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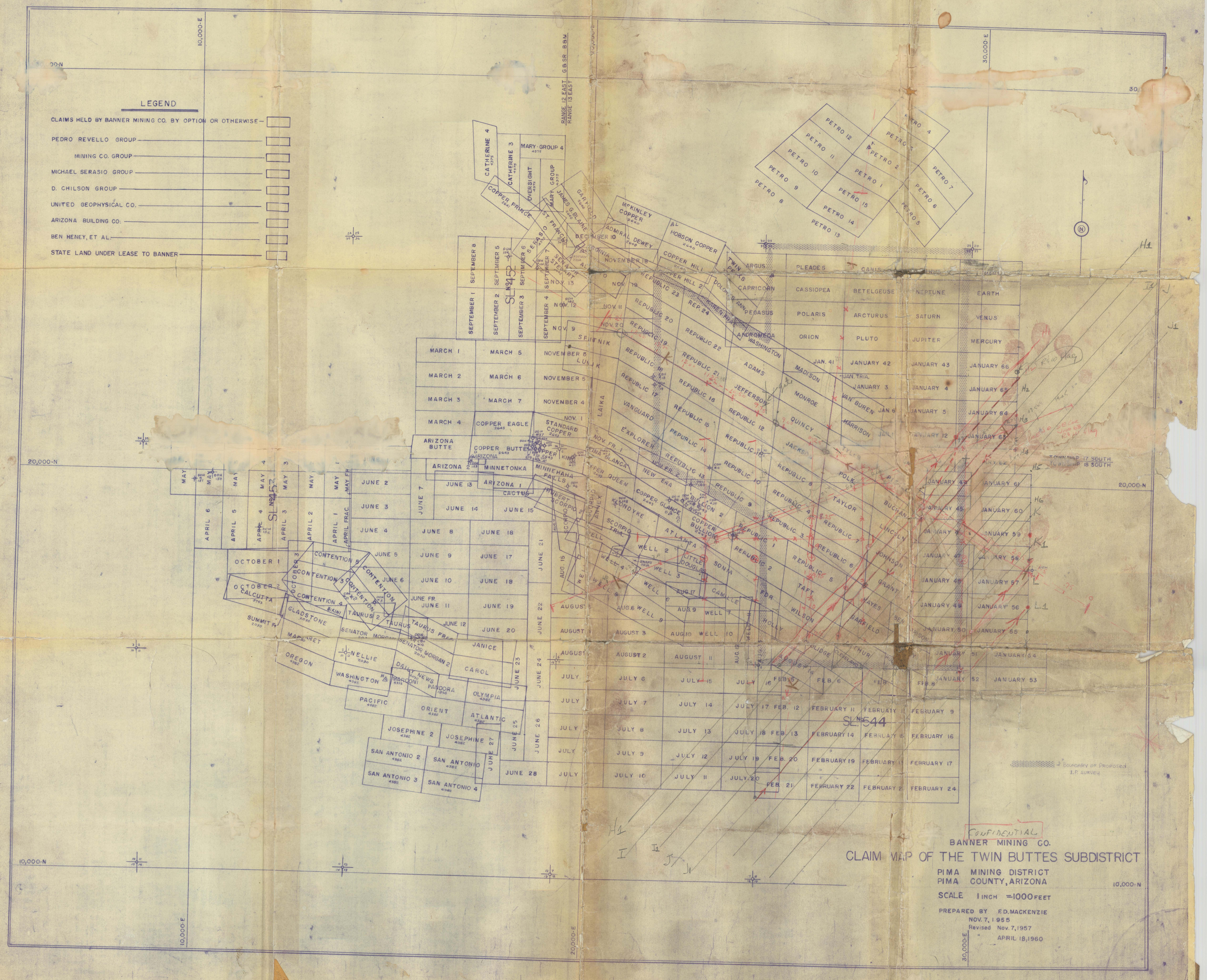
LEGEND
CLAIMS HELD BY BANNER MINING CO. BY OPTION OR OTHERWISE
PEDRO REVELLO GROUP
MINING CO. GROUP
MICHAEL SERASIO GROUP
D. CHILSON GROUP
UNITED GEOPHYSICAL CO.
ARIZONA BUILDING CO.
BEN HENEY, ET AL.
STATE LAND UNDER LEASE TO BANNER
RANGE 12 EAST G&SR B&M
RANGE 13 EAST
10,000-E
20,000-N
10,000-N
30,000-E
SL No 452
SL No 544
TOWNSHIP 17 SOUTH
TOWNSHIP 18 SOUTH
BOUNDARY OF PROPOSED I.P. SURVEY
CONFIDENTIAL
BANNER MINING CO.
CLAIM MAP OF THE TWIN BUTTES SUBDISTRICT
PIMA MINING DISTRICT
PIMA COUNTY, ARIZONA
SCALE 1 INCH = 1000 FEET
PREPARED BY F.D. MACKENZIE
NOV. 7, 1955
Revised Nov. 7, 1957
APRIL 18, 1960

File Copy
Banner I.P.

HEINRICHS GEOEXPLORATION COMPANY
MINERAL ENGINEERING CONSULTANTS AND CONTRACTORS
GEOPHYSICAL, GEOLOGICAL AND ECONOMIC APPRAISALS
TUCSON, ARIZONA

WALTER E. HEINRICHS, JR.
E. GROVER HEINRICHS

PHONE: MAIN 2-4202
806-808 WEST GRANT ROAD
MAIL: P. O. BOX 5671

March 28, 1961

Mr. Allen B. Bowman, Vice President
Banner Mining Company
P. O. Box 5605
Tucson, Arizona

Re: Twin Buttes Subdistrict Project
Pima Mining District
Pima County, Arizona

Dear Allen:

Enclosed are the original and one copy of our report on the induced polarization investigations conducted for you in the Twin Buttes Subdistrict, Pima County, Arizona.

According to our regular practice we retain the original maps and field data on file in our office. However, if you wish, we will forward all original data to you.

I am sure that you will recognize the problem in making a discreet interpretation of geophysical data when all the physical quantities involved are variables. In this sense we may have a rare opportunity in your area to add definition to the interpretation by systematic comparison and analysis with available drill hole logs and geological data and we recommend this approach for your consideration.

It has been a pleasure to work with you and Mac on this project. We are pleased that we were able to complete this work in only nine of the ten estimated field days.

Our statement is enclosed.

Very truly yours,

HEINRICHS GEOEXPLORATION CO.

Franklin A. Seward, Jr.
Geophysicist

FAS:jh
Enclosures

INDUCED POLARIZATION

RECONNAISSANCE INVESTIGATIONS

Twin Buttes Subdistrict
Pima County, Arizona

for

Banner Mining Company

March 1961

by

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

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

In Pocket

Induced Polarization Anomaly Map

INTRODUCTION

During the month of March 1961, Heinrichs GEOEXploration Company conducted induced polarization investigations in the Twin Buttes Subdistrict over portions of Sections 29, 31, 32 & 33, T17S, R13E and Sections 4, 5, 6 and 8, T18S, R13E, G&SRB&M. This work was performed at the request of Mr. Allen Bowman and Mr. F. D. MacKenzie, of Banner Mining Company. This consisted of three observed lines requiring 6 electrode spreads and totaling 42,750 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, asst. field engineer and electronics technician; Mr. J. King, field assistant and Mr. C. S. Ludwig, computer.

CONCLUSIONS AND RECOMMENDATIONS

1. The I. P. anomalism observed on Lines #2 and #3 can be definitely attributed to sulfide mineralization but of unknown grade, vertical or lateral extent. The mineralization on Line #2 apparently has a definite top and bottom and, in this sense, would appear to be a blanket type deposit. The mineralization at the western end of Line #2 from 4.5E to at least 6.0E is apparently of higher grade and/or greater vertical extent than the anomalism towards the eastern end of this line and that observed on Line #3.

2. A comparison of the I. P. data with known geologic and drill hole data should be made immediately and the I. P. data reinterpreted on this basis. It is probable that some additional definition can be obtained from the I. P. data as to grade, depth to, and thickness of mineralization from this comparison. This analysis should also aid in the planning of any additional detail I. P. investigation.

3. It is recommended that additional induced polarization studies be made of the anomalous area probably at a reduced electrode separation (tentatively 500 ft.) to further delineate and define the horizontal limits and to aid in determining to some degree, if possible, the vertical limits and possibly some grade relationships.

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 somewhat 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

survey control, available geophysical data, especially magnetic and electro-magnetic information and the size and shape of the area of interest.

A 750 ft. dipole spacing was selected as optimum for reconnaissance of the area.

Line #1 consisted of two spreads "end-on" run approximately S 65° E along the sidelines of the Republic and Presidential Claim Groups. The center of spread #1 was located about 500 ft. northwest of the SE Cor. Jefferson and that of #2 about 350 ft. east of the SE Cor. Pierce.

Line #2 consisted of two spreads "end-on" run approximately N 70° E through the SW Cor. Republic 1 and the SW Cor Pierce. The center of spread #3 was located about 450 ft. SW of the SW Cor. Republic #1 and that of spread #4 about 1,000 ft. NE of the SW Cor of Pierce.

Line #3 consisted of two spreads "end-on" run approximately S 8° W along the end lines of the Presidential and Republic Groups. Spread #5 centered about 250 ft. NE of the NE Cor. Madison and Spread #6 about 575 ft. SW of the SE Cor. Republic #3.

Terrain is essentially gentle and vegetation medium to light. The presence of stock in the area gave some trouble in wire breakage. Telluric "noise" was at a very low level and interference from artificial fields was experienced only at the far western end of Line #2 where two grounded powerlines intersect.

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

The data obtained is considered to be of exceptionally high quality for the Pima District. This is primarily due to the fact that near surface resistivities were unusually high and the telluric noise level unusually low for this time of year.

Line #1 showed only questionable anomalism in two areas. The first between 10.5W and 11.25W was anomalous in only one depth point at the first dipole separation and can only be considered as questionable or weak. The second area extends from 3.00W to possibly 4.5W or even 5.25W with the strongest indication between 3.0W and 3.75W.

Line #2 showed definite strong anomalism between 4.5E and 5.25E with a very definite cut off to the west which is apparently an approximately vertical interface. Anomalism diminishes to the east to 9.75E then increases to moderate anomalism between 9.75E and 10.5E. There appears to be a barren zone existing somewhere between 6.75 and 9.0E most probably between 8.25E and 9.0E. The data is not as discreet as to the limits of anomalism and therefore of sulfide mineralization towards the east as it is at the western end.

Line #3 shows distinct if somewhat unusual anomalism from 8.25S to beyond the south end of the line. As on Line #2 only one depth point shows anomalism on the first dipole separation but unlike Line #2 the anomalism throughout the line appears to have definite vertical limits or boundaries. The anomalism is tentatively attributed to a horizontal layer of sulfide mineralization of unknown depth and thickness. It is thought that except possibly between 8.25S and 9.5 the depth to the top of mineralization will be in excess of 150 ft. and possibly as much as 300 to 400 ft. Comparison of the I.P. results with known drill hole and geologic data may provide for a much more discrete interpretation

Respectfully submitted,

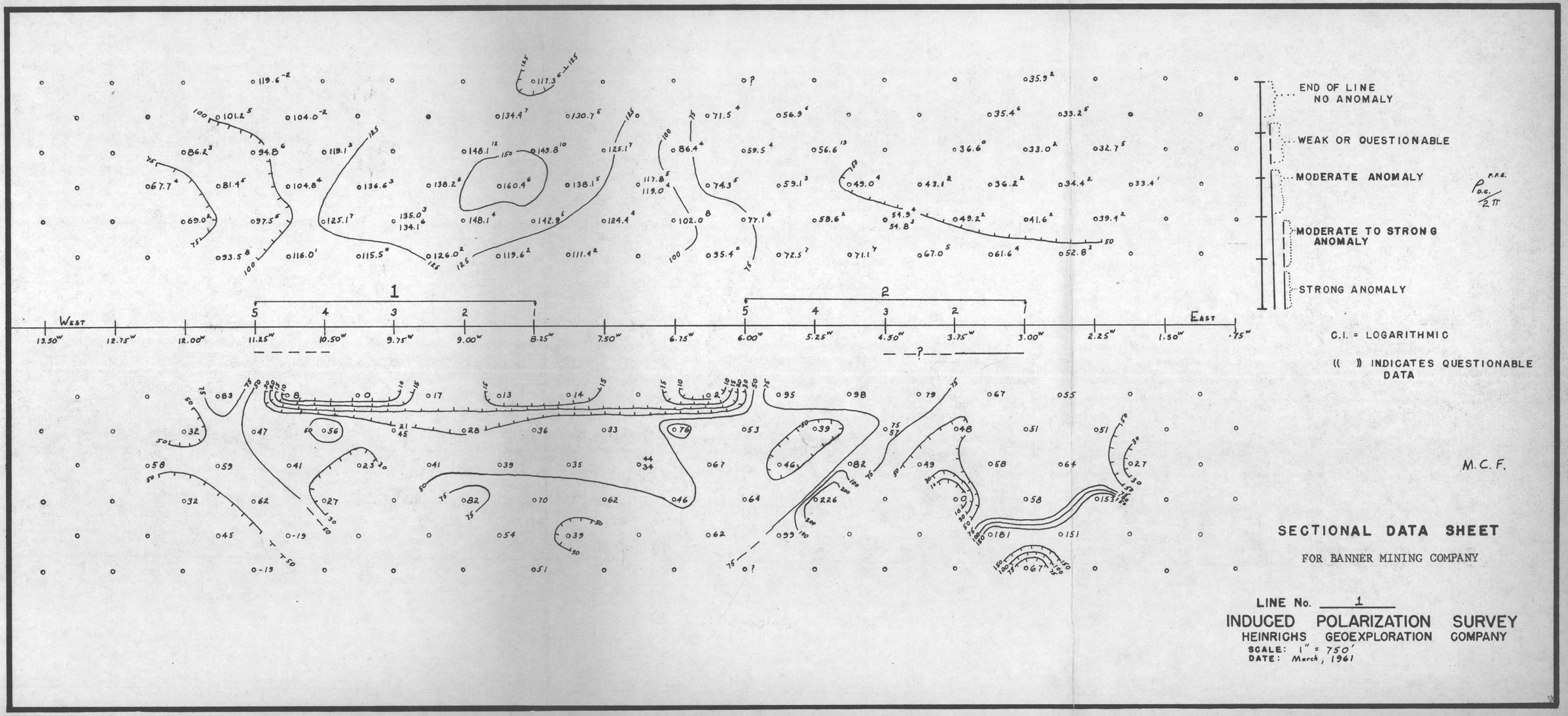
HEINRICHS GEOEXPLORATION CO.

Approved:

Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
WALTER E. HEINRICHS, JR.
DEC. 31, 1961
ARIZONA, U.S.A.

Franklin A. Seward, Jr.
Geophysicist

March 28, 1961
Tucson, Arizona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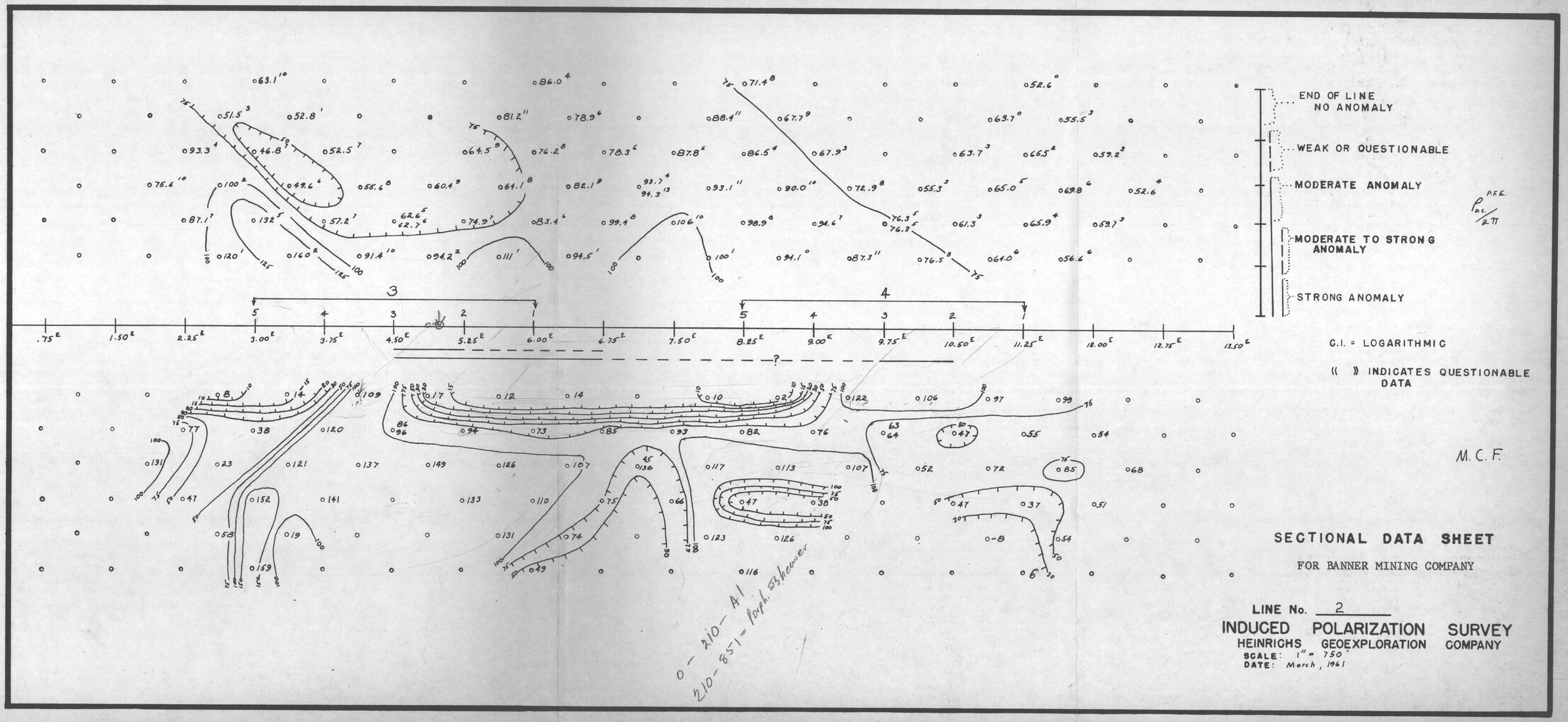
WEAK OR QUESTIONABLE
MODERATE ANOMALY
MODERATE TO STRONG ANOMALY
STRONG ANOMALY
C.I. = LOGARITHMIC
(( )) INDICATES QUESTIONABLE DATA
WEST
EAST
13.50W
12.75W
12.00W
11.25W
10.50W
9.75W
9.00W
8.25W
7.50W
6.75W
6.00W
5.25W
4.50W
3.75W
3.00W
2.25W
1.50W
.75W
M.C.F.
SECTIONAL DATA SHEET
FOR BANNER MINING COMPANY
LINE No. 1
INDUCED POLARIZATION SURVEY
HEINRICHS GEOEXPLORATION COMPANY
SCALE: 1" = 750'
DATE: March, 1961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WEAK OR QUESTIONABLE
MODERATE ANOMALY
MODERATE TO STRONG ANOMALY
STRONG ANOMALY
C.I. = LOGARITHMIC
(( )) INDICATES QUESTIONABLE DATA
M. C. F.
SECTIONAL DATA SHEET
FOR BANNER MINING COMPANY
LINE No. 2
INDUCED POLARIZATION SURVEY
HEINRICHS GEOEXPLORATION COMPANY
SCALE: 1" = 750'
DATE: March, 1961
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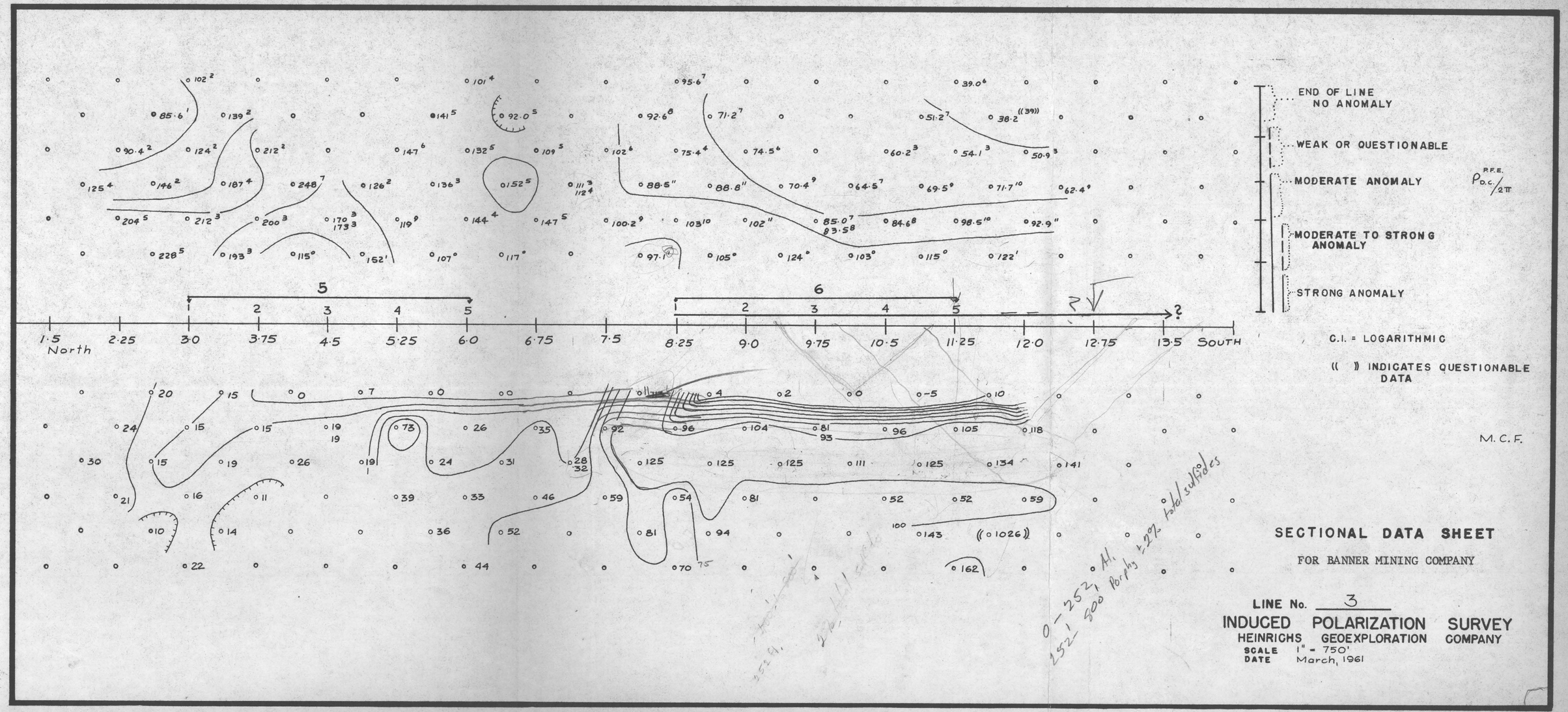
210 - 651 = Porph. Stockwork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MODERATE ANOMALY
MODERATE TO STRONG ANOMALY
STRONG ANOMALY
P.F.E. $\rho_{a.c.}/2\pi$
C.I. = LOGARITHMIC
(( )) INDICATES QUESTIONABLE DATA
M. C. F.
1.5 North
2.25
3.0
3.75
4.5
5.25
6.0
6.75
7.5
8.25
9.0
9.75
10.5
11.25
12.0
12.75
13.5 South
SECTIONAL DATA SHEET
FOR BANNER MINING COMPANY
LINE No. 3
INDUCED POLARIZATION SURVEY
HEINRICHS GEOEXPLORATION COMPANY
SCALE 1" = 750'
DATE March, 1961

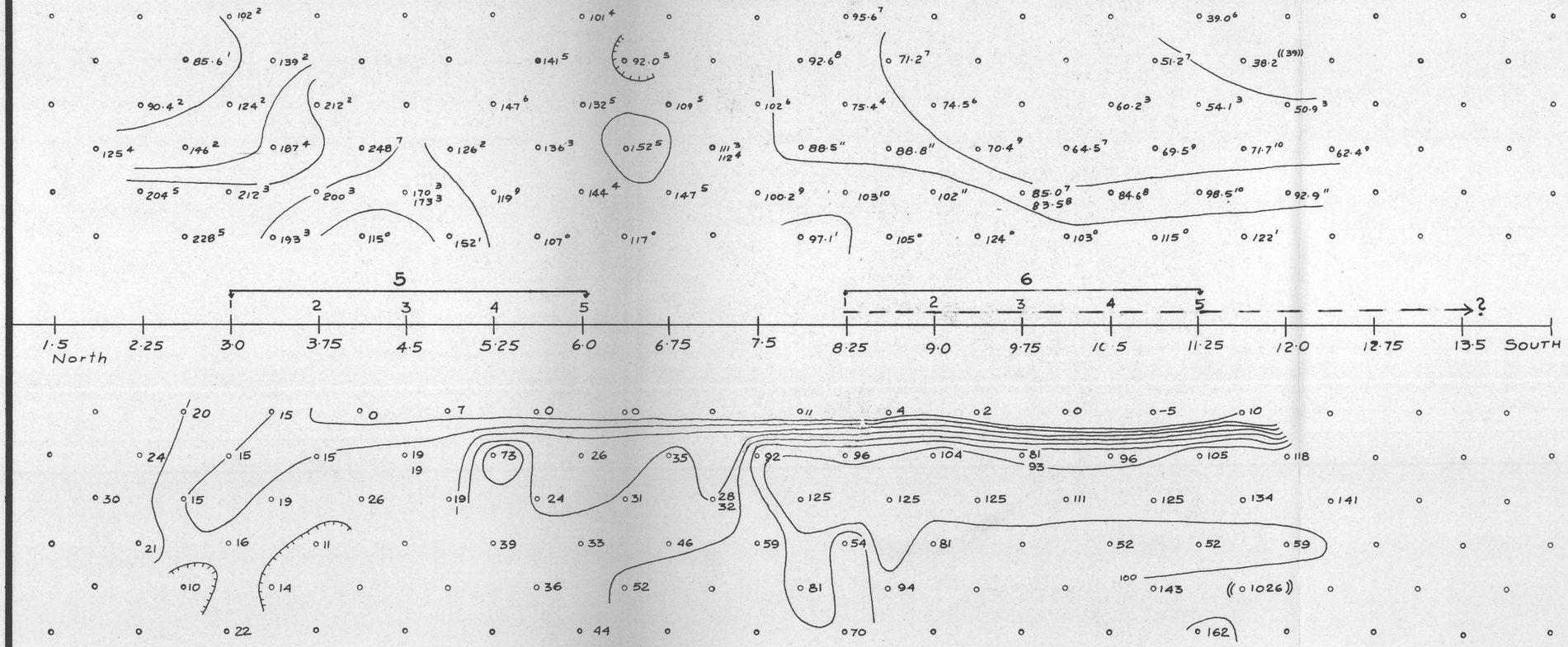
ERRATA & REVISIONS to the REPORT ON INDUCED POLARIZATION INVESTIGATIONS, TWIN BUTTES SUBDISTRICT, PIMA COUNTY ARIZONA
for
BANNER MINING COMPANY

Page 6 (signature page): delete the part of second sentence, second paragraph reading "As on Line #2 only one depth point shows anomalism on the first dipole separation but...." beginning the new sentence with the word "Unlike.....".

Sectional Data Sheet - Line #3. Change value in first separation between 7.5S and 8.25S from 113 to 11 (eleven).

In light of more recent data, the anomalism reported on the south end of Line #3 and interpreted as of moderate degree has been reduced to the status of weak or questionable.

May 8, 1961



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WEAK OR QUESTIONABLE

MODERATE ANOMALY

MODERATE TO STRONG ANOMALY

STRONG ANOMALY

$\rho_{D.C.}^{P.F.E.}/2\pi$

C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M. C. F.

SECTIONAL DATA SHEET

FOR BANNER MINING COMPANY

LINE No. 3

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 750'

DATE March, 1961 corrected May, 61

SUPPLEMENT #1 TO A REPORT ON

INDUCED POLARIZATION RECONNAISSANCE INVESTIGATIONS

Twin Buttes Subdistrict
Pima County, Arizona

for

Banner Mining Company

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

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Plan Maps: Rdc, Pfe, MCF, - 3rd Separation

Sectional Data Sheets----Line #4 - Line #9

Anomaly Plan Map----------In Pocket

INTRODUCTION

Following completion of the I. P. reconnaissance investigations in March 1961 and subsequent interpretation of data, additional work was requested by Banner Mining Company to examine in greater detail, anomalism observed in Sections 5 and 6.

The work consisted of six north-south lines approximately ¼ mile apart and one east-west line through the zone of strongest anomalism. A 500 foot dipole spacing was used and a total of 45,500 ft. of profile traverse was observed.

Work was performed by the same crew involved in the first survey.

CONCLUSIONS & RECOMMENDATIONS

1. The only observed anomalism definitely interpretable as being due to sulfide mineralization is in the NE¼ Section 6.

2. Several other weakly anomalous zones have been observed which may or may not deserve further examination either geophysically or by drilling.

3. It should be possible to further delineate in detail the strongly anomalous zone in the northeast corner of Section 6 if such were desirable.

4. Extending lines 4, 5, 10, 6, 7 and 8 to the south might be worthy of consideration or alternatively a long east-west line across the bottom of the section might add further definition

to possibly indicated trends at the southern ends of the lines.

5. Additional magnetic coverage in Sections 4, 5, 7, 8 and 9 should give added valuable structural information and provide further aid in interpretation of the present I. P. results and all other data obtained from the area.

6. As discussed at your Mineral Hill office on May 3, 1961, in order to derive maximum benefit from the geophysical results, as well as from other information already on hand, it will be extremely valuable and very important to carefully correlate all available data. Very often the proper integration of information from all available sources will provide the most reliable over all interpretation. Consideration of additional geophysics, or any drilling based on present results, should await pending further ideas and conclusions which will be obtained by this process.

PROCEDURE

The six north-south lines were approximately centered on an east west line through the middle of Sections 5 and 6 except that an additional spread was added on the north end of Line #4. Station zero on Line #4 was located at the NE corner of the Little Douglas Claim. Line #5 was located about 150 feet west of the section line fence in order to avoid possible artificial effects from the fence. Line #9, run east west, was centered at Station 0.5N on Line #5.

Telluric noise remained at a low level throughout the period during which the survey was run and no disturbing effects due to artificial fields were observed.

The 500 foot dipole spacing was selected as the best suited to cover the area of interest offering sufficient resolution of data for detail examination.

In addition to the standard "sectional" presentation of data and the anomaly plan map, plans of the frequency effects, metal factors, and resistivities on the third separation have been prepared and are included with this report.

INTERPRETATION

The only strong anomalism observed in the detail survey that can definitely be attributed to sulfide mineralization was on Line #4 and #9 in the immediate vicinity of that previously observed and reported on Line #2 of the reconnaissance survey. Lines #5, #10, #6 and #7 showed the least evidence of anomalism that might be indicative of sulfide involvement. Line #10 was run in the immediate vicinity of reconnaissance Line #3 and the anomalism previously reported on that line in the second and third separation levels, was supported only questionably in the 4th, 5th and 6th separations.

There is a slight suggestion of anomalism near the northern end of Line #4 which may substantiate that originally reported in the western half of Line #1. Line #7 shows questionable

anomalism between 1.5N and 2.5N possibly validating that reported between 9.75E and 10.50E on Line #2. A second questionable zone is located between 1S and 1.5S.

At first observation, Line #8 along the east line of Section 5 shows weak anomalism throughout the length from second separation down. However, inspection of the rather anomalous metal factors in light of the relatively lower resistivity and particularly of the only slightly higher than normal frequency effects (perhaps twice background) may negate the significance of this observation. On the other hand, there is some support for this anomalism from that observed between 3.0W and 3.75W on Line #1. If this anomalism can be considered valid and due to sulfide mineralization it is strongest from the center of the line towards the south.

The plan MCF, Rac and PFE maps delineate effectively the zone of most intense anomalism in the northeast ¼ Section 6. In addition, the MCF and PFE plans show a weakly anomalous easterly to northeasterly intermittent trend across Section 5. The definite significance of this marginal effect may be determined by existing geological or drill information or by other work.

Respectfully submitted,

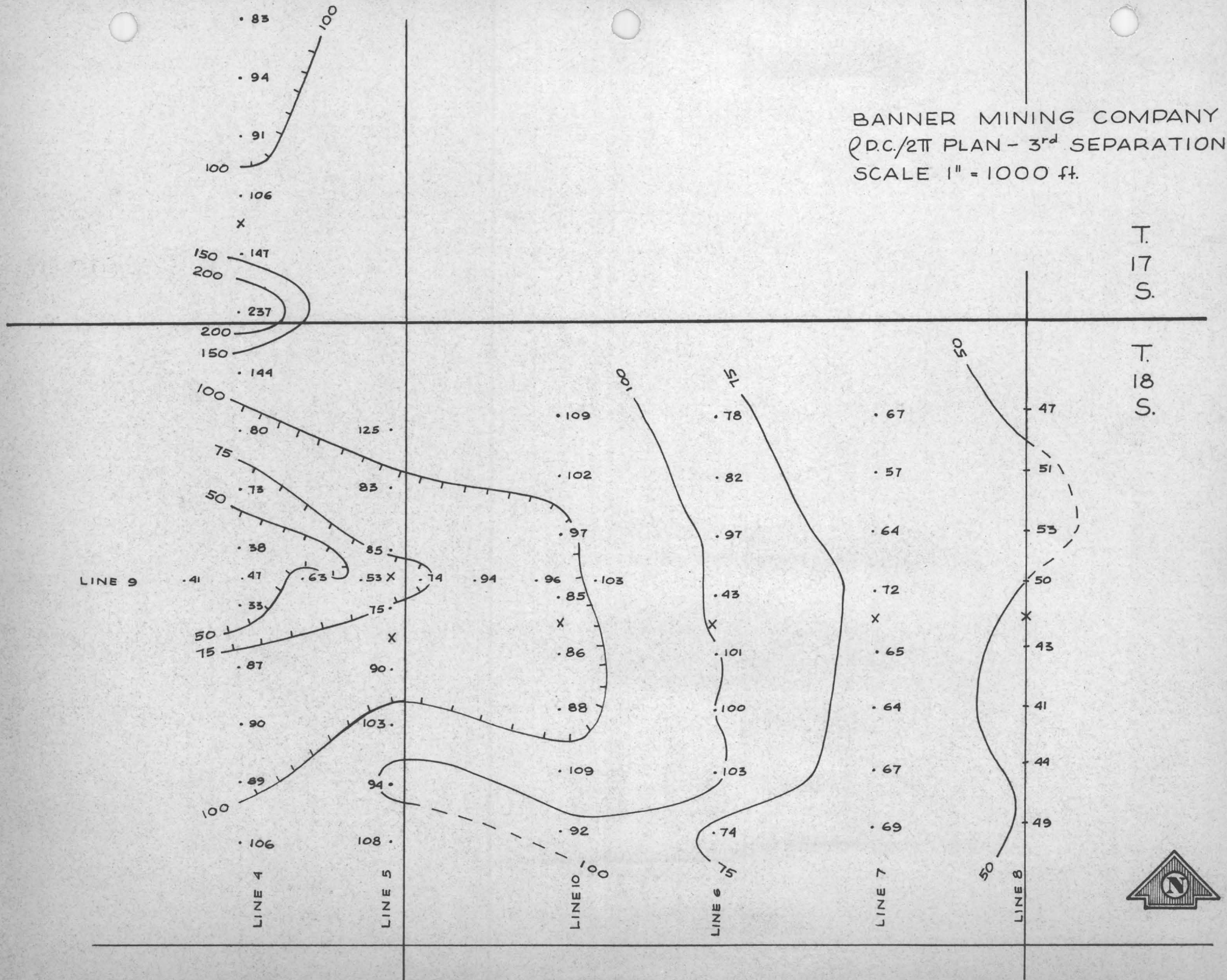
HEINRICHS GEOEXPLORATION COMPANY

Franklin A. Seward Jr.

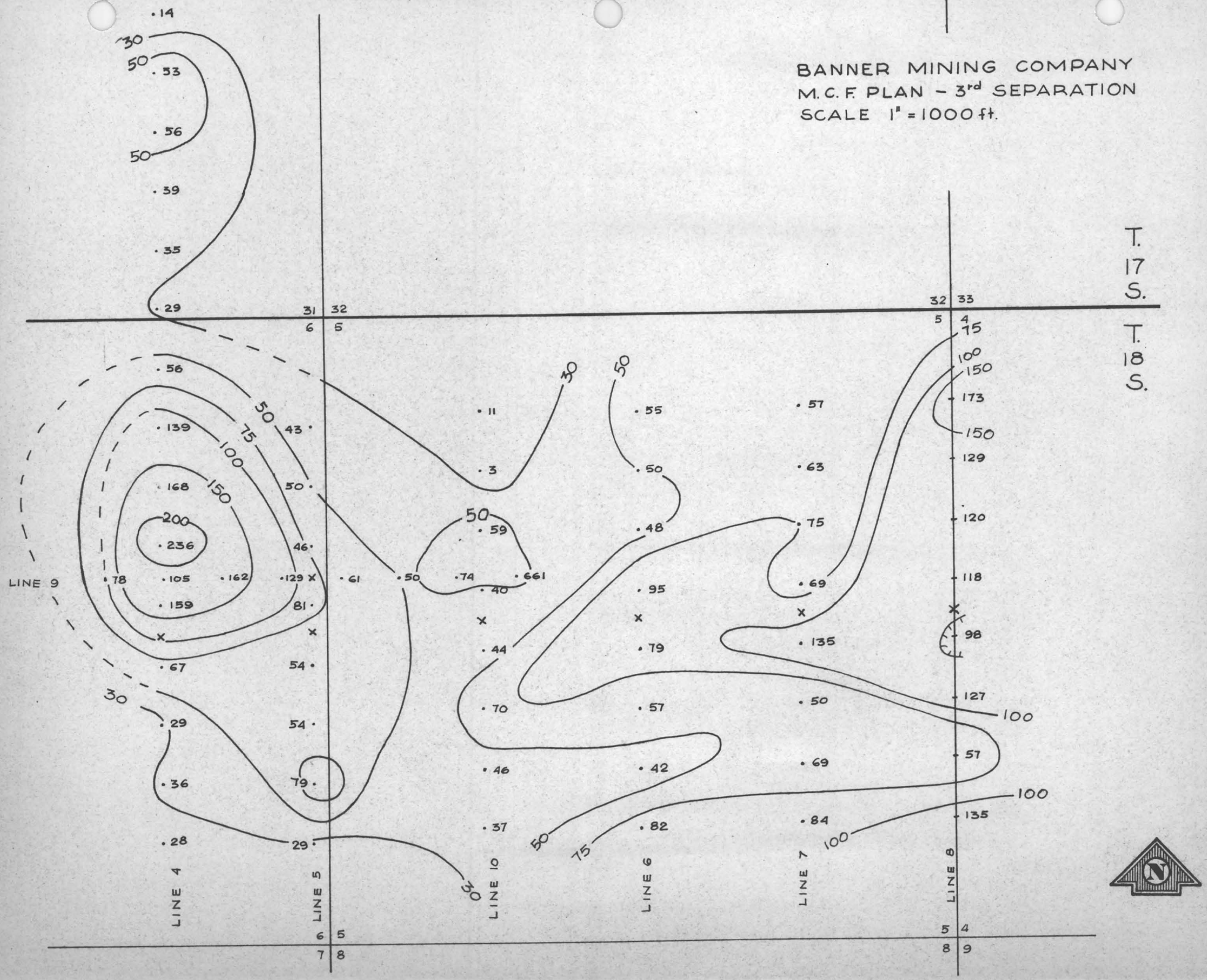
8 May 1961
Tucson, Arizona

Franklin A. Seward, Jr.
Geophysicist

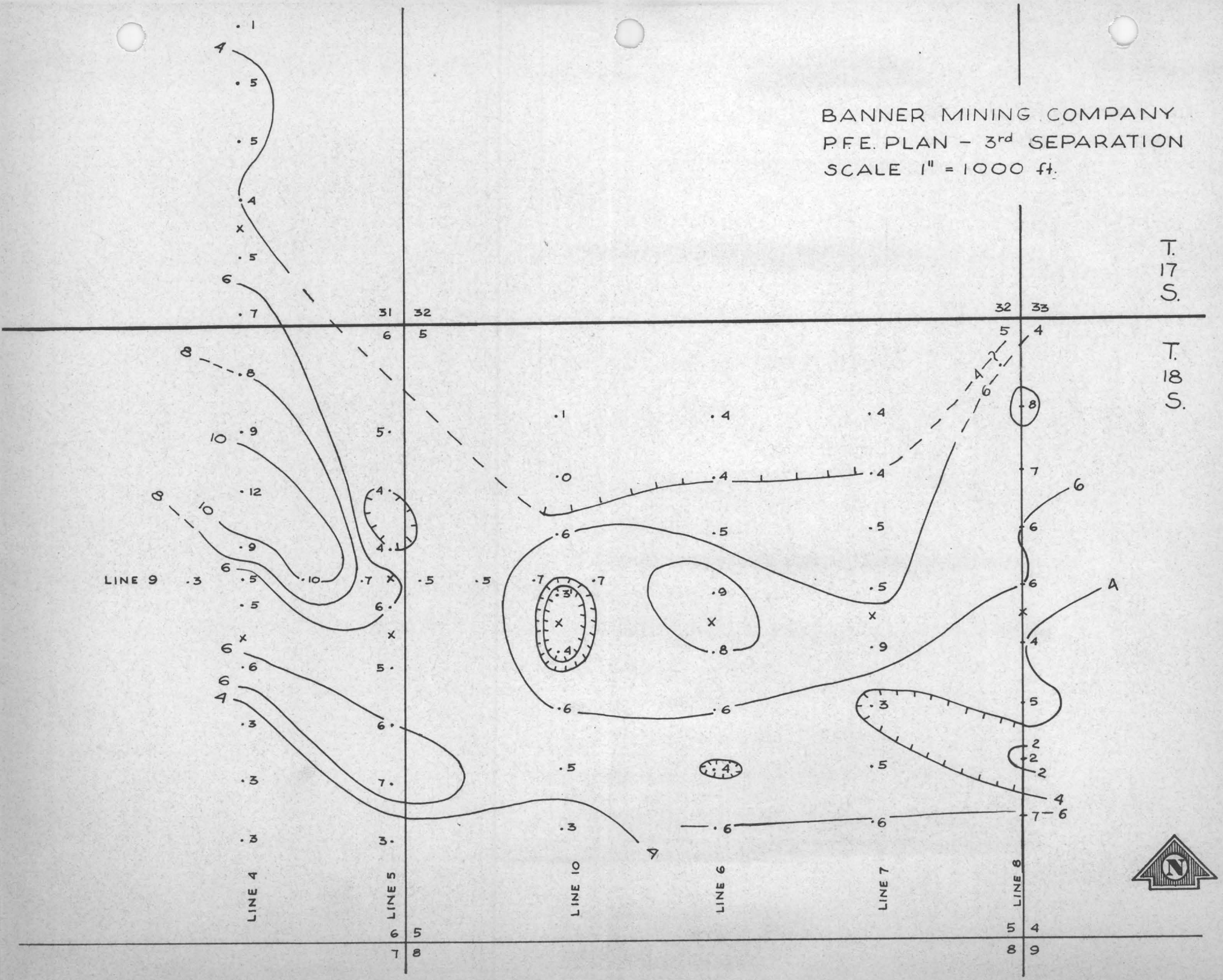
BANNER MINING COMPANY
ρ D.C./2π PLAN – 3rd SEPARATION
SCALE 1" = 1000 ft.

