudden rise in level after which it drops off gradually to the lowest level on the record, just south of the road. A change in rock type is indicated with an intrusion between, possibly of volcanic origin, as evidenced by the next two records.

Record #26 & #27 each have sudden, sharp and high anomalies that are related and show a NW-SE strike, but little dip. The level on the north side is 200-300 gammas lower than the south side. A major fault is indicated, filled with a highly magnetic body which may be contact metamorphic minerals but which is more

likely a volcanic dike, possibly andesite. On Record #27 the magnetic profile indicates the cause of the peak of the high is very near surface and about 1000' ± south of the road. Possibly outcrop could be found in the vicinity, or, if not, shallow drilling could locate it easily. However, if mineralization is associated with this anomaly it may be on the flanks, at contacts with surrounding rocks, rather than on the magnetic high itself. This anomaly should be investigated but we suggest it be after the anomaly in Section 6 has been given prior consideration, or during a program that combines both.

Record #28 shows a deep high with the level starting to climb at the end, which is also where #29 starts.

Record #29 has a broad, moderately deep anomaly very similar to the one in Section 6. More coverage will be needed to the west to learn more about this as to whether this profile crosses near the high or is only on the east flank of a larger feature.

In general the magnetic profiles show three things:

1. Long broad variations up or down on a regional basis, generally indicating thickening or thinning of alluvial cover over bedrock or basement.

2. Erratic anomalism around outcropping hills in Sections 26, 35 & 36. There are peculiar features to this. For one thing the sharp deviations commonly associated with andesite are not found. Since the hills are supposedly basalt this can be

accounted for by basalt being a more homogeneous mix than andesite. The most striking feature, however, is the fact that looking through the anomalism the general overall level drops sharply. This indicates that the area in mass relationship contains even less magnetite than the alluvial covered surrounding countryside. To account for this we offer this postulation--the basalt is a thin veneer, the hills are underlain by low-susceptibility limestones or sediments, or the main composition of the hills is tuff or latite.

3. Isolated anomalies. A major one is centered in the southwest quarter of Section 6. This is a buried feature with a deviation of over 800 gammas and a closure of about 500 gammas. The main portion of it underlies about ¼ section and estimates of depth to the cause indicate as much as 1000 - 1200 ft. but possibly as little as 500 ft. Several theories can be discussed as to its cause. If the strike of the hills in Sections 26, 35 and 36 is projected southwest into Section 6 it would pass through the northeast portion. Thus there would have to be a bend in the strike line or a fault for the cause of this anomaly to be related to the hills. A factor which further mitigates against this possible relationship is the fact that this is a high from a buried cause while around the outcropping hills the level is actually lower. A better possibility is that it represents a buried intrusive. Another possibility to consider is that it is an expression of magnetite from contact metamorphism.

Faults can be postulated in several directions crossing here: one NW-SE roughly along Esperanza wash, one nearly north-south which truncates the outcrops in the east of Section 36, and one striking NE-SW. Any of these, or especially if two such intersected here, could have a high local magnetite content. In conjunction with this, the smaller, shallow anomaly in Section 1 may have an important bearing.

PROCEDURES

The instrument is a Gulf licensed flux-gate type, total intensity magnetometer mounted on a Dodge Powerwagon. Variations in the total earth's field are continuously recorded on chart paper on a recorder geared to the vehicle drive. Record is made at whatever speed the vehicle can be driven, according to terrain conditions. On this project most of the existing roads and trails across and around the area of interest were traversed, as well as some off road work. A total of about 38 miles of record were made. For the purpose of getting considerable detail the recorder was set to record on scales of 100 ft. to the inch horizontally and 100 gammas per half inch vertically. The charts are to be read looking lengthwise with higher values to the right. This type of recorder allows for 10 effective chart widths by letting the trace cross the paper and continue again from the other side as necessary. To avoid confusion, values have been plotted at intervals on the records. An arbitrary

base level was picked at the start and assigned a value of 1000 gammas. Each dot on the paper represents an interval along the ground of 5 ft. Certain natural and cultural features noted in passing were marked on the records for control. Basic control was from a base map of the subdivision in Sections 5, 6, 7 & 8 and the Twin Buttes Topographic Quadrangle.

HEINRICHS GEOEXPLORATION COMPANY

John W. Marlatt

John W. Marlatt, Geologist

February 17, 1961
P. O. Box 5671
Tucson, Arizona

INDUCED POLARIZATION INVESTIGATIONS

Esperanza Wash Area

Pima County, Arizona

for

Dr. Thomas W. Mitcham

February & March
1961

by

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

TABLE OF CONTENTS

	Page
Introduction	1
Conclusions & Recommendations	1
Method	3
Procedure	4
Interpretation	6

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

In Pocket:

Induced Polarization Anomaly Plan Map.

INTRODUCTION

During the months of February and March 1961, Heinrichs GEOEXploration Company conducted induced polarization investigations in the Esperanza Wash Area over portions of Section 32, T18S, R13E, Sections 5, 6 and 8, T19S, R13E and Sections 1 and 2 T19S, R12E. This work was performed at the request of Dr. Thomas W. Mitcham, and consisted of three observed lines requiring 7 electrode spreads and totaling 37,500 ft. of profile traverse.

The crew consisted of Mr. F. A. Seward, Jr. geophysicist in charge; Mr. H. L. Andres, field engineer; Mr. D. Graff, electronics technician; Mr. J. King, field assistant; Mr. C. S. Ludwig, computer.

CONCLUSIONS AND RECOMMENDATIONS

1. The work has indicated at least two anomalies that are interpreted as probably due to disseminated sulfide mineralization but with certain reservations. These anomalies are certainly worthy of further detailed investigation. The reservations are: that the very low resistivity in this area contributes to somewhat erratic metal factors; the percent frequency effects and/or metallic conduction factors are not sufficient order of magnitude above background to be considered as undeniably due to disseminated sulfides.

2. Line #3 probably crosses the magnetic anomaly in Section 6 south of the main mineralized zone and this anomaly should be further delineated by a series of five north-south lines of at least one spread each using 500 ft. dipoles with 1,000 feet between lines centered about 1,500 ft. north of the south line of Section 6 beginning about 500 ft. east of the west side of Section 6 and moving progressively eastward. Then upon correlating the known geology with the magnetic and I. P. data a suitable drill target might be located.

3. The anomalous zone on Line #2 should also be given detailed attention by a series of four N 45° E lines of 500 ft. dipoles 1000 ft. apart centered on a line running S 45° E from the NW Cor. Section 5 starting at that corner and progressing southeast. A north south line 500 ft. east of and parallel to the east sideline of Sections 5 and 32 might also be worthy of consideration.

4. It might be advisable to briefly investigate the other indicated but questionable anomalies on Lines #2 and #3 by single spreads across the anomalous zones.

5. In summary the results and reported anomalies can be considered to be probable if not definitely conclusive of disseminated sulfide mineralization and further investigation is recommended to aid in drill hole location.

METHOD

The induced polarization method is based on the somewhat peculiar electrical properties of sulfide particles, and more particularly those of iron, copper and lead. Sulfide particles react to electrical currents much in the manner of miniature capacitors. A rock mass containing sulfide particles will offer a lower impedence to an alternating current than its resistance to a direct current. Hence when a direct current is applied across a pair of current electrodes in the vicinity of a disseminated sulfide body, the potential drop between two potential electrodes some given distance from the current electrodes will be greater than when an alternating current is applied to the first two electrodes. Three separate quantities are computed from the data acquired in the field. The first is the D.C. resistivity. The second is the percent frequency effect. The third quantity is the so called "metallic conduction factor" (a misnomer) which is simply the frequency effect divided by the D.C. resistivity.

The property of induced polarization is not entirely unique to sulfide particles but with sufficient geological knowledge anomalism due to sulfides can be normaly interpreted apart from that possibly due to graphite, magnetite, clay particles, etc.

In field practice five equally spaced co-linear current electrodes are set. Observations are made in accordance with

the dipole-dipole or Eltran configuration mode of operation in which the distance between the receiver or potential electrodes is equal to the distance between each pair of current electrodes and the separation between the center of each potential electrode set-up from the center of each pair of current electrodes is some multiple of the electrode spacing.

PROCEDURE

Line #1 was a reconnaissance line employing 1000 ft. electrode spacing. The center was located about 2,700 ft. NE of the SW Cor. Sec. 6 at a road intersection and the line was run about N 45° E - S 45° W across the section. It was obvious from examination of the data that due to a very low surface resistivity the area did not lend itself to examination with 1000 ft. electrode spacing. Accordingly subsequent work was carried out using 500 ft. spacing.

Line #2 consisted of two spreads of 500 ft. dipoles centered on about the common sideline of sections 5 and 6 and extending 4,500 ft. east and west from this point and run east-west just south of the north boundary lines of Sections 5 and 6. The two spreads were overlapped one additional dipole to provide repeat information in the area of immediate interest.

Line #3 consisted of four spreads of 500 ft. dipoles extending from about 1,000 ft. east of the Canoa Land Grant boundary fence traversing about N 82° westerly across portions

of Sections 8, 5 and 6 thence about N 76° W across portions of Sections 1 and 2. For purposes of plotting the line crosses the side line between sections 6 and 1 about 200 ft. west of station 8.5 W and about 700 ft. north of the SW Cor. Sec. 6.

Lines #2 and #3 were reconnaissance lines planned on the basis of anomalisim observed on Line #1 and on magnetic anomalism observed in an earlier mobile magnetic survey made by Heinrichs GEOEXploration Company.

In addition to the problem of very low surface resistivity particularly in the eastern part of the area examined, there was a high telluric noise level especially on certain days. The National Bureau of Standards CRPL radio warning service reports a magnetic storm due to increased solar activity on February 16 and 17, the days on which data was obtained on Line #1.

Terrain is essentially gentle and vegetation medium to light. Cattle in the area caused some trouble in wire breakage.

The data is presented in "section". The D.C. resistivity is plotted above the horizontal line representing the spread layout and the percent frequency effect as a superscript to this value. The metal factor (MCF) is plotted below the line. It should be emphasized that the presentation has no linear vertical scale and that the points are plotted at the intersection of 45° lines extending from the cemter of sender and receiver positions as a matter of convenience. The actual depths of the profiles are an indeterminant function of the D. C. resistivity. In general it can be said that the data acquired will be from a depth

of from 0.2 to 2.0 times the dipole spacing. The data is contoured "logarithmically", again as a matter of convenience in interpretation only.

INTERPRETATION

Line #1. Following computation of the data on line #1 it became apparent that most of the data acquired must be considered questionable at best. However, a moderately strong anomalous zone between stations 4N and 5N was considered to be valid and of significant interest. Several factors contributed to the questionability of the data on this line including the low surface resistivity, the 1,000 ft. dipole spacing and as was subsequently learned, high telluric noise induced by increased solar activity at the time the line was run. Re-examination of the data with these facts taken into account and in light of data later obtained indicates the possibility of additional significant anomalism from 4S through 5N and particularly from 2S to 4S. However, the data must be considered somewhat erratic due to the above stated factors and it is not possible to make a definite interpretation.

Line #2 was run east-west across the zone of most intense and definite anomalism on Line #1 using 500 ft. dipoles, and yielded information of a much more definite and consistent nature. This line showed anomalism from 2.5E to 0.5W with the highest

intensity between 1.5E and 2E and between 0 and .5W. This data correlated with the anomalous zone observed on Line #1. A second questionably anomalous zone appears from 3.0 to 3.5W extending possibly to 2.5W.

Line #3 was run westerly across the magnetic anomalies in Sections 6 and 1 with excellent correlation of results. The line crossed the magnetic anomaly in the south half of Section 6 on the south slope of the high at about the 1700 gamma level. Moderately strong induced polarization anomalism was observed between 7W and 7.5W with moderate anomalism extending to 6.5W and 8W and possibly to 9W. A second zone of questionable anomalism is observed between 9.5 and 10.5W and another zone is apparently beginning to appear at the west end of the line between 13.5W and 14W. Of very significant interest is the data obtained across the sharp magnetic high in Section 1 between 10W and 12W. It will be noted that no significant metal factor or percent frequency anomalism effect appears in the data other than the questionable anomalism reported between 9.5W and 10.5W. On the other hand a very marked decrease in apparent resistivity appears immediately associated with the magnetic anomaly. If the magnetic information were not available and in lieu of other geologic data this low resistivity zone might conceivably be interpreted as a major water course or channel, but in light of the available information, the anomalous source is obviously a body of high electrical conductance and magnetic susceptibility but contains

no disseminated sulfide mineralization. Little is known about the conductivity of specific volcanic rock types other than the fact that flows and epithermal dikes are normaly relatively good conductors and the source of this resistivity and magnetic anomaly is tentatively interpreted as a volcanic intrusion or flow, possibly an andesite (?).

Respectfully submitted

HEINRICHS GEOEXPLORATION COMPANY

Franklin A. Seward

Franklin A. Seward, Jr.
Geophysicist

March 17, 1961
P. O. Box 5671
Tucson, Arizona

TABLE OF CONTENTS

Supplement #1

	Page
Introduction----------	1
Conclusions & Recommendations----------	2
Procedure----------	3
Interpretation----------	4

Sectional Data Sheets-----Line #4, Line #5, Line #6

In Pocket:

Induced Polarization Anomaly Plan Map--Revised.

SUPPLEMENT # 1
To A Report On

INDUCED POLARIZATION INVESTIGATIONS
Esperanza Wash Area
Pima County, Arizona

April 1961

INTRODUCTION

Following completion of I. P. Surveys in March 1961 and subsequent interpretation of data, additional work was requested by Dr. Mitcham to substantiate the validity of initial results and better delineate possible mineralization in the zone of interest.

The work consisted of three lines striking N 30° E, 1000ft. apart across the magnetic anomaly in the south half of Section 6 and the I. P. anomalism previously reported on Lines #1 and #3. A 500 foot electrode spacing was used as on Lines #2 and #3 and a total of 18,000 ft. of profile traverse were observed. The work was performed by the same crew as that involved in the first phase survey.

This supplementary report and the resultant conclusions and recommendations is confined to the geophysical investigations in the south half of Section 6.

CONCLUSIONS AND RECOMMENDATIONS

1.) The exceptionally low resistivity in the area of interest precludes a discrete interpretation of the I. P. data and it must be concluded that the additional three lines across the magnetic anomaly and the I. P. anomalism observed on Line #3 do not add substantial definition to the original interpretation. The percent frequency effects are not of a sufficient order of magnitude as to be definitely attributable to sulfide involvement and the best that can be said for the data is that the observed anomalism, though weak in character, may be indicative of the existence of a disseminated sulfide body in the vicinity of and related to the magnetic anomaly in the south half of Section 6. It should be further stated that the I. P. data in no way detracts from the possibility of the existence of such a body for the reason that the information obtained could possibly be restricted entirely to the (thick?) low resistivity alluvial layer.

2.) At least two drill holes would be required to test the validity of the I. P. data. The first and most obvious location based on the magnetics and to some extent the induced polarization information would be at the center of Line #4 which approximately coincides with the top of the magnetic anomaly, I. P. anomalism on Line #4, and the I. P. anomalism observed on Line #3 projected north.

A second hole based entirely on the most intense I. P.

anomalism observed at the south ends of Lines #4, #5 and #6 might be located between 2.0S and 2.5S on Line #5 which is about 2500 ft. south of the first location. It should be anticipated that depth to bedrock may be well in excess of 500 ft.

3.) Additional valuable information may be gleaned from a reinterpretation of the I. P. data based on evaluation of the results of drilling. In this respect the total sulfide content of bedrock should be accurately determined. Some log should also be kept of the magnetite content of the alluvial overburden as well as that of the bedrock. To aid in metalization studies, geochemical analysis of bedrock drill core samples, possibly using copper and/or molybdenum, should be considered.

PROCEDURE

Line #4 was centered at Station 1^S on Line #1 near the center of the magnetic anomaly in the south half of Section 6 and run N 30° E - S 30° W from this point. The center of Line #5 was located about 1,000 ft. S 60° E of the center of Line #4 at the southeast edge of the magnetic high and the line was parallel to #4. The center of Line #6 was located about 1,000 ft. N 60° W of the center of Line #4 and also parallel thereto.

The Bureau of Standards CRPL Radio Warning Service reported no expected magnetic distrubance during the period in which the I. P. work was done and telluric noise was found to be at a very low level. Artificial noise was experienced on Line #8 between

.5N and 1.0N and is attributed to the grounding of an east-west power line in the vicinity. Lines #5 and #6 also crossed this power line, without any disturbing effects being observed.

INTERPRETATION

At first observation a very definite pattern persists in the metallic conduction factors throughout the three lines. This pattern can only be considered to be a function of a continuous geologic relationship. The northern ends of the three lines exhibit some degree of horizontal "layering" in the MCF's while the southern ends indicate to a more or less extent a semblence of a vertical contact or facies.

Line #4 is possibly the least definite of interpretation with anomalous MCF's and PFE's occuring primarily in only the second separation at the north end and only a slight suggestion of a vertical contact possibly existing between 0.5S and 1.0S and between 2.5S and 3.0S.

Line #5 is of the same general character with "horizontal" anomalism existing in the first and second separation from possibly 0.5S to 1.5N or more and a more definite vertical "boundary" anomalism between 2.0S and 2.5S.

Line #6 shows the horizontal feature existing from about 0n to the north in the second and third separation and the vertical feature expressed from about 1.5S to 2.5S.

Respectfully submitted
HEINRICHS GEOEXPLORATION COMPANY
Franklin A. Seward, Jr
Franklin A. Seward, Jr

Geophysicist

ADDITIONAL MAGNETIC RECONNAISSANCE

in the

ESPERANZA WASH AREA

Pima County, Arizona

A supplement
to coverage obtained February 1961.

for

Dr. T. W. Mitcham

APRIL 1961

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

TABLE OF CONTENTS

	Page
Introduction	1
Conclusions & Recommendations	1
Interpretation	2

Map - Magnetic Contours - In Back Pocket

INTRODUCTION

Subsequent to Dr. Thomas Mitcham's request in early April 1961 for additional magnetic coverage in the Esperanza Wash Area, the mobile magnetometer was used on April 21, 24, 25 & 28 to obtain magnetic profiles in Section 31, T18S, R13E, Sections 35 and 36, T18S, R12E, and Sections 1, 2, 11 and 12, T19S, R12E. Approximately 35 more miles of coverage were obtained. The same procedures, scales and base were used as in the previous work.

CONCLUSIONS & RECOMMENDATIONS

The most obvious result was the closing off of anomaly "C" in the southwest part of Section 1. In Sections 35, 36 and 31, as expected, there is considerable magnetic deviation on or near the volcanic outcrops. Magnetically the three highs, "A", "B" and "C", the two zones between them, the area immediately north of them, and the area immediately west of "C", about on the section line between Sections 2 and 1, appear to be areas most worthy of further investigation. Some induced polarization lines have been run in Section 6 and one line in Section 1. Interpretation of data obtained from that work does not give strong, clear-cut indications of disseminated sulfides over anomaly "A" in Section 6, though some induced polarization anomalism does appear. At least two and possibly three induced polarization lines run north-south across Section 1 should be considered for further

evaluation of anomalies "B" & "C" and the associated areas of interest nearby, not adequately appraised with the previous east-west I.P. line.

It is possible that anomaly "B" is shallow enough to warrant one day of trial self potential braversing. The method is fast and cheap and if definite anomalism were obtained, it would be a good indication of sulfide. E. M. would also indicate any massive sulfide - probably to about as great a depth as I.P. However, it is strongly effected by faults, would stand little chance of indicating disseminated sulfides and costs about the same as I. P. Even so, its use should continue to be considered pending additional information and discussion.

Interpretation of geophysical results to date has not yet pin pointed the ideal or most favorable drill target, but has rather delineated several possibilities. This situation dictates further consideration, analysis and scrutiny and especially careful geological correlation.

INTERPRETATION

Some geologic inferences may be drawn from the regional magnetic trends. In general the area north of Esperanza Wash in this vicinity is magnetically lower than the area south of the wash, with the exception of the volcanic outcrops and even these do not cause large magnetic highs, where crossed. Thus a fault along or near Esperanza Wash is indicated. If such a fault exists,

there is some evidence of shallow southerly dip, with the southern block tilted southerly - at least on its surface. This block is further complicated into at least four sub-zones occupied by anomalies "A", "B", "C" & "F". The relative depth indications of "A" deepest, "B" shallowest and "C" and "F" in between, suggest the possibility of normal, steep, fault-boundaries between these sub-zones. A northeast-southwest series of magnetic lows crosses the northwest part of Section 31, the southeast part of Section 36, the northwest part of Section 1, the southeast part of Section 2 and the northwest corner of Section 11. These definitely indicate an "antimagnetic" zone which could represent sediments, acid igneous rocks, or faulting, with the latter most probable. In any event the feature intersects the Esperanza Wash lineation in the north central part of Section 1. Southwest of Esperanza its dip seems to be about 45° +/- SE. Northeast of Esperanza the dip is obscured, but appears to be relatively steep, either SE or NW.

Anomalies "A", "B" & "C" are located in the south halves of Sections 1 and 6. These are all caused by buried features with the cause to the magnetic top of "B" in Section 1 being quite shallow, probably 100 feet or so and maybe considerably less. The westernmost one, "C", in the southwest part of Section 1 is deeper, but probably not more than 200 feet at the magnetic high and deepening somewhat steeply on the flanks. Anomaly "B"

suggests a narrow steeply dipping dike-like feature, possibly broken, striking mainly northwesterly, but with some indication of extension or plunge to the south. It could also represent a series of small plugs, lenses or segregations. Anomaly "C" may also be a similar feature plunging steeply easterly or a narrow vertical dipping dike body which deepens to the east and is abruptly faulted on the west. Anomaly "F" is surrounded, but only partly covered. Nevertheless it evidently strikes SW and is also probably a steep dike like feature.

As discussed in our previous report the depth to the cause of anomaly "A" in Section 6 may lie between 500 and 1,000 ft. and this feature steepens less steeply on the flanks. If anomaly "B" is interpreted as a feature on or in a N-S striking and south plunging fault or fault block between the other two anomalies "A" & "C" then the north extension of such a fault would meet the other two postulated faults in a sort of triple intersection. Such an intersection may make the center of Section 1 a potential area of interest in addition to the anomaly itself.

One theory offered for consideration is that the area northwest of the NE-SW fault is up relative to the area to the southeast and that the area north of Esperanza Wash is down relative to the area south of the wash. This latter block could be a thrust block. Another possibility is that the anomalies are expressions of a small range of buried volcanics with three peaks

nearer the surface than the main mass. No schist or diabase is known in the vicinity. Diorite and granodiorite are known to the north in the Duval area. Andesite is fairly wide spread and common. Based on frequency or area of occurrence and degree of usual magnetic effect, the most likely cause is either andesite or contact metamorphic magnetite.

A northwest-southeast trend can be plotted across anomalies "C", "D" & "E" and their associated lows. This strike projection may be as important as any in the whole area even though "D" and "E", when considered as individual separate features, appear less significant than the larger anomalies "A", "B" & "C". In the Duval area, a few miles north, the fault pattern is radial but mainly one of NE-SW faults occasionally intersected or cut off by NW-SE faults. The latter in some instances are important ore locations.

Record #30 shows a magnetic low in the southwest part of Section 35. This is felt to be related to nearby volcanics and/or faulting between them along the course of Esperanza Wash.

Record #31 shows little other than the same low feature noted on the previous parallel line.

Record #32 has a strong high north of the south section line of Section 35 and is designated as anomaly "E". This is associated with the lows mentioned on the two previous lines. Taken all together this spot might become of very definite interest if mineralization is found in the area on or around the larger

magnetic highs to the southeast. No further work is recommended here except contingent on good results elsewhere.

Reeord #33 has the easterly expression of the above mentioned anomaly "E". Of importance is the fact that background level north of the anomaly is 300 +/- gammas lower than background south of it. This is indicative of faulting along the south and west sides of the Esperanza Wash with the south side relatively up.

Record #34 has gradual anomalism from relatively deeper sources. Again the level south of Esperanza Wash is relatively higher though more subtly than on Record #33.

Record #35 has an isolated deep high in the northeast part of Section 2 and is designated as anomaly "D".

Record #36 shows considerable minor magnetic deviation--not considered important at this time except as it fits into the overall regional picture.

Record #37 crosses the magnetically highest part found of the major anomaly "C" in the southwest part of Section 1. Unfortunately there is a sheer face on the south bank of a major wash near the peak of the anomaly but as the level had already started to drop, nothing significant was missed that cannot be interpolated into the record.

Record #38 crosses the east flank of the above anomaly "C".

Record #39 has a drop in level to the north in Section 35.

Records #40 & 41 cross the north flank of anomaly "C".

Record #42. A rise in level along the road near the middle of Section 11 indicates a fault contact.

Records #43, #44, #45, #46, nothing of important significance.

Record #47, a small deep high in the northeast part of Section 12.

Record #48, minor effects from deep causes.

Record #49 crosses the southern flank on anomaly "B" and has some evidence for faulting on the west side about at the south ¼ corner for Section 1.

Records #50, #51, #52, #53 & #54 level changes associated with volcanics and Esperanza Wash.

Record #55. Fast change in level north of South section line, Section 36 appears to be fault contact.

Record #56 considerable anomalism due to crossing volcanic outcrop and possible associated fault.

Record #57 probable fault contact at Demetrie Wash.

Record #58 sudden low in north central part of Section 31 is indicative of a fault.

Record #59 another expression of the low and assumed fault of Record #58.

Record #60, #61 & #62. broad changes expressive of deep features.

Record #63 crosses a fault near south ¼ corner of Section 2 and then a fairly broad high near the southeast corner of Section 2. This may be a continuation of anomaly "C" in the southwest

part of Section 1.

Record #64 fault again crossed about halfway across lower part of Section 2.

Record #65 closely parallel and similar to Record #37 but more on the west flank of the high for anomaly "C" in southwest part of Section 1.

Respectfully submitted,

HEINRICHS GEOEXPLORATION CO.

John W. Marlatt

J. W. Marlatt
Geologist

Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
WALTER E. HEINRICHS, JR.
DEC. 31, 19
ARIZONA, U. S. A.

Walter E. Heinrichs, Jr.
President & General Manager

5 May 1961
Tucson, Arizona
P. O. Box 5671

May 5, 1961

Dr. Thomas W. Mitcham
6909 E. Calle Bellatrix
Tucson, Arizona

Dear Tom:

Enclosed are three copies of the report for supplementary MoMag coverage in the Esperanza Area. Also enclosed are the MoMag records and a sepia of the contour map so that you can have additional copies made as desired. You may note that the rate of coverage this time was considerably slower than previously. This of course, is due to the fact that previously we had many roads that could be driven and the later coverage entailed rougher going generally, with steep washes to cross and very few roads.

There are some additional factors on possible geological interpretation and future planning that are very nebulous and difficult to write and which therefore, we hesitated to put in the report. I am sure these can be better discussed and amplified in person in our office, rather than in written fashion anyway. If you care to do so, we can arrange a time to go over things with you whenever mutually convenient.

Our billing is enclosed.

Very truly yours,

HEINRICHS GEOEXPLORATION CO.

John W. Marlatt

J. W. Marlatt
Geologist

JWM:jh
Enclosures

P. S. Now that we have a better feel and are more familiar with the area, if we again briefly had on hand the previous set of original magnetic records, we might be able to extend our interpretation for them a little further.

Jim
JWM

May 5, 1961

STATEMENT

To: Dr. Thomas W. Mitcham
6909 E. Calle Bellatrix
Tucson, Arizona

Re: Additional Mobile Magnetic Survey. Esperanza Wash Area
Pima County, Arizona. April - May 1961

Services:

April 20, 1961 Survey for control (locating Section & ¼ Corners & flagging Line)
Two men----------$115.00

April 21, 24 & 25, 1961
Mobile Magnetic Survey, 3 days
@ $280.00/day---------- $840.00

April 28, 1961, MoMag Survey, ½ day---------- 155.00

April 26, 27, 29, May 1 thru 5, Computation, compilation, maps, Trip to Duval, Report, etc----------N.C.

$1110.00

Expenses:

Vehicle used on April 20, 85 miles
@ $0.10/mile & $10.00/day---------- 18.50

Reproductions & misc. supplies--------- 10.18

TOTAL DUE---------- $1138.68

TABLE OF CONTENTS

Supplement #2

	Page
Introduction	1
Conclusions & Recommendations	1
Procedure	2
Interpretation	3

Sectional Data Sheets
Line #7, Line #8, Line #9

In Pocket
Induced Polarization Anomaly Plan Map---Revised

Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
WALTER E. HEINRICHS, JR.
DEC. 31, 1964
ARIZONA, U.S.A.

Walter E. Heinrichs, Jr.

SUPPLEMENT # 2

INDUCED POLARIZATION INVESTIGATION
and
RESULTS OF AN EXPERIMENTAL SELF POTENTIAL PROFILE

Esperanza Wash Area
Pima County, Arizona

May 1961

INTRODUCTION

During May, 1961 three additional reconnaissance I. P. lines were run over areas of magnetic anomalism at the request of Dr. T. W. Mitcham. The lines were run over magnetic anomalies "B", "C" and "E" using a 500 ft. electrode spacing and totalling 18,000 ft. of observed profile traverse. Because of exceptionally low resistivities observed over anomaly "E" and the resultant somewhat erratic frequency and metallic conduction effects we repeated this line at our own expense, moving the center one electrode spacing to the southeast. Also one 2,000 ft. self potential line was run north-south across magnetic anomaly "B".

CONCLUSIONS AND RECOMMENDATIONS

The I. P. effects over magnetic anomalies "B", "C" and "E" are the strongest and most distinct so far observed on the project. Although they are still not strong or definite enough to <u>positively</u> indicate sulfides, we feel the chances are at least much improved if not actually good.

The most significant results were obtained over magnetic anomalies "B" and "C". However, based solely on the I.P. results alone, the data over "E" is such that we do not recommend dropping ground in this area without more negative information or over riding circumstances.

Relatively, "B" and "C" areas are about a toss up, except "B" appears possibly shallower and has a correlating weak, but hopefully sulfide indicating, self potential low. To date, our best correlation relates to the magnetic highs. However, we should emphasize that continual consideration of the lows and slope intercepts should not be ignored.

PROCEDURE

Line #7 was originally centered just north of the ¼ Cor. on the south line of Sec. 35 and run N 50° W - S 50° E for the repeat survey.

Line #8 was centered 600 ft. E and 650 ft. S of the west ¼ Cor. Sec. 1 and run north-south across Anomaly "C".

Line #9 was centered at the point of maximum magnetic intensity of Anomaly "B" and run north-south.

The self potential profile was also centered on Anomaly "B" and run north-south a distance of 1,000 ft. on either side from the center, on 50 ft. intervals to 400 ft. and 100 ft. intervals from 400 to 1,000 ft.

INTERPRETATION

Line #7 very unexpectedly encountered the lowest resistivities observed in the area and this resulted in erratic frequency and MCF effects. All previous data had indicated a general regional resistivity increase to the west with some occasional anomalous lows and highs of limited extent which have been previously discussed. Experience in other areas has indicated that both acidic and basic volcanics even where exposed and weathered, can have normal to relatively high resistivities. Therefore some situation other than the presence of fresh or even normally weathered volcanics must at least be considered as the possible cause of this anomalism. It is conceivable that a trachyte or latite sill or flow might weather or be otherwise altered to clay, which could give rise to such low resistivities. Gouge or clay in a flat easterly dipping thrust fault could also account for this picture. Also the line could have been oriented parallel to and immediately over or adjacent to a gouge filled normal fault. Regardless of the cause of the abnormally low resistivities it can be stated that the source is likely fairly shallow becoming deeper to the southeast; that electrical penetration was limited to this depth, and that the somewhat anomalous if erratic polarization effects are subject to question regarding whether they represent valid sulfide effects.

Line #8 shows distinct anomalism from about 1.0S to about 1.0N or even 1.5N and a bare suggestion of possible continuation to the north. The strongest anomalism centers about over the mag high or a little to the north.

Line #9 also shows distinct anomalism, but not quite so strong as Line #8. This could be partly because the causative feature is somewhat narrower and/or smaller and/or dips more nearly vertical. At least the indications suggest a rather sharp drop off on both sides, but especially to the north. The strongest anomalism centers near the mag high, or a little to the south. This slight tendency to the south may or may not correlate with the indicated southerly mag extension.

It is interesting to note that the sharp resistivity low observed on Line #3 at station 11W does not appear on Line #9 except possibly towards the southern end. This suggests that the course or strike of this feature is predominently north-south. The fact that the resistivity low on Line #3 is bounded on both sides by marked rather narrow anomalous resistivity highs, was not previously discussed. Also there is a resistivity high bounding the north edge and the low on Line #3, which further supports this interpretation.

Previously we suggested that porous permeable extrusive or epithermal volcanics could provide for the exceptionally low resistivities observed on Line #3 and such may be the case. However, latest evidence indicates that a more plausible

explanation would be contact effects due either to a fault zone or intrusive contact metamorphism.

The S. P. line showed a total variation of about 35 millivolts. Ordinarily, experience in this region indicates background may be about 25 to 30 millivolts. Topography also gives some variation on occasions and we do have a little involved here. However, the anomalism does not quite properly match that to be expected from topography, but the S.P. low does almost exactly match the position of the mag. high. This could represent a weak indication of sulfide, and if so, would also confirm the magnetic indications of relatively shallow depth, because true residual S. P. effects usually cannot be obtained from much deeper than about 200 feet.

Respectfully submitted,

HEINRICHS GEOEXPLORATION CO.

Franklin A. Seward, Jr.

Franklin A. Seward, Jr.
Geophysicist

Approved:

Walter E. Heinrichs, Jr.

May 27, 1961
P. O. Box 5671
Tucson, Arizona

INFORMATION

Data obtained by Continuous Recording
Total Intensity Mobile Magnetometer

Trail road

Nº 5 Number, location & Direction of Traverse

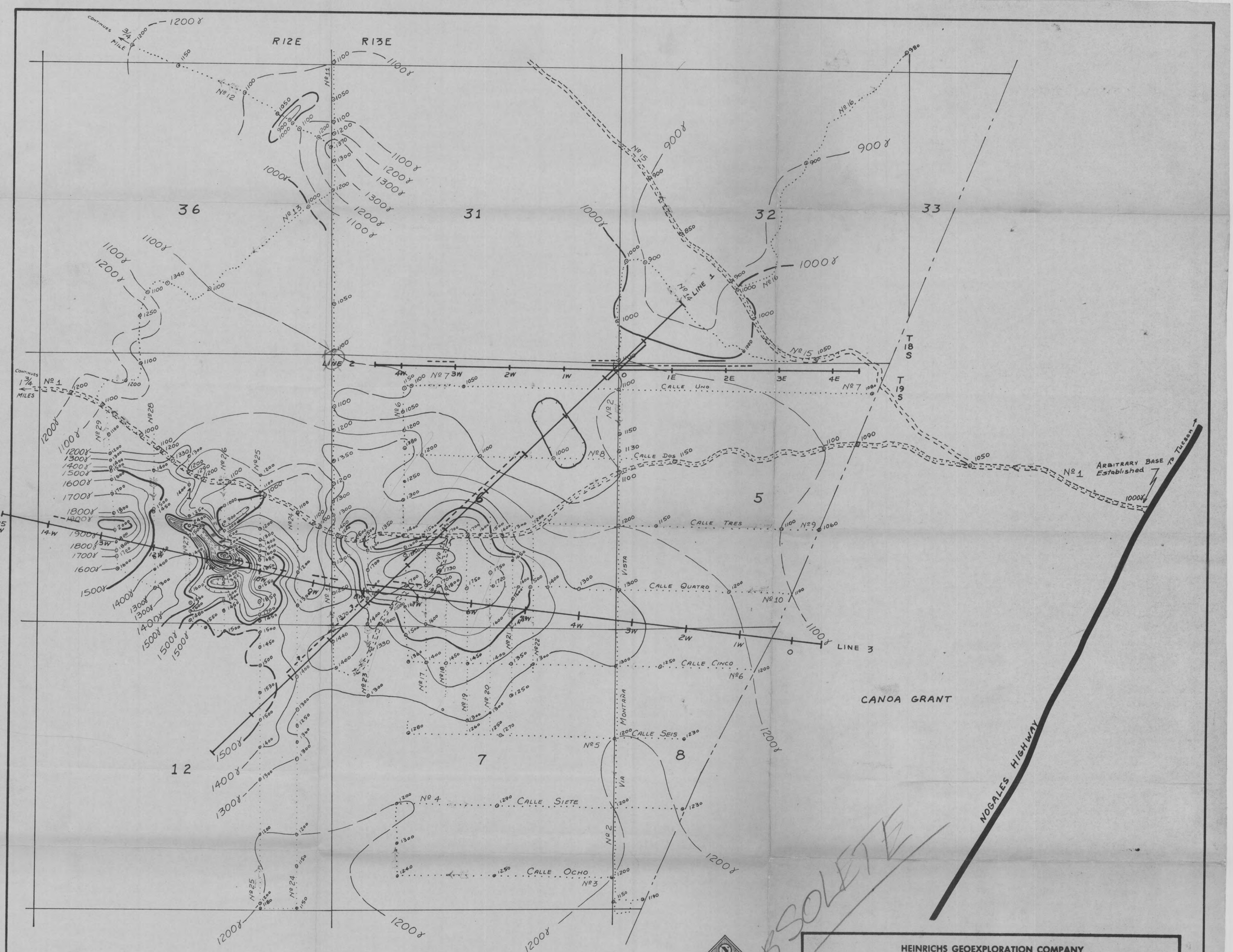
γ Gamma symbol

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

MAGNETIC SURVEY
ESPERANZA WASH PROJECT
FOR
THOMAS W. MITCHAM

Latest

SCALE: 1" = 1000	CONTOUR INTERVAL: 100 γ	REVISIONS
	DATA BY: J.W.M.	5-61
DATE: 2-61	SHEET 1 OF 1	
DRAWN BY: E.G.H.	DRAWING NO.:	FILE:



INFORMATION

Data obtained by Continuous Recording Total Intensity Mobile Magnetometer

= = = = = Trail road

Nº5 Number, location & Direction of Traverse

γ Gamma symbol

End of Line No Anomaly

Weak or Questionable

Moderate Anomaly

Moderate to Strong Anomaly

Strong Anomaly

C.I. = Logarithmic

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

MAGNETIC SURVEY
ESPERANZA WASH PROJECT
FOR
THOMAS W. MITCHAM

INDUCED POLARIZATION SURVEY
ANOMALY PLAN MAP

SCALE: 1" = 1000	CONTOUR INTERVAL: 100 γ	REVISIONS
	DATA BY: J.W.M. & F.A.S.	I.P. 3-61
DATE: 2-61	SHEET 1 OF 1	
DRAWN BY: E.G.H.	DRAWING NO.:	FILE:

ADDITIONAL MAGNETIC RECONNAISSANCE

in the

ESPERANZA WASH AREA

Pima County, Arizona

A supplement
to coverage obtained February 1961.

for

Dr. T. W. Mitcham

APRIL 1961

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

TABLE OF CONTENTS

	Page
Introduction	1
Conclusions & Recommendations	1
Interpretation	2

Map - Magnetic Contours - In Back Pocket

INTRODUCTION

Subsequent to Dr. Thomas Mitcham's request in early April 1961 for additional magnetic coverage in the Esperanza Wash Area, the mobile magnetometer was used on April 21, 24, 25 & 28 to obtain magnetic profiles in Section 31, T18S, R13E, Sections 35 and 36, T18S, R12E, and Sections 1, 2, 11 and 12, T19S, R12E. Approximately 35 more miles of ooverage were obtained. The same procedures, scales and base were used as in the previous work.

CONCLUSIONS & RECOMMENDATIONS

The most obvious result was the closing off of anomaly "C" in the southwest part of Section 1. In Sections 35, 36 and 31, as expected, there is considerable magnetic deviation on or near the volcanic outcrops. Magnetically the three highs, "A", "B" and "C", the two zones between them, the area immediately north of them, and the area immediately west of "C", about on the section line between Sections 2 and 1, appear to be areas most worthy of further investigation. Some induced polarization lines have been run in Section 6 and one line in Section 1. Interpretation of data obtained from that work does not give strong, clear-cut indications of disseminated sulfides over anomaly "A" in Section 6, though some induced polarization anomalism does appear. At least two and possibly three induced polarization lines run north-south across Section 1 should be considered for further

evaluation of anomalies "B" & "C" and the associated areas of interest nearby, not adequately appraised with the previous east-west I.P. line.

It is possible that anomaly "B" is shallow enough to warrant one day of trial self potential traversing. The method is fast and cheap and if definite anomalism were obtained, it would be a good indication of sulfide. E. M. would also indicate any massive sulfide - probably to about as great a depth as I.P. However, it is strongly effected by faults, would stand little chance of indicating disseminated sulfides and costs about the same as I. P. Even so, its use should continue to be considered pending additional information and discussion.

Interpretation of geophysical results to date has not yet pin pointed the ideal or most favorable drill target, but has rather delineated several possibilities. This situation dictates further consideration, analysis and scrutiny and especially careful geological correlation.

INTERPRETATION

Some geologic inferences may be drawn from the regional magnetic trends. In general the area north of Esperanza Wash in this vicinity is magnetically lower than the area south of the wash, with the exception of the volcanic outcrops and even these do not cause large magnetic highs, where crossed. Thus a fault along or near Esperanza Wash is indicated. If such a fault exists,

there is some evidence of shallow southerly dip, with the southern block tilted southerly - at least on its surface. This block is further complicated into at least four sub-zones occupied by anomalies "A", "B", "C" & "F". The relative depth indications of "A" deepest, "B" shallowest and "C" and "F" in between, suggest the possibility of normal, steep, fault-boundaries between these sub-zones. A northeast-southwest series of magnetic lows crosses the northwest part of Section 31, the southeast part of Section 36, the northwest part of Section 1, the southeast part of Section 2 and the northwest corner of Section 11. These definitely indicate an "antimagnetic" zone which could represent sediments, acid igneous rocks, or faulting, with the latter most probable. In any event the feature intersects the Esperanza Wash lineation in the north central part of Section 1. Southwest of Esperanza its dip seems to be about 45° +/- SE. Northeast of Esperanza the dip is obscured, but appears to be relatively steep, either SE or NW.

Anomalies "A", "B" & "C" are located in the south halves of Sections 1 and 6. These are all caused by buried features with the cause to the magnetic top of "B" in Section 1 being quite shallow, probably 100 feet or so and maybe considerably less. The westernmost one, "C", in the southwest part of Section 1 is deeper, but probably not more than 200 feet at the magnetic high and deepening somewhat steeply on the flanks. Anomaly "B"

suggests a narrow steeply dipping dike-like feature, possibly broken, striking mainly northwesterly, but with some indication of extension or plunge to the south. It could also represent a series of small plugs, lenses or segregations. Anomaly "C" may also be a similar feature plunging steeply easterly or a narrow vertical dipping dike body which deepens to the east and is abruptly faulted on the west. Anomaly "F" is surrounded, but only partly covered. Nevertheless it evidently strikes SW and is also probably a steep dike like feature.

As discussed in our previous report the depth to the cause of anomaly "A" in Section 6 may lie between 500 and 1,000 ft. and this feature steepens less steeply on the flanks. If anomaly "B" is interpreted as a feature on or in a N-S striking and south plunging fault or fault block between the other two anomalies "A" & "C" then the north extension of such a fault would meet the other two postulated faults in a sort of triple intersection. Such an intersection may make the center of Section 1 a potential area of interest in addition to the anomaly itself.

One theory offered for consideration is that the area northwest of the NE-SW fault is up relative to the area to the southeast and that the area north of Esperanza Wash is down relative to the area south of the wash. This latter block could be a thrust block. Another possibility is that the anomalies are expressions of a small range of buried volcanics with three peaks

nearer the surface than the main mass. No schist or diabase is known in the vicinity. Diorite and granodiorite are known to the north in the Duval area. Andesite is fairly wide spread and common. Based on frequency or area of occurrence and degree of usual magnetic effect, the most likely cause is either andesite or contact metamorphic magnetite.

A northwest-southeast trend can be plotted across anomalies "C", "D" & "E" and their associated lows. This strike projection may be as important as any in the whole area even though "D" and "E", when considered as individual separate features, appear less significant than the larger anomalies "A", "B" & "C". In the Duval area, a few miles north, the fault pattern is radial but mainly one of NE-SW faults occasionally intersected or cut off by NW-SE faults. The latter in some instances are important ore locations.

Record #30 shows a magnetic low in the southwest part of Section 35. This is felt to be related to nearby volcanics and/or faulting between them along the course of Esperanza Wash.

Record #31 shows little other than the same low feature noted on the previous parallel line.

Record #32 has a strong high north of the south section line of Section 35 and is designated as anomaly "E". This is associated with the lows mentioned on the two previous lines. Taken all together this spot might become of very definite interest if mineralization is found in the area on or around the larger

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magnetic highs to the southeast. No further work is recommended here except contingent on good results elsewhere.

Record #33 has the easterly expression of the above mentioned anomaly "E". Of importance is the fact that background level north of the anomaly is 300 +/- gammas lower than background south of it. This is indicative of faulting along the south and west sides of the Esperanza Wash with the south side relatively up.

Record #34 has gradual anomalism from relatively deeper sources. Again the level south of Esperanza Wash is relatively higher though more subtly than on Record #33.

Record #35 has an isolated deep high in the northeast part of Section 2 and is designated as anomaly "D".

Record #36 shows considerable minor magnetic deviation--not considered important at this time except as it fits into the overall regional picture.

Record #37 crosses the magnetically highest part found of the major anomaly "C" in the southwest part of Section 1. Unfortunately there is a sheer face on the south bank of a major wash near the peak of the anomaly but as the level had already started to drop, nothing significant was missed that cannot be interpolated into the record.

Record #38 crosses the east flank of the above anomaly "C".

Record #39 has a drop in level to the north in Section 35.

Records #40 & 41 cross the north flank of anomaly "C".

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Record #42. A rise in level along the road near the middle of Section 11 indicates a fault contact.

Records #43, #44, #45, #46, nothing of important significance.

Record #47, a small deep high in the northeast part of Section 12.

Record #48, minor effects from deep causes.

Record #49 crosses the southern flank on anomaly "B" and has some evidence for faulting on the west side about at the south ¼ corner for Section 1.

Records #50, #51, #52, #53 & #54 level changes associated with volcanics and Esperanza Wash.

Record #55. Fast change in level north of South section line, Section 36 appears to be fault contact.

Record #56 considerable anomalism due to crossing volcanic outcrop and possible associated fault.

Record #57 probable fault contact at Demetrie Wash.

Record #58 sudden low in north central part of Section 31 is indicative of a fault.

Record #59 another expression of the low and assumed fault of Record #58.

Record #60, #61 & #62. broad changes expressive of deep features.

Record #63 crosses a fault near south ¼ corner of Section 2 and then a fairly broad high near the southeast corner of Section 2. This may be a continuation of anomaly "C" in the southwest

part of Section 1.