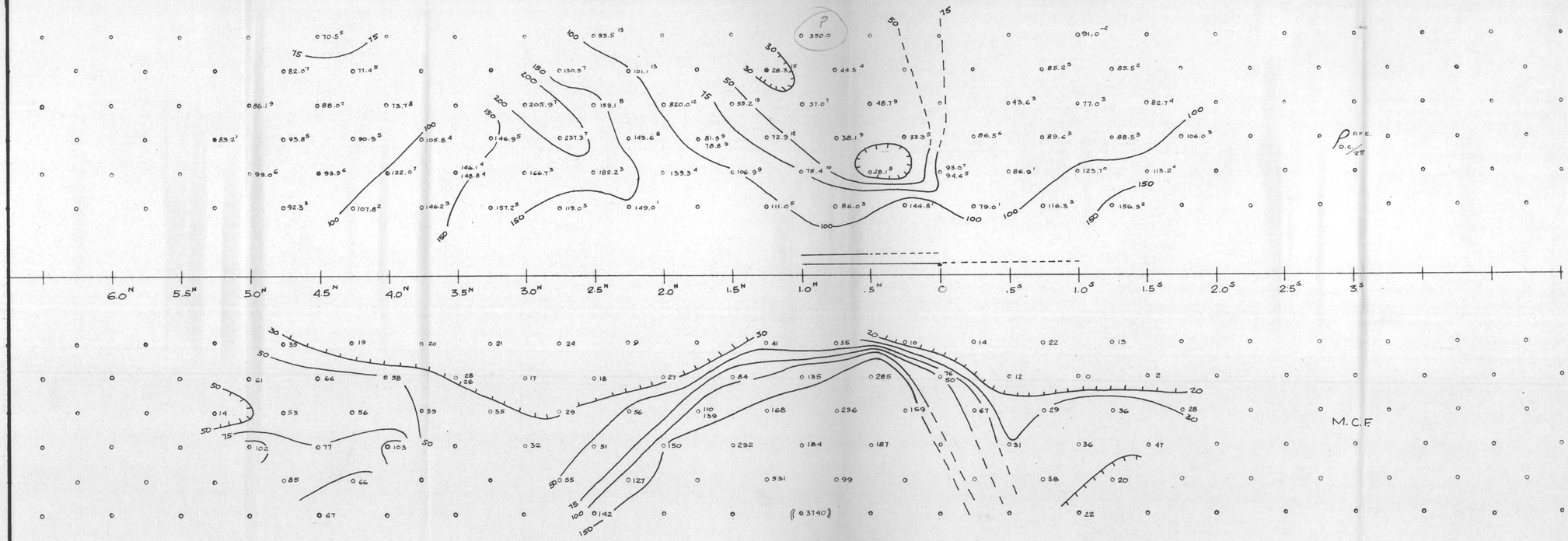


BANNER MINING COMPANY
M.C.F. PLAN – 3rd SEPARATION
SCALE 1" = 1000 ft.



BANNER MINING COMPANY
P.F.E. PLAN – 3rd SEPARATION
SCALE 1" = 1000 ft.





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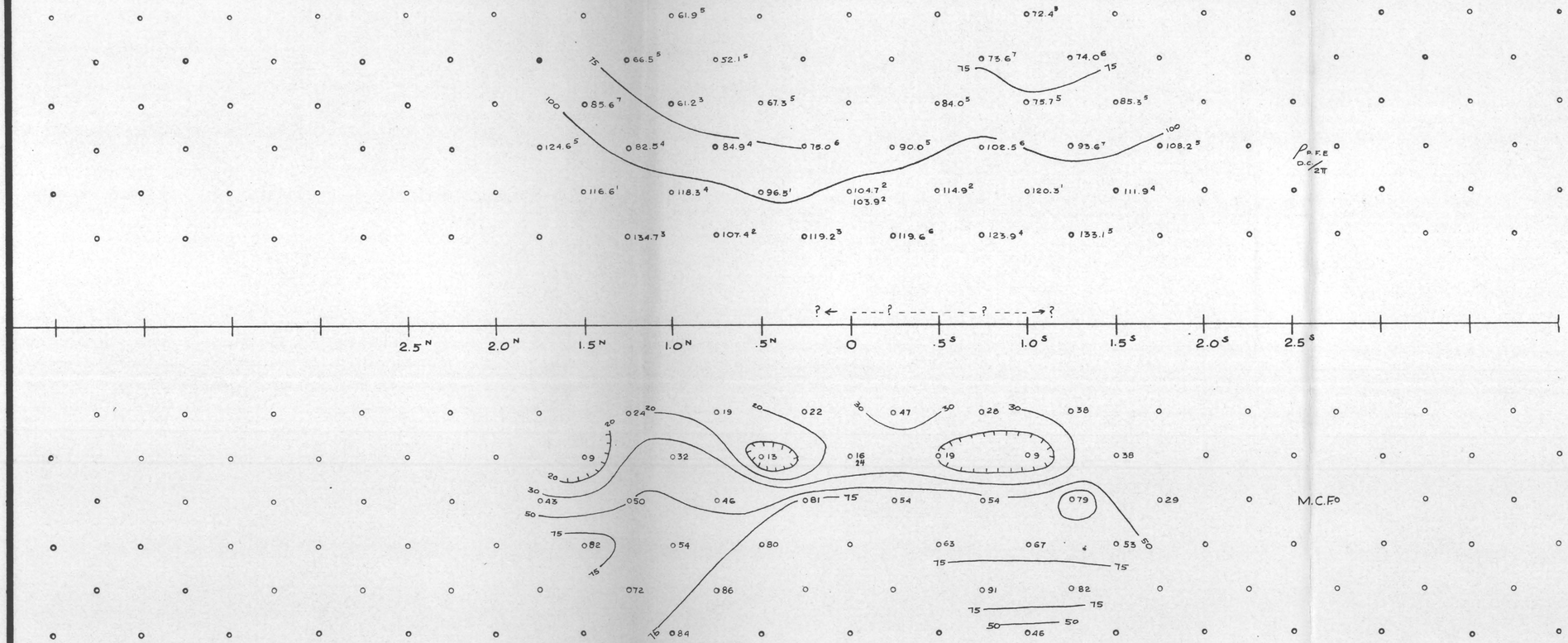
INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE APRIL 1961



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INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

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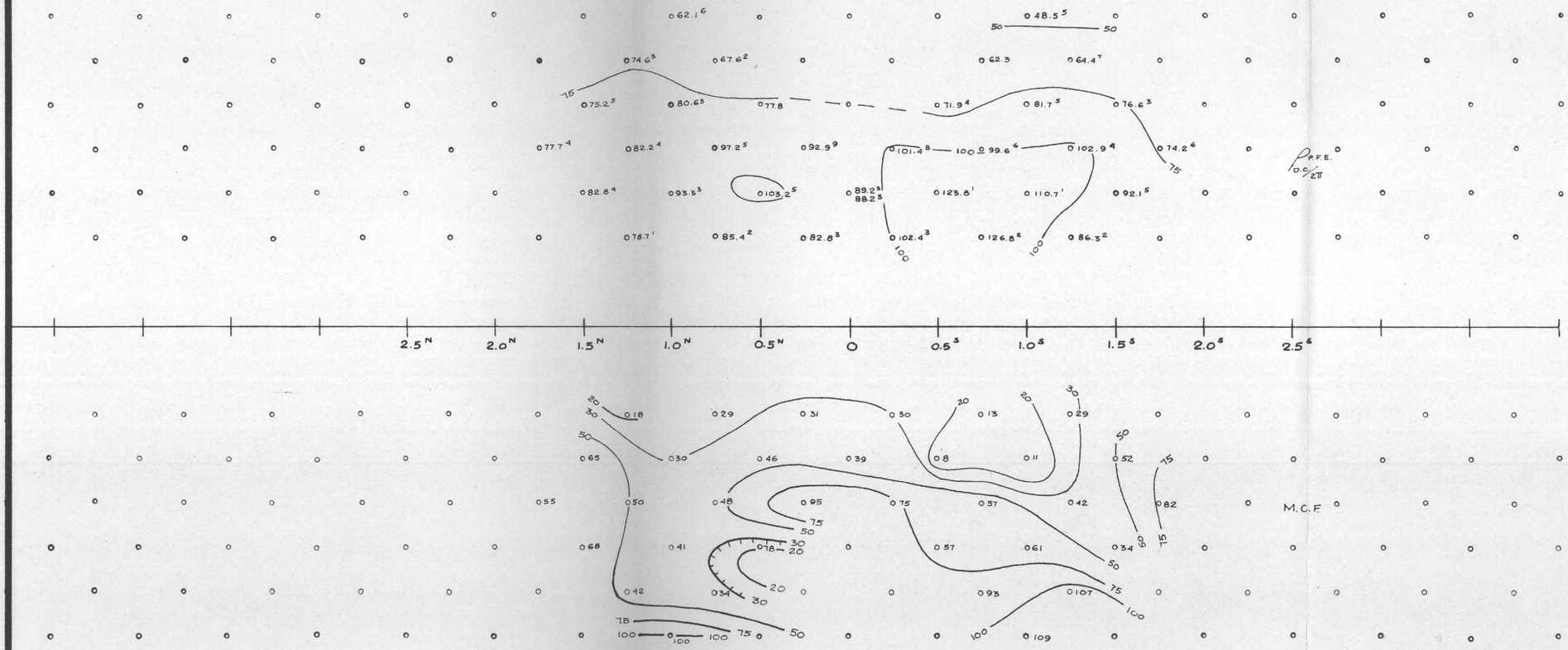
DATE APRIL 1961



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HEINRICHS GEOEXPLORATION COMPANY

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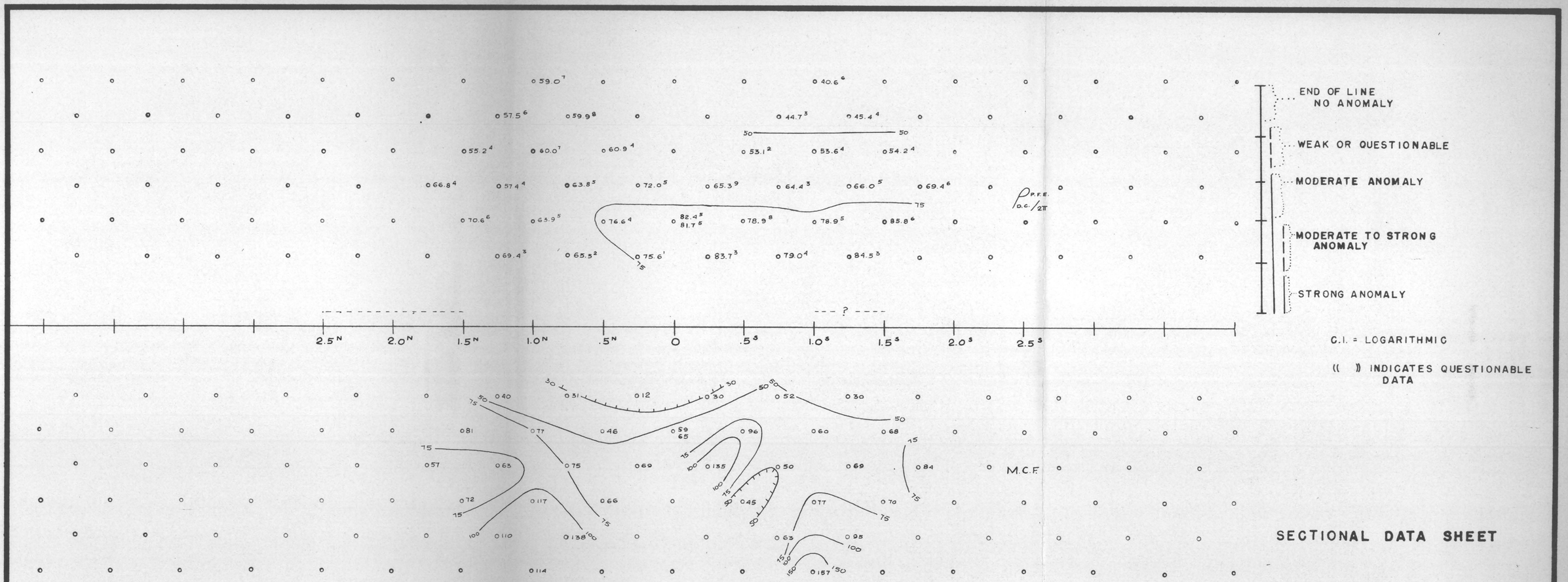
DATE APRIL 1961



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HEINRICHS GEOEXPLORATION COMPANY

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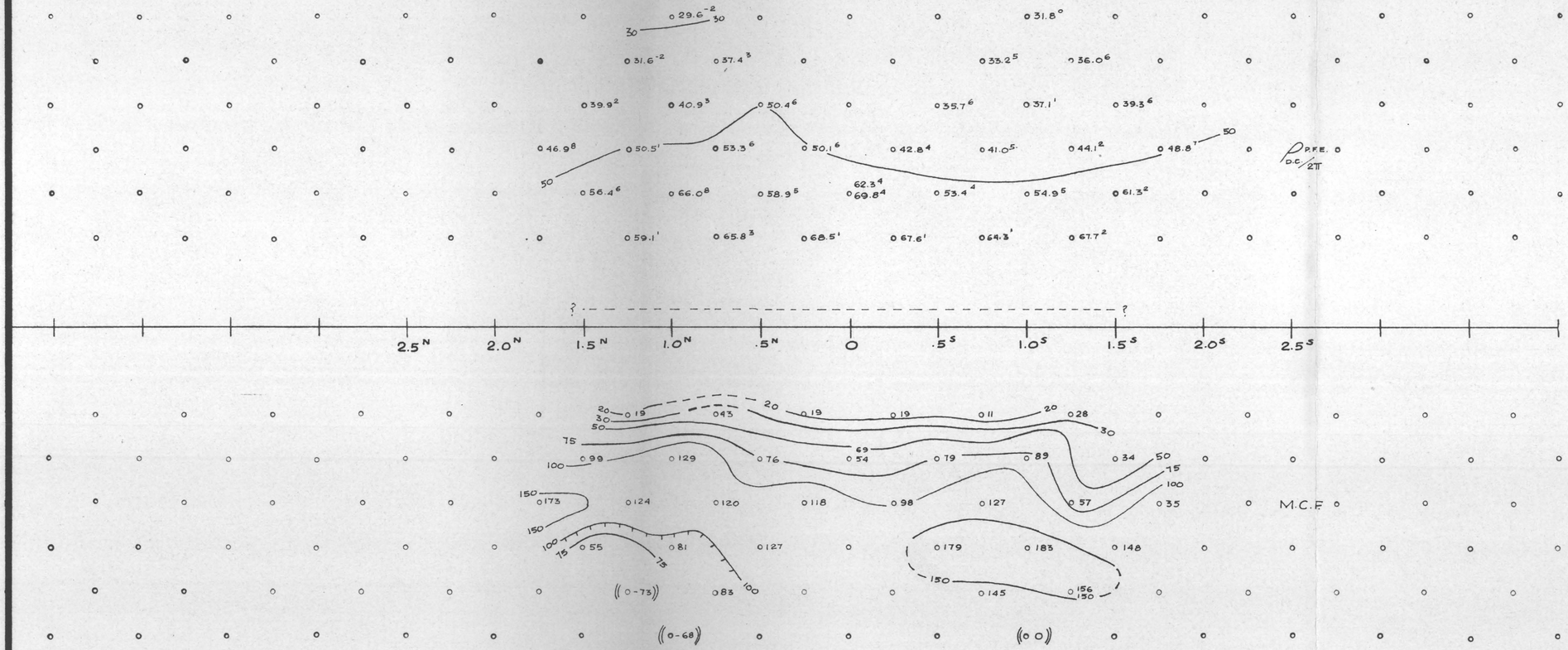

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SECTIONAL DATA SHEET

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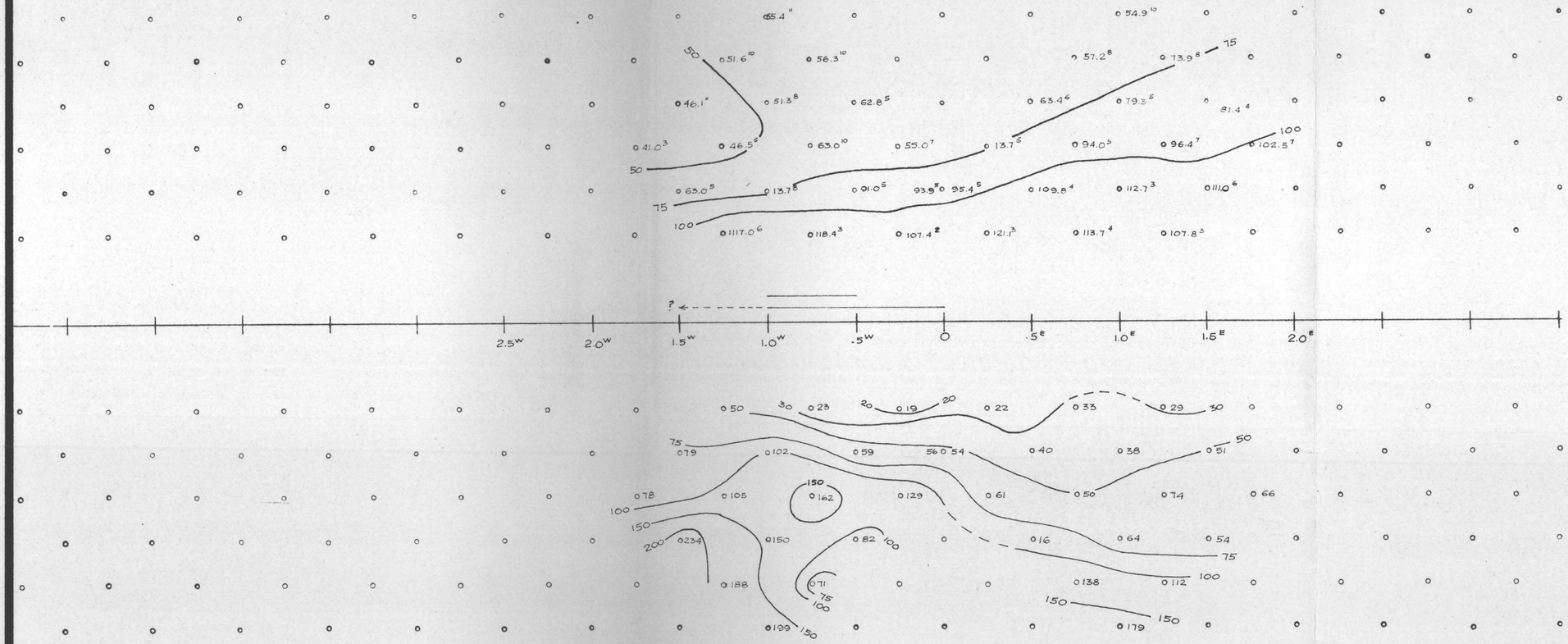
HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE APRIL 1961



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SECTIONAL DATA SHEET

LINE No. 9

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HEINRICHS GEOEXPLORATION COMPANY

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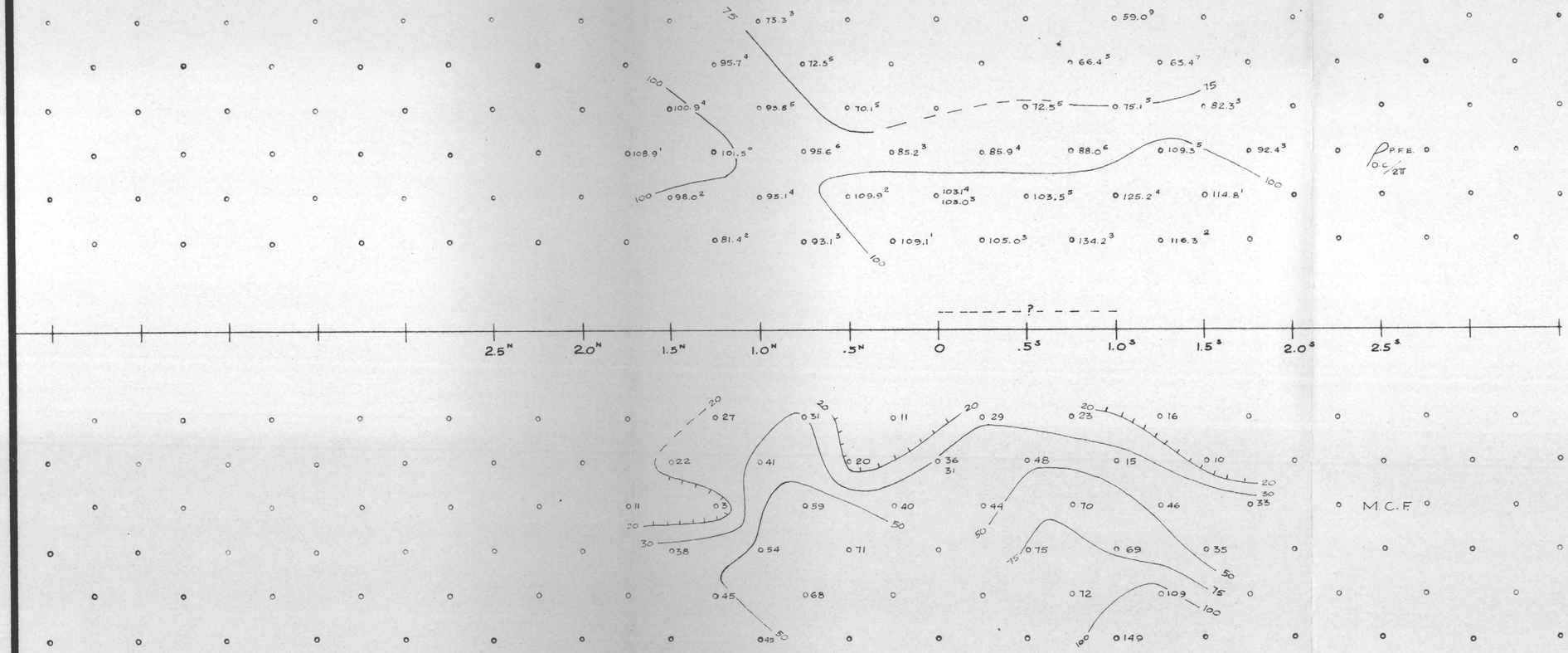
DATE APRIL, 1961



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MODERATE ANOMALY

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STRONG ANOMALY

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SECTIONAL DATA SHEET

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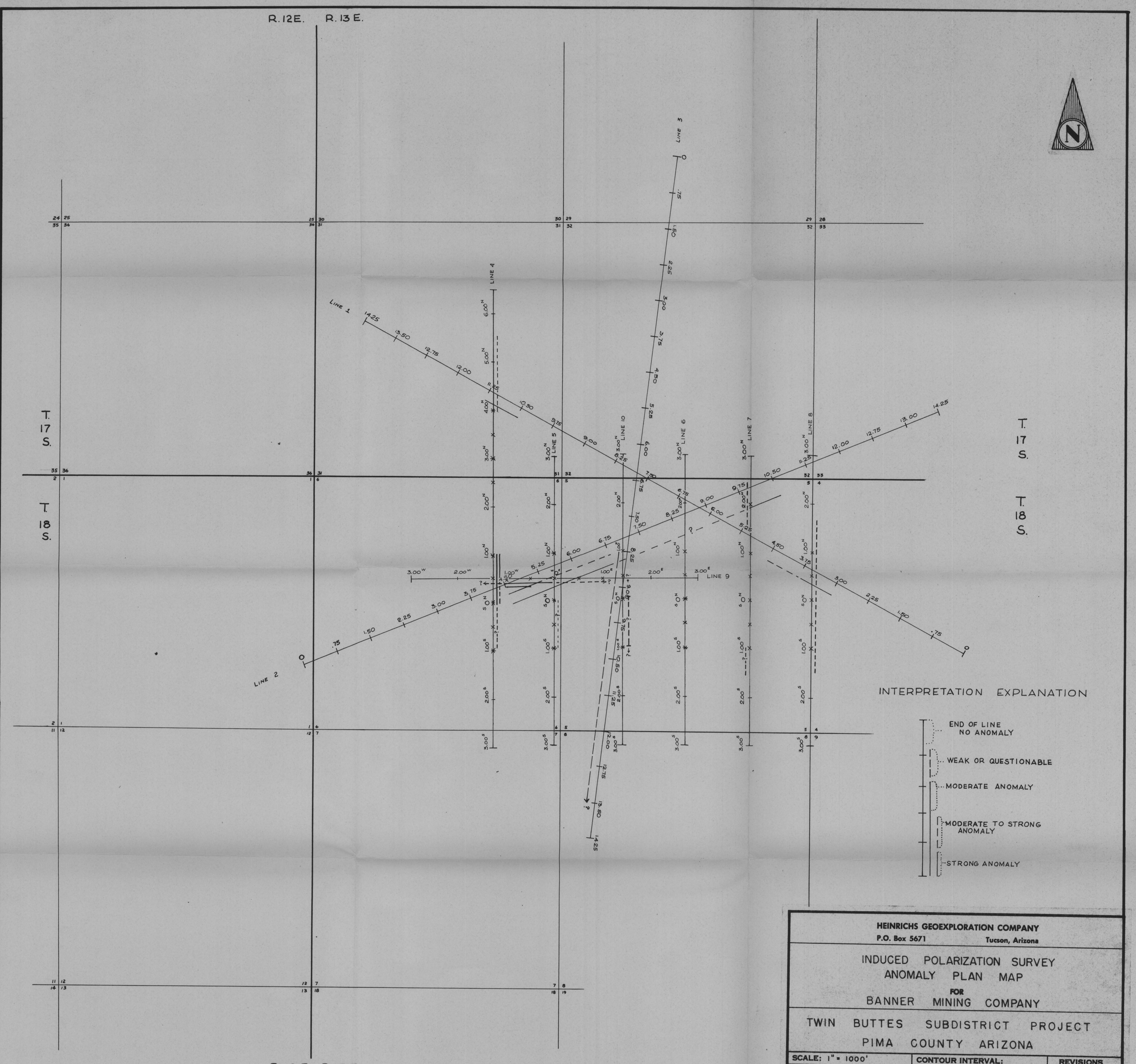
INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE APRIL 1961

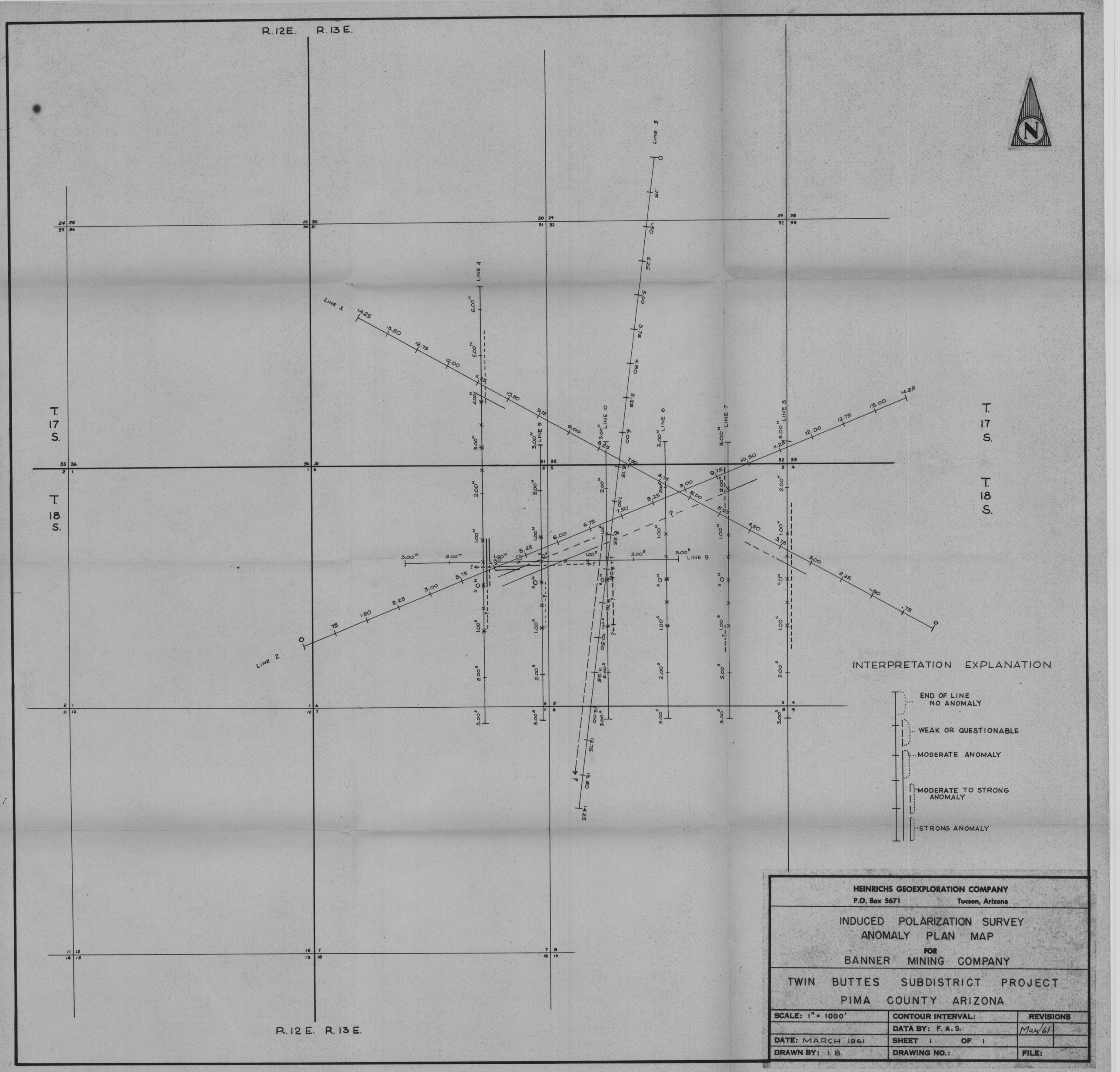


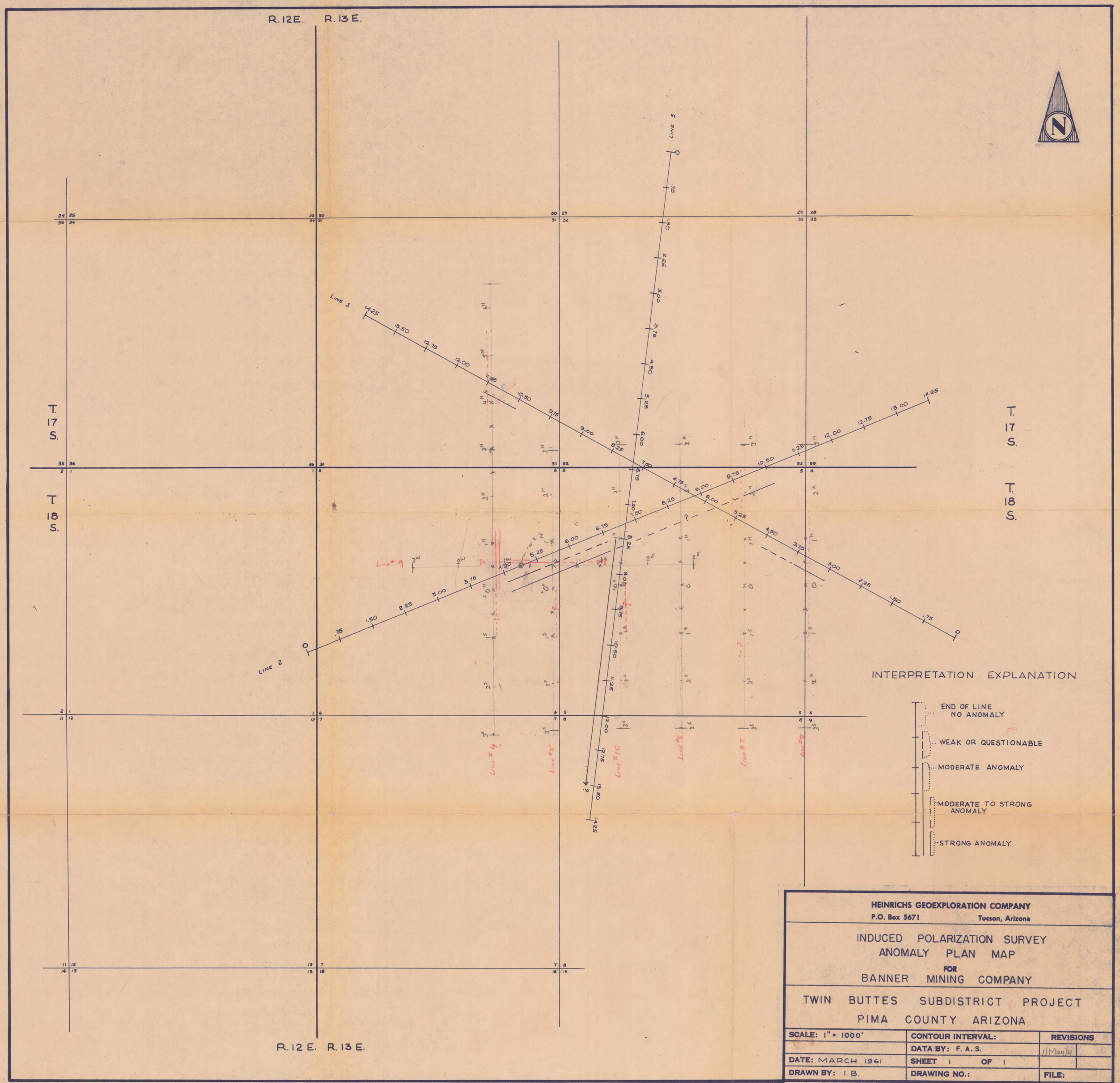
HEINRICHS GEOEXPLORATION COMPANY
P.O. Box 5671 Tucson, Arizona

INDUCED POLARIZATION SURVEY
ANOMALY PLAN MAP
FOR
BANNER MINING COMPANY

TWIN BUTTES SUBDISTRICT PROJECT
PIMA COUNTY ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL:	REVISIONS
	DATA BY: F. A. S.	May 61
DATE: MARCH 1961	SHEET 1 OF 1	
DRAWN BY: I. B.	DRAWING NO.:	FILE:


R. 12 E. R. 13 E.
T. 17 S.
T. 18 S.
LINE 1
LINE 2
LINE 3
LINE 4
LINE 5
LINE 6
LINE 7
LINE 8
LINE 9
LINE 10
INTERPRETATION EXPLANATION
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
ANOMALY PLAN MAP
FOR
BANNER MINING COMPANY
TWIN BUTTES SUBDISTRICT PROJECT
PIMA COUNTY ARIZONA
SCALE: 1" = 1000'
CONTOUR INTERVAL:
REVISIONS
DATA BY: F. A. S.
May/61
DATE: MARCH 1961
SHEET 1 OF 1
DRAWN BY: I. B.
DRAWING NO.:
FILE:


R. 12 E.
R. 13 E.
T. 17 S.
T. 18 S.
LINE 1
LINE 2
LINE 3
Line #4
Line #5
Line #6
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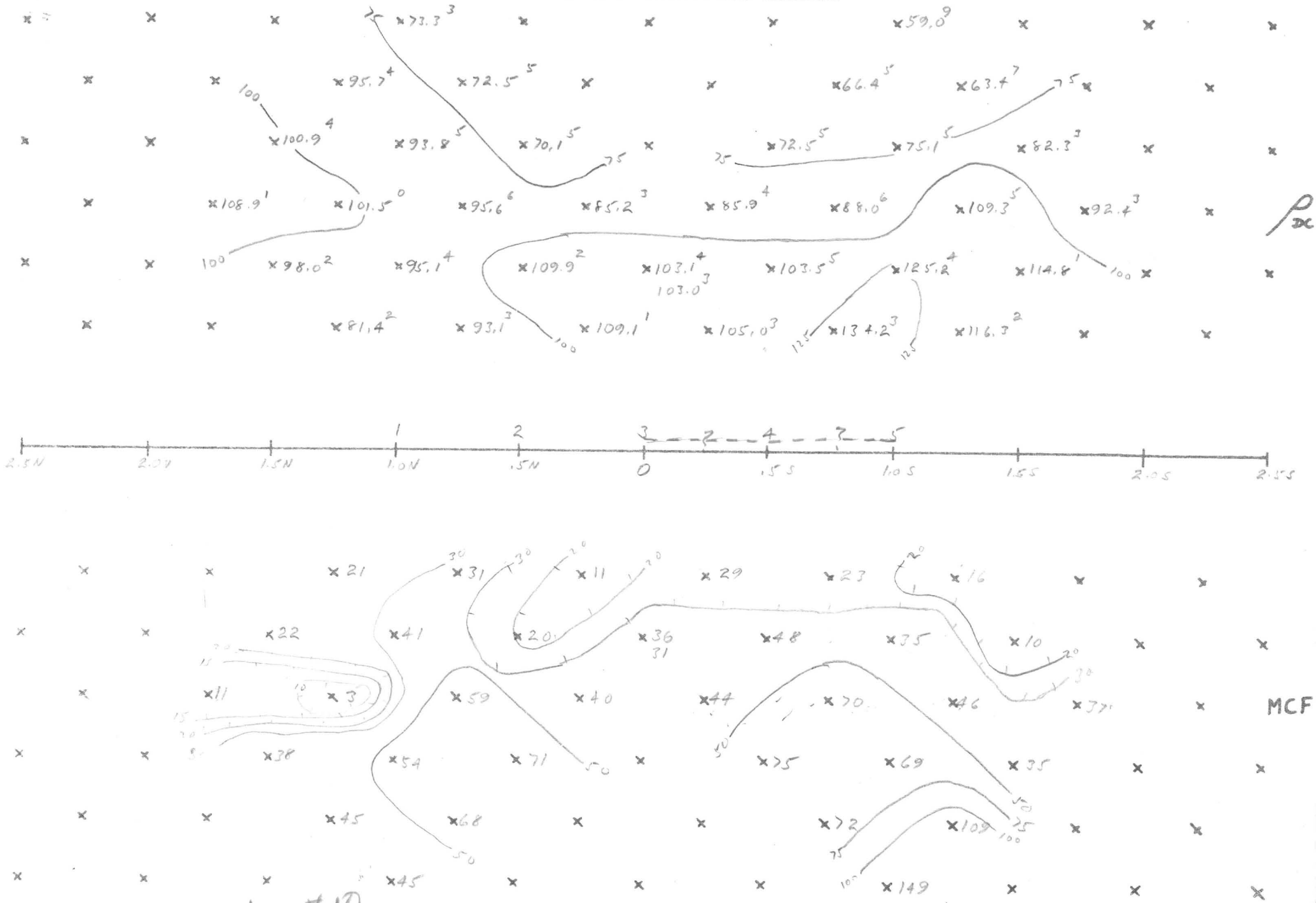
SCALE: 1" = 1000'
CONTOUR INTERVAL:
REVISIONS
DATA BY: F. A. S.
11 Mar 61
DATE: MARCH 1961
SHEET 1 OF 1
DRAWN BY: I. B.
DRAWING NO.:
FILE:

INDUCED POLARIZATION WORK SHEET



Line #10

Area Banner Line ~~13 N & S~~ ~~1320~~ E Scale 1" = 500' Date Apr. 28, 61

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: 6S Int. Cal. Date: 3-23

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		10.5-11	255 →	1125-125	→		12-12.75	→			12.75-13.5 →	
Time		1255	1256	1307	1309	1311	1322	1324	1325	1328	1342	1343
DC-1		34.3 34.0	6.46 6.41	36.9 36.9	6.30 6.27	2.03 2.03	38.0 38.0	7.46 7.46	2.12 2.13	.90 .90	7.38 7.38	2.25 2.27
DC-2		36.7 36.8	6.50 6.56	35.7 35.7	6.78 6.77	1.92 1.91	38.0 38.0	7.60 7.60	2.10 2.11	.90 .91	7.05 7.01	2.16 2.14
Σ		71.0 70.8	12.96 12.97	72.6 72.6	13.08 13.04	3.95 3.96	76.0 76.0	15.06 15.06	4.22 4.24	1.80 1.81	14.43 14.49	4.41 4.41
DC-3		34.0 33.9	6.38 6.36	36.8 36.8	6.28 6.32	2.03 2.04	38.0 37.9	7.47 7.52	2.10 2.07	.91 .88	7.38 7.38	2.28 2.27
DC-4		37.0 37.2	6.60 6.61	35.7 35.7	6.75 6.72	1.92 1.92	37.9 37.8	7.58 7.58	2.15 2.18	.92 .95	7.00 7.00	2.10 2.11
Σ		71.0 71.1	12.98 12.97	72.5 72.5	13.03 13.04	3.95 3.96	75.9 75.7	15.05 15.10	4.25 4.25	1.83 1.83	14.38 14.38	4.38 4.38
DC-AV.		71.0	12.97	72.6	13.05	3.96	75.9	15.07	4.24	1.82	14.42	4.39
AC-1		36.0	6.10	37.0	6.13	1.87	38.0	6.93	1.98	.90	6.60	2.03
AC-2		36.0	6.10	37.0	6.13	1.87	38.0	6.93	1.98	.90	6.60	2.03
Σ		72.0	12.20	74.0	12.26	3.74	76.0	13.86	3.96	1.80	13.20	4.06
S.P.		+10.8		+3.1			+10.4				+15.8	
AC-N		.08		.08			.10				.08	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE ____

Project: Banner Line: 6 S Int.Cal. ____ Date: 3-23

Send	2-3	1-2	4-5	3-4	2-3	1-2						
Rec.	12.75-13.5 →		13.5-14.25 →									
Time	1345	1346	1355	1356	1358	1400						
DC-1	81 85	41 40	1.93 1.94	.77 .79	34 33	24 27						
DC-2	81 78	47 48	1.98 1.93	.80 .78	32 33	15 12						
Σ	1.63 1.63	88 88	3.91 3.87	1.57 1.57	66 66	49 39						
DC-3	83 80	40 40	1.95 1.91	.81 .82	.35 .34	20 20						
DC-4	82 84	48 48	1.94 1.99	.74 .73	32 32	20 20						
Σ	1.65 1.69	88 88	3.87 3.90	1.55 1.55	67 66	40 40						
DC-AV	1.64	.88	3.89	1.56	.66	.42						
AC-1	.81	.42	1.84	.77	.35	.21						
AC-2	.81	.42	1.84	.77	.35	.21						
Σ	1.62	.84	3.68	1.54	.70	.42						
S. P.	+15.8		+5.4									
AC-N	.08		.06									

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Benne Line: 6N-S Int. Cal. Date: 3.23

Send	2-3	2-3	2-3		2-3	2-3	2-3					
Rec.	Cal	Cal	Cal		Cal	Cal	Cal					
Time	1228	1229	1230		1549	1550	1551					
DC-1	13.7	24.6	34.3		13.9	25.3	35.0					
DC-2	13.7	24.6	34.3		13.9	25.3	35.0					
Σ												
DC-3	13.7	24.6	34.3		13.9	25.3	35.0					
DC-4	13.7	24.6	34.3		13.9	25.3	35.0					
Σ												
DC-AV.	274	492	686		278	506	700					
AC-1	13.4	22.3	35.1		13.8	23.4	35.5					
AC-2	13.4	22.3	35.1		13.8	23.4	35.5					
Σ	268	446	702		276	468	710					
S.P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

Project: Banner Line: 6S Date: 3-23-61

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		1255	1256	1307	1309	1311	1322	1324	1325	1328	1342	1343
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	1440	1410	1400	1425	1400	1395	1380	1425	1400
Send	2-3	1-2	4-5	3-4	2-3	1-2	2-3	→				
Receive							CAL	→				
Time	1345	1346	1355	1356	1358	1400	1228	1229	1230			
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75			
Current	1385	1375	1425	1400	1380	1375	280	500	700			

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project Banner Line 65 Field date 3-23 Data page _____ Comp. date _____ Comp by _____ Page _____

(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		10.5-11.25S →		11.25-12S →			12-12.75S →				12.75-13.5S →	
(C) n separation		1	2	1	2	3	1	2	3	1	2	3
(D) I		1435	1420	1440	1410	1400	1425	1400	1395	1380	1425	1400
(E) Vdc (avg)		71.0	12.97	72.6	13.05	3.96	75.9	15.07	4.24	1.82	14.42	4.39
(F) DCcal	1.015											
(G) Kn x 10^{-3}		2.25	9.0	2.25	9.0	22.5	2.25	9.0	22.5	45	9.0	22.5
(H) ρ dc=ExFxGx10^3/D		103.0	83.5	115.0	84.6	64.5	121.6	98.5	69.5	60.2	92.9	71.7
(I) Vac Σ		72.0	12.20	74.0	12.26	3.74	76.0	13.86	3.96	1.80	13.20	4.06
(J) AC noise x 2		.16	.16	.16	.16	.16	.20	.20	.20	.20	.16	.16
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		72.0	12.20	74.0	12.26	3.74	76.0	13.86	3.96	1.79	13.20	4.06
(L) AC-DC cal.	1.015											
(M) ρ dc/ρac=ExL/K		1.000	1.078	.997	1.081	1.074	1.012	1.103	1.087	1.031	1.110	1.096
(N) PFE=(M-1)(10^2)		0	8	0	8	7	1	10	9	3	11	10
(O) MCF=(M-1)(10^5)/H		0	93	-5	96	111	10	105	125	52	118	134

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

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	2-3	2-3	2-3	2-3	2-3	2-3
(B) Receive	12.75-13.5S →		13.5-14.25S →				Cal	Cal	Cal	Cal	Cal	Cal
(C) n separation	4	5	3	4	5	6						
(D) I	1385	1375	1425	1400	1380	1375	280	500	700	277	505	700
(E) Vdc (avg)	1.64	.88	3.89	1.56	.66	.42	274	492	686	278	506	700
(F) DCcal	1.015						1.021	1.017	1.020	.998	.998	1.000
(G) Kn x 10^{-3}	45	78.75	22.5	45	78.75	126						
(H) ρ dc=ExFxGx10^3/D	54.1	51.2	62.4	50.9	38.2	39.0						
(I) Vac Σ	1.62	.84	3.68	1.54	.70	.42	268	446	702	276	468	710
(J) AC noise x 2	.16	.16	.12	.12	.12	.12	.979	.907	1.022	.994	.926	1.013
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.62	.83	3.63	1.54	.48	.40						
(L) AC-DC cal.	1.015											
(M) ρdc/ρac =ExL/K	1.028	1.073	1.088	1.030	1.392	1.063						
(N) PFE=(M-1)(10^2)	3	7	9	3	39	6						
(O) MCF=(M-1)(10^5)/H	52	143	141	59	1026	162						

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE ____

Project: Bandar Line: 6N Int.Cal. ____ Date: 3-23

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		9.0-8.25S →		8.25-7.5S →			7.5-6.75S →				6.75-6.0S →	
Time		1446	1447	1456	1457	1459	1505	1506	1507	1509	1515	1516
DC-1		39.1 39.0	6.60 6.63	33.0 33.0	7.88 7.85	2.13 2.12	30.0 30.0	7.93 8.00	2.80 2.82	1.16 1.18	7.93 8.12	2.78 2.78
DC-2		38.6 38.5	6.56 6.54	32.1 32.0	7.82 7.84	2.20 2.20	30.0 30.0	7.90 7.79	2.60 2.60	1.11 1.09	7.43 7.18	2.62 2.61
Σ		77.7 77.5	13.16 13.17	65.1 65.0	15.70 15.69	4.33 4.33	60.0 60.0	15.83 15.79	5.40 5.42	2.27 2.27	15.36 15.30	5.40 5.39
DC-3		38.8 38.8	6.60 6.60	33.0 33.0	7.88 7.81	2.16 2.12	29.8 29.8	8.05 8.07	2.83 2.82	1.22 1.20	7.95 7.90	2.80 2.81
DC-4		38.2 38.1	6.58 6.56	32.0 32.0	7.82 7.85	2.18 2.21	30.0 30.0	7.75 7.79	2.60 2.61	1.06 1.11	7.40 7.40	2.60 2.58
Σ		77.0 76.9	13.18 13.16	65.0 65.0	15.70 15.66	4.34 4.33	59.8 59.8	15.80 15.81	5.43 5.43	2.28 2.31	15.35 15.30	5.40 5.39
DC-AV		77.3	13.16	65.0	15.68	4.33	59.9	15.81	5.42	2.28	15.33	5.40
AC-1		39.0	6.25	32.8	7.19	2.02	30.0	7.31	2.47	1.09	7.12	2.47
AC-2		39.0	6.25	32.8	7.19	2.02	30.0	7.31	2.47	1.09	7.12	2.47
Σ		78.0	12.50	65.6	14.38	4.04	60.0	14.62	4.94	2.18	14.24	4.94
S. P.		-9.7		-1.5			-15.3				-11.8	
AC-N		.05		.05			.05				.06	

INDUCED POLARIZATION RECEIVER NOTES PAGE

Project Banner. Line 6N Int.Cal. Date: 3-23

Send	3-4	4-5	1-2	2-3	3-4	4-5
Rec.	6.75-6.0	→	6.0-5	255	→	
Time	1518	1520	1527	1528	1531	1534
DC-1	1.13	.66	3.33	1.47	83	51
	1.15	.66	3.32	1.45	82	52
DC-2	1.17	.60	3.41	1.62	78	52
	1.17	.58	3.41	1.65	80	50
Σ	2.30 2.32	1.26 1.24	6.74 6.73	3.09 3.10	1.61 1.62	1.03 1.02
DC- 3	1.11	68	3.20	1.41	76	52
	1.12	.69	3.19	1.41	83	48
DC-4	1.19	.54	3.54	1.67	84	52
	1.17	.54	3.53	1.68	77	55
Σ	2.36 2.29	1.22 1.23	6.94 6.72	3.08 3.09	1.60 1.60	1.04 1.03
DC-Av	230	1.24	6.73	3.09	1.61	1.03
AC-1	1.13	.59	3.30	1.48	.76	.49
AC- 2	1.12	.59	3.30	1.48	.76	.49
Σ	2.24	1.18	6.60	2.96	1.52	.98
S.P.	-11.8		-9.7			
AC-N	.06		.05			

INDUCED POLARIZATION SENDER NOTES

Project: BAUER Line: 6N Date: 23 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		1446	1447	1456	1457	1459	1505	1506	1507	1509	1515	1516
Range		1.5	—	—	—	—	—	—	—	—	—	—
Current		1425	1415	1420	1410	1405	1405	1400	1395	1400	1400	1395
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	—	—	—	—	—
Receive							CAL	—	—	—	—	—
Time	1518	1520	1527	1528	1531	1534	1549	1550	1551			
Range	—	—	—	—	—	—	.3	.5	.75			
Current	1395	1395	1375	1385	1380	1380	277	505	700			

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page

Project Banner Line 6N Field date 3-23 Data page Comp. date Comp by HLA

(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		9.0-8.25s →		8.25-7.50s →			7.50-6.75s →				6.75-6.0s →	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1425	1415	1420	1410	1405	1405	1400	1395	1400	1400	1395
(E) Vdc (avg)		77.3	13.16	65.0	15.68	4.33	59.9	15.81	5.42	2.28	15.33	5.40
(F) DCcal	1.016											
(G) Kn x 10^{-3}		2.25	9.0	2.25	9.0	22.5	2.25	9.0	22.5	45	9.0	22.5
(H) ρ dc=ExFxGx10^3/D		123.8	88.0	104.5	101.6	70.4	97.1	103.3	88.8	74.5	100.2	88.5
(I) Vac Σ		78.0	12.50	65.6	14.38	4.04	60.0	14.62	4.94	2.18	14.24	4.94
(J) AC noise x 2		.10	.10	.10	.10	.10	.10	.10	.10	.10	.12	.12
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		78.10	12.50	65.6	14.38	4.04	60.0	14.62	4.94	2.18	14.24	4.94
(L) AC-DC cal.	1.016											
(M) ρ dc/ρac=ExL/K		1.003	1.069	1.004	1.106	1.088	1.011	1.099	1.111	1.060	1.092	1.110
(N) PFE=(M-1)(10^2)		0	7	0	11	9	1	10	11	6	9	11
(O) MCF=(M-1)(10^5)/H		2	81	4	104	125	163	96	125	81	92	125

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	6.75-6.0s →		6.0-5.25s →									
(C) n separation	4	5	3	4	5	6						
(D) I	1395	1395	1375	1385	1380	1380						
(E) Vdc (avg)	2.30	1.24	6.73	3.09	1.61	1.03						
(F) DCcal	1.016											
(G) Kn x 10^{-3}	45	78.75	22.5	45	78.75	126						
(H) ρ dc=ExFxGx10^3/D	75.4	71.2	111.7	101.9	92.6	95.6						
(I) Vac Σ	2.24	1.18	6.60	2.96	1.52	.98						
(J) AC noise x 2	.12	.12	.10	.10	.10	.10						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.24	1.18	6.60	2.96	1.52	.98						
(L) AC-DC cal.	1.016											
(M) ρdc/ρac =ExL/K	1.041	1.067	1.036	1.060	1.075	1.067						
(N) PFE=(M-1)(10^2)	4	7	4	6	8	7						
(O) MCF=(M-1)(10^5)/H	54	94	32	59	81	70						

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE 11

Project: Banner Line: 5N Int. Cal. 50.8 Date: 3-22

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec		3.0-3.255→		2.25.	3.05→		15-2.255		→		75-1.55→	
Time		1150	1151	1207	1210	1214	1230	1231	1234	1235	1246	1247
DC-1		37.3 37.2	13.7 13.7	62.0 61.9	16.1 16.0	7.85 8.32	72.7 72.3	16.8 16.9	5.60 5.63	3.15 3.21	15.8 15.7	4.27 4.20
DC-2		37.1 37.1	13.4 13.4	62.0 62.0	15.7 15.3	7.38 7.08	72.6 72.8	16.2 16.0	6.00 5.97	3.39 3.20	15.9 15.9	4.86 4.88
Σ		74.4 74.3	27.1 27.1	124.0 123.9	31.8 31.3	15.23 15.20	145.3 145.1	33.0 32.9	11.60 11.6	6.54 6.41	31.7 31.6	9.13 9.08
DC-3		37.2 37.3	13.6 13.6	61.9 61.8	15.1 15.2	7.75 7.35	72.0 72.1	16.8 16.7	5.64 5.71	3.35 3.17	15.7 15.5	4.80 4.80
DC-4		37.0 36.9	13.5 13.5	61.9 61.9	16.3 16.1	7.74 8.20	72.5 72.1	16.2 16.3	5.96 5.84	3.22 3.43	15.9 15.9	4.28 4.25
Σ		74.2 74.3	27.1 27.1	123.8 123.7	31.4 31.3	15.49 15.55	144.5 144.3	33.0 33.0	11.60 11.55	6.57 6.60	31.6 31.6	9.08 9.05
DC-AV.		74.3	27.1	123.8	31.5	15.42	144.8	33.0	11.59	6.53	31.6	9.09
AC-1		37.7	13.3	61.0	15.5	7.35	70.3	16.2	5.67	3.23	15.3	4.50
AC-2		37.7	13.3	61.0	15.5	7.35	70.3	16.2	5.67	3.23	15.3	4.50
Σ		75.4	26.6	122.0	31.0	14.70	140.6	32.4	11.34	6.46	30.6	9.00
S.P.		+2.9		-3.2			-147				-383	
AC-N		.05		.07			.01				.05	

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Banner Line: 5N Int.Cal _____ Date: 3-22

Rend	3-4	4-5	1-2	2-3	3-4	4-5						
Rec.	.75-1.5S →		0-.75S →									
Time	1250	1251	1313	1314	1315	1317						
DC-1	1.90 2.15	1.22 1.21	4.00 4.06	1.36 1.38	83 85	58 47						
DC-2	1.83 1.74	1.22 1.25	3.80 3.75	1.44 1.46	68 68	59 72						
Σ	3.73 3.89	2.44 2.46	7.80 7.81	2.80 2.84	1.51 1.53	112 119						
DC-3	2.04 2.05	1.06 1.10	4.05 4.02	1.33 1.35	82 87	42 56						
Dc-4	1.88 1.77	1.42 1.31	3.79 3.75	1.50 1.40	69 62	66 51						
Σ	3.92 3.82	2.48 2.41	7.84 7.77	2.83 2.75	1.51 1.49	1.08 1.07						
-AV	3.84	2.45	7.81	2.81	1.51	1.13						
-1	1.91	1.22	3.82	1.40	.76	.56						
C-2	1.91	1.22	3.82	1.40	.76	.56						
Σ	3.82	2.44	7.64	2.80	1.52	1.12						
. P.	+38.3		-35									
C-N	.05		.04									

INDUCED POLARIZATION SENDER NOTES

Project: Banner Line: 5N Date: 3-22-61

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
eceive	CAL											
Time		1150	1151	1207	1210	1214	1230	1231	1234	1235	1246	1247
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1450	1435	1440	1415	1400	1425	1400	1390	1385	1410	1400
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	→				
Receive							CAL	→				
Time	1250	1251	1313	1314	1315	1317	1145	1146	1147			
Range	1.5	→					.3	.5	.75	.3	.5	.75
Current	1390	1390	1410	1400	1390	1390	280	500	710			

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: 5 N-S Int.Cal. Date:

Send	2-3	2-3	2-3		2-3	2-3	2-3					
Rec.	Cal											
Time	1145	1146	1147		1620	1621	1622					
DC-1	14.0	25.5	35.5		14.2	25.9	35.3					
DC-2	14.0	25.5	35.5		14.2	25.9	35.3					
Σ	28.0	51.0	71.0		28.4	51.8	70.6					
DC-3	14.0	25.5	35.5		14.2	25.9	35.3					
DC-4	14.0	25.5	35.5		14.2	25.9	35.3					
Σ	28.0	51.0	71.0		28.4	51.8	70.6					
DC-AV												
AC-1	13.9	24.0	36.0		14.1	24.5	36.0					
AC-2	13.9	24.0	36.0		14.1	24.5	36.0					
Σ	27.8	48.0	72.0		28.2	49.0	72.0					
S. P.												
AC-N												

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Banner Line# 3 Spd #5 Field date 22/March Data page_____ Comp. date 23/March. Comp by JAS

(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		3.75s-3.0	→	2.25-3.0s	→	→	1.5-2.25s	→	→	→	.75-1.5s	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1450	1435	1440	1415	1400	1425	1400	1390	1385	1410	1400
(E) Vdc (avg)		74.3	27.1	123.8	31.5	15.42	144.8	33.0	11.59	6.53	31.6	9.09
(F) DCcal	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}		2.25	9.0	2.25	9.0	22.5	2.25	9.0	22.5	45.0	9.0	22.5
(H) ρdc=ExFxGx10^3/D		115	170	193	200	248	228	212	187	212	204	146
(I) Vac Σ		75.4	26.6	122.0	31.0	14.70	140.6	32.4	11.34	6.46	30.6	9.00
(J) AC noise x 2		.10	.10	.14	.14	.14	.14	.14	.14	.14	.10	.10
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		75.4	26.6	122.0	31.0	14.70	140.6	32.4	11.34	6.46	30.6	9.00
(L) AC-DC cal.	1.015	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K		1.000	1.033	1.029	1.030	1.065	1.045	1.032	1.036	1.024	1.049	1.022
(N) PFE=(M-1)(10^2)		0	3	3	3	7	5	3	4	2	5	2
(O) MCF=(M-1)(10^5)/H		0	19	15	15	26	20	15	19	11	24	15

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	→	→	→	→	→
(B) Receive	.75-1.5s	→	0-.75s	→	→	→	Cal	→	→	→	→	→
(C) n separation	4	5	3	4	5	6						
(D) I	1390	1390	1410	1400	1390	1390	280	500	710	280	505	700
(E) Vdc (avg)	3.84	2.45	7.81	2.81	1.51	1.13	28.0	51.0	71.0	28.4	51.8	70.6
(F) DCcal	1.000	→	→	→	→	→	1.000	980	1.000	986	.994	.994
(G) Kn x 10^{-3}	45.0	78.75	22.5	45.0	78.75	126						
(H) ρ dc=ExFxGx10^3/D	124	139	125	90.4	85.6	102						
(I) Vac Σ	3.82	2.44	7.64	2.80	1.52	1.12						
(J) AC noise x 2	.10	.10	.08	.08	.08	.08						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	3.82	2.44	7.64	2.80	1.52	1.12	27.8	48.0	72.0	28.2	49.0	72.0
(L) AC-DC cal.	1.015	→	→	→	→	→	.994	.942	1.011	.994	.945	1.018
(M) ρdc/ρac =ExL/K	1.020	1.019	1.038	1.019	1.009	1.022						
(N) PFE=(M-1)(10^2)	2	2	4	2	1	2						
(O) MCF=(M-1)(10^5)/H	16	14	30	21	10	22						

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Banner Line 5S Int.Cal. Date: 3-22

end	2-3	1-2	4-5	3-4	2-3	1-2						
ec.	8.25-7.5		8.25-9.05		→							
ime	1541	1540	1551	1553	1555	1556						
DC-1	2.22 2.26	1.30 1.27	3.57 3.65	1.69 1.65	78 76	53 49						
DC-2	1.89 1.85	1.22 1.27	3.44 3.25	1.70 1.75	85 88	60 64						
Σ	4.11 4.11	2.52 2.54	7.01 6.90	3.39 3.40	1.63 1.63	1.13 1.13						
DC- 3	2.28 2.26	1.23 1.20	3.92 4.06	1.58 1.55	71 67	45 49						
DC-4	1.85 1.87	1.29 1.36	3.10 3.00	1.81 1.81	91 97	63 60						
Σ	4.13 4.13	2.52 2.56	7.02 7.06	3.39 3.36	1.62 1.64	1.08 1.09						
C-Av	4.12	2.53	7.00	3.39	1.63	1.11						
C-1	2.00	1.22	3.44	1.64	.79	.54						
C- 2	2.00	1.22	3.44	1.64	.79	.54						
Σ	4.00	2.44	6.88	3.28	1.58	1.08						
S.P.	-.45		-2.0									
AC-N	.04		.04									

INDUCED POLARIZATION SENDER NOTES

Project: Banner Line: 5S Date: 3-22-61

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	2-3											
Time		1454	1455	1506	1507	1509	1517	1520	1523	1524	1533	1544
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	1440	1420	1410	1430	1420	1405	1395	1425	1400
Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal	→				
Receive							2-3	→				
Time	1541	1540	1551	1553	1555	1556	1620	1621	1622			
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1405	1410	1415	1400	1395	1390	280	505	700			

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Banner . Line 3 S Int.Cal. Date: 3-22

end	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
ec.	5.25-	6.005	6.05-6.75	→		6.75-7.5			→	7.5-8.25	→
ime	1459	1435	1506	1507	1509	1517	1520	1523	1524	1533	1544
DC-1	48.7 48.4	14.0 13.8	34.6 34.2	9.23 9.25	3.87 3.85	37.1 37.1	11.5 11.5	4.25 4.16	2.31 2.32	11.0 10.8	4.46 4.48
DC-2	48.3 48.5	13.5 13.5	34.3 34.2	9.61 9.60	4.01 4.00	37.2 37.2	11.2 11.2	4.30 4.38	2.25 2.21	12.2 12.3	5.00 5.00
Σ	97.0 96.9	27.5 27.3	68.9 68.4	18.84 18.85	7.88 7.85	74.3 74.3	22.7 22.7	8.55 8.54	4.56 4.53	23.2 23.1	9.46 9.48
DC- 3	48.2 48.0	13.8 13.9	34.2 34.1	9.24 9.21	3.97 4.00	37.0 36.7	11.5 11.4	4.21 4.20	2.37 2.32	10.7 10.3	4.58 4.64
DC-4	48.6 48.5	13.4 13.4	34.1 34.2	9.60 9.60	3.88 3.90	37.2 37.4	11.2 11.2	4.25 4.31	2.20 2.26	12.6 12.8	4.90 4.89
Σ	96.8 96.5	27.2 27.3	68.3 68.3	18.84 18.81	7.85 7.90	74.2 74.1	22.7 22.6	8.46 8.51	4.57 4.58	23.3 23.1	9.48 9.53
C-Av	96.8	27.3	68.5	18.84	7.87	74.2	22.7	8.52	4.56	23.2	9.49
C-1	48.6	13.4	34.8	8.80	3.90	37.7	11.1	4.18	2.19	11.2	4.60
C- 2	48.6	13.4	34.8	8.80	3.90	37.7	11.1	4.18	2.19	11.2	4.60
Σ	97.2	26.8	69.6	17.60	7.80	75.4	22.2	8.36	4.38	22.4	9.20
.P.	-3.4		-7.6			-1.8				-14.5	
C-N	.04		.07			.06				.04	

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ____

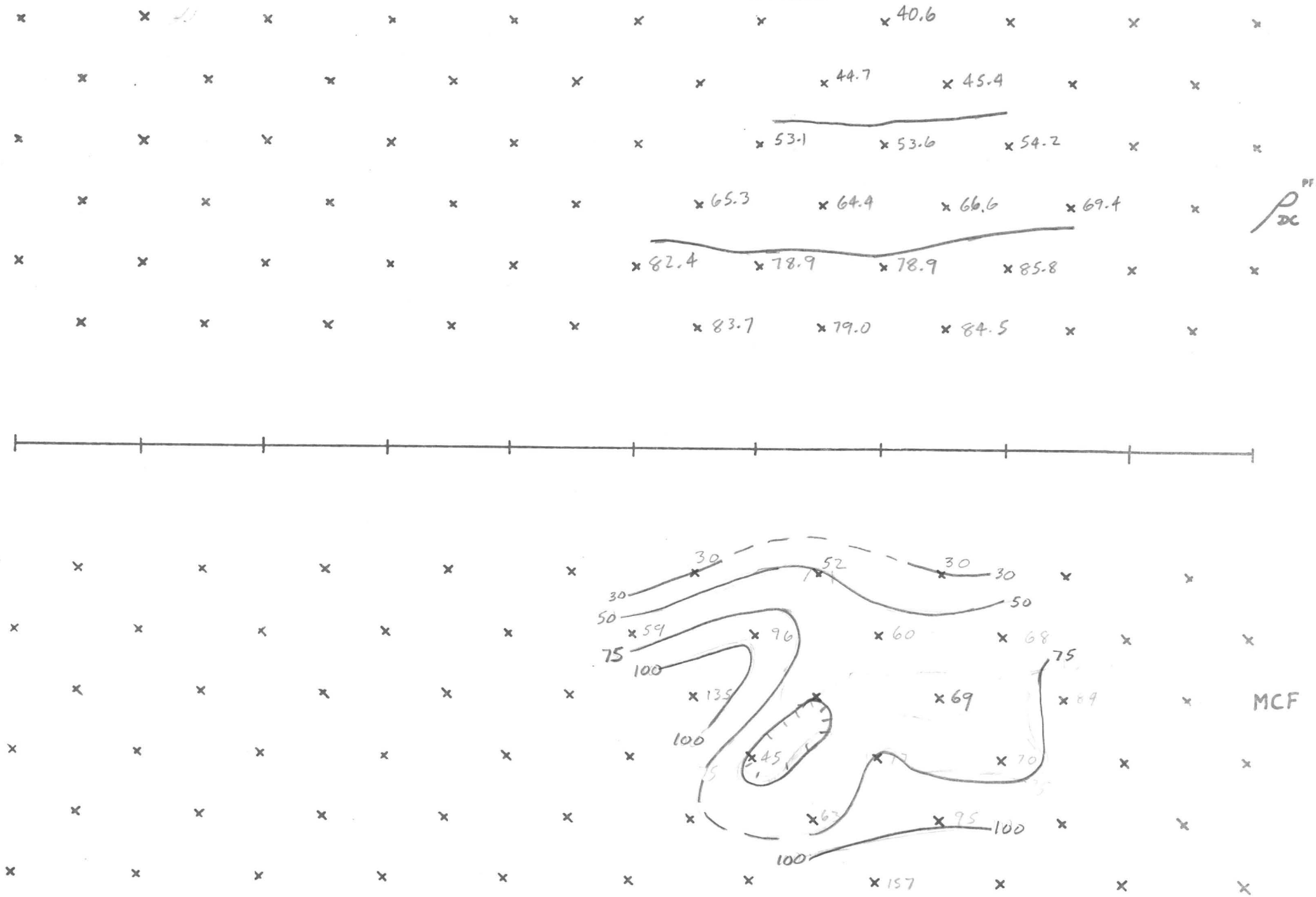
Project Banner Line #3 Sprd #5S Field date 22/March/61 Data page ____ Comp. date 23/March Comp by [illegible]

(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		5.25-6s	→	6-6.75s	→	→	6.75-7.5s	→	→	→	7.5-8.25s	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1435	1420	1440	1420	1410	1430	1420	1405	1395	1425	1400
(E) Vdc (avg)		96.8	27.3	68.5	18.84	7.87	74.2	22.7	8.52	4.56	23.2	9.49
(F) DCcal	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}		2.25	9.0	2.25	9.0	22.5	2.25	9.0	22.5	45	9.0	22.5
(H) ρ dc=ExFxGx10^3/D		152	173	107	119	126	117	144	136	147	147	152
(I) Vac Σ		97.2	26.8	69.6	17.60	7.80	75.4	22.2	8.36	4.38	22.4	9.20
(J) AC noise x 2		.08	.08	.14	.14	.14	.12	.12	.12	.12	.08	.08
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		97.2	26.8	69.6	17.60	7.80	75.4	22.2	8.36	4.38	22.4	9.20
(L) AC-DC cal.	1.015	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K		1.010	1.033	1.000	1.087	1.024	1.000	1.038	1.033	1.058	1.051	1.047
(N) PFE=(M-1)(10^2)		1	3	0	9	2	0	4	3	6	5	5
(O) MCF=(M-1)(10^5)/H		7	19	0	73	19	0	26	24	39	35	31

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

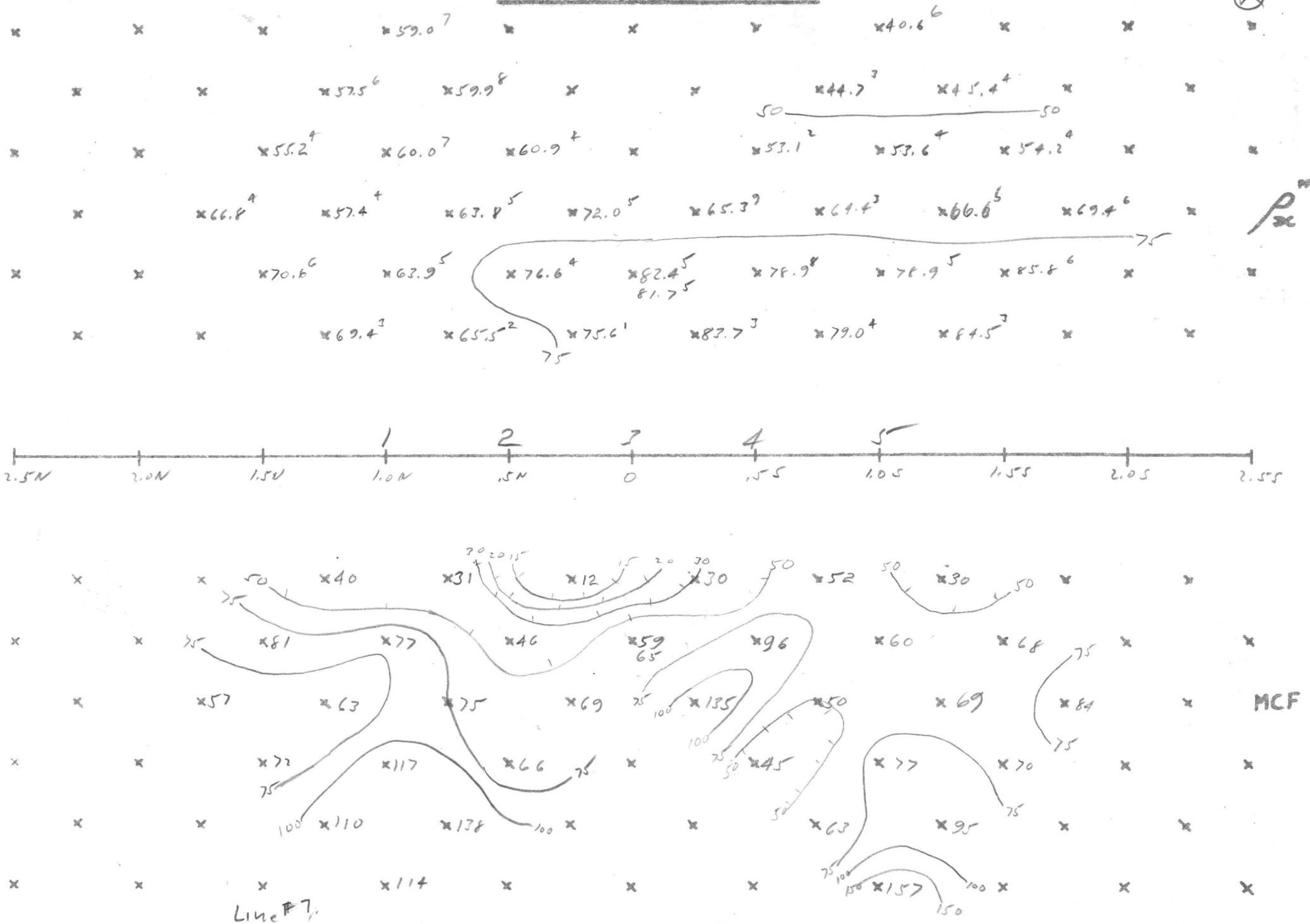
(A) Send	2-3	1-2	4-5	3-4	2-3	1-2						
(B) Receive	7.5-8.25s	→	8.25-9.0s	→	→	→						
(C) n separation	4	5	3	4	5	6						
(D) I	1405	1410	1415	1400	1395	1390						
(E) Vdc (avg)	4.12	2.53	7.00	3.39	1.63	1.11						
(F) DCcal	1.000	→	→	→	→	→						
(G) Kn x 10^{-3}	45	78.75	22.5	45	78.75	126						
(H) ρ dc=ExFxGx10^3/D	132	141	111	109	92.0	101						
(I) Vac Σ	4.00	2.44	6.88	3.28	1.58	1.08						
(J) AC noise x 2	.08	.08	.08	.08	.08	.08						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	4.00	2.44	6.88	3.28	1.58	1.08						
(L) AC-DC cal.	1.015	→	→	→	→	→						
(M) ρdc/ρac =ExL/K	1.045	1.051	1.031	1.050	1.048	1.044						
(N) PFE=(M-1)(10^2)	5	5	3	5	5	4						
(O) MCF=(M-1)(10^5)/H	33	36	28	46	52	44						

INDUCED POLARIZATION WORK SHEET



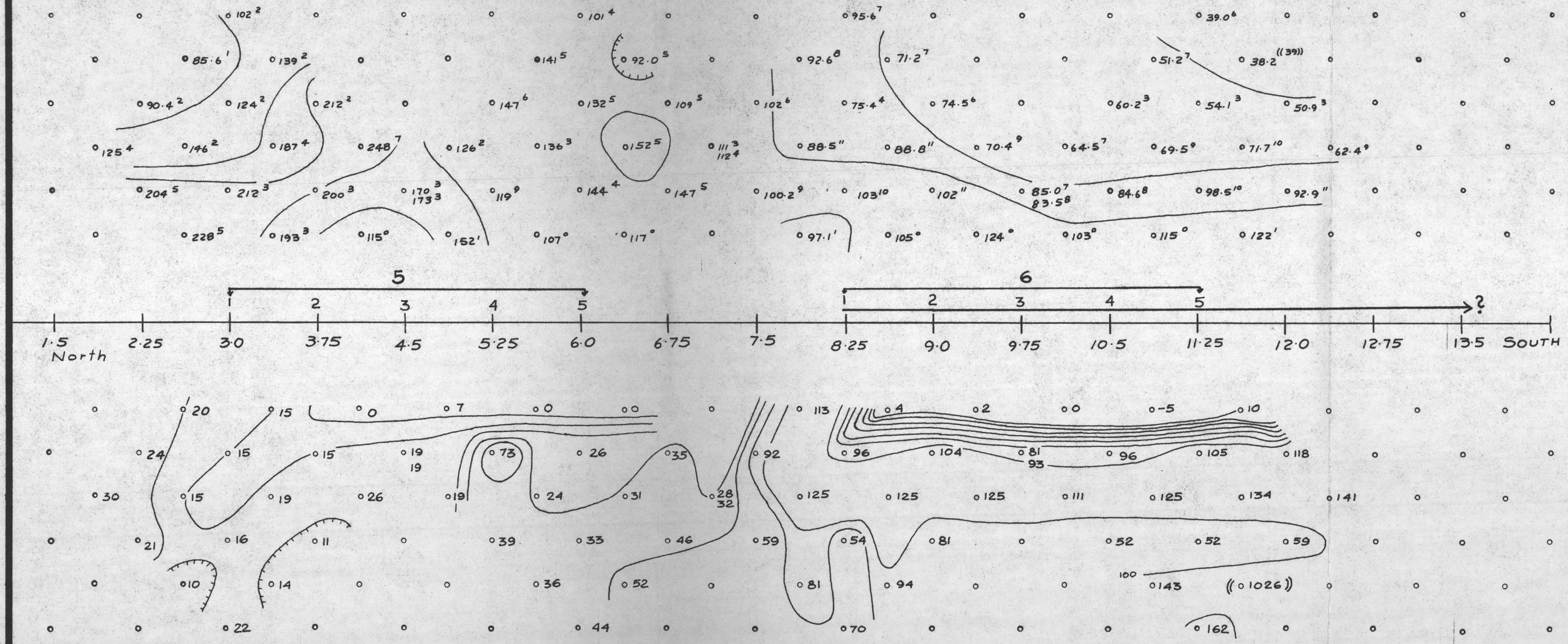
Area _____ Scale _____ Date _____

INDUCED POLARIZATION WORK SHEET



Line #7.

Area Banner : 3960 E - 1058 N Scale 1" = 500' Date Apr. 21, 61



END OF LINE
NO ANOMALY

WEAK OR QUESTIONABLE

MODERATE ANOMALY

MODERATE TO STRONG ANOMALY

STRONG ANOMALY

$\rho_{a.c.}^{P.F.E.} / 2\pi$

C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M. C. F.