Record #64 fault again crossed about halfway across lower part of Section 2.

Record #65 closely parallel and similar to Record #37 but more on the west flank of the high for anomaly "C" in southwest part of Section 1.

Respectfully submitted,

HEINRICHS GEOEXPLORATION CO.

J. W. Marlatt
Geologist

Walter E. Heinrichs, Jr.
President & General Manager

5 May 1961
Tucson, Arizona
P. O. Box 5671

INFORMATION

Data obtained by Continuous Recording

Line #1 N 45° E w center

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Esperanza Wash Line #1 N. Field date 16/Feb/61 Data page 1 Comp. date _____. Comp by F.A.S.

(A) Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2 *	2-3 *
(B) Receive	CAL	1N-2N →		2N-3N		→	3N-4N			→	4N-5N	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1410	1400	1410	1390	1380	1400	1390	1380	1375	1400	1380
(E) Vdc (avg)	.969	10.52	2.32	9.72	2.25	.72	8.68	2.57	.82	N.D.	1.69	.73
(F) DCcal		.970	970	.970	.970	.970	.971	.971	.971		971	972
(G) Kn x 10^{-3}		3	12	3	12	30	3	12	30	60	12	30
(H) ρ dc=ExFxGx10^3/D		21.7	19.3	20.0	18.9	15.2	18.0	18.6	17.3	—	14.1	15.4
(I) Vac Σ		10.40	2.34	9.60	2.22	.76	8.70	2.18	.84	N.D	1.66	.76
(J) AC noise x 2		.10	.10	0	0	0	.10	.10	.10		.30	.30
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		10.40	2.34	9.60	2.22	.76	8.70	2.18	.84		1.63	.70
(L) AC-DC cal.	1.021	1.022	1.022	1.022	1.022	1.022	1.023	1.023	1.023	—	1.024	1.024
(M) ρ dc/ρac=ExL/K		1.036	1.013	1.032	1.036	.980	1.020	1.019	1.000		1.061	1.068
(N) PFE=(M-1)(10^2)		4	1	3	4	-2	2	2	0		6	7
(O) MCF=(M-1)(10^5)/H		165	67	160	191	-131	111	102	0		432	441

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

(A) Send	3-4 *	4-5	1-2 *	2-3 **	3-4	4-5	2-3		2-3	2-3	2-3	2-3
(B) Receive	4N-5N →		5N-6N			→	CAL		CAL	CAL	CAL	CAL
(C) n separation	4	5	3	4	5	6						
(D) I	1375	N.D	1400	1400	N.D	N.D			500	700	500	700
(E) Vdc (avg)	.30	ND	.72	.41	ND.	N.D.			536	724	534	720
(F) DCcal	972		.972	.972			.973		974	.969	.937	973
(G) Kn x 10^{-3}	60	105	30	60	105	168						
(H) ρ dc=ExFxGx10^3/D	12.7	—	15.0	17.1	—	—						
(I) Vac Σ	.40	ND	.78	.56					516	740	518	740
(J) AC noise x 2	.30	ND	.30	.30	—	—						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.27		.72	.47								
(L) AC-DC cal.	1.024		1.025	1.025		1.026			.964	1.021	.972	1.026
(M) ρdc/ρac =ExL/K	1.111		1.025	.1895								
(N) PFE=(M-1)(10^2)	11		3	-11								
(O) MCF=(M-1)(10^5)/H	875		167	-614								

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ____

Project Esperanza West Line 1 S Field date 2-17-61 Data page ____ Comp. date 2-17-61 Comp by ____

A) Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
B) Receive		1-2S	→	2-3S	→		3-4S	→		→	4-5S	→
C) n separation		1	2	1	2	3	1	2	3	4	2	3
D) I		1000	1000	1400	1000	1000	1010	1010	1000	1000	1010	1000
E) Vdc (avg)		10.87	1.66	13.27	225	—	8.73	2.18	.87	—	1.87	.78
F) DCcal	.966	.966	.965	.965	.964		.963	.963	.963		.962	.962
G) Kn x 10^{-3}		3	12	3	12	30	3	12	30	60	12	30
H) ρ dc=ExFxGx10^3/D		31.4	19.2	27.4	26.0		25.0	24.9	25.2	—	21.3	22.5
I) Vac Σ		10.80	1.74	13.30	2.20	.46	8.60	2.24	.80		1.96	.80
J) AC noise x 2		.04	.04	.10	.10	.10	.20	.20	.20	.20	.14	.14
K) Vac(corr) = $\sqrt{I^2 - J^2}$		10.80	1.74	13.30	2.20		8.60	2.23	.785		1.96	.79
L) AC-DC cal.	1.028	1.027	1.027	1.026	1.026	1.026	1.025	1.030	1.024	—	1.023	1.023
M) ρ dc/ρac=ExL/K		1.020	.983	1.021	1.050	ND	1.041	1.011	1.134	ND	.983	1.010
N) PFE=(M-1)(10^2)		2	-2	2	5		4	1	13		-2	1
O) MCF=(M-1)(10^5)/H		64	-89	77	192		164	44	532		-80	44

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ____

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

A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4		3-4	3-4	3-4	3-4
B) Receive	4-5S	→	5-6S	→					Cal	Cal	Cal	Cal
C) n separation	4	5	3	4	5	6						
D) I	1000	—	1010	1410	1000				500	695	500	695
E) Vdc (avg)			.44	.40					528	720	540	730
F) DCcal			.961	.961			.959		.946	.966	.926	.959
G) Kn x 10^{-3}	60	105	30	60	105	168						
H) ρ dc=ExFxGx10^3/D			12.6	16.4								
I) Vac Σ			.56	.42					516	740	518	744
J) AC noise x 2			.16	.16								
K) Vac (corr) = $\sqrt{I^2 - J^2}$			.53	.39								
L) AC-DC cal.	—	—	1.021	1.021	-	—	1.019		.977	1.028	.960	1.019
M) ρdc/ρac =ExL/K	ND	ND	.830	1.050								
N) PFE=(M-1)(10^2)			-17	5								
O) MCF=(M-1)(10^5)/H			-1350	304								

Supplement # 1
To A Report On
Induced Polarization Investigations
Esperanza Wash Area
Pima County, Arizona
April 1961

Introduction

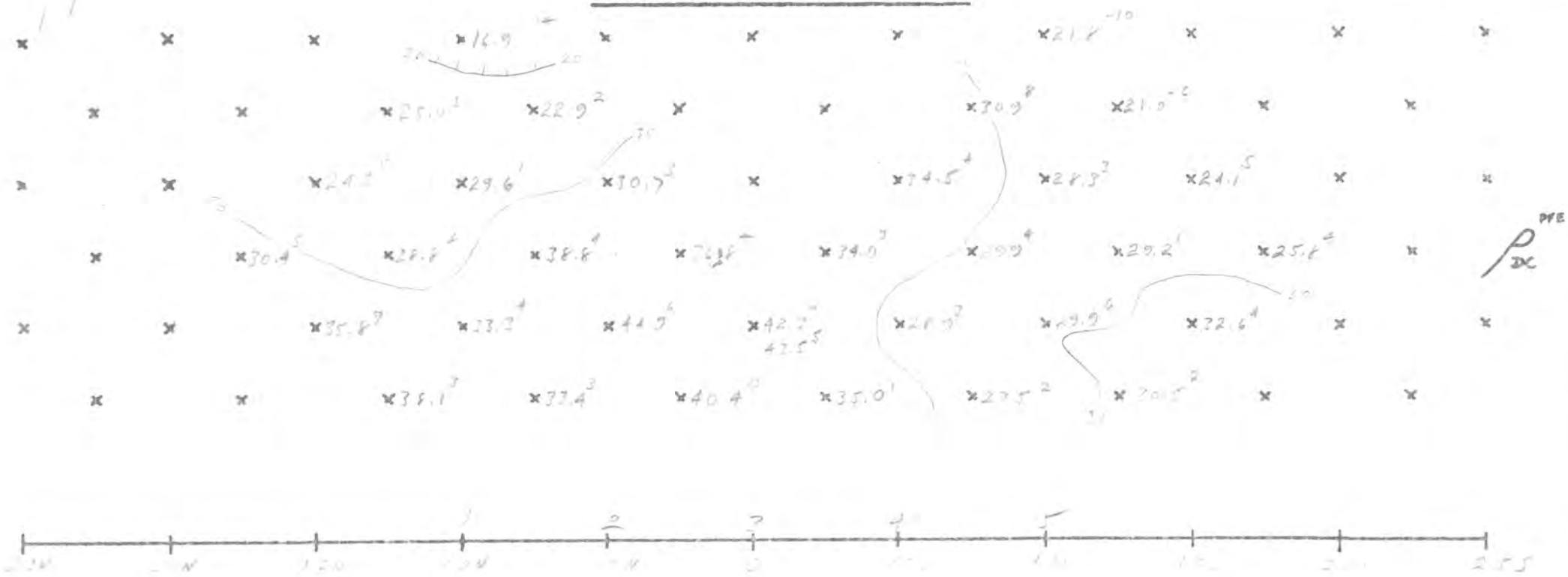
Following completion of I.P. surveys in March 1961 and subsequent interpretation of data additional work was requested by Dr Mitcham to substantiate the validity of initial results and better delineate possible mineralization in the zone of interest

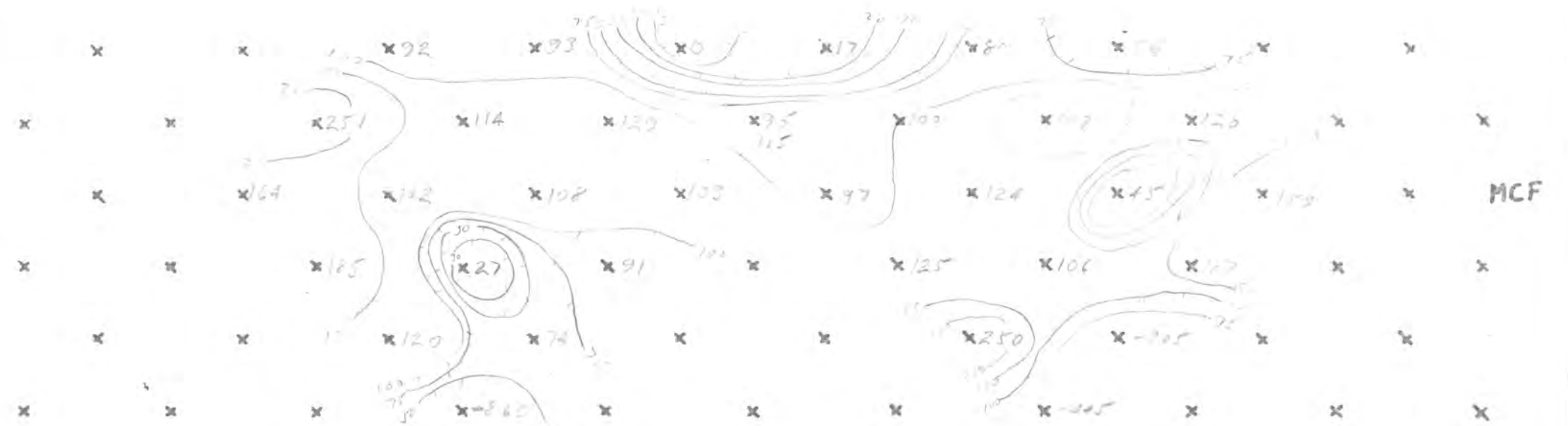
The work consisted of 3 lines striking N 30°E 1000 feet apart across the magnetic anomaly in the south half of section 6 and the I.P. anomalism previously reported on lines # 1 and # 3. A 500 foot electrode spacing was used as on lines # 2 & 3 and a total of 18000 ft. of profile traverse were observed

The work was performed by the same crew as that involved in the first phase survey.

This supplementary report and the resultant conclusions and recommendations is confined to the geophysical investigations in the south half of section 6.

INDUCED POLARIZATION WORK SHEET





Area Esperanza #6 Sprd Scale 1" = 500' Date

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project Esperanza Line 10N Field date 4-14 Data page _____ Comp. date 4-14 Comp by _____ Page _____

(A) Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive		.5-1N	→	1-1.5N	→		1.5-2N	→			2-2.5N	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1440	1430	1435	1425	1420	1420	1415	1407	1405	1420	1407
(E) Vdc (avg)		40.0	10.4	33.0	11.0	3.59	37.2	8.1	3.75	1.48	8.72	2.79
(F) DCcal USED	.970											
(G) Kn x 10^{-3}		15	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		40.4	42.2	27.4	44.9	26.6	38.1	33.2	38.8	20.7	35.8	28.8
(I) Vac Σ		40.0	10.0	32.0	10.4	3.46	36.0	7.8	3.60	1.44	8.0	2.68
(J) AC noise x 2		.04	.04	.06	.06	.06	.02	.02	.02	.02	.04	.04
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		40.0	10.0	32.0	10.4	3.46	36.0	7.8	3.60	1.44	8.0	2.68
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.040	1.040	1.031	1.058	1.038	1.033	1.031	1.002	1.028	1.020	1.041
(N) PFE=(M-1)(10^2)		0	4	3	6	4	-	4	4	3	2	4
(O) MCF=(M-1)(10^5)/H		0	95	92	129	103	92	114	108	91	121	142

Project	Line		Field date		Data page		Comp. date				Comp by	
(A) Send	3-4	4-5	1-2	2-3	3-4	4-5						
(B) Receive	2-2.5N	→	2.5-3N			→						
(C) n separation	4	5	3	4	5	6						
(D) I	1403	1400	1410	1400	1400	1397	282	510	705	284	510	705
(E) Vdc (avg)	1.43	.63	2.94	1.17	.68	.29	292	523	726	286	510	719
(F) DCcal					USED	1.000	.966	.976	.971	.994	1.000	.983
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	29.6	22.9	30.4	24.3	25.0	16.9						
(I) Vac Σ	1.42	.62	2.80	1.12	.66	.34	292	520	720	286	502	710
(J) AC noise x 2	.04	.04	.02	.02	.02	.02	1.000	.995	.992	1.000	.985	.990
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.42	.62	2.80	1.12	.66	.34						
(L) AC-DC cal.					USED	1.000						
(M) ρdc/ρac =ExL/K	1.008	1.017	1.050	1.045	1.030	.855						
(N) PFE=(M-1)(10^2)	1	2	5	5	3	-14						
(O) MCF=(M-1)(10^5)/H	27	54	164	185	120	-860						

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE ___

Project: Esperanza Line: 10N Int. Cal. Date 4-[illegible]

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec		5-1N	→	1-1.5N	→	→	+5.2N	→	→	→	2-2.5N	→
Time		1040	1041	1053	1054	1055	1106	1107	1110	1111	1124	1126
DC-1		20.0	5.3	16.0	5.6	1.81	18.5	4.1	1.81	.72	4.0	1.40
		20.0	5.3	16.0	5.6	1.85	18.1	4.1	1.82	.74	4.1	1.38
DC-2		20.0	5.1	17.0	5.4	1.78	18.9	4.0	1.93	.74	4.7	1.39
		20.0	5.1	17.0	5.4	1.74	19.1	3.9	1.93	.74	4.7	1.42
Σ			10.4	33.0	11.0	3.59	37.4	8.1	3.74	[illegible]	8.7	2.79
						3.59	37.2	8.0	3.75	[illegible]	8.8	2.80
DC-3		20.0	5.2	15.7	5.6	1.88	18.0	4.2	1.80	.67	3.9	1.41
		20.0	5.3	15.6	5.6	1.90	18.0	4.2	1.68	.82	3.9	1.35
DC-4		20.0	5.1	17.2	5.4	1.71	19.0	4.0	1.97	.81	4.8	1.39
		20.0	5.0	17.3	5.4	1.69	19.0	3.9	2.06	.66	4.8	1.43
Σ			10.3	32.9		3.79	37.0	8.2	3.77	[illegible]	8.7	2.80
				33.0			37.0	8.1	3.74	[illegible]		2.78
DC-AV.		40.0	10.4	33.0	11.0	3.59	37.2	8.1	3.75	1.48	8.72	2.79
AC-1		20.0	5.0	16.0	5.2	1.73	18.0	3.9	1.80	.72	4.0	1.34
AC-2		20.0	5.0	16.0	5.2	1.73	18.0	3.9	1.80	.72	4.0	1.34
Σ		40.0	10.0	32.0	10.4	3.46	36.0	7.8	3.60	1.44	8.00	2.68
S.P.		+8.6		+10.6			+7.1				+2.2	
AC-N		.02		.03			.01				.02	

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Esperanza Line: 10 N Int.Cal 52.2 Date: 4-14

Send	3-4	4-3	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
Rec.	2.25M →		2.5-3M →				Cal	Cal	Cal	Cal	Cal	Cal
Time	1128	1130	1142	1146	1147	1149	1035 282	1036	1037 [illegible]	1402	1403	1404
DC-1	86 95	36 30	1.60 1.64	40 38	35 34	12 7	14.6	26.1	36.3	14.3	25.5	35.9
DC-2	58 49	27 31	1.34 1.30	76 79	33 34	17 21	14.6	26.1	36.3	14.3	25.5	35.9
Σ	144 144	[illegible]	2.94 2.94	111 117	68 68	29 28						
DC-3	82 80	37 34	1.66 1.71	43 45	31 31	19 15	14.6	26.1	36.3	14.3	25.5	35.9
Dc-4	59 63	28 29	1.26 1.24	74 72	37 36	10 17	14.6	26.1	36.3	14.3	26.5	35.9
Σ	141 143	[illegible]	2.92 2.95	117		29 32						
DC-AV	143	.63	2.94	1.17	.68	.29	29.2	523	726	286	510	718
AC-1	.71	.31	1.40	.56	.33	.17	14.6	26.0	36.0	14.3	25.1	35.5
AC-2	.71	.31	1.40	.56	.33	.17	14.6	26.0	36.0	14.3	25.1	35.5
Σ	1.42	.62	2.80	1.12	.66	.34	292	520	720	286	502	710
S. P.	+2.2		+5.0									
AC-N	.02		.01									

INDUCED POLARIZATION SENDER NOTES

Project: Esperanza Line: 10 N Date: 4-14 6

Send	Cal	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	2-3	.5-1N	→	1-1.5N	→		1.5-2N	→			2-2.5N	→
Time		1040	1041	1053	1054	1055	1106	1107	1110	1111	1124	1126
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1440	1430	1435	1425	1420	1420	1415	1407	1405	1420	1407
Send	3-4	4-5	1-2	2-3	3-4	4-5	Cal					
Receive	2-2.5N	→	2.5-3N	→			2-3					
Time	1128	1130	1142	1146	1147	1149	1035	1036	1037	1402	1403	1404
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1403	1400	1410	1409	1400	1397	282	510	705	284	510	705

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Esperanza Line 10S Field date 4-14 Data page_____ Comp. date_____. Comp by_____

(A) Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive		.5-15	→	1-1.55	→	→	15-25	→	→	→	2-2.55	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1435	1420	1435	1420	1405	1430	1415	1403	1397	1425	1405
(E) Vdc (avg)		34.2	10.5	26.8	7.0	3.25	29.7	7.2	2.86	1.64	7.9	2.80
(F) DCcal												
(G) Kn x 10^{-3}		15	6	15	6	15	15	6	15	30	6	15
(H) ρdc=ExFxGx10^3/D		25.2	43.5	27.5	28.9	[illegible]	30.5	29.9	[illegible]	32.5	32.6	29.2
(I) Vac Σ		34.0	10.0	26.2	6.8	3.14	29.2	6.8	2.78	1.60	7.6	2.76
(J) AC noise x 2		.08	.08	.08	.08	.08	.30	.30	.30	.30	.16	.16
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		34.0	10.0	26.2	6.8	3.14	29.2	6.8	2.76	1.57	7.6	2.76
(L) AC-DC cal.		1.000										
(M) ρdc/ρac=ExL/I		1.006	1.050	1.022	1.029	1.022	1.017	1.059	1.057	1.043	1.039	1.013
(N) PFE=(M-1)(10^2)		1	5	2	3	3	2	6	4	4	4	1
(O) MCF=(M-1)(10^5)/H		17	115	80	100	97	56	197	124	125	120	45

Project	Line		Field date			Data page		Comp. date		Comp by		
(A) Send	2-3	1-2	4-5	3-4	2-3	1-2						
(B) Receive	2-2.55	→	2.5-35	→	→	→						
(C) n separation	4	5	3	4	5	6						
(D) I	1400	1395	1410	1400	1395	1395			CAL	ON		
(E) Vdc (avg)	1.35	84	2.48	1.15	.57	.37						
(F) DCcal						[illegible]	.980		10	N		
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρdc=ExFxGx10^3/D	28.3	30.9	25.8	24.1	21.0	21.8						
(I) Vac Σ	132	.80	2.38	1.10	.62	.42						
(J) AC noise x 2	.16	.16	.10	.10	.10	.10						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.31	.78	2.38	1.10	.61	.41						
(L) AC-DC cal.						[illegible]	1.000					
(M) ρdc/ρac =ExL/I	1.030	1.077	1.041	1.045	.936	.903						
(N) PFE=(M-1)(10^2)	3	8	4	5	−6	−10						
(O) MCF=(M-1)(10^5)/H	106	250	159	187	−305	−445						

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Esparanza Line 105 Int.Cal. Date:4-14

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		.5-15	→	1-1.55	→	→	1.5-25	→	→	→	2-2.55	[illegible]
Time		1248	1250	1257	1258	1300	1306	1308	1310	1312	1321	1323
DC-1		17.1 17.2	5.2 5.2	13.0 13.0	4.0 4.1	1.70 1.71	15.1 15.2	3.5 3.5	1.40 1.49	.90 .89	4.0 4.0	1.40 1.40
DC-2		17.1 17.1	5.3 5.3	13.8 13.8	3.0 2.9	1.55 1.54	14.6 14.5	3.7 3.7	1.46 1.37	.75 .82	3.9 3.9	1.40 1.40
Σ		[illegible]				3.25 3.25			.86 .86	1.62 1.62	[illegible]	
DC- 3		17.2 17.2	5.2 5.2	12.9 12.8	4.2 4.1	1.71 1.72	15.2 15.2	3.5 3.4	1.39 1.38	.90 .69	4.0 4.0	1.40 1.40
DC-4		17.0 17.0	5.3 5.3	13.9 13.9	2.9 2.9	1.54 1.53	14.5 14.5	3.7 3.8	1.47 1.46	.77 .91	3.9 3.9	1.40 1.40
Σ		[illegible]				[illegible]			[illegible]	1.67 1.60		
DC-Av		34.2	10.5	26.8	7.0	3.25	29.7	7.2	2.86	1.64	7.9	2.80
AC-1		17.0	5.0	13.1	3.4	1.57	14.6	3.4	1.39	.80	3.8	1.38
AC- 2		17.0	5.0	13.1	3.4	1.57	14.6	3.4	1.39	.80	3.8	1.38
Σ		34.0	10.0	26.2	6.8	3.14	29.2	6.8	2.78	1.60	7.6	2.76
S.P.		+18.7		-12.6			+16.4				+6.2	
AC-N		.04		.04			.15				.08	

1.5 - 150 E of power [illegible]

Power [illegible] 1.905

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Esparanza Line: 105 Int.Cal. Date: 4-14

Send	2-3	1-2	4-5	3-4	2-3	1-2						
Rec.	2.2.35	→	2.5.35	→	→	→						
Time	1324	1326	1342	1344	1345	1347						
DC-1	.70 .72	.44 .43	1.18 1.20	60 61	26 27	18 20						
DC-2	.65 .64	.40 .42	1.29 1.28	56 54	31 30	19 17						
Σ	1.35 1.36	.84 .83	47 48	116 115	57 57	37 37						
DC-3	.71 .75	.42 .40	1.20 1.23	56 61	23 26	19 29						
DC-4	.63 .59	.42 .44	1.29 1.25	56 54	34 31	18 15						
Σ	1.34 1.34	[illegible]	48 48	[illegible]	57 57	33 33						
DC-AV	1.35	.84	2.48	1.15	.57	.37						
AC-1	.66	.40	1.19	.55	.31	.21						
AC-2	.66	.40	1.19	.55	.31	.21						
Σ	1.32	.80	2.38	1.10	.62	.42						
S. P.	+6.2		-0.8									
AC-N	.08		.05									

INDUCED POLARIZATION SENDER NOTES

Project: Esperanza Line: 10 S Date: 4-[illegible]-81

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive		.5-1.5 →		1-1.5 5 →			1.5-2 5 →				2-2.5 5 →	
Time		1248	1250	1257	1258	1300	1306	1308	1310	1312	1321	1323
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1435	1420	1435	1420	1405	1430	1415	1403	1397	1425	1405
Send	2-3	1-2	4-5	3-4	2-3	1-2						
Receive	2-2.5	5 →	2.5-3	5 →								
Time	1324	1326	1342	1344	1345	1347						
Range	1.5	1.5	1.5	1.5	1.5	1.5						
Current	1400	1395	1410	1400	1395	1395						

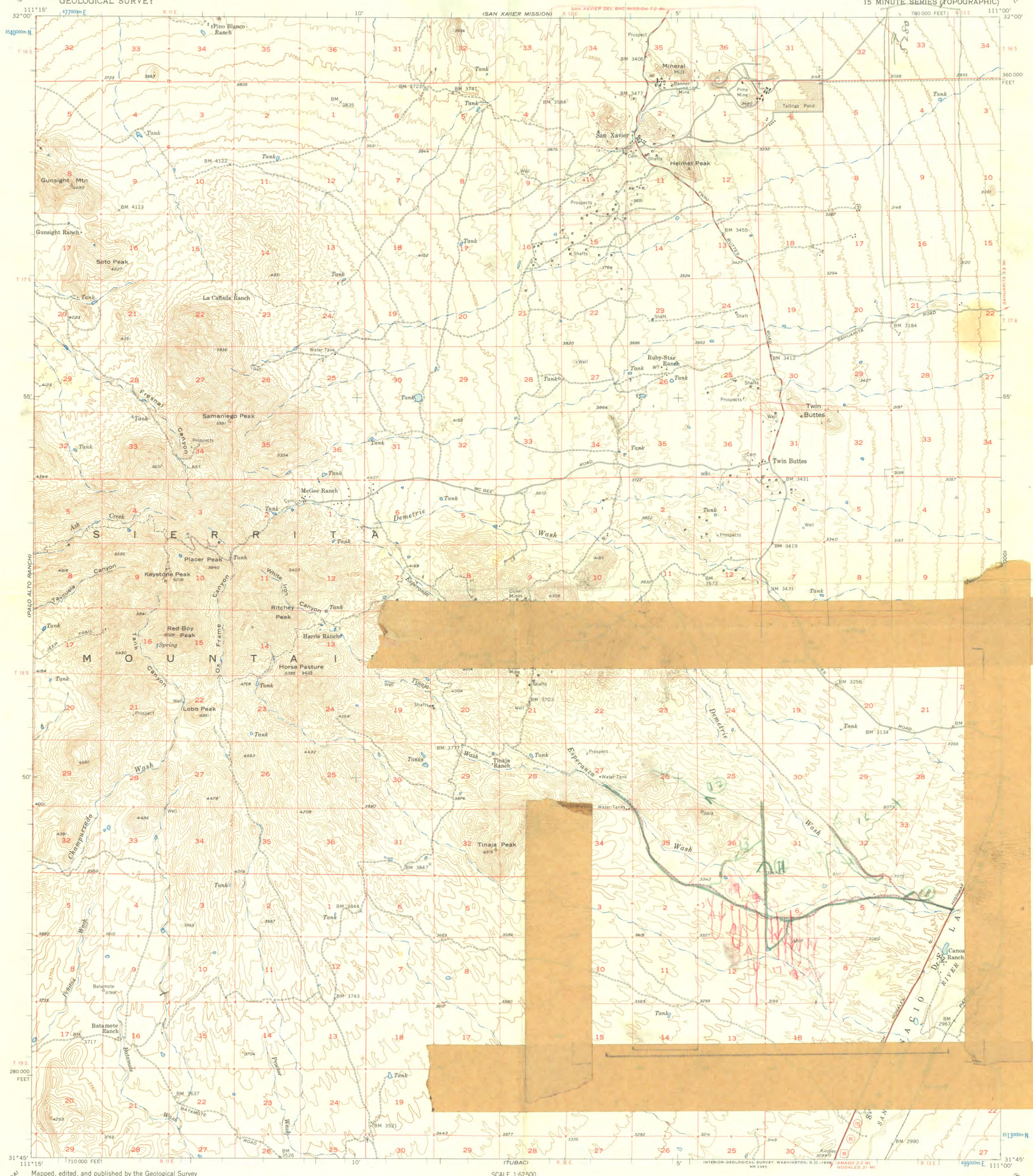
BM 3256
22
23
24
19
20
21
Demetrie
3250
Tank
BM 3134
ROAD
BM
3056
rospect
27
Water Tank
26
25
30
29
28
3500
Water Tanks
3813
3073
Wash
33
34
35
Wash
36
31
32
3250
3267
3342
3111
3075
3500
3000
3
2
1
6
5
3416
3327
3207
3060
Canoa
Ranch
10
11
12
7
8
RIVER
3383
3299
3199
Tank
BM
2967
15
14
13
18

Esperanza Wash Project

1" = 500'

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TWIN BUTTES QUADRANGLE
ARIZONA—PIMA CO.
15 MINUTE SERIES (TOPOGRAPHIC)



INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1958
MR 2385

Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and USCE

Topography by planetable surveys 1938–39
Culture revision and field check 1957

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

13°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1957

SCALE 1:62 500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

ARIZONA
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Unimproved dirt
U. S. Route — State Route

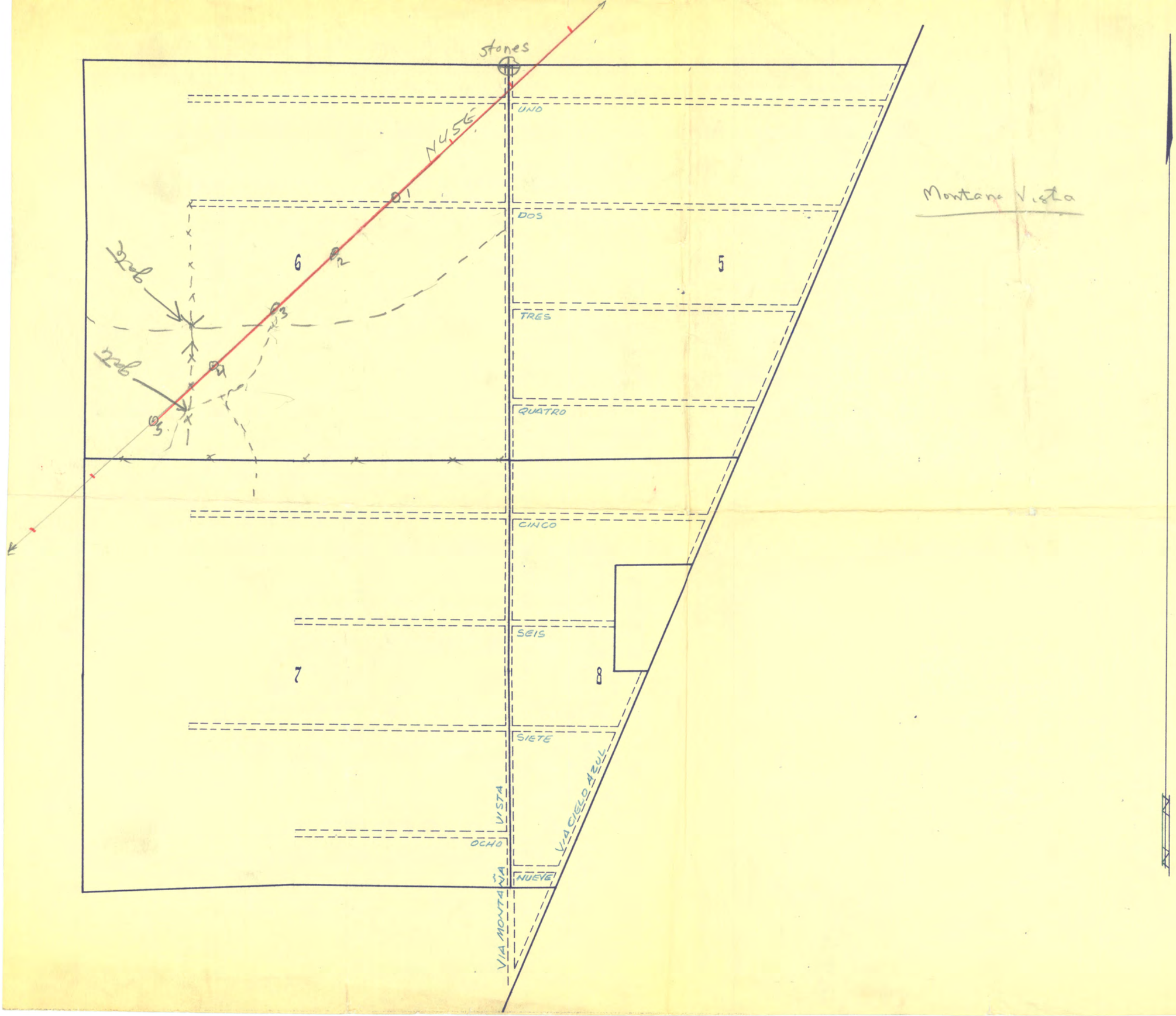
TWIN BUTTES, ARIZ.
N3145—W11100/15

1957

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 2, COLORADO OR WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Certified Area Ford Sed.

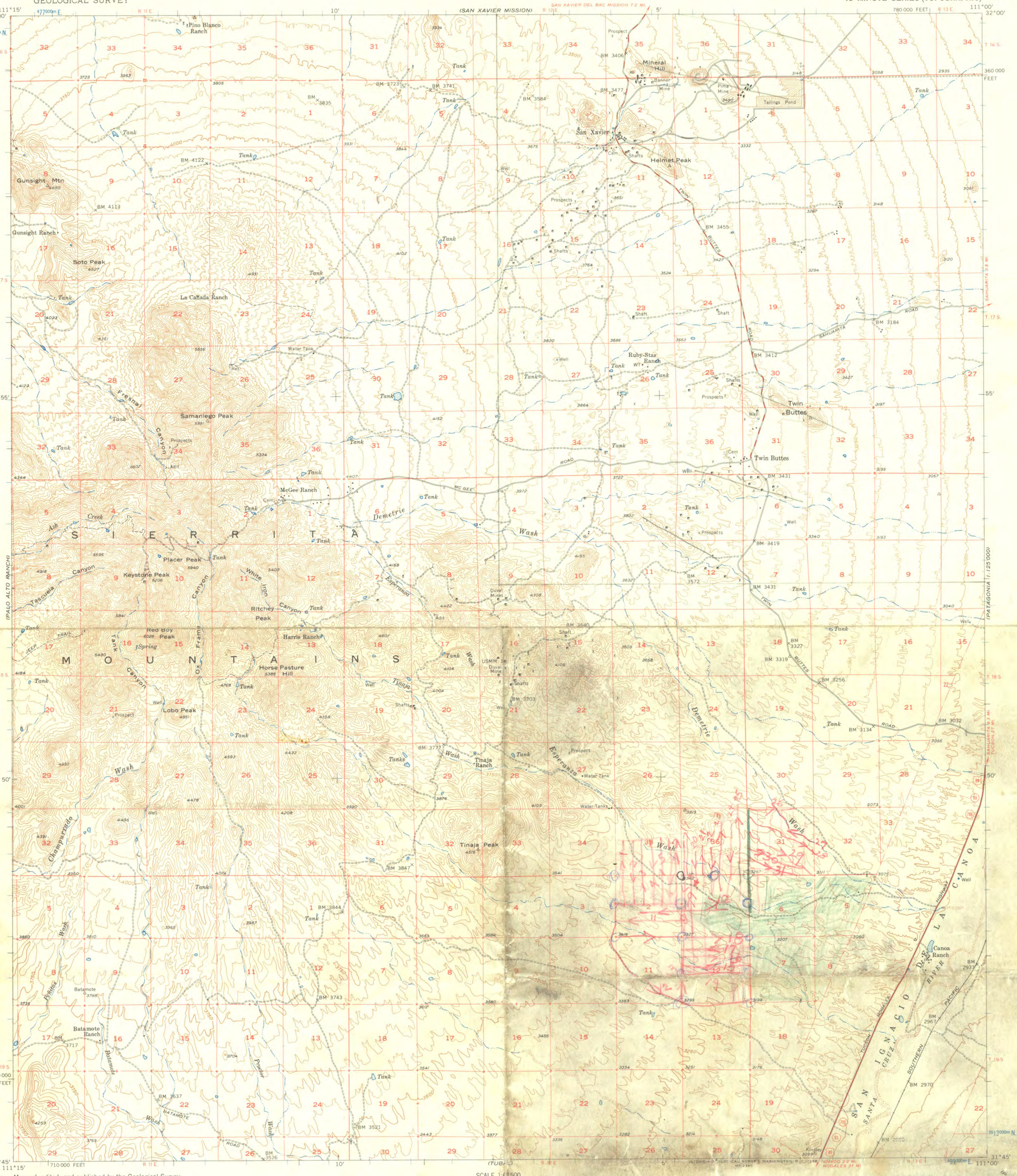
John Balla



Montana Vista

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TWIN BUTTES QUADRANGLE
ARIZONA—PIMA CO.
15 MINUTE SERIES (TOPOGRAPHIC)



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TRUE NORTH
MAGNETIC NORTH
13°
APPROXIMATE MEAN DECLINATION, 1957

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1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

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CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

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1957

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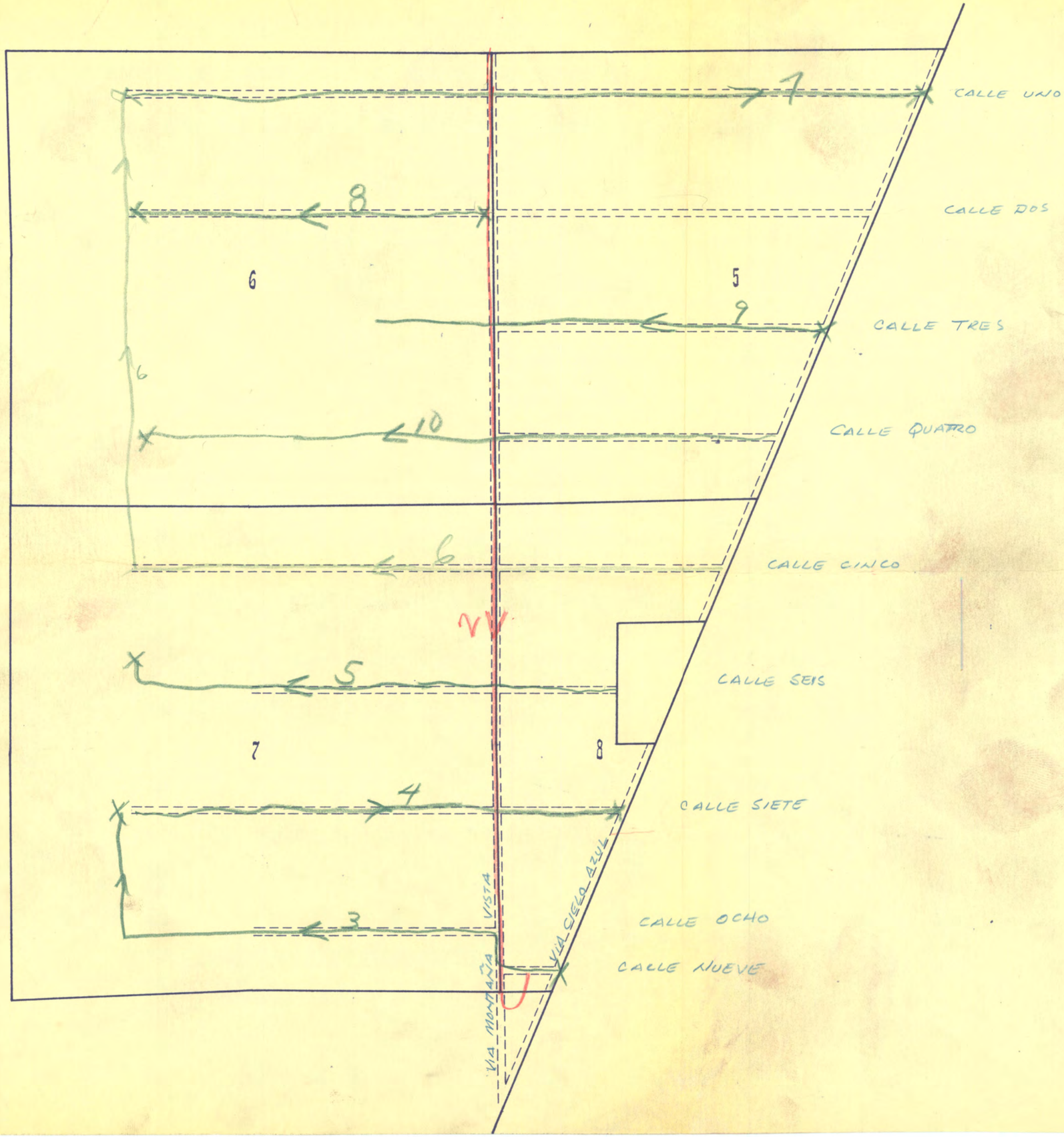
CALLE UNO
CALLE DOS
CALLE TRES
CALLE QUATRO
CALLE CINCO
CALLE SEIS
CALLE SIETE
CALLE OCHO
CALLE NUEVE
VIA MONTAÑA VISTA
VIA CIELO AZUL
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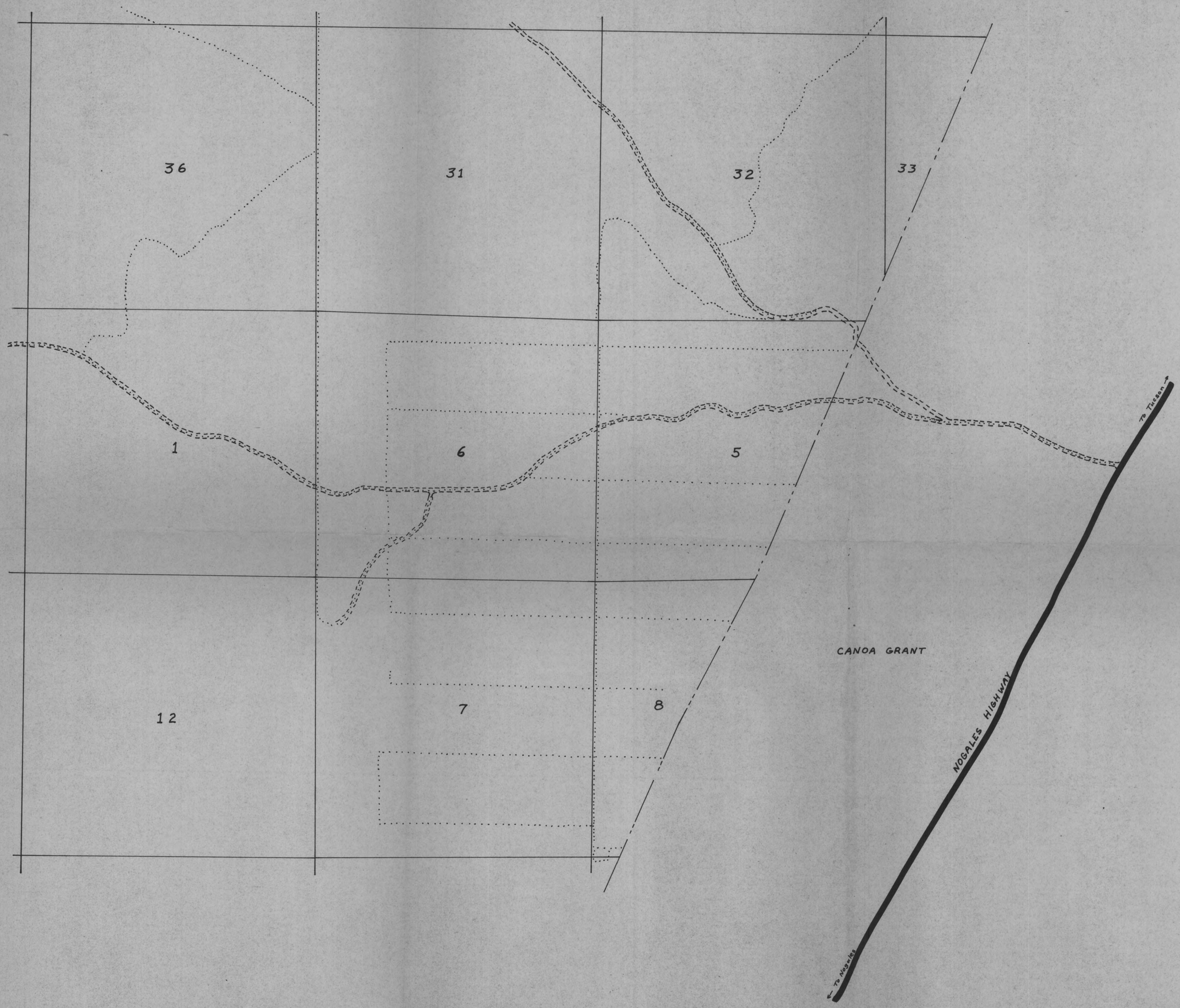
36
31
32
33
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12
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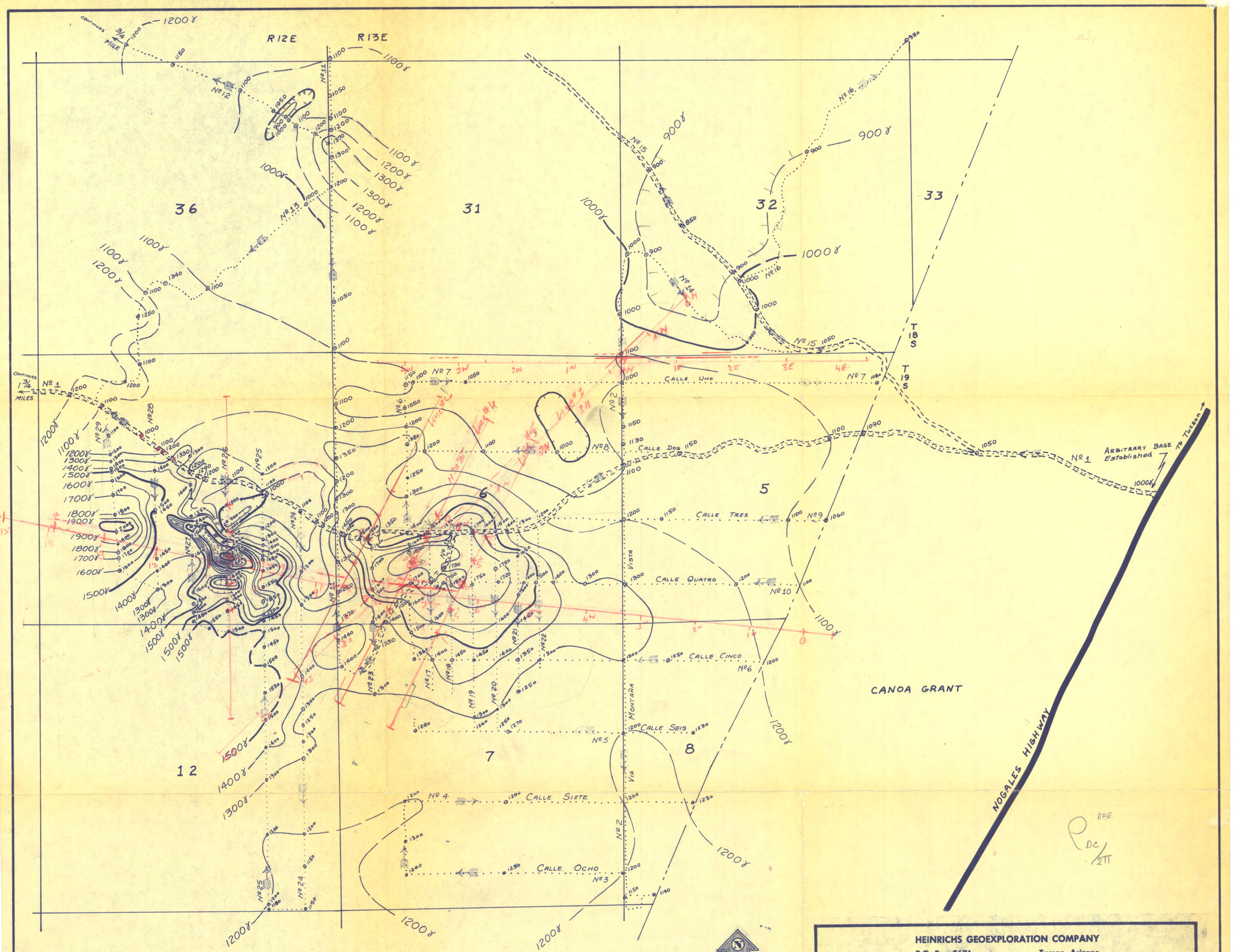
8
CANOA GRANT
NOGALES HIGHWAY
To Tucson
To Nogales



INFORMATION

Data obtained by Continuous Recording Total Intensity Mobile Magnetometer

= = = = = Trail road

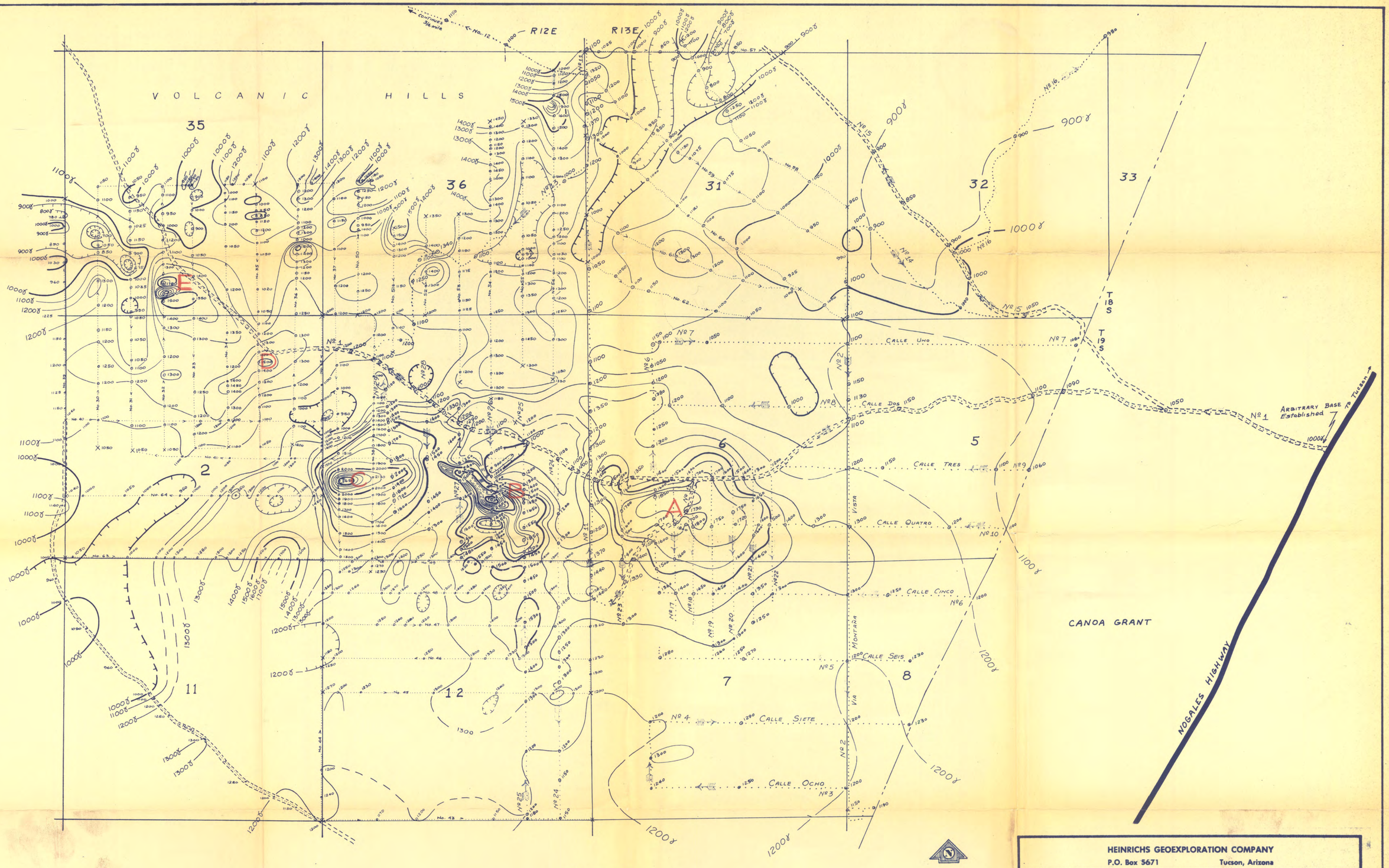
Nº 5 ⟶ Number, location & Direction of Traverse

γ Gamma symbol

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

MAGNETIC SURVEY
ESPERANZA WASH PROJECT
FOR
THOMAS W. MITCHAM

SCALE: 1" = 1000	CONTOUR INTERVAL: 100 γ	REVISIONS
	DATA BY: J.W.M.	
DATE: 2-61	SHEET 1 OF 1	
DRAWN BY: E.G.H.	DRAWING NO.:	FILE:



INFORMATION

Data obtained by Continuous Recording
Total Intensity Mobile Magnetometer

= = = = = Trail road

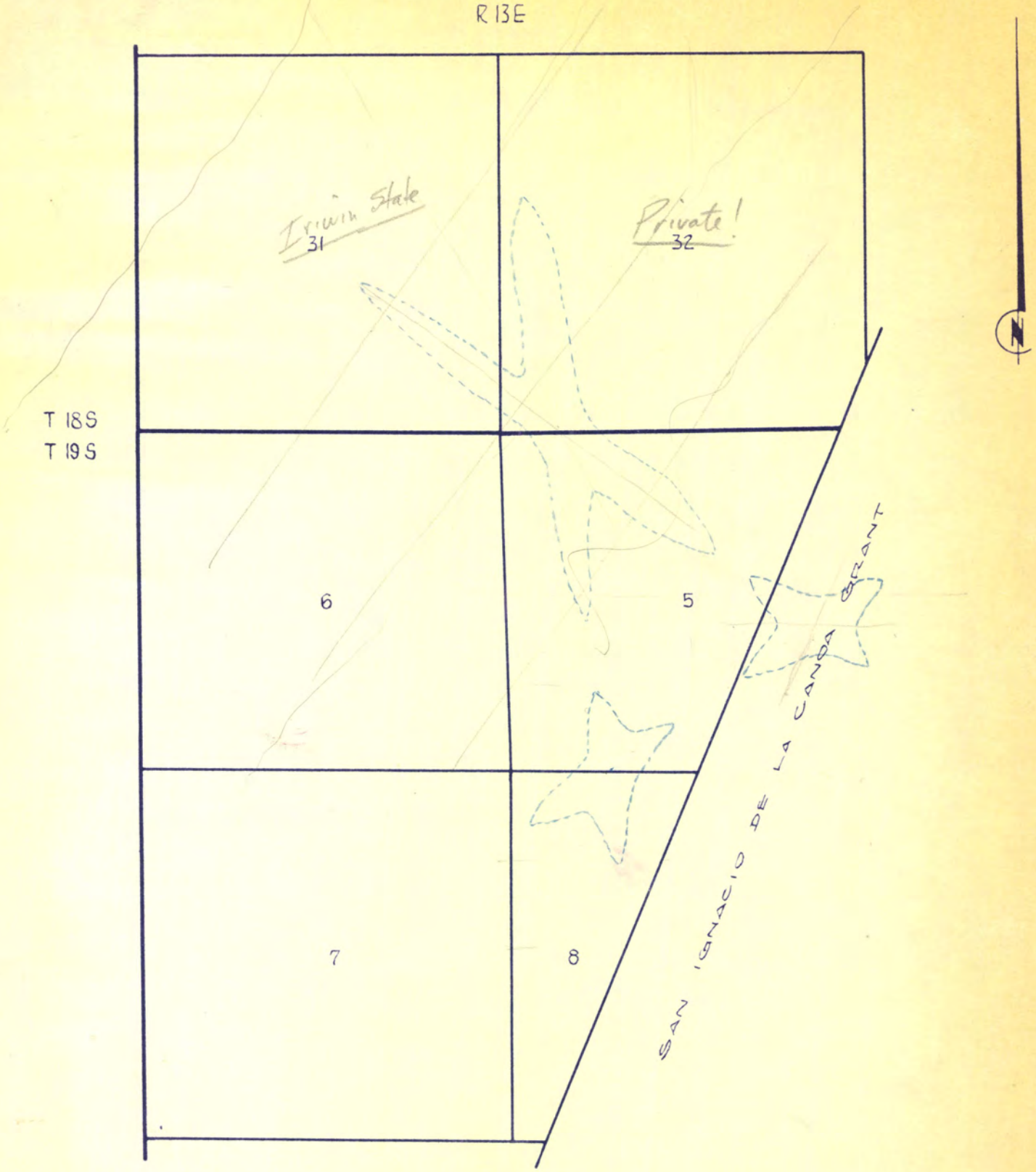
Nº 5 ⟶ Number, location & Direction of Traverse

γ Gamma symbol

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

MAGNETIC SURVEY
ESPERANZA WASH PROJECT
FOR
THOMAS W. MITCHAM

SCALE: 1" = 1000	CONTOUR INTERVAL: 100 γ	REVISIONS
	DATA BY: J.W.M.	5-61
DATE: 2-61	SHEET 1 OF 1	
DRAWN BY: E.G.H.	DRAWING NO.:	FILE:

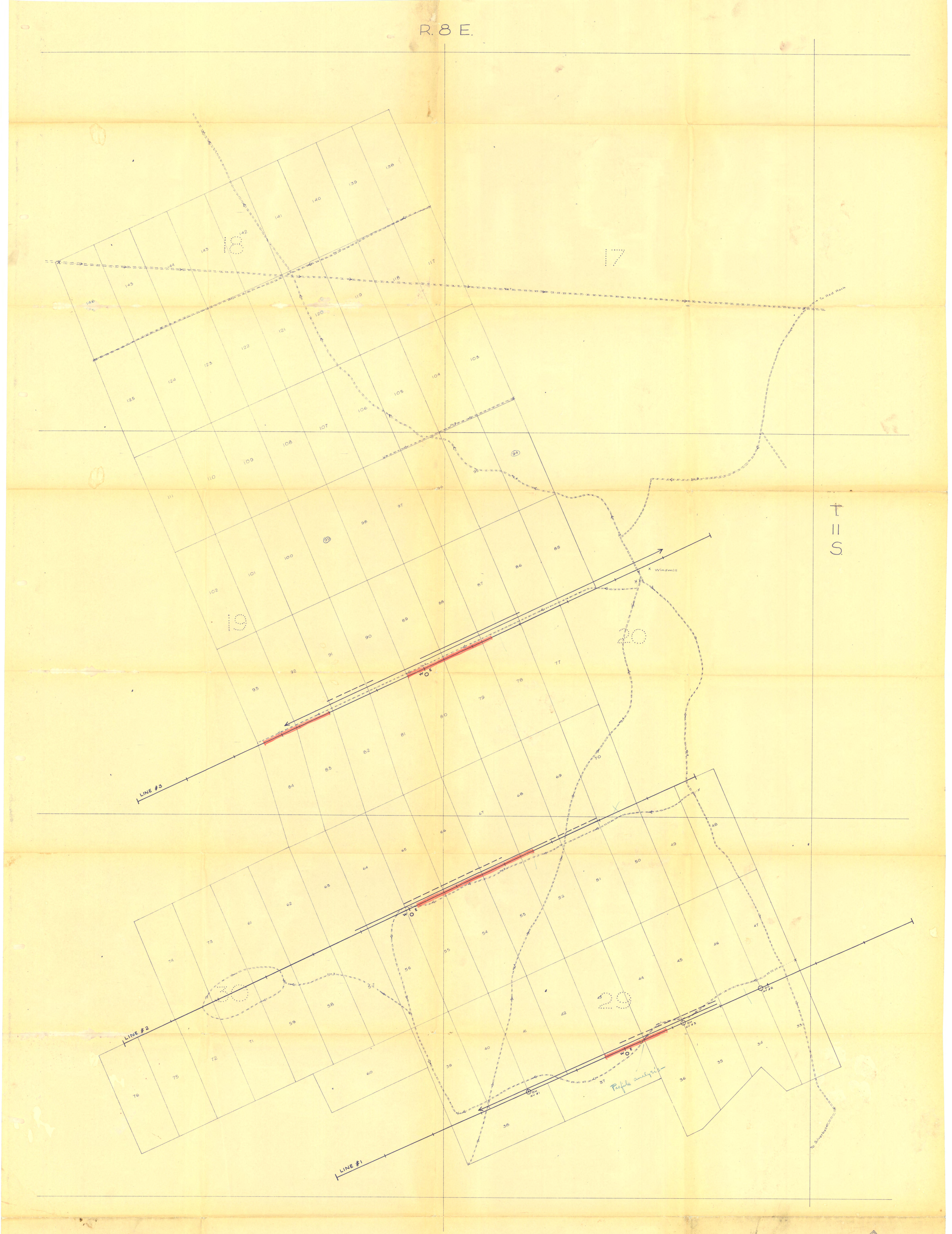


Confidential

ESPERANZA WASH AREA
PIMA DISTRICT
PIMA COUNTY, ARIZONA

0 2000 4000
FEET

TWM 1-5-61 REVISED:



Trail road

No. 5 Number, location & Direction of Traverse by mobile magnetometer

Drill hole AV #2

END OF LINE NO ANOMALY

WEAK OR QUESTIONABLE

MODERATE ANOMALY

MODERATE TO STRONG ANOMALY

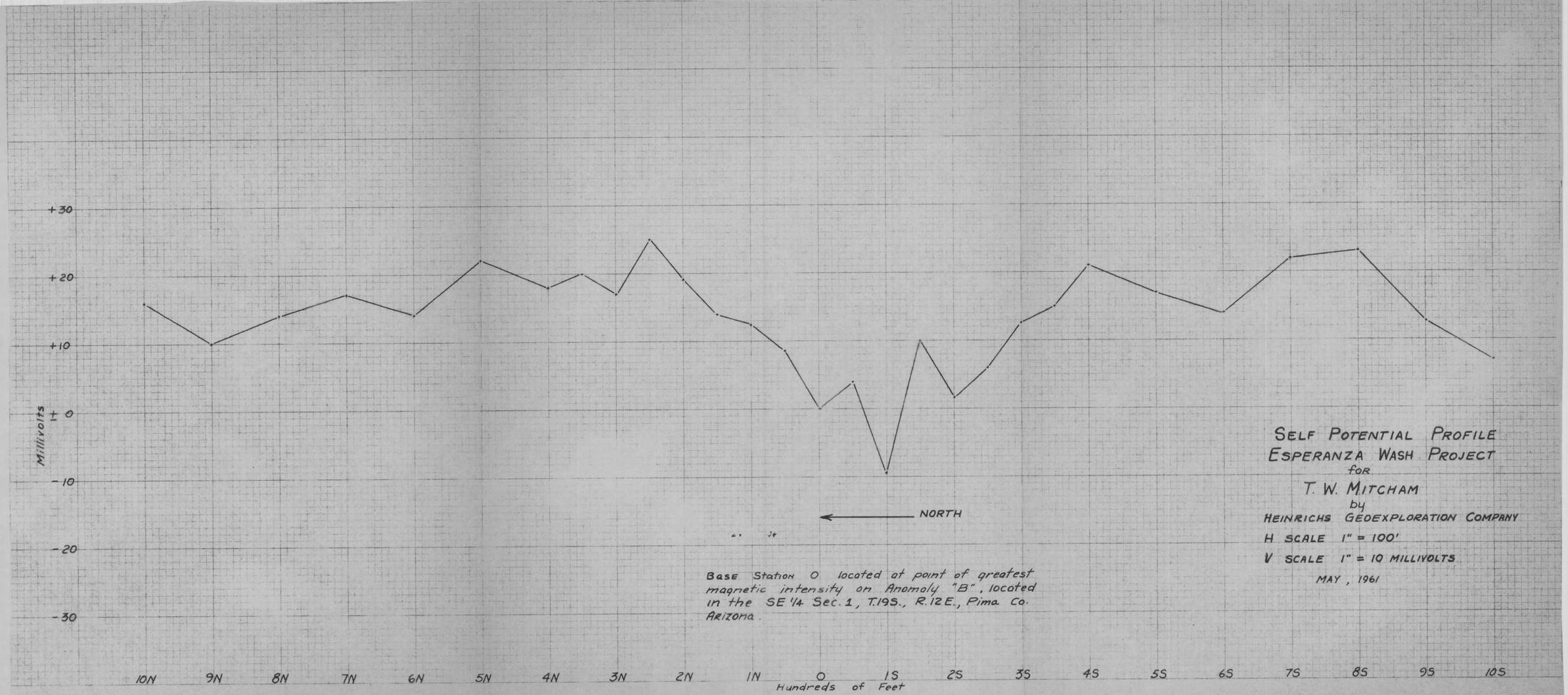
STRONG ANOMALY

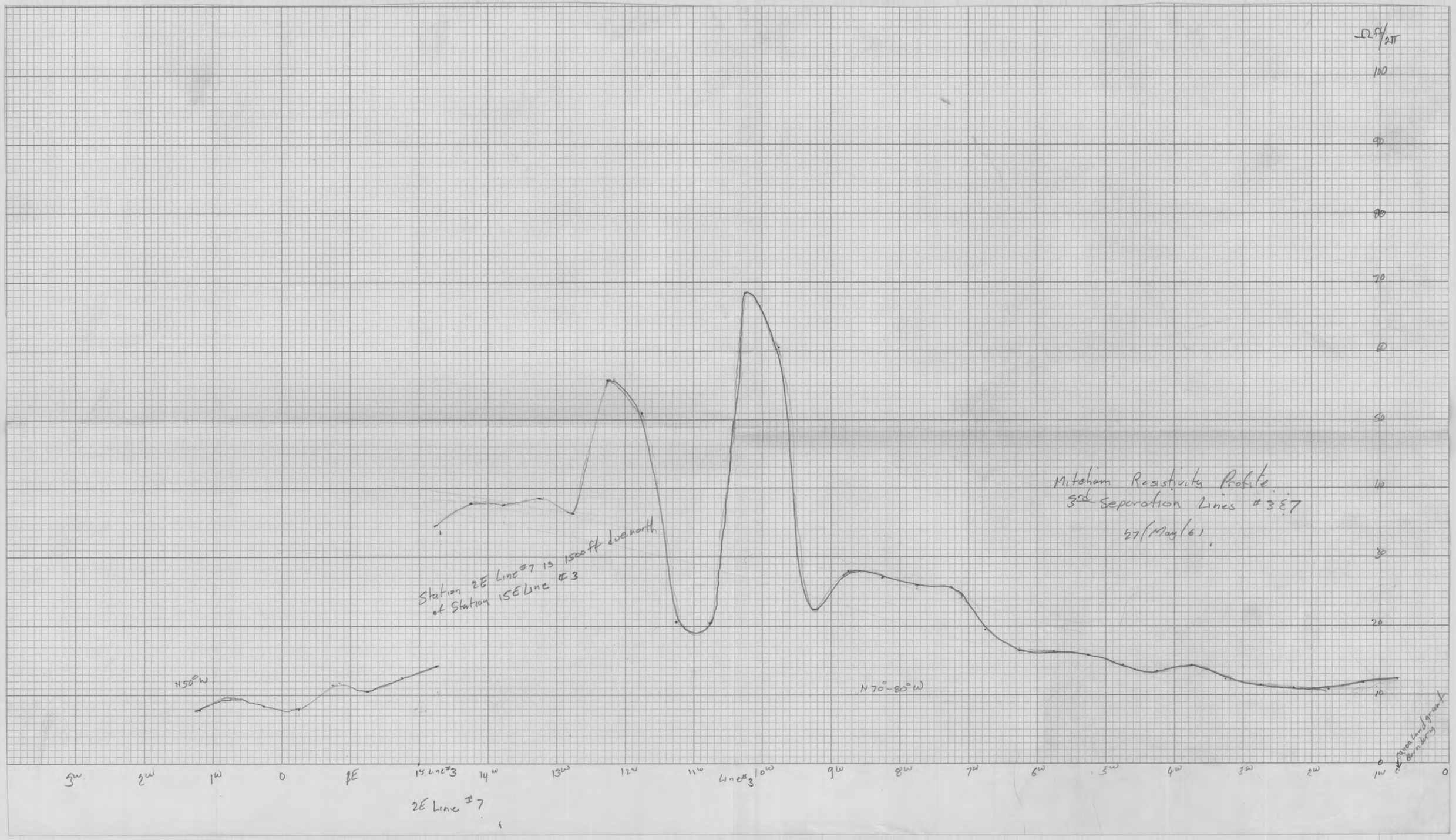
HEINRICHS GEOEXPLORATION COMPANY
P.O. Box 5671 Tucson, Arizona

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

TREND CLAIM GROUP
PIMA COUNTY, ARIZONA

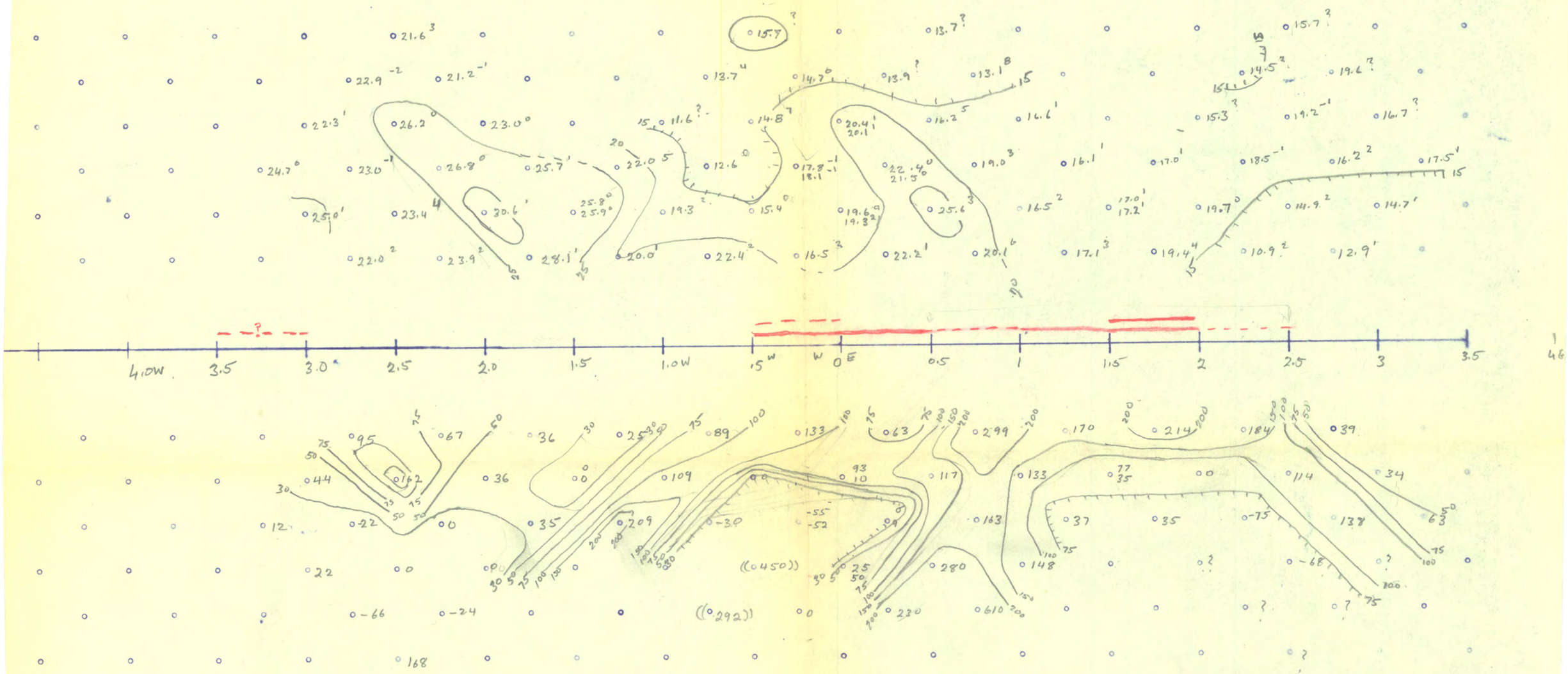
SCALE: 1" = 400'	CONTOUR INTERVAL:	REVISIONS
	DATA BY: J. W. M. & F. A. S.	
DATE: JUNE 1961	SHEET 2 OF 2	
DRAWN BY: I. B	DRAWING NO.:	FILE:


+30
+20
+10
± 0
-10
-20
-30
Millivolts
10N
9N
8N
7N
6N
5N
4N
3N
2N
1N
0
1S
2S
3S
4S
5S
6S
7S
8S
9S
10S
Hundreds of Feet
NORTH
Base Station 0 located at point of greatest magnetic intensity on Anomoly "B", located in the SE 1/4 Sec. 1, T.19S., R.12E., Pima Co. Arizona.
SELF POTENTIAL PROFILE
ESPERANZA WASH PROJECT
for
T. W. MITCHAM
by
HEINRICHS GEOEXPLORATION COMPANY
H SCALE 1" = 100'
V SCALE 1" = 10 MILLIVOLTS
MAY, 1961


Mitcham Resistivity Profile
3rd Separation Lines #3 & 7
27/May/61
Station 2E Line #7 is 1500 ft due north of Station 15E Line #3
N50°W
N70°-80°W
5W
2W
1W
0
2E
15 Line #3
14W
13W
12W
11W
Line #3 10W
9W
8W
7W
6W
5W
4W
3W
2W
1W
0
2E Line #7
100
90
80
70
60
50
40
30
20
10
0

HEINRICHS GEOEXPLORATION COMPANY

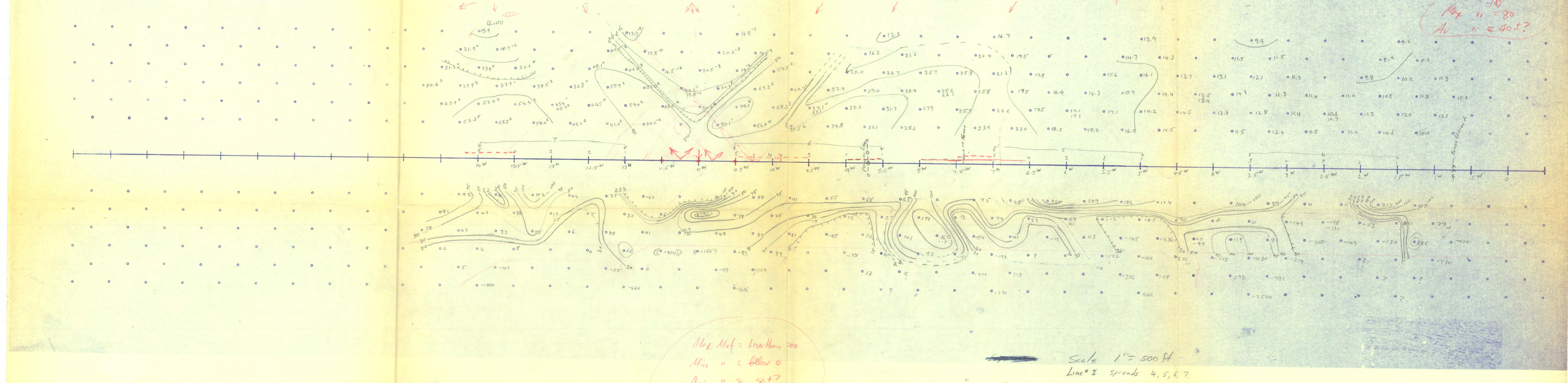
INDUCED POLARIZATION DATA SHEET

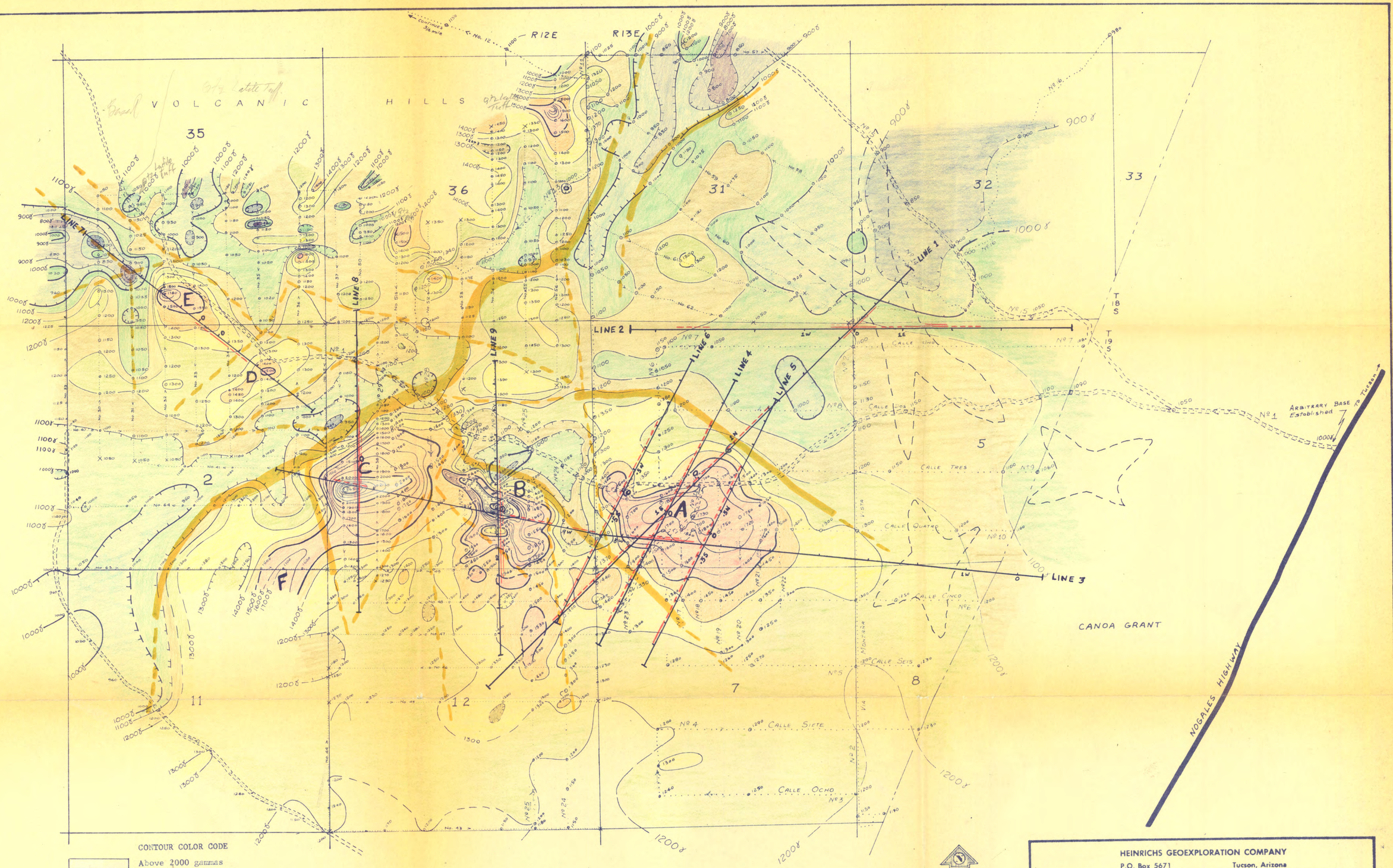


Esperanza

spreads 2&3

Line # 2 Scale: 1" = 500 ft


Max " = 80
Av " = 40±?
Max Mcf = less than 200
Min " = below 0
Av " = 50±?
Scale 1" = 500 ft
Line # 3 spreads 4, 5, 6, 7.



CONTOUR COLOR CODE

- Above 2000 gammas
- 1500-2000 "
- 1400-1500 "
- 1300-1400 "
- 1200-1300 "
- 1100-1200 "
- 1000-1100 "
- 900- 1000 "
- 800- 900 "
- Below 800 "

INFORMATION

Data obtained by Continuous Recording Total Intensity Mobile Magnetometer

Trail road

Nº 5 Number, location & Direction of Traverse

γ Gamma symbol

Magnetic indications of possible faulting

Stronger —
Medium —
Weaker —

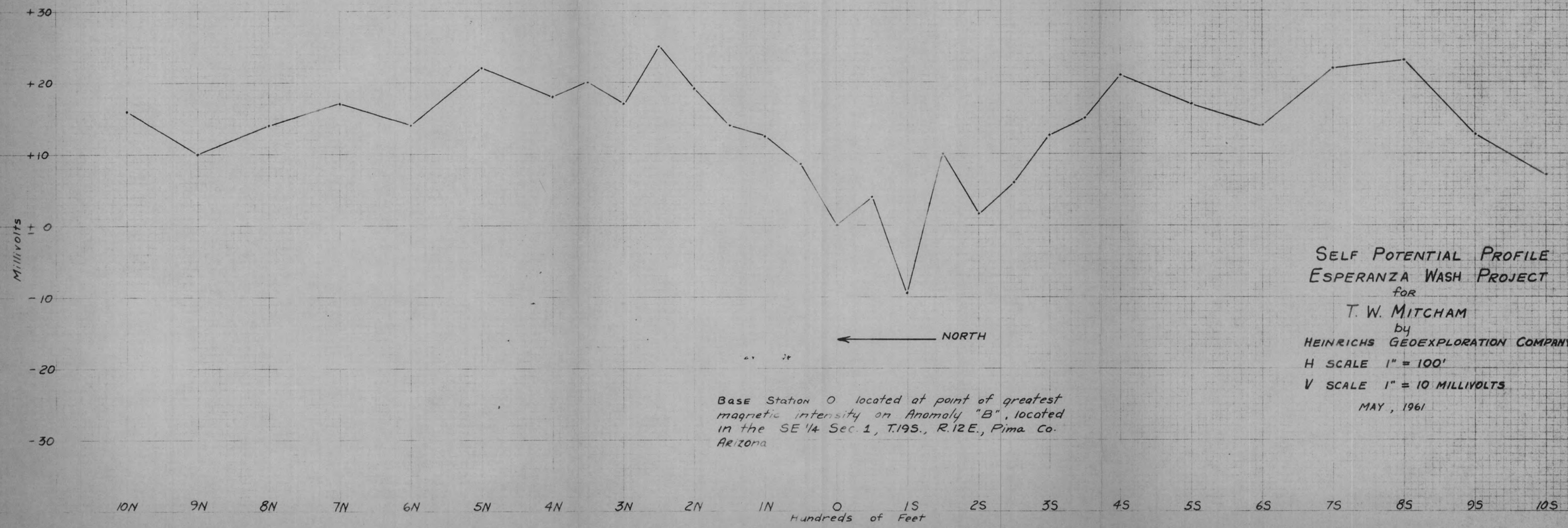
Induced polarization lines and anomaly symbolism.

- Weak or questionable
- Moderate
- Moderate to strong
- Strong

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

MAGNETIC SURVEY
ESPERANZA WASH PROJECT
FOR
THOMAS W. MITCHAM

SCALE: 1" = 1000	CONTOUR INTERVAL: 100 γ	REVISIONS
	DATA BY: J.W.M.	5-61
DATE: 2-61	SHEET 1 OF 1	
DRAWN BY: E.G.H.	DRAWING NO.:	FILE:



Base Station 0 located at point of greatest magnetic intensity on Anomaly "B", located in the SE 1/4 Sec. 1, T.19S., R.12E., Pima Co. Arizona

SELF POTENTIAL PROFILE
ESPERANZA WASH PROJECT
for
T. W. MITCHAM
by
HEINRICHS GEOEXPLORATION COMPANY

H SCALE 1" = 100'

V SCALE 1" = 10 MILLIVOLTS

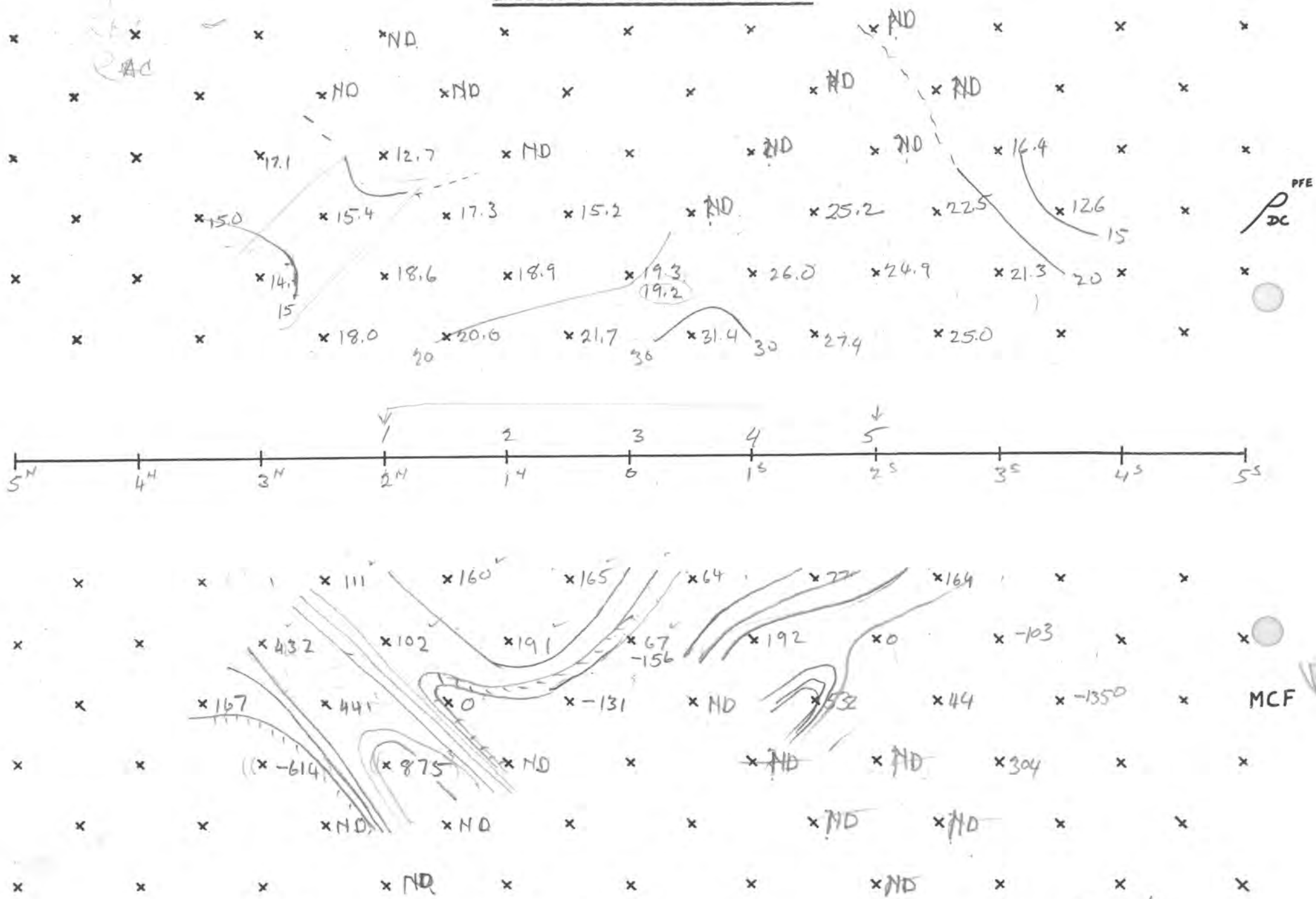
MAY, 1961

INDUCED POLARIZATION SENDER NOTES

Project: Esperanza Wash Line: N GRAFF Date: 16 FEB 61

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	CAL	1-2N	→	2-3N	—	→	3-4N	—	—	→	4-5N	—
Time		1334	1336	1347	1349	1351	1413	1414	1416	1420	1441	1444
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1410	1400	1410	1390	1380	1400	1390	1380	1375	1400	1380
Send	3-4	4-5	1-2	2-3	3-4	4-5			2-3	2-3	2-3	2-3
Receive	—	→	5-6N	—	—	→			CAL	CAL	CAL	CAL
Time	1446	—	1515	1517					1303	1304	1542	1544
Range	1.5	1.5	1.5	1.5	1.5	1.5			.5	.75	.5	.75
Current	1375	—	1400	1400					500	700	500	700

INDUCED POLARIZATION WORK SHEET



Area Esperanza Wash Line #1 (N 45°E) Scale 1" = 1000 Date 17/Feb/61

INDUCED POLARIZATION - RECEIVER NOTES PAGE [illegible]

Project: [illegible] Line: [illegible] Int.Cal 51.5 Date: 2-17-[illegible]

Send	2-4	2-3	1-2	3-4	2-3	1-2	4-5	[illegible]	[illegible]	1-2	4-5	3-4
Rec.	Cal	1-25	→	2-35		→	3-45			→	4-55	→
Time		9.51	9.53	10.04	1013	1016	1033	1039	1042		1057	1100
DC-1		5.55 5.52	81 78	6.40 6.50	1.13 1.13	27	4.40 4.30	1.36 1.28	32 [illegible]		1.05 .90	55 45
DC-2		5.28 5.39	88 87	6.80 6.87	1.12 1.12		4.02 4.40	84 98	[illegible]		.87 1.00	23 32
Σ		10.83 10.91	[illegible]	13.20 13.37	2.25 2.25	Low Tellurics	8.47 8.78	2.20 2.26	[illegible]	Low Tellurics	1.92 1.88	78 77
DC-3		5.50 5.45	81 80	6.60 6.68	1.05 1.09		4.41 4.68	1.28 1.20	[illegible] 53		.91 .83	54 60
Dc-4		5.40 5.39	83 87	6.64 6.60	1.12 1.25		4.65 4.09	.92 .87	34 36		.90 1.02	25 18
Σ		10.9[illegible] 10.89	[illegible]	[illegible] [illegible]8	2.17 2.34		[illegible] 8.76	2.20 2.07	[illegible]		1.81 1.89	79 78
C-AV		10.87	1.66	13.27	2.25	—	8.73	2.18	.87	—	1.87	.78
C-1		5.40	.87	6.65	1.10	.23	4.30	1.12	.40		.98	.40
AC-2		5.40	.87	6.65	1.10	.23	4.30	1.12	.40		.98	.40
Σ		10.80	1.74	13.30	2.20	.46	8.60	2.24	.80	-	1.96	.80
S. P.		+6.0	+6.0	+3.4	+3.4	+3.4	-2.6	-2.6	-2.6		+1.9	+1.9
AC-N		.02	.02	.05	.05	.05	.10	.10	.10		.07	.07

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: [illegible] Line: 1-5 Int.Cal. 51.5 Date: [illegible]

Send	2-3	1-2	4-3	3-4	2-3	1-2			3-4	3-4	3-4	3-4
Rec.	A-55	→	565	→					Cal	Cal	Cal	Cal
Time			1125	1128					9.40	9.41	1200	1201
DC-1			35 25	26 32 12					26.4	36.0	27.0	36.5
DC-2			10 15	10					26.4	36.0	27.0	36.5
Σ				40 42					52.8	72.0	54.0	73.0
DC-3			28 15	16 10					26.4	36.0	27.0	36.5
DC-4			20 28	22 30					26.4	36.0	27.0	36.5
Σ			46 43	37 40					52.8	72.0	54.0	73.0
DC-AV			.44	.40					52.8	72.0	54.0	73.0
AC-1			28	.21					25.8	32.0	25.9	37.2
AC-2			28	.21					25.8	32.0	25.9	37.2
Σ			.56	.42					51.6	74.0	51.8	74.4
S. P.												
AC-N	.07		.08	.08								

INDUCED POLARIZATION SENDER NOTES

Project: Esperanza Wash Line: 1S GRAFF Date: 17 FEB 01

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	CAL	1-2S	→	2-3S	→		3-4S	→		→	4-5S	→
Time		0951	0953	1005	1013	1016	1034	1039	1042	1045	1057	1100
Range		1.0	1.0	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Current		1000	1000	1400	1000	1000	1010	1010	1000	1000	1010	1000
Send	2-3	1-2	4-5	3-4	2-3	1-2			3-4	3-4	3-4	3-4
Receive	→	→	5-6S	→	→	→			CAL	CAL	CAL	CAL
Time	1102	—	1125	1128	1130	—			0940	0941	1200	1201
Range	1.0	—	1.0	1.5	1.0	—			.5	.75	.5	.75
Current	1000	—	1010	1410	1000	—			500	695	500	695

[illegible] = 5,

$$\left.\begin{array}{l} 1-2 - 500\ \Omega \\ \quad 4\ 500\ \Omega \\ \quad 4\ 500\ \Omega \\ \quad - 600\ \Omega \end{array}\right\}$$

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Esperanza Wash Line #1 N Int.Cal. 52.0 Date: 16/Feb/61

Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		1-2N	→	2-3N		→	3-4N			→	4-5N	→
Time		1334	1336	1397	1349	1351	1413	1414	1416		1494	1494
DC-1		5.30 5.30	1.15 1.14	4.85 4.85	1.10 1.10	.35 .32	4.41 4.42	.92 .92	.41 .40		.72 .71	.26 .22
DC-2		5.25 5.22	1.19 1.19	4.87 4.88	1.15 1.14	.39 .38	4.27 4.27	1.30 1.30	.41 .42		.97 .98	.48 .50
Σ		10.55 10.52	2.34 2.33	9.72 9.73	2.25 2.24	.74 .73	8.68 8.69	2.22 2.22	.82 .82		1.69 1.69	.76 .72
DC- 3		5.29 5.26	1.13 1.13	4.89 4.81	1.09 1.08	.33 .34	4.39 4.42	.92 .95	.40 .41		.68 .67	.22 .21
DC-4		5.22 5.20	1.18 1.18	4.88 4.88	1.16 1.17	.39 .37	4.29 4.26	1.30 1.28	.42 .40		.99 1.02	.50 .50
Σ		10.51 10.46	2.31 2.31	9.73 9.70	2.25 2.25	.72 .71	8.68 8.68	2.22 2.23	.82 .81		1.69 1.69	.72 .71
DC-Av		10.52	2.32	9.72	2.25	.72	8.68	2.22	.82		1.69	.73
AC-1		5.20	1.17	4.80	1.11	.38	4.35	1.09	.42		.83	.38
AC- 2		5.20	1.17	4.80	1.11	.38	4.35	1.09	.42		.83	.38
Σ		10.40	2.34	9.60	2.22	.76	8.70	2.18	.84		1.66	.76
S.P.		-5.9	-5.9	-3.6	-3.6	-3.6	-3.7	-3.7	-3.7		-7.4	
AC-N		.05	.05	0	0	0	.05	.05	.05		.10	.10

4N Locat[illegible] 200' N [illegible]
Calle Uno

#1 El[illegible] on North [illegible]
of [illegible]

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE 1

Project: Esperanza wash Line: 1N Int.Cal. _____ Date: 16/Feb/61

Send	3-4	4-5	1-2	2-3	3-4	4-5			2-3	2-3	2-3	2-3
Rec.	4-4N	→	5-6N	→					Cal	Cal	Cal	Cal
Time	1440		1515	1517					1303	1304	1442	1444
DC-1	.13 .16		.30 .60	.21 .23					26.8	36.2	26.7	36.0
DC-2	.15 .12		.21 .10	.19 .17					26.8	36.2	26.7	36.0
Σ	.28		.71 .71	.40 .40					536	724	534	720
DC-3	.11 .09		.23 .18	.24 .22					26.8	36.2	26.7	36.0
DC-4	.22 .24		.51 .29	.17 .19					26.8	36.2	26.7	36.0
Σ			.74	.41 .41					536	724	534	720
DC-AV	.30		.72	.41					536	724	534	720
AC-1	.20		.39	.28					25.8	37.0	25.9	37.0
AC-2	.20		.39	.28					25.8	37.0	25.9	37.0
Σ	.40		.78	.56					516	740	518	740
S. P.	-74											
AC-N	.15		.15	.15								

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Esperanza Line 2W Field date 3-2-61 Data page_____ Comp. date 3-3-61. Comp by C.E.L

(A) Send	2-3	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	CAL	1-.5E	→	.5-0E	→	→	0-.5W	→	→	→	.5-1W	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1486	1037	1494	1474	1029	1486	1459	1441	1028	[illegible]	1418
(E) Vdc (avg)		16.98	2.94	20.04	4.05	1.10	22.0	6.22	1.83	.57	4.26	[illegible]
(F) DCcal		1.000										
(G) Kn x 10^{-3}		1.5	6	1.5	6	1.5	1.5	6	1.5	30	6	1.5
(H) ρ dc=ExFxGx10^3/D		17.1	17.0	20.1	16.5	16.1	22.2	25.6	19.0	16.6	19.3	21.5
(I) Vac Σ		17.50	3.08	20.08	4.20	1.16	22.0	6.40	1.88	.60	4.96	2.20
(J) AC noise x 2		.04	.04	.06	.06	.06	.00	.00	.00	.00	.00	.00
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		17.50	3.08	20.08	4.20	1.16	22.0	6.40	1.88	.60	4.96	2.20
(L) AC-DC cal.		1.061	1.									
(M) ρ dc/ρac=ExL/K		1.029	1.013	1.060	1.022	1.006	1.014	1.030	1.031	1.008	1.018	1.000
(N) PFE=(M-1)(10^2)		3	1	6	2	1	1	3	3	1	2	0
(O) MCF=(M-1)(10^5)/H		170	77	299	133	37	63	117	163	48	93	0

Project Esperanza Line 2W Field date 3-2-61 Data page_____ Comp. date 3-3-61 Comp by C.E.L

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	2-3					
(B) Receive	→	→	1-.5W			→	CAL					
(C) n separation	4	5	3	4	5	6						
(D) I	1429	1020	1465	1445	1425	1020						
(E) Vdc (avg)	.77	.255	1.77	.97	.38	.14						
(F) DCcal	1.000											
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	64						
(H) ρ dc=ExFxGx10^3/D	16.2	13.1	18.1	20.1	13.9	13.7						
(I) Vac Σ	.78	.26	1.90	1.02	.40	.18						
(J) AC noise x 2	.02	.02	.04	.04	.08	.04						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.78	.26	1.90	1.08	.30	.17						
(L) AC-DC cal.	1.061											
(M) ρdc/ρac =ExL/K	1.045	1.080	.990	1.010	1.032	2						
(N) PFE=(M-1)(10^2)	5	8	-1	1								
(O) MCF=(M-1)(10^5)/H	280	610	-55	50	230							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Esperanza Line 2E Field date 3-2-61 Data page _____ Comp. date 3-3-61 Comp by C.S.L

(A) Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	CAL	2-2.5E	→	2.5-3E	→	→	3-3.5E	→	→	→	1.5-4E	→
(C) n separation		1	2	1	2	3	1	2	3	4	1	2
(D) I		1490	1480	1480	1475	1460	1035	1470	1460	1453	1030	1465
(E) Vdc (avg)		19.24	4.23	10.73	4.83	1.65	8.90	3.66	1.80	.74	2.52	1.58
(F) DCcal		1.000	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		19.37	17.15	10.88	19.65	16.95	12.90	14.94	18.49	15.28	14.68	16.18
(I) Vac Σ		19.6[illegible]	4.46	[illegible]	5.14	1.74	9.40	3.82	1.94	.82	[illegible]	[illegible]
(J) AC noise x 2		.04	.04	.10	.10	.10	.04	.04	.04	.04	.02	.02
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		19.60	4.46	[illegible]	5.14	1.74	9.40	3.82	1.94	.82	2.66	1.64
(L) AC-DC cal.		1.061	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K		1.042	1.006	1.020	1.000	1.006	1.005	1.017	.986	.957	1.005	1.022
(N) PFE=(M-1)(10^2)		4.2	.6	2.0	0	0.6	0.5	1.7	-1		0.5	2.2
(O) MCF=(M-1)(10^5)/H		214	35	184	0	35	39	114	-75	?	34	138

Project Esperanza Line 2E Field date 3-2-61 Data page _____ Comp. date 3-3-61 Comp by C.S.L

(A) Send	3-4	4-5	[illegible]	[illegible]	3-4	4-5		2-3	2-3	2-3	2-3	2-3	2-3
(B) Receive	→	→	4-4.5E			→	CAL	CAL	→	→	→	→	→
(C) n separation	4	5		4		6							
(D) I	1455	1449	1029	1458	1448	1446		283	510	708	283	508	700
(E) Vdc (avg)	.93	.40	1.20	.81	.54	.23		290	520	720	282	518	700
(F) DCcal	1.000							.983	.982	.984	1.002	.983	1.000
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84							
(H) ρ dc=ExFxGx10^3/D	19.18	14.49	17.49	16.67	19.58	15.68							
(I) Vac Σ	1.00	.44	1.26	.90	.58	.26		304	540	764	300	532	746
(J) AC noise x 2	.02	.02	.02	.02	.02	.02							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.00	.44	1.26	.90	.58	.26							
(L) AC-DC cal.	1.061	→	1.062	→	→	→		1.048	1.038	1.061	1.064	1.027	1.066
(M) ρdc/ρac =ExL/K	.987	.965	1.011	.956	.989	.939							
(N) PFE=(M-1)(10^2)	-1	—	1.1	—	—	—							
(O) MCF=(M-1)(10^5)/H	-68		63										

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Esperanza Line Anomaly C-N Field date 17/May/81 Data page_____ Comp. date 18/May . Comp by [illegible]

(A) Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	Cal	.5-1N	→	1-1.5N	→	→	1.5-2N	→	→	→	2-2.5N	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1450	1440	1440	1420	1410	1420	1400	1390	1380	1340	1370
(E) Vdc (avg)		73.0	12.25	61.7	19.1	4.17	55.1	11.99	5.07	1.39	10.36	3.24
(F) DCcal												
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		75.6	51.0	64.4	80.7	44.4	58.2	51.4	54.7	30.2	44.7	35.5
(I) Vac Σ		68.0	11.2	55.0	17.0	3.80	49.8	11.0	4.80	1.30	9.80	3.10
(J) AC noise x 2		.50	.50	.40	.40	.40	.20	.20	.20	.20	.20	.20
(K) Vac(corr) = $\sqrt{I^2 - J^2}$										1.29		
(L) AC-DC cal.	1.000	1										
(M) ρ dc/ρac=ExL/K		1.071	1.093	1.121	1.122	1.099	1.105	1.090	1.056	1.078	1.056	1.044
(N) PFE=(M-1)(10^2)		7	9	12	12	10	11	9	6	8	6	4
(O) MCF=(M-1)(10^5)/H		94	182	188	152	223	181	175	102	258	125	124

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
(B) Receive	2N-2.5N	→	2.5-3N	→	→	→	Cal	→	→	→	→	→
(C) n separation	4	5	3	4	5	6						
(D) I	1360	1360	1400	1370	1370	—	270	490	690	270	480	675
(E) Vdc (avg)	1.77	.60	3.08	1.21	.78	?	291.5	528.5	731	288.5	518.5	720
(F) DCcal							.928	.928	.944	.935	.928	.938
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	39.1	23.1	33.0	26.5	29.8							
(I) Vac Σ	1.70	.60	2.90	1.20	.79							
(J) AC noise x 2	.20	.20	.20	.20	.20							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	169	.575		119	.77							
(L) AC-DC cal.							.990	.985	.998	.995	.971	1.011
(M) ρdc/ρac =ExL/K	1.041	1.042	1.061	1.018	1.012		288	520	730	287	503	729
(N) PFE=(M-1)(10^2)	4	4	6	2	1							
(O) MCF=(M-1)(10^5)/H	105	181	185	68	40							

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Esperanza Line Anomaly C-South Field date 17/May Data page_____ Comp. date 19/May. Comp by [illegible]

(A) Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	Cal	.5-1.0^3	→	1.0-1.5^3	→	→	1.5-2.0^3	→	→	→	2.0-2.5^3	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1460	1440	1440	1420	1400	1430	1400	1390	1400	1400	1380
(E) Vdc (avg)		49.2	12.10	46.2	8.6	3.05	55.3	13.23	3.35	1.35	17.89	6.33
(F) DCcal	1.000											
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		50.5	50.4	48.2	36.3	32.7	58.0	56.8	36.2	29.0	76.7	68.8
(I) Vac Σ		44.9	11.10	44.5	8.3	2.80	52.0	12.8	3.26	1.34	17.2	6.04
(J) AC noise x 2		.10	.10	.10	.10	.10	.04	.04	.04	.04	.50	.50
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000											
(M) ρ dc/ρac=ExL/K		1.092	1.091	1.038	1.035	1.089	1.061	1.034	1.028	1.009	1.039	1.048
(N) PFE=(M-1)(10^2)		9	9	4	4	9	6	3	3	1	4	5
(O) MCF=(M-1)(10^5)/H		182	180	79	99	272	105	60	77	31	51	70

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	→	→	→	→	→
(B) Receive	2.0-2.5^3	→	2.5-3.0^3	→	→	—	Cal					
(C) n separation	4	5	3	4	5	6						
(D) I	1375	1375	1400	1380	1370	—	290	500	705	290	495	680
(E) Vdc (avg)	1.88	.89	5.78	2.52	.82		298	537	750	303	538	740
(F) DCcal							.974	.932	.940	.958	.929	.920
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	41.0	34.0	62.0	54.8	31.4							
(I) Vac Σ	1.84	.84	5.50	2.38	.80		292	518	756	298	518	740
(J) AC noise x 2	.10	.10	.10	.10	.10							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.							.981	.965	.992	.984	.971	1.000
(M) ρdc/ρac =ExL/K	1.021	1.059	1.050	1.059	1.022							
(N) PFE=(M-1)(10^2)	2	6	5	6	2							
(O) MCF=(M-1)(10^5)/H	51	173	81	107	70							

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: ESPERANZA Line: ANOMALY C S Int.Cal Date: 17MAY

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		.5-1.5	→	1-1.55	→	→	1.5-2.5	→	→	→	2-2.55	→
Time		1124	1128	1145	1150	1155	1250	1254	1258	1300	1312	1317
DC-1		25.0 25.0	5.90 5.40	2 4.0 2 4.	4.4 4.5	1.70 1.66	28.0 27.8	6.6 6.5	1.70 1.65	.66 .68	9.25 9.40	3.2 3.18
DC-2		24.5 24.5	6.20 6.70	2 2. 2 2.	4.1 4.3	1.15 1.40	27.8 27.6	6.65 6.75	1.70 1.60	.66 .69	8.65 8.60	3.2 3.16
Σ		49.5 49.5	12.10 12.10	47.0 46.0	8.5 8.8	2.85 3.06	55.8 55.4	13.25 13.25	3.40 3.34	1.32 1.37	17.90 18.0	6.40 6.34
DC-3		252 255	5.10 4.90	2 4. 2 5.	4.3 4.2	1.75 1.70	27.8 27.6	6.5 6.4	1.65 1.75	.70 .73	9.45 9.60	3.21 3.20
Dc-4		23.8 23.3	7.00 7.20	2 2. 2 1.	4.3 4.2	1.40 1.40	27.4 27.2	6.75 6.75	1.65 1.60	.66 .61	8.40 8.20	3.08 3.08
Σ		49.0 48.8	12.10 12.10	46.0 46.0	8.6 8.4	3.15 3.10	55.2 54.8	13.25 13.15	3.30 3.35	1.36 1.34	17.85 17.80	6.29 6.28
DC-AV		49.2	12.10	46.2	8.6	3.05	55.3	13.23	3.35	1.35	17.89	6.33
AC-1		22.4	5.6	2 2.5	4.1	1.40	25.8	6.4	1.63	.67	8.6	3.02
AC-2		22.5	5.5	2 2.	4.2	1.40	26.2	6.4	1.63	.67	8.6	3.02
Σ		44.9	11.10	44.5	8.3	2.80	52.0	12.8	3.26	1.34	17.2	6.04
S. P.		+10.4	+8.5	+4.01	+3.99	+3.77	.000	-1.2	-2.4	-2.8	+12.6	+8.6
C-N			.05			.05				.02		
NOISE		.03	.01	.1	.01	.003	.03	.01	.003	.003	.01	.01

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: ESPERANZA Line: ANAMACY CS. Int.Cal _____ Date: 17MAY

Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4					
Rec.			2.5-3S				CAL					
Time	1320	1327	1340	1345	1347		1118	1119	1120	1408	1409	1411
DC-1	.95 .89	.50 .50	3.0 3.15	1.20 1.18	.46 .45		14.9	26.9	37.5	15.2	26.9	37.0
DC-2	.97 .92	.46 .32	2.80 2.68	1.34 1.40	.38 .36		14.9	26.8	37.5	15.1	26.9	37.0
Σ	1.92 1.81	.96 .82	5.80 5.83	2.54 2.58	.84 .81		29.8	53.7	75.0	30.3	53.8	74.0
DC-3	.93 .95	.58 .50	3.21 3.35	1.30 1.33	.50 .51							
Dc-4	.97 .95	.41 .30	2.52 2.40	1.16 1.18	.30 .32							
Σ	1.90 1.90	.99 .80	5.73 5.75	2.46 2.51	.80 .83							
DC-AV	1.88	.89	5.78	2.52	.82							
AC-1	.92	.42	2.75	1.19	.40		14.6	25.9	37.8	14.9	25.9	37.0
AC-2	.92	.42	2.75	1.19	.40		14.6	25.9	37.8	14.9	25.9	37.0
Σ	1.84	.84	5.50	2.38	.80		29.2	51.8	75.6	29.8	51.8	74.0
S. P.	+7.7	+7.4	+.5	-2.0	-2.9							
AC-N		.05			.05							
RANGE	.003	.003	.01	.003	.003		.03	.03	.10	.03	.03	.10

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: ESPERANZA Line: ANDMC -N Int.Cal Date: 17MAY

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	.5-1N	→	1-1.5N	→	→	1.5-2N	→	→	→	2-2.5N	→
Time		1536	1546	1549	1552	1601	1604	1608	1611	1619	1622
DC-1	37.5 37.5	6.2 6.2	31.0 30.5	10.0 10.0	2.20 2.20	27.3 27.0	6.1 6.1	2.50 2.45	.74 .75	5.15 5.05	1.65 1.63
DC-2	36.0 35.5	6.0 6.0	31.9 31.5	9.2 9.2	2.0 1.95	28.1 28.2	5.9 5.9	2.60 2.60	.65 .65	5.25 5.30	1.59 1.60
Σ	73.5 73.0	12.2 12.2	62.9 62.0	19.2 19.2	4.20 4.15	55.4 55.2	12.0 12.0	5.10 5.05	1.39 1.40	10.40 10.35	3.24 3.23
DC-3	36.0 35.5	6.5 6.5	30.2 30.1	10.0 10.0	1.95 1.90	26.8 26.6	5.95 6.00	2.45 2.40	.76 .78	5.00 4.98	1.62 1.61
Dc-4	37.0 37.0	5.8 5.8	31.5 31.0	9.1 9.0	2.25 2.25	28.2 28.2	6.05 5.95	2.61 2.65	.62 .60	5.35 5.38	1.62 1.63
Σ	73.0 72.5	12.3 12.3	61.7 61.1	19.1 19.0	4.20 4.15	55.0 54.8	12.00 11.95	5.06 5.05	1.38 1.38	10.35 10.36	3.24 3.24
DC-AV	73.0	12.25	61.7	19.1	4.17	55.1	11.99	5.07	1.39	10.36	3.24
AC-1	34.0	5.6	27.5	8.5	1.90	24.9	5.5	2.40	.65	4.90	1.55
AC-2	34.0	5.6	27.5	8.5	1.90	24.9	5.5	2.40	.65	4.90	1.55
Σ	68.0	11.2	55.0	17.0	3.80	49.8	11.0	4.80	1.30	9.80	3.10
S. P.	+6.4	+7.4	-4.1	-4.1	-3.1	-7.8	-10.2	-10.6	-10.8	-8.7	-8.7
AC-N	.25	.25	.20	.20	.20	.10	.10	.10	.10	.10	.10
Range	.01	.03				.03					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: ESPERANZA Line: ANONC M Int.Cal _____ Date: 17MAY

Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3					
Rec.			2.5-3N				CAL					
Time	1626	1628	1646	1649	1653		1518	1520	1528	1720	1722	1725
DC-1	.85 .84	.30	1.55 1.53	.62 .63	.35 .36		14.7	26.5	37.0	14.5	26.0	36.0
DC-2	.92 .93	.30	1.54 1.56	.59 .58	.45 .40		14.5	26.5	36.5	14.5	25.9	36.0
Σ	1.77 1.77	.60	3.09 3.09	1.21 1.21	.80 .76		29.2	53.0	73.5	29.0	51.9	72.0
DC-3	.82 .83	.30	1.50 1.48	.64 .64	.38 .38		14.5	26.3	36.2	14.4	26.0	36.0
Dc-4	.93 .94	.30	1.58 1.59	.57 .57	.41 .40		14.6	26.4	36.5	14.3	25.8	36.0
Σ	1.75 1.77	.60	3.08 3.07	1.21 1.21	.79 .78		29.1	52.7	72.7	28.7	51.8	72.0
DC-AV	1.77	.60	3.08	1.21	.78		29.15	52.85	73.1	28.85	51.85	72.0
AC-1	.85	.20	1.45	.60	.39		14.4	26.0	36.5	14.4	25.2	36.5
AC-2	.85	.30	1.45	.60	.40		14.4	26.0	36.5	14.3	25.1	36.4
Σ	1.70	.60	2.90	1.20	.79		28.8	52.0	73.0	28.7	50.3	72.9
S. P.	-9.0	-9.0	+11.8	+12.0								
AC-N	.10	.10	.10	.10	.10							
RANGE							.03	.03	.10	.03	.03	.10

INDUCED POLARIZATION - ~~RECEIVER~~ Sender NOTES PAGE _____

Project Esperanza . Line Anomaly C - S Int.Cal. Date: 17 May

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	.5-1.8 →		1.0-1.5 →			1.5-2.0 →				2.0-2.5 →	
Time	1124	1128	1145	1150	1155	1200	1254	1258	1300	1312	1317
~~DC-1~~ I	1460	1440	1400	1420	1400	1430	1400	1390	1400	1400	1380
DC-2											
Σ											
DC- 3											
DC-4											
Σ											
DC-Av											
AC-1											
AC- 2											
Σ											
S.P.											
AC-N											

INDUCED POLARIZATION - ~~RECEIVER~~ NOTES PAGE _____

Project: _____ Line: Sender Anomaly C-3 Int.Cal _____ Date: _____

Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	—				→
Rec.	2.0-2.5 →		2.5-3.0	→		→	Cal					
Time	1320	1327	1340	1345	1347		1118	1119	1120	1408	1409	1411
~~DC-1~~ I	1375	1375	1400	1380	1370		290	500	705	290	~~495~~	680
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION - ~~RECEIVER~~ SENDER NOTES PAGE _____

Project: Esp. Line: Anomaly 2 - N Int.Cal _____ Date: 17/May

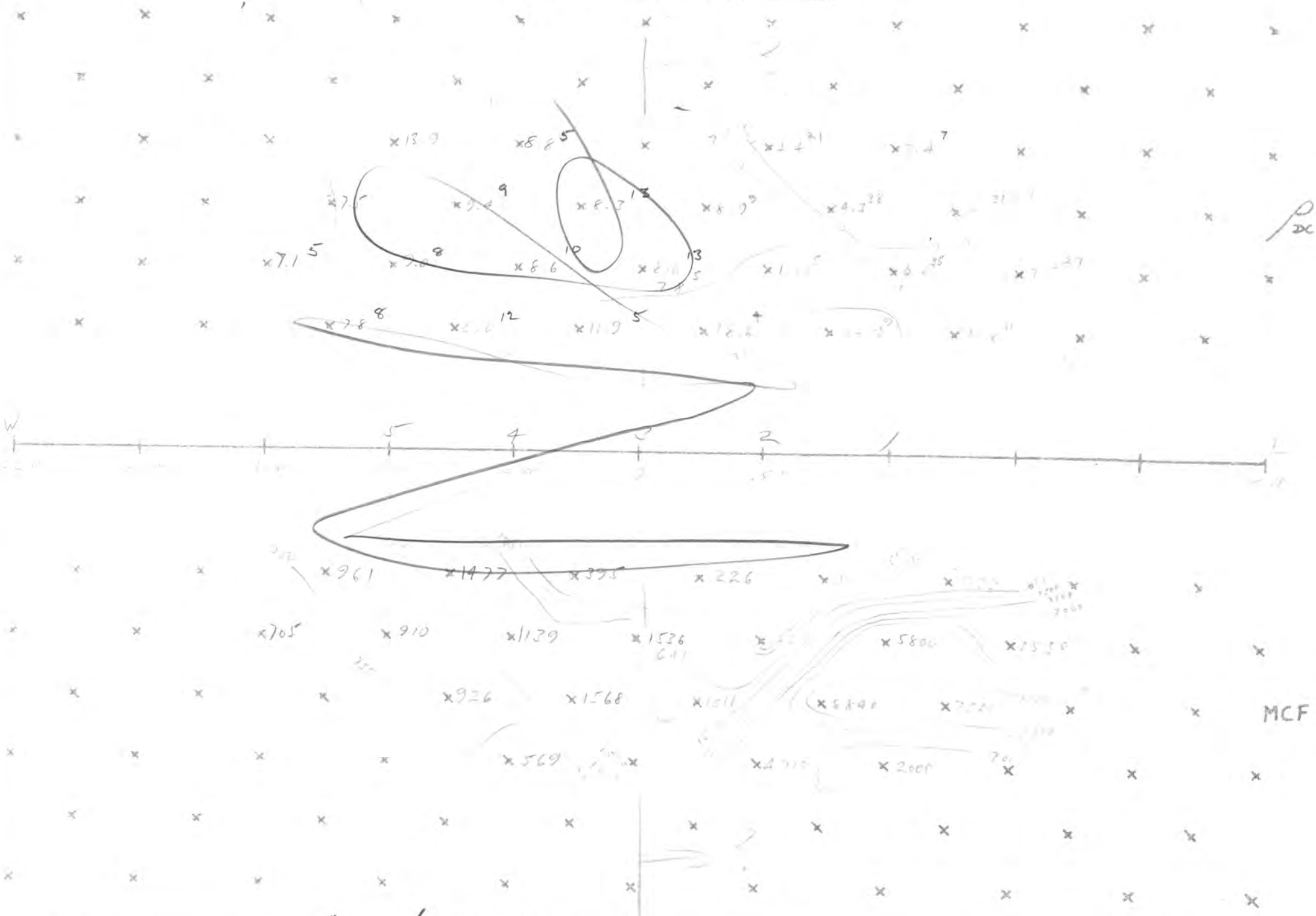
Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		.5-1M	→	1.0-1.5M	→		1.5-2.0M	→		→	2.0-2.5M	→
Time		1533	1536	1546	1549	1552	1601	1604	1608	1611	1619	1622
DC-1 I		1450	1440	1440	1420	1410	1420	1400	1390	1380	1390	1370
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Esp Line: Anomc-N Int. Cal. Date: 17/May

Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	→			
Rec.	20-25"	→	25-3"	→		→	Cal	→				
Time	1626	1628	1646	1649	1653		1518	1520	1528	1720	1722	1723
DC-1 I	1360	1360	1400	1370	1370		270	490	690	270	480	675
DC-2												
Σ												
DC-3												
DC-4												
Σ												
DC-AV.												
AC-1												
AC-2												
Σ												
S.P.												
AC-N												

INDUCED POLARIZATION WORK SHEET



Area Esperanza Anomaly E-~~Wes~~ Scale 1" = 500' Date May 16, 61

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: MITCHUM Line: E Int.Cal Date: 16 MAY

Send	4-5	1-2	2-3	3-4	4-5							
Rec.												
Time												
DC-1	00095 001											
DC-2	0021 0022											
Σ												
DC-3	001 0011											
Dc-4	002											
Σ							CAL	CAL	CAL	CAL	CAL	CAL
DC-AV						D.C.	149	270	370	148	270	365
AC-1						AC	148	259	369	145	259	369
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: Esp. Line: Anomaly E west Int.Cal 525 Date: 15/May

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		.5-1.0 W	.5-1.0 W	1.0-1.5 W	→	→	1.5-2W	→	→	→	2-2.5W	→
Time					1333	1336	1357	1400	1403	1405		
DC-1		5.8 5.8	1.2 1.2	4.0 4.0	1.09 1.10	.42 .46	3.85 3.90	1.10 1.08	.50 .55	.31 .32	.54 .50	.60 .60
DC-2		5.5 5.5	.84 .83	3.6 3.6	0.93 0.91	.35 .33	3.45 3.42	1.03 1.04	.36 .35	.10 .09	1.13 1.20	.10 .09
Σ		11.3 11.3	2.04 2.03	7.6 7.6	2.02 2.01	.73 .79	7.30 7.32	2.13 2.12	.86 .90	.41 .41	1.67 1.70	
DC-3		5.8 5.5	1.2 ? 1.3	4.0 4.0	1.11 1.15	.48 .51	3.90 3.90	1.07 1.05	.58 .56	.31 .31	.48 1.21	.63 [illegible]
Dc-4		5.5 5.8	.81 .85	3.6 3.6	0.91 0.88	.30 .27	3.40 3.40	1.05 1.06	.30 .32	.08 .10	1.20 .45	.08 [illegible]
Σ		11.3 11.3	2.15 ? [illegible]	7.2 7.6	2.02 2.03	.78 .78	7.30 7.30	2.12 2.11	.88 .88	.39 .41	1.65 1.66	
DC-AV		11.3	2.04	7.60	2.02	.78	7.31	2.12	.88	.41	1.68	NG
AC-1		5.4	.90	3.4	0.92	0.35	3.40	.98	.41	.20	.80	.35
AC-2		5.4	.90	3.4	0.92	0.35	3.4	.98	.41	.20	.80	
Σ		10.8	1.80	6.80	1.84	.70	6.80	1.96	.82	.40	1.60	
S. P.		+4.3	+4.3	-1.2	+1.3	+1.2	+7.2	+7.2	+7.2	+7.2		
AC-N		.02	.02	.04	.04	.04	.05	.05	.05	.05		.02

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Esperanza Line NW Int.Cal. Date: 5-

Send	Cal	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	3-4											
Time		1314	1318	1329	1333	1336	1357	1400	1403	1405	1426	143[illegible]
~~DC-1~~ Current		1430	1425	1430	1415	1405	1415	1415	1400	1400	1415	1400
~~DC-2~~ Range Set		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Σ												
DC- 3												
DC-4	2-3	1-2	4-5	3-4	2-3	1-2	Cal	—				→
~~Σ~~ Rec							3-4	—				→
~~DC-Av~~ Time	1443	1455	→				1303	1305	1307	1516	1521	1525
~~AC-1~~ Curr	1400	1400	→				285	510	710	290	550	740
AC Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Σ												
S.P.												
AC-N												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: _____ Line: _____ Int.Cal _____ Date: _____

Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4	3-4			
Rec.	2-2.5W	→	2.5-3W	←		→	Cal	Cal	Cal			
Time							1303	05	1308			
DC-1	.50 .55		.38 3.9	.49 .45			14.8	26.6	37.0	14.6	26.4	36.2
DC-2	.12 .10		.17 .15	.16 .15			14.8	26.6	37.0	14.6	26.4	36.2
Σ	.62 .65		.55 .54				14.8	26.6				
DC-3	.51 .51		.40 .42				14.8	26.6	37.0	14.6	26.4	36.2
Dc-4	.18 .14		.11 .08						37.0	14.6	26.4	36.2
Σ	.32 .32		.51 .50									
DC-AV	.65		.53				29.6	53.2	74.0	29.2	52.8	72.4
AC-1	.20		.28				14.6	26.5	37.0	14.5	26.4	36.2
AC-2	.20		.28				14.6	26.5	37.0	14.5	26.4	36.2
Σ	.40		.56				29.2	53.0	74.0	29.0	52.8	72.4
S. P.	1		16.0									
AC-N												

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Esperanza Line [illegible] Field date May 15, 61 Data page _____ Comp. date May 16, 61. Comp by [illegible]

(A) Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	CAL	.5-1.0W	→	1.0-1.5W	→	→	1.5-2.0W	→	→	→	2.0-2.5W	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1430	1425	1430	1415	1405	1415	1415	1400	1400	1415	1400
(E) Vdc (avg)		11.3	2.04	7.60	2.02	.78	7.31	2.12	.88	.41	1.68	[illegible]
(F) DCcal USED	1.000											
(G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	15	1.5	6.0	15	30	6.0	[illegible]
(H) ρ dc=ExFxGx10^3/D		11.9	8.6	8.0	8.6	8.3	7.6	9.0	9.4	8.8	7.1	7.5
(I) Vac Σ		10.8	1.80	6.80	[illegible]	[illegible]	[illegible]	1.96	.82	[illegible]	[illegible]	—
(J) AC noise x 2		.04	.04	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		10.8	1.80	6.80	1.84	[illegible]	6.80	1.96	.81	.39	1.60	—
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.047	1.132	1.118	1.098	1.130	1.075	1.082	1.087	1.050	1.050	—
(N) PFE=(M-1)(10^2)		5	13	12	10	13	8	8	9	5	5	—
(O) MCF=(M-1)(10^5)/H		395	1536	1477	1139	1568	961	910	926	569	705	—

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

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2						
(B) Receive		→	[illegible]			→						
(C) n separation	4	5	[illegible]	[illegible]	[illegible]	6						
(D) I	[illegible]	—	1400	—	—	—	285	510	710	[illegible]	[illegible]	[illegible]
(E) Vdc (avg)	.65	—	.53				29.6	53.2	[illegible]	29.2	52.8	[illegible]
(F) DCcal							.963	.959	.960	.994	1.042	1.021
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	13.9	—	5.7									
(I) Vac Σ	.40	—	.56				[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
(J) AC noise x 2	.04	.04	.04									
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.40	—	.56									
(L) AC-DC cal.							.988	.996	1.000	.994	1.000	1.000
(M) ρdc/ρac =ExL/K	1.623		X									
(N) PFE=(M-1)(10^2)	62	—	X	—	—	—						
(O) MCF=(M-1)(10^5)/H			X									

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: MITCHUM Line: E Int.Cal ____ Date: 16MAY

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.												
Time												
DC-1	088 087	00088 00086	012 0118	0011 00115	0004 0003	.0006 00055	00069 00065	0002 00019	0001 0001	0009 0009	0002 0002	0001 0001
DC-2	090 091	00098 0012	0122 0121	0013 0013	00047 00047	0006 0006	0007 00072	0002 0002	0001 0001	0009 00088	0002 00018	00005 00005
Σ												
DC-3	085 085	00085 00079	0118 0118	0012 0011	0003 00035	0005 0005	00069 "	00025 00019	00008 00009	00085 00085	00019 00018	00012 0001
Dc-4	091 091	00102 0011	012 012	0014 0015	00052 00061	00055 00055	00072 "	00025 0002	00013 00012	00089 0009	0002 00018	00004 00005
Σ												
DC-AV												
AC-1	085	0009	.011	0012	0004	0005	00052	00015	00009	00069	00015	00008
AC-2	085	0009	.011	0012	0004	0005	00052	00015	00009	0007	00015	00008
Σ												
S. P.	102	114	178	184	191	59	42	37	34.5	45	41	38
AC-N												00003
		.0001			.0001				—			

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Esperanza Line: Anomaly E-east Int.Cal _____ Date: 16/May

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		.5-1.0^6 →		1.0-1.5^6 →			1.5-2.0^6 →				2.0-2.5^6 →	
Time												
DC-1		8.8 8.7	.88 .86	12.0 11.8	1.1 1.15	.40 .30	6.0 5.5	.69 .68	.20 .19	.10 .10	.90 .90	.20 .20
DC-2		9.0 9.1	.98 1.02	12.2 12.1	1.30 1.30	.47 .42	6.0 6.0	.70 .72	.20 .20	.10 .10	.90 .96	.20 .18
Σ		17.8 17.8	1.86 1.88	24.2 23.9	2.40 2.45	.87 .72	12.0 11.5	1.39 1.40	.40 .39	.20 .20	1.80 1.76	.40 .38
DC-3		8.5 8.5	.85 .79	11.8 11.8	1.20 1.10	.30 .35	5.0 5.0	.64 .69	.25 .19	.08 .09	.85 .85	.19 .18
Dc-4		9.1 9.1	1.02 1.10	12.0 12.0	1.40 1.50	.52 .60	5.5 5.5	.72 .72	.25 .20	.13 .12	.89 .90	.20 .18
Σ		17.6 17.6	1.87 1.89	23.8 23.8	2.60 2.60	.82 .95	10.5 10.5	1.41 1.41	.50 .39	.21 .21	1.74 1.75	.39 .36
DC-AV		17.7	1.88	23.9	2.51	.84	11.1	1.40	.40	.205	1.76	.38
AC-1		8.5	.90	11.0	1.20	.40	5.0	.52	.15	.09	.69	.15
AC-2		8.5	.90	11.0	1.20	.40	5.0	.52	.15	.09	.70	.15
Σ		17.0	1.80	22.0	2.40	.80	10.0	1.04	.30	.18	1.39	.30
S. P.		10.2	11.4	17.8	18.4	19.1	5.9	4.2	3.7	34.5	4.5	4.1
AC-N		.12 →									.02	
Range												

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Esperanza . Line Anomaly E-east Int. Cal. Date: 16/Ma

Se	3-4	4-5	1-2	2-3	3-4	4-5	2-3					
Rec.	20-25E	→	2.5-30E	→	→	→	Cal	→	→	→	→	→
Time												
DC-1	.10 .10						149	270	370	148	270	365
DC-2	.05 .06						149	270	370			
Σ	.15											
DC- 3	.12 .10						149	270	370			
DC-4	.04 .05						149	270	370			
Σ	[illegible]											
DC-Av	[illegible]						29.8	54.0	74.0	29.6	54.0	73.0
AC-1	.08						148	259	370	145	259	369
AC- 2	.08						148	259	369	145	259	369
Σ	.16						29.6	51.8	73.9	29.0	51.8	73.8
S.P.												
AC-N												

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Esperanza Line: Anomaly E east Int.Cal. Date: 16/May

Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	Cal	.5-1.0E	→	1.0-1.5E	→	→	1.5-2.6	→	→	→	2-2.5E	→
Time		1127	1134	1151	1155	1158	1212	1216	1219	1224	1242	1244
~~DC-1~~ I		1460	1440	1440	1430	1410	1410	1400	1400	1400	1410	1400
~~DC-2~~												
SEND	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3		
DC Rec.	2-2.5E	→	.5-3E	→	→	→	Cal	→	→	→	→	
DC-4 Time	1247						1105	1107	1109	1341	1342	1343
Σ I	1400		1400				290	505	700	290	505	700
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Esperanza Line Anomaly E-cam Field date May 16, 61 Data page_____ Comp. date May 17, 61. Comp by C.S.L.

(A) Send	2-3	3-4	4-5	2-3	3-4	4-5	[illegible]	2-3	3-4	4-5	[illegible]	[illegible]
(B) Receive	CAL	[illegible]	→	[illegible]	→	→	15-20E	→	→	→	20-25E	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1460	1440	1440	1430	1410	1410	1400	1400	1400	1410	1400
(E) Vdc (avg)		17.7	1.88	23.9	2.51	.84	11.1	1.40	.40	[illegible]	1.76	.38
(F) DCcal USED	1.000											
(G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	1.5	1.5	[illegible]	[illegible]	[illegible]	6.0	[illegible]
(H) ρ dc=ExFxGx10^3/D		18.2	7.8	22.9	10.5	8.9	11.8	6.0	4.3	4.4	7.5	4.1
(I) Vac Σ		17.0	1.80	22.0	2.40	.80	10.0	1.04	.20	.18	1.32	.20
(J) AC noise x 2		.20	.20	.20	.20	.20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		17.0	1.79	22.0	2.40	.77	10.0	1.04	.29	.17	1.39	.29
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.041	1.050	1.087	1.045	1.090	1.110	1.348	1.380	1.207	1.266	1.310
(N) PFE=(M-1)(10^2)		4	5	9	5	9	11	35	38	22	27	31
(O) MCF=(M-1)(10^5)/H		226	641	350	429	1011	933	5800	8840	4710	3550	3560

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5	CAL					
(B) Receive	→	→	25-30E			→						
(C) n separation	4	5	3	4	5	6						
(D) I	1400						290	505	700	290	505	700
(E) Vdc (avg)	.16						29.8	54.0	74.0	29.6	54.0	73.0
(F) DCcal							.974	.936	.946	.981	.936	.959
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	14						
(H) ρ dc=ExFxGx10^3/D	3.4											
(I) Vac Σ	.16						29.6	51.8	72.9	29.0	51.8	72.8
(J) AC noise x 2	.06											
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.15											
(L) AC-DC cal.							.994	.959	.998	.981	.959	1.009
(M) ρdc/ρac =ExL/K	1.068											
(N) PFE=(M-1)(10^2)	7											
(O) MCF=(M-1)(10^5)/H	2000											

INDUCED POLARIZATION - RECEIVER NOTES PA. 1

Project: ESPERANZA Line: SE. Anomaly Int.Cal Date: 18 MAY

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		1.0-1.5	→	1.5-2.0	→	→	2.0-2.5	→	→	→		
Time												
DC-1		12.2 12.2	1.20 1.20	19.1 18.9	1.80 1.80	.62 .61	17.2 17.2	2.30 2.30	.48 .45	.42 .45	2.45 2.50	.70 .73
DC-2		11.8 11.8	1.21 1.22	18.8 18.7	1.79 1.79	.55 .56	16.7 16.6	2.38 2.39	.58 .62	.10 .09	2.55 2.50	.55 .50
Σ		24.0 24.0	2.41 2.42	37.9 37.6	3.59 3.59	1.17 1.17	33.9 33.8	4.68 4.69	1.06 1.07	.52 .54	5.00 5.00	1.25 1.23
DC-3		12.1 12.0	1.20 1.20	18.9 18.8	1.80 1.80	.62 .62	17.1 17.0	2.29 2.28	.40 .41	.35 .35	2.45 2.45	.78 .84
Dc-4		11.7 11.6	1.22 1.22	18.5 18.5	1.80 1.79	.55 .55	16.6 16.5	2.38 2.39	.63 .62	.16 .15	2.55 2.55	.48 .40
Σ		23.8 23.6	2.42 2.42	37.4 37.3	3.59 3.59	1.13 1.13	33.7 33.5	4.63 4.63	1.03 1.03	.51 .50	5.00 5.00	1.26 1.24
DC-AV		23.9	2.42	37.6	3.59	1.17	33.7	4.68	1.05	.52	5.00	1.25
AC-1		11.4	1.20	17.8	1.70	.60	16.2	2.30	.52	.25	2.40	.65
AC-2		11.5	1.19	17.7	1.70	.58	16.2	2.28	.51	.25	2.45	.65
Σ		22.9	2.39	35.5	3.40	1.18	32.4	4.58	1.03	.50	4.85	1.30
S. P.		+14.0	+14.4	+13.0	+12.6	+12.6	+6.0	+6.5	+6.6	+6.9	-8.0	-7.4
AC-N			.06			.08				.06		
RANGE		.03	.01	.03	.01	.003	.03	.01	.003	.003	.01	.003

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: ESPERANZA Line: SE Anomaly Int.Cal Date: 18 MAY

Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3					
Rec.							CAL					
Time												
DC-1	.25 .25	.18 .18	.70 .70	.25 .30	.15 .18		14.6	26.5	36.5	14.5	26.2	35.9
DC-2	.25 .25	.18 .18	.70 .70	.24 .20	.15 .12		14.5	26.4	37.0	14.5	26.0	35.9
Σ	.50 .50	.36 .36	1.40 1.40	.49 .50	.30 .30		29.1	52.9	73.5	29.0	52.2	71.8
DC-3	.25 .25	.18 .18	.68 .68	.32 .35	.10 .10		14.7	26.5	36.9	14.5	26.1	36.0
Dc-4	.25 .25	.18 .18	.71 .73	.18 .15	.20 .20		14.5	26.3	36.5	14.5	26.0	35.9
Σ	.50 .50	.36 .36	1.40 1.41	.50 .50	.30 .30		29.2	52.8	73.4	29.0	52.1	71.9
DC-AV	.50	.36	1.40	.50	.30		29.15	52.85	73.45	29.0	52.15	71.85
AC-1	.25	.18	.72	.25	.15		14.5	25.5	36.9	14.4	25.0	36.0
AC-2	.25	.17	.70	.25	.15		14.5	25.5	37.0	14.4	25.0	36.0
Σ	.50	.35	1.42	.50	.30		29.0	51.0	73.9	28.8	50.0	72.0
S. P.	-8.6	-8.6	-3.0	-2.7	-2.3							
AC-N		.04			.12							
RANGE	.003	.003	.003	.003	.003	.003	.03	.03	.10	.03	.03	.16

INDUCED POLARIZATION - ~~RECEIVER~~ SENDER NOTES PAGE 2

Project: ESPERANZA Line: ANOM. E - SEAST Int.Cal _____ Date: 5-18-61

Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
Rec.			3.0-305E				Cal					
Time	1432	1435	1503	1506	1508		1303	1305	1306	1544	1545	1547
~~DC-1~~ I	1370	1360	1380	1360	1370		280	490	680	270	485	660
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION - ~~RECEIVER~~ SENDER NOTES PAGE 1

Project: ESPERANZA Line: ANOM. E - SEast Int.Cal _____ Date: 5-18-61

Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		1.0-1.5E		1.5-2.0E			2.0-2.5E				2.5-3.0E	
Time		1313	1316	1328	1331	1334	1347	1352	1355	1403	1418	1423
~~DC-1~~ I		1455	1440	1450	1430	1420	1420	1405	1395	1380	1380	1390
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: ESPERANZA Line: N.W. Amulg E Int.Cal _____ Date: 19MAY

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.												
Time		1054	1057	1108	1113	1120	1135	1143	1148	1156	1206	1209
DC-1		9.4 9.4	1.20 1.20	5.5 5.5	1.05 1.05	.30 .30	3.5 3.5	1.1 1.15	.30 .30	.10 .10	1.1 1.08	.50 .50
DC-2		9.5 9.5	1.21 1.21	5.8 5.8	.92 .92	.50 .50	3.8 3.8	.85 .80	.50 .50	.40 .40	1.0 1.01	.40 .40
Σ		18.9 18.9	2.41 2.41	11.3 11.3	1.97 1.97	.80 .80	7.3 7.3	1.95 1.95	.80 .80	.50 .50	2.10 2.09	.90 .90
DC-3		9.5 9.4	1.20 1.20	5.5 5.4	1.03 1.03	.30 .29	3.5 3.6	1.15 1.20	.30 .28	.10 .08	1.1 1.1	.45 .50
Dc-4		9.5 9.4	1.22 1.22	5.8 5.9	.92 .92	.50 .51	3.8 3.7	.80 .75	.50 .52	.50 .52	1.0 1.0	.45 .40
Σ		19.0 18.8	2.42 2.42	11.3 11.3	1.95 1.95	.80 .80	7.3 7.3	1.95 1.95	.80 .80	.60 .60	2.10 2.10	.90 .90
DC-AV		18.9	2.42	11.3	1.96	.80	7.3	1.95	.80	.55	2.10	.90
AC-1		.89	1.20	5.3	.94	.39	3.4	.92	.40	.22	.95	.45
AC-2		.90	1.20	5.4	.94	.39	3.5	.93	.40	.22	.95	.45
Σ		17.9	2.40	10.7	1.88	.78	6.9	1.85	.80	.44	1.90	.90
S. P.		+5.7	+5.4	0.00	-.5	-.9	+3.7	+1.5	+.3	-1.1	+4.5	+4.7
AC-N			.05			.05				.06		
RANGE		.03	.01	.03	.003	.003	.01	.003	.003	.003	.003	.003

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: ESPERANZA Line: N.W. Anomaly E Int.Cal Date: 19 MAY

Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	—	—	—	—	—
Rec.							CAL	—	—	—	—	—
Time	1214	1219	1234	1237	1240		1046	1047	1050	1301	1302	1304
DC-1	.35 .30	.18 .18	.20 .15	.28 .28	.12 .12		14.5	26.8	36.9	14.4	26.0	36.0
DC-2	.10 .15	.10 .10	.55 .60	.16 .10	.12 .12		14.4	26.8	36.9	14.5	26.1	36.0
Σ	.45 .45	.28 .28	.75 .75	.38 .38	.24 .24		28.9	53.6	73.8	28.9	52.1	72.0
DC-3	.30 .25	.20 .18	.10 .10	.29 .29	.12 .12		14.5	26.7	36.9	14.4	26.0	35.9
DC-4	.15 .20	.08 .10	.65 .65	.09 .09	.12 .12		14.5	26.7	36.9	14.5	26.0	36.0
Σ	.45 .45	.28 .28	.75 .75	.38 .38	.24 .24		29.0	53.4	73.8	28.9	52.0	71.9
DC-AV	.45	.28	.75	.38	.24		28.95	53.5	73.8	28.9	52.0	71.95
AC-1	.22	.18	.35	.20	.12		14.2	25.4	37.0	14.2	25.0	36.1
AC-2	.22	.18	.35	.20	.12		14.2	25.5	37.0	14.2	25.1	36.1
Σ	.44	.36	.70	.40	.24		28.4	50.9	74.0	28.4	50.1	72.2
S. P.	+4.7	+3.9	-3.8	-3.8	-5.4							
AC-N		.05			.05							
RANGE	.003	.003	.003	.003	.003		.03	.03	.1	.03	.03	.1

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: ESP Line: Anomaly B West Int.Cal Date: 19 May

Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	Cal	0-.5W	→	.5-1W	→	→	1.0-1.5W	→	→	→	1.5-2W	→
Time		1054	1057	1108	1113	1120	1135	1143	1148	1156	1206	1209
DC-1 I		1470	1450	1445	1425	1395	1390	1380	1365	1350	1365	1355
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION - ~~RECEIVER~~ Sender NOTES PAGE _____

Project: Esperanza Line: Anomaly E-West Int.Cal _____ Date: 19 May

Send	2-3	1-2	4-5	8-4	2-3	1-2	3-4	—	—	—	—	→
Rec.	1.5-2W	→	2-2.5W			→	Cal	Cal				
Time	1214	1219	1234	1237	1240		1046	1047	1050	1301	1302	1304
DC-1↑	1350	1340	1355	1350	1350		270	500	685.	270	480	660
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

Repeated.