SECTIONAL DATA SHEET

FOR BANNER MINING COMPANY

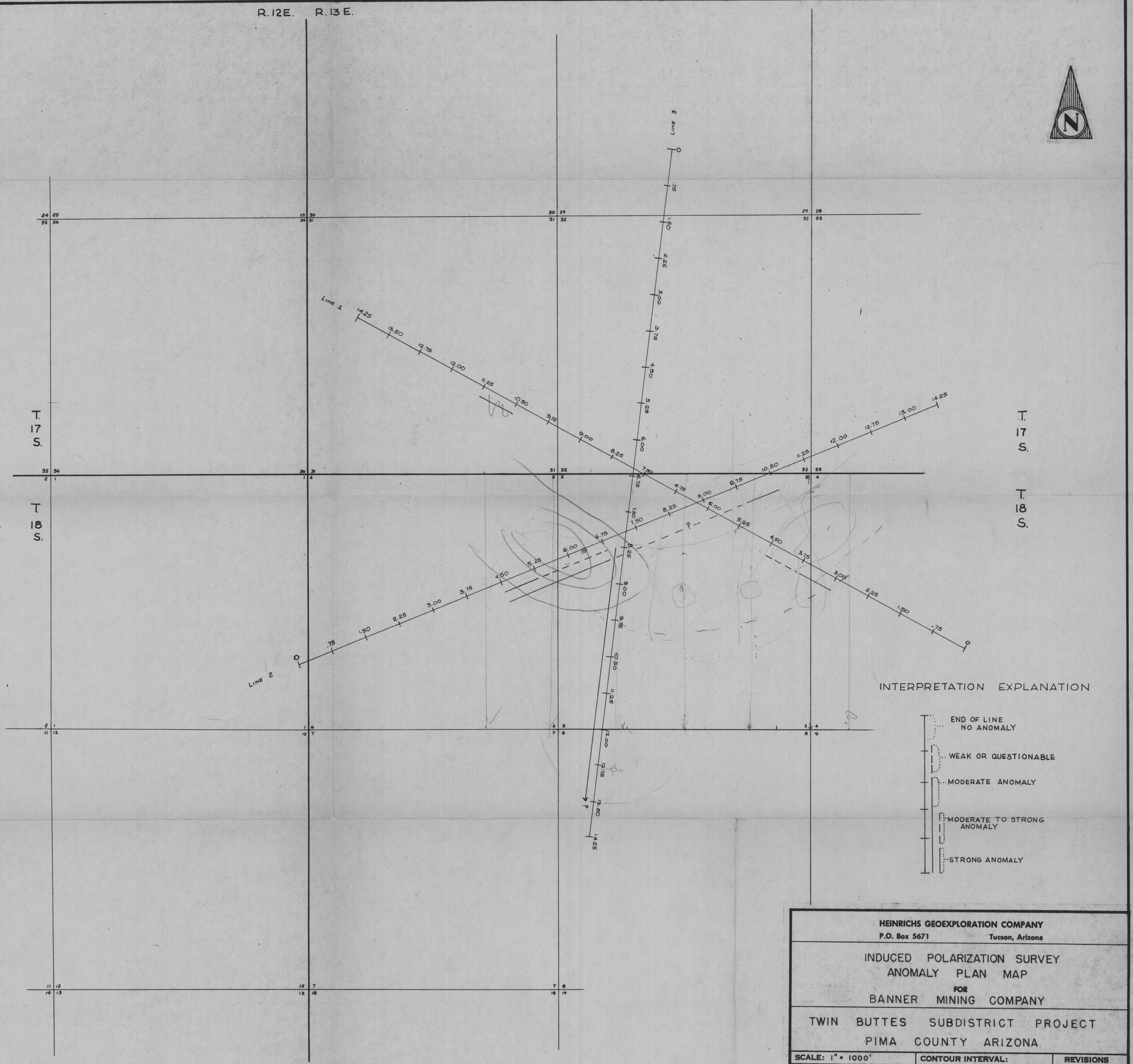
LINE No. 3

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 750'

DATE March, 1961



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

INDUCED POLARIZATION SURVEY
ANOMALY PLAN MAP
FOR
BANNER MINING COMPANY

TWIN BUTTES SUBDISTRICT PROJECT
PIMA COUNTY ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL:	REVISIONS
	DATA BY: F. A. S.	
DATE: MARCH 1961	SHEET 1 OF 1	
DRAWN BY: I. B.	DRAWING NO.:	FILE:

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ____

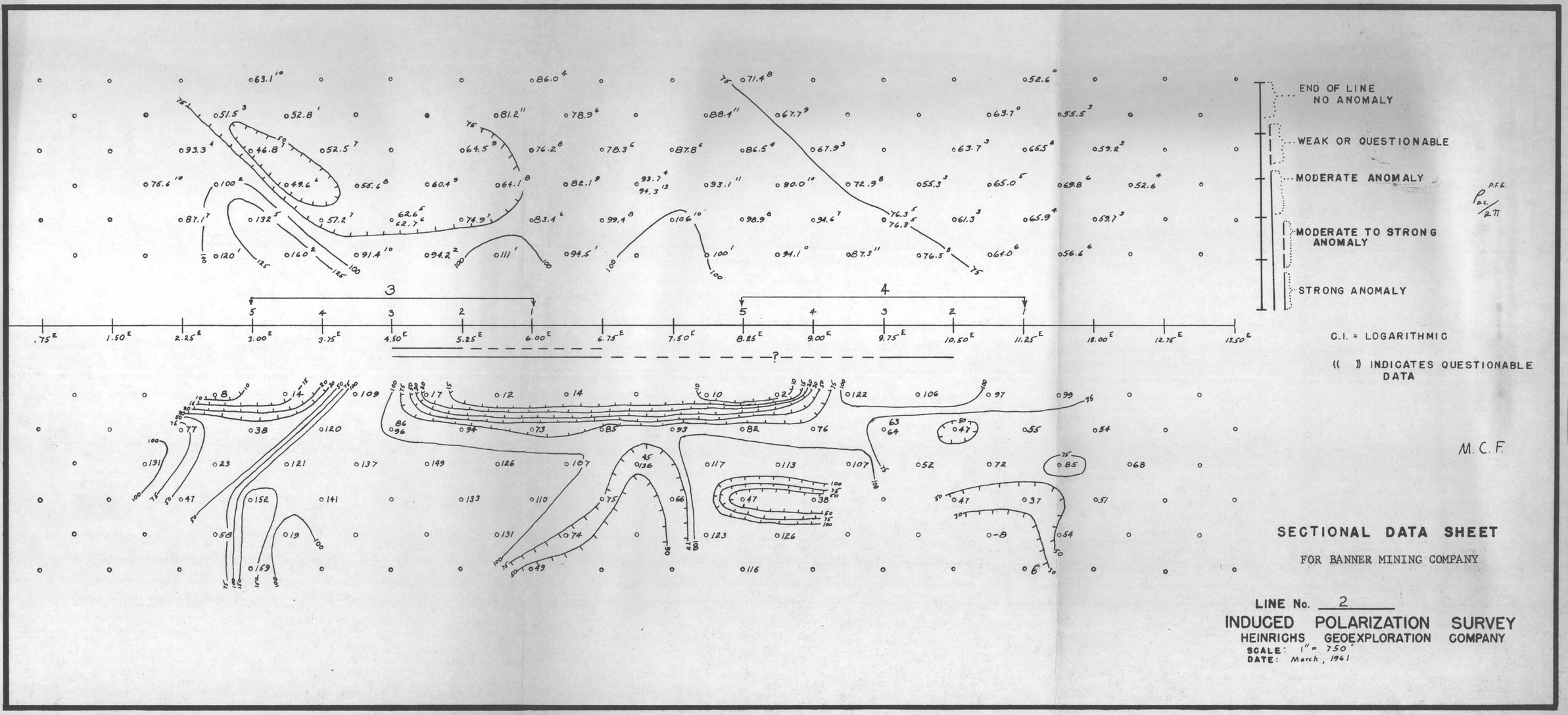
Project *Banner* Line *10 N* Field date *Apr. 21, 61* Data page ____ Comp. date *Apr. 21, 61* Comp by *C.S.L.*

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	.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		1430	1410	1420	1395	1400	1430	1400	1400	1395	1420	1400
E) Vdc (avg)		72.0	19.2	62.0	17.8	6.72	66.1	14.9	5.95	2.83	16.7	5.25
F) DCcal USED	1.000											
G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	1.5	1.5	6.0	15	30	6.0	15
H) ρ dc=ExFxGx10^3/D		75.6	81.7	65.5	76.6	72.0	69.4	63.9	63.8	60.9	70.6	57.4
I) Vac Σ		71.4	18.2	60.8	17.2	6.40	64.4	14.2	5.68	2.72	15.8	5.16
J) AC noise x 2		.08	.08	.06	.06	.06	.10	.10	.10	.10	.14	.14
K) Vac(corr) = $\sqrt{I^2 - J^2}$		71.4	18.2	60.8	17.2	6.40	64.4	14.2	5.68	2.72	15.8	5.16
L) AC-DC cal. USED	1.000											
M) ρ dc/ρac=ExL/K		1.009	1.053	1.020	1.035	1.050	1.028	1.049	1.048	1.040	1.057	1.036
N) PFE=(M-1)(10^2)		1	5	2	4	5	3	5	5	4	6	4
O) MCF=(M-1)(10^5)/H		12	65	31	46	69	40	77	75	66	41	63

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	6						
D) I	1380	1375	1400	1380	1380	1380	285	530	700	285	530	700
E) Vdc (avg)	2.76	1.57	6.22	2.54	1.51	.97	24.0	51.2	71.4	24.0	50.2	69.2
F) DCcal					USED	1.000	1.018	1.035	.980	1.018	1.054	1.010
G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
H) ρ dc=ExFxGx10^3/D	60.0	59.9	66.8	55.2	57.5	59.0						
I) Vac Σ	2.58	1.46	6.00	2.44	1.42	.92	24.0	50.8	70.4	24.0	49.0	68.1
J) AC noise x 2	.14	.14	.10	.10	.10	.10						
K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.58	1.45	6.00	2.44	1.42	.91						
L) AC-DC cal.						USED →	1.000	.993	.986	1.000	.976	.988
M) ρdc/ρac =ExL/K	1.070	1.083	1.038	1.040	1.063	1.067						
N) PFE=(M-1)(10^2)	7	8	4	4	6	7						
O) MCF=(M-1)(10^5)/H	117	138	57	72	110	114						

Anaconda Will Develop Banner Mining Area


END OF LINE NO ANOMALY
WEAK OR QUESTIONABLE
MODERATE ANOMALY
MODERATE TO STRONG ANOMALY
STRONG ANOMALY
C.I. = LOGARITHMIC
(( )) INDICATES QUESTIONABLE DATA
M. C. F.
SECTIONAL DATA SHEET
FOR BANNER MINING COMPANY
LINE No. 2
INDUCED POLARIZATION SURVEY
HEINRICHS GEOEXPLORATION COMPANY
SCALE: 1" = 750'
DATE: March, 1961

INDUCED POLARIZATION - RECEIVER NOTES

PAGE _____

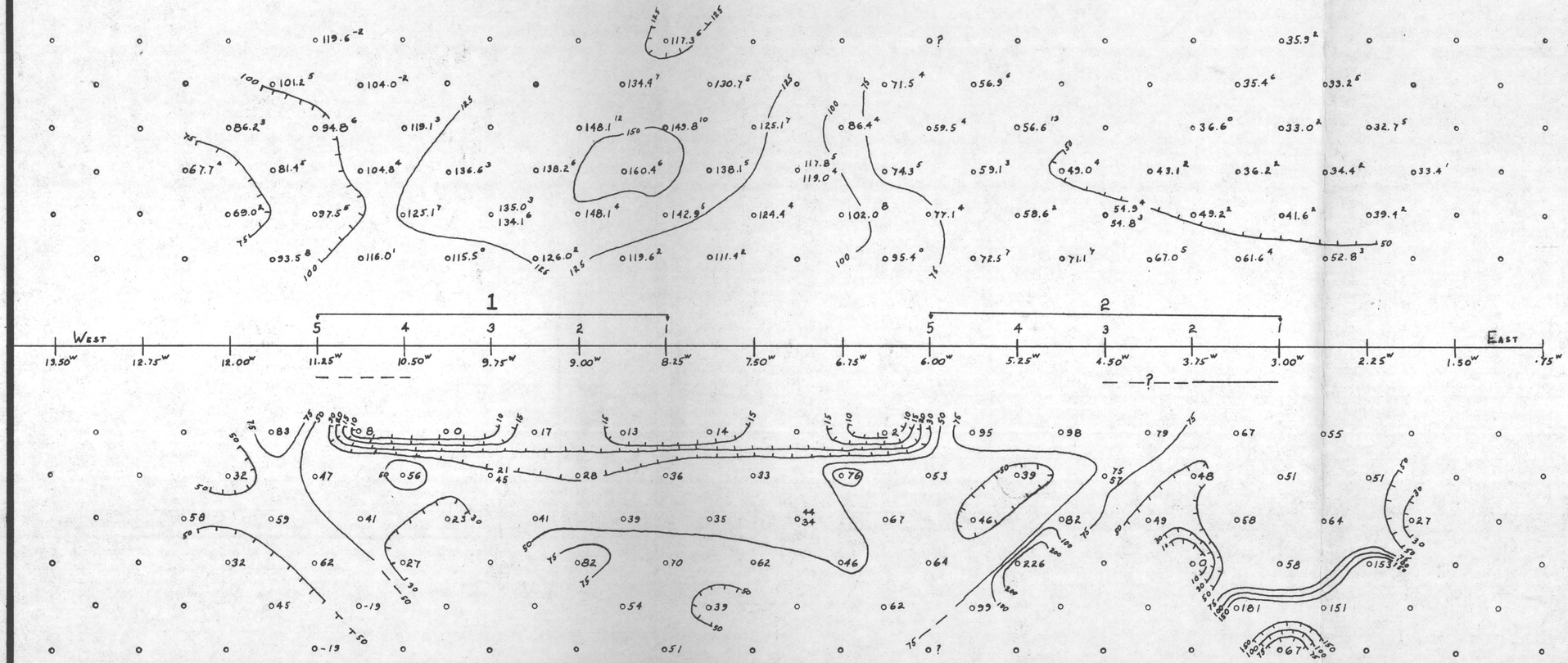
Project: Banner Line: 3960 E #7 ~~10N~~ Int.Cal _____ Date: 4-20

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	1009	1010	1018	1019	1020	1026	1027	1028	1030	1036	1037
DC-1	36.0 36.0	9.7 9.7	31.0 31.2	9.2 9.2	3.41 3.42	33.2 33.3	8.0 8.0	2.93 2.93	1.49 1.47	8.7 8.8	2.73 2.75
DC-2	36.0 36.0	9.5 9.5	31.0 30.8	8.6 8.6	3.32 3.31	32.9 32.8	6.9 6.9	3.00 3.02	1.33 1.36	8.0 7.9	2.61 2.60
Σ	72.0 72.0	19.2 19.2	62.0 62.0	17.8 17.8	6.73 6.73	66.1 66.1	14.9 14.9	5.95 5.95	2.82 2.83	16.7 16.7	5.34 5.35
DC-3	36.0 36.0	9.7 9.7	31.0 31.1	9.3 9.3	3.42 3.44	33.3 33.5	8.0 8.1	2.91 2.90	1.46 1.44	8.9 9.0	2.76 2.79
Dc-4	36.0 36.0	9.5 9.5	31.0 30.9	8.5 8.5	3.30 3.27	32.8 32.6	6.9 6.8	3.03 3.05	1.37 1.38	7.8 7.7	2.59 2.57
Σ	72.0 72.0	19.2 19.2	62.0 62.0	17.8 17.8	6.72 6.71	66.1 66.1	14.9 14.9	5.94 5.95	2.83 2.82	16.7 16.7	5.35 5.36
DC-AV	72.0	19.2	62.0	17.8	6.72	66.1	14.9	5.95	2.83	16.7	5.35
AC-1	35.7	9.1	30.4	8.6	3.20	32.2	7.1	2.84	1.36	7.9	2.58
AC-2	35.7	9.1	30.4	8.6	3.20	32.2	7.1	2.84	1.36	7.9	2.58
Σ	71.4	18.2	60.8	17.2	6.40	64.4	14.2	5.68	2.72	15.8	5.16
S. P.	+1.7		+12.3			-14.0				+7.1	
AC-N	.04		.03			.05				.07	

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Banna . Line 3960E 7 KON Int.Cal. Date: 4 21

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.	2-2.5N	→	2.5-3N	→	→	→	Cal	Cal	Cal	Cal	Cal	Cal
Time	1039	1040	1046	1047	1049	1050	1004	1005	1006	1104	1105	1106
DC-1	1.47 1.48	.81 81	3.20 3.22	1.34 1.36	76 78	.54 .56	14.0	25.6	35.7	14.0	25.1	34.6
DC-2	1.28 1.28	77 76	3.00 2.99	1.19 1.17	76 74	.42 .42	14.0	25.6	35.7	14.0	25.1	34.6
Σ	2.75 2.76	1.57 1.57	6.20 6.21	2.53 2.53	1.52 1.52	.97 .98						
DC- 3	1.49 1.48	82 86	3.03 3.01	1.40 1.41	79 82	.55 .56	14.0	25.6	35.7	14.0	25.1	34.6
DC-4	1.27 1.27	74 71	3.22 3.21	1.14 1.14	71 69	.42 .40	14.0	25.6	35.7	14.0	25.1	34.6
Σ	2.76 2.75	1.56 1.57	6.25 6.22	2.54 2.55	1.50 1.51	.97 .96						
DC-Av	2.76	1.57	6.22	2.54	1.51	.97	28.0	51.2	71.4	28.0	50.2	69.2
AC-1	1.29	.73	3.00	1.22	.71	46	14.0	25.4	35.2	14.0	24.5	34.2
AC- 2	1.29	.73	3.00	1.22	.71	46	14.0	25.4	35.2	14.0	24.5	34.2
Σ	2.58	1.46	6.00	2.44	1.42	.92	28.0	50.8	70.4	28.0	49.0	68.4
S.P.	+7.1		-8.4									
AC-N	.07		.05									



END OF LINE NO ANOMALY

WEAK OR QUESTIONABLE

MODERATE ANOMALY

MODERATE TO STRONG ANOMALY

STRONG ANOMALY

$\rho_{a.c.}^{P.F.E.} / 2\pi$

C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M.C.F.

SECTIONAL DATA SHEET

FOR BANNER MINING COMPANY

LINE No. 1

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 750'

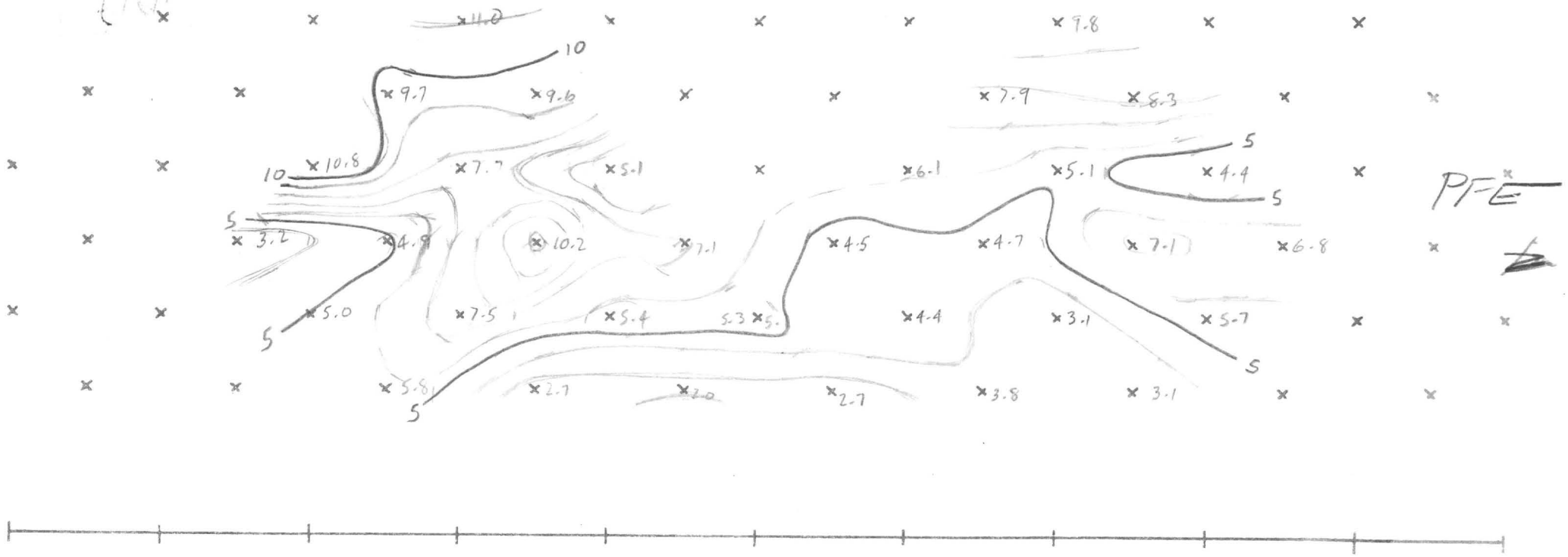
DATE: March, 1961

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: 1~~0N~~7 Date: 21 APR 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												
Time		1009	1010	1018	1019	1020	1026	1027	1028	1030	1036	1037
Range		1.5	—	—	—	—	—	—	—	—	—	—
Current		1430	1410	1420	1395	1400	1430	1400	1400	1395	1420	1400
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	—	—	—	—	—
Receive							CAL	—	—	—	—	—
Time	1039	1040	1046	1047	1049	1050	1004	1005	1006	1104	1105	1106
Range	—	—	—	—	—	—	.3	.5	.75	.3	.5	.75
Current	1380	1375	1400	1380	1380	1380	285	530	700	285	530	700

INDUCED POLARIZATION WORK SHEET



Area BANNER 12 E & W Scale Date 27 APR 61

REEVES CONTOURS

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE ____

Project: Banner Line: 12W Int. Cal. ____ Date: 4-26

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		5-1W	→	1-1.5W	→	→	1.5-2W	→	→	→	2.25W	→
Time		1228	1229	1236	1237	1239	1255	1257	1259	1301	1314	1315
DC-1		51 51	11.4 11.6	57 57	10.2 10.2	2.71 2.76	55 55	8.7 8.7	3.00 2.87	1.59 1.50	7.6 7.6	1.91 2.00
DC-2		51 51	10.5 10.3	56 56	11.1 11.1	2.39 2.42	55 55	8.6 8.5	3.50 3.58	1.36 1.44	7.2 7.2	2.40 2.30
Σ			21.9			5.18 5.12		17.3 17.2	6.50 6.45	2.90 2.89		4.31 4.30
DC-3		51 51	11.5 11.6	57 57	10.2 10.2	2.75 2.64	55 55	8.8 8.6	3.00 2.89	1.48 1.48	7.6 7.6	2.00 2.00
DC-4		51 51	10.4 10.3	56 56	11.1 11.1	2.35 2.45	55 55	8.5 8.5	3.47 3.53	1.40 1.42	7.1 7.2	2.35 2.37
Σ				113		2.10 4.09		17.3 17.1	6.47 6.42	2.9 2.8		
DC-AV.		102.0	21.9	113	21.3	5.10	1.10	17.2	6.46	2.90	14.8	4.32
AC-1		50	10.6	55	10.1	2.38	52	8.0	2.93	1.38	7.1	2.06
AC-2		50	10.4	55	10.1	2.38	52	8.0	2.93	1.38	7.1	2.06
Σ												
S.P.		-3.9		-10.4			+3.5				+13.3	
AC-N		.09		.04			.10				.06	
			12.00									

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Banner Line: 12W Int.Cal _____ Date: 4-26

Send	3-3	1-2	4-5	3-4	2-3	1-2						
Rec.	2-2.5W →		2.5-3W →									
Time	1317	1318	1326	1327	1329	1331						
DC-1	1.11 1.12	75 78	2.00 2.00	1.02 1.06	76 75	50 62						
DC-2	1.26 1.25	77 69	2.15 2.12	1.13 1.09	60 62	41 29						
Σ	2.37	1.52 1.47	4.15 4.12	2.15	1.36 1.37	91 81						
DC-3	1.09 1.06	78 75	2.00 1.98	1.02 1.05	66 62	28 30						
Dc-4	1.28 1.29	69 71	2.15 2.11	1.15 1.09	75 75	64 60						
Σ	2.37 2.35	1.41 1.46	4.15 4.09	2.17 2.14	1.35 1.37							
DC-AV	2.37	1.48	4.13	2.15	1.36	91						
AC-1	1.10	.68	2.00	97	62	41						
AC-2	1.10	.68	2.00	.97	62	41						
Σ	2.20	1.36	4.00	1.94	1.24	82						
S. P.	+13.3		+2.9									
AC-N	.06		.04									

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Banos Line: 12E Int.Cal. _____ Date: 4-26

Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3 (35)	2-3 (70)	2-3	2-3	2-3
Rec.	2-2.5E	→	2.5-3E			→	Cal	Cal	Cal	Cal	Cal	Cal
Time	1124	1125	1132	1134	1135	1137	1011	1013	1014	1350	1351	
DC-1	1.80 1.80	77 77	4.6 4.9	1.90 1.98	1.00 97	46 44	13.8	24.6	34.2	13.2	24.2	34.0
DC-2	1.91 1.90	74 74	4.9 5.0	1.84 1.80	99 1.00	42 48	13.8	24.6	34.2	13.2	24.2	34.0
Σ	3.71 3.70	1.51	9.5 9.4	3.74 3.78	1.99 1.97	88 92						
DC-3	1.82 1.81	77 89	4.9 4.4	1.90 1.90	.98 .98	51 44	13.8	24.6	34.2	13.2	24.2	34.0
DC-4	1.88 1.90	73 68	4.9 5.0	1.86 1.85	.97 .97	38 47	13.8	24.6	34.2	13.2	24.2	34.0
Σ	3.70 3.71	1.41 1.39	9.9 9.4	3.70 3.75	1.95	89 91	27.6	49.2	68.4	26.4	48.4	68.0
DC-AV	3.70	1.51	9.4	3.76	1.95	.90						
AC-1	1.76	.70	4.4	1.80	.90	41	13.6	24.0	33.6	13.2	23.7	33.0
AC-2	1.76	.70	4.4	1.80	.90	41	13.6	24.0	33.6	13.2	23.7	33.0
Σ	3.52	1.40	8.8	3.60	1.80	.82						
S. P.	-2.8		-1.2									
AC-N	.04		.03									

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Banna . Line 12E Int.Cal. 4 Date: 4-26

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		.5-1E	→	1-1.5E	→		1.5-2E	→			2-2.5E	→
Time		1052	1053	1103	1105	1106	1111	1112	1113	1114	1121	1122
DC-1		58.0	11.6	53	12.0	3.7	50	13.2	4.6	1.55	12.9	4.4
		58.0	11.6	53	12.1	3.7	50	13.3	4.6	1.63	12.9	4.4
DC-2		57.0	10.9	55	13.9	3.2	51	13.2	4.2	1.38	13.1	4.6
		57.0	10.9	55	13.8	3.2	51	13.1	4.1	1.32	13.1	4.6
Σ			22.5						8.8 8.7	2.93 2.95	26.0	9.0
DC- 3		58.0	11.6	53	12.1	3.7	50	13.2	4.7	1.64	12.9	4.3
		58.0	11.6	53	12.1	3.7	50	13.3	4.7	1.67	12.9	4.3
DC-4		57.0	10.9	55	13.8	3.2	51	13.2	4.1	1.30	13.1	4.7
		57.0	10.9	55	13.8	3.2	51	13.1	4.1	1.33	13.1	4.7
Σ									8.8 8.8	2.94 3.00		
DC-Av		115.0	22.5	108.0	25.9	6.9	101.0	26.4	8.8	2.96	26.0	9.0
AC-1		56.0	10.7	52	12.4	3.3	49	12.8	4.2	1.39	12.3	4.2
AC- 2		56.0	10.7	52	12.4	3.3	49	12.8	4.2	1.39	12.3	4.2
Σ		112.0	21.4	104	24.8	6.6	98.0	25.6	8.4	2.78	24.6	8.4
S.P.		-0.3		-0.3			-2.1				-2.8	
AC-N		.04		.05			.02				.04	
			121									

INDUCED POLARIZATION SENDER NOTES

Project: Banner Line: 12 E Date: 4-26-61

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											
Time		1052	1053	1103	1105	1106	1111	1112	1113	1114	1121	1122
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1425	1415	1425	1415	1405	1405	1405	1405	1400	1405	1400
Send	3-4	4-5	1-2	2-3	3-4	4-5	Cal					
Receive							2-3					
Time	1124	1125	1132	1134	1135	1137	1011	1013	1014	1350	1351	1352
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1400	1395	1375	1385	1385	1385	282	515	710	280	510	700

INDUCED POLARIZATION SENDER NOTES

Project: Banner Line: 12W Date: 4-26-61

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive												
Time		1228	1229	1236	1237	1239	1255	1257	1259	1301	1314	1315
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1425	1400	1425	1405	1390	1410	1400	1395	1385	1410	1395
Send	2-3	1-2	4-5	3-4	2-3	1-2						
Receive												
Time	1317	1318	1326	[illegible]	1329	1331						
Range	1.5	1.5	1.5	1.5	1.5	1.5						
Current	1385	1380	1410	1400	1385	1380						

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page

Project BANNER Line 12E Field date 26 APR 61 Data page Comp. date 27 APR 61 . Comp by GER

(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	.5-1E	→	1-1.5E	→	→	1.5-2E	→	→	→	2-2.5E	→
(C) n separation	1	2	1	2	3	1	2	3	4	2	3
(D) I	1425	1415	1425	1415	1405	1405	1405	1405	1400	1405	1400
(E) Vdc (avg)	115.0	22.5	108.0	25.9	6.9	101.0	26.4	8.8	2.96	26.0	9.0
(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	121.1	95.4	113.7	109.8	73.7	107.8	112.7	94.0	63.4	111.0	96.4
(I) Vac Σ	112.0	21.4	104.0	24.8	6.6	98.0	25.6	8.4	2.78	24.6	8.4
(J) AC noise x 2	.08	→	.10	→	→	.04	→	→	→	.08	→
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	112.0	21.4	104.0	24.8	6.6	98.0	25.6	8.4	2.79	24.6	8.4
(L) AC-DC cal.	1.000	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.027	1.051	1.038	1.044	1.045	1.031	1.031	1.047	1.061	1.057	1.071
(N) PFE=(M-1)(10^2)	3	5	4	4	5	3	3	5	6	6	7
(O) MCF=(M-1)(10^5)/H	22	54	33	40	61	29	28	50	96	51	74

Project Line Field date Data page Comp. 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	2-2.5E	→	2.5-3E	→	→	→		CAL	→	→	→	→	→
(C) n separation	4	5	3	4	5	6							
(D) I	1400	1395	1375	1385	1385	1385		282	515	710	280	510	700
(E) Vdc (avg)	3.70	1.51	9.4	3.76	1.95	.90		27.6	49.2	68.4	26.4	48.9	68.0
(F) DCcal	1.000	→	→	→	→	→		1.022	1.047	1.038	1.061	1.054	1.029
(G) Kn x 10^{-3}	30.0	52.5	15.0	30.0	52.5	84							
(H) ρ dc=ExFxGx10^3/D	79.3	57.2	102.5	81.4	73.9	54.6							
(I) Vac Σ	3.52	1.40	8.8	3.60	1.80	.82							
(J) AC noise x 2	.08	→	.06	→	→	→							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	3.52	1.40	8.8	3.60	1.80	.82		27.2	48.0	67.2	26.4	47.4	66.0
(L) AC-DC cal.	1.000	→	→	→	→	→		.986	.976	.982	1.000	.979	.971
(M) ρdc/ρac =ExL/K	1.061	1.079	1.068	1.044	1.083	1.098							
(N) PFE=(M-1)(10^2)	5	8	7	4	8	10							
(O) MCF=(M-1)(10^5)/H	64	138	66	54	112	179							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project BANNER Line 12W Field date 26 APR 61 Data page _____ Comp. date 27 APR 61. Comp by GER

(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		.5-1W	→	1-1.5W	→	→	1.5-2W	→	→	→	2-2.5W	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1425	1400	1425	1405	1390	1410	1400	1395	1385	1410	1395
(E) Vdc (avg)		102.0	21.9	113	21.3	5.10	110	17.2	6.46	2.90	14.8	4.32
(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) ρdc=ExFxGx10^3/D		107.4	93.9	118.9	91.0	55.0	117.0	73.7	63.0	62.8	63.0	46.5
(I) Vac Σ		100.0	20.8	110.	20.2	47.6	104	16.0	5.86	2.76	14.1	4.12
(J) AC noise x 2		.08	→	.08	→	→	.20	→	→	→	.12	→
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		100.0	20.8	110	20.2	47.6	104	16.0	5.86	2.76	14.1	4.12
(L) AC-DC cal.		1.000	→	→	→	→	→	→	→	→	→	→
(M) ρdc/ρac=ExL/K		1.020	1.053	1.027	1.054	1.071	1.058	1.075	1.102	1.051	1.050	1.049
(N) PFE=(M-1)(10^2)		2	5	3	5	7	6	8	10	5	5	5
(O) MCF=(M-1)(10^5)/H		19	56	23	59	129	50	102	162	82	79	105

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	2-2.5W	→	2.5-3W	→	→	→						
(C) n separation	4	5	3	4	5	6						
(D) I	1385	1380	1410	1400	1385	1380						
(E) Vdc (avg)	2.37	1.48	4.13	2.15	1.36	.91						
(F) DCcal	1.000	→	→	→	→	→						
(G) Kn x 10^{-3}	30.0	52.5	15.0	30.0	52.5	84.0						
(H) ρdc=ExFxGx10^3/D	51.3	56.3	41.0	46.1	51.6	55.4						
(I) Vac Σ	2.20	1.36	4.00	1.94	1.24	.82						
(J) AC noise x 2	.12	→	.08	→	→	→						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.20	1.35	4.00	1.94	1.24	.82						
(L) AC-DC cal.	1.000	→	→	→	→	→						
(M) ρdc/ρac =ExL/K	1.077	1.096	1.032	1.108	1.097	1.110						
(N) PFE=(M-1)(10^2)	8	10	3	11	10	11						
(O) MCF=(M-1)(10^5)/H	150	171	78	234	188	199						

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ____

Project BANNER Line 5280 E 11N Field date 24APR61 Data page ____ Comp. date 25APR61 . Comp. by GER

(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	1420	1405	1430	1405	1395	1415	1400	1395	1380	1415	1405
(E) Vdc (avg)	64.8	14.6	62.7	13.8	4.66	56.0	15.4	4.96	2.32	13.3	4.73
(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	68.5	62.3	65.8	58.9	50.1	59.4	66.0	53.3	50.4	56.4	50.5
(I) Vac Σ	64.0	14.0	61.0	13.2	4.40	55.4	14.2	4.66	2.18	12.6	4.44
(J) AC noise x 2	.00	→	→	→	→	.02	→	→	→	.02	→
(K) Vac(corr) $=\sqrt{I^2 - J^2}$	64.0	14.0	61.0	13.2	4.40	55.4	14.2	4.66	2.18	12.6	4.44
(L) AC-DC cal.	1.000	—	—	—	—	—	—	—	—	—	—
(M) ρ dc/ρac=ExL/K	1.013	1.043	1.028	1.045	1.059	1.011	1.085	1.064	1.064	1.056	1.065
(N) PFE=(M-1)(10^2)	1	4	3	5	6	1	8	6	6	6	7
(O) MCF=(M-1)(10^5)/H	19	69	43	76	118	19	129	120	127	99	129

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5					
(B) Receive	2-2.5N	→	2.5-3N	→	→	→					
(C) n separation	4	5	3	4	5	6					
(D) I	1395	1390	1405	1400	1395	1390					
(E) Vdc (avg)	1.90	.99	4.39	1.86	.84	.49					
(F) DCcal	1.000	→	→	→	→	→					
(G) Kn x 10^{-3}	30.0	52.5	15.0	30.0	52.5	84					
(H) ρ dc=ExFxGx10^3/D	40.9	37.4	46.9	39.9	31.6	29.6					
(I) Vac Σ	1.84	0.96	4.06	1.82	0.86	0.50					
(J) AC noise x 2	.02	→	→	→	→	→					
(K) Vac (corr) $=\sqrt{I^2 - J^2}$	1.84	0.96	4.06	1.82	0.86	0.50					
(L) AC-DC cal.	1.000	→	→	→	→	→					
(M) ρdc/ρac =ExL/K	1.033	1.031	1.081	1.022	0.977	0.980					
(N) PFE=(M-1)(10^2)	3	3	8	2	-2	-2					
(O) MCF=(M-1)(10^5)/H	81	83	173	55	-73	-68					

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project *Banner* Line *11 S* Field date *Apr. 24, 61* Data page _____ Comp. date *Apr. 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		1420	1410	1410	1405	1395	1400	1400	1400	1395	1400	1395
(E) Vdc (avg)		64.0	16.4	60.4	12.5	3.98	63.2	12.8	3.83	1.66	14.3	4.10
(F) DCcal		1.000	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}		1.5	6.0	1.5	6.0	15	1.5	6.0	15	30	6.0	15
(H) ρdc=ExFxGx10^3/D		67.6	69.8	64.3	53.4	42.8	67.7	54.9	41.04	35.7	61.3	44.1
(I) Vac Σ		63.2	15.8	60.0	12.0	3.82	62.0	12.2	3.64	1.56	14.0	4.00
(J) AC noise x 2		.04	.04	.00	.00	.00	.02	.02	.02	.02	.04	.04
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		63.2	15.8	60.0	12.0	3.82	62.0	12.2	3.64	1.56	14.0	4.00
(L) AC-DC cal.		1.000	→	→	→	→	→	→	→	→	→	→
(M) ρdc/ρac=ExL/K		1.013	1.038	1.007	1.042	1.042	1.019	1.049	1.052	1.064	1.021	1.025
(N) PFE=(M-1)(10^2)		1	4	1	4	4	2	5	5	6	2	2
(O) MCF=(M-1)(10^5)/H		19	54	11	79	98	28	89	127	179	34	57

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

(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	1400	1390	1395	1390	1385	1375	276	503	690	278	515	708
(E) Vdc (avg)	1.73	.88	4.54	1.82	.95	.52	27.8	50.0	70.2	27.2	48.4	66.0
(F) DCcal	1.000	→	→	→	→	→	0.993	1.006	0.983	1.022	1.064	1.041
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρdc=ExFxGx10^3/D	37.1	33.2	48.8	39.3	36.0	31.8						
(I) Vac Σ	1.62	.84	4.26	1.72	.90	.52	27.8	50.0	69.8	27.2	48.0	66.0
(J) AC noise x 2	.04	.04	.02	.02	.02	.02						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.62	.84	4.26	1.72	.90	.52						
(L) AC-DC cal.	1.000	→	→	→	→	→	1.000	1.000	0.994	1.000	0.992	0.971
(M) ρdc/ρac =ExL/K	1.068	1.048	1.066	1.058	1.056	1.000						
(N) PFE=(M-1)(10^2)	7	5	7	6	6	0						
(O) MCF=(M-1)(10^5)/H	183	145	135	148	156	0						

INDUCED POLARIZATION - RECEIVER NOTES

PAGE _____

Project: Banner Line: 5280E Line #8 11N Int.Cal _____ Date: 4-24

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 →			15-2N →				2-2.5N →	
Time		1309	1310	1316	1317	1319	1329	1330	1332	1335	1343	1345
DC-1		32.6 32.7	7.8 7.9	31.7 31.7	6.8 6.8	2.01 2.00	28.1 28.1	8.0 8.0	2.50 2.50	1.05 96	6.7 6.7	2.20 2.22
DC-2		32.2 32.1	6.7 6.7	31.0 31.0	7.0 7.0	2.65 2.66	28.0 28.0	7.4 7.4	2.45 2.45	1.27 1.35	6.7 6.6	2.51 2.52
Σ		65.3 64.3	14.5 14.6	62.7 62.7	13.8 13.8	4.66 4.66	56.1 56.1	15.4 15.4	4.95 4.95	2.32 2.31	13.4 13.3	4.71 4.74
DC-3		32.6 32.7	7.9 7.9	31.7 31.6	6.9 6.9	2.04 2.03	28.0 28.0	8.0 8.0	2.45 2.41	1.35 1.31	6.6 6.6	2.20 2.20
Dc-4		32.2 32.1	6.7 6.7	31.0 31.1	6.9 6.9	2.61 2.62	28.0 28.0	7.4 7.4	2.52 2.55	96 1.01	6.6 6.6	2.53 2.54
Σ		65.3 64.3	14.6 14.6	62.7 62.7	13.8 13.8	4.65 4.65	56.0 56.0	15.4 15.4	4.97 4.96	2.31 2.32	13.2 13.2	4.73 4.74
DC-AV		64.8	14.6	62.7	13.8	4.66	56.0	15.4	4.96	2.32	13.3	4.73
AC-1		32.0	7.0	30.5	6.6	2.20	27.7	7.2	2.33	1.09	6.3	2.22
AC-2		32.0	7.0	30.5	6.6	2.20	27.7	7.2	2.33	1.09	6.3	2.22
Σ		64.0	14.0	61.0	13.2	4.40	55.4	14.2	4.66	2.18	12.6	4.44
S. P.		-11.0		-3.4			-4.6				-0.1	
AC-N		00		00			.01				.01	

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Bonne Line: 5280E 1N Int.Cal _____ Date: 4-29

Send	3-4	4-5	1-2	2-3	3-4	4-5						
Rec.	2.25N →		25.3N →									
Time	1346	1348	1357	1359	1400							
DC-1	1.05 1.06	49 49	2.23 2.21	1.01 1.03	42 43	.29 .29						
DC-2	84 84	51 51	2.16 2.18	84 84	42 41	.20 .20						
Σ	1.89 1.90	1.00 1.00	4.39 4.39	1.85 1.87	84 84	.49 .49						
DC-3	1.05 1.05	52 57	2.14 2.00	1.03 1.03	45 46	.29 .28						
Dc-4	84 85	47 41	2.26 2.39	84 84	39 37	.20 .21						
Σ	1.89 1.90	.99 .98	4.65 3.5	1.87 1.84	84 83	.49 .49						
C-AV	1.90	.99	4.39	1.86	.84	.49						
C-1	.92	48	2.03	.91	43	25						
AC-2	.92	48	2.03	.91	43	25						
Σ	1.84	.96	4.06	1.82	.86	.50						
S. P.	-0.1		-5.8									
AC-N	.01		.01									

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Banner . Line 6280 IIN Int.Cal. Date:

end		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
ec.												
ime		1309	1310	1316	1317	1319	1329	1330	1332	1335	1343	1345
DC-1 Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
DC-2 Current		1420	1405	1430	1405	1395	1415	1400	1395	1380	1415	1405
Σ												
DC- 3 Send	3-4	4-5	1-2	2-3	3-4	4-5						
DC-4 Rec												
Σ Time	1346	1348	1351	1359	1400	1401						
C-Av Range	1.5	1.5	1.5	1.5	1.5	1.5						
C-1 Current	1395	1390	1405	1400	1395	1390						
C- 2												
Σ												
S.P.												
AC-N												

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Banner . Line 5 280E 115 Int. Cal. Date 4-24

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.	2-2.5S	→	2.5-3S			→	Cal	Cal	Cal	Cal	Cal	Cal
Time	1146	1147	1155	1156	1158	1200	1056	1057	1058	1429	1430	1431
DC-1	.90 .88	38 40	2.20 2.20	83 80	46 45	30 32	13.9	25.0	35.1	13.6	24.2	34.0
DC-2	.83 .86	49 48	2.34 2.34	99 1.02	49 50	22 20	13.9	25.0	35.1	13.6	24.2	34.0
Σ	1.73 1.74	87 88	4.54 4.54	1.82 1.82	.95 .95	.52 .52						
DC- 3	.86 .88	39 38	2.20 2.19	80 78	44 44	31 33	13.9	25.0	35.1	13.6	24.2	34.0
DC-4	.86 .83	49 49	2.34 2.34	1.02 1.04	50 50	21 19	13.9	25.0	35.1	13.6	24.2	34.0
Σ	1.72 1.31	[illegible]	4.54 4.53	1.82 1.82	.94 .94	.52 .51						
DC-Av	1.73	.88	4.54	1.82	.95	.52	27.8	50.0	70.2	27.2	48.4	68.0
AC-1	.81	.42	2.13	.86	.45	.26	13.9	25.0	34.9	13.6	24.0	33.0
AC- 2	.81	.42	2.13	.86	.45	.26	13.9	25.0	34.9	13.6	24.0	33.0
Σ	1.62	.84	4.26	1.72	.90	.52	27.8	50.0	69.8	27.2	48.0	66.0
S.P.	-4.2		-0.1									
AC-N	.02		.01									

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Banner. Line 5280E 11S Int.Cal. Date: 4-24

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		5-1S →		1-1.5S	→		1.5-2S	→	→		2-2.5S	→
Time		1101	1102	1110	1111	1112	1130	1132	1134	1135	1143	1144
DC-1		32.0 32.0	8.3 8.3	30.3 30.3	5.7 5.7	2.00 1.98	30.9 30.6	6.7 6.7	1.91 1.92	.78 .76	7.1 7.2	2.05 2.04
DC-2		32.0 32.0	8.1 8.1	30.1 30.1	6.8 6.8	1.99 2.01	33.0 32.6	6.1 6.1	1.92 1.91	.88 .90	7.2 7.2	2.06 2.06
Σ		64.0 64.0	16.4 16.4	60.4 60.4	12.5 12.5	3.99 3.99	63.9 63.2	12.8 12.8	3.83 3.83	1.66 1.66	14.3 14.4	4.11 4.10
DC-3		32.0 32.0	8.3 8.3	30.3 30.3	5.7 5.7	1.95 1.96	30.2 30.3	6.7 6.7	1.92 1.91	.74 .76	7.1 7.1	2.07 2.09
DC-4		32.0 32.0	8.1 8.1	30.0 30.0	6.8 6.8	2.03 2.01	32.9 32.8	6.1 6.1	1.92 1.92	.91 .89	7.2 7.2	2.02 2.01
Σ		64.0 64.0	16.4 16.4	60.3 60.3	12.5 12.5	3.98 3.97	63.1 63.1	12.8 12.8	3.84 3.83	1.65 1.65	14.3 14.3	4.09 4.10
DC-Av		64.0	16.4	60.4	12.5	3.98	63.2	12.8	3.83	1.66	14.3	4.10
AC-1		31.6	7.9	30.0	6.0	1.91	31.0	6.1	1.82	.78	7.0	2.00
AC-2		31.6	7.9	30.0	6.0	1.91	31.0	6.1	1.82	.78	7.0	2.00
Σ		63.2	15.8	60.0	12.0	3.82	62.0	12.2	3.64	1.56	14.0	4.00
S.P.		+1.3		+5.6			-6.3				-4.2	
AC-N		.02		.00			.01				.02	

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Banner Line 5200 115 Int.Cal Date: 4-28-61

Send	Cal	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	3-4											
Time		1101	1102	1110	1111	1112	1130	1132	1134	1135	1142	1142
~~DC-1~~ Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
current DC-2		1420	1410	1410	1405	1395	1400	1400	1400	1395	1400	1395
Σ												
DC-3 Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal					
DC-4 Rec.							3-4					
Σ Time	1146	1147	1155	1156	1158	1200	1056	1057	1058	1429	1430	1431
C-AV Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
C-1 Current	1400	1390	1395	1390	1385	1375	276	503	690	278	515	708
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Banna Line: 6 Spread 9N 2640E Int.Cal. _____ Date: 4-20