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Esperanza Line Anomaly E NW Field date 19/May/61 Data page_____ Comp. date 22/May. Comp by [illegible]

(A) Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	Cal	0-.5W →		.5-1.0W	→	→	1.0-1.5W	→	→	→	1.5-2W	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1470	1450	1445	1425	1395	1390	1380	1365	1350	1365	1355
(E) Vdc (avg)		18.9	2.42	11.3	1.96	.80	7.3	1.95	.80	.55	2.10	.90
(F) DCcal	.935	→										→
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		18.1	9.1	9.7	7.7	8.0	7.4	7.9	8.2	11.4	8.6	9.3
(I) Vac Σ		17.9	2.40	10.7	1.88	.78	6.9	1.85	.80	.44	1.90	.90
(J) AC noise x 2		.10	.10	.10	.10	.10	.12	.12	.12	.12	.10	.10
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		17.9	2.40	10.7	1.88	.78	6.9	1.85	.79	.42	1.90	.89
(L) AC-DC cal.	1.000	→										→
(M) ρ dc/ρac=ExL/K		1.055	1.009	1.055	1.042	1.025	1.056	1.052	1.011	1.250	1.103	1.011
(N) PFE=(M-1)(10^2)		6	1	6	4	3	6	5	1	((25))	10	1
(O) MCF=(M-1)(10^5)/H		304	99	567	546	312	758	658	134	2190	1200	118

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	—	—	—	—	→
(B) Receive	1.5-2W →	→	2-2.5W	→	→	→	Cal	—	—	—	—	→
(C) n separation	4	5	3	4	5	6	—					
(D) I	1350	1340	1355	1350	1350	—	270	500	685	270	480	660
(E) Vdc (avg)	.45	.28	.75	.38	.24	—	289.5	535	738	289	520	719.5
(F) DCcal	.935	→	→	→	→		.934	.935	928	.935	.924	.917
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	8						
(H) ρ dc=ExFxGx10^3/D	9.4	10.2	7.8	7.9	8.7							
(I) Vac Σ	.44	.36	.70	.40	.24		284	509	740	284	501	722
(J) AC noise x 2	.10	.10	.10	.10	.10							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.42	.35	.69	.39	.22		.982	.952	1.001	.984	.965	1.001
(L) AC-DC cal.	1.000	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.070	—	1.086	1.000	1.090							
(N) PFE=(M-1)(10^2)	7	—	9	0	9							
(O) MCF=(M-1)(10^5)/H	745	—	1100	0	1035							

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project *Esperanza* Line *Anomaly I-SE* Field date *May 18, 61* Data page _____ Date *May 19, 61* Page _____ C.S.L.

(A) Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	CAL	1.0-1.5E →		1.5-2.0E		→	2.0-2.5E			→	[illegible]	—
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1455	1440	1450	1430	1420	1420	1405	1395	1380	1380	1390
(E) Vdc (avg)		23.9	2.42	37.6	3.59	1.17	33.7	4.68	1.05	.52	5.00	1.25
(F) DCcal USED	.930											
(G) Kn x 10^{-3} (a = 500')		1.5	6.0	1.5	6.0	15	1.5	6.0	15	30	6.0	15
(H) ρ dc=ExFxGx10^3/D		22.9	9.38	36.2	14.[illegible]	11.5	33.1	18.6	10.5	10.5	20.2	12.6
(I) Vac Σ		22.9	2.39	35.5	3.40	1.18	32.4	4.58	[illegible]	.50	[illegible]	[illegible]
(J) AC noise x 2		.12	.12	.16	.16	.16	.12	.12	.12	.02	.08	.08
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		22.9	2.39	35.5	3.40	1.17	32.4	4.58	[illegible]	[illegible]	4.85	1.30
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.043	1.012	1.059	1.056	1.000	1.041	1.022	1.029	1.070	1.031	.961
(N) PFE=(M-1)(10^2)		4	1	6	6	0	4	[illegible]	[illegible]	[illegible]	[illegible]	-4
(O) MCF=(M-1)(10^5)/H		188	128	163	400	0	124	118	276	666	153	-.10

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5						
(B) Receive	→	→	2.0-3.5E	→	→	→						
(C) n separation	4	5	3	4	5	6						
(D) I	1370	1360	1380	1360	1370	—	[illegible]	4.90	[illegible]	[illegible]	4.85	66.0
(E) Vdc (avg)	.50	.36	1.40	.50	.30	—	29.15	52.85	72.45	[illegible]	[illegible]	[illegible]
(F) DCcal					USED .930		.961	.927	.926	.931	.930	.920
(G) Kn x 10^{-3} (a = 500')	30	52.5	15	30	52.5							
(H) ρ dc=ExFxGx10^3/D	10.2	12.9	14.1	10.3	10.7							
(I) Vac Σ	.50	.35	1.42	.50	.30	—	29.0	51.0	72.9	28.8	[illegible]	[illegible]
(J) AC noise x 2	.08	.08	.24	.24	.24							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.494	.34	1.40	.44	.18							
(L) AC-DC cal.					USED 1.000		.995	.965	1.007	.994	.959	1.003
(M) ρdc/ρac =ExL/K	1.010	1.060	1.000	1.137	1.667							
(N) PFE=(M-1)(10^2)	1	6	0	14	67							
(O) MCF=(M-1)(10^5)/H	98	465	0	1332	6240							

Check

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Esp. Line Anomaly E East Field date 19/May Data page — Comp. date 22/May Comp by [illegible]

(A) Send	3-4	4-5	2-3	3-4	4-5					CAL	→	
(B) Receive	1.0-1.5E →		1.5-2.0E →									
(C) n separation	1	2	1	2	3							
(D) I	1455	1435	1445	1430	1410					275	495	680
(E) Vdc (avg)	23.7	2.50	36.5	3.60	1.18					290	526	720
(F) DCcal	.945	→								.949	.942	.944
(G) Kn x 10^{-3}	1.5	6	1.5	6	15							
(H) ρ dc=ExFxGx10^3/D	23.0	9.9	35.8	14.3	11.8							
(I) Vac Σ	22.8	2.40	36.0	3.40	1.18							
(J) AC noise x 2	.08	.08	.10	.10	.10							
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	22.8	2.40	36.0	3.40	1.18					288	506	738
(L) AC-DC cal.	1.000	→								.994	.963	1.025
(M) ρ dc/ρac=ExL/K	1039	1.040	1.012	1.058	0							
(N) PFE=(M-1)(10^2)	4	4	1	6	0							
(O) MCF=(M-1)(10^5)/H	164	404	34	406	0							

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send												
(B) Receive												
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D												
(I) Vac Σ												
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1 Repeat

Project: ESPERANZA Line: S.E. Anomaly Int.Cal _____ Date: 19MAY Repeated

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	2-3	—	—
Rec.	1.0-1.5	→	1.5-2.0	—	→					CAL	—	—
Time	1412	1415								1357	1358	1359
DC-1	12.1 12.1	1.30 1.30	18.0 18.0	1.80 1.80	.60 .60					14.5	26.5	36.0
DC-2	11.6 11.6	1.20 1.20	18.5 18.5	1.80 1.80	.58 .58					14.5	26.4	36.0
Σ	23.7 23.7	2.50 2.50	36.5 36.5	3.60 3.60	1.18 1.18					29.0	52.9	72.0
DC-3	12.1 12.1	1.30 1.30	18.0 18.25	1.80 1.78	.56 .56					14.5	26.3	36.0
Dc-4	11.6 11.6	1.20 1.20	18.5 18.25	1.80 1.82	.62 .62					14.5	26.3	36.0
Σ	23.7 23.7	2.50 2.50	36.5 36.5	3.60 3.60	1.18 1.18					29.0	52.6	72.0
DC-AV	23.7	2.50	36.5	3.60	1.18					29.0	52.75	72.0
AC-1	11.4	1.20	18.0	1.70	.59					14.4	25.3	36.9
AC-2	11.4	1.20	18.0	1.70	.59					14.4	25.3	36.9
Σ	22.8	2.40	36.0	3.40	1.18					28.8	50.6	73.8
S. P.	+12.8	+12.3	+8.9	+9.2	+8.8							
AC-N		.04			.05							
RANGE	.03	.01	.10	.01	.003					.03	.03	.10

INDUCED POLARIZATION SURVEY - ~~RECEIVER~~ Sender NOTES PAGE

Project: Esp. Line: Anom C-East Int. Cal Repeat Date: 19/May

Send	3-4	4-5	2-3	3-4	4-5		2-3					
Rec.	1.0-1.5E	→	1.5-2E	→			Cal.	→				
Time	1412	1415	1428	1430	1433		1357	1358	1359			
DC-1	1455	1435	1445	1430	1410		275	495	680			
DC-2												
Σ												
DC-3												
DC-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P												
AC-N												

INDUCED POLARIZATION SENDER NOTES

Project: ESPERANZA Line: 2 E Date: 2 MAR 61

Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	CAL	2-2.5E	→	2.5-3E	→	→	3-3.5E	→	→	→	3.5-4E	→
Time		1020	1022	1036	1038	1041	1050	1052	1053	1054	1101	1103
Range		1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.0	1.5
Current		1490	1480	1480	1475	1460	1035	1470	1460	1453	1030	1465
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	→	→	2-3	→	→
Receive	→	→	4-4.5E	→	→	→	CAL	CAL	CAL	CAL	CAL	CAL
Time	1104	1105	1114	1115	1117	1118	1008	1009	1010			
Range	1.5	1.5	1.0	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1455	1449	1029	1458	1448	1446	283	510	708			

INDUCED POLARIZATION SENDER NOTES

Project: ESPERANZA Line: 2W Date: 2MARG1

Send	2-3	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	CAL											
Time		1159	1201	1217	1218	1220	1235	1237	1239	1241	1250	1252
Range		1.5	1.0	1.5	1.5	1.0	1.5	1.5	1.5	1.0	1.5	1.5
Current		1486	1037	1494	1474	1029	1486	1459	1441	1028	1475	1448
Send	2-3	1-2	4-5	3-4	2-3	1-2				2-3	2-3	2-3
Receive										CAL	CAL	CAL
Time	1254	1255	1311	1312	1314	1316				1330	1331	1332
Range	1.5	1.0	1.5	1.5	1.5	1.0				.3	.5	.75
Current	1429	1020	1465	1445	1435	1020				283	508	700

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: _____ Line: 2E-W Int.Cal 51.0 Date: 3-2-61

Send	2-3	2-3	2-3		2-3	2-3	2-3					
Rec.	Cal	Cal	Cal		Cal	Cal	Cal					
Time	1008	1009	1010		1330	1331	1332					
DC-1	145	260	360		141	259	350					
DC-2	145	260	360		141	259	350					
Σ	290	520	720		282	518	700					
DC-3	145	260	360		141	259	350					
Dc-4	145	260	360		141	259	350					
Σ	290	520	720		282	518	700					
DC-AV	292	520	720		282	518	700					
AC-1	152	270	382		150	266	373					
AC-2	152	270	382		150	266	373					
Σ	304	540	764		300	532	746					
S. P.	.996	.982	.98									
AC-N	1.048	1.039	1.061									

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Esperanza Line: 2 E Int.Cal. Date: 3-2-61

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		2-2.5E	→	2.5-3E	→		3-3.5E	→			3.5-4E	→
Time		1020	1022	1036	1038	1041	1050	1052	1053	1054	1101	1103
DC-1		9.60 9.57	2.10 2.07	5.42 5.46	2.40 2.40	.89 .86	4.50 4.52	1.91 1.93	95 96	36 32	1.21 1.20	80 77
DC-2		9.68 9.70	2.15 2.16	5.31 5.28	2.43 2.43	.80 .80	4.40 4.39	1.74 1.73	86 84	46 42	1.31 1.22	80 80
Σ		19.28 19.27	4.23 4.23	10.73 10.74	4.83 4.83	16.5 16.5	8.90 8.91	3.65 3.66	1.8.1 1.8.0	76 74	2.52 2.52	16.9 16.9
DC-3		9.80 9.53	2.13 2.18	5.45 5.41	2.39 2.40	.87 .88	4.53 4.49	1.90 1.87	.98 .98	31 32	1.19 1.18	77 77
DC-4		9.70 9.69	2.08 2.06	5.30 5.28	2.43 2.44	.79 .76	4.38 4.36	1.78 1.78	.83 .82	43 41	1.32 1.33	80 81
Σ		19.28 19.22	4.21 4.20	10.75 10.69	4.82 4.84	16.5 16.5	8.90 8.90	3.68 3.65	1.8.1 1.8.0	73 74	2.53 2.51	15.7 15.8
DC-AV		19.24	4.23	10.73	4.83	16.5	8.90	3.66	1.8.0	.74	2.52	15.8
AC-1		9.80	2.23	5.58	2.57	.81	4.70	1.91	97	41	1.33	82
AC-2		9.80	2.23	5.58	2.57	.81	4.70	1.91	97	41	1.33	82
Σ		19.60	4.46	11.16	5.14	1.62	9.40	3.82	1.9.4	.82	2.66	1.64
S. P.		+16.8	+16.9	+5.6			+0.8				+7.9	
AC-N		.02	.02	.05			.02				.01	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE 4

Project: ES[illegible] Line: 2E Int.Cal. _____ Date: _____

Send	3-4	4-5	1-2	2-3	3-4	4-5						
Rec.	3.5-4E	→	4-4E			→						
Time	1104	1105	1114	1115	1117	1118						
DC-1	52 52	22 24	.60 .62	.42 .43	29 25	11 12						
DC-2	42 40	17 16	.60 .58	.34 .37	26 29	10 11						
Σ	.94 .92	.40 .40	1.20 1.20	.81 .80	55 54	.21 .23						
DC-3	54 53	25 27	.63 .66	44 40	23 23	13 14						
DC-4	28 33	15 13	.57 .53	39 42	30 29	10 09						
Σ	.92 .94	.40 .40	1.20 1.19	.83 .82	53 57	.23 .22						
DC-AV	.93	.40	1.20	.81	.54	.23						
AC-1	.50	.22	.63	.45	29	.13						
AC-2	.50	.22	.63	.45	29	.13						
Σ	1.00	.44	1.26	.90	.58	.26						
S. P.	+0.9		+4.8									
AC-N	.01		.01									

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Esparanza Line 2W Int.Cal _____ Date: 3-2

Send	2-3	1-2	4-5	3-4	2-3	1-2						
Rec.	.5 1W	→	1-1.5W	→								
Time	1254	1255	1311	1312	1314	1316						
DC-1	40 40	12 12	82 80	50 50	20 22	06 07						
DC-2	37 37	14 13	92 96	45 47	18 14	08 08						
Σ	.77 .77	.26 .25	1.74 1.76	.95 .97	.38 .36	.14 .15						
DC-3	40 40	11 12	78 [illegible]	50 49	17 18	04 06						
Dc-4	37 37	14 14	100 103	48 47	21 20	09 08						
Σ	.77 .77	.25 .26	1.78 1.79	.98 .96	.38 .38	.13 .14						
DC-AV	.77	.255	1.77	.97	.38	.14						
AC-1	.39	.13	95	51	20	09						
AC-2	.39	.13	95	51	20	09						
Σ	.78	.26	1.90	1.02	.40	.18						
S. P.	+109		+2.2									
AC-N	.01		.02									

[illegible] FORMATION - RECEIVER NOTES PAGE _____

Project [illegible] Line 2W Int.Cal. Date:

Send		8-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		1-5E	→	.5-0E	→	→	0-.5W	→	→	→	.5-1W	→
Time		1159	1201	1217	1218	1220	1235	1237	1239	1241	1250	1252
DC-1		8.20 8.20	1.51 1.50	10.04 10.04	2.00 2.00	.50 .51	11.0 11.0	3.20 3.20	.91 .91	.29 .28	2.42 2.43	1.05 1.06
DC-2		8.84 8.79	1.46 1.44	10.00 9.98	2.03 2.05	.60 .60	11.0 11.0	3.02 3.01	.91 .91	.29 .32	2.35 2.34	1.02 1.01
Σ		17.39 16.99	2.97 2.94	20.04 20.02	4.03 4.05	1.10 1.11	22.0 22.0	6.22 6.21	1.82 1.82	.58 .60	4.77 4.77	2.07 2.07
DC- 3		8.18 8.17	1.51 1.50	9.98 9.99	1.98 1.96	.48 .50	11.0 11.0	3.20 3.23	.95 .96	.25 .28	2.43 2.46	.07 .09
DC-4		8.80 8.80	1.41 1.43	10.05 10.04	2.08 2.11	.60 .58	11.0 11.0	3.00 3.00	.89 .88	.31 .28	2.32 2.30	.00 .09
Σ		16.98 16.97	2.92 2.93	20.02 20.04	4.06 4.07	1.08 1.10	22.0 22.0	6.20 6.23	1.84 1.84	.56 .56	4.75 4.76	2.07 2.07
DC-Av		6.98	2.94	20.04	4.05	1.10	22.0	6.22	1.83	.57	4.76	2.07
AC-1		8.75	1.54	10.04	2.10	.58	11.5	3.20	.94	.30	2.48	1.10
AC- 2		8.75	1.54	10.04	2.10	.58	11.5	3.20	.94	.30	2.48	1.10
Σ		17.50	3.08	20.08	4.20	1.16	23.0	6.40	1.88	.60	4.96	2.20
S.P.		-0.7	-2.7	-9.8			-4.1					
AC-N		.02	.02	.03			00	00	→			

INDUCED POLARIZATION SENDER NOTES

Project: ESPERANZA Line: 3W Date: 2 MARC 1

Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	CAL											
Time		1520	1521	1531	1532	1534	1547	1548	1549	1550	1559	1600
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1493	1474	1484	1469	1463	1484	1464	1452	1449	1476	1455
Send	2-3	1-2	4-5	3-4	2-3	1-2				3-4	3-4	3-4
Receive							CAL2	CAL2	CAL2	CAL1	CAL1	CAL1
Time	1601	1603	1613	1614	1615	1617				1513	1516	1517
Range	1.5	1.5	1.5	1.5	1.5	1.5				.3	.5	.75
Current	1444	1440	1470	1451	1445	1439				285	515	716

FINAL CALIBRATION

TIME	1630	1638	1639
T	276	510	710
RANGE	.3	.5	.7

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Esperanza Line: 3 E Int.Cal Date:

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2
Rec.		1-.5W	→	.5W-0	—	→	0-.5E	—	—	→	.5-1E	→
Time		1045	1046	1112	1114	1115	1139	1141	1145	1156	1211	1217
DC-1		10.0 10.5	3.21 3.21	11.5 11.5	2.50 2.50	1.13 1.12	8.22 8.17	1.77 1.79	62 55	30 31	2.56 2.5[illegible]	.91 .91
DC-2		10.0 10.0	3.26 3.26	11.1 11.0	2.32 2.32	1.08 1.05	8.28 8.30	2.10 2.10	64 71	28 29	2.40 2.38	.89 .88
Σ			6.47 6.47	22.6 22.5	4.82 4.82	2.21 2.17	16.50 16.47	3.87 3.84	1.26 1.26	58 55	4.90 4.89	1.80 1.79
DC-3		10.0 10.0	3.28 3.28	11.2 11.3	2.55 2.51	1.14 1.00	8.18 8.20	1.75 1.88	70 72	36 30	2.53 2.54	.91 .95
Dc-4		10.0 10.0	3.18 3.19	11.0 11.0	2.30 2.33	1.07 1.15	8.22 8.22	2.06 2.01	58 55	25 27	2.37 2.33	.88 .82
Σ			6.48 6.49	[illegible]	4.63 4.63	2.21 2.24	16.40 16.42	3.81 3.87	1.28 1.27	61 57	4.90 4.87	1.78 1.77
DC-AV		20.0	6.47	22.4	4.83	2.20	16.45	3.85	1.26	0.58	4.89	1.78
AC-1		10.0	3.45	11.7	2.52	1.12	8.58	2.10	.68	.37	2.60	.96
AC-2		10.0	3.45	11.7	2.52	1.12	8.58	2.10	.68	.37	2.60	.96
Σ		21.2	6.90	23.4	5.04	2.24	17.16	4.20	1.36	0.74	5.20	1.92
S. P.		+2.[illegible]	[illegible]	+19.5			+10.4					
AC-N		.04	.04	.03			.06					

INDUCED POLARIZATION RECEIVER NOTES PAGE

Project: Esperanza Line: 3.E Int.Cal Date: 3 3

Send	3-4	4-5	1-2	2-3	3-4	4-5						
Rec.	.5 1	→	1-1.5 1	→	→	→						
Time	1214	1216	1228	1230	1231							
DC-1	42 42	21 24	1.09 1.03	50 46	20 21	14 13						
DC-2	31 31	17 16	1.18 1.21	53 58	21 21	19 16						
Σ	73 73	38 40	2.27 2.24	1.03 1.03	41 42	28 29						
DC-3	44 45	23 22	1.03 1.07	45 50	21 22	13 11						
Dc-4	30 29	18 15	1.19 1.17	55 51	21 21	16 17						
Σ	74 74	41 37	2.22 2.24	1.00 1.01	42 43	29 28						
C-AV	0.74	0.39	2.24	1.02	.42	.28						
C-1	.37	.20	1.19	.54	.23	.16						
AC-2	.37	.20	1.19	.54	.23	.16						
Σ	.74	.40	2.38	1.08	.46	.32						
S. P.	+13.6		+14.3									
AC-N	.03		.03									

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE 5

Project: [illegible] Line: 5L Int. Cal. Date:

Send	2.3	2.3	2.3		2.3	2.3						
Rec.	Cal	Cal	Cal									
Time	1036	1037	1039		1250	1252						
DC-1	[illegible]	251	352		150	248	347					
DC-2	150	251	352		150	248	347					
Σ												
DC-3	150	251	352		150	248	347					
DC-4	150	251	352		150	248	347					
Σ												
DC-AV.												
AC-1	160	265	280		160	261	374					
AC-2	160	265	380		160	261	374					
Σ												
S.P.												
AC-N	1045	1048	1050									

INDUCED POLARIZATION SENDER NOTES

Project: ESPERANZA Line: 3E Date: 3 MAR 61

Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	CAL											
Time		1045	1046	1112	1114	1115	1139	1141	1145	1156	1210	1212
Range		2.0	—	—	—	—	—	—	—	—	—	—
Current		1500	1500	—	—	—	—	—	—	—	—	—
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
Receive							CAL_1	CAL_1	CAL_1	CAL_2	CAL_1	CAL_2
Time	1214	1215	1228	1230	1231	1233	1036	1037	1039	1250	1252	1254
Range	2.0	—	—	—	—	—	—	—	—	—	—	—
Current	1500	—	—	—	—	—	300	500	700	300	500	700

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Espasoma Line 3W Int.Cal. Date: 3-2-61

Send		2-3	1-2	3-4	2-3	1-2	4-5	2-4	2-3	1-2	4-5	3-4
Rec.		2-2.5W	→	2.5-3W	→	→	3-3.5W	→	→	→	3.5-4W	→
Time		1520	1521	1531	1532	1534	1547	1548	1549	1556	1559	1600
DC-1		14.0 13.9	3.10 3.14	11.9 11.9	3.70 3.70	1.19 1.19	10.7 10.6	2.82 2.84	1.18 1.16	.56 .55	3.10 3.09	1.11 1.10
DC-2		14.1 14.1	3.28 3.22	11.8 11.8	3.78 3.79	1.32 1.32	11.1 11.2	2.90 2.89	1.41 1.43	.55 .56	3.04 3.07	1.11 1.13
Σ		28.1 28.0	6.38 6.36	23.7 23.7	7.48 7.49	2.51 2.51	21.8 21.8	5.72 5.72	2.61 2.59	1.11 1.11	6.14 6.15	2.23 2.23
DC- 3		13.8 13.8	3.18 3.21	11.8 11.8	3.69 3.68	1.18 1.19	10.5 10.4	2.86 2.89	1.16 1.16	.53 .53	3.05 3.00	1.09 1.08
DC-4		14.1 14.1	3.20 3.13	11.8 11.8	3.80 3.80	1.33 1.32	11.3 11.3	2.86 2.89	1.43 1.43	.57 .58	3.10 3.12	1.14 1.15
Σ		27.9 27.9	6.38 6.34	23.6 23.6	7.49 7.48	2.51 2.51	21.8 21.8	5.72 5.72	2.59 2.59	1.10 1.11	6.15 6.17	2.23 2.23
DC-Av		28.0	6.36	23.2	7.48	2.51	21.8	5.72	2.60	1.11	6.14	2.23
AC-1		14.7	3.40	12.3	3.92	1.32	11.3	2.93	1.38	.59	3.21	1.19
AC- 2		14.7	3.40	12.3	3.92	1.32	11.3	2.93	1.38	.59	3.21	1.19
Σ		29.4	6.80	24.6	7.84	2.64	22.6	5.86	2.76	1.18	6.42	2.38
S.P.		+6.1	-6.1	+4.4			+17.1				+8.6	
AC-N		.03	.03	.03	.03		.02				.00	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: [illegible] Line: 3W Int. Cal. _____ Date: 3-2-61

Send	2-3	1-2	4-5	3-4	2-3	1-2						
Rec	3,5-4W	→	4-4.5W			→						
Time	1601	1603	1613	1614	1615	1617						
DC-1	.65 .67	.32 .33	1.23 1.30	.52 .52	.34 .35	.20 .20						
DC-2	.60 .59	.26 .25	1.18 1.14	.56 .57	.29 .28	.18 .17						
Σ	1.25 1.26	.58 .58	2.41 2.44	1.08 1.09	.63 .63	.38 .37						
DC-3	.68 .68	.33 .34	1.30 1.29	.50 .50	.34 .37	.18 .24						
DC-4	.58 .57	.24 .23	1.12 1.10	.59 .58	.29 .26	.25 .13						
Σ	1.26 1.25	.57 .57	2.42 2.39	1.09 1.08	.63 .63	.35 .37						
DC-AV.	1.26	.58	2.42	1.08	.63	.37						
AC-1	.67	.31	1.28	.57	.34	.19						
AC-2	.67	.31	1.28	.57	.34	.19						
Σ	1.34	.62	2.56	1.14	.68	.38						
S.P.	+8.6		~~+6.8~~									
AC-N	0.0		0.4									

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Col Esp. Line: 3W Int. Cal. Date:

Send	2-3	2-3	2-3		3-4	3-4	3-4		3-4	3-4	3-4	
Rec	Ca	Ca	Ca		Ca	Ca	Ca		Ca	Ca	Ca	
Time	1537	1538	1539		1514	1516	1517		1630	1638	1639	
DC-1	144	261	360		144	260	359		145	255	353	
DC-2	144	261	360		144	260	359		145	255	353	
Σ												
DC-3	144	261	360		144	260	359		145	255	353	
DC-4	144	261	360		144	260	359		145	255	353	
Σ												
DC-AV.												
AC-1	152	269	386		150	267	386		147	265	375	
AC-2	152	269	386		150	267	386		147	265	375	
Σ												
S.P.												
AC-N												

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ____

Project ESPERANZA Line 3W Field date 2 MAR 61 Data page ____ Comp. date ____ Comp. by ____

(A) Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive		2-2.5W	→	2.5-3W	→	→	3-3.5W	→	→	→	3.5-4W	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1493	1474	1484	1469	1463	1484	1464	1452	1449	[illegible]	1455
(E) Vdc (avg)		28.0	6.36	23.6	7.48	2.51	21.8	5.72	2.60	1.11	6.14	2.23
(F) DCcal		1.000										→
(G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	15.0	1.5	6.0	15.0	30.0	6.0	15.0
(H) ρ dc=E×F×G×10^3/D		28.1	25.8	23.9	30.6	25.7	22.0	23.4	26.8	23.0	25.0	23.0
(I) Vac Σ		29.4	6.80	24.6	7.84	2.64	22.6	5.86	2.76	1.18	6.42	2.38
(J) AC noise x 2		.06	.06	.06	.06	.06	.04	.04	.04	.04	.00	.00
(K) Vac (corr) = $\sqrt{I^2 - J^2}$		29.4	6.80	24.6	7.84	2.64	22.6	5.84	2.76	1.18	6.42	2.38
(L) AC-DC cal.		1.060										→
(M) ρ dc/ρac=ExL/K		1.010	1.000	1.016	1.011	1.009	1.021	1.038	1.000	1.000	1.011	.995
(N) PFE=(M-1)(10^2)		1	0	2	1	1	2	4	0	0	1	-1
(O) MCF=(M-1)(10^5)/H		36	0	67	36	35	95	162	0	0	44	-22

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

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4	3-4	3-4	3-4	3-4	3-4
(B) Receive	3.5-4W	→	4-4.5W	→	→	→		CAL	→	→	→	→	→
(C) n separation	4	5	3	4	5	6							
(D) I	1444	1440	1470	1451	1445	1439		285	515	716	276	510	710
(E) Vdc (avg)	1.26	0.58	2.42	1.08	0.63	2.37		288	520	718	290	510	706
(F) DCcal	1.000							.990	.990	.997	.952	1.000	1.006
(G) Kn x 10^{-3}	30.0	52.5	15.0	30.0	52.5	84.0							
(H) ρ dc=E×F×G×10^3/D	26.2	21.2	24.7	22.3	22.9	21.6							
(I) Vac Σ	1.34	0.62	2.56	1.14	0.68	0.38		300	534	760	294	530	750
(J) AC noise x 2	.00	.00	.04	.04	.04	.04							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.34	0.62	2.56	1.14	0.68	0.38		~~1.042~~	~~1.027~~	~~1.058~~	~~1.014~~	~~1.039~~	~~1.062~~
(L) AC-DC cal.	1.062					→		1.042	1.027	1.058	1.014	1.039	1.062
(M) ρdc/ρac =ExL/K	1.000	.995	1.003	1.005	.985	1.032							
(N) PFE=(M-1)(10^2)	0	-1	0	1	-2	3							
(O) MCF=(M-1)(10^5)/H	0	-24	12	22	-66	148							

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project ESPERANZA Line 3E Field date 3MAR61 Data page _____ Comp. date _____ Comp by _____

(A) Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive		1-.5W	→	.5W-0	→	→	0-.5E	→	→	→	.5-1E	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
(E) Vdc (avg)		20.0	6.47	22.4	4.83	2.20	16.45	3.85	1.26	0.58	4.89	1.78
(F) DCcal	1.000											
(G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	15.0	1.5	6.0	15.0	30.0	6.0	15.0
(H) ρ dc=ExFxGx10^3/D		20.0	25.9	22.4	19.3	22.0	16.5	15.4	12.6	11.6	19.6	17.8
(I) Vac Σ		21.2	6.90	23.4	5.04	2.24	17.16	4.20	1.36	0.74	5.20	1.92
(J) AC noise x 2		.08	.08	.06	.06	.06	.12	.12	.12	.12	.12	.12
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		21.2	6.90	23.4	5.04	2.24	17.16	4.20	1.35	0.74	5.20	1.92
(L) AC-DC cal.	1.067											
(M) ρ dc/ρac=ExL/K		1.005	1.000	1.020	1.021	1.046	1.022	1.000	.996	?	1.002	.990
(N) PFE=(M-1)(10^2)		1	0	2	2	5	2	0	0		0	-1
(O) MCF=(M-1)(10^5)/H		25	0	89	109	209	133	0	-30		10	-52

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3	2-3	2-3	2-3	2-3	2-3
(B) Receive	.5-1E	→	1-1.5E	→	→	→		CAL	CAL	CAL	CAL	CAL	CAL
(C) n separation	4	5	3	4	5	6							
(D) I	1500	1500	1500	1500	1500	1500		300	500	700	300	500	700
(E) Vdc (avg)	0.74	0.39	2.24	1.02	0.42	0.28		300	502	704	300	496	694
(F) DCcal	1.000					→	1.000	1.000	.996	.994	1.000	1.008	1.009
(G) Kn x 10^{-3}	30.0	52.5	15.0	30.0	52.5	84.0							
(H) ρ dc=ExFxGx10^3/D	14.8	13.7	22.4	30.4	14.7	15.7							
(I) Vac Σ	0.74	0.40	2.38	1.08	0.46	0.32		320	530	760	320	522	750
(J) AC noise x 2	.06	.06	.06	.06	.06	.06		1.067	1.056	1.080	1.067	1.052	1.081
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	0.74	0.40	2.38	1.08	0.46	0.32							
(L) AC-DC cal.	1.067					→	1.067	1.067	1.056	1.080	1.067	1.052	1.081
(M) ρdc/ρac =ExL/K	1.067	1.040	1.002	1.005	1.000	?							
(N) PFE=(M-1)(10^2)	7	4	0	1	0								
(O) MCF=(M-1)(10^5)/H	450	292	9	25	0	?							

INDUCED POLARIZATION RECEIVER NOTES PAGE

Project [illegible] Line 4w Int.Cal. 52 Date: [illegible]

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	3-3.5W →		3.5-4W	→		4-4.5W	→		→	4.5-5W	→
Time	1020	1022	1037	1038	1039	1055	1056	1058	1059	1130	1131
DC-1	5.80 5.82	1.33 1.34	6.12 6.01	1.48 1.48	.58 .59	5.63 5.98	1.62 1.63	.57 .59	.30 .32	1.58 1.59	.66 .62
DC-2	5.65 5.65	1.29 1.30	6.23 6.27	1.36 1.35	.53 .55	5.60 5.58	1.54 1.54	.63 .62	.28 .26	1.60 1.61	.77 .78
Σ	11.47 11.47	2.62 2.64	12.35 12.28	2.81 2.83	[illegible] [illegible]	11.53 11.56	3.16 3.17	1.20 1.21	.58 .58	3.18 3.19	1.43 1.40
DC- 3	5.79 5.82	1.30 1.32	6.05 5.98	1.48 1.50	.60 .60	6.00 5.98	1.63 1.60	.58 .59	.30 .30	1.52 1.57	.61 .61
DC-4	5.68 5.68	1.30 1.30	6.30 6.34	1.35 1.32	.51 .52	5.50 5.46	1.52 1.51	.62 .62	.27 .27	1.64 1.58	.78 .77
Σ	11.47 11.50	2.60 2.62	12.35 12.32	2.83 2.82	[illegible] [illegible]	11.50 11.44	3.15 3.11	1.20 1.21	.57 .57	3.16 3.15	1.39 1.38
DC-Av	11.47	2.62	12.32	2.82	1.12	11.51	3.15	1.20	.57	3.17	1.40
AC-1	6.08	1.42	6.46	1.52	.62	6.02	1.67	.63	.31	1.68	.73
AC- 2	6.08	1.42	6.46	1.52	.62	6.02	1.67	.63	.31	1.68	.73
Σ	12.16	2.84	12.92	3.04	1.24	12.04	3.34	1.26	.62	3.36	1.46
S.P.	+17.2		+7.4			+11.8				-7.8	
AC-N	.02		.02			.01				.03	

INDUCED POLARIZATION RECEIVER NOTES PAGE

Project: Esperanza Line: 4 W Int. Cal 52 v Date: 2-6-6

							286	509	706			
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4	3-4	3-4	3-4	3-4
Rec.	4.5-5W	→	5-5.5W	→	→	→	Cal	Cal	Cal	Cal	Cal	Cal
Time	1132	1133	1148	1149	1151	1152	1013	1014	1015	1214	1215	1216
DC-1	34 29	19 18	61 60	30 30	15 12	10 12	143	258	353	143	260	358
DC-2	28 27	14 13	71 71	34 34	17 19	08 06	143	258	353	143	260	358
Σ	55	.33 .31	1.32 1.31	.64 .64	.32 .31	.18 .18	286	516	706			
DC-3	31 33	18 20	60 60	29 30	14 12	10 10	143	258	353	143	260	358
DC-4	28 26	13 11	71 72	35 34	18 19	05 06	143	258	353	143	260	358
Σ	59	.31	1.31 1.32	.64 .64	.33 .31	.15	286	516	706			
DC-AV	.59	.32	1.32	.64	.32	.17						
AC-1	.33	.19	.69	.34	.19	.12	151	268	380	152	268	380
AC-2	.33	.19	.69	.34	.19	.12	151	268	380	152	268	380
Σ	.66	.38	1.38	.68	.38	.24	302	536	760			
S. P.	1.80		+19.9									
AC-N	.03		.01									

100' E of 7.5 W - fence

75 W is on line #1

200' W of 8.5 W - power line

Line #5 W [illegible] power line [illegible]

INDUCED POLARIZATION SENDER NOTES.

Project: [illegible] Line: 4W Date: 6 MAY [illegible]

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	AC											
Time		1020	1022	1037	1038	1039	1055	1056	1058	1059	1130	1131
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1478	1463	1480	1465	1460	1482	1461	1452	1448	1471	1455
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4					
Receive							CAL	CAL	CAL	CAL	CAL	CAL
Time	1132	1133	1148	1149	1151	1152	1013	1014	1015	1214	1215	1216
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1446	1441	1466	1449	1440	1434	280	509	705	285	511	709

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page

Project ESPERANZA Line 4W Field date 6MAR61 Data page _____ Comp. date _____ Comp. by _____

(A) Send	2-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	CAL	3-3.5W	→	3.5-4W		→	4-4.5W			→	4.5-5W	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1478	1463	1480	1465	1460	1482	1461	1452	1448	1471	1455
(E) Vdc (avg)		11.47	2.62	12.32	2.82	1.12	11.51	3.15	1.20	0.57	3.17	1.40
(F) DCcal	Used 0.990	→										
(G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	15.0	1.5	6.0	15.0	30.0	6.0	15.0
(H) ρ dc=ExFxGx10^3/D		11.5	10.6	12.4	11.4	[illegible]	11.5	12.8	12.2	11.2	12.8	[illegible]
(I) Vac Σ		12.16	2.84	12.92	3.04	1.24	12.04	3.34	1.26	0.62	3.36	1.46
(J) AC noise x 2		.04	.04	.04	.04	.04	.02	.02	.02	.02	.06	.06
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		12.16	2.84	12.92	3.04	1.24	12.04	3.34	1.26	0.62	3.36	1.46
(L) AC-DC cal	Used 1.060	→										
(M) ρ dc/ρac=ExL/K		1.000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.010	[illegible]	1.000	[illegible]
(N) PFE=(M-1)(10^2)		0	[illegible]	[illegible]	[illegible]	[illegible]	1	0	1	-2	0	2
(O) MCF=(M-1)(10^5)/H		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]	0	[illegible]

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

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4					→
(B) Receive	4.5-5W	→	5-5.5W			→		CAL					→
(C) n separation	4	5	3	4	5	6							
(D) I	1446	1441	1466	1449	1440	1434		280	509	705	285	511	709
(E) Vdc (avg)	0.59	0.32	1.32	0.64	0.32	0.17		286	516	706	286	520	716
(F) DCcal	→						.990	.979	.986	.999	.997	.983	.990
(G) Kn x 10^{-3}	30.0	52.5	15.0	30.0	52.5	84.0							
(H) ρ dc=ExFxGx10^3/D	12.1	11.5	[illegible]	13.1	[illegible]	[illegible]							
(I) Vac Σ	0.66	0.38	1.38	0.68	0.38	0.24		302	536	760	304	536	760
(J) AC noise x 2	.06	.06	.02	.02	.02	.02							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	0.66	0.38	1.38	0.68	0.38	0.24							
(L) AC-DC cal	→						1.060	1.056	1.039	1.076	1.063	1.31	1.061
(M) ρdc/ρac = ExL/K	.948	.893	[illegible]	.948	.892	[illegible]							
(N) PFE=(M-1)(10^2)	-5	-11	1	0	-11	-25							
(O) MCF=(M-1)(10^5)/H	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]							

INDUCED POLARIZATION SURVEY - RECEIVER NOTES

Project: FSP Line: 6E Int/Cal 3-7

Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
Rec.	7.5-7w →		7-6.5w →				Cal	Cal	Cal			
Time	1550	1551	1558	1559	1600	1601	1515	1516	1517	1609	1610	1611
DC-1	60 60	20 20	1.21 1.16	57 50	29 28	13 13	145	260	361	142	258	356
DC-2	60 61	25 25	1.32 1.39	70 75	29 31	10 10	145	260	361	142	258	356
Σ	1.20 1.21	.45 .45	2.53 2.55	127 125	.58 .59	.23 .23	290	520	722	284	516	712
DC-3	60 59	20 19	1.10 1.04	47 40	26 24	13 13	145	260	361	142	258	356
DC-4	61 62	25 26	1.45 1.50	80 85	33 34	10 10	145	260	361	142	258	356
Σ	1.21 1.21	.45 .45	2.55 2.54	127 125	.59 .58	.23 .23	290	520	722	284	516	712
DC-AV	1.21	.45	2.54	1.26	.59	.23	290	520	722	284	516	71[illegible]
AC-1	.62	.23	1.25	.63	.32	.12	146	258	370	146	255	363
AC-2	.62	.23	1.25	.63	.32	.12	146	258	370	146	255	363
Σ	1.24	.46	2.50	1.26	.64	.24	292	516	740	292	510	726
S. P.	+0.4		+19.3									
AC-N	.02		.02									

INDUCED POLARIZATION RECEIVER NOTES PAGE

Project ESparanza Line 6E Loc. Cal Date 3-7

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec	9-8.5w →		8.5-8w →			8-7.5w →				7.5-7w →	
Time	1520	1521	1529	1530	1531	1539	1540	1541	1542	1548	1549
DC	17.2	3.47	16.1	4.05	1.12	14.3	4.00	1.45	.48	3.40	1.42
	17.2	3.53	16.1	4.02	1.12	14.3	4.00	1.46	.48	3.36	1.42
	17.2	3.29	16.2	4.00	1.10	14.3	3.86	1.41	.50	3.58	1.38
DC	17.2	3.26	16.2	4.01	1.09	14.3	3.86	1.39	.50	3.59	1.39
Σ	34.4	6.76	32.3	8.05	2.22	28.6	7.86	2.86	.98	6.98	2.80
	34.4	6.79	32.3	8.03	2.21	28.6	7.86	2.85	.98	6.95	2.80
DC	17.2	3.55	16.0	4.00	1.13	14.3	3.99	1.47	.48	3.31	1.42
	17.2	3.57	16.0	4.00	1.13	14.3	3.98	1.48	.49	3.28	1.42
	17.2	3.22	16.3	4.03	1.10	14.3	3.88	1.39	.50	3.60	1.38
	17.2	3.21	16.3	4.03	1.09	14.3	3.88	1.38	.49	3.61	1.38
Σ	34.4	6.77	32.3	8.03	2.23	28.6	7.87	2.86	.98	6.91	2.80
	34.4	6.79	32.3	8.03	2.22	28.6	7.86	2.86	.98	6.89	2.80
DC-AV	34.4	6.78	32.3	8.03	2.22	28.6	7.86	2.86	.98	6.94	2.80
AC	17.3	3.45	16.2	4.10	1.15	14.4	4.00	1.46	.51	3.55	1.42
AC	17.3	3.45	16.2	4.10	1.15	14.4	4.00	1.46	.51	3.55	1.42
Σ	34.6	6.90	32.4	8.20	2.30	28.8	8.00	2.92	1.02	7.10	2.84
S.P.	+188		+0.7			+17.4				+0.4	
AC-%	.01		.05			.01				.02	

INDUCED POLARIZATION SENDER NOTES

project: ESPERANZA Line: 6E Date: 7 MAR 61

Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	CAL											
Time		1520	1521	1529	1530	1531	1538	1540	1541	1542	1548	1549
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1500	1483	1495	1480	1471	1486	1471	1463	1457	1477	1461
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
Receive							CAL	CAL	CAL	CAL	CAL	CAL
Time	1550	1551	1558	1559	1600	1601	1515	1516	1517	1609	1610	1611
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1454	1449	1470	1454	1445	1439	285	510	711	284	510	706

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Project Esperanza Line 6E Field Date Mar. 7, 61 Data mp. date Mar. 6, 61 Comp. C.S.L

(A) Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	[illegible]	2-3
(B) Receive	CAL	9-8.5W	→	8.5-8W	→	→	8-7.5W	→	→	→	7.5-7W	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1500	1483	1495	1480	1471	1486	1471	1463	1457	1477	1461
(E) Vdc (avg)		34.4	6.78	32.3	8.03	2.22	28.6	7.86	2.86	.98	6.94	2.80
(F) DCcal	.990											
(G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	1.5	1.5	6.0	1.5	[illegible]	[illegible]	[illegible]
(H) ρ dc=ExFxGx10^3/D		34.8	27.1	31.1	32.2	22.4	28.6	31.7	29.0	20.0	27.9	28.4
(I) Vac Σ		34.6	6.90	32.4	8.20	2.30	28.8	8.00	2.92	1.02	7.10	2.84
(J) AC noise x 2		.02	.02	.10	.10	.10	.02	.02	.02	.02	.04	.04
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		34.6	6.90	32.4	8.20	2.30	28.8	8.00	2.92	1.02	7.10	2.84
(L) AC-DC cal.	1.025											
(M) ρ dc/ρac=ExL/K		1.019	1.008	1.021	1.004	.990	1.018	1.008	1.003	.985	1.048	1.040
(N) PFE=(M-1)(10^2)		2	1	2	0	-1	2	1	0	-2	5	4
(O) MCF=(M-1)(10^5)/H		55	30	68	12	-45	63	25	10	-75	172	141

Project Esperanza Line 6F Field Date Mar. 7, 61 Data page Comp. date Mar. 6, 61 Comp by C.S.L

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3				
(B) Receive	→	→	[illegible]			→	CAL	CAL				
(C) n separation	4	5	3	4	5	6						
(D) I	1454	1449	1470	1454	1445	1439	285	510	711	284	510	706
(E) Vdc (avg)	1.21	.45	2.54	1.26	.59	.23	290	520	722	284	516	712
(F) DCcal							.983	.981	.986	1.000	.988	.993
(G) Kn x 10^{-3}	30	52.5	[illegible]	[illegible]	[illegible]	[illegible]						
(H) ρ dc=ExFxGx10^3/D	24.7	16.2	25.6	25.7	21.2	13.3						
(I) Vac Σ	1.24	.46	2.50	1.26	.64	.24	292	516	740	292	510	726
(J) AC noise x 2	.04	.04	.04	.04	.04	.04						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.24	.46	2.50	1.26	.64	.24						
(L) AC-DC cal.							1.006	.992	1.023	1.028	.989	1.020
(M) ρdc/ρac =ExL/K	1.001	1.002	1.041	1.025	.945	?						
(N) PFE=(M-1)(10^2)	0	0	4	3	?	?						
(O) MCF=(M-1)(10^5)/H	4	12	160	97	?	?						