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.	2-2.5N →		2.5-3N →				Cal	Cal	Cal	Cal	Cal	Cal
Time	1025	1026	1032	1033	1034	1035	956	957	958	1045	1046	1046
DC-1	1.96 1.96	.87 .87	3-9 3.9	2.11 2.12	1.16 1.17	.44 .44	14-0	26.0	35-8	13.9	25-3	35-1
DC-2	1.80 1.80	.92 .92	3-4 3-4	1.40 1.39	.83 .82	.58 .58	14-0	26-0	35-8	13-9	25-3	35-1
Σ		1.79 1.79	7-3	3.51	1.99	1.02						
DC-3	1.96 1.96	.89 .89	4-0 4-0	2.13 2.11	1.19 1.21	45 43	14-0	26-0	35-8	13-9	25-3	35-1
DC-4	1.80 1.80	.90 .90	3-3 3-3	1.38 1.40	.79 .78	58 60	14-0	26.0	35-8	13-9	25-3	35-1
Σ			7.3		1.98 1.99	1.03						
DC-AV	3.76	1.79	7.3	3.51	1.99	1.02						
AC-1	1.82	87	3.5	1.67	.97	.49	14-0	25.7	35-7	13-9	25-2	34-6
AC-2	1.82	87	3.5	1.67	.97	.49	14-0	25-7	35-7	13-9	25-2	34-6
Σ	3.64	175	7.0	3.34	1.94	.98						
S. P.	+7.6		-0.2									
AC-N	.08		.10									

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: 9N #6 Spur 4 Date: 20 APR 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		1000	1001	1007	1008	1010	1015	1016	1017	1018	1023	1024
Range		1.5	—	—	—	—	—	—	—	—	—	—
Current		1450	1420	1440	1425	1405	1430	1415	1405	1400	1420	1405
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	—	—	—	—	—
Receive							CAL	—	—	—	—	—
Time	1025	1026	1032	1033	1034	1035	0956	0957	0958	1045	1046	1047
Range	1.5	—	—	—	—	—	.3	.5	.75	.3	.5	.75
Current	1400	1390	1410	1400	1400	1380	286	500	710	280	500	700

INDUCED POLARIZATION - RECEIVER NOTES

PAGE _____

Project: Banna Line: 2640 E 6 Spread 9N Int.Cal _____ Date: 4-20

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		1000	1001	1007	1008	1010	1015	1016	1017	1018	1023	1024
DC-1		40.0 40.0	10.5 10.5	41.0 41.0	12.4 12.4	4.0 3.9	38.0 38.0	10.7 10.7	5.0 5.0	1.81 1.81	9.9 9.9	3.9 3.8
DC-2		40.0 40.0	10.6 10.6	41.0 41.0	12.1 12.1	4.7 4.8	37.0 37.0	11.3 11.3	4.1 4.1	1.82 1.82	9.8 9.8	3.9 3.9
Σ			21.1			8.7				3.63 3.63	19.7 19.7	7.8 7.7
DC-3		40.0 40.0	10.5 10.5	41.0 41.0	12.4 12.4	3.9 3.9	38.0 38.0	10.7 10.7	5.0 5.0	1.80 1.82	9.8 9.8	3.8 3.8
Dc-4		40.0 40.0	10.6 10.6	41.0 41.0	12.1 12.1	4.8 4.8	37.0 37.0	11.3 11.3	4.1 4.1	1.83 1.81	9.8 9.8	3.9 3.9
Σ			21.1			8.7				3.63 3.63	19.6 19.6	7.7 7.7
DC-AV		80.0	21.1	82.0	24.5	8.7	75.0	22.0	9.1	3.63	19.6	7.7
AC-1		39.0	10.2	40.0	11.7	4.0	37.0	10.7	4.3	1.79	9.3	3.7
AC-2		39.0	10.2	40.0	11.7	4.0	37.0	10.7	4.3	1.79	9.3	3.7
Σ		78.0	20.4	80.0	23.4	8.0	74.0	21.4	8.6	3.58	18.6	7.4
S. P.		+7.8		-0.9			-4.1				+7.6	
AC-N		.04		.03			.04				.08	

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project BANNER Line 6 SPREAD 9N Field date 20 APR 61 Dat page _____ Comp. date 21 APR 61 . 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		.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	1420	1440	1425	1405	1430	1415	1405	1400	1420	1405
(E) Vdc (avg)		80.0	21.1	82.0	24.5	8.7	75.0	22.0	9.1	3.63	19.6	7.7
(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		82.8	89.2	85.4	103.2	92.9	78.7	93.3	97.2	77.8	82.8	82.2
(I) Vac Σ		78.0	20.4	80.0	23.4	8.0	74.0	21.4	8.7	3.58	18.6	7.4
(J) AC noise x 2		.08	→	.06	→	→	.08	→	→	→	.16	→
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		78.0	20.4	80.0	23.4	8.0	74.0	21.4	8.7	3.58	18.6	7.4
(L) AC-DC cal.		1.000	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K		1.026	1.034	1.025	1.047	1.088	1.014	1.028	1.046	1.014	1.054	1.041
(N) PFE=(M-1)(10^2)		3	3	2	5	9	1	3	5	1	4	4
(O) MCF=(M-1)(10^5)/H		31	38	29	46	95	18	30	48	18	65	50

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	2-2.5N	→	2.5-3N	→	→	→		CAL	→	→	→	→	→
(C) n separation	4	5	3	4	5	6							
(D) I	1400	1390	1410	1400	1400	1380		286	500	710	280	500	700
(E) Vdc (avg)	3.76	1.79	7.3	3.51	1.99	1.02		28.0	52.0	71.6	27.8	50.6	70.2
(F) DCcal	1.000	→	→	→	→	→		1.021	0.962	.992	1.007	.988	.997
(G) Kn x 10^{-3}	30.0	52.5	15.0	30.0	52.5	84.0							
(H) ρ dc=ExFxGx10^3/D	80.6	67.6	77.7	75.2	74.6	62.1							
(I) Vac Σ	3.64	1.75	7.0	3.34	1.94	0.98		28.0	51.4	71.4	27.8	50.4	69.2
(J) AC noise x 2	.16	→	.20	→	→	→							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	3.64	1.75	7.0	3.34	1.93	0.96							
(L) AC-DC cal.	1.000	→	→	→	→	→		1.000	0.988	.997	1.000	.996	.986
(M) ρdc/ρac =ExL/K	1.033	1.023	1.043	1.051	1.031	1.062							
(N) PFE=(M-1)(10^2)	3	2	4	5	3	6							
(O) MCF=(M-1)(10^5)/H	41	34	55	68	42	100							

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Bannar Line: 6 Spread 9s Int.Cal. Date: 4-9

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		15-15	→	1-1.55	→	→	15-25	→	→	→	2-2.55	→
Time		1525	1527	1540	1541	1542	1549	1550	1552	1554	1605	1606
DC-1		50 50	10.5 10.3	60.0 60.0	15.1 15.1	3.0 4.9	41.0 41.0	13.0 13.0	4.5 4.4	1.92 1.94	10.9 10.8	4.6 4.6
DC-2		49 49	10.7 10.8	60.0 60.0	14.2 14.2	4.6 4.6	41.0 41.0	13.1 13.1	4.9 4.9	1.40 1.40	11.0 11.0	5.0 5.0
Σ		99 99	21.2 21.1	[illegible]	29.3 29.3	9.6 9.5			9.4 9.3	3.32 3.34	21.9 21.8	
DC-3		50 50	10.8 10.7	60.0 60.0	15.1 15.1	4.9 4.9	41.0 41.0	13.0 13.0	4.4 4.4	1.92 1.93	10.8 10.8	4.5 4.5
DC-4		49 49	10.3 10.4	60.0 60.0	14.2 14.2	4.6 4.6	41.0 41.0	13.1 13.1	4.9 4.9	1.41 1.40	11.0 11.0	5.0 5.0
Σ		99 99	21.1 21.1		29.3	9.5 9.5			9.3 9.3	3.33 3.33	21.8 21.8	
DC-AV		99.0	21.1	120.0	29.3	9.5	82.0	26.1	9.3	3.33	21.8	9.6
AC-1		48.0	10.2	59.0	14.5	4.4	40.0	12.9	4.4	1.60	10.4	4.6
AC-2		48.0	10.2	59.0	14.5	4.4	40.0	12.9	4.4	1.60	10.4	4.6
Σ		96.0	20.4	118.0	29.0	8.8	80.0	25.8	8.8	3.20	20.8	9.2
S. P.		+27.4		+134			+10.1				+9.0	
AC-N		.10		.06			.03				.02	

INDUCED POLARIZATION RECEIVER NOTES PAGE

Project Banner . Line 6 Spread 9.5 Int.Cal. Date: 4-19

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.	2-2.5		2.5-3				Cal					
Time	1607	1608	1615	1616	1617	1618	1519	1520	1521	1635	1636	1637
DC-1	1.80 1.80	.83 .86	3.4 3.4	1.60 1.60	.88 .89	50 49	14.1	25.5	35.7	14.0	25.7	35.6
DC-2	2.00 2.00	.80 .77	3.6 3.6	1.95 1.95	.83 .83	30 30	14.1	25.5	35.7	14.0	25.7	35.6
Σ	3.80 3.80	1.68 1.67	7.0 7.0	3.55 3.53	1.71 1.72	80 79						
DC- 3	1.80 1.79	.88 .90	3.4 3.4	1.60 1.60	.89 .89	50 50	14.1	25.5	35.7	14.0	25.7	35.6
DC-4	2.00 2.02	.75 .73	3.6 3.6	1.95 1.95	.82 .82	30 29	14.1	25.5	35.7	14.0	25.7	35.6
Σ	3.80 3.80	1.63 1.63	7.0 7.0	3.55	1.71 1.71	80 79	28.2	51.0	71.4	28.0	51.4	71.2
DC-Av	3.80	1.65	7.0	3.55	1.71	80						
AC-1	1.81	.78	3.3	1.73	.80	.38	14.0	25.3	35.2	14.0	25.4	35.0
AC- 2	1.81	.78	3.3	1.73	.80	.38	14.0	25.3	35.2	14.0	25.4	35.0
Σ	3.62	1.56	6.6	3.46	1.60	.76	28.0	50.6	70.4	28.0	50.8	70.0
S.P.	-19.0		-1.4									
AC-N	.02		.04									

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: ~~95~~ #6 qs. Date: 19 APR 61

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		1525	1527	1540	1541	1542	1549	1550	1552	1554	16	
Range		1.5	1.5	1.5	1.5	1.5	—	—	—	—	—	—
Current		1450	1435	1445	1420	1405	1425	1415	1400	1390	1420	1400
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	—	—	—	—	—
Receive							CAL	—	—	—	—	—
Time			1615	1616	1617	1618	1519	1520	1521			
%Range	—	—	—	—	—	—	.3	.5	.75	.3	.5	.75
Current	1395	1390	1415	1400	1395	1385	285	500	700	285	500	705

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

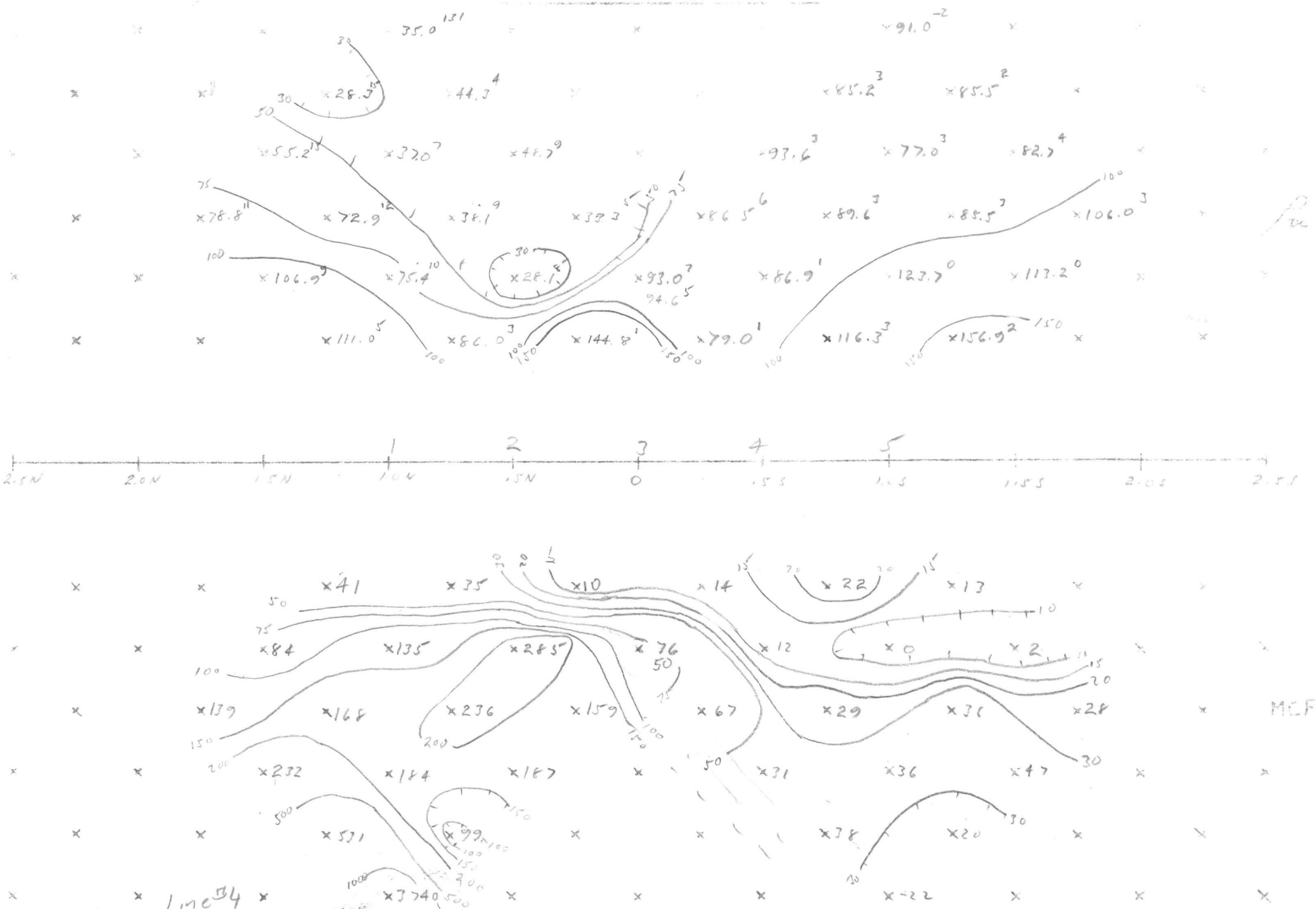
Page _____

Project BANNER Line 6 SPREAD 95 Field date 19 APR 61 Dat. page _____ Comp. date 21 APR 61 . 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		.5-1.5	→	1-1.55	→	→	1.5-2.5	→	→	→	2-2.55	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1450	1435	1445	1420	1405	1425	1415	1400	1390	1420	1400
(E) Vdc (avg)		99.0	21.1	120.0	29.3	9.5	82.0	26.1	9.3	3.33	21.8	9.6
(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		102.4	88.2	126.8	123.8	101.4	86.3	110.7	99.6	71.9	92.1	102.9
(I) Vac Σ		96.0	20.4	118.0	29.0	8.8	80.0	25.8	8.8	3.20	20.8	9.2
(J) AC noise x 2		.20	→	.12	→	→	+.06	→	→	→	.04	→
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		96.0	20.4	118.0	29.0	8.8	80.0	25.8	8.8	3.20	20.8	9.2
(L) AC-DC cal.		1.000	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K		1.031	1.034	1.017	1.010	1.080	1.025	1.012	1.057	1.041	1.048	1.043
(N) PFE=(M-1)(10^2)		3	3	2	1	8	2	1	6	4	5	4
(O) MCF=(M-1)(10^5)/H		30	39	13	8	79	29	11	57	57	52	42

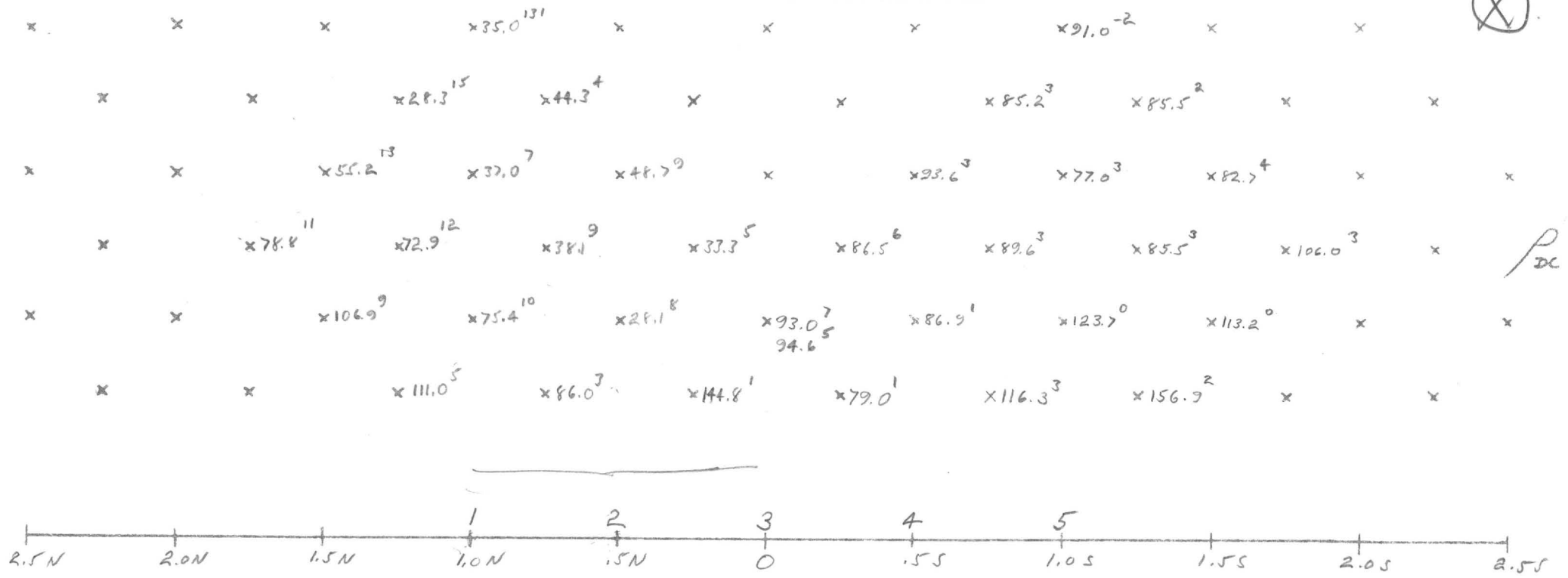
Project _____ Line _____ Field date _____ Data page _____ Comp. date _____ Comp by _____

(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	3-4
(B) Receive	2-2.55	→	2.5-3.5	→	→	→	CAL	→	→	→	→	→	→
(C) n separation	4	5	3	4	5	6							
(D) I	1395	1390	1415	1400	1395	1385		285	500	700	285	500	705
(E) Vdc (avg)	3.80	1.65	7.0	3.55	1.71	0.80		28.2	51.0	71.4	280	514	712
(F) DCcal	1.000	→	→	→	→	→		+.011	0.980	0.980	1.018	0.973	0.990
(G) Kn x 10^{-3}	30.0	52.5	15.0	30.0	52.5	84							
(H) ρ dc=ExFxGx10^3/D	81.7	62.3	74.2	76.6	64.4	48.5							
(I) Vac Σ	3.62	1.56	6.6	3.46	1.60	0.76		28.0	50.6	70.4	28.0	50.8	70.0
(J) AC noise x 2	.04	→	.08	→	→	→							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	3.62	1.56	6.6	3.46	1.60	0.76							
(L) AC-DC cal.	1.000	→	→	→	→	→		0.993	.992	.986	1.000	.988	.983
(M) ρdc/ρac =ExL/K	1.050	1.058	1.061	1.026	1.069	1.053							
(N) PFE=(M-1)(10^2)	5	6	6	3	7	5							
(O) MCF=(M-1)(10^5)/H	61	93	82	34	107	109							



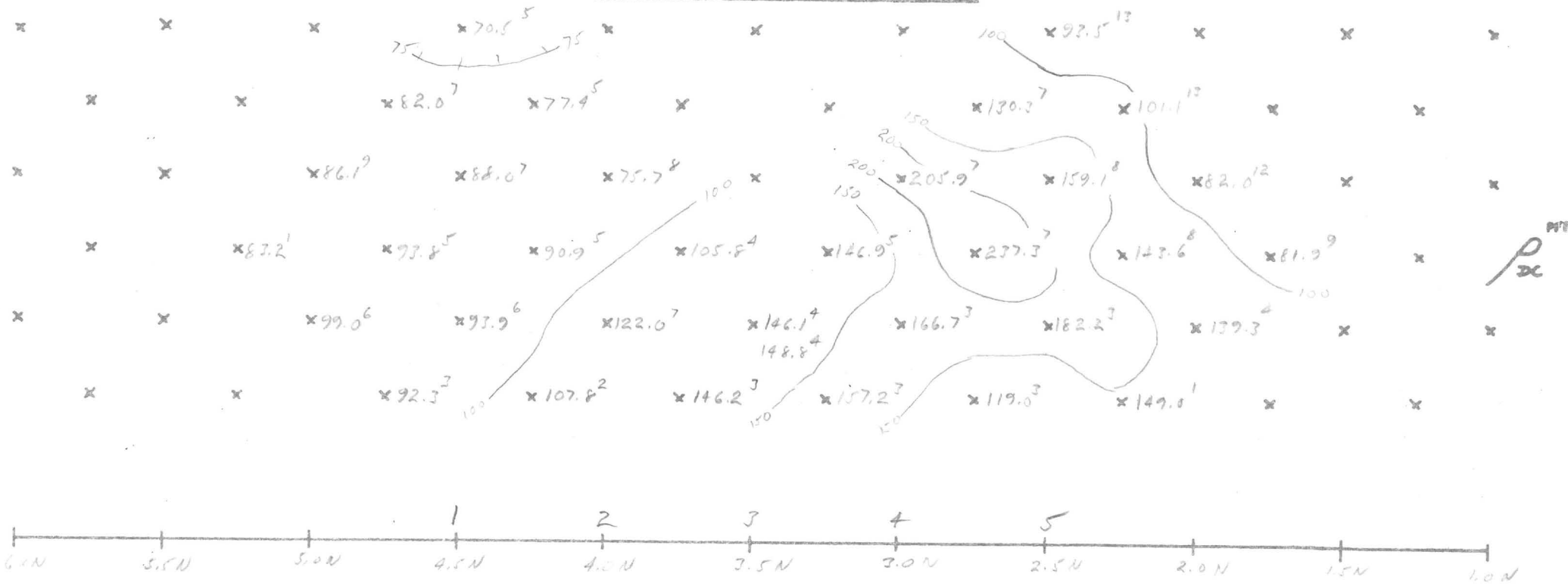
Area Banner - Line 4 - spread > 5 Scale 1" = 500' Date Apr. 15, 61

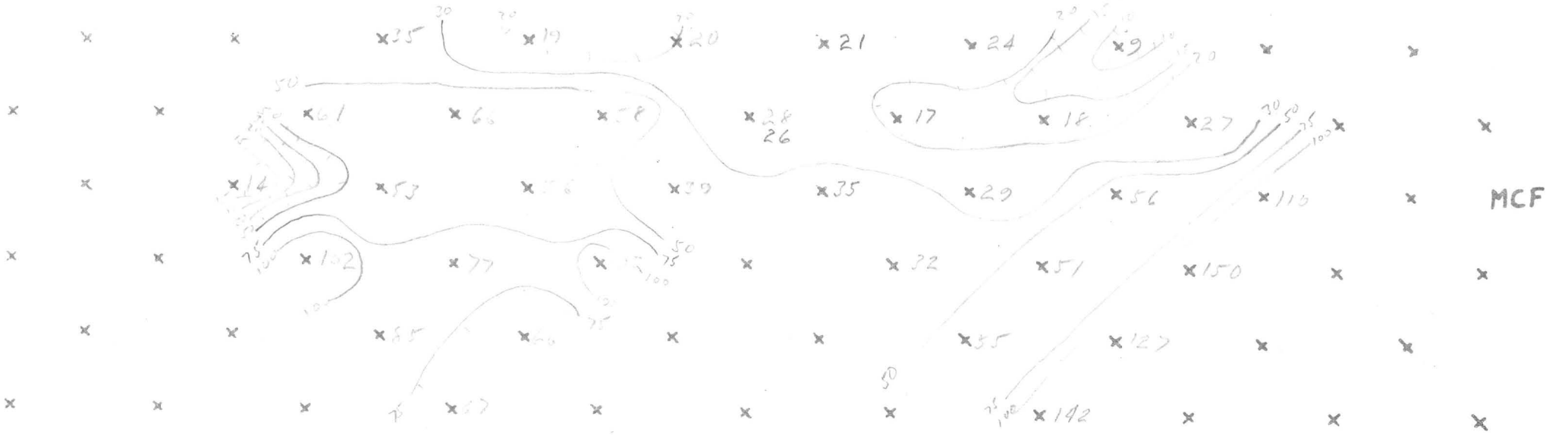
INDUCED POLARIZATION WORK SHEET



Area Banner : Line 4 ; Spread 7S Scale 1" = 500' Date Apr. 18, 61

INDUCED POLARIZATION WORK SHEET





Area Banner - Lines 14 N & S - 1320W (2) Scale 1" = 500' Date Apr 28 81

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page

Project Banner Line #4 1320W 19N Field date Apr. 24, 61 Data page Comp. date Apr. 26, 61 Comp by C.S.L.

(A) Send	3-4	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	CAL	4.0-4.5N	→	4.5-5.0N		→	5.0-5.5N	→	→	→	5.5-6.0N	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1435	1420	1420	1400	1390	1410	1400	1385	1375	1400	1380
(E) Vdc (avg)		140.0	34.6	102.0	28.5	9.80	86.8	21.9	8.38	3.47	23.1	8.63
(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	15
(H) ρ dc=ExFxGx10^3/D		146.2	146.1	107.8	122.0	105.8	92.3	93.9	90.9	75.7	99.0	93.8
(I) Vac Σ		136.0	33.2	100.0	26.6	9.40	84.0	20.6	7.96	3.22	21.8	8.20
(J) AC noise x 2		.16	.16	.14	.14	.14	.08	.08	.08	.08	.08	.08
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		136.0	33.2	100.0	26.6	9.40	84.0	20.6	7.96	3.22	21.8	8.20
(L) AC-DC cal. USED 1.000												
(M) ρ dc/ρac=ExL/K		1.030	1.041	1.020	1.071	1.041	1.032	1.062	1.051	1.078	1.060	1.050
(N) PFE=(M-1)(10^2)		3	4	2	7	4	3	6	5	8	6	5
(O) MCF=(M-1)(10^5)/H		20	28	19	58	39	35	66	56	103	61	53

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			4.0-4.5N			→			CAL			
(C) n separation	4	5	3	4	5	6			ON	14-5		
(D) I	1370	1370	1390	1380	1370	1370						
(E) Vdc (avg)	4.01	2.02	7.70	3.96	2.14	1.15						
(F) DCcal							USED	1.000				
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	88.0	77.4	83.2	86.1	82.0	70.5						
(I) Vac Σ	3.76	1.92	7.60	3.64	2.00	1.10						
(J) AC noise x 2	.08	.08	.10	.10	.10	.10						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	3.76	1.92	7.60	3.64	2.00	1.10						
(L) AC-DC cal.						USED	1.000					
(M) ρdc/ρac =ExL/K	1.068	1.051	1.012	1.088	1.070	1.047						
(N) PFE=(M-1)(10^2)	7	5	1	9	7	5						
(O) MCF=(M-1)(10^5)/H	77	66	14	102	85	67						

INDUCED POLARIZATION SENDER NOTES

Project: Banner Line: 1320W(2) 14N Date: 4-28

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	1306 4-4.5N →	1307	1317 4.5-5N →	1318	1321	1330 5-5.4N →	1331	1333	1335	1340 5.5-6N →	1341
~~Time~~ DC	70 70	16.8 16.8	51 51	14.5 14.5	5.0 5.0	43.0 43.0	10.9 10.9	4.00 4.03	1.61 1.61	11.6 11.5	4.5 4.4
~~Range~~ DC	70 70	17.8 17.8	51 51	14.0 14.0	4.8 4.8	43.8 43.8	11.0 11.0	4.38 4.33	1.86 1.86	11.5 11.6	4.2 4.2
Current	140.0	34.6	102.0	28.5	9.80	86.8	21.9	8.38	3.47	23.1	8.63
~~Send~~ DC	70 70	16.7 16.4	51 51	14.4 14.5	5.0 5.0	42.9 42.9	10.8 10.8	4.01 4.00	1.68 1.63	11.5 11.5	4.4 4.6
~~Receive~~ DC	70 70	17.9 18.0	51 51	14.0 14.0	4.8 4.8	43.9 43.9	11.1 11.1	4.37 4.39	1.80 1.84	11.6 11.6	4.1 4.0
~~Time~~	136.0	33.2	100.0	26.6	9.40	84.0	20.6	7.96	3.22	21.8	8.20
~~Range~~ AC	68 68	16.6 16.6	50 50	13.3 13.3	4.7 4.7	42.0 42.0	10.3 10.3	3.98 3.98	1.61 1.61	10.9 10.9	4.1 4.1
SP. AFN Current	+5.0 .08		-3.2 .07			-1.7 .04				+0.4 .09	

INDUCED POLARIZATION SENDER NOTES

Project: Banner Line: 1320 W(2) 14N Date: 4-28

Send	3-4	4-5	1-2	2-3	3-4	4-5						
Receive	1342 5.5-6N →	1344	1350 6-6.5N	1351	1354	→						
Time	2.10 2.06	96 99	4.0 4.0	1.98 1.95	.96 .92	50 53						
Range	1.92 1.96	1.05 1.03	3.7 3.7	2.00 1.99	1.20 1.21	66 60						
Current	4.01	2.02	7.70	3.96	2.14	1.15						
Send	2.00 1.98	91 87	4.0 4.0	1.98 1.82	.96 .99	57 55						
Receive	2.00 2.01	1.11 1.14	3.7 3.7	2.00 2.12	1.16 1.17	59 61						
Time	3.76	1.92	7.60	3.64	2.00	1.10						
%Range	1.88 1.88	96 96	3.8 3.8	1.82 1.82	1.00 1.00	.55 .55						
Current	+0.4 .04		-3.4 .05									

INDUCED POLARIZATION [illegible] SENDER NOTES

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

Send		3-4	4-4	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive												
Time		1306	1307	1317	1318	1321	1330	1331	1332	1335	1340	1341
Range		1.5										
Current		1435	1420	1420	1400	1390	1410	1400	1385	1395	1400	1380
Send	3-4	4-5	1-2	2-3	3-4	4-5						
Receive												
Time	1342	1344	1350	1357	1354	1355						
Range	1.5											
Current	1370	1370	1390	1380	1370	1370						

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page

Project *Banner* Line *1320 W 14-S* Field date *Apr. 28, 61* Data page _____ Comp. date *Apr. 28, 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	2.5-3.0N →		2.0-2.5N →			1.5-2.0N →				1.0-1.5N →	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1460	1440	1450	1430	1420	1430	1415	1405	1400	1420	1400
(E) Vdc (avg)		153.0	35.7	115.0	39.7	13.9	142.0	43.0	22.2	9.60	33.0	13.4
(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	15
(H) ρ dc=ExFxGx10^3/D		157.2	148.8	119.0	166.7	146.9	149.0	182.2	237.3	205.9	139.3	143.6
(I) Vac Σ		148.0	34.4	112.0	38.6	13.2	140.0	41.6	20.8	9.00	31.8	12.4
(J) AC noise x 2		.10	.10	.12	.12	.12	.14	.14	.14	.14	.10	.10
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		148.0	34.4	112.0	38.6	13.2	140.0	41.6	20.8	9.00	31.8	12.4
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.033	1.039	1.028	1.038	1.052	1.013	1.033	1.068	1.066	1.038	1.081
(N) PFE=(M-1)(10^2)		3	4	3	3	5	1	3	7	7	4	8
(O) MCF=(M-1)(10^5)/H		21	26	24	17	35	9	18	29	32	27	56

Project	Line		Field date		Data page		Comp. date					
(A) Send	2-3	1-2	4-5	3-4	2-3	1-2						
(B) Receive	→		3.5-4.0N →									
(C) n separation	4	5	3	4	5	6						
(D) I	1390	1380	1400	1390	1380	1375	285	515	710	275	505	700
(E) Vdc (avg)	7.38	3.43	7.63	3.80	2.66	1.53	28.0	51.2	71.4	22.6	50.4	69.6
(F) DCcal					USED	1.000	1.018	1.005	.996	.997	1.002	1.004
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	159.1	130.3	81.9	82.0	101.1	93.5						
(I) Vac Σ	6.82	3.20	7.00	3.38	2.36	1.36	27.8	50.0	70.2	22.4	49.0	68.0
(J) AC noise x 2	.10	.10	.12	.15	.18	.18						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	6.82	3.20	7.00	3.38	2.36	1.35						
(L) AC-DC cal.					USED 1.000		.994	.977	.985	.994	.975	.977
(M) ρdc/ρac =ExL/K	1.081	1.072	1.090	1.123	1.124	1.133						
(N) PFE=(M-1)(10^2)	8	7	9	12	12	13						
(O) MCF=(M-1)(10^5)/H	51	55	110	150	127	142						

INDUCED POLARIZATION SENDER NOTES

Project: Banner Line: 1320W (2)14 S Date: 4-28

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive		1044 2.5-3N →	1045	1116 2-2.5N →	1117	1118	1129 1.5-2N →	1130	1131	1132	1139 -1.5N →	1140
DC1 ~~Time~~		77 77	18.0 18.0	58 58	20.2 20.2	7.0 7.0	70.0 70.0	23.0 23.0	11.2 11.0	4.7 4.7	16.5 16.5	6.4 6.4
DC2 ~~Range~~		76 76	17.7 17.7	57 57	19.5 19.5	6.9 6.9	72.0 72.0	20.0 20.0	11.0 11.2	4.9 4.9	16.5 16.5	7.0 7.0
Current		153.0 153	357 357	115 115	39.7 39.7	13.9 13.9	142.0 142.0	43.0 43.0	22.2 22.2	9.6 9.6	33.0 33.0	13.4 13.4
DC3 ~~Send~~		77 77	18.0 18.0	58 58	20.2 20.3	7.0 7.0	70.0 70.0	23.0 23.0	11.0 11.0	4.7 4.7	16.5 16.5	6.4 6.4
DC4 ~~Receive~~		76 76	17.7 17.7	57 57	19.5 19.4	6.9 6.9	72.0 72.0	20.0 20.0	11.2 11.2	4.9 4.9	16.5 16.5	7.0 7.0
~~Time~~		153 153.0	357 357	115 115.0	39.7 39.7	13.9 13.9	142.0 142.0	43.0 43.0	22.2 22.2	9.6 9.6	33.0 33.0	13.4 13.4
AC ~~%Range~~		74 74	17.2 17.2	56 56	19.3 19.3	6.6 6.6	70.0 70.0	20.8 20.8	10.4 10.4	4.5 4.5	15.9 15.9	6.2 6.2
SP & ACN ~~Current~~		14.6 +1.8 .05	34.4	115 -15.0 .06	38.6	13.2	140.0 -2.2 .07	41.6	20.8	9.0	-2.5 % .06	13.4

INDUCED POLARIZATION SENDER NOTES

Project: Banno Line: 1320W (2) 145 Date:

Send	2-3	1-2	4-5	5-4	2-3	1-2	3-4	3-4	3-4	3-4	3-4	3-4
Receive	1142 1-1.5N	1143	1155 .5-1N	1156	1158	1300	1040	1041	1092	1412	1413	1414
DC1 ~~Time~~	3.60 3.59	1.61 1.66	3.64 3.62	1.70 1.68	1.38 1.35	78 76	14.0	25.6	35.7	13.8	25.2	34.8
DC2 ~~Range~~	3.80 3.81	1.81 1.82	3.99 4.00	2.11 2.13	1.29 1.30	74 81	14.0	25.6	35.7	13.8	25.2	34.8
~~Current~~	7.40 7.40	3.42 3.42	7.63 7.62	3.81 3.81	2.67 2.65	152 151	28.0	51.2	71.4	27.6	50.4	69.6
DC3 ~~Send~~	3.52 3.48	1.59 1.58	3.62 3.60	1.71 1.72	1.33 1.30	76 73	14.0	25.6	35.7	13.8	25.2	34.8
DC4 ~~Receive~~	3.85 3.87	1.84 1.85	4.01 4.03	2.09 2.06	1.33 1.37	77 81	14.0	25.6	35.7	13.8	25.2	34.8
~~Time~~	7.37 7.34	3.43 3.43	7.63 7.63	3.80 3.82	2.66 2.67 2.66	153 154						
AC ~~Range~~	3.41 3.41	1.60 1.60	3.50 3.50	1.69 1.69	1.18 1.18	68 68	13.9 13.9	25.0 25.0	35.1 35.1	13.7 13.7	24.5 24.5	34.0 34.0
SP&ACN Current	-2.5 .05	2.20	-2.4 .09	3.38	2.36	1.36	27.6	50.0	70.2	27.4	49.0	68.0

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: 14 S Date: 28APR61

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		1044	1045	1116	1117	1118	1129	1130	1131	1132	1139	1140
Range		1.5	—	—	—	—	—	—	—	—	—	>
Current		1460	1440	1450	1430	1420	1430	1415	1405	1400	1420	1400
Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal	—	—	—	—	—
Receive							3-4					
Time	1142	1143	1155	1156	1158	1200	1040	1041	1042	1412	1413	1414
Range	1.5	—	—	—	—	>	.3	.5	.75	.3	.5	.75
Current	1390	1380	1400	1390	1380	1375	285	515	710	275	505	700

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Banner Line 4 - Spread 2N Field date Apr. 18, 61 Dat. page _____ Comp. date Apr. 19, 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	.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		1430	1420	700	1430	1415	690	685	1425	1400	685	680
(E) Vdc (avg)		138.0	22.4	40.1	6.70	3.14	51.0	8.60	3.62	2.27	12.2	3.30
(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	15
(H) ρ dc=ExFxGx10^3/D		144.8	94.6	86.0	28.1	33.3	111.0	75.4	38.1	48.7	106.9	72.9
(I) Vac Σ		136.0	21.4	39.0	6.20	2.98	48.8	7.80	3.32	2.08	11.2	2.94
(J) AC noise x 2		.20	.20	.12	.12	.12	.14	.14	.14	.14	.14	.14
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		136.0	21.4	39.0	6.20	2.98	48.8	7.80	3.32	2.08	11.2	2.94
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.014	1.048	1.030	1.080	1.053	1.095	1.101	1.090	1.091	1.090	1.122
(N) PFE=(M-1)(10^2)		1	5	3	8	5	5	10	9	9	9	12
(O) MCF=(M-1)(10^5)/H		10	50	35	285	159	41	135	236	187	84	168

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	→		→	→
(B) Receive	→	→	2.5-3.0N	→	→	→		CAL	→		→	→
(C) n separation	4	5	3	4	5	6						
(D) I	1420	1400	680	680	1410	1390		280	435		280	430
(E) Vdc (avg)	1.75	1.18	3.57	1.25	.76	.58		28.2	48.2		28.0	46.4
(F) DCcal						USED	1.000	.994	.997		1.000	.997
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	37.0	44.3	78.8	55.2	28.3	35.0						
(I) Vac Σ	1.64	1.14	3.22	1.12	.68	.30		28.0	48.0		27.8	46.2
(J) AC noise x 2	.14	.14	.16	.16	.16	.16						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.64	1.13	3.22	1.11	.66	.25						
(L) AC-DC cal.						USED	1.000	.994	.996		.994	.997
(M) ρdc/ρac =ExL/K	1.068	1.044	1.109	1.128	1.150	2.309						
(N) PFE=(M-1)(10^2)	7	4	11	13	15	131						
(O) MCF=(M-1)(10^5)/H	184	99	139	232	531	3540						

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: 4 Spread N Int. Cal. Date 4-18

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		1011	1012	1023	1024	1026	1033	1034	1035	1037	1046	1048
DC-1		69.	11.4	20.1	3.1	1.40	25.2	4.5	1.82	1.06	6.7	1.41
		69.	11.4	20.2	3.1	1.40	25.2	4.5	1.83	1.09	6.8	1.40
DC-2		69.	11.0	20.0	3.6	1.74	25.8	4.1	1.80	1.21	5.5	1.86
		69.	11.0	19.9	3.6	1.74	25.8	4.1	1.79	1.21	5.4	1.91
Σ		138	22.4	40.1	6.3	3.14	51.0	8.6	3.62	2.27	12.2	3.27
		138	22.4	40.1	6.3	3.14	51.0	8.6	3.62	2.26	12.2	3.31
DC-3		69.	11.4	20.2	3.1	1.40	25.1	4.5	1.84	1.03	6.8	1.30
		69.	11.5	20.1	3.1	1.40	25.1	4.5	1.85	1.01	6.8	1.19
DC-4		69.	11.0	19.9	3.6	1.75	25.9	4.1	1.78	1.24	5.4	2.00
		69.	10.9	20.0	3.6	1.74	25.9	4.1	1.77	1.26	5.4	2.12
Σ		138	22.4	40.1	6.3	3.15	51.0	8.6	3.62	2.27	12.2	3.30
		138	22.4	40.1	6.3	3.14	51.0	8.6	3.62	2.27	12.2	3.31
DC-AV.		138.0	22.4	40.1	6.70	3.14	51.0	8.60	3.62	2.27	12.2	3.30
AC-1		68.0	10.7	19.5	3.1	1.49	24.4	3.9	1.66	1.04	5.6	1.47
AC-2		68.	10.7	19.5	3.1	1.49	24.4	3.9	1.66	1.04	5.6	1.47
Σ		136.0	21.4	39.0	6.20	2.98	48.8	7.80	3.32	2.08	11.2	2.94
S.P.		-7.5		-2.1			+0.5				+10.5	
AC-N		.10		.06			.07				.07	

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Banner . Line #4 Spread 7N Int. Cal. Date: A-18

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.	2-2.5N	→	2.5-3N		→		Cal	Cal	Cal	Cal	Cal	Cal
Time	1050	1052	1100	1101	1103	1105	1005	1006	1133	1134		
DC-1	91 92	.77 .78	1.80 1.80	.58 .59	45 45	31 31	14-1	24-1	14-0	23-2		
DC-2	.84 83	.41 .40	1.77 1.77	.66 .65	30 31	27 28	14-1	24-1	14-0	23-2		
Σ	1.75 1.75	1.18 1.18	3.57 3.57	1.24 1.24	.75 .76	.58 .59	28.2	48.2	28.0	46.4		
DC-3	.94 .96	.79 .80	1.80 1.80	.59 .59	46 46	30 30	14-1	24-1	14-0	23-2		
DC-4	.81 .79	.39 .38	1.77 1.77	.66 .66	30 30	28 28	14-1	24-1	14-0	23-2		
Σ	1.75 1.75	1.18 1.18	3.53 3.53	1.25 1.25	.76 .76	.58 .58	28.2	48.2	28.0	46.4		
DC-Av	1.75	1.18	3.57	1.25	.76	.58	28.2	48.2	28.0	46.4		
AC-1	.82	.57	1.61	.56	.34	.15	14-0	24-0	13-9	23-1		
AC-2	.82	.57	1.61	.56	.34	.15	14-0	24-0	13-9	23-1		
Σ	1.64	1.14	3.22	1.12	.68	.30	28.0	48.0	27.8	46.2		
S.P.	+10.5		+0.9									
AC-N	.07		.08									