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Esperanza Line 5 W Int Date

d	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4	3-4	3-4	3-4	3-4
	8-8.5 W →		8.5 9W →				Cal	Cal	Cal	Cal	Cal	Cal
	1516	1517	1539	1540	1541	1543	1430	1431	1432	1547	1548	1549
	.51	29	1.38	.61	.27	17						
	.51	29	1.39	.62	.26	17	145	262	360	144	259	357
	.51	25	1.21	.65	.30	12						
	.52	25	1.21	.66	.31	12	145	262	360	144	259	357
Σ	1.02 1.03	.54 .54	2.59 2.60	1.26 1.28	.57 .57	.29 .29						
	.50	29	1.40	.61	.25	17						
	.50	30	1.41	.61	.24	17	145	262	360	144	259	357
	.53	25	1.18	.66	.32	12						
	.54	24	1.18	.66	.33	12	145	262	360	144	259	357
Σ	1.03 1.04	.54 .54	2.58 2.59	1.27 1.27	.57 .57	.29 .29						
-AV	1.03	.54	2.59	1.27	.57	.29						
	57	.28	1.38	.70	32	.16	152	270	388	151	268	383
	57	.28	1.38	.70	32	.16	152	270	388	151	268	383
Σ	1.14	.56	2.76	1.40	.64	.32						
S.P.	+15.7		+7.9									
AC-N	.01		.01									

INDUCED POLARIZATION RECEIVER NOTES PAGE _____

Project: Esparanza Line: 5W Inst.Cal _____ Date: 3-6-61

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		6.5-7W	→	7-7.5W	→		7.5-8W	→			8-8.5W	→
Time		1438	1440	1451	1453	1454	1502	1503	1505	1507	1514	1515
DC-1		8.02 9.04	2.11 2.09	11.5 11.4	2.08 2.06	.82 .81	12.0 11.9	3.00 2.99	.99 .98	.45 .45	3.23 3.23	1.50 1.50
DC-2		8.79 8.70	2.14 2.16	11.5 11.5	2.24 2.25	.78 .80	11.9 11.9	2.98 2.99	.91 .91	.42 .41	3.18 3.18	1.04 1.02
Σ		17.81 17.74	4.25 4.25	23.0 22.9	4.32 4.31	1.60 1.61	23.9 23.8	5.98 5.98	1.90 1.89	.83 .86	6.41	2.54 2.52
DC-3		9.03 9.03	2.07 2.04	11.4 11.4	2.06 2.04	.80 .81	11.9 11.9	2.98 2.95	.97 .97	.48 .47	3.27 3.27	1.52 1.53
Dc-4		9.65 9.60	2.18 2.19	11.4 11.4	2.26 2.27	.81 .80	11.8 11.8	3.00 3.03	.93 .93	.40 .40	3.11 3.11	1.00 1.00
Σ		18.58 18.63	4.25 4.23	22.8 22.8	4.32 4.31	1.61 1.61	23.7 23.7	5.98 5.96	1.90 1.90	.88 .87	6.38	2.53 2.53
DC-AV		18.22	4.24	22.9	4.32	1.61	23.8	5.99	1.90	.87	6.40	2.53
AC-1		9.10	2.22	12.0	2.28	.87	12.4	3.11	1.00	.50	3.38	1.36
AC-2		9.10	2.22	12.0	2.28	.87	12.4	3.11	1.00	.50	3.38	1.36
Σ		18.20	4.44	24.0	4.56	1.74	24.8	6.22	2.00	1.00	6.76	2.72
S. P.		+12.4		+11.7			+14.8				+16.3	
AC-N		.02		.03			.02				.01	

INDUCED POLARIZATION SENDER NOTES

Project: ESPERANZA Line: 5W Date: 6 MAR 81

Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	CAL											
Time		1438	1440	1451	1453	1454	1502	1503	1505	1507	1514	1515
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1490	1472	1480	1464	1457	1479	1462	1449	1453	1471	1458
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4	3-4	3-4	3-4	3-4
Receive							CAL	CAL	CAL	CAL	CAL	CAL
Time	1516	1517	1539	1540	1541	1543	1430	1431	1432	1547	1548	1549
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1446	1441	1472	1461	1454	1449	287	515	715	286	514	711

ESPERANZA — SW — 6 MAR 61

3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
CAL	6.5-7W	→	7-7.5W		→	7.5-8W	→			8-8.5W	→
	1	2	1	2	3	1	2	3	4	2	3
	1470	1472	1480	1464	1457	1479	1462	1449	1453	1471	1458
	18.22	4.24	22.9	4.32	1.61	23.8	5.98	1.90	.87	6.40	2.53
USED-.990											
	1.5	6.0	1.5	6.0	15.0	1.5	6.0	15.0	30.0	6.0	15.0
	18.2	17.1	27.0	17.5	16.4	27.9	24.2	19.5	17.8	25.8	25.8
	18.20	4.44	24.0	4.56	1.74	24.8	6.22	2.00	1.00	6.76	2.72
	.04	.04	.06	.00	.00	.04	.04	.04	.04	.02	.02
	18.20	4.44	24.0	4.56	1.74	24.8	6.22	2.00	1.00	6.76	2.72
USED-1.060											
	1.061	1.011	1.011	1.004	.981	1.018	1.019	1.008	.921	1.003	.986
	6	1	1	0	-2	2	2	1	-8?	0	-1 0
	335	64	48	23	-12	75	79	41	-44	12	-54

Project — Field date — a page — Comp. date — Comp by

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4	→				
(B) Receive	8-8.5W	→	8.5-9W	→				CAL	→				
(C) n separation	4	5	3	4	5	6							
(D) I	1446	1441	1472	1461	1454	1449		287	515	715	286	514	711
(E) Voc (avg)	1.03	0.54	2.59	1.27	0.57	0.29		290	524	720	288	518	714
(F) DCcal							.990	.990	.983	.993	.993	.992	.996
(G) Xn x 10^{-3}	30.0	52.5	15.0	30.0	52.5	84.0							
(H) dc=ExFxGx10^3/D	21.2	19.5	26.1	25.8	20.4	16.7							
(I) Vac E	1.14	.56	2.76	1.40	0.64	0.32		304	540	776	302	536	766
(J) AC noise x 2	.02												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.14	.56	2.76	1.40	0.64	0.32							
(L) AC-DC cal							1.060	1.048	1.031	1.078	1.049	1.034	1.073
(M) dc/Vac = ExL/K	.959	1.022	.996	.961	.944	.961							
(N) PFE=(M-L)(10²)	-4?	2	0	-4?	-6?	-4?							
(O) MCF=(M-L)(10⁵)/H	-193	113	-15	-151	-274	-234							

EXPLORATION COMPANY

COMPUTATION SHEET

Project Esperanza 5E Mar 3,61 Mar 8,61 C.S.L.

(A) Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Rec	CAL	5.5-5W	→	5-4.5W	→	→	4.5-4W	→	→	→	4-3.5W	—
(C) n separation		1	2	1	3	3	1	2	3	4	2	3
(D) I		1491	1469	1488	1475	1459	1484	1468	1462	1449	1474	1463
(E) Vdc (avg)		18.29	4.22	16.72	4.26	1.60	14.50	3.52	1.57	.76	3.60	1.42
(F) DC cal	USED - .990											
(G) Kn		1.5	6.0	1.5	6.0	1.5	1.5	6.0	1.5	[illegible]	6.0	
(H) ρ dc=ExFxGx10³/I		18.2	17.1	16.7	17.1	16.3	14.5	14.2	15.9	15.6	14.5	14.4
(I) Vac Σ		17.98	4.28	16.56	4.36	1.62	14.52	3.64	1.64	.80	3.62	1.50
(J) AC noise x 2		.12	.12	.06	.06	.06	.08	.08	.08	.08	.04	.04
(K) Vac (corr) = √(I² - J²)		17.98	4.28	16.56	4.36	1.62	14.52	3.64	1.64	.79	3.62	1.50
(L) AC-DC cal	USED - 1.020											
(M) ρ dc/ρ ac = E·I·K		1.038	1.007	1.031	.998	1.007	1.018	.988	.977	.981	1.013	.966
(N) FFE=(M-1)(10²)		4	1	3	0	1	2	-1	-2	-2	1	-3
(O) MCF=(M-1)(10⁵)/H		209	41	186	-12	43	124	-85	-145	-122	90	-236

Project Esperanza 5E Mar 3,61 Mar 8,61 C.S.L.

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
(B) Receive	→	→	3.5-3W	→	→	→	CAL	CAL	CAL	CAL	CAL	CAL
(C) n separation	4	5	3	4	5	6						
(D) I	1457	1445	1471	1456	1450	1437		280	512	709	284	515	712
(E) Vac (avg)	.79	.41	1.34	.67	.40	.24		288	518	720	290	522	720
(F) DC cal	→	→	→	→	→	→	.990	.973	.990	.985	.990	.986	.990
(G) Kn x 10⁻³	30.0	52.5	15.0	30.0	52.5	84.0							
(H) ρ dc=ExFxGx10³/D	16.1	14.7	13.5	13.7	14.3	13.9							
(I) Vac Σ	.82	.44	1.38	.66	.42	.24		292	518	724	294	518	724
(J) AC noise x 2	.04	.04	.08	.08	.08	.08							
(K) Vac (corr) = √(I² - J²)	.82	.44	1.38	.65	.41	.23							
(L) AC-DC cal	→	→	→	→	→	→	1.020	1.013	1.000	1.018	1.012	1.008	1.018
(M) ρ dc/ρ ac = E·I·K	.983	.952	.991	1.051	.996	1.064						
(N) FFE=(M-1)(10²)	-2	-5	-1	5	0	6						
(O) MCF=(M-1)(10⁵)/H	-106	-326	-67	372	-22	460						

INDUCED POLARIZATION SURVEY - RECEIVER NOTES

Project: Esperanza Line: 5E Int: 52 3-7-61

Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
Rec.	4-3.5 →		3.5-3W		→		1115	1116	1117	1259	1300	1301
Time	1213	1214	1222	1224	1225	1226	Col	Col	Col			
DC-1	.40 .40	.22 .22	.70 .69	.30 .31	22 20	15 11	144	259	360	145	261	360
DC-2	.39 .39	.19 .18	.63 .65	.38 .37	18 15	11 13	144	259	360	145	261	360
Σ	.79 .79	.41 .40	1.33 1.34	.68 .68	.40 .39	26 24	288	518	720	290	522	720
DC-3	.40 .40	.26 .26	.68 .67	.28 .28	25 28	10 11	144	259	360	145	261	360
DC-4	.39 .39	.16 .16	.65 .67	.37 .38	15 13	12 13	144	259	360	145	261	360
Σ	.79 .79	.42 .42	1.33 1.34	.65 .66	.40 .41	22 24	288	518	720	290	522	720
DC-AV	.79	.41	1.34	.67	.40	.24	288	518	720	290	522	720
AC-1	.41	22	.69	.33	.21	.12	146	259	367	147	259	367
AC-2	.41	22	.69	33	.21	.12	146	259	367	147	259	367
Σ	.82	.44	1.38	.66	.42	.24	292	518	734	294	518	734
S. P.	+11.8		+2.2									
AC-N	.02		.04									

INDUCED [illegible] ATION SURVEY [illegible] NOTE [illegible] PAGE

Project Esp Line: 5E Int. [illegible] 520 [illegible]

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec	5.5W-5 →		5-4 5W	→		4.5-4	→			4-4 5W →	
Time	1133	1134	1142	1143	1145	1152	1153	1155	1156	1211	1212
DC-1	9.0	2.14	8.44	2.08	.79	7.33	1.70	.82	.38	1.74	.70
	8.92	2.15	8.45	2.11	.80	7.33	1.72	.82	.36	1.75	.67
DC-2	9.38	2.08	8.30	2.18	.80	7.19	1.82	.76	.38	1.86	.72
	9.40	2.07	8.26	2.17	.80	7.19	1.80	.75	.39	1.85	.75
Σ	18.38	4.22	16.75	4.26	1.59	14.52	3.52	1.58	.76	3.60	1.42
	18.32	4.22	16.71	4.28	1.60	14.52	3.52	1.57	.75	3.60	1.42
DC-3	9.40	2.17	8.20	2.05	.80	7.30	1.72	.83	.34	1.86	.70
	9.40	2.19	8.19	2.04	.82	7.30	1.73	.83	.36	1.82	.68
DC-4	8.85	2.04	8.52	2.20	.79	7.18	1.80	.74	.40	1.74	.74
	8.81	2.02	8.50	2.22	.78	7.17	1.79	.73	.40	1.77	.73
Σ	18.25	4.21	16.72	4.25	1.59	14.48	3.52	1.57	.75	3.60	1.44
	18.21	4.21	16.69	4.26	1.60	14.47	3.52	1.56	.76	3.59	1.41
DC-AV.	18.29	4.22	16.72	4.26	1.60	14.50	3.52	1.57	.76	3.60	1.42
AC-1	8.99	2.14	8.28	2.18	.81	7.26	1.82	.82	.40	1.81	.75
AC-2	8.99	2.14	8.28	2.18	.81	7.26	1.82	.82	.40	1.81	.75
Σ	17.98	4.28	16.56	4.36	1.62	14.52	3.64	1.64	.80	3.62	1.50
S.P.	-2.8		+20.9			+2.2				+11.8	
AC-N	06.		.03			.04				02	

INDUCED POLARIZATION SENDER NOTES

Project: ESPERANZA Line: 5E Date: 7 MARCH

Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	CAL											
Time		1133	1134	1142	1143	1145	1152	1153	1455	1156	1211	1212
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1491	1469	1488	1475	1459	1484	1468	1462	1449	1474	1463
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
Receive							CAL	CAL	CAL	CAL	CAL	CAL
Time	1213	1214	1222	1224	1225	1226	1115	1116	1117	1259	1300	1301
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1457	1445	1471	1456	1450	1437	280	512	709	284	515	712

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE 2

Project: Esperanza Line: 4E Int. Cal. _____ Date: 4 March

Send	3-4	4-5	1-2	2-3	3-4	4-5						
Rec.												
Time	1058	1100	1110	1112	1113							
DC-1	29 30	16 17	58 58	37 38	11 13	09 11						
DC-2	23 20	09 08	64 62	19 17	16 15	09 05						
Σ	.52 .50	.23 .25	1.22 1.20	.56 .55	.29 .28	.16 .16						
DC-3	30 31	19 21	58 60	40 43	16 18	10 13						
DC-4	19 18	08 05	62 60	12 11	12 11	05 02						
Σ	.49 .49	.27 .26	1.20 1.20	.54 .54	.28 .29	.15 .15						
DC-AV.	.50	.25	1.20	.55	.29	.16						
AC-1	28	.16	.65	.30	.17	.09						
AC-2	.28	.16	65	.30	.17	.09						
Σ	.56	.32	1.30	.60	.34	.18						
S.P.	+185		+102									
AC-N	.02		01									

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE 3

Project: Esparanza Line: 4E Int. Cal. _____ Date: 4/March

Send	2-3	2-3	2-3		2-3	2-3	2-3					
Rec	Cal	Cal	Cal		Cal	Cal	Cal					
Time	1007	1008	1009		1138	1139	1140					
DC-1	140	258	355		142	259	357					
DC-2	140	258	355		142	259	357					
Σ	280											
DC-3	140	258	355		142	259	357					
DC-4	140	258	355		142	259	357					
Σ	280											
DC-AV.	280	516	710		284	518	714					
AC-1	148	267	380		151	269	380					
AC-2	148	267	380		151	269	380					
Σ												
S.P.												
AC-N												

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Esposito Line: 4 E Int.Cal. _____ Date: 4 March

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.												
Time		1013	1015	1022	1023	1025	1033	1044	1045	1046	1054	1057
DC-1		5.68 5.69	1.31 1.29	7.40 7.40	1.39 41	.54 .57	7.46 7.45	1.51 1.50	.61 .58	23 22	1.60 1.59	.63 .62
DC-2		5.72 5.70	1.32 1.33	7.30 7.28	1.41 1.39	.52 .50	7.40 7.40	1.49 1.48	.46 .49	23 25	1.66 1.69	.55 .51
Σ		11.40 11.35	2.63 2.62	14.70 14.68	2.79 2.80	1.07 1.07	14.85 14.85	3.00 2.98	1.09 1.07	.46 47	3.26 3.26	1.18 1.13
DC-3		5.62 5.61	1.30 1.31	7.38 7.39	1.43 1.47	.59 .66	7.46 7.45	1.52 1.49	.58 .60	21 26	1.54 1.54	.66 .68
DC-4		5.67 5.66	1.34 1.33	7.23 7.20	1.36 1.32	.49 .48	7.39 7.38	1.47 1.48	.45 .44	27 29	1.20 1.22	.51 49
Σ		11.29 11.27	2.65 2.64	14.61 14.59	2.79 2.79	1.08 1.08	14.85 14.83	2.99 2.97	1.03 1.04	.48 .49	3.25 3.27	1.17 1.17
DC-AV		11.33	2.64	14.64	2.79	1.08	14.84	2.98	1.06	.48	3.26	1.16
AC-1		6.00	1.42	7.63	1.49	58	7.75	1.58	.57	.29	1.71	.60
AC-2		6.00	1.42	7.63	1.49	58	7.75	1.58	.57	29	1.71	.60
Σ		12.00	2.84	14.26	2.98	1.16	15.50	3.16	1.14	.58	3.42	1.20
S. P.		+11.8		+1.3			+17.8				+18.5	
AC-N		.05		.03			.03				.02	

France — Telegraph line [illegible] 314
[illegible] Com[illegible]

INDUCED POLARIZATION SENSER NOTES

Project: ESPERANZA Line: 45 Date 4 MAR 81

Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	AL											
Time		1013	1015	1022	1023	1025	1033	1044	1045	1046	1055	1057
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1480	1471	1494	1470	1464	1479	1476	1460	1454	1474	1460
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	→				
Receive							CAL	→				
Time	1058	1100	1110	1112	1113	1115	1007	1008	1009	1138	1139	1140
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1450	1446	1460	1450	1444	1440	278	510	709	281	510	709

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page____

Project ESPERANZA Line 4E Field date 4/March Data page____ Comp. date____ Comp by____

(A) Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive												
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1480	1471	1484	1470	1464	1479	1476	1460	1454	1474	1460
(E) Vdc (avg)		11.33	2.64	14.64	2.79	1.08	14.84	2.98	1.06	0.48	3.26	1.16
(F) DCcal		1										
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		11.4	10.7	14.6	11.3	11.0	15.0	12.0	10.8	9.8	13.1	11.8
(I) Vac Σ		12.00	2.84	14.26	2.98	1.16	15.50	3.16	1.14	0.58	3.42	1.20
(J) AC noise x 2		.10	.10	.06	.06	.06	.06	.06	.06	.06	.04	.04
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		12.00	2.84	14.26	2.98	1.16	15.50	3.16	1.14	0.58	3.42	1.20
(L) AC-DC cal.	1.060	1.060										
(M) ρ dc/ρac=ExL/K		1.000	.986	1.031	.994	.988	1.016	1.000	.986	?	1.010	1.022
(N) PFE=(M-1)(10^2)		0	-1	3	-1	-1	2	0	-1		1	2
(O) MCF=(M-1)(10^5)/H		0	-131	212	-53	-102	107	0	-130		27	186

Project____ Line____ Field date____ Data page____ Comp. date____ Comp by____

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3	2-3	2-3	2-3	2-3	2-3
(B) Receive								CAL	→				
(C) n separation	4	5	3	4	5	6							
(D) I	1450	1446	1460	1450	1444	1440		278	510	709	281	510	709
(E) Vdc (avg)	.50	0.25	1.20	0.55	.29	.16		280	516	710	284	518	714
(F) DCcal	990	→				→		.993	.988	.999	.989	.985	.993
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84.0							
(H) ρ dc=ExFxGx10^3/D	10.2	8.9	12.2	11.3	10.4								
(I) Vac Σ	.56	0.32	1.30	0.60	.34	.18		296	534	760	302	538	760
(J) AC noise x 2	.04	.04	.02	.02	.02	.02							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.56	0.32	1.30	.60	.34	.18							
(L) AC-DC cal.	1.060	→				→		1.057	1.035	1.070	1.063	1.039	1.064
(M) ρdc/ρac =ExL/K	?	?	.980	.974	?	?							
(N) PFE=(M-1)(10^2)			-2	-3									
(O) MCF=(M-1)(10^5)/H			-164	-230									

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project Esperanza Line 6 W Field date Mar. 9, 61 Data page _____ Comp. date Mar. 13, 61 Comp. by C.S.L.

(A) Send	3 - 4	2 - 3	1 - 2	3 - 4	2 - 3	1 - 2	4 - 5	3 - 4	2 - 3	1 - 2	4 - 5	3 - 4
(B) Receive	CAL	10-10.5 W →		10.5-11 W →			11-11.5 W →				11.5-12 W →	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1487	1475	1489	1474	1467	1486	1470	1460	1455	1473	1460
(E) Vdc (avg)		25.4	6.70	55.8	16.89	5.97	79.7	19.52	6.79	2.66	5.17	1.99
(F) DCcal	USED .995											
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		25.5	27.1	56.0	68.3	60.7	81.1	79.3	69.3	54.5	20.9	20.3
(I) Vac Σ		25.6	6.84	54.6	16.78	6.04	81.0	18.86	6.80	2.68	5.10	2.02
(J) AC noise x 2		.06	.06	.08	.08	.08	.12	.12	.12	.12	.04	.04
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		25.6	6.84	54.6	16.78	6.04	81.0	18.86	6.80	2.68	5.10	2.02
(L) AC-DC cal.	USED 1.007											
(M) ρ dc/ρac=ExL/K		1.018	1.004	1.049	1.031	1.013	1.010	1.062	1.028	1.018	1.040	1.010
(N) PFE=(M-1)(10^2)		2	0	5	3	1	1	6	2	2	4	1
(O) MCF=(M-1)(10^5)/H		71	15	88	45	21	13	78	32	33	191	49

Project Esperanza Line 6 W Field date Mar. 9, 61 Data page _____ Comp. date Mar. 13, 61 Comp. by C.S.L.

(A) Send	2 - 3	1 - 2	4 - 5	2 - 4	2 - 3	1 - 2	3 - 4	3 - 4				
(B) Receive	→		12-12.5 W	→			CAL	CAL				
(C) n separation	4	5	3	4	5	6						
(D) I	1449	1443	1470	1452	1445	1439		284	513	710	283	514	710
(E) Vdc (avg)	.94	.48	1.99	1.00	.56	.29		288	524	722	284	516	718
(F) DCcal							.995	.987	.979	.984	.998	.995	.982
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84							
(H) ρ dc=ExFxGx10^3/D	19.3	17.3	20.2	20.5	20.2	16.8							
(I) Vac Σ	.98	.54	2.02	1.06	.60	.34		294	520	740	292	514	732
(J) AC noise x 2	.04	.04	.10	.10	.10	.10							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.98	.54	2.02	1.06	.59	.32		1.020	.993	1.023	1.028	.996	1.020
(L) AC-DC cal.							1.025						
(M) ρdc/ρac =ExL/K	.984	.912	1.010	.968	.973	.930							
(N) PFE=(M-1)(10^2)	-2	-9	1	-3	-3	-7			≐	1.025			
(O) MCF=(M-1)(10^5)/H	-83	-509	49	-156	-134	-414							

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Espinosa Line: 6W Int.Cal. 52-0 Date 3-9

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	10-10.5N →		10.5-11N →			11-11.5N →				11.5-12N →	
Time	1001	1002	1010	1012	1013	1022	1023	1025	1026	1034	1036
DC-1	12.8 12.7	3.43 3.43	28.0 27.9	8.24 8.25	3.00 3.00	40.6 39.9	9.66 9.67	3.40 3.39	1.33 1.32	2.76 2.77	1.01 1.00
DC-2	12.7 12.7	3.26 3.27	27.8 27.9	8.65 8.63	2.95 2.96	39.8 39.8	9.86 9.88	3.39 3.40	1.32 1.31	2.40 2.42	.95 .98
Σ	25.5 25.4	6.69 6.70	55.8 55.8	16.90 16.88	5.95 5.96	79.8 79.7	19.52 19.55	6.79 6.79	2.65 2.63	5.16 5.19	1.96 2.02
DC-3	12.7 12.7	3.44 3.41	27.9 27.9	8.23 8.22	2.99 2.99	39.8 39.9	9.64 9.63	3.41 3.42	1.43 1.31	2.75 2.73	1.02 1.07
DC-4	12.7 12.7	3.28 3.28	27.8 27.8	8.66 8.66	2.99 3.00	39.7 39.8	9.87 9.87	3.39 3.37	1.28 1.33	2.42 2.41	.94 .95
Σ	25.4 25.4	6.73 6.69	55.7 55.7	16.69 16.88	5.98 5.99	79.5 79.7	19.51 19.50	6.80 6.79	2.71 2.66	5.17 5.14	1.96 2.02
DC-AV	25.4	6.70	55.8	16.89	5.97	79.7	19.52	6.79	2.66	5.17	1.99
AC-1	12.8	3.42	27.3	8.39	3.02	40.5	9.43	3.40	1.34	2.55	1.01
AC-2	12.8	3.42	27.3	8.39	3.02	40.5	9.43	3.40	1.34	2.55	1.01
Σ	25.6	6.84	54.6	16.78	6.04	81.0	18.86	6.80	2.68	5.10	2.02
S. P.	+8.2		+5.9			+4.1				+6.1	
AC-N	.03		.04			.06				.02	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE 3-9

Project: Espo... Line: 6 W Int. Cal. 52.0 Date:

Send	2-3	1-2	4-5	3-4	2-3	1-2					
Rec	11.5-12W →		12-12.5W →								
Time	1038	1039	1047	1049	1050	1051					
DC-1	55 56	24 26	1.00 99	47 56	31 33	17 17					
DC-2	40 38	24 26	1.00 1.00	50 45	26 23	11 12					
Σ	94 94	.49 .46	2.00 1.99	.97 1.01	.57 .56	.28 .29					
DC-3	59 52	27 23	.99 1.00	51 51	31 36	20 20					
DC-4	37 39	21 25	.99 1.00	51 49	23 21	10 10					
Σ	96 91	.48 .46	1.98 2.00	1.02 1.00	.54 .57	.30 .30					
DC-AV.	.94	.48	1.99	1.00	.56	.29					
AC-1	49	.27	1.01	53	.30	.17					
AC-2	49	.27	1.01	.53	.30	.17					
Σ	.98	.54	2.02	1.06	.60	.34					
S.P.	+16.1		+6.5								
AC-N	.02		.05								

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project ESP . Line 6W Int.Cal. Date: 3-9-61

Send	3-4	3-4	3-4	3-4	3-4	3-4						
Rec.	Cal	Cal	Cal	Cal	Cal	Cal						
Time	954	955	956	1113	1114	1115						
DC-1	144	262	361	142	258	359						
DC-2	144	262	361	142	258	359						
Σ	288	524	722	284	516	718						
DC- 3	144	262	361	142	258	359						
DC-4	144	262	361	142	258	359						
Σ	288	524	722	284	516	718						
DC-Av	288	524	722	284	516	718						
AC-1	147	260	370	146	257	366						
AC- 2	147	260	370	146	257	366						
Σ	294	520	740	292	514	732						
S.P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

project: CSPERANZA Line: 6 W (.5 μfd) Date: 9 MAR

Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	CAL											
Time		1001	1002	1010	1012	1013	1022	1023	1025	1026	1035	1036
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1487	1475	1489	1474	1467	1486	1470	1460	1455	1473	1460
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4					
Receive							CAL					
Time	1038	1039	1047	1049	1050	1051	0954	0955	0956	1113	1114	1115
%Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1449	1443	1470	1452	1445	1439	284	513	710	283	514	710

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project Esperanza Line 7E Field date Mar. 19, 61 Data page _____ Comp. date Mar. 19, 61 Comp by C.S.L. Page _____

(A) Send	2 - 3	3 - 4	4 - 5	2 - 3	3 - 4	4 - 5	1 - 2	2 - 3	3 - 4	4 - 5	1 - 2	2 - 3
(B) Receive	CAL	12 - 11.5W →		11.5 - 11W	→		11 - 10.5W	→			10.5 - 10W	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1502	1483	1496	1477	1464	1477	1460	1454	1444	1464	1446
(E) Vdc (avg)		46.4	11.59	41.6	10.18	3.62	64.3	14.75	5.57	2.37	16.97	5.01
(F) DCcal	USED 100											
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		45.4	45.9	41.0	40.5	36.3	64.3	59.4	55.9	48.1	68.0	51.0
(I) Vac Σ		46.4	11.72	42.0	10.36	3.68	66.8	14.76	5.54	2.42	16.72	5.00
(J) AC noise x 2		.10	.10	.10	.0	.10	.06	.06	.06	.06	.08	.03
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		46.4	11.72	42.0	10.36	3.68	66.8	14.76	5.54	2.42	16.72	5.00
(L) AC-DC cal.	USED=100											
(M) ρ dc/ρac=ExL/K		1.020	1.008	1.015	1.002	1.002	.983	1.019	1.021	1.000	1.004	1.021
(N) PFE=(M-1)(10^2)		2	1	2	2	0	-2	2	2	0	0	2
(O) MCF=(M-1)(10^5)/H		44	12	37	5	6	-27	32	38	0	6	41

Project Esperanza Line 7E Field date Mar. 19, 61 Data page _____ Comp. date Mar. 19, 61 Comp by C.S.L.

(A) Send	3 - 4	4 - 5	1 - 2	2 - 3	3 - 4	4 - 5	2 - 3	2 - 3	→	→	→	→
(B) Receive	→	→	10 - 9.5W	→	→	→	CAL	CAL	→	→	→	→
(C) n separation	4	5	3	4	5	6						
(D) I	1442	1437	1458	1448	1444	1424		278	509	711	280	510	705
(E) Vdc (avg)	2.26	1.13	1.96	.81	.50	.23		286	520	722	284	516	714
(F) DCcal							.940	.971	.979	.950	.987	.988	.988
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84							
(H) ρ dc=ExFxGx10^3/D	46.0	40.5	19.4	16.5	17.8	13.3							
(I) Vac Σ	2.24	1.18	2.02	.98	.52	.26		290	520	760	288	512	726
(J) AC noise x 2	.08	.08	.08	.08	.08	.08							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.24	1.18	2.02	.98	.51	.25							
(L) AC-DC cal.	→	→	→	→	→	→	1.020	1.013	1.000	1.051	1.013	.993	1.018
(M) ρdc/ρac =ExL/K	1.030	.979	.990	.843	1.000	.939							
(N) PFE=(M-1)(10^2)	3	-2	-1	-16	0	-6							
(O) MCF=(M-1)(10^5)/H	66	-52	-51	-950	0	-460							

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project ESR . Line 7E Int.Cal. Date 3-10

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		12-11.5W →		11.5-11W		→	11-10.5		→		10.5-10W →	
Time		1238	1239	1246	1247	1249	1254	1256	1257	1259	1307	1308
DC-1		23.3 23.3	5.83 5.82	21.0 21.0	5.07 5.03	1.82 1.80	32.4 32.2	7.17 7.13	2.83 2.86	1.24 1.28	8.80 8.65	2.52 2.56
DC-2		23.2 23.1	5.78 5.77	20.8 20.8	5.12 5.15	1.82 1.81	32.1 32.2	7.60 7.59	2.67 2.70	1.14 1.08	8.30 8.26	2.48 2.47
Σ		46.5 46.4	11.61 11.59	41.8 41.8	10.19 10.18	3.64 3.61	64.5 64.4	14.77 14.72	5.50 5.56	2.38 2.36	17.10 16.91	5.00 5.03
DC- 3		23.1 23.1	5.83 5.83	20.9 21.0	5.01 5.02	1.79 1.80	32.2 32.1	7.15 7.15	2.85 2.81	1.24 1.30	8.79 8.65	2.48 2.55
DC-4		23.2 23.1	5.75 5.76	20.8 20.8	5.14 5.16	1.82 1.82	32.0 32.0	7.60 7.60	2.69 2.71	1.12 1.07	8.24 8.20	2.50 2.49
Σ		46.3 46.2	11.58 11.59	41.7 41.8	10.15 10.18	3.64 3.62	64.2 64.1	14.75 14.75	5.54 5.52	2.36 2.37	17.03 16.85	4.98 5.04
DC-Av		46.4	11.59	41.8	10.18	3.62	64.3	14.75	5.53	2.37	16.97	5.01
AC-1		23.2	5.86	21.0	5.18	1.84	33.4	7.38	2.77	1.21	8.36	2.50
AC- 2		23.2	5.86	21.0	5.18	1.84	33.4	7.38	2.77	1.21	8.36	2.50
Σ		46.4	11.72	42.0	10.36	3.68	66.8	14.76	5.54	2.42	16.72	5.00
S.P.		+16.1		+4.9			+13.2				+2.6	
AC-N		.05		.05			.03				.04	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: E-S Line: 7E Int.Cal Date:

Send	3-4	4-5	1-2	2-3	3-4	4-5					
Rec.	10-10	10-5	10-9	5 →							
Time	1310	1311	1320	1322	1324	1325					
DC-1	1.09 1.19	.63 .64	1.00 98	.41 .42	28 27	.12 .14					
DC-2	1.15 1.10	.49 .51	98 99	.39 .40	26 26	.11 .10					
Σ	2.24 2.29	1.12 1.15	1.98 1.97	.80 .83	.54 .53	.23 .24					
DC-3	1.15 1.12	.60 .62	97 97	.40 .38	29 31	.13 .14					
DC-4	1.12 1.12	.51 .51	98 98	.42 .43	22 .18	.09 .10					
Σ	2.27 2.24	1.11 1.13	1.95 1.95	.82 .81	.51 .49	.23 .24					
DC-AV	2.26	1.13	1.96	.81	.50	.23					
AC-1	1.12	.59	1.01	49	.26	.13					
AC-2	1.12	.59	1.01	49	.26	.13					
Σ	2.24	1.18	2.02	.98	.52	.26					
S. P.	+2.6		+11.0								
AC-N	.04		.09								

INDUCED POLARIZATION SURVEY - RECEIVER NOTES - PAGE 5

Project: Esp 5 Line: 7E Int. Cal. _____ Date: 3-10

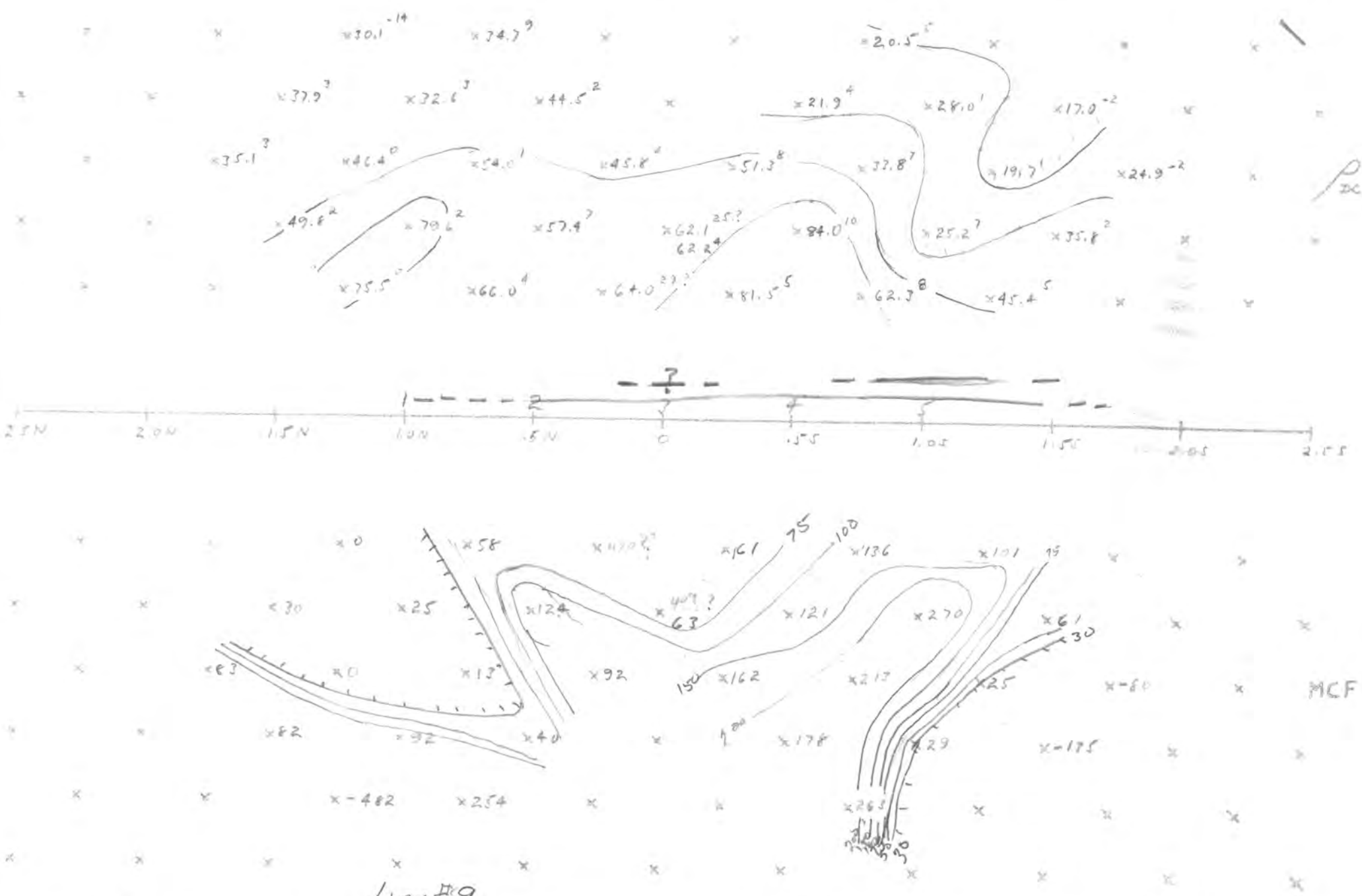
Send	2-3	2-3	2-3	2-3	2-3	2-3					
Rec	Cal	Cal	Cal	Cal	Cal						
Time	1215	1231	1232	1340	1345	1346					
DC-1	143	260	361	142	258	357					
DC-2	143	260	361	142	258	357					
Σ	286	520	722	284	516	714					
DC-3	143	260	361	142	258	357					
DC-4	143	260	361	142	258	357					
Σ	286	520	722	284	516	714					
DC-AV.	286	520	722	284	516	714					
AC-1	145	260	380	144	256	363					
AC-2	145	260	380	144	256	363					
Σ	290	520	760	288	512	726					
S.P.											
AC-N											

INDUCED POLARIZATION SPINNER NOTES

Project: Esperanza Line: 7-E Date: 10/Mar/61

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive		12-11.5 →		11.5-11	→		11-10.5	→			10.5-10 →	
Time		1238	1239	1246	1247	1249	1254	1256	1257	1259	1307	1308
Range		1.5										
Current		1502	1483	1496	1477	1464	1477	1460	1454	1441	1464	1446
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
Receive	10.5-10 →		10-9.5	→			Cal	→				
Time	1310	1311	1320	1322	1324	1325	1215	1231	1232	1344	1305	1346
Range	1.5					→	.3	.5	.75	.3	.5	.75
Current	1442	1433	1458	1448	1444	1424	278	509	711	280	510	705

I.P. POLARIZATION WORK SHEET



Line #9.

Area Esperanza Anomaly B - N & S Scale 1" = 50' Date May 24, 61

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: ESPERANZA Line: ANOM B-N Int.Cal 105/100 Date: 24 MAY

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		.5-1.0N →		1.0-1.5N →			1.5-2.0N →				2.0-2.5N →	
Time		0957	1000	1009	1012	1015	1031	1033	1035	1037	1106	1109
DC-1		33.5 33.5	8.1 8.1	34.5 34.5	7.5 7.5	2.39 2.39	39.5 39.5	10.4 10.4	2.81 2.81	1.15 1.15	6.6 6.6	2.5 2.5
DC-2		33.7 33.7	8.2 8.2	35.0 35.0	7.5 7.5	2.39 2.39	39.5 39.5	10.4 10.4	2.80 2.80	1.15 1.15	6.6 6.6	2.4 2.4
Σ		67.2 67.2	16.3 16.3	69.5 69.5	15.0 15.0	4.78 4.78	79.0 79.0	20.8 20.8	5.61 5.61	2.30 2.30	13.2 13.2	4.90 4.90
DC-3		33.5 33.5	8.0 8.0	34.5 34.5	7.6 7.6	2.39 2.39	39.0 39.0	10.4 10.4	2.81 2.81	1.13 1.13	6.6 6.6	2.5 2.5
Dc-4		33.7 33.7	8.3 8.3	35.0 35.0	7.4 7.4	2.39 2.39	40.0 40.0	10.4 10.4	2.80 2.80	1.17 1.17	6.6 6.6	2.4 2.4
Σ		67.2 67.2	16.3 16.3	69.5 69.5	15.0 15.0	4.78 4.78	79.0 79.0	20.8 20.8	5.61 5.61	2.30 2.30	13.2 13.2	4.90 4.90
DC-AV		67.2	16.3	69.5	15.0	4.78	79.0	20.8	5.61	2.30	13.2	4.90
AC-1		26.5	6.5	33.5	7.0	2.29	39.5	10.2	2.79	1.13	6.5	2.45
AC-2		26.5	6.5	33.5	7.0	2.29	39.5	10.2	2.79	1.13	6.5	2.45
Σ		53.0	13.0	67.0	14.0	4.58	79.0	20.4	5.58	2.26	13.0	4.90
S. P.		-18.9	-18.8	-10.1	-11.4	-11.4	-2.2	-2.2	-2.4	-2.7	-4.6	-3.7
AC-N		VERY	ERRATIC	>.5		.07				.08		
RANGE		100	30	100	30	10	100	30	10	3	30	10

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: ESPERANZA Line: ANOMB-N Int.Cal 105/20 Date: 24 MAY

Send	3-4 4-5		1-2	2-3	3-4	4-5	2-3					
Rec.			25-30 N				CAL					
Time	1111	1114	1124	1126	1130		0950	0951	0952	1208	1210	1211
DC-1	.85 .85	.49 .49	1.85 1.85	.99 .99	.45 .47		14.5	25.5	36.5	14.8	26.5	37.0
DC-2	.85 .85	.51 .51	1.80 1.80	.98 .98	.44 .42		14.5	25.5	36.5	14.8	26.5	37.0
Σ	1.70 1.70	1.00 1.00	3.65 3.65	1.97 1.97	.89 .89							
DC-3	.85 .85	.50 .49	1.85 1.85	1.00 1.00	.47 .49		14.5	25.5	36.5	14.8	26.5	37.0
Dc-4	.85 .85	.50 .51	1.80 1.80	.97 .97	.42 .40		14.5	25.5	36.5	14.8	26.5	37.0
Σ	1.70 1.70	1.00 1.00	3.65 3.65	1.97 1.97	.89 .89							
DC-AV	1.70	1.00	3.65	1.97	.89		29.0	51.0	73.0	29.6	53.0	74.0
AC-1	.85	.50	1.80	1.00	.60	CONT FVL	14.4	25.5	36.5	14.8	26.5	37.0
AC-2	.85	.50	1.80	1.00	.60		14.4	25.5	36.5	14.8	26.5	37.0
Σ	1.70	1.00	3.60	2.00	1.20		28.8	51.0	73.0	29.6	53.0	74.0
S. P.	+3.1	+3.0	-6.9	-7.2	-7.5							
AC-N		.20			.30							
RANGE	3	3	10	3			.03	.10	.10	.03	.10	.10

INDUCED POLARIZATION - ~~RECEIVER~~ Sender NOTES PAGE 1

Project: Esp Line: Anom B – N Int.Cal _____ Date: 24/May

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		.5-1.0M →		1.0-1.5M →			1.5-2.0M →				2.0-2.5M →	
Time		0957	1000	1099	1012	1015	1031	1033	1035	1037	1106	1009
DC-1 I		1512	1512	1515	1505	1502	1505	1505	1495	1490	1525	1520
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION - ~~RECEIVER~~ Sender NOTES PAGE 2

Project: ESP Line: Anom.B — H Int.Cal Date: 24 May

Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	—	—	—	—	—
Rec.	2.0-2.5" →		2.5-20" →				Cal	—	—	—	—	—
Time	1111	1114	1124	1126			0950	0951	0952	1209	1210	1211
DC-1 τ	1502	1495	1498	1498	1490		275	500	695	280	510	710
DC-2												
Σ												
DC-3												
Dc-4					(88 vs 92)							
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project *Esperanza* Line *Anomaly B-North* Field date *May 24, 81* Data page _____ Comp. date *May 24 81* Comp by *C.S.L.*

(A) Send	2-3	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	CAL	.5-1.0N	→	1.0-1.5N	→	→	1.5-2.0N	—	—	→	2.0-2.5N	—
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1512	1512	1515	1505	1502	1505	1505	1495	1490	1525	1520
(E) Vdc (avg)		62.2	16.3	69.5	15.0	4.78	79.0	20.4	5.61	2.30	13.2	4.90
(F) DCcal USED	.960											
(G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	15	1.5	6.0	15	30	6.0	15
(H) ρ dc=ExFxGx10^3/D		64.0	62.1	66.0	57.4	45.8	75.5	79.6	54.0	44.5	49.8	46.4
(I) Vac Σ		53.0	13.0	67.0	14.0	4.58	79.0	20.4	5.58	2.26	13.0	4.90
(J) AC noise x 2		.50	.50	.14	.14	.14	.16	.16	.16	.16	.14	.30
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		53.0	13.0	67.0	14.0	4.58	79.0	20.4	5.58	2.26	13.0	4.90
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.267	1.254	1.038	1.071	1.042	1.000	1.020	1.007	1.018	1.015	1.000
(N) PFE=(M-1)(10^2)		27	25	4	7	4	0	2	1	2	2	0
(O) MCF=(M-1)(10^5)/H		420	409	58	124	92	0	25	13	40	30	0

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5						
(B) Receive	—	→	2.5-3.0N	—	—	→						
(C) n separation	4	5	3	4	5	—						
(D) I	1502	1495	1498	1498	1490		275	500	695	240	510	210
(E) Vdc (avg)	1.70	1.00	3.65	1.97	.89		29.0	51.0	72.0	22.6	52.0	24.0
(F) DCcal					USED	.960	.949	.980	.953	.946	.962	.960
(G) Kn x 10^{-3}	30	52.5	15	30	52.5							
(H) ρ dc=ExFxGx10^3/D	32.6	34.7	35.1	37.9	30.1							
(I) Vac Σ	1.70	1.00	3.50	2.00	1.20		28.6	51.0	72.0	23.6	52.0	24.0
(J) AC noise x 2	.10	.40	.60	.60	.60							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.65	.92	3.55	1.91	1.04							
(L) AC-DC cal.					USED	1.000	.993	1.000	1.000	1.000	1.000	1.000
(M) ρdc/ρac =ExL/K	1.030	1.088	1.029	1.031	.855							
(N) PFE=(M-1)(10^2)	3	9	3	3	-14							
(O) MCF=(M-1)(10^5)/H	92	254	83	82	-482							

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: ESPERANZA Line: ANOMALY B S Int.Cal _____ Date: 23MAY

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		.5-1.09	→	1.0-1.5	S →		1.5-2.0	S →			2.0-2	.55 →
Time		1349	1351	1410	1412	1415	1439	1441	1444	1447	1507	1512
DC-1		42.5 42.5	8.1 8.1	32.0 32.0	10.80 10.80	2.6 2.6	23.0 23.0	3.20 3.20	1.70 1.70	.60 .60	4.5 4.5	.98 .98
DC-2		42.5 42.5	8.1 8.1	32.0 32.0	10.80 10.80	2.6 2.6	23.0 23.0	3.20 3.20	1.70 1.70	.50 .50	4.5 4.5	1.0 1.0
Σ		85.0 85.0	16.2 16.2	64.0 64.0	21.6 21.6	5.2 5.2	46.0 46.0	6.40 6.40	3.40 3.40	1.10 1.10	9.00 9.00	1.98 1.98
DC-3		42.5 42.5	8.1 8.1	32.0 32.0	10.80 10.80	2.7 2.7	23.0 23.0	3.20 3.20	1.75 1.75	.60 .60	4.5 4.5	.98 .98
Dc-4		42.5 42.5	8.1 8.1	32.0 32.0	10.80 10.80	2.5 2.5	23.0 23.0	3.20 3.20	1.65 1.65	.50 .50	4.5 4.5	1.0 1.0
Σ		85.0	16.2	64	21.6 21.6	5.1 5.1	46.0 46.0	6.40 6.40	3.40 3.40	1.10 1.10	9.00 9.00	1.98 1.98
DC-AV		85.0	16.2	64.0	21.6	5.20	46.0	6.40	3.40	1.10	9.00	1.98
AC-1		40.5	7.8	29.5	9.80	2.4	22.0	3.00	1.59	.55	4.4	.99
AC-2		40.5	7.8	29.5	9.80	2.4	22.0	3.00	1.59	.55	4.4	.99
Σ		81.0	15.6	59.0	19.6	4.80	44.0	6.00	3.18	1.10	8.80	1.98
S. P.		+7.0	+7.0	-.4	-.4	-.1	-11.1	-10.5	-10.5	-10.3	-9.5	-8.1
AC-N			.06			.07				.15		
RANGE		.10	.03	.10	.03	.01	.10	.01	.01	.003	.03	.003

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: ESPERANZA Line: ANOM B S Int.Cal _____ Date: 23MAY

Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4					
Rec.			2.5-3.05				CAL					
Time	1515	1517	1535	1538			1338	1340	1342	1610	1612	1614
DC-1	.70 .70	.29 .29	1.30 1.30	.45 .45			14.5	26.0	37.0	13.2	26.0	36.0
DC-2	.70 .70	.29 .29	1.20 1.20	.40 .40			14.5	26.0	37.0	13.2	26.0	36.0
Σ	1.40 1.40	.58 .58	2.50 2.50	.85 .85			29.0	52.0	74.0	26.4	52.0	72.0
DC-3	.65 .65	.29 .29	1.30 1.28	.45 .46			14.5	26.0	37.0	13.2	26.0	36.0
Dc-4	.75 .75	.29 .29	1.20 1.22	.40 .39			14.5	26.0	37.0	13.2	26.0	36.0
Σ	1.40 1.40	.58 .58	2.50 2.50	.85 .85			29.0	52.0	74.0	26.4	52.0	72.0
DC-AV	1.40	.58	2.50	.85			29.0	52.0	74.0	26.4	52.0	72.0
AC-1	.70	.29	1.30	.50			14.4	26.0	36.8	14.0	26.0	35.8
AC-2	.70	.29	1.30	.50			14.4	26.0	36.8	14.0	26.0	35.8
Σ	1.40	.58	2.60	1.00			28.8	52.0	73.6	28.0	52.0	71.6
S. P.	-7.8	-8.1	+15.6	+14.2								
AC-N		.09		.25								
RANGE	.003	.003	.003	.003			.03	.10	.10	.03	.10	.10

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: ESP. Line: 7 from B-South Int.Cal Date: 23 May

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		.5-1.0	→	1.0-1.5	→	→	1.5-2.0	→	→	→	2.0-2.5	→
Time		1349	1351	1410	1412	1415	1439	1441	1444	1447	1507	1512
DC-1 I		1500	1500	1480	1480	1460	1460	1460	1450	1445	1450	1445
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Esperanza Line: Sender Anomaly B-S Int.Cal _____ Date: 23/May

Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	→				→
Rec.	2.0-2.5 →		2.5-3.0 →				Cal	→				→
Time	1515	1517	1535	1538			1388	1340	1342	1610	1612	1614
DC-1 I	1440	1425	1445	1440	NG	NG	275	500	700	275	500	640
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

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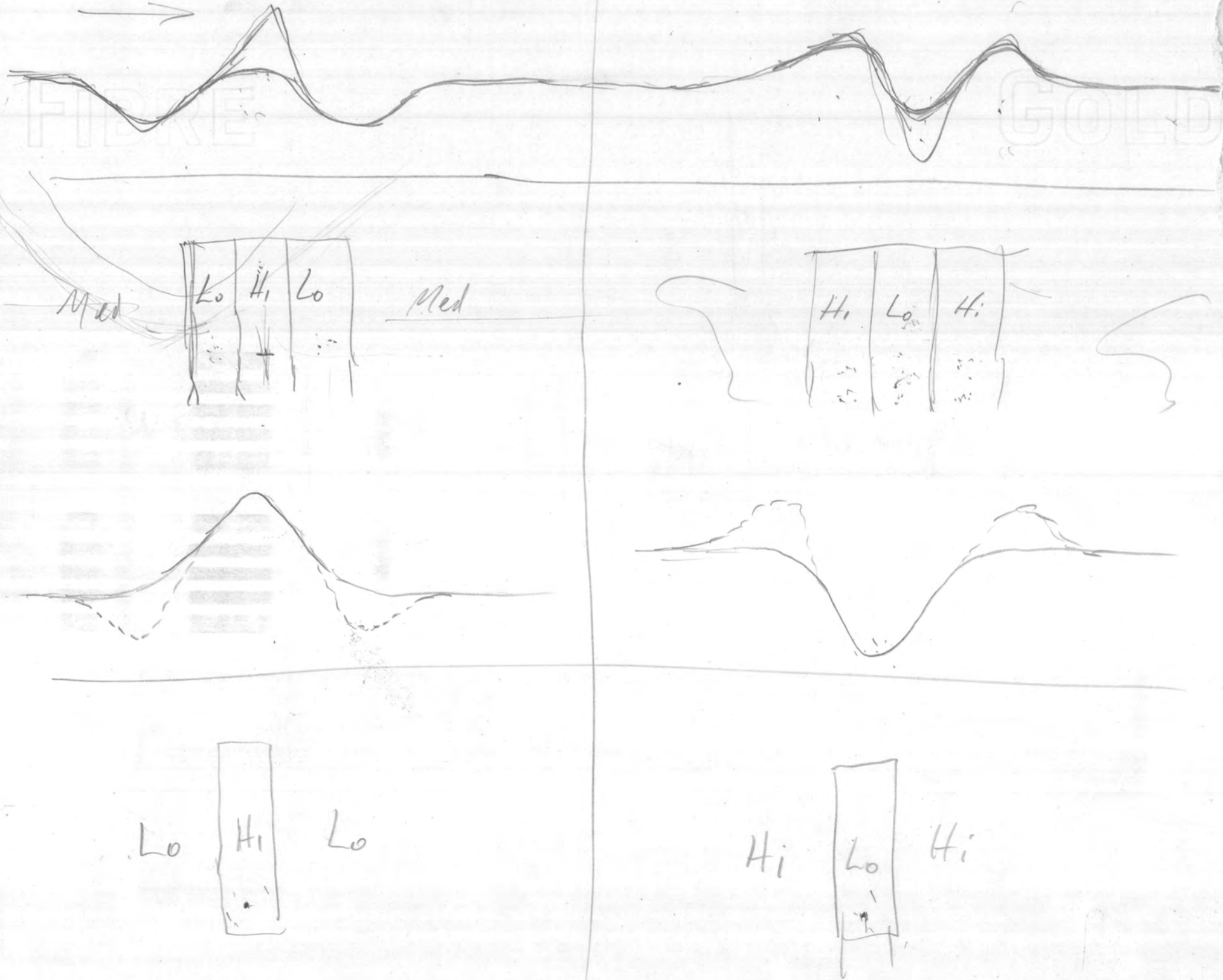
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project *Esperanza* Line *Anomaly 6 South* Field date *May 23, 61* Data page _____ Comp. date *May 24, 61* Comp by *C.S.L.*

(A) Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	CAL	.5-1.05	→	1.0-1.55	→	→	1.5-2.05	→	→	→	2.0-2.55	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1500	1500	1480	1480	1460	1460	1460	1450	1445	1450	1445
(E) Vdc (avg)		85.0	16.2	64.0	21.6	5.20	46.0	6.40	3.40	1.10	9.00	1.98
(F) DCcal USED	.960											
(G) Kn x 10^{-3} (a = 500')		1.5	6.0	1.5	6.0	15	1.5	6.0	15	30	6.0	15
(H) ρ dc=ExFxGx10^3/D		81.5	62.2	62.3	84.0	51.3	45.4	25.2	33.8	21.9	35.8	19.7
(I) Vac Σ		81.0	15.6	59.0	19.6	4.80	44.0	6.00	3.18	1.10	8.80	1.98
(J) AC noise x 2		.12	.12	.14	.14	.14	.30	.30	.20	.20	.18	.18
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		81.0	15.6	59.0	19.6	4.80	44.0	6.00	3.17	1.06	8.80	1.97
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.050	1.039	1.085	1.102	1.083	1.046	1.068	1.072	1.039	1.022	1.005
(N) PFE=(M-1)(10^2)		5	4	8	10	8	5	7	7	4	2	1
(O) MCF=(M-1)(10^5)/H		61	63	136	121	162	101	270	213	178	61	25

Project	Line		Field date		Data page		Comp. date				Comp by	
(A) Send	2-3	1-2	4-5	3-4	2-3	1-2						
(B) Receive	→	→	2.5-3.05	→	→	→				?		
(C) n separation	4	5	3	4	5	6						
(D) I	1440	1425	1445	1440	—	—	275	500	700	275	500	690
(E) Vdc (avg)	1.40	.58	2.50	.85	—	—	29.0	52.0	74.0	26.4	52.0	70.0
(F) DCcal					USED	.960	.948	.961	.946	1.041	.961	.958
(G) Kn x 10^{-3} (a = 500')	30	52.5	15	30	—	—						
(H) ρ dc=ExFxGx10^3/D	28.0	20.5	24.9	17.0								
(I) Vac Σ	1.40	.58	2.60	1.00			28.4	52.0	72.6	28.0	52.0	71.6
(J) AC noise x 2	.18	.18	.50	.50								
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.39	.55	2.55	.87								
(L) AC-DC cal.					USED	1.000	.993	1.000	.995	1.061	1.000	.995
(M) ρdc/ρac =ExL/K	1.008	1.054	.980	.977								
(N) PFE=(M-1)(10^2)	1	5	-2	-2								
(O) MCF=(M-1)(10^5)/H	29	263	-80	-135								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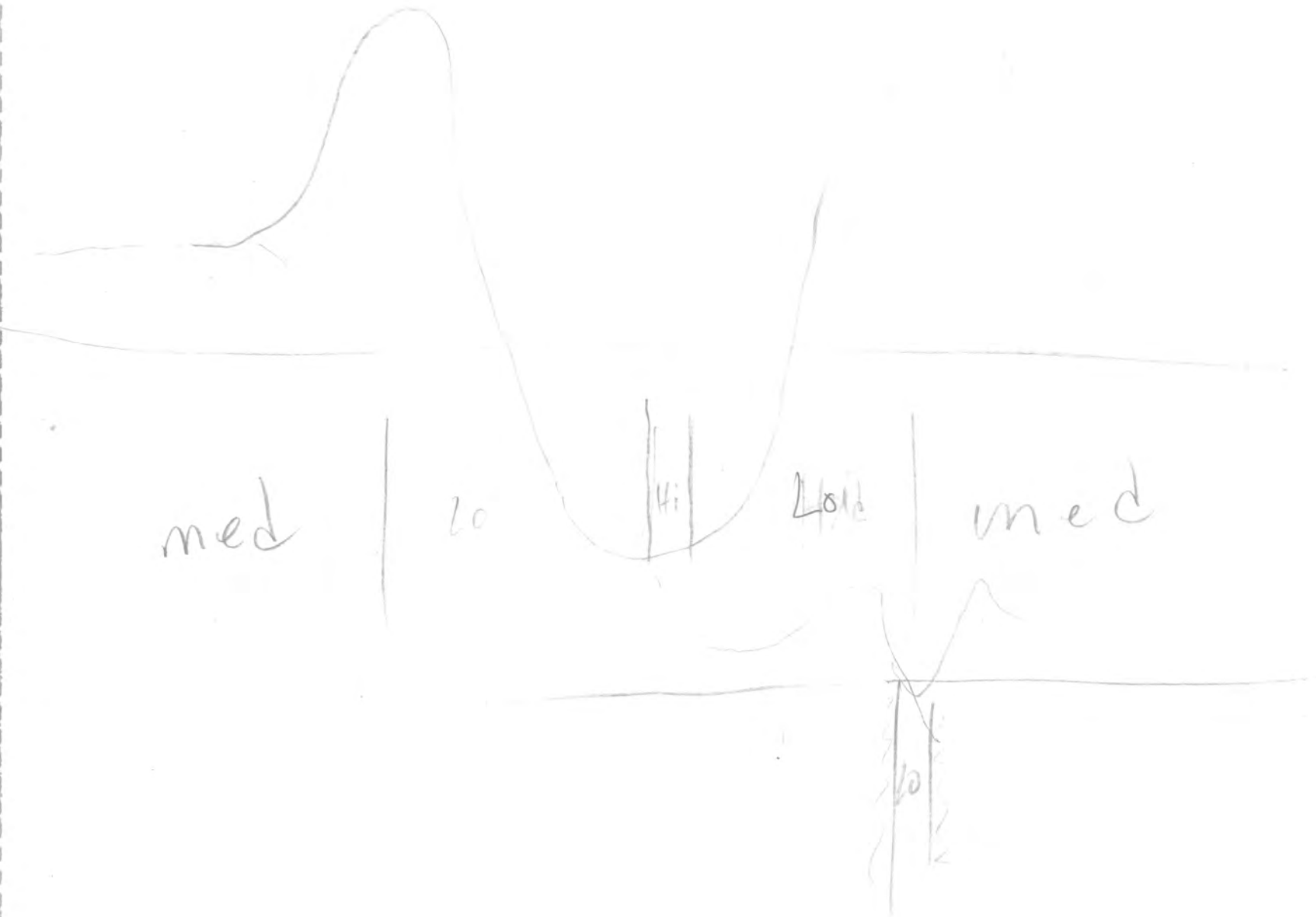
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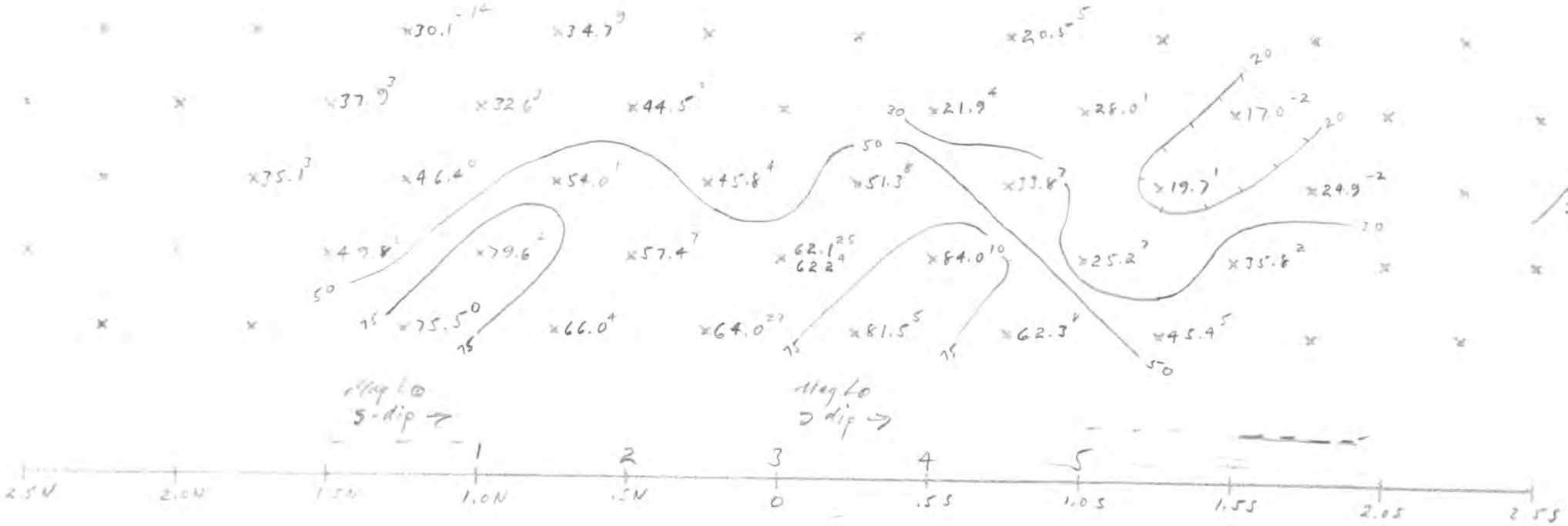
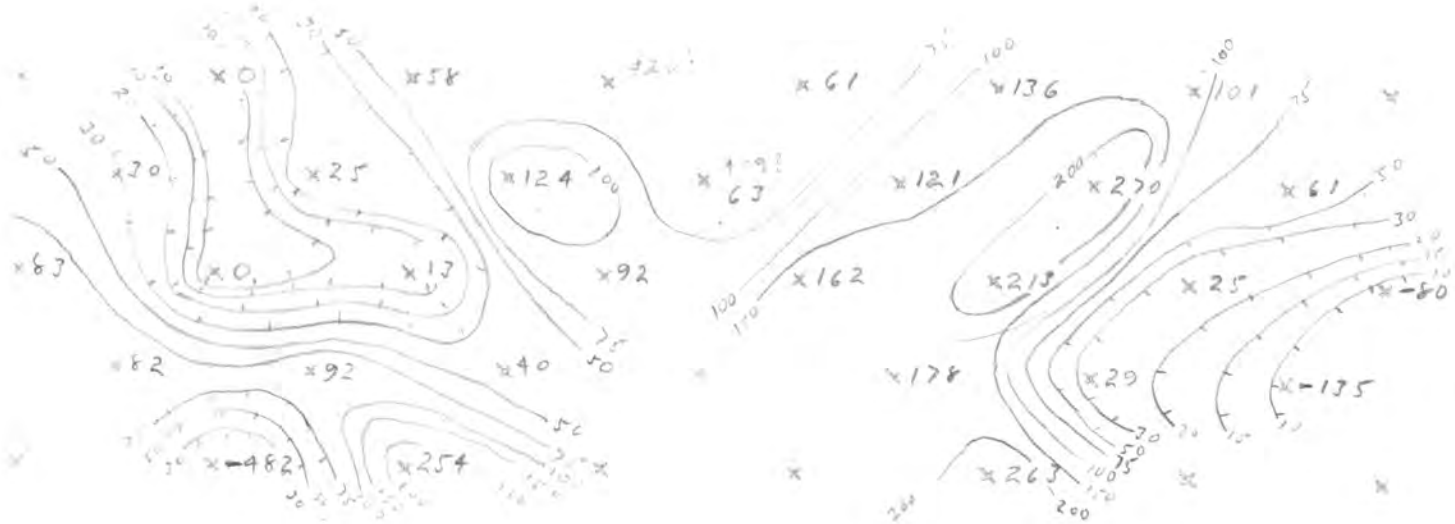
IP AND POLARIZATION WORK SHEET

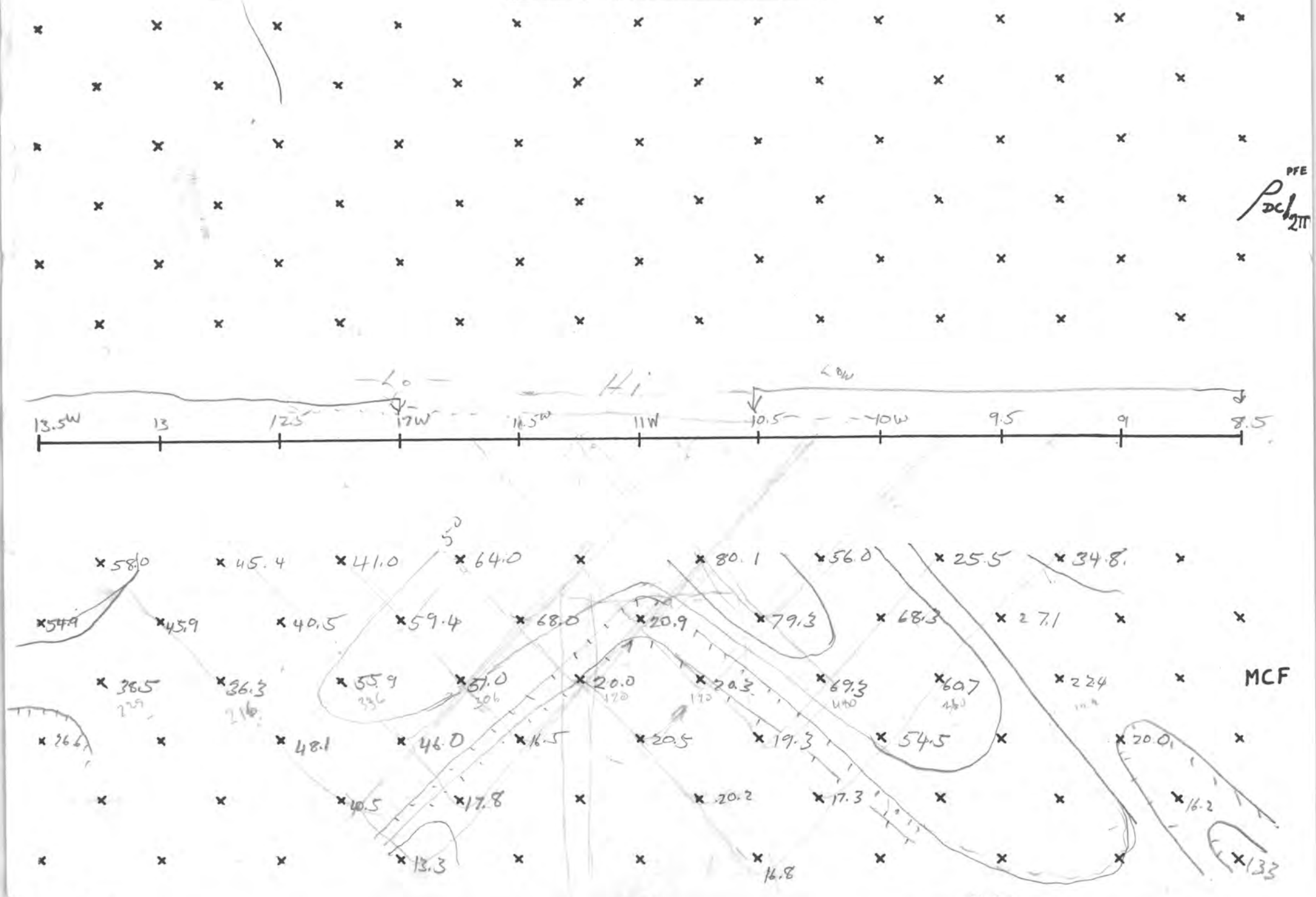




MCF

Area Esperanza Anomaly B - N & S Scale 1" = 500' Date May 29, 61

INDUCED POLARIZATION WORK SHEET



Area _____ Scale _____ Date _____

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Esperanza Line 7 W Field date Mar 9 61 Data page _____ Comp. date Mar 12 61 Comp by C.S.L.

(A) Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	CAL	13.5-14W	→	14-14.5	→	→	14.5-15W	→	→	→	15-15.5W	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1494	1475	1482	1466	1457	1480	1469	1458	1452	1471	1460
(E) Vdc (avg)		58.3	11.39	68.1	13.52	7.77	52.2	12.96	3.70	1.30	10.78	3.73
(F) DCcal	USED .990	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		58.0	45.9	68.3	54.9	38.5	52.3	52.4	37.7	26.6	43.4	37.9
(I) Vac Σ		57.0	11.60	70.2	13.70	3.82	51.6	13.10	3.78	1.34	10.78	3.80
(J) AC noise x 2		.10	.10	.08	.08	.08	.10	.10	.10	.10	.08	.08
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		57.0	11.60	70.2	13.70	3.82	51.6	13.10	3.78	1.34	10.78	3.80
(L) AC-DC cal.	USED 1.035	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K		1.059	1.016	1.003	1.021	1.021	1.048	1.022	1.012	1.002	1.035	1.016
(N) PFE=(M-1)(10^2)		6	2	0	2	2	5	2	1	0	4	2
(O) MCF=(M-1)(10^5)/H		102	35	4	38	55	92	42	32	8	61	42

Project Esperanza Line 7 W Field date Mar 9 61 Data page _____ Comp. date Mar 13 61 Comp by C.S.L.

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4	→	→	→	→	→
(B) Receive	→	→	15.5-16W	→	→	→	CAL	CAL	→	→	→	→	→
(C) n separation	4	5	3	4	5	6							
(D) I	1451	1441	1464	1455	1444	1435		284	515	709	279	514	710
(E) Vdc (avg)	1.34	.52	3.41	1.53	.61	.24		284	522	720	282	520	722
(F) DCcal	→	→	→	→	→	→	.990	1.000	.987	.985	.990	.988	.984
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84							
(H) ρ dc=ExFxGx10^3/D	27.4	18.7	34.6	31.2	21.9	13.9							
(I) Vac Σ	1.38	.56	3.46	1.58	.64	.34		276	520	744	292	518	744
(J) AC noise x 2	.08	.08	.08	.08	.08	.08							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.38	.55	3.46	1.58	.63	.33							
(L) AC-DC cal.	→	→	→	→	→	→	1.035	1.041	.996	1.032	1.037	.996	1.029
(M) ρdc/ρac =ExL/K	1.003	.980	1.020	1.002	1.001	.754							
(N) PFE=(M-1)(10^2)	0	-2	2	0	0	-25			1.035				
(O) MCF=(M-1)(10^5)/H	11	-107	58	6	5	-1800							

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Esp Line: 7W Int.Cal Date 89

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	13.5-14	W ->	14-14.5	→	→	14.5-15	W	→	→	15-15.5	W ->
Time	1435	1436	1449	1450	1452	1508	1509	1510	1511	1521	1525
DC-1	29.2 29.2	5.70 5.72	34.1 34.1	7.00 7.02	1.87 1.86	26.2 26.2	6.21 6.21	1.80 1.78	71 74	5.20 5.19	1.85 1.87
DC-2	29.2 29.1	5.70 5.65	34.0 34.0	6.50 6.50	1.92 1.88	26.0 26.0	6.75 6.75	1.91 1.92	58 56	5.60 5.60	1.89 1.85
Σ	58.4 58.3	11.40 11.37	68.1 68.1	13.50 13.52	3.79 3.74	52.2 52.2	12.96 12.96	3.71 3.70	1.29 1.30	10.80 10.79	3.74 3.72
DC-3	29.2 29.2	5.70 5.68	34.1 34.1	7.06 7.07	1.84 1.83	26.2 26.1	6.20 6.20	1.78 1.77	74 73	5.17 5.08	1.89 1.95
DC-4	29.1 29.0	5.70 5.71	34.0 34.0	6.48 6.46	1.91 1.94	26.0 25.9	6.76 6.76	1.92 1.93	57 56	5.63 5.66	1.82 1.78
Σ	58.3 58.2	11.40 11.39	68.1 68.1	13.54 13.53	3.76 3.77	52.2 52.0	12.96 12.96	3.70 3.70	1.31 1.29	10.80 10.74	3.71 3.73
DC-AV	58.3	11.39	68.1	13.52	3.77	52.2	12.96	3.70	1.30	10.78	3.73
AC-1	28.5	5.80	35.1	6.85	1.91	25.8	6.55	1.89	.67	5.39	1.90
AC-2	28.5	5.80	35.1	6.85	1.91	25.8	6.55	1.89	.67	5.39	1.96
Σ	57.0	11.60	70.2	13.70	3.82	51.6	13.10	3.78	1.34	10.78	3.80
S. P.	+2.7		+18.0			-3.7				+13.7	
AC-N	.05		.04			.05				.04	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE 3-9

Project: [illegible] Line: 7W Int. Cal. Date:

Send	2-3	1-2	4-5	3-4	2-3	1-2						
Rec	15-16.5W →		15.5-16W →									
Time	1524	1528	1532	1533	1534	1536						
DC-1	66 63	31 32	1.70 1.71	71 72	28 31	15 18						
DC-2	68 70	21 19	1.70 1.68	82 80	30 28	07 6						
Σ	1.34 1.33	.52 .51	3.44 3.39	1.53 1.52	.58 .59	.22 .24						
DC-3	64 61	37 38	1.75 1.72	71 73	33 35	16 13						
DC-4	69 73	15 14	1.68 1.67	82 79	31 26	09 11						
Σ	1.33 1.34	.52 .52	3.43 3.39	1.53 1.58	.64 .61	.25 .24						
DC-AV.	1.34	.52	3.41	1.53	.61	.24						
AC-1	.69	28	1.73	.79	.32	.17						
AC-2	.69	28	1.73	.79	.32	.17						
Σ	1.38	.56	3.46	1.58	.64	.34						
S.P.	+13.7		-7.0									
AC-N	04		.09									

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Line: 7W Int.Cal 5.8 Date:

Send	3-4	3-4	3-4	3-4	3-4	3-4						
Rec.	Cal	Cal	Cal	Co	Co	Co						
Time	1431	1432	1433	1600	1601	1602						
DC-1	142	261	360	141	260	361						
DC-2	142	261	360	141	260	361						
Σ	284	522	720	282	520	722						
DC-3	142	261	360	141	260	361						
Dc-4	142	261	360	141	260	361						
Σ	284	522	720	282	520	722						
DC-AV	284	522	720	282	520	722						
AC-1	148	260	372	146	259	372						
AC-2	148	260	372	146	259	372						
Σ	296	520	744	292	518	744						
S. P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

project: ESPERANZA Line: 7 W .5 μfd Date: 9MAR81

Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	CAL											
Time		1435	1436	1449	1450	1452	1508	1509	1510	1511	1521	1523
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1494	1475	1482	1466	1457	1480	1469	1458	1452	1471	1460
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4					
Receive							CAL					
Time	1524	1525	1532	1533	1534	1536	1431	1432	1433	1600	1601	1602
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1451	1441	1464	1455	1444	1435	284	515	709	279	514	710

SEND	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
TIME												
RANGE	1.5											
I												
SEND	4-5	1-2	2-3	3-4	4-5				2-3	2-3	2-3	
TIME							FINAL					
RANGE	1.0						CAL.		.3	.5	.75	
=												

7E SMARGI

Pot # 1 + 1 mv start + 4 mv end SP Data.

HEINRICHS GEOEXPLORATION COMPANY

~~INDUCED POLARIZATION SURVEY COMPUTATION SHEET~~

Page_____

Project_____ Line SP# 1 N Field date_____ Data page_____ Comp. date_____. Comp by_____

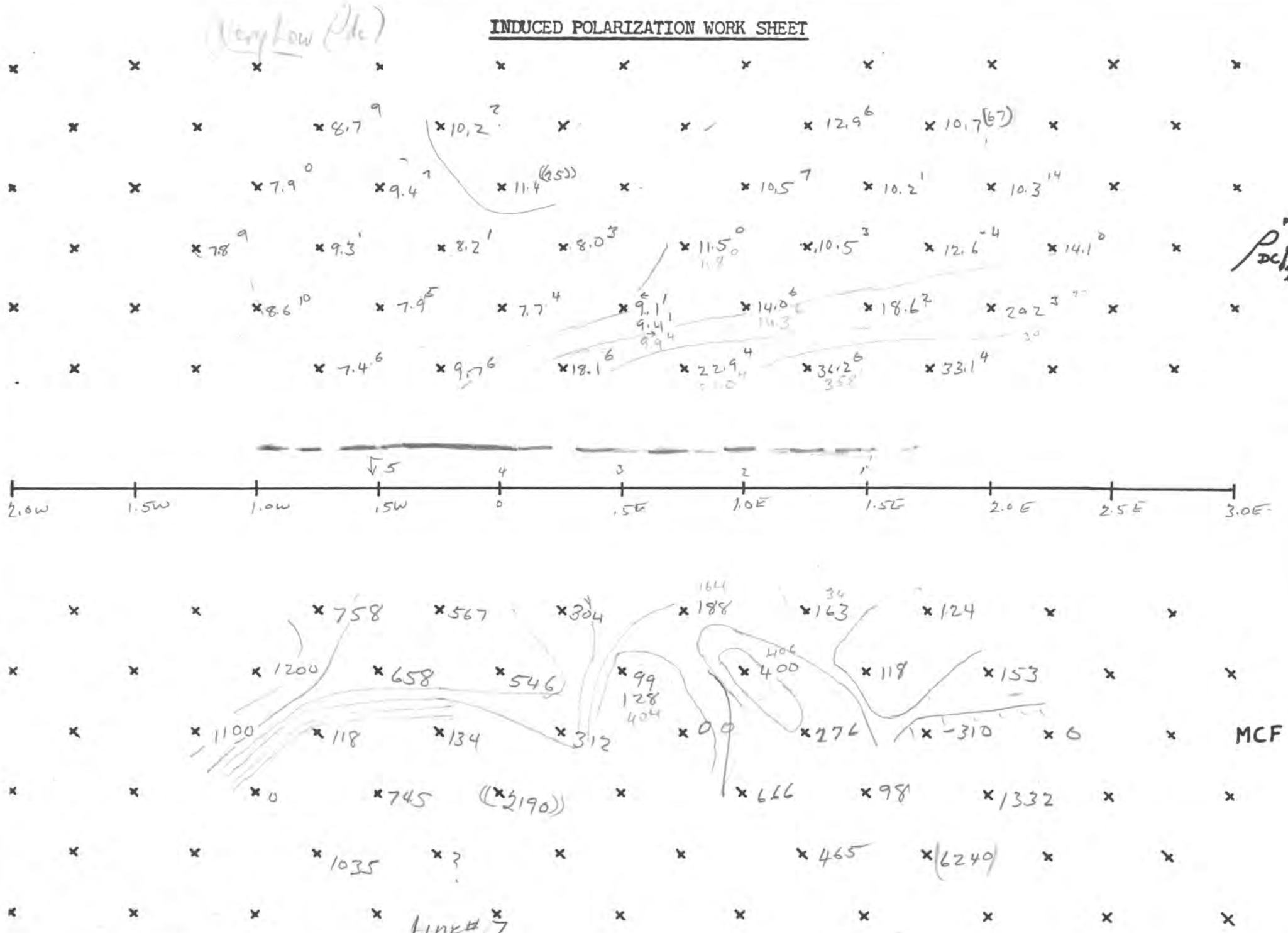
(A) Send	Sta.	S.P										
(B) Receive	.50	+8.5										
(C) n separation	1.00	+12.2										
(D) I	1.5	+14										
(E) Vdc (avg)	2.0	+19										
(F) DCcal	2.5	+25										
(G) Kn x 10^{-3}	3.0	+17										
(H) ρ dc=ExFxGx10^3/D	3.5	+20										
(I) Vac Σ	4.0	+18										
(J) AC noise x 2	5.0	+22										
(K) Vac(corr) $=\sqrt{I^2 - J^2}$	6.0	+14										
(L) AC-DC cal.	7.0	+17										
(M) ρ dc/ρac=ExL/K	8.0	+14										
(N) PFE=(M-1)(10^2)	9.0	+10										
(O) MCF=(M-1)(10^5)/H	10.0	+16										

Pot # 2 - 1 mv - + 2 mv end

Project_____ Line SP# 1 - S Field date_____ Data page_____ Comp. date_____ Comp by_____

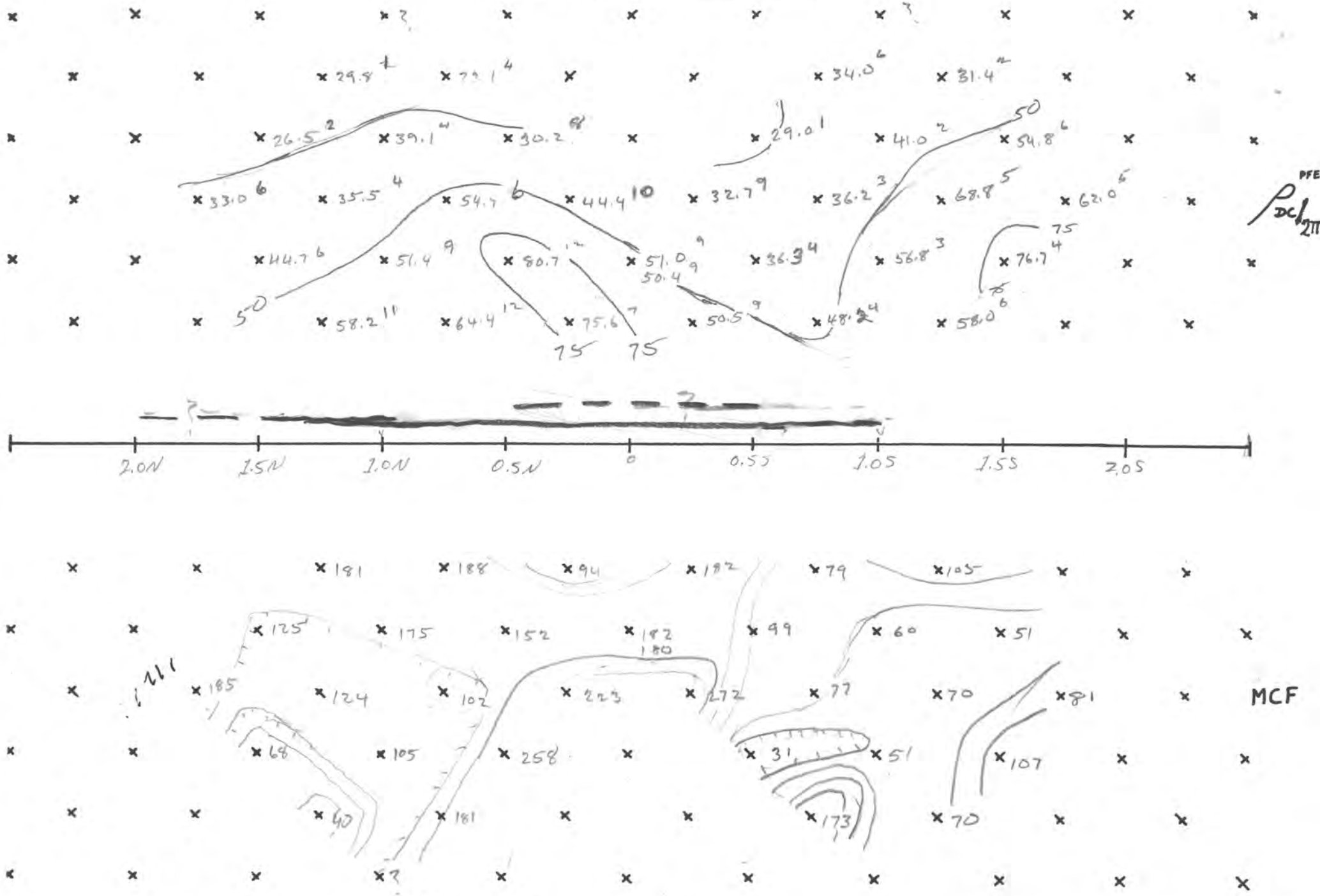
(A) Send	Station	S.P.										
(B) Receive	1.50 s	+4										
(C) n separation	1.0 s	-9.5										
(D) I	1.5	+10										
(E) Vdc (avg)	2.0	+1.5										
(F) DCcal	2.5	+6										
(G) Kn x 10^{-3}	3.0	+12.5										
(H) ρ dc=ExFxGx10^3/D	3.5	+15										
(I) Vac Σ	4.0	+21										
(J) AC noise x 2	5.0	+17										
(K) Vac (corr) $=\sqrt{I^2 - J^2}$	6.0	+14										
(L) AC-DC cal.	7.0	+22										
(M) ρdc/ρac =ExL/K	8.0	+23										
(N) PFE=(M-1)(10^2)	9.0	+12.5										
(O) MCF=(M-1)(10^5)/H	10.0	+8										