INDUCED POLARIZATION SENDER NOTES

Project: [illegible] Line: 7 N Date: 18 APR 61

Send	[illegible]	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		1011	1012	1023	1024	1026	1033	1034	1035	1037	1046	1048
Range		1.5	1.5	.75	1.5	1.5	.75	.75	1.5	1.5	.75	.75
Current		1430	1420	700	1430	1415	690	685	1425	1400	685	680
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	—	—	—	—	—
Receive							CAL	—	—	—	—	—
Time	1050	1052	1100	1101	1103	110	1005	1006	113	1133	1134	
Range	1.5	1.5	.75	.75	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1420	1400	680	680	1410	1390	280	435	—	280	430	

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project *Banner* Line *4 spread 25* Field date *Apr. 12, 61* Data page_____ Comp. date *Apr. 18, 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		675	665	1430	670	675	1435	1408	670	670	1430	1405
(E) Vdc (avg)		35.5	10.3	111.0	9.7	3.89	150.0	29.0	4.00	2.09	27.0	8.0
(F) DCcal USED	1.000											
(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		79.0	93.0	116.3	86.9	86.5	156.9	123.7	89.6	93.6	117.8	85.5
(I) Vac Σ		34.4	9.4	106.0	9.4	3.60	144.0	28.4	3.82	2.00	26.4	7.6
(J) AC noise x 2		.16	.16	.14	.14	.14	.20	.20	.20	.20	.12	.12
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		34.4	9.4	106.0	9.4	3.60	144.0	28.4	3.82	1.99	26.4	7.6
(L) AC-DC cal. USED	.980											
(M) ρ dc/ρac=ExL/K		1.011	1.071	1.025	1.010	1.058	1.020	1.000	1.026	1.029	1.002	1.031
(N) PFE=(M-1)(10^2)		1	7	3	1	6	2	0	3	3	0	3
(O) MCF=(M-1)(10^5)/H		14	76	22	12	67	13	0	29	31	2	36

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	670	660	1430	1400	670	665	280	505	704	280	507	700
(E) Vdc (avg)	1.72	1.07	10.1	3.86	1.09	.72	28.0	51.6	72.0	28.0	51.6	70.6
(F) DCcal						USED →	1.000	.979	.978	1.000	.984	.903
(G) Kn x 10^{-3} (a = 500')	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	77.0	85.2	106.0	82.7	85.5	91.0						
(I) Vac Σ	1.64	1.02	9.6	3.64	1.06	.74	28.0	50.4	71.0	28.0	50.4	69.2
(J) AC noise x 2	.12	.12	.16	.16	.16	.16						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.64	1.015	9.6	3.64	1.05	.72						
(L) AC-DC cal.						USED .98	1.000	.978	.986	1.000	.978	.981
(M) ρdc/ρac =ExL/K	1.028	1.032	1.030	1.039	1.017	.980						
(N) PFE=(M-1)(10^2)	3	3	3	9	2	-2						
(O) MCF=(M-1)(10^5)/H	36	38	28	47	20	-22						

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Banner Line: #4 Spread 7S Int.Cal _____ Date: 4-17

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		.5-1S	→	1-1SS	→		1.5-2S	→			2-2.5S	→
Time		1431	1433	1441	1443	1444	1452	1453	1455	1456	1503	1505
DC-1		18.0 18.0	5.9 5.5	56.0 56.0	5.0 5.0	1.90 1.87	75.0 75.0	14.0 14.0	2.01 2.04	1.08 1.08	13.5 13.5	4.0 4.0
DC-2		17.5 17.5	4.8 4.8	55.0 55.0	4.7 4.7	2.00 2.02	75.0 75.0	15.1 15.0	2.00 1.96	1.00 1.00	13.5 13.5	4.0 4.0
Σ		35.5 35.5	10.3 10.3	111.0 111.0	9.7 9.7	3.90 3.89	150.0 150.0	29.1 29.0	4.01 4.00	2.08 2.08	27.0 27.0	8.0 8.0
DC-3		18.0 18.1	5.5 5.5	56.0 56.0	5.0 5.0	1.86 1.86	75.0 75.0	14.0 14.0	2.05 2.01	1.07 1.05	13.5 13.5	3.9 3.9
Dc-4		17.5 17.4	4.8 4.8	55.0 55.0	4.7 4.7	2.02 2.02	75.0 75.0	15.0 15.0	1.95 1.99	1.02 1.05	13.5 13.5	4.1 4.1
Σ		35.5 35.5	10.3 10.3	111.0 111.0	9.7 9.7	3.88 3.88	150.0 150.0	29.0 29.0	4.00 4.00	2.09 2.10	27.0 27.0	8.0 8.0
DC-AV		35.5	10.3	111.0	9.7	3.89	150.0	29.0	4.00	2.09	27.0	8.0
AC-1		17.2	4.7	53.0	4.3?	1.80	72.0	14.2	1.91	1.00	13.2	3.8
AC-2		17.2	4.7	53.0	4.7	1.80	72.0	14.2	1.91	1.00	13.2	3.8
Σ		34.4	9.4	106.0	9.4	3.60	144.0	28.4	3.82	2.00	26.4	7.6
S. P.		+1.5		+5.0			+1.4				+10.6	
AC-N		.08		.07			.10				.06	

AC power line at 1.85

Fence ⊥ to line at 2.65

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: #4 Spread 175 Int.Cal. Date: 4-17

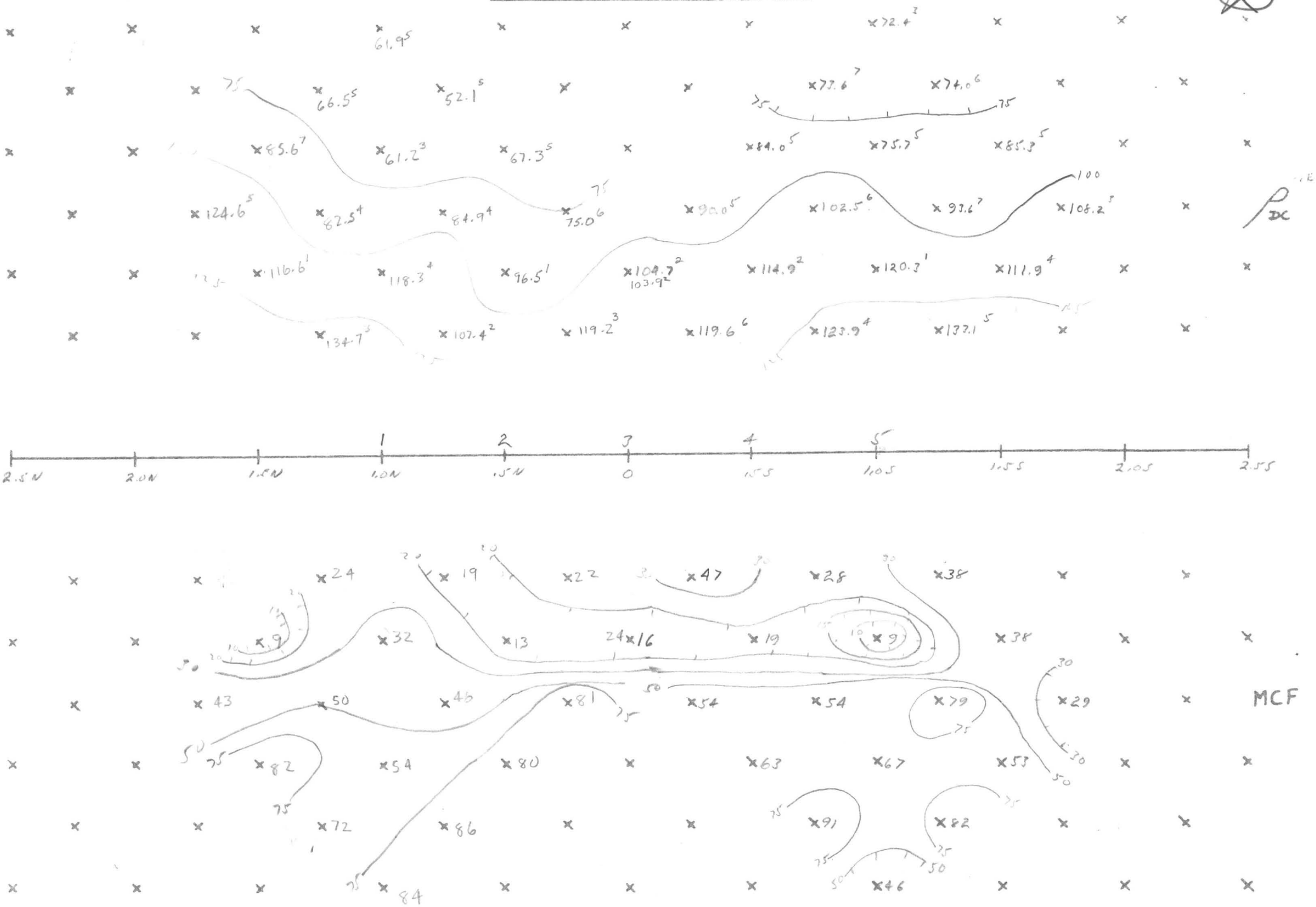
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4	3-4	3-4	3-4	3-4
Rec.	2-2.55	→	2.5-3.5	→			Cal	Cal	Cal	Cal	Cal	Cal
Time	1506	1507	1516	1518	1519		1257	1258	1259	1539	1540	1541
DC-1	.87 .87	59 .59	8.0 5.0	2.98? 2.00	51 53	42 43	14.0	25.8	36.0	14.0	23.8	36.3
DC-2	.84 .85	.48 .49	5.1 5.1	1.88 1.86	58 56	30 30	14.0	25.8	36.0	14.0	25.8	35.3
Σ	1.71 1.72	1.07 1.07	10.1 10.1	3.86 3.86	1.09 1.09	.72 .73	28.0	51.6	72.0	28.0	51.6	70.6
DC-3	.82 .80	.60 .62	4.9 4.9	2.01 2.00	56 66	40 41	14.0	25.8	36.0	14.0	25.8	35.3
DC-4	.90 .92	.47 .44	5.2 5.2	1.85 1.86	53 49	32 30	14.0	25.8	36.0	14.0	25.8	35.3
Σ	1.72 1.72	1.07 1.06	10.1 10.1	3.86 3.86	1.09 1.08	.32 .31	28.0	51.6	72.0	28.0	51.6	70.6
DC-AV	1.72	1.07	10.1	3.86	1.09	.72	28.0	51.6	72.0	28.0	51.6	70.6
AC-1	.82	.51	4.8	1.82	.53	.37	14.0	25.2	35.5	14.0	25.2	34.6
AC-2	.82	.51	4.8	1.82	.53	.37	14.0	25.2	35.5	14.0	25.2	34.6
Σ	1.64	1.02	9.6	3.64	1.06	.74	28.0	50.4	71.0	28.0	50.4	69.2
S. P.	+10.6		-4.0									
AC-N	.06		.08									

INDUCED POLARIZATION SENDER NOTES

Project: Line: 4-sp 75 Date:

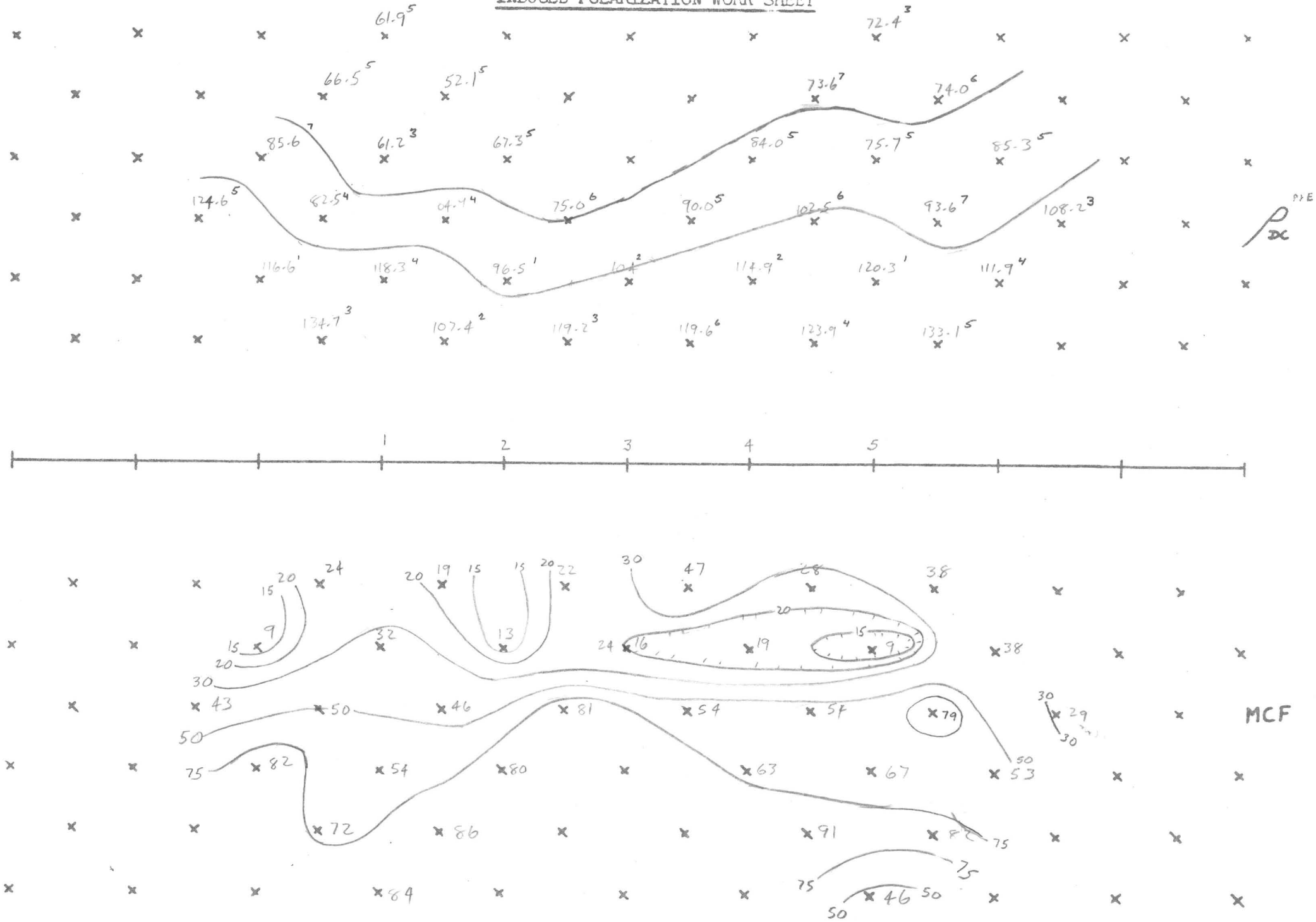
Send	Cal	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	3-4											
Time		1431	1433	1441	1443	1444	1452	1453	1455	1456	1503	1505
Range		.75	.75	1.5	.75	.75	1.5	1.5	.75	.75	1.5	1.5
Current		675	665	1430	670	675	1435	1408	670	670	1430	1405
Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal					
Receive							3-4					
Time	1506	1507	1516	1518	1519	1521	1257	1258	1259	1539	1540	1541
%Range	.75	.75	1.5	1.5	.75	.75	.3	.5	.75	.3	.5	.75
Current	670	660	1430	1400	670	665	280	505	704	280	507	700

INDUCED POLARIZATION WORK SHEET



Area Bonner Line 5 - ~~spread 8 S~~ Scale 1" = 500' Date Apr. 19, 61

INDUCED POLARIZATION WORK SHEET



Area _____ Scale _____ Date _____

REEVES INTERP. LINE 5 8N & 5

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Banner Line: 5 Spread 8 N Int.Cal Date: 4-19

end		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
ec.		.5-1N	→	1-1.5N	→		1.5-2N	→	→	→	2-2.5N	→
ime		1003	1004	1011	1013	1014	1020	1022	1023	1025	1031	1032
C-1		60.0 59.0	12.0 12.0	51.0 51.0	11.3 11.3	3.4 3.4	64.0 64.0	13.3 13.3	4.2 4.2	1.60 1.53	14.0 13.9	3.9 3.9
C-2		60.0 60.0	12.6 12.6	51.0 51.0	11.4 11.4	3.6 3.6	64.0 64.0	13.5 13.5	3.7 3.7	1.53 1.59	13.8 13.8	3.8 3.8
Σ		120.0 119.0	24.6 24.6		22.7 22.7	7.0 7.0				3.13 3.12	27.8 27.7	7.7 7.7
C-3		59.0 59.0	12.0 12.0	51.0 51.0	11.5 11.5	3.4 3.3	64.0 64.0	13.2 13.2	4.2 4.2	1.60 1.62	13.9 13.9	3.9 3.8
c-4		60.0 60.0	12.6 12.6	51.0 51.0	11.2 11.2	3.6 3.7	64.0 64.0	13.6 13.6	3.7 3.7	1.51 1.48	13.8 13.8	3.9 3.9
Σ		119.0 119.0	24.6 24.6							3.11 3.10	27.7 27.7	7.8 7.7
-AV		119.2	24.6	102.0	22.7	7.0	128.0	27.6	7.9	3.12	27.7	7.7
-1		58.0	12.0	50.0	11.2	3.3	62.0	13.3	3.8	1.48	13.7	3.7
C-2		58.0	12.0	50.0	11.2	3.3	62.0	13.3	3.8	1.48	13.7	3.7
Σ		116.0	24.0	100.0	22.4	6.6	124.0	26.6	7.6	2.96	27.4	7.4
. P.		+5.5		-11.9			+7.1				-8.7	
C-N		.07		.08			.07				.08	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Bannor Line: 5 Spread 8W Int. Cal. Date: 4-19

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	2-2.5M	→	2.5-3M	→	→	→	Cal	Cal	Cal	Cal	Cal	Cal
Time	1034	1035	1041	1042	1044	1045	959	1000	1001	1054	1056	1056
DC-1	1.46 1.45	.66 .68	6.0 6.0	1.93 1.95	84 86	47 52	14.1	26.0	36.2	14.0	25.1	35.0
DC-2	1.39 1.39	.70 .70	5.9 5.8	2.04 2.02	93 89	54 49	14.1	26.0	36.2	14.0	25.1	35.0
Σ	2.85 2.84	1.36 1.38	11.9 11.8	3.97	177 177	1.01 1.01						
DC-3	1.45 1.44	.67 .67	6.0 6.0	1.82 1.83	90 86	55 52	14.1	26.0	36.2	14.0	25.1	35.0
DC-4	1.40 1.41	.72 .73	5.8 5.8	2.18 2.17	86 91	48 50	14.1	26.0	36.2	14.0	25.1	35.0
Σ	2.85 2.85	1.39 1.40	11.8 11.8	4.00 4.00	176 177	1.03 1.02						
DC-AV.	2.85	1.38	11.8	3.98	1.76	1.02						
AC-1	1.38	.66	5.6	1.86	.84	.49	14.1	25.9	35.8	14.0	25.0	34.6
AC-2	1.38	.66	5.6	1.86	.84	.49	14.1	25.9	35.8	14.0	25.0	34.6
Σ	2.76	1.32	11.2	3.72	1.68	.98						
S.P.	-8.7		+6.2									
AC-N	.08		.08									

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: ~~9A~~ #5 (SP 8A Date: 19 APR 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	CAL											
Time		1003	1004	1011	1012	1014	1020	1022	1023	1025	1031	1032
Range		1.5	←									→
Current		1435	1420	1425	1410	1400	1425	1400	1395	1390	1425	1400
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	←				→
Receive							CAL	←				→
Time	1034	1035	1041	1042	1044	1045	0959	1000	1001	1054	1055	1056
Range	←					→	.3	.5	.75	.3	.5	.75
Current	1395	1390	1420	1395	1390	1385	285	500	710	285	500	700

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project BANNER Line #5 - 8N Field date 19 APRIL Dat. page_____ Comp. date 21 APR 61. Comp by GER

(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		1435	1420	1425	1410	1400	1425	1400	1395	1390	1425	1400
(E) Vdc (avg)		119.2	24.6	102.0	22.7	7.0	128.0	27.6	7.9	3.12	27.7	7.7
(F) DCcal		1.000	→								→	
(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		124.6	103.9	107.4	96.5	75.0	134.7	118.3	84.9	67.3	116.6	82.5
(I) Vac Σ		116	24	100	22.4	6.6	124	26.6	7.6	2.96	27.4	7.4
(J) AC noise x 2		.14	→	.16	→	→	.14	→	→	→	.16	→
(K) Vac(corr) $=\sqrt{I^2 - J^2}$		116	24	100	22.4	6.6	124	26.6	7.6	2.96	27.4	7.4
(L) AC-DC cal.		1.000	→								→	
(M) ρ dc/ρac=ExL/K		1.028	1.025	1.020	1.013	1.061	1.032	1.038	1.039	1.054	1.011	1.041
(N) PFE=(M-1)(10^2)		3	2	2	1	6	3	4	4	5	1	4
(O) MCF=(M-1)(10^5)/H		22	24	19	13	81	24	32	46	80	9	50

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	23	2-3	2-3	2-3	2-3
(B) Receive	2-2.5N	→	2.5-3N	→	→	→		CAL	CAL	CAL	CAL	CAL	CAL
(C) n separation	4	5	3	4	5	6							
(D) I	1395	1390	1420	1395	1390	1385		285	500	710	285	500	700
(E) Vdc (avg)	2.85	1.38	11.8	3.98	1.76	1.02		28.2	52.0	72.4	28.0	50.2	70.0
(F) DCcal	1.000	→				→		1.011	0.961	0.981	1.018	0.996	1.000
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84							
(H) ρ dc=ExFxGx10^3/D	61.2	52.1	124.6	85.6	66.5	61.9							
(I) Vac Σ	2.76	1.32	11.2	3.72	1.68	0.98		28.2	51.8	71.6	28.0	50.0	69.2
(J) AC noise x 2	.16	→				→							
(K) Vac (corr) $=\sqrt{I^2 - J^2}$	2.76	1.32	11.2	3.72	1.68	0.97							
(L) AC-DC cal.	1.000	→				→		1.000	0.996	0.992	1.000	0.996	0.989
(M) ρdc/ρac =ExL/K	1.033	1.045	1.054	1.070	1.048	1.052							
(N) PFE=(M-1)(10^2)	3	5	5	7	5	5							
(O) MCF=(M-1)(10^5)/H	54	86	43	82	72	84							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Banner Line 5 - Spread 85 Field date Apr. 18, 61 Dat. page _____ Comp. date Apr. 19, 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		1430	1410	1430	1400	1400	1420	1400	1390	1380	1400	1380
(E) Vdc (avg)		114.0	24.6	118.0	26.8	8.40	126.0	28.1	9.50	3.86	26.1	8.60
(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	15
(H) ρ dc=ExFxGx10^3/D		119.6	104.7	123.9	114.9	90.0	133.1	120.3	102.5	84.0	111.9	93.6
(I) Vac Σ		108.0	24.2	114.0	26.2	8.00	120.0	27.8	9.00	3.66	25.0	8.00
(J) AC noise x 2		.14	.14	.12	.12	.12	.12	.12	.12	.12	.14	.14
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		108.0	24.2	114.0	26.2	8.00	120.0	27.8	9.00	3.66	25.0	8.00
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.056	1.017	1.035	1.022	1.049	1.050	1.011	1.055	1.037	1.043	1.074
(N) PFE=(M-1)(10^2)		6	2	4	2	5	5	1	6	5	4	7
(O) MCF=(M-1)(10^5)/H		47	16	28	19	54	38	9	54	63	38	79

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	1375	1370	1400	1390	1370	1360	285	500	710	285	500	700
(E) Vdc (avg)	3.47	1.92	10.1	3.95	1.93	1.23	28.2	52.0	72.2	28.0	51.2	71.0
(F) DCcal					USED	1.000	1.011	.962	.983	1.019	.976	.987
(G) Kn x 10^{-3}	30	52.5	15	30	525	84						
(H) ρ dc=ExFxGx10^3/D	75.7	73.6	108.2	85.3	74.0	72.4						
(I) Vac Σ	3.30	1.80	9.8	3.78	1.82	1.20	28.0	51.2	71.4	28.0	50.0	69.4
(J) AC noise x 2	.14	.14	.16	.16	.16	.16						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	3.30	1.80	9.8	3.78	1.82	1.19						
(L) AC-DC cal.					USED	1.000	.994	.985	.988	1.000	.977	.977
(M) ρdc/ρac =ExL/K	1.051	1.067	1.031	1.045	1.061	1.033						
(N) PFE=(M-1)(10^2)	5	7	3	5	6	3						
(O) MCF=(M-1)(10^5)/H	67	91	29	53	82	46						

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Banner Line: Line 5 Spread 85 Int.Cal _____ Date: 4-18

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	→	1-1.5	→		1.5-2.5	→			2-2.5	→
Time		1442	1444	1457	1459	1500	1510	1511	1512	1515	1525	1527
DC-1		58. 58.	12.0 12.0	59.0 59.0	12.8 12.8	4.1 4.1	63.0 63.0	14.1 14.1	4.8 4.8	2.04 2.06	13.1 13.1	4.6 4.6
DC-2		56. 56.	12.6 12.6	59.0 59.0	14.0 14.0	4.3 4.3	63.0 63.0	14.0 14.0	4.7 4.7	1.82 1.80	13.0 13.0	4.0 4.0
Σ		114.0 114.0	24.6 24.6	118.0 118.0	26.8 26.8	8.4 8.4	126.0 126.0	28.1 28.1	9.50 9.50	3.86 3.86	26.1 26.1	8.6 8.6
DC-3		58. 59.	12.0 11.9	59.0 59.0	12.8 12.8	4.1 4.1	63.0 63.0	14.1 14.1	4.8 4.8	1.77 1.77	13.1 13.1	4.6 4.6
Dc-4		56. 56.	12.6 12.7	59.0 59.0	14.0 14.0	4.3 4.3	63.0 63.0	14.0 14.0	4.7 4.7	2.10 2.09	13.0 13.0	4.0 4.0
Σ		114.0 114.0	24.6 24.6	118.0 118.0	26.8 26.8	8.4 8.4	126.0 126.0	28.1 28.1	9.50 9.50	3.87 3.86	26.1 26.1	8.6 8.6
DC-AV		114.0	24.6	118.0	26.8	8.40	126.0	28.1	9.50	3.86	26.1	8.60
AC-1		54.0	12.1	57.0	13.1	4.0	60.0	13.9	4.5	1.83	12.5	4.0
AC-2		54.0	12.1	57.0	13.1	4.0	60.0	13.9	4.5	1.83	12.5	4.0
Σ		108.0	24.2	114.0	26.2	8.00	120.0	27.8	9.00	3.66	25.0	8.00
S. P.		+28.9		-2.1			+4.2				+5.3	
AC-N		.07		.06			.06				.07	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: #5 Spread 8s Int.Cal. Date: A-18

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	→	2.5-3.5	→	→	→	Cal	Cal	Cal	Cal	Cal	Cal
Time	1529	1530	1538	1539	1541	1542	1438	1439	1440	1555	1556	1557
DC-1	1.73 1.73	93 .91	5.0 5.0	2.02 2.02	1.02 1.03	57 58	14.1	26.0	36.1	14.0	25.6	35.5
DC-2	1.73 1.73	.99 1.01	5.1 5.1	1.93 1.93	90 89	66 65	14.1	26.0	36.1	14.0	23.6	35.5
Σ	3.47 3.46	1.92 1.92	10.1 10.1	3.95 3.95	1.92 1.92	1.23 1.23	28.2	52.0	72.2	28.0	51.2	71.0
DC-3	1.75 1.75	.92 91	5.0 5.0	2.00 2.00	1.03 1.03	59 60	14.1	26.0	36.1	14.0	25.6	35.5
DC-4	1.92 1.92	1.00 1.01	5.1 5.1	1.95 1.95	90 90	64 63	14.1	26.0	36.1	14.0	25.6	35.3
Σ	3.47 3.47	1.92 1.92	10.1 10.1	3.95 3.95	1.93 1.93	1.23 1.23	28.2	52.0	72.2	28.0	51.2	71.0
DC-AV	3.47	1.92	10.1	3.95	1.93	1.23	28.2	52.0	72.2	28.0	51.2	71.0
AC-1	1.65	.90	4.9	1.89	.91	.60	14.0	25.6	35.7	14.0	25.6	34.7
AC-2	1.65	.90	4.9	1.89	.91	60	14.0	25.6	35.7	14.0	23.0	34.7
Σ	3.30	1.80	9.8	3.78	1.82	1.20	28.0	51.2	71.4	28.0	50.0	69.4
S. P.	+53		+64									
AC-N	.01		.08									

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: ~~85~~ #5 sp 8s Date: 18 APR 61

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		1442	1443	1457	1459	1500	1510	1511	1512	1515	1525	1527
Range		1.5	1.5	1.5	1.5	1.5	→	→	→	→	→	→
Current		1430	1410	1430	1400	1400	1420	1400	1390	1380	1400	1380
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	→	→	→	→	→
Receive							CAL	→	→	→	→	→
Time	1529	1530	1538	1539	1541	1542	1438	1439	1440	1555	1556	1557
Range	1.5	→	→	→	→	→	.3	.5	.75	.3	.5	.75
Current	1375	1370	1400	1390	1370	1360	285	500	710	285	500	700

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page

Project Banner Line 3960E, 105 Field date Apr. 20, 61 Dat page Comp. date Apr. 21, 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		1435	1420	1425	1410	1400	1420	1400	1395	1390	1420	1400
(E) Vdc (avg)		80.0	19.5	75.0	18.5	6.09	80.0	18.4	5.99	2.46	20.3	6.21
(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	15
(H) ρ dc=ExFxGx10^3/D		83.7	82.4	79.0	78.9	65.3	84.5	78.9	64.4	53.1	85.8	66.6
(I) Vac Σ		78.0	18.6	72.0	17.2	5.60	78.0	17.6	5.80	2.40	19.2	5.94
(J) AC noise x 2		.08	.08	.04	.04	.04	.08	.08	.08	.08	.04	.04
(K) Vac (corr) = $\sqrt{I^2 - J^2}$		78.0	18.6	72.0	17.2	5.60	78.0	17.6	5.80	2.40	19.2	5.94
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.025	1.049	1.041	1.076	1.088	1.025	1.047	1.032	1.024	1.058	1.046
(N) PFE=(M-1)(10^2)		3	5	4	8	9	3	5	3	2	6	5
(O) MCF=(M-1)(10^5)/H		30	59	52	96	135	30	60	50	45	68	69

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	1390	1375	1400	1390	1375	1365	285	505	710	213	505	710
(E) Vdc (avg)	2.48	1.17	6.48	2.51	1.19	.66	28.2	52.0	72.0	28.0	51.6	71.4
(F) DCcal					USED 1.000		1.011	.972	1.000	1.011	.979	.995
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	53.6	44.7	69.4	54.2	45.4	40.6						
(I) Vac Σ	2.38	1.14	6.12	2.42	1.14	.62	28.0	51.6	71.4	28.0	51.1	70.6
(J) AC noise x 2	.04	.04	.06	.06	.06	.06						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.38	1.14	6.12	2.42	1.14	.62						
(L) AC-DC cal.							.994	.993	.991	1.000	.991	.990
(M) ρdc/ρac =ExL/K	1.041	1.028	1.058	1.038	1.043	1.064						
(N) PFE=(M-1)(10^2)	4	3	6	4	4	6						
(O) MCF=(M-1)(10^5)/H	77	63	84	70	95	157						

INDUCED POLARIZATION SURVEY - RECEIVER NOTES

PAGE 1

Project: Banno Line: 3960E ~~105~~ 7 Int.Cal. Date: 4-20

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 →		1-1.35	→		1.5-25	→			2-2.55 →	
Time		1325	1326	1335	1336	1337	1346	1347	1348	1350	1357	1359
DC-1		40.0 40.0	9.6 9.6	38.0 38.0	8.6 8.6	3.21 3.21	40.0 40.0	9.7 9.7	3.03 3.06	1.32 1.33	10.0 10.0	3.01 3.06
DC-2		40.0 40.0	9.9 9.9	37.0 37.0	9.9 9.9	2.88 2.88	40.0 40.0	8.7 8.7	2.99 2.94	1.14 1.13	10.4 10.4	3.20 3.21
Σ		80.0 80.0	19.5 19.5	75.0 75.0	18.5 18.5	6.09 6.09	80.0 80.0	18.4 18.4	6.02 6.00	2.46 2.46	20.4 20.4	6.21 6.21
DC-3		40.0 40.0	9.7 9.9	38.0 38.0	8.6 8.6	3.22 3.22	40.0 40.0	9.7 9.7	3.11 3.12	1.32 1.36	9.9 9.9	2.99 2.96
DC-4		40.0 40.0	9.7 9.7	37.0 37.0	9.9 9.9	2.87 2.87	40.0 40.0	8.7 8.7	2.87 2.85	1.15 1.09	10.4 10.3	3.03 3.05
Σ		80.0 80.0	19.4 19.5	75.0 75.0	18.5 18.5	6.09 6.09	80.0 80.0	18.4 18.4	5.98 5.97	2.42 2.45	20.3 20.2	6.02 6.01
DC-AV		80.0	19.5	75.0	18.5	6.09	80.0	18.4	5.99	2.46	20.3	6.21
AC-1		39.0	9.3	36.0	8.6	2.80	39.0	8.8	2.90	1.20	9.6	2.97
AC-2		39.0	9.3	36.0	8.6	2.80	39.0	8.8	2.90	1.20	9.6	2.97
Σ		78.0	18.6	72.0	17.2	5.60	78.0	17.6	5.80	2.40	19.2	5.94
S. P.		+19.7		-5.0			+37				-1.1	
AC-N		.04		.02			.04				.02	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE ____

Project: Banna Line: 3960 Int. Cal. ____ Date: 4-26

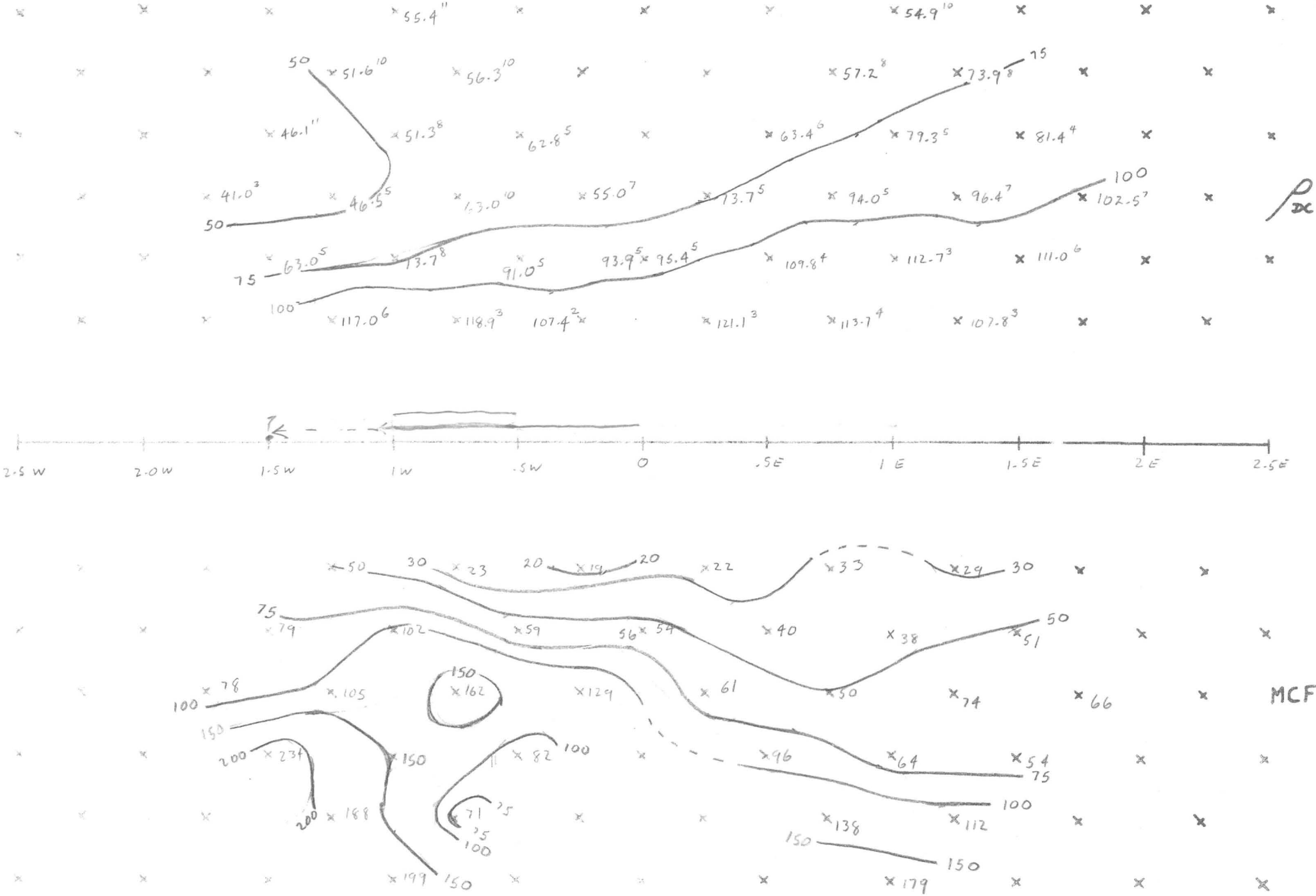
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4	3-4	3-4	3-4	3-4
Rec.	2-2.5S →		2-5-3S →				Cal	Cal	Cal	Cal	Cal	Cal
Time	1400	1402	1411	1413	1414	1415	1320	1321	1322	1435	1436	1437
DC-1	1.10 1.08	62 52	3.12 3.10	1.25 1.25	.50 .50	37 33	14.1	26.0	36.0	14.0	25.8	35.7
DC-2	1.37 1.40	54 59	3.37 3.39	1.27 1.26	.69 .68	30 32	14.1	26.0	36.0	14.0	25.8	35.7
Σ	2.47 2.48	6	6.49 6.49	2.52 2.51	1.19 1.18	.67 .65						
DC-3	1.07 1.06	63 63	3.08 3.05	1.28 1.30	.51 .49	33 30	14.1	26.0	36.0	14.0	25.8	35.7
DC-4	1.41 1.42	58 58	3.40 3.41	1.23 1.21	.67 .70	33 36	14.1	26.6	36.0	14.0	25.8	35.7
Σ	2.48 2.48	121 121	6.48 6.46	2.51 2.51	1.18 1.19	.66 .66						
DC-AV.	2.48	1.17	6.48	2.51	1.19	.66	28.2	52.0	72.0	28.0	51.6	71.4
AC-1	1.19	57	3.06	1.21	.57	.31	14.0	25.8	35.7	14.0	25.5	35.3
AC-2	1.19	57	3.06	1.21	.57	.31	14.0	25.8	35.7	14.0	25.5	35.3
Σ	2.38	1.14	6.12	2.42	1.14	.62	28.0	51.6	71.4	28.0	51.1	70.6
S.P.	-1.1		+3.6									
AC-N	.02		.03									

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: 10 S 1 Date: 20 APR 61

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		1325	1326	1335	1336	1337	1346	1347	1348	1350	1357	1359
Range		1.5	—	—	—	—	—	—	—	—	—	—
Current		1435	1420	1425	1410	1400	1420	1400	1395	1390	1420	1400
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	—	—	—	—	—
Receive							CAL	—	—	—	—	—
Time	1400	1402	1411	1413	1414	1415	1320	1321	1322	1435	1436	1437
Range	—	—	—	—	—	—	.3	.5	.75	.3	.5	.75
Current	1390	1375	1400	1390	1375	1365	285	505	720	283	505	710