INDUCED POLARIZATION WORK SHEET

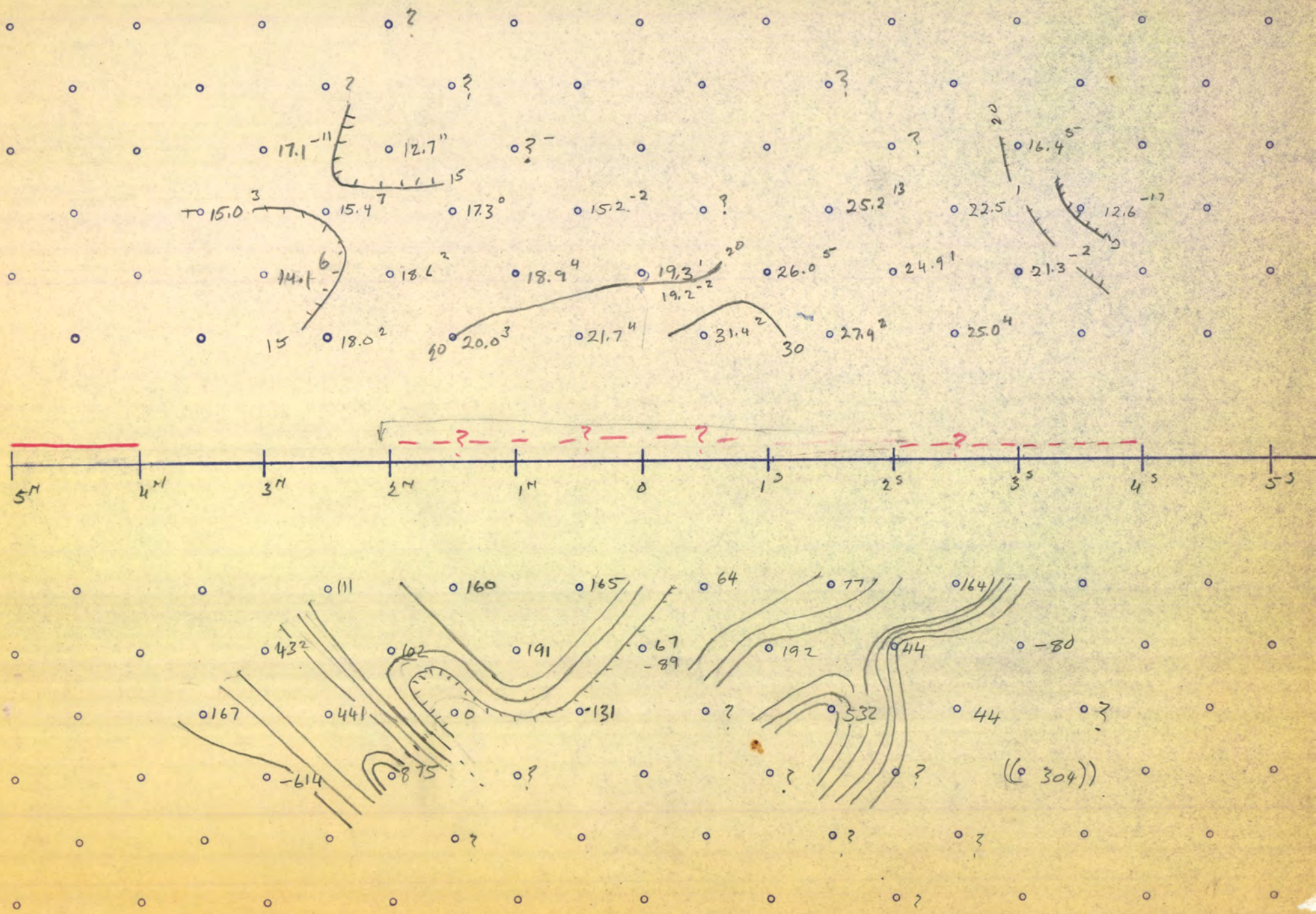


Area Esperanza Anomaly E Scale _____ Date _____

INDUCED POLARIZATION WORK SHEET

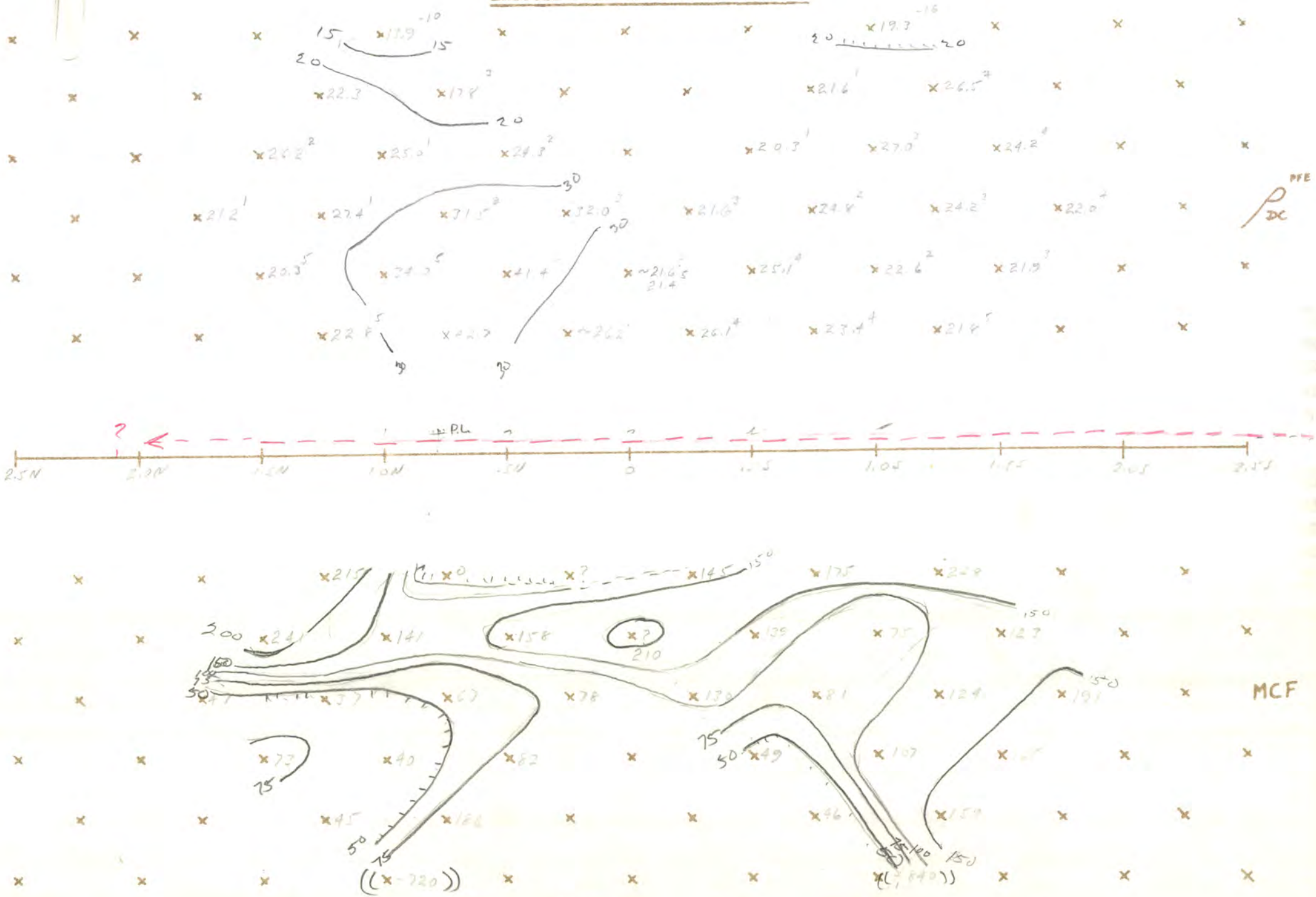


Area Esp. Arom C Line #8 Scale Date



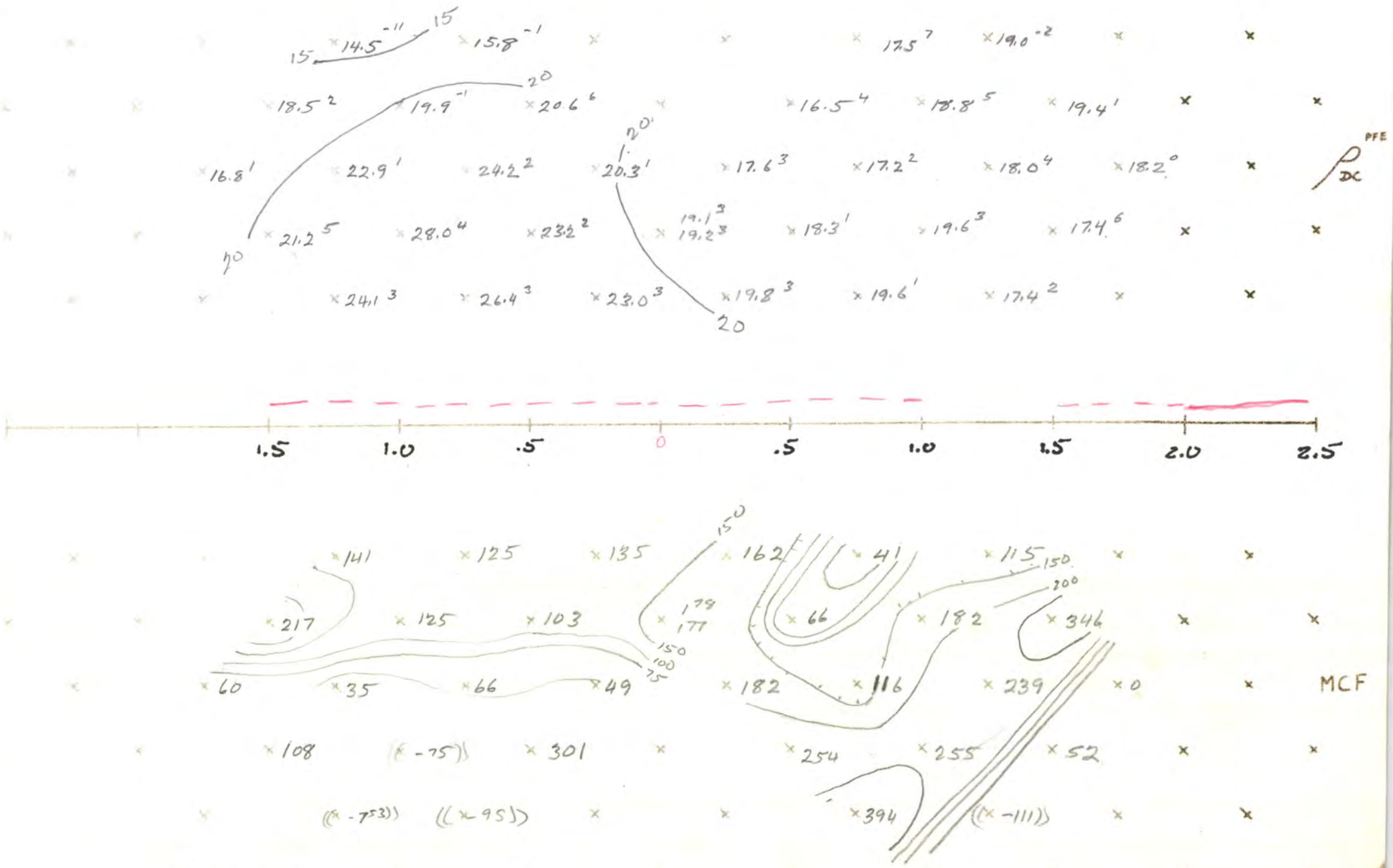
Line #1 Esperanza Wash Scale 1" = 1000'

INDUCED POLARIZATION WORK SHEET



Area Esperanza - Lines 4 Spread #8 Scale 1" = 500' Date April 12 61

INDUCED POLARIZATION WORK SHEET



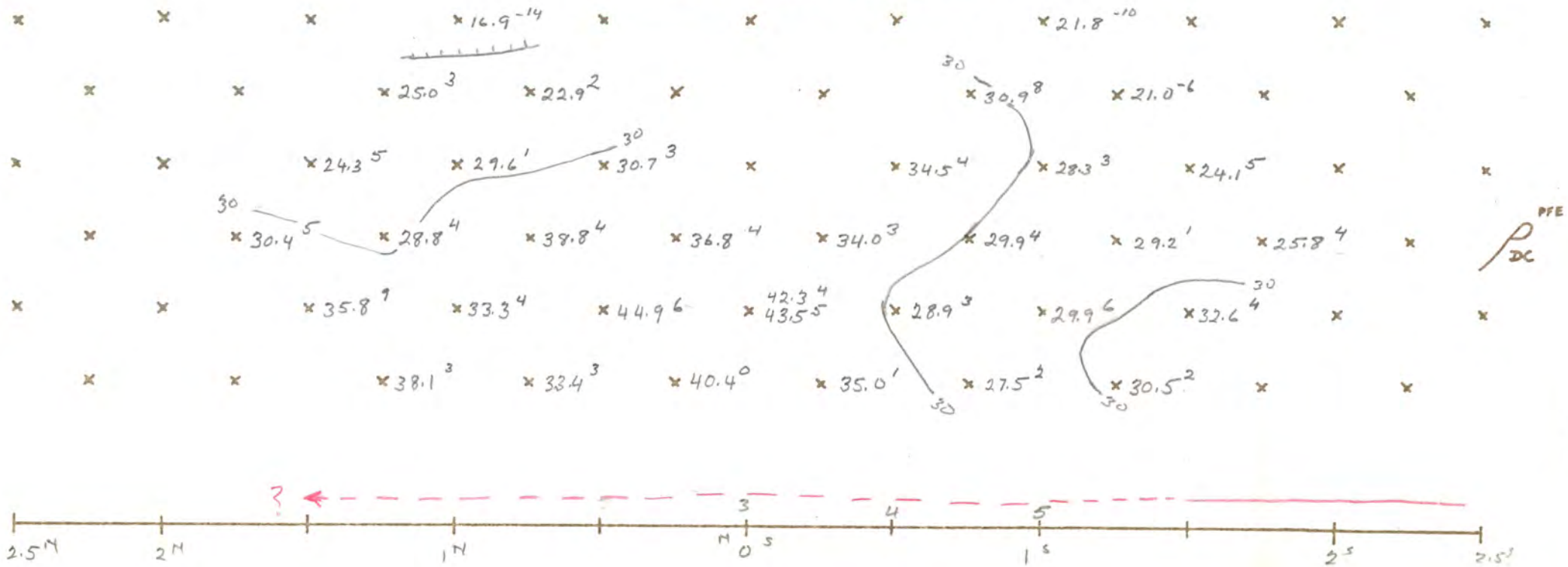
Esperanza

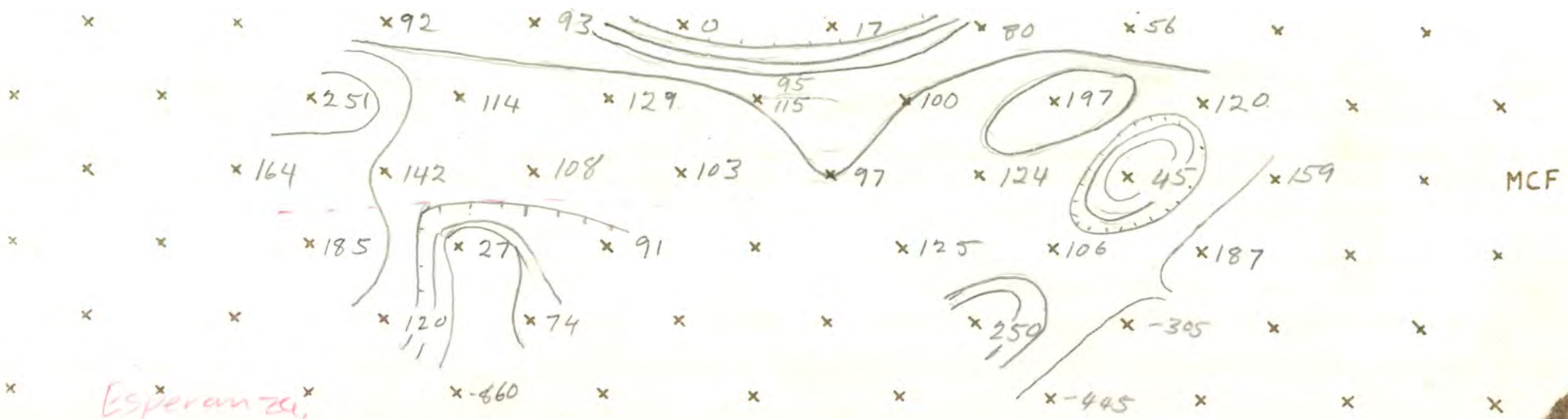
Line #5 Spread #9

Scale

Date

INDUCED POLARIZATION WORK SHEET

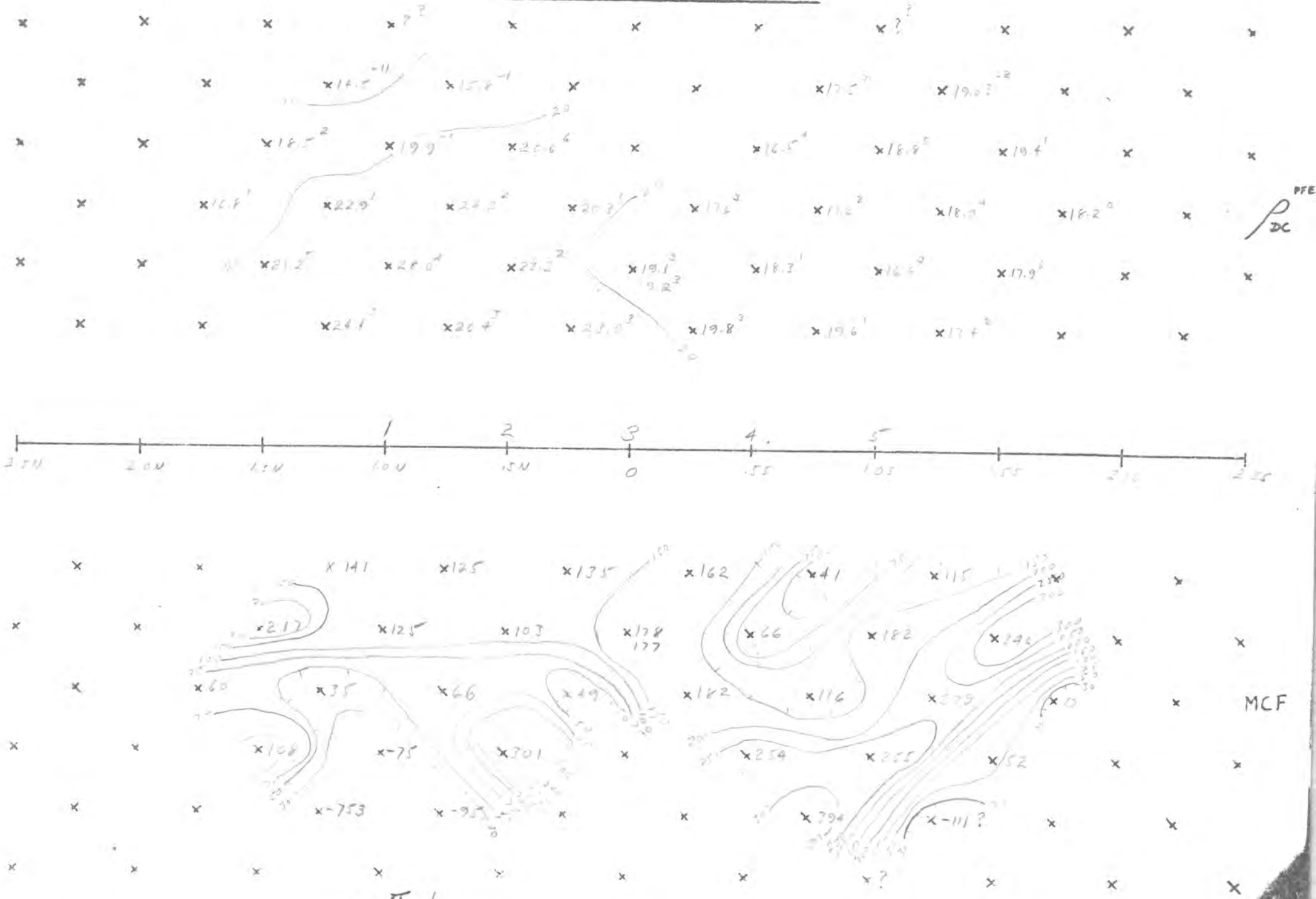




Esperanza

Area Line #6 Sprd 10 Scale Date

INDUCED POLARIZATION WORK SHEET



Esperanza - Line #5 Spread N & S Scale 1" = 500' Date Apr 18 [illegible]

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ____

Project *Esperanza* Line *9S* Field date *Apr. 12, 61* Dat page ____ Comp. date *Apr. 14, 61* Comp by *C.S.L.*

(A) Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	CAL	.5-1.05	→	1.0-1.55		→	1.5-2.05			→	2.0-2.55	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1420	1415	1440	1410	1400	1435	1410	1400	1395	1405	1407
(E) Vdc (avg)		19.2	4.58	19.15	4.26	1.67	16.9	3.96	1.63	.78	4.32	1.71
(F) DCcal USED	.985											
(G) Kn x 10^{-3} (a = 500')		1.5	6.0	1.5	6.0	15	1.5	6.0	15	30	6.0	15
(H) ρ dc=ExFxGx10^3/D		19.8	19.1	19.6	18.3	17.6	17.4	16.6	17.2	16.5	17.9	18.0
(I) Vac Σ		18.4	4.38	18.80	4.26	1.60	16.4	3.80	1.58	.74	4.02	1.62
(J) AC noise x 2		.02	.02	.02	.02	.02	.04	.04	.04	.04	.06	.06
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		18.4	4.38	18.80	4.26	1.60	16.4	3.80	1.58	.74	4.02	1.62
(L) AC-DC cal. USED	.990											
(M) ρ dc/ρac=ExL/K		1.032	1.034	1.008	1.018	1.032	1.020	1.031	1.020	1.042	1.062	1.042
(N) PFE=(M-1)(10^2)		3	3	1	1	3	2	3	2	4	6	4
(O) MCF=(M-1)(10^5)/H		162	178	41	66	182	115	182	116	254	346	239

Project	Line		Field date		Data page		Comp. date				Comp by	
(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4					
(B) Receive		→	2.5-2.0			→	[illegible]					
(C) n separation	4	5	3	4	5	6						
(D) I	1400	1390	1415	1400	[illegible]		282	515	705	279	500	705
(E) Vdc (avg)	.89	.47	1.74	.92	.51?	—	28.6	58.2	72.4	27.6	50.0	69.6
(F) DCcal				USED	.985		.986	.987	.990	1.011	1.020	1.011
(G) Kn x 10^{-3} (a = 500')	30	52.5	15	30	52.5		←	95	→	←	9N	→
(H) ρ dc=ExFxGx10^3/D	18.8	17.5	18.2	19.4	17.0?							
(I) Vac Σ	.84	.44	1.72	.90	.52		28.2	51.8	71.6	27.3	49.2	62.8
(J) AC noise x 2	.06	.06	.06	.06	.06							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.84	.435	1.72	.90	.516							
(L) AC-DC cal.					USED	.990	.987	.993	.990	.979	.985	.974
(M) ρdc/ρac =ExL/K	1.048	1.069	1.000	1.010	.979							
(N) PFE=(M-1)(10^2)	5	7	0	1	−2?							
(O) MCF=(M-1)(10^5)/H	255	394	0	52	−111?							

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Esperanza Line: 9N Int.Cal _____ Date: 4-73

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		.5-1N →		1-1.5N →			1.5-2N →				2-2.5N →	
Time		1238	1240	1246	1249	1250	1257	1259	1300	1302	1310	1311
DC-1		11.1 11.1	2.04 2.03	12.7 12.7	2.67 2.65	1.01 1.01	11.2 11.2	3.20 3.19	1.23 1.22	42 41	2.01 1.99	1.10 1.12
DC-2		10.7 10.7	2.50 2.49	12.2 12.2	2.73 2.76	88 89	11.3 11.3	3.29 3.30	1.00 1.01	56 54	2.86 2.90	1.01 1.00
Σ		21.8 21.8	4.54 4.52	24.9 24.9	5.40 5.41	1.89 1.90	22.5 22.5	6.49 6.49	2.23 2.23	.98 .95	4.87 4.89	2.11 2.12
DC-3		11.0 11.0	2.01 2.00	12.6 12.6	2.60 2.59	1.01 1.01	11.2 11.3	3.20 3.19	1.22 1.20	41 45	1.89 1.87	1.10 1.12
Dc-4		10.7 10.7	2.51 2.50	12.2 12.1	2.80 2.82	88 88	11.2 11.2	3.30 3.32	1.01 1.02	52 50	3.00 3.03	.99 .99
Σ		21.8 21.8	4.52 4.50	24.8 24.9	5.40 5.41	1.89 1.89	22.4 22.5	6.50 6.51	2.23 2.22	.97 .95	4.89 4.90	2.09 2.11
DC-AV		21.8	4.52	24.8	5.41	1.89	22.5	6.50	2.23	.95	4.89	2.11
AC-1		10.4	2.15	11.8	2.60	92	10.7	3.09	1.08	44	2.30	1.03
AC-2		10.4	2.15	11.8	2.60	.92	10.7	3.09	1.08	44	2.30	1.03
Σ		20.8	4.30	23.6	5.20	1.89	21.4	6.18	2.16	.88	4.60	2.06
S. P.		+5.0		-8.2			+8.0				+7.4	
AC-N		.02		.01			.02				.01	

15:1 right under power in

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE ____

Project: [illegible] Line: 9N Int.Cal. ____ Date: 4-13

Send	3-4	4-5	1-2	2-3	3-4	4-5						
Rec.	[illegible]		2-5-3N									
Time	1312	1313	1320	1321	1323							
DC-1	49 50	21 20	77 76	46 49	20 18							
DC-2	42 41	21 22	80 81	36 37	20 21							
Σ	.91 .91	.42 .42	1.57 1.57	.85 .86	.38 .39							
DC-3	50 50	20 21	74 70	48 44	14							
DC-4	42 42	21 21	83 87	38 40	26 23							
Σ	.92 .92	.41 .41	1.57 1.57	.85 .85								
DC-AV	.915	.415	1.51	.85	.38							
AC-1	.46	.21	.76	.41	.21							
AC-2	.46	.21	.76	.41	.21							
Σ	.92	.42	1.52	.82	.42							
S. P.	+7.4		-6.0									
AC-N	.01		.02									

INDUCED POLARIZATION SENDER NOTES

Project: [illegible] Line: 3-N Date: 4 - [illegible]

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive		.5-1N →		1-1.5N →			1.5-2N →				2-2.5N →	
Time		1238	1240	1246	1249	1250	1257	1259	1300	1302	1310	1311
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1435	1425	1425	1415	1410	1415	1405	1400	1395	1400	1395
Send	3-4	4-5	1-2	2-3	3-4	4-5						
Receive	2-2.5N →		2.5-3N →									
Time	1312	1313	1320	1321	1323	13						
Range	1.5	1.5	1.5	1.5	1.5	1.5						
Current	1395	1395	1405	1395	1390							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project Esperanza Line 9 N Field date Apr 13, 61 Dat page _____ Comp date Apr 14, 61 Comp by C.S.L.

(A) Send	3-4	3-4	4-5	2-3	3-4	4-5	[illegible]	2-3	3-4	[illegible]	[illegible]	2-3
(B) Receive	CAL	.5-1KN	→	1.0-1.5N		→	[illegible]			→	[illegible]	—
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1435	1425	1425	1415	1410	1415	1405	1400	1395	1400	1395
(E) Vdc (avg)		21.8	4.52	24.8	5.41	1.89	22.5	6.50	2.23	.95	4.89	2.11
(F) DCcal USED	1.010											
(G) Kn x 10^{-3} (a = 500)		1.5	6.0	1.5	6.0	15	1.5	6.0	15	30	[illegible]	[illegible]
(H) ρ dc=ExFxGx10^3/D		23.0	19.2	26.4	23.2	20.3	24.[illegible]	22.0	24.2	16.6	[illegible]	22.9
(I) Vac Σ		20.8	4.30	23.6	5.20	1.84	21.4	6.18	2.16	.88	[illegible]	2.06
(J) AC noise x 2		.04	.04	.02	.02	.02	.04	.04	[illegible]	[illegible]	.02	.02
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		20.8	4.30	23.6	5.20	1.84	21.4	.18	[illegible]	[illegible]	[illegible]	[illegible]
(L) AC-DC cal USED	.985											
(M) ρ dc/ρac=ExL/K		1.031	1.034	1.033	1.024	1.010	1.034	1.035	1.016	1.062	1.046	1.008
(N) PFE=(M-1)(10^2)		3	3	3	2	1	3	4	2	6	5	1
(O) MCF=(M-1)(10^5)/H		135	177	125	103	49	141	125	66	301	217	35

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

(A) Send	[illegible]	[illegible]	[illegible]	2-3	3-4	4-5						
(B) Receive	→	→	2.5-3.0N			→			CAL			
(C) n separation	4	5	3	4	5	6						
(D) I	1395	1395	1405	1395	1390	—						
(E) Vdc (avg)	.92	.42	1.56	.85	.38	—			ON	Line		
(F) DCcal					USED	1.010						
(G) Kn x 10^{-3} (a = 500)	30	52.5	15	30	52.5				9	S		
(H) ρ dc=ExFxGx10^3/D	19.9	15.8	16.8	18.5	14.5							
(I) Vac Σ	.92	.42	1.52	.82	.42	—						
(J) AC noise x 2	.02	.02	.04	.04	.04							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.92	.42	1.52	.82	.42							
(L) AC-DC cal					USED	.985						
(M) ρdc/ρac =ExL/K	.985	.985	1.010	1.020	.891							
(N) PFE=(M-1)(10^2)	-1	-1	1	2	-11							
(O) MCF=(M-1)(10^5)/H	-75	-95	60	108	-753							

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Esperanza Line: 95 Int.Cal. 5.8 Date: 4-7

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		.5-1.5	→	1-1.55	→		1.5-2.5	→	→	→	2-2.35	→
Time		1042	1044	1050	1052	1053	1100	1102	1104	1105	1116	1116
DC-1		9.7 9.7	2.20 2.18	9.2 9.0	2.35 2.41	93 94	8.7 8.8	2.07 2.10	83 82	39 38	2.20 2.14	90 89
DC-2		9.5 9.5	2.38 2.40	10.0 10.1	2.41 1.98	93 92	8.2 8.1	1.90 1.88	80 81	39 39	2.13 2.18	82 86
Σ		19.2 19.2	4.51 4.58	19.2 19.1	4.76 4.38	[illegible]	16.9 16.9	3.97 3.98	1.63 1.63	.78 .77	4.37 4.32	1.72 1.74
DC-3		9.7 9.7	2.20 2.18	9.0 8.9	2.43 2.46	95 93	8.8 9.0	2.08 2.07	82 81	40 38	2.11 2.05	90 94
DC-4		9.5 9.5	2.38 2.40	10.2 10.2	1.91 1.87	94 93	8.1 8.0	1.86 1.88	80 82	39 41	2.20 2.26	79 76
Σ		19.2 19.2	4.58 4.58	19.2 19.2	4.34 4.33	[illegible]	16.9 17.0	3.94 3.96	1.63 1.63	.78 .79	4.31 4.31	1.69 1.70
DC-AV		19.2	4.58	19.15	4.36	1.67	16.9	3.96	1.63	.78	4.32	1.71
AC-1		9.2	2.19	9.4	2.13	.80	8.2	1.90	.79	.37	2.01	.81
AC-2		9.2	2.19	9.4	2.13	.80	8.2	1.90	.79	.37	2.01	.81
Σ		18.4	4.38	18.80	4.26	1.60	16.4	3.80	1.58	.74	4.02	1.62
S. P.		+0.7		+0.6			+1.2				-0.1	
AC-N		.01		00			.02				03	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE ____

Project: ESP Line: 95 Int. Cal. 52.8 Date: 4-13

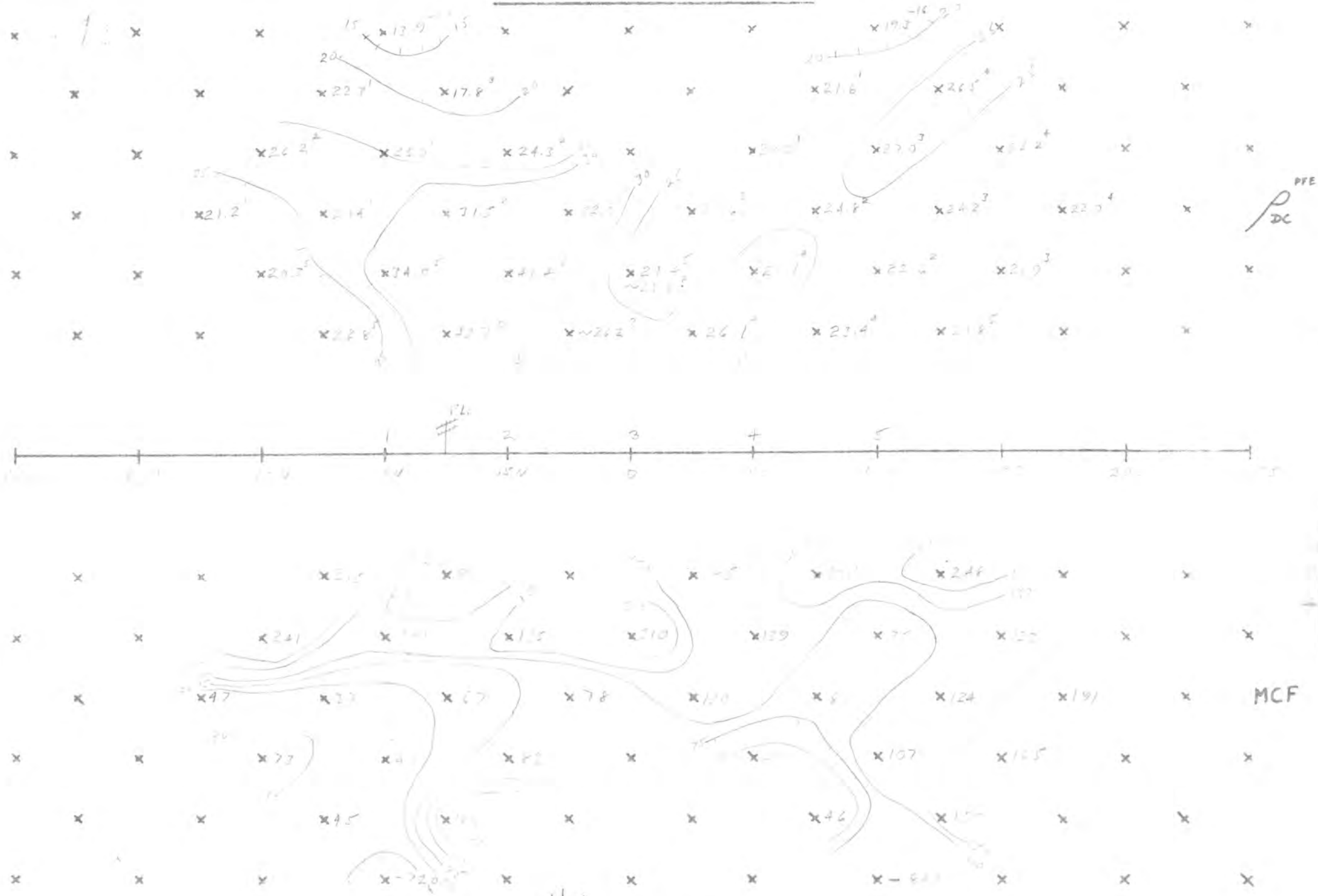
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4	3-4	3-4	3-4	3-4
Rec.	2-2.55	→	2.5 35	→	→	→	[illegible]	Cal	Cal	Cal	Cal	[illegible]
Time	1120	1122	1135	1138	1140		1033	1034	1035	1341	1342	1343
DC-1	53 50	21 20	84 84	51 52	20 18		14.3	26.1	36.2	13.8	25.0	34.8
DC-2	38 36	26 27	88 90	40 40	28 30		14.3	26.1	36.2	13.8	25.0	34.8
Σ	.91 .86	.47 .47	.73 .74	.91 .92	[illegible]		28.6	52.2	72.4	27.6	50.0	69.6
DC-3	57 57	22 20	98 110	45 42	25 22		14.3	26.1	36.2	13.8	25.0	34.8
DC-4	32 32	25 27	78 62	49 50	31 28		14.3	26.1	36.2	13.8	25.0	34.8
Σ	.89	.47	[illegible]	.94 .92			28.6	52.2	72.4	27.6	[illegible]	69.6
DC-AV.	.89	.47	1.74	.92	.51		28.6	52.2	72.4	27.6	50.0	69.6
AC-1	.42	.22	.86	.45	.26		14.1	25.9	35.8	13.5	24.6	33.9
AC-2	.42	.22	.86	.45	.26		14.1	25.9	35.8	13.5	24.6	33.9
Σ	.84	.44	1.72	.90	.52		28.2	51.8	71.6	27.0	49.2	67.8
S.P.	-0.1		+7.3									
AC-N	.03		.03									

INDUCED POLARIZATION SENDER NOTES

project: Esperanza Line: 9 S Date: 4-13-61

Send	Cal	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	3-4	.5-1.5 →		1-1.5 →			1.5-2.5 →				2-2.5 →	
Time		1042	1044	1050	1052	1053	1100	1102	1104	1105	1116	1118
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1430	1415	1440	1410	1400	1435	1410	1400	1395	1425	1407
Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal	Cal	Cal	Cal	Cal	Cal
Receive	2-2.5 →		2.5-3.5 →				3-4	3-4	3-4	3-4	3-4	3-4
Time	1120	1121	1135	1138	1140		1033	1034	1035	1341	1342	1343
%Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1400	1390	1415	1400	1390		282	575	705	279	510	705

INDUCED POLARIZATION WORK SHEET



Area Esperanza Lines 4 spredd 8 Scale [illegible] Date [illegible]

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ___

Project [illegible] Line 8 N Field date [illegible] Data page _____ Comp. date [illegible] Comp by [illegible]

(A) Send	2-4	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	[illegible]	[illegible]	→	[illegible]		→	[illegible]			→	2.0-2.5M	—
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1420	1407	1415	1410	1405	1410	1400	1400	1400	1405	1295
(E) Vdc (avg)		22.5?	—	36.0	8.65	2.72	19.5	7.21	2.67	[illegible]	[illegible]	[illegible]
(F) DCcal USED	1.02											
(G) Kn x 10^{-3} (a=500)		1.5	6.0	1.5	6.0	1.5	1.5	[illegible]	1.5	30	[illegible]	[illegible]
(H) ρdc=ExFxGx10^3/D		~26.3	~21.6	45.7	[illegible]	32.0	22.8	31.0	21.5	24.3	20.3	27.4
(I) Vac Σ		[illegible]	[illegible]	37.0	8.40	2.68	18.4	6.36	2.64	1.12	4.16	[illegible]
(J) AC noise x 2		.30	.30	.04	.04	.04	.04	.04	.04	.04	.04	.04
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		22.6?	1.60?	37.0	8.40	2.68	18.4	6.36	2.62	[illegible]	[illegible]	[illegible]
(L) AC-DC cal. USED	1.010											
(M) ρdc/ρac=ExL/K		[illegible]	—	1.000	1.064	1.025	1.049	1.048	1.021	1.020	1.049	1.010
(N) PFE=(M-1)(10^2)		-4		0	6	3	5	5	2	2	5	1
(O) MCF=(M-1)(10^3)/H		-14		0	155	78	215	141	67	82	241	37

Project	Line		Field date		Data page		Comp. date			Comp by		
(A) Send	2-4	4-5	[illegible]	2-3	2-4	4-5						
(B) Receive	—	→	2.0-2.5M	—	—	→						
(C) n separation	4	5	2	4	5	6						
(D) I	1400	1295	1400	1295	1400	1295						
(E) Vdc (avg)	1.06	.42	1.60	1.12	.54	.21				4 & 5		
(F) DCcal					—	[illegible]	1.010		Same			
(G) Kn x 10^{-3} (a=500)	30	52.5	15	30	52.5	54						
(H) ρdc=ExFxGx10^3/D	25.0	17.8	21.2	26.2	23.3	13.9			Line			
(I) Vac Σ	1.06	.42	1.60	[illegible]	[illegible]	[illegible]						
(J) AC noise x 2	.04	.04	.04	.04	.04	.04						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.06	.42	1.60	1.12	.54	.236						
(L) AC-DC cal.						USED	1.010					
(M) ρdc/ρac =ExL/K	1.010	1.033	1.010	1.019	1.010	.900						
(N) PFE=(M-1)(10^2)	1	-3	1	2	1	-10						
(O) MCF=(M-1)(10^5)/H	40	186	47	73	45	-720						

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: [illegible] Line: 8N Int.Cal Date: 4-11

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		.5 1N	[illegible]	1-1.5N	→	→	1.5-2N	→	→	→	2-2.5N	→
Time		1344	1348	1405	1407	1408	1417	1418	1420	1421	1431	1433
DC-1		9.5 8.5	1.98 2.00	18.6 18.3	4.7 4.6	1.38 1.39	9.7 9.7	3.81 3.82	1.31 1.33	68 69	2.39 2.50	1.29 1.31
DC-2		13.1 14.0	6.80 6.20	18.3 18.2	4.2 4.3	1.35 1.34	9.8 9.8	3.46 3.39	1.35 1.33	35 34	1.94 1.86	1.03 1.00
Σ		22.6 22.5		36.9 36.5	8.9 8.9	2.73 2.73	19.5 19.5	7.21 7.21	2.66 2.66	1.03 1.03	4.33 4.30	2.32 2.4
DC-3		8.2 8.9	3.30	18.2 18.2	4.6 4.6	1.39 1.40	9.7 9.7	3.83 3.84	1.32 1.32	70 71	2.58 2.60	1.35 1.38
Dc-4		14.0 13.6		18.2 18.2	4.2 4.2	1.32 1.32	9.8 9.8	3.38 3.37	1.35 1.36	33 32	1.75 1.70	.98 .94
Σ		[illegible]	[illegible]	36.4 36.4	8.8 8.8	2.71 2.72	19.5 19.5	7.21 7.21	2.67 2.67	1.03 1.03	[illegible]	[illegible]
DC-AV		22.6		36.6	8.85	2.72	19.5	7.21	2.67	1.03	4.32	2.32
AC-1		11.8	2.30	18.5	4.2	1.34	9.4	3.48	1.32	.51	2.08	1.16
AC-2		11.8	2.30	18.5	4.2	1.34	9.4	3.48	1.32	.51	2.08	1.16
Σ		22.6	4.60	37.0	8.40	2.68	18.8	6.96	2.64	1.02	4.16	2.32
S. P.		+115		-0.7			+3.3				+12.6	
AC-N		.15		.02			.02				.02	

INDUCED POLARIZATION [illegible]

Project Esp Line 8N [illegible] Date: 4-[illegible]

Send	3-4	4-5	1-2	2-3	3-4	4-5						
Rec.	2-2.5N →		2.5-3N →									
Time	1436	1437	1445	1447	1448	1450						
DC-1	.52 .49	15 11	87 87	54 55	25 23	11 12						
DC-2	.54 .58	28 31	93 93	56 56	29 31	10 9						
Σ	1.06 .27	.43 .42	1.80 1.80	1.10 1.11	.54 .54	.21 .21						
DC-3	.46 .40	18 16	86 86	54 54	20 19	11 12						
DC-4	.60 .65	26 28	94 94	57 57	34 35	10 9						
Σ	1.06 1.08	.44 .44	1.80 1.80	1.11 1.11	.54 .54	.21 .21						
DC-Av	1.06	.43	1.80	1.11	.54	.21						
AC-1	.53	.21	90	.55	27	.12						
AC-2	.53	21	90	.55	27	.12						
Σ	1.06	.42	1.80	1.10	.54	.24						
S.P.	+12.6		-85									
AC-N	.02		.02									

INDUCED POLARIZATION SENDER NOTES

Project: E Speranza Line: 8 N Date: 4-11-6

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive												
Time		1344	1348	1405	1407	1408	1417	1418	[illegible]	1421	1431	1433
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1420	1407	1415	1410	1405	1410	1400	1400	1400	1405	1395
Send	3-4	4-5	1-2	2-3	3-4	4-5						
Receive												
Time	1435	1437	1445	1447	1448	1450						
Range	1.5	1.5	1.5	1.5	1.5	1.5						
Current	1400	1395	1400	1395	1400	1395						

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project *Esperanza* Line *8 S* Field date *Apr. 11, 61* Data page _____ Comp. date *Apr. 12, 61* Comp by *C.S.L.*

(A) Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	CAL	.5-1.05	→	1.0-1.55	→	→	1.5-2.05	→	→	→	2.0-2.55	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1420	1410	1435	1407	1400	1425	1410	1400	1400	1420	1405
(E) Vdc (avg)		22.4	4.57	20.4	5.35	1.83	18.8	4.52	[illegible]	.86	4.71	2.06
(F) DCcal												
(G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	1.5	1.5	6.0	1.5	3.0	[illegible]	1.5
(H) ρ dc=ExFxGx10^3/D		26.1	21.4	23.4	25.1	21.6	21.8	22.6	24.8	24.1	21.9	24.2
(I) Vac Σ		21.8	4.42	19.8	5.22	1.80	18.6	4.60	2.08	.86	4.64	2.02
(J) AC noise x 2		.08	.08	.02	.02	.02	.06	.06	.06	[illegible]	.04	.04
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		21.8	4.42	19.8	5.22	1.80	18.6	4.60	2.08	.86	4.64	2.02
(L) AC-DC cal. USED	1.010											
(M) ρ dc/ρac=ExL/K		1.038	1.045	1.041	1.035	1.028	1.054	1.017	1.020	1.010	1.027	1.020
(N) PFE=(M-1)(10^2)		4	5	4	4	3	5	2	2	1	3	3
(O) MCF=(M-1)(10^5)/H		145	210	175	139	130	248	75	81	49	123	124

Project	Line		Field date			Data page		Comp. date			Comp by	
(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4					
(B) Receive	→	→	2.5-3.05	→	→	→	CAL					
(C) n separation	4	5	3	4	5	6						
(D) I	1395	1392	1410	1400	1395	1390	255	520	710	262	510	700
(E) Vdc (avg)	1.14	.52	1.88	1.03	.64	.29	2.62	46.0	64.8	27.0	48.0	67.4
(F) DCcal					USED	1.00	1.088	1.130	1.095	1.043	1.062	1.039
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	27.0	21.6	22.0	24.2	26.5	[illegible]						
(I) Vac Σ	1.12	.52	1.82	1.00	.62	.36	26.0	46.6	65.4	26.4	47.6	67.2
(J) AC noise x 2	.04	.04	.06	.06	.06	.06						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.12	.52	1.82	1.00	.62	.35						
(L) AC-DC cal.					USED	1.010	.993	1.012	1.009	.979	.992	.998
(M) ρdc/ρac =ExL/K	1.029	1.010	1.042	1.040	1.042	.838						
(N) PFE=(M-1)(10^2)	3	1	4	4	4	−16						
(O) MCF=(M-1)(10^5)/H	107	46	191	165	159	−240						

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Esparanza Line 8S Int.Cal. 480 Date: 4-11

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		.5-16 →		1-1.55	→		1.5-25		→		2-2.45 →	
Time		1150	1152	1202	1204	1205	1215	1216	1217	1219	1225	1226
DC-1		11.2 11.6	2.38 2.38	10.1 10.0	2.60 2.58	.95 .95	9.3 9.3	2.23 2.23	1.06 1.06	.41 .42	2.50 2.50	1.02 1.01
DC-2		11.2 10.9	2.13 2.14	10.3 10.4	2.73 2.79	.88 .88	9.5 9.5	2.60 2.60	1.04 1.04	.45 .44	2.20 2.21	1.04 1.05
Σ		22.4 22.4	4.53 4.52	20.4 20.4	5.33 5.37	1.83 1.83	18.8 18.8	4.83 4.83	2.10 2.10	.86 .86	4.70 4.71	2.06 2.06
DC- 3		11.4 11.3	2.20 2.40	10.0 10.0	2.59 2.66	.92 .88	9.4 9.3	2.22 2.23	1.07 1.07	.45 .46	2.47 2.42	1.00 1.01
DC-4		11.0 11.0	2.39 2.22	10.4 10.4	2.80 2.74	.91 .95	9.4 9.5	2.60 2.60	1.03 1.03	.41 .40	2.24 2.28	1.06 1.04
Σ		22.4 22.3	4.50 4.62	20.4 20.4	5.35 5.39	1.83 1.83	18.8 18.8	4.82 4.83	2.10 2.10	.86 .86	4.71 4.70	2.05 2.05
DC-Av		22.4	4.57	20.4	5.35	1.83	18.8	4.83	2.10	.86	4.71	2.06
AC-1		10.9	2.21	9.9	2.61	.90	9.0	2.40	1.04	.43	2.32	1.01
AC- 2		10.9	2.21	9.9	2.61	.90	9.0	2.40	1.04	.43	2.32	1.01
Σ		21.8	4.42	19.8	5.22	1.80	18.0	4.80	2.08	.86	4.64	2.02
S.P.		+6.2		-3.1			+5.6				-9.0	
AC-N		.04		.01			.03				.02	

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Esquimalt Line: 8 S Int.Cal _____ Date: 4/1

Send	2-3	1-2	4-3	3-4	2-3	1-2	3-4	3-4	3-4	3-4	3-	
Rec.	2-2 55	→	25-35			→	Cal	Cal	Cal	Cal	Cal	
Time	1227	1228	1238	1240	1241	1242	1143	1144	1144	1510	1511	1512
DC-1	.59 .59	26 25	78 69	50 52	32 30	15 16	13.1	23.0	32.4	13.5	24.0	33.7
DC-2	.55 .56	26 26	1.14 1.20	52 50	31 34	15 13	13.1	23.0	32.4	13.5	24.0	33.7
Σ	1.14 1.14	.52 .51	1.92 .98	1.02 1.02	.63 .64	.30 .29	262	46.0	64.8	27.0	48.0	67.4
DC-3	.58 .58	25 25	66 .61	54 53	28 21	19 21	13.1	23.0	32.4	13.5	24.0	33.7
Dc-4	.56 .56	27 27	1.23 1.25	49 50	37 43	10 08	13.1	23.0	32.4	13.4	24.0	33.7
Σ	1.14 1.14	.52 .52	1.89 .96	1.03 1.02	.66 .66	.29 .29	26.2	46.0	64.8	27.0	48.0	67.4
DC-AV	1.14	.52	1.88	1.03	.64	.29	26.2	46.0	64.8	27.0	48.0	67.4
AC-1	.56	.26	.91	.50	.31	.18	13.0	23.3	32.7	13.2	2.38	33.6
AC-2	.56	.26	.91	.50	.31	.18	13.0	23.3	32.7	13.2	23.8	33.6
Σ	1.12	.52	1.82	1.00	.62	.36	26.0	46.6	65.4	26.4	47.6	67.2
S. P.	-9.0		-8.7									
AC-N	.02		.03									

INDUCED POLARIZATION SENDER NOTES

Project: [illegible] Line: [illegible] Date: [illegible]

Send	Cal	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	3-4											
Time		1150	1152	1202	1204	1205	1215	1216	1217	1218	1225	1226
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1420	1410	1435	1407	1400	1425	1410	1400	1400	1420	1405
Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal					
Receive							3-4					
Time	1227	1228	1238	1240	1241	1242	1143	1144	1145	1510	1511	1512
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1393	1392	1410	1400	1395	1390	285	520	710	282	510	700