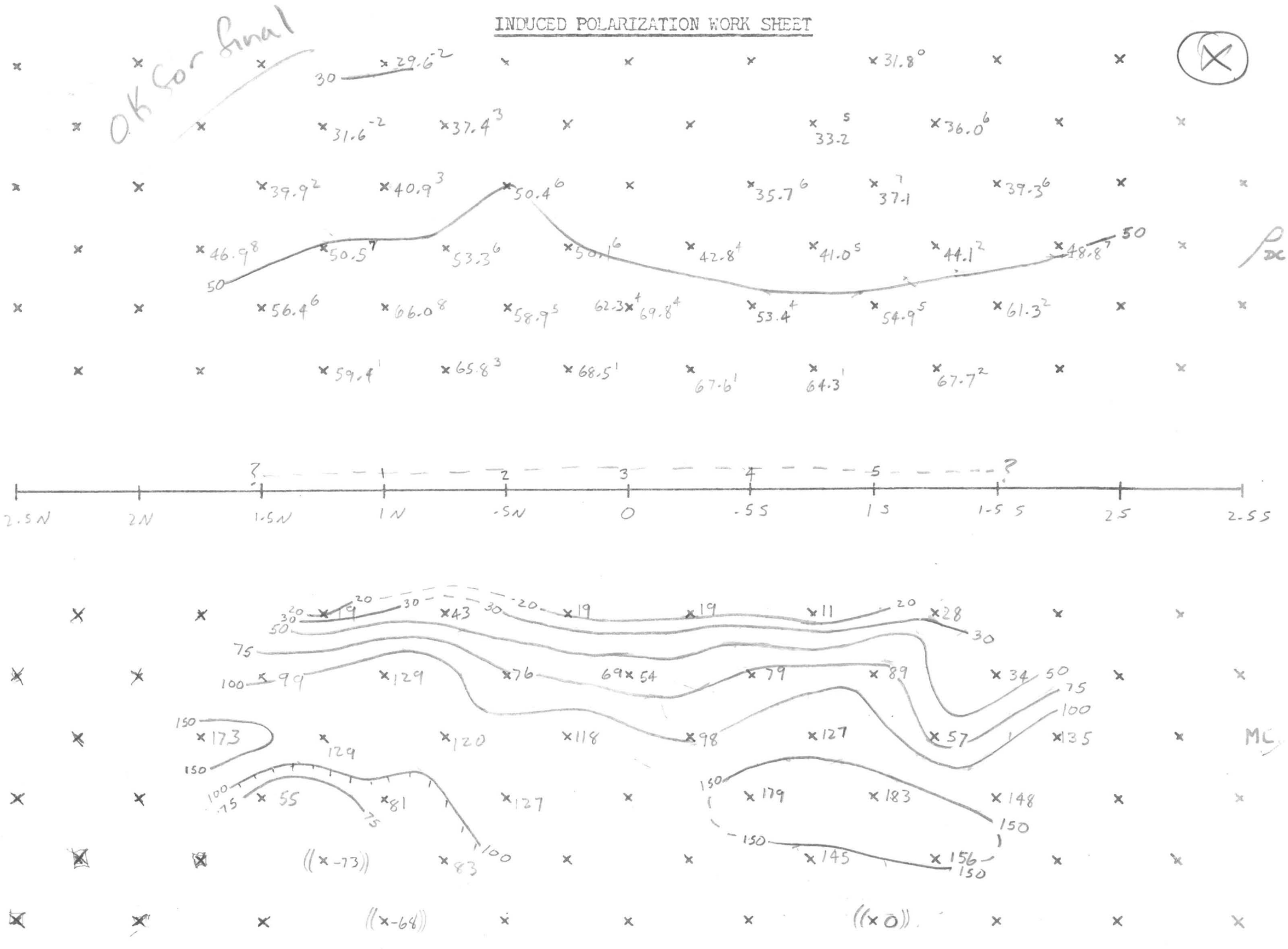
INDUCED POLARIZATION WORK SHEET



Area BANNER Line #9 Scale Date 27 APR 61

REEVES CONTOURS

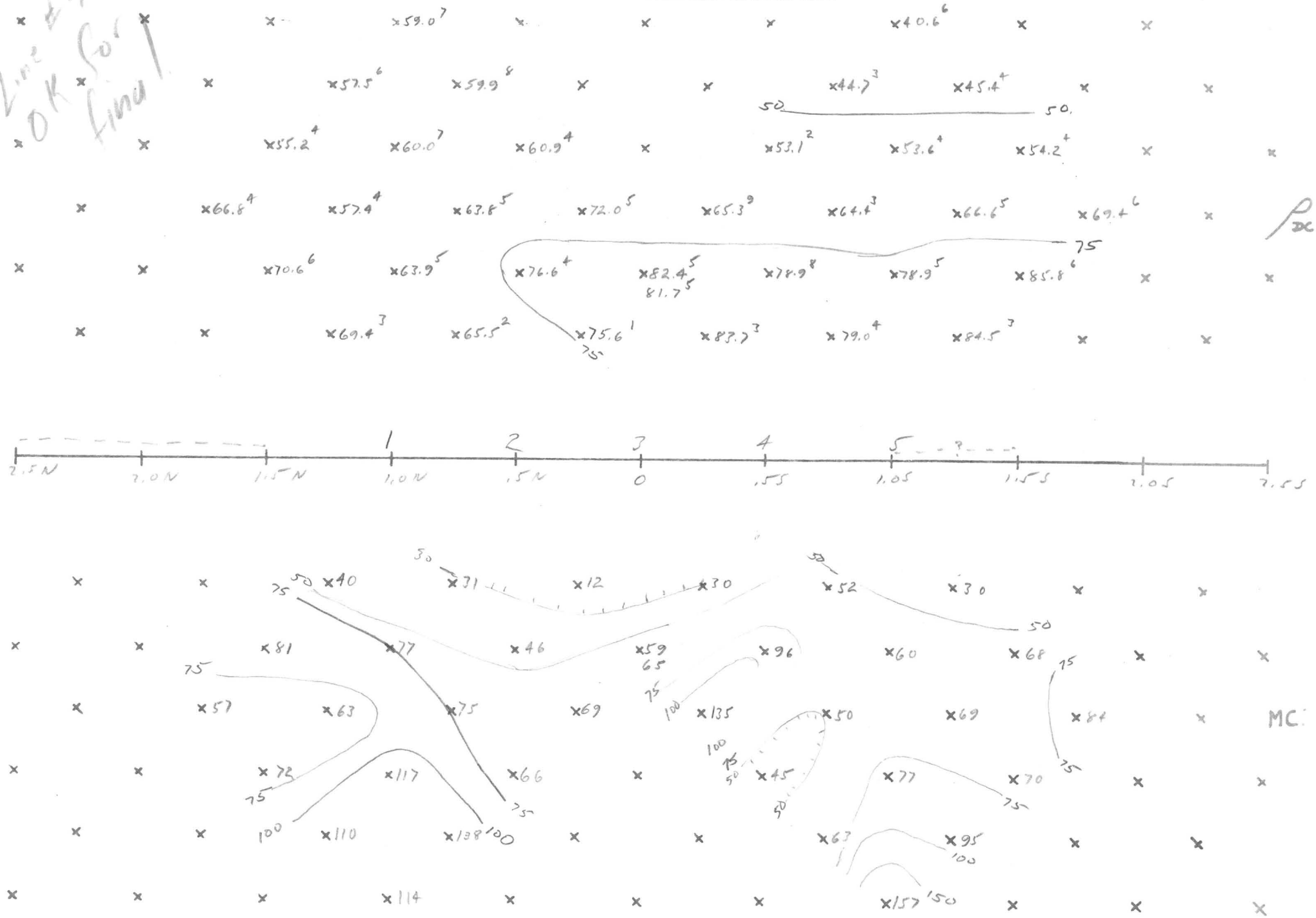
INDUCED POLARIZATION WORK SHEET



Area Line #8 Scale Date

INDUCED POLARIZATION WORK SHEET

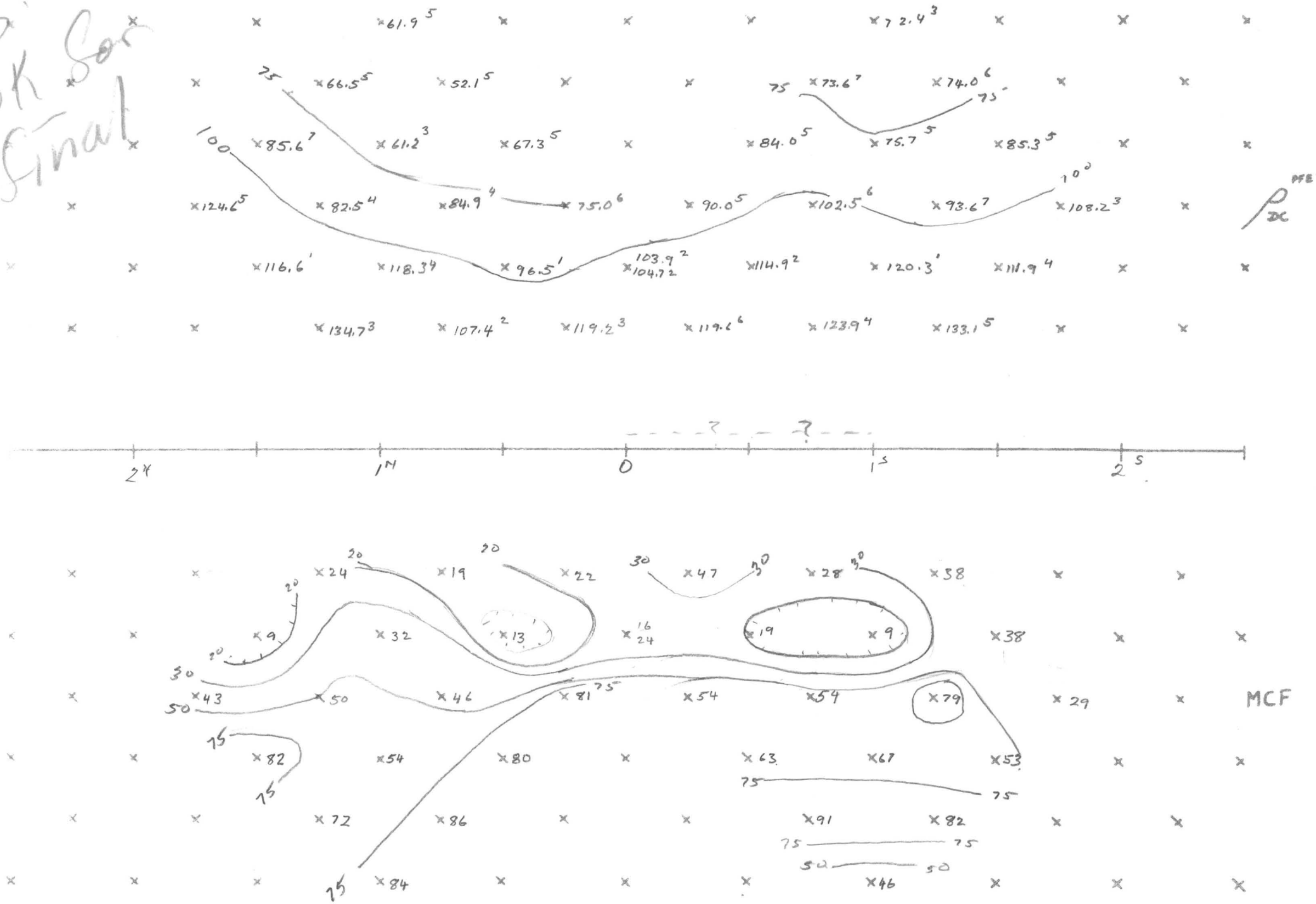
Line #7 OK for final



Area Banner Line #7 ~~to~~ 3960E N & S Scale 1" = 500 Date Apr. 61

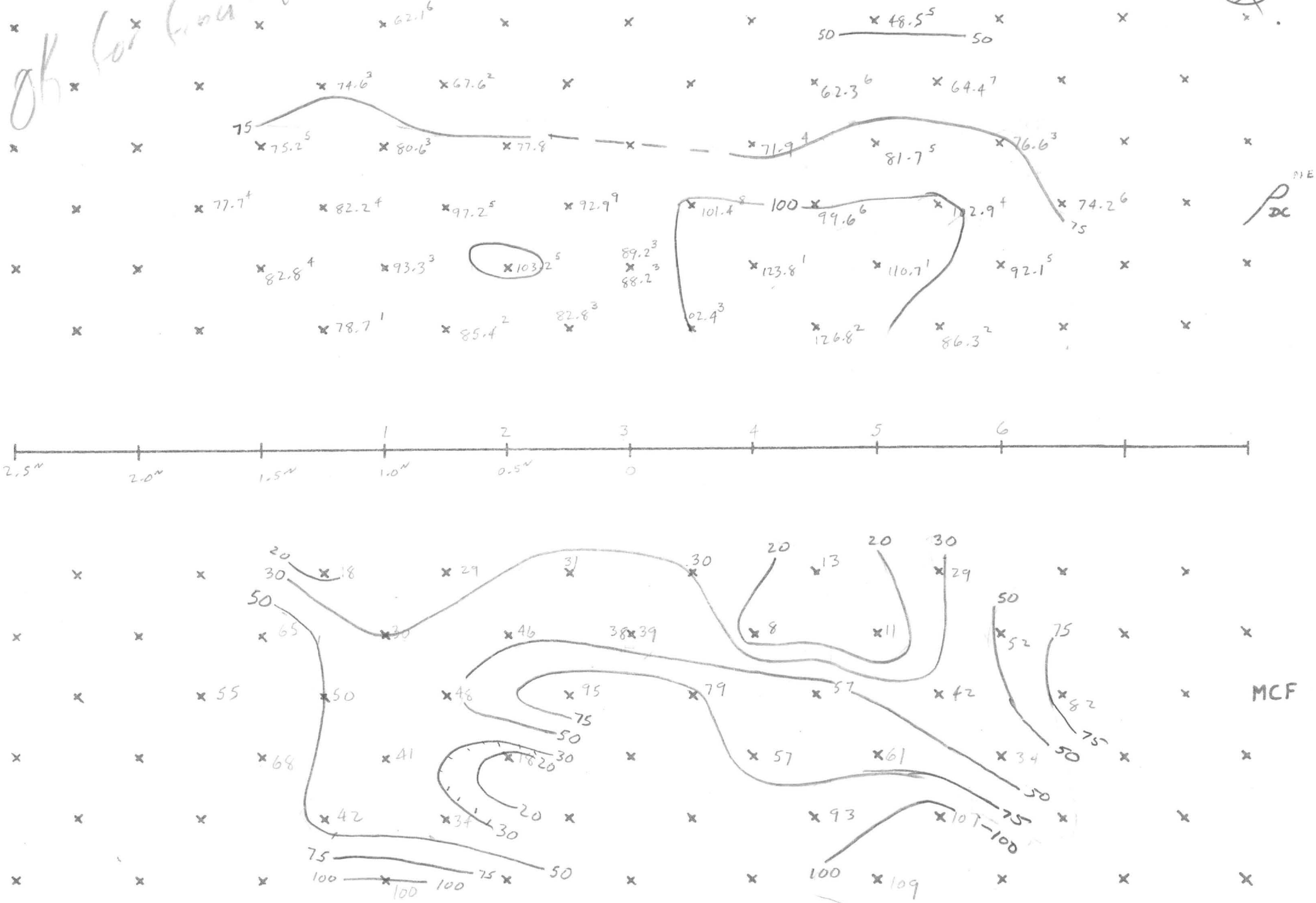
INDUCED POLARIZATION WORK SHEET

#5 OK for final



Area Line #5 (200W) Scale Date

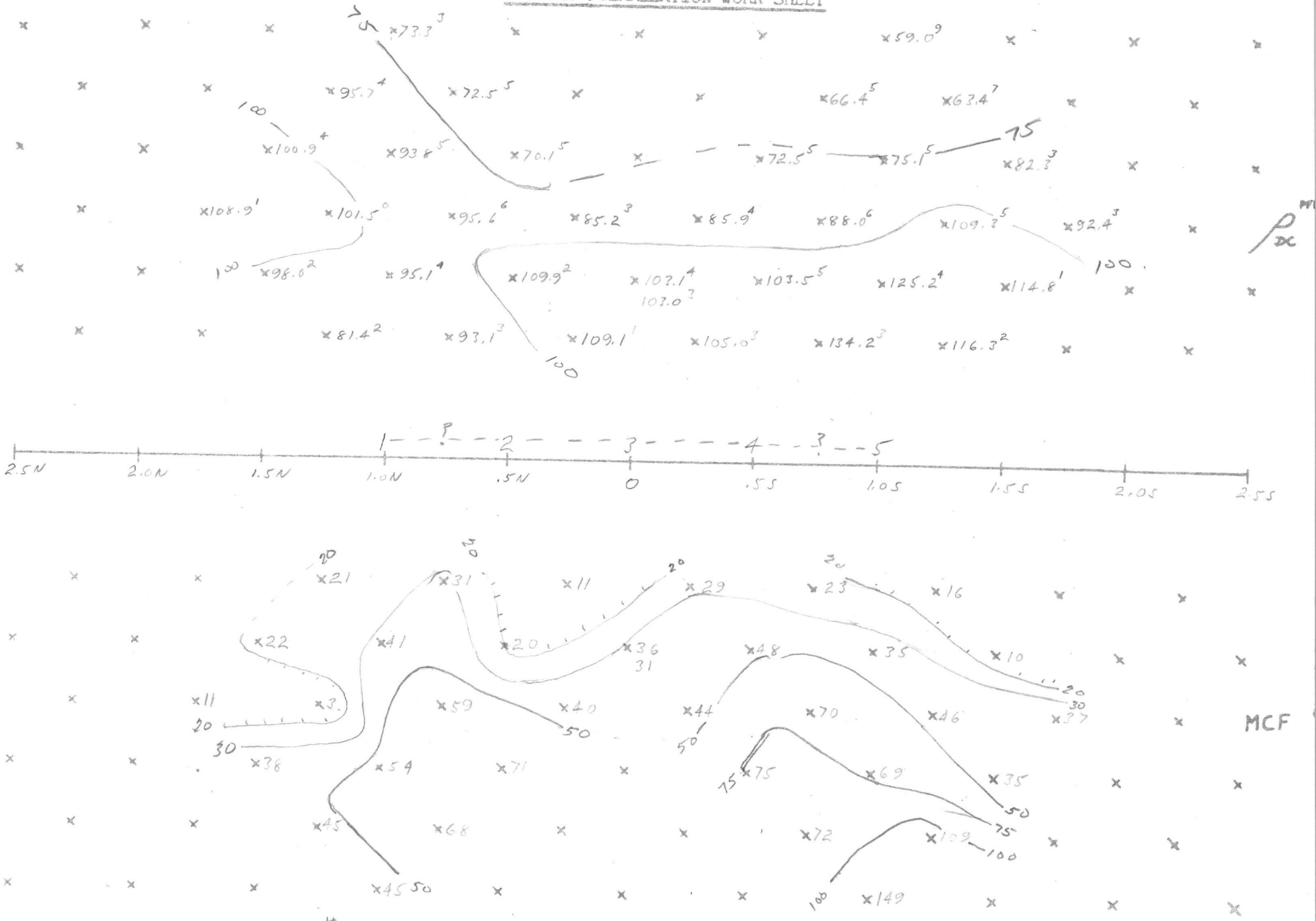
INDUCED POLARIZATION WORK SHEET



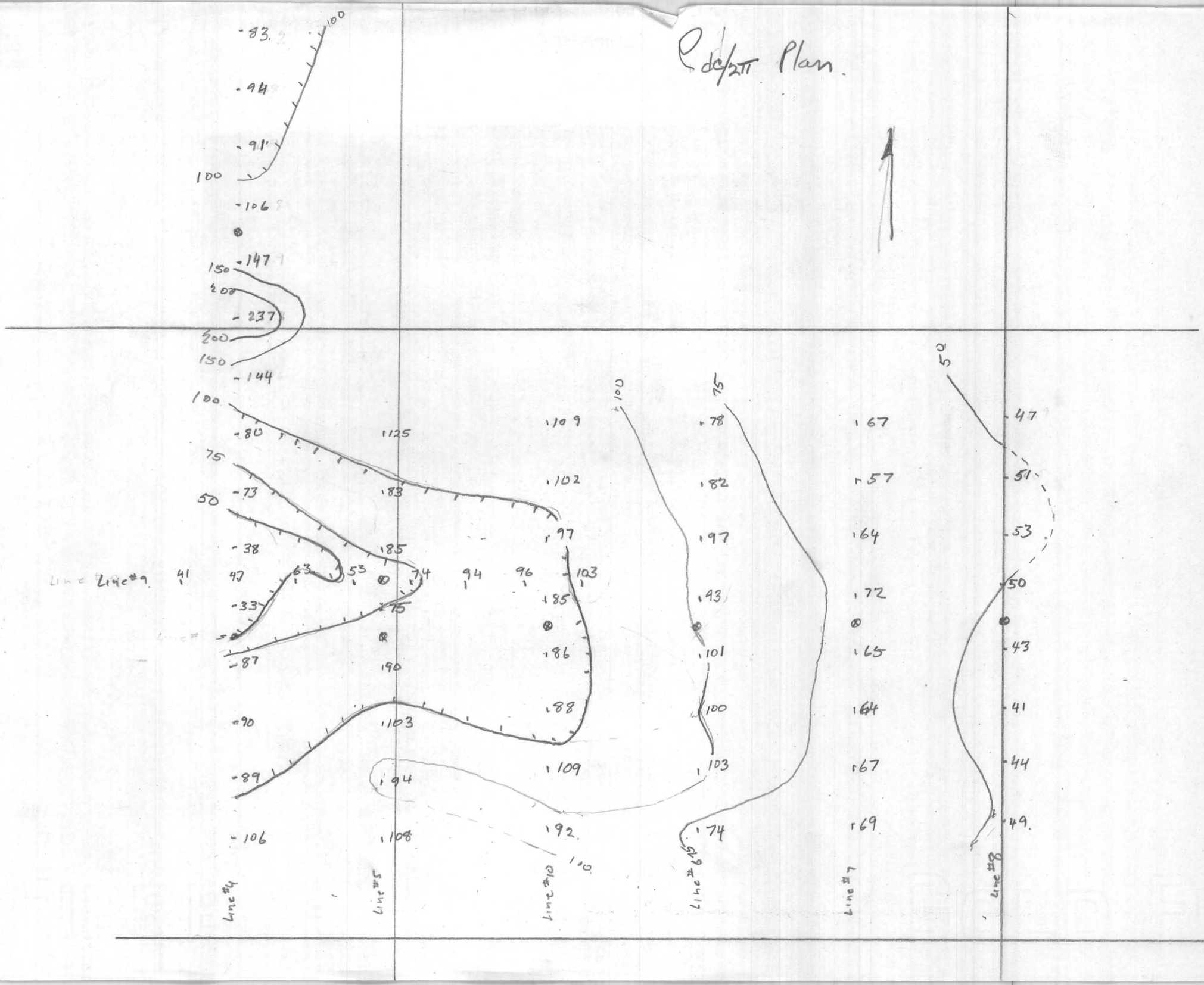
Area Line # 6 ~~SPREAD 9 N/S~~ ~~(2640E)~~ Scale _____ Date _____

REEVES CONTOURS

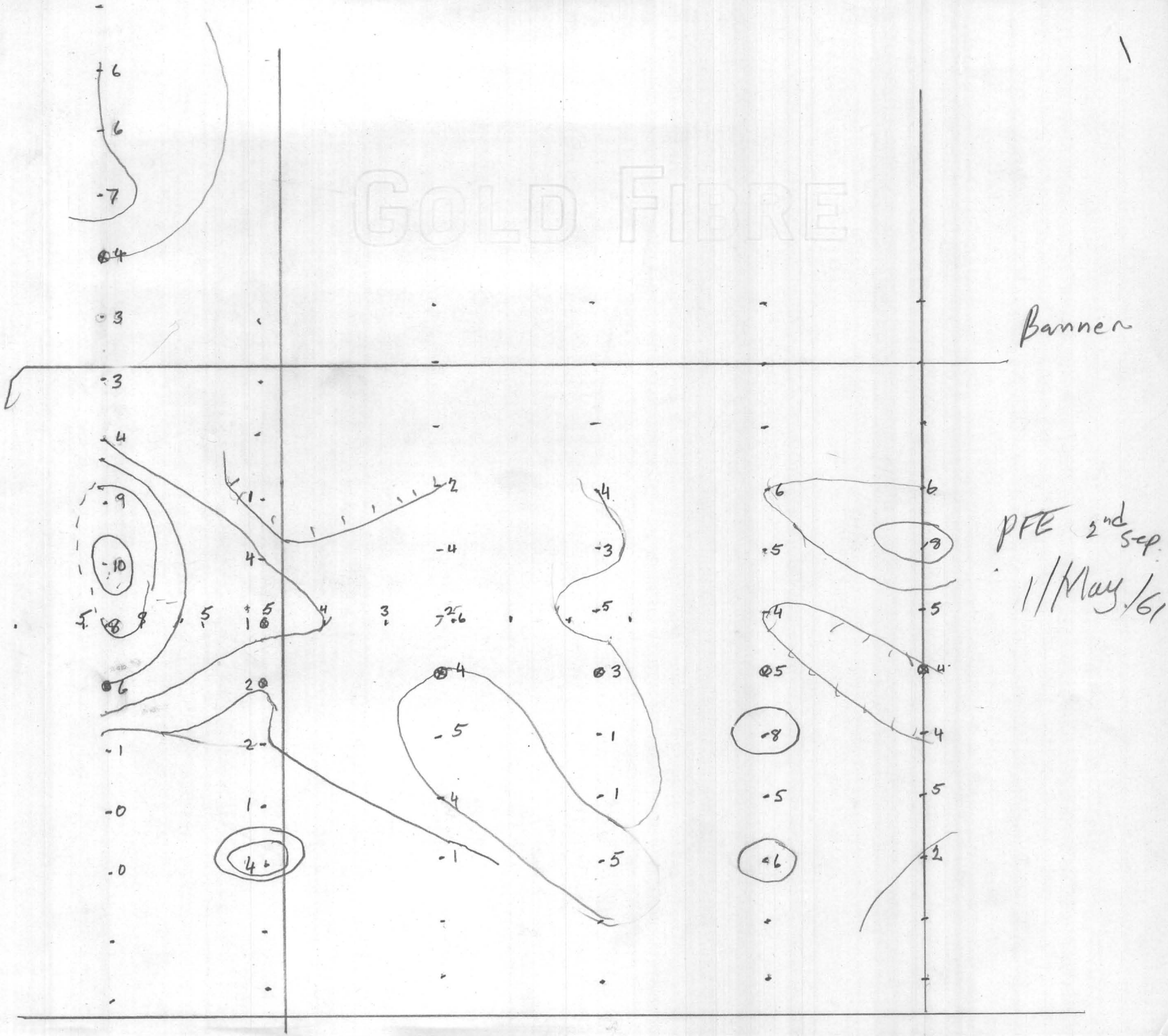
INDUCED POLARIZATION WORK SHEET



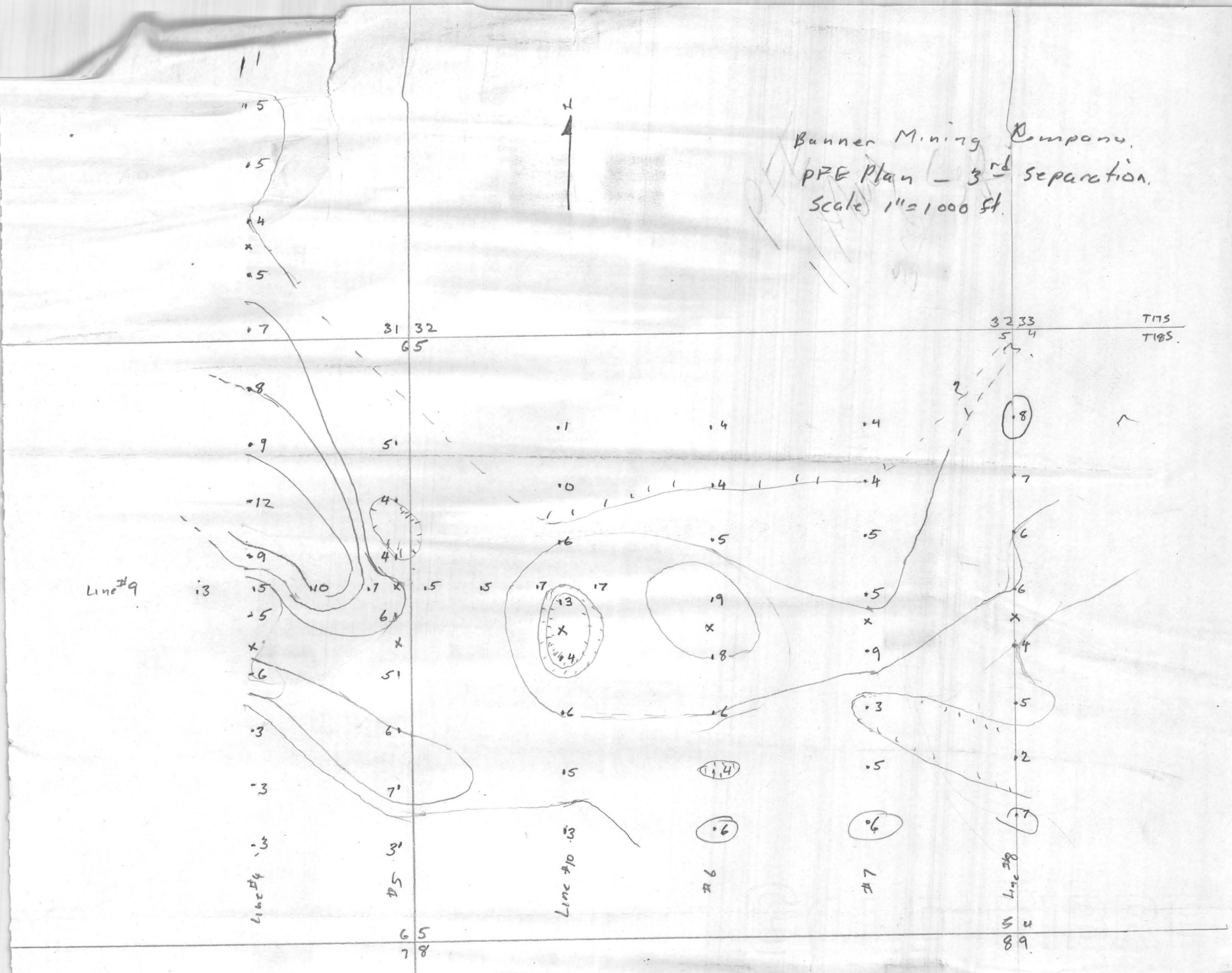
Area Banner Lines ~~13 N & S 1320 E~~ #10 Scale 1" = 500' Date Apr. 28, 61



ρ dc/2π Plan.
Line #4
Line #5
Line #10
Line #6
Line #7
Line #8
Line #9


Banner
PFE 2nd Sep.
1/May/61

Banner Mining Company.
PPE Plan – 3rd Separation.
Scale 1" = 1000 ft.



HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Banner Line 1320 E - 13 N Field date Apr 27, 61 Data page _____ Comp. date Apr 28, 61 Comp by C. S. L.

(A) Send	3-4	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	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		1475	1460	1460	1450	1440	1450	1430	1425	1420	1440	1425
(E) Vdc (avg)		109.0	25.5	92.0	27.0	8.30	29.8	23.0	9.23	3.37	23.9	9.80
(F) DCcal USED	.985											
(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		109.1	103.1	93.1	109.9	85.2	81.4	95.1	95.6	70.1	98.0	101.5
(I) Vac Σ		106.0	24.2	88.0	26.0	7.90	27.2	21.8	8.60	3.16	23.0	9.60
(J) AC noise x 2		.10	.10	.06	.06	.06	.02	.02	.02	.02	.06	.06
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		106.0	24.2	88.0	26.0	7.90	27.2	21.8	8.60	3.16	23.0	9.60
(L) AC-DC cal. USED	.985											
(M) ρ dc/ρac=ExL/K		1.012	1.037	1.029	1.022	1.034	1.017	1.039	1.056	1.050	1.022	1.003
(N) PFE=(M-1)(10^2)		1	4	3	2	3	2	4	6	5	2	0
(O) MCF=(M-1)(10^5)/H		11	36	31	20	40	21	41	59	71	22	3

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	6						
(D) I	1415	1400	1450	1425	1400	1400		ON				
(E) Vdc (avg)	4.49	1.96	10.7	4.87	2.59	1.24						
(F) DCcal					USED	.985		13-5				
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	93.8	72.5	108.9	100.9	95.7	77.3						
(I) Vac Σ	4.20	1.84	10.4	4.62	2.44	1.18						
(J) AC noise x 2	.06	.06	.03	[illegible]	[illegible]	[illegible]						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	4.20	1.84	10.4	4.62	2.44	1.18						
(L) AC-DC cal.					USED	.985						
(M) ρdc/ρac =ExL/K	1.051	1.049	1.012	1.038	1.043	1.033						
(N) PFE=(M-1)(10^2)	5	5	1	4	4	3						
(O) MCF=(M-1)(10^5)/H	54	68	11	38	45	45						

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Banner 1062 Line 1326 E 13N Int.Cal. Date: 4-27

end		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
ec.		5-1N	→	1-15N	→	→	1.5-2N	→	→	→	2-2.5N	→
ime		1255	1256	1304	1305	1306	1313	1314	1315	1316	1323	1324
DC-1		55 55	12.8 12.8	46 46	13.8 13.8	4.30 4.30	40.1 40.1	12.1 12.1	4.5 4.4	1.59 1.57	12.0 12.0	5.0 5.0
DC-2		54 54	12.7 12.7	46 46	13.2 13.2	4.00 4.00	39.7 39.7	10.9 10.9	4.8 4.8	1.80 1.80	11.9 11.9	4.8 4.8
Σ		109.0 109	25.5 25.5	92 92	27.0 27.0	8.30 8.30	79.8 79.8	23.0 23.0	9.3 9.2	3.39 3.37	23.9 23.9	9.8 9.8
DC- 3		55 55	12.8 12.8	46 46	13.8 13.8	4.30 4.30	40.1 40.1	12.1 12.1	4.4 4.4	1.58 1.58	12.0 12.0	5.0 5.0
DC-4		54 54	12.7 12.7	46 46	13.2 13.2	4.00 4.00	39.7 39.7	10.9 10.9	4.8 4.8	1.79 1.79	11.9 11.9	4.8 4.8
Σ		109 109	25.5 25.5	92 92	27.0 27.0	8.30 8.30	79.8 79.8	23.0 23.0	9.2 9.2	3.37 3.37	23.9 23.9	9.8 9.8
C-Av		109.0	25.5	92.0	27.0	8.30	79.8	23.0	9.23	3.37	23.9	9.80
C-1		53	12.1	44	13.0	3.95	38.6	10.9	4.3	1.58	11.5	4.8
C- 2		53	12.1	44	13.0	3.95	38.6	10.9	4.3	1.58	11.5	4.8
Σ		106.0	24.2	88.0	26.0	7.90	77.2	21.8	8.60	3.16	23.0	9.60
S.P.		-4.1		-2.3			-2.9				-4.9	
AC-N		.05		.03			.01				.03	

INDUCED POLARIZATION SURVEY — RECEIVER NOTES

Project: Banna Line: 1320E 13N Int. Cal. Date 4-27

Send	3-4	4-5	1-2	2-3	3-4	4-5
Rec	2.25N	→	2.5 3N	→	→	→
Time	1325	1326	1337	1339	1340	1341
DC-1	2.40 2.40	1.00 1.00	5.1 5.1	2.46 2.48	1.29 1.30	64 64
DC-2	2.08 2.09	.96 .97	5.6 5.6	2.40 2.39	1.29 1.30	60 60
Σ	4.48 4.49	1.96 1.97	10.7 10.7	4.86 4.87	2.58 2.60	1.24 1.24
DC-3	2.30 2.30	.99 1.01	5.1 5.0	2.51 2.52	1.30 1.31	67 69
DC-4	2.19 2.19	.96 .93	5.6 5.7	2.37 2.36	1.29 1.29	57 55
Σ	4.49 4.49	1.95 1.94	[illegible]	4.88 4.88	2.59 2.60	1.24 1.24
DC-AV.	4.49	1.96	10.7	4.87	2.59	1.24
AC-1	2.10	.92	5.2	2.31	1.22	.59
AC-2	2.10	.92	5.2	2.31	1.22	.59
Σ	4.20	1.84	10.4	4.62	2.44	1.18
S.P.	-4.9		-11.1			
AC-N	.03		.03			

INDUCED POLARIZATION SENDER NOTES

Project: PANDORA Line: 1320E #130 Date: 27 APR 81

Send	3-4	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	CAC											
Time		1255	1256	1304	1305	1306	1313	1314	1315	1316	1323	1324
Range		1.5	—	—	—	—	—	—	—	—	—	—
Current		1475	1460	1460	1450	1440	1450	1430	1425	1420	1440	1425
Send	3-4	4-5	1-2	1-3	3-5	1-2	3-4	—	—	—	—	—
Receive							CAC	—	—	—	—	—
Time	1325	1326	1337	1339	1340	1341	1400	1401	1402			
Range	—	—	—	—	—	—	.3	.5	.75			
Current	1415	1400	1450	1425	1400	1400	285	500	690			

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project *Banner* Line *1320 E - 13 S* Field date *Apr. 27, 61* Data page _____ Comp. date *Apr. 28, 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	5-105	→	10-155	→	→	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	1490	1475	1460	1450	1470	1450	1450	1440	1460	1440
(E) Vdc (avg)		105.0	25.6	132.0	25.2	8.30	114.0	30.3	8.50	3.48	27.9	10.5
(F) DCcal USED	1.000											
(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) ρdc=ExFxGx10^3/D		105.0	103.0	134.2	103.5	85.9	116.3	125.2	88.0	72.5	114.8	109.3
(I) Vac Σ		102.0	24.8	128.0	24.0	8.00	112.0	29.0	8.00	3.30	27.6	10.0
(J) AC noise x 2		.08	.08	.02	.02	.02	.10	.10	.10	.10	.06	.06
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		102.0	24.8	128.0	24.0	8.00	112.0	29.0	8.00	3.30	27.6	10.0
(L) AC-DC cal. USED	1.000											
(M) ρdc/ρac=ExL/K		1.030	1.032	1.031	1.050	1.038	1.019	1.044	1.062	1.054	1.011	1.050
(N) PFE=(M-1)(10^2)		3	3	3	5	4	2	4	6	5	1	5
(O) MCF=(M-1)(10^5)/H		29	31	23	48	44	16	35	70	75	10	46

Project	Line		Field date		Data page		Comp. date			Comp by		
(A) Send	2-3		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	1430	1425	1445	1425	1415	1410	285	510	705	285	500	690
(E) Vdc (avg)	3.58	1.80	8.90	3.91	1.71	.99	28.0	51.2	71.0	28.0	51.0	70.6
(F) DCcal					USED	1.000	1.018	.997	.994	1.018	.981	.977
(G) Kn x 10^{-3} (a = 500')	30	52.5	15	30	52.5	84						
(H) ρdc=ExFxGx10^3/D	75.1	66.4	92.4	82.3	63.4	59.0						
(I) Vac Σ	3.40	1.72	8.60	3.80	1.60	.92	28.0	50.6	70.0	28.0	49.6	69.2
(J) AC noise x 2	.06	.06	.10	.10	.10	.10						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	3.40	1.72	8.60	3.80	1.60	.91						
(L) AC-DC cal.					USED	1.000	1.000	.989	.986	1.000	.975	.980
(M) ρdc/ρac =ExL/K	1.052	1.048	1.034	1.029	1.069	1.088						
(N) PFE=(M-1)(10^2)	5	5	3	3	7	9						
(O) MCF=(M-1)(10^5)/H	69	72	37	35	109	149						

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Banner . Line 1820E 135 Int.Cal. Date: 4-27

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	→
Time	1022	1024	1033	1034	1035	1044	1045	1046	1049	1100	1101
DC-1	52 52	13.1 13.1	66 66	12.0 12.1	4.0 4.0	57 57	14.9 15.0	4.5 4.5	1.68 1.68	14.0 14.0	4.8 4.8
DC-2	53 53	12.5 12.5	66 66	13.2 13.1	4.3 4.3	57 57	15.4 15.3	4.0 4.0	1.80 1.80	13.9 13.9	5.7 5.7
Σ	105 105	25.6 25.6	132 132	25.2 25.2	8.3 8.3	114 114	30.3 30.3	8.5 8.5	3.48 3.48	27.9 27.9	10.5 10.5
DC- 3	52 52	13.1 13.1	66 66	12.0 12.0	4.3 4.3	57 57	14.8 14.8	4.5 4.5	1.68 1.68	14.0 14.0	4.8 4.8
DC-4	53 53	12.5 12.5	66 66	13.2 13.2	4.0 4.0	57 57	15.4 15.4	4.0 4.0	1.80 1.80	13.9 13.9	5.7 5.7
Σ	105 105	25.6 25.6	132 132	[illegible] [illegible]	8.3 8.3	114 114	30.3 30.3	8.5 8.5	3.48 3.48	27.9 27.9	10.5 10.5
DC-Av	105.0	25.6	132.0	25.2	8.30	114.0	30.3	8.50	3.48	27.9	10.5
AC-1	51	12.4	64	12.0	4.0	56	14.5	4.0	1.65	13.8	5.0
AC- 2	51	12.4	64	12.0	4.0	56	14.5	4.0	1.65	13.8	5.0
Σ	102.0	24.8	128.0	24.0	8.00	112.0	29.0	8.00	3.30	27.6	10.0
S.P.	+0.9		+18.0			-5.1				+3.7	
AC-N	.04		.01			.05				.03	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Banna Line: 1320E 135 Int.Cal. _____ Date: 4-27

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	→	2.5-3	5	→		Cal	Cal	Cal	Cal	Cal	Cal
Time	1102	1104	1113	1114	1115	1116	1017	1018	1019	1400	1401	1402
DC-1	1.70 1.71	96 98	4.3 4.3	2.00 2.01	77 76	49 48	14.0	25.6	35.5	14.0	25.5	35.3
DC-2	1.88 1.87	83 81	4.6 4.6	1.91 1.90	94 95	50 51	14.0	25.6	35.5	14.0	25.5	35.3
Σ	3.58 3.58	1.79 1.79	8.9 8.9	3.91 3.91	1.71 1.71	.99 .99	28.0	51.2	71.0			
DC-3	1.70 1.70	1.00 99	4.3 4.2	2.03 2.01	76 74	47 48	14.0	25.6	35.5	14.0	25.5	35.3
DC-4	1.88 1.88	80 81	4.6 4.7	1.88 1.90	95 97	51 51	14.0	25.6	35.5	14.0	25.5	35.3
Σ	3.58 3.58	1.80 1.80	8.9 8.8	3.91 3.91	1.71 1.71	.97 .99						
DC-AV	3.58	1.80	8.90	3.91	1.71	.99	28.0	51.2	71.0	28.0	51.0	70.6
AC-1	1.70	86	4.3	1.90	.80	.46	14.0	25.3	35.0	14.0	24.8	34.6
AC-2	1.70	86	4.3	1.90	.80	.46	14.0	25.3	35.0	14.0	24.8	34.6
Σ	3.40	1.72	8.60	3.80	1.60	.92	28.0	50.6	70.0	28.0	49.6	69.2
S. P.	+3.7		+7.3									
AC-N	.03		.05									

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: 1320E #135 Date: 27 APR 61

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		1022	1024	1033	1034	1035	1044	1045	1046	1049	1100	1101
Range		1.5	1.5	1.5	1.5	1.5	1.5	—	—	—	—	—
Current		1500	1490	1475	1460	1450	1470	1450	1450	1440	1460	1440
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	—	—	—	—	—
Receive							CAL	—	—	—	—	—
Time	1102	1104	1113	1114	1115	1116	1017	1018	1019			
Range	—	—	—	—	—	—	.3	.5	.75	.3	.5	.75
Current	1430	1425	1445	1425	1415	1410	285	510	705			

SUPPLEMENT #1 TO A REPORT ON

INDUCED POLARIZATION RECONNAISSANCE INVESTIGATIONS

Twin Buttes Subdistrict
Pima County, Arizona

for

Banner Mining Company

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

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Plan Maps: Rdc, Pfe, MCF, - 3rd Separation

Sectional Data Sheets----Line #4 - Line #9

Anomaly Plan Map----------In Pocket

INTRODUCTION

Following completion of the I. P. reconnaissance investigations in March 1961 and subsequent interpretation of data, additional work was requested by Banner Mining Company to examine in greater detail, anomalism observed in Sections 5 and 6.

The work consisted of six north-south lines approximately ¼ mile apart and one east-west line through the zone of strongest anomalism. A 500 foot dipole spacing was used and a total of 45,500 ft. of profile traverse was observed.

Work was performed by the same crew involved in the first survey.

CONCLUSIONS & RECOMMENDATIONS

1. The only observed anomalism definitely interpretable as being due to sulfide mineralization is in the NE¼ Section 6.

2. Several other weakly anomalous zones have been observed which may or may not deserve further examination either geophysically or by drilling.

3. It should be possible to further delineate in detail the strongly anomalous zone in the northeast corner of Section 6 if such were desirable.

4. Extending lines 4, 5, 10, 6, 7 and 8 to the south might be worthy of consideration or alternatively a long east-west line across the bottom of the section might add further definition

to possibly indicated trends at the southern ends of the lines.

5. Additional magnetic coverage in Sections 4, 5, 7, 8 and 9 should give added valuable structural information and provide further aid in interpretation of the present I. P. results and all other data obtained from the area.

6. As discussed at your Mineral Hill office on May 3, 1961, in order to derive maximum benefit from the geophysical results, as well as from other information already on hand, it will be extremely valuable and very important to carefully correlate all available data. Very often the proper integration of information from all available sources will provide the most reliable over all interpretation. Consideration of additional geophysics, or any drilling based on present results, should await pending further ideas and conclusions which will be obtained by this process.

PROCEDURE

The six north-south lines were approximately centered on an east west line through the middle of Sections 5 and 6 except that an additional spread was added on the north end of Line #4. Station zero on Line #4 was located at the NE corner of the Little Douglas Claim. Line #5 was located about 150 feet west of the section line fence in order to avoid possible artificial effects from the fence. Line #9, run east west, was centered at Station 0.5N on Line #5.

Telluric noise remained at a low level throughout the period during which the survey was run and no disturbing effects due to artificial fields were observed.

The 500 foot dipole spacing was selected as the best suited to cover the area of interest offering sufficient resolution of data for detail examination.

In addition to the standard "sectional" presentation of data and the anomaly plan map, plans of the frequency effects, metal factors, and resistivities on the third separation have been prepared and are included with this report.

INTERPRETATION

The only strong anomalism observed in the detail survey that can definitely be attributed to sulfide mineralization was on Line #4 and #9 in the immediate vicinity of that previously observed and reported on Line #2 of the reconnaissance survey. Lines #5, #10, #6 and #7 showed the least evidence of anomalism that might be indicative of sulfide involvement. Line #10 was run in the immediate vicinity of reconnaissance Line #3 and the anomalism previously reported on that line in the second and third separation levels, was supported only questionably in the 4th, 5th and 6th separations.

There is a slight suggestion of anomalism near the northern end of Line #4 which may substantiate that originally reported in the western half of Line #1. Line #7 shows questionable

anomalism between 1.5N and 2.5N possibly validating that reported between 9.75E and 10.50E on Line #2. A second questionable zone is located between 1S and 1.5S.

At first observation, Line #8 along the east line of Section 5 shows weak anomalism throughout the length from second separation down. However, inspection of the rather anomalous metal factors in light of the relatively lower resistivity and particularly of the only slightly higher than normal frequency effects (perhaps twice background) may negate the significance of this observation. On the other hand, there is some support for this anomalism from that observed between 3.0W and 3.75W on Line #1. If this anomalism can be considered valid and due to sulfide mineralization it is strongest from the center of the line towards the south.

The plan MCF, Rac and PFE maps delineate effectively the zone of most intense anomalism in the northeast ¼ Section 6. In addition, the MCF and PFE plans show a weakly anomalous easterly to northeasterly intermittent trend across Section 5. The definite significance of this marginal effect may be determined by existing geological or drill information or by other work.

Respectfully submitted,

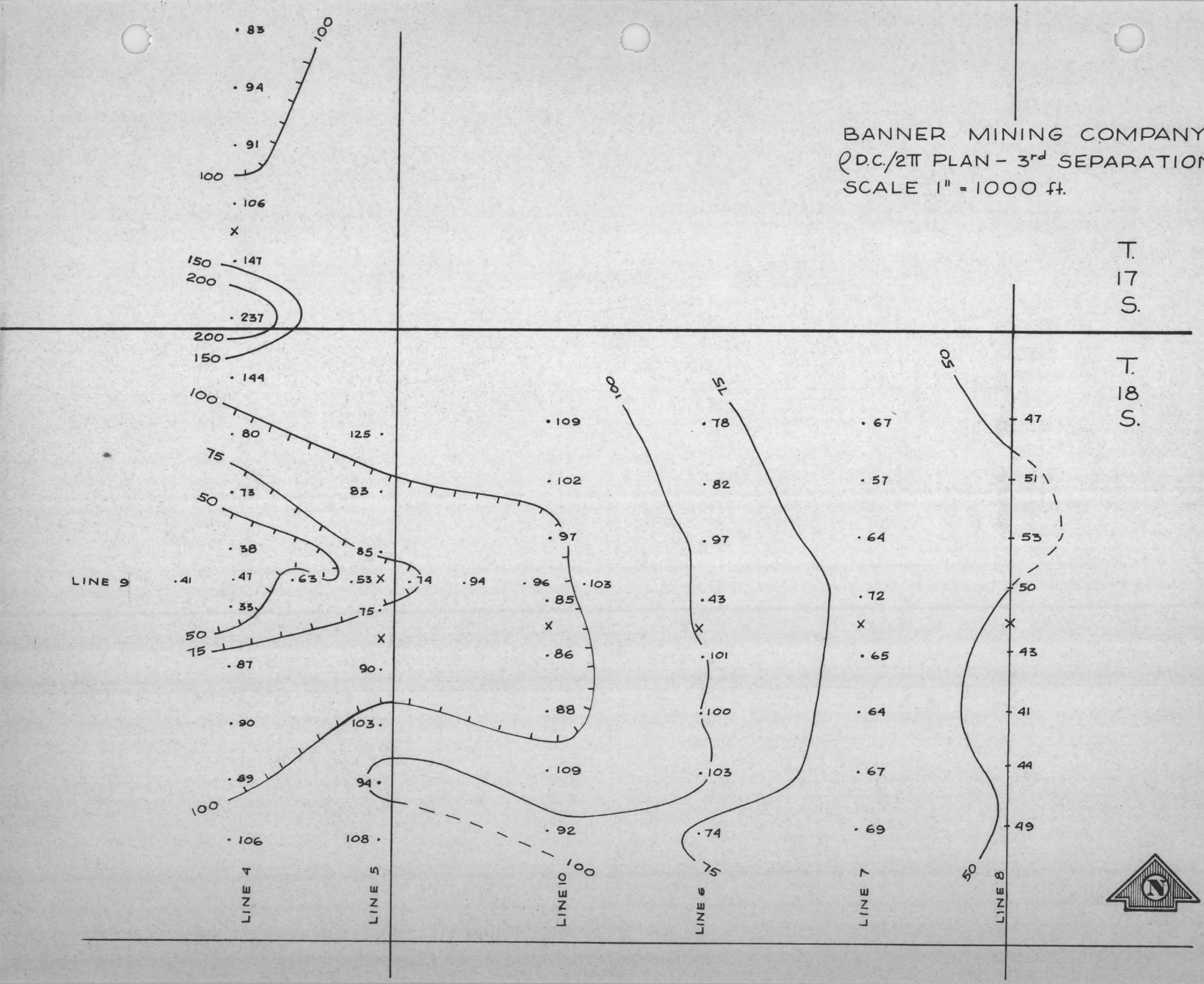
HEINRICHS GEOEXPLORATION COMPANY

Franklin A. Seward, Jr.

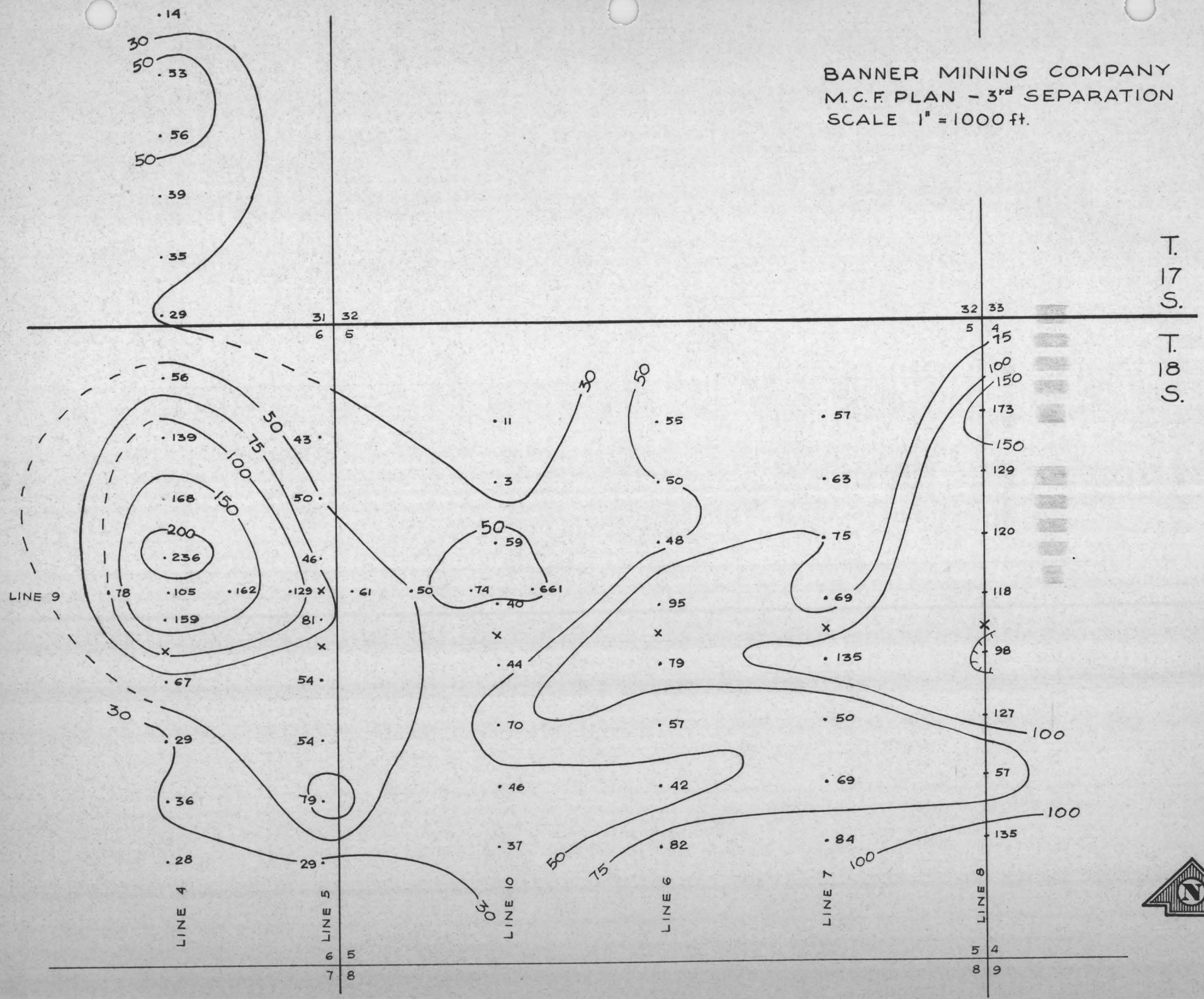
8 May 1961
Tucson, Arizona

Franklin A. Seward, Jr.
Geophysicist

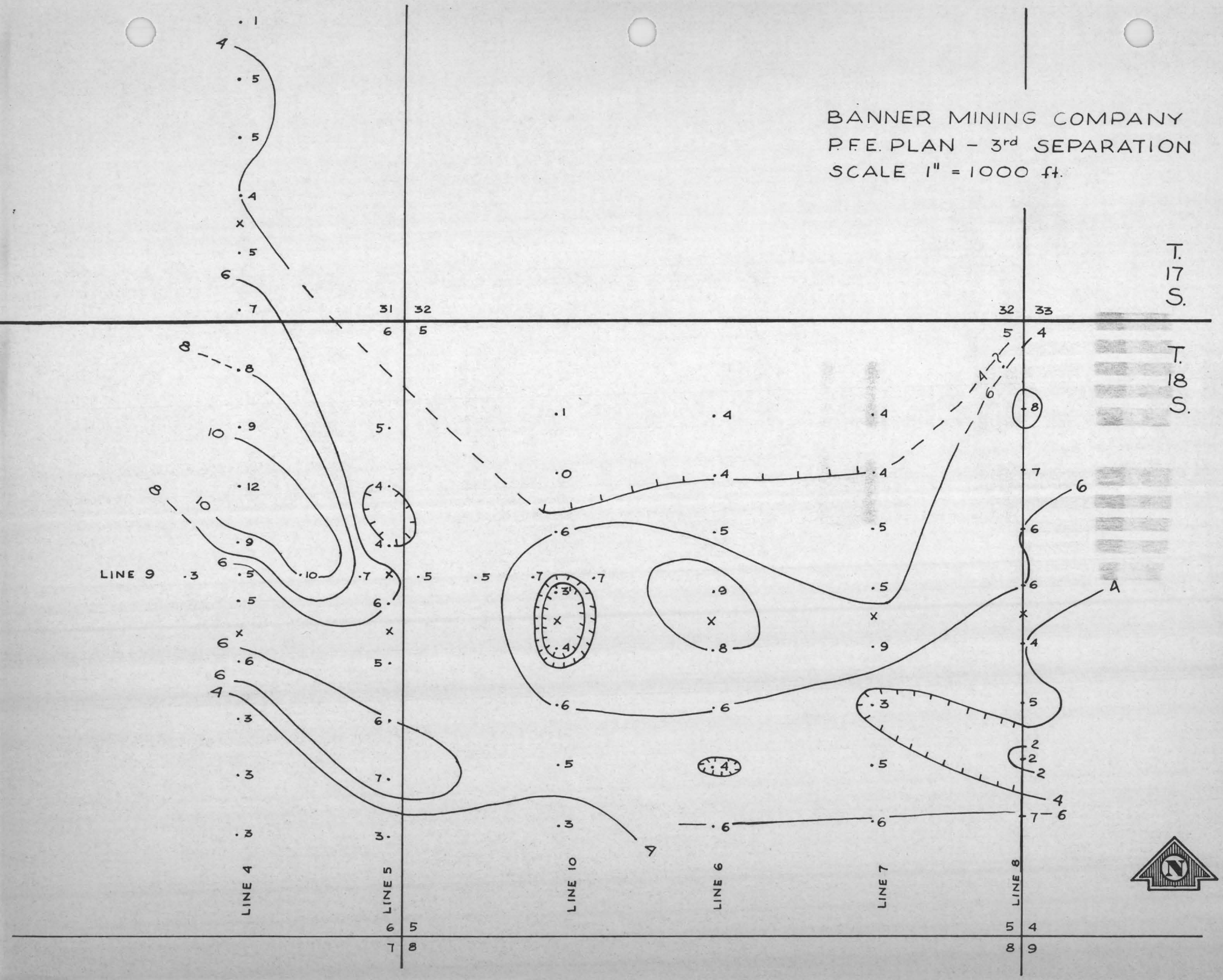
BANNER MINING COMPANY
ρD.C./2π PLAN – 3rd SEPARATION
SCALE 1" = 1000 ft.

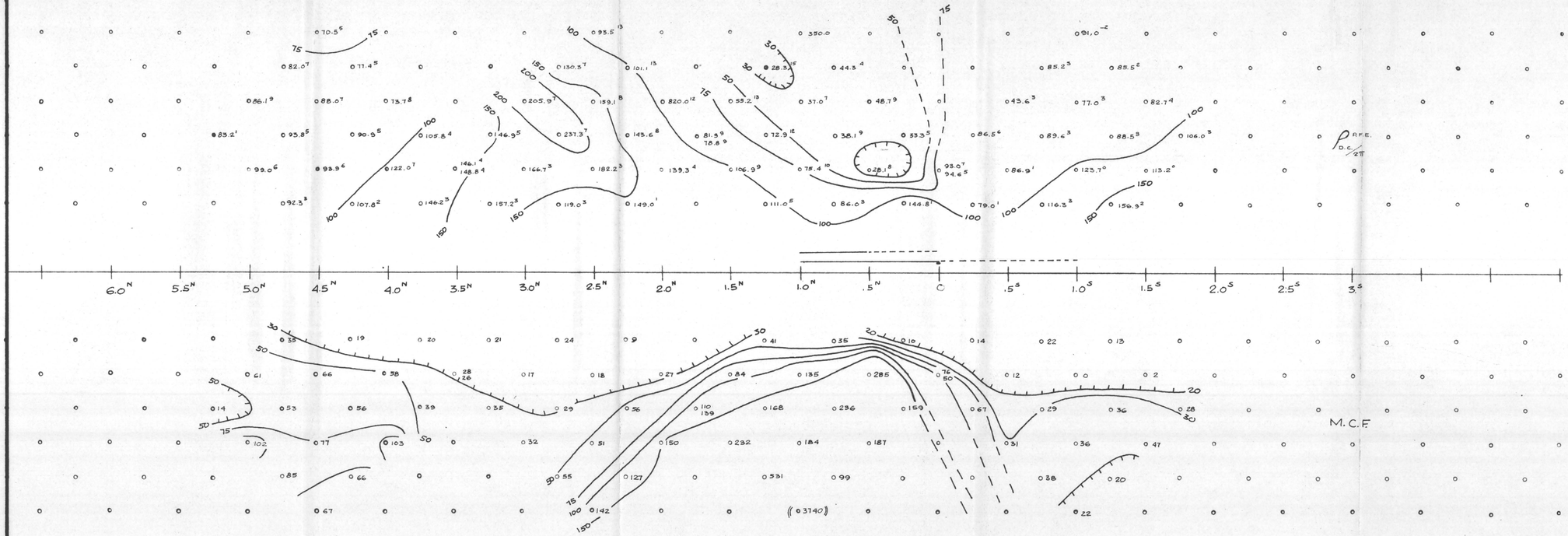


BANNER MINING COMPANY
M.C.F. PLAN - 3rd SEPARATION
SCALE 1" = 1000 ft.



BANNER MINING COMPANY
P.F.E. PLAN - 3rd SEPARATION
SCALE 1" = 1000 ft.





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

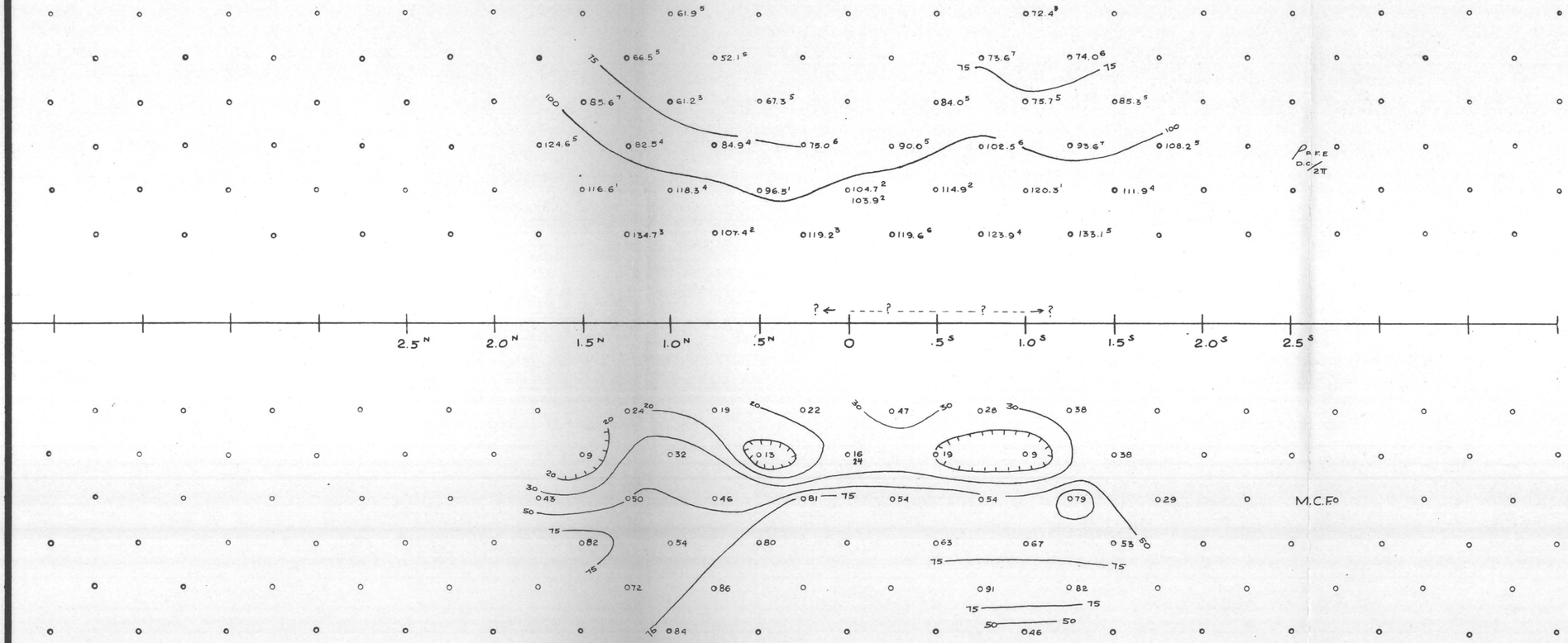
LINE No. 4

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

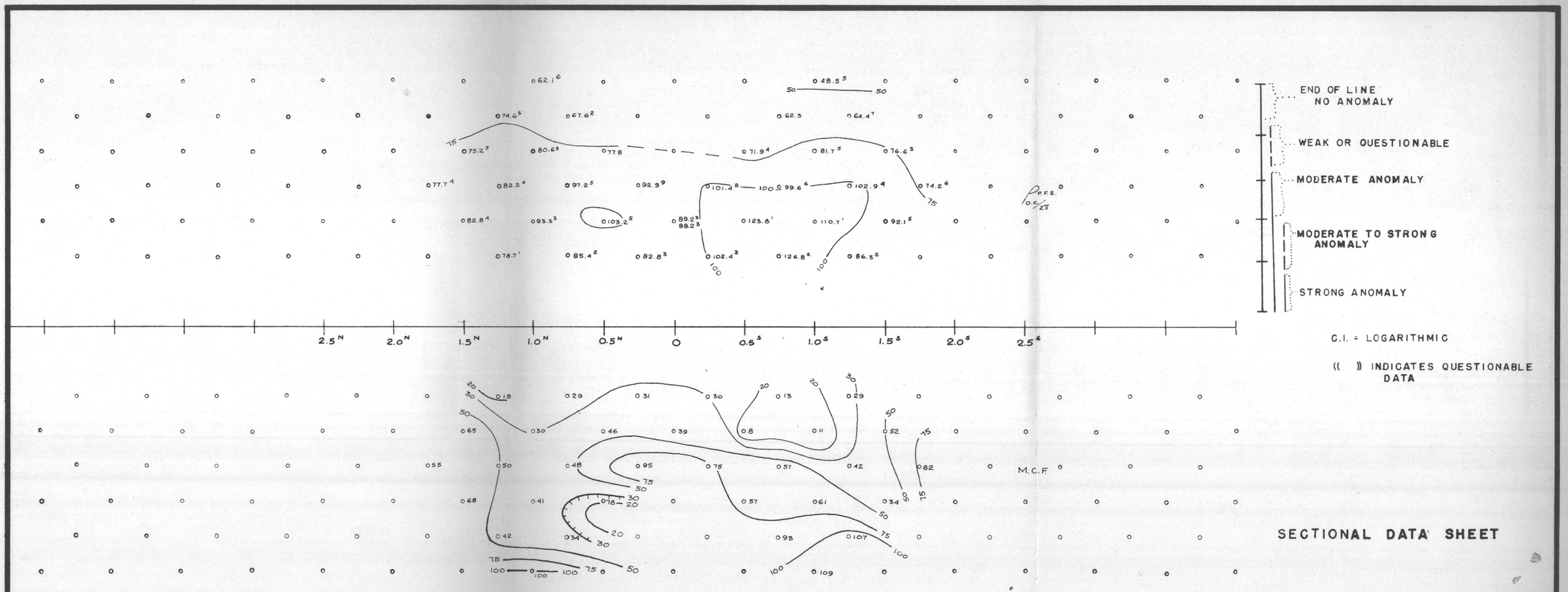
LINE No. 5

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE APRIL 1961



SECTIONAL DATA SHEET

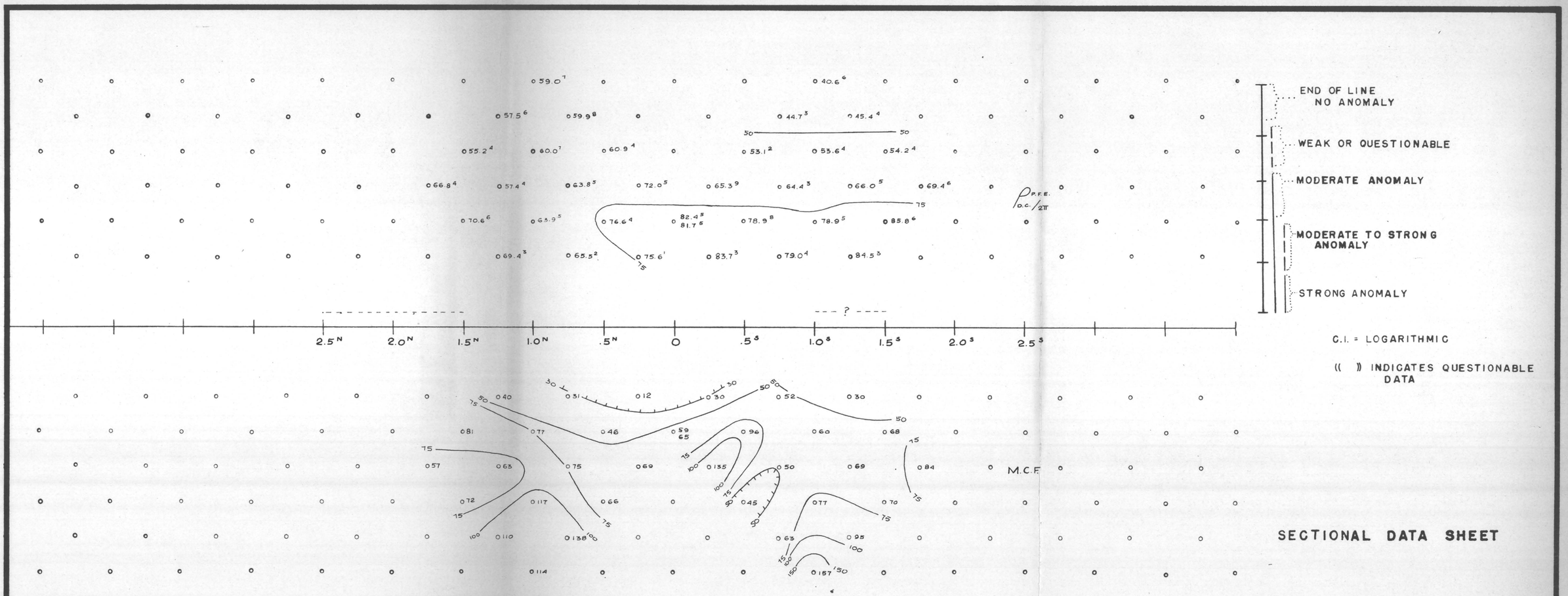
LINE No. 6

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'

DATE APRIL 1961



SECTIONAL DATA SHEET

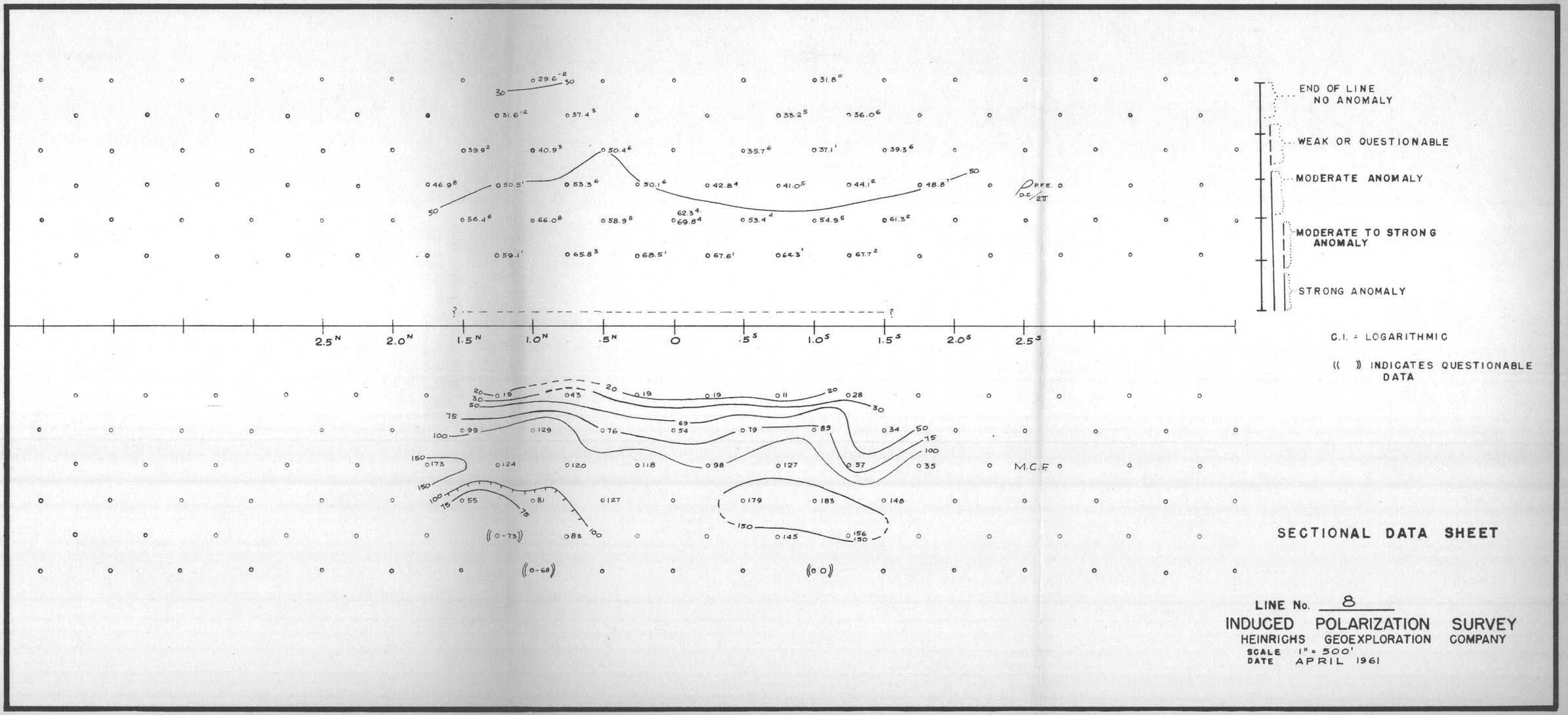
LINE No. 7

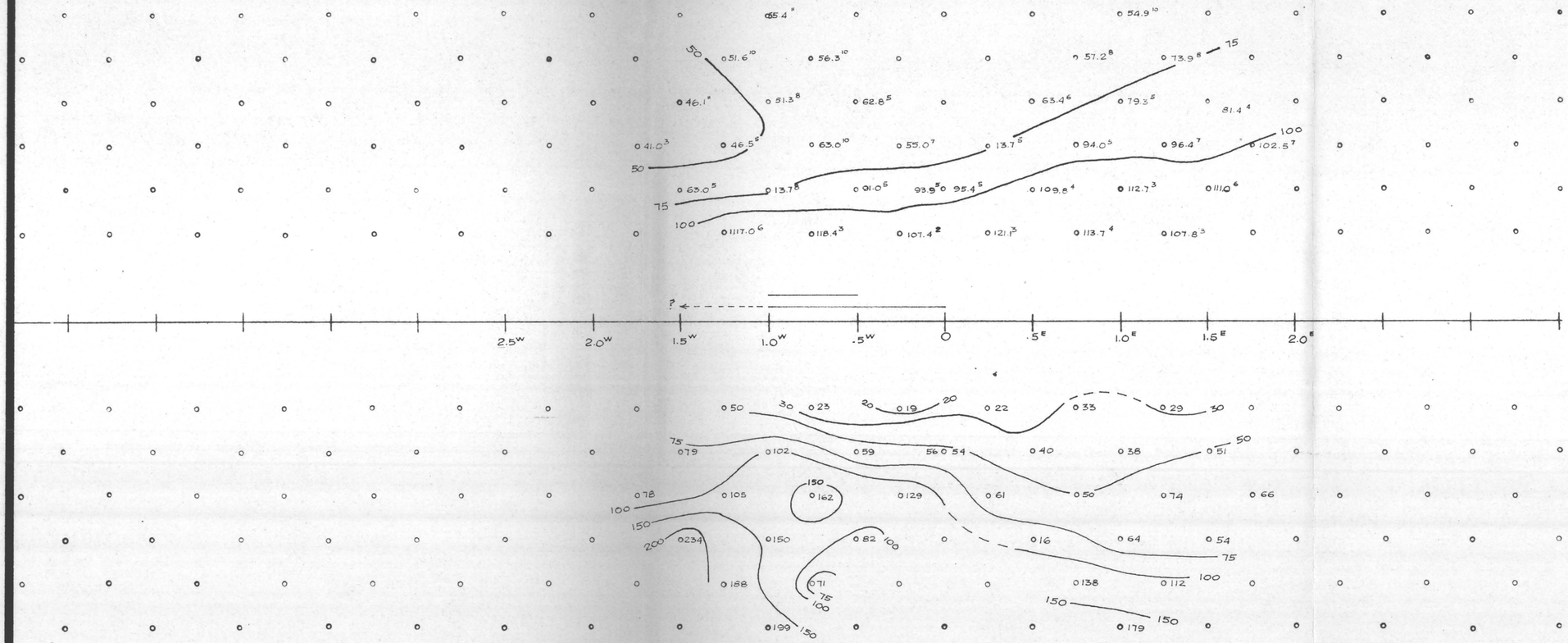
INDUCED POLARIZATION SURVEY

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
2.5N
2.0N
1.5N
1.0N
.5N
0
.5S
1.0S
1.5S
2.0S
2.5S
M.C.F.
SECTIONAL DATA SHEET
LINE No. 8
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

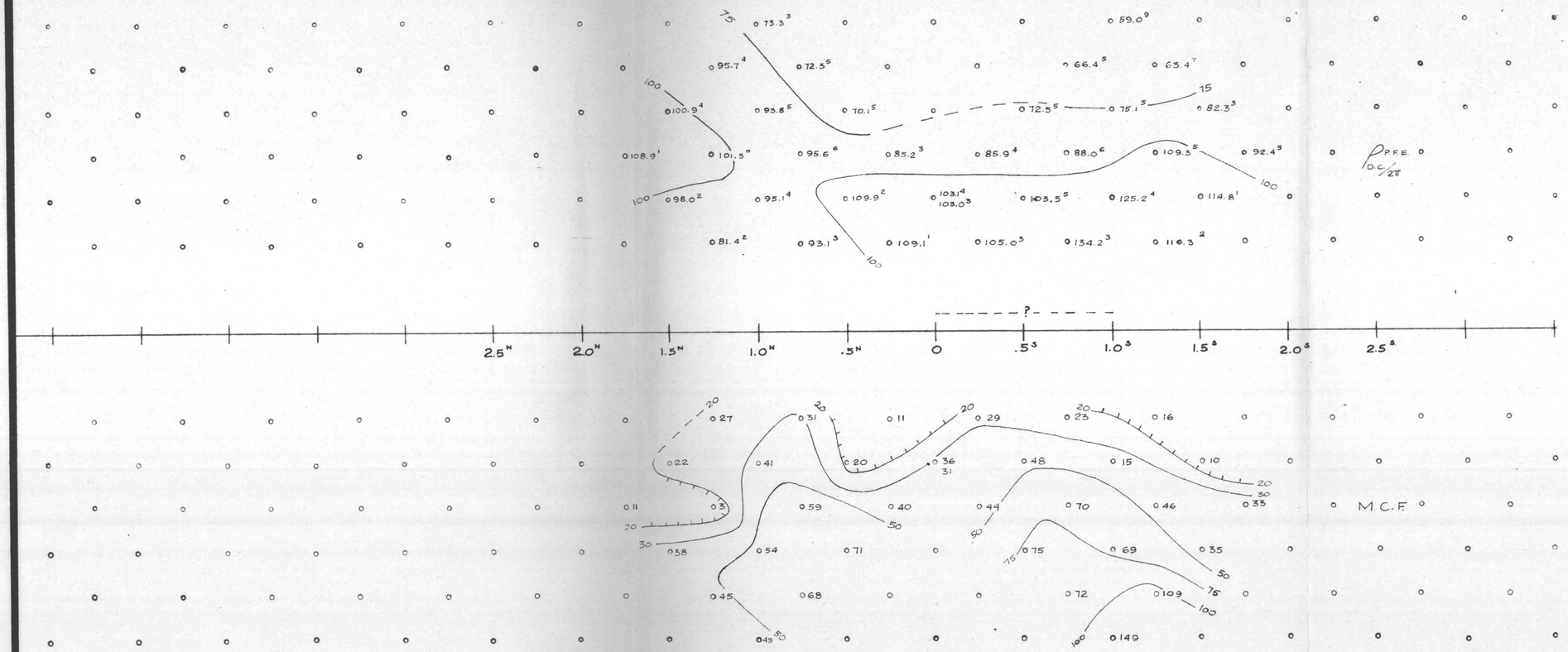
LINE No. 9

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

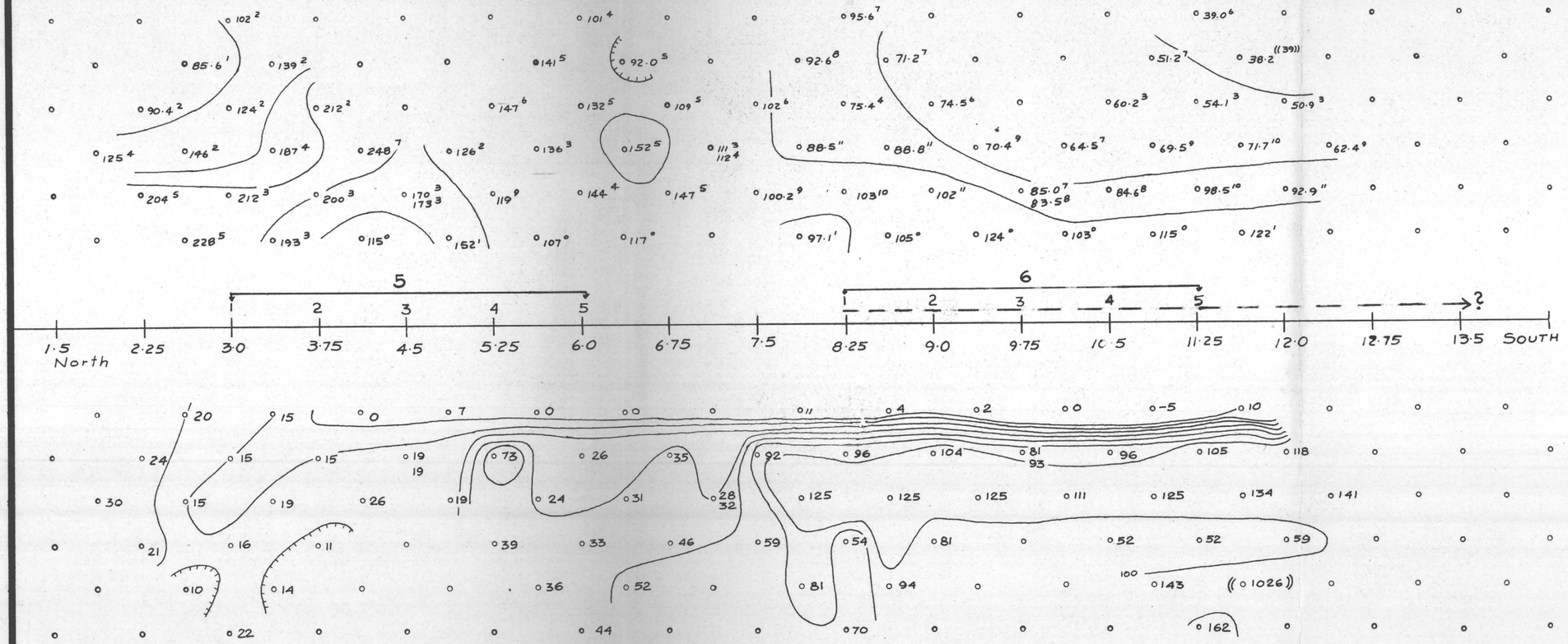
LINE No. 10

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

$\rho_{D.C.}^{P.F.E.}/2\pi$

C.I. = LOGARITHMIC

(( )) INDICATES QUESTIONABLE DATA

M. C. F.

SECTIONAL DATA SHEET

FOR BANNER MINING COMPANY

LINE No. 3

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 750'

DATE March, 1961 corrected May, 61

May 18, 1971

HEINRICHS GEOEXPLORATION COMPANY

806 WEST GRANT ROAD. TUCSON, ARIZONA 85703. P.O. BOX 5964. PHONE: (602) 623-0578

ELECTRICAL
PHYSICAL PROPERTY TESTS
for
BANNER MINING COMPANY

Requested by: F. D. MacKenzie

Frequency: 3Hz vs. 0.3 Hz

Sample No.	$\rho/2\pi$ in ohm feet	PFE	MCF
Dark gray or blackish grittish shale or silt stone			
1.	812	1.4	1.7
2.	40	0.5	13
3.	252	1.6	6.3
4.	658	0.5	0.8
5.	24	0.8	33
6.	168	2.3	14

These results are based on one specimen per sample bag and were not trimmed or otherwise specially prepared other than about one hour tap water soak and therefore are only rough approximations. Only No. 6 would be considered anomalous in I. P. effect and rather weak at that. Sample No. 5 and No. 2 were somewhat more conductive than the others and were the two most porous appearing materials.

Magnetic properties by magnet are very weak or nil.

C. S. Ludwig
Senior Geophysicist

CSL:jh

DAta phoned to Mr. MacKenzie
May 18, 1971 by W. E. Heinrichs.

May 18, 1971

ELECTRICAL
PHYSICAL PROPERTY TESTS
for
BANNER MINING COMPANY

Requested by: F. D. MacKenzie

Frequency: 3Hz vs. 0.3 Hz

Sample No.	$\rho/2\pi$ in ohm feet	PFE	MCF
Dark gray or blackish grittish shale or silt stone			
1.	812	1.4	1.7
2.	40	0.5	13
3.	252	1.6	6.3
4.	658	0.5	0.8
5.	24	0.8	33
6.	168	2.3	14

These results are based on one specimen per sample bag and were not trimmed or otherwise specially prepared other than about one hour tap water soak and therefore are only rough approximations. Only No. 6 would be considered anomalous in I. P. effect and rather weak at that. Sample No. 5 and No. 2 were somewhat more conductive than the others and were the two most porous appearing materials.

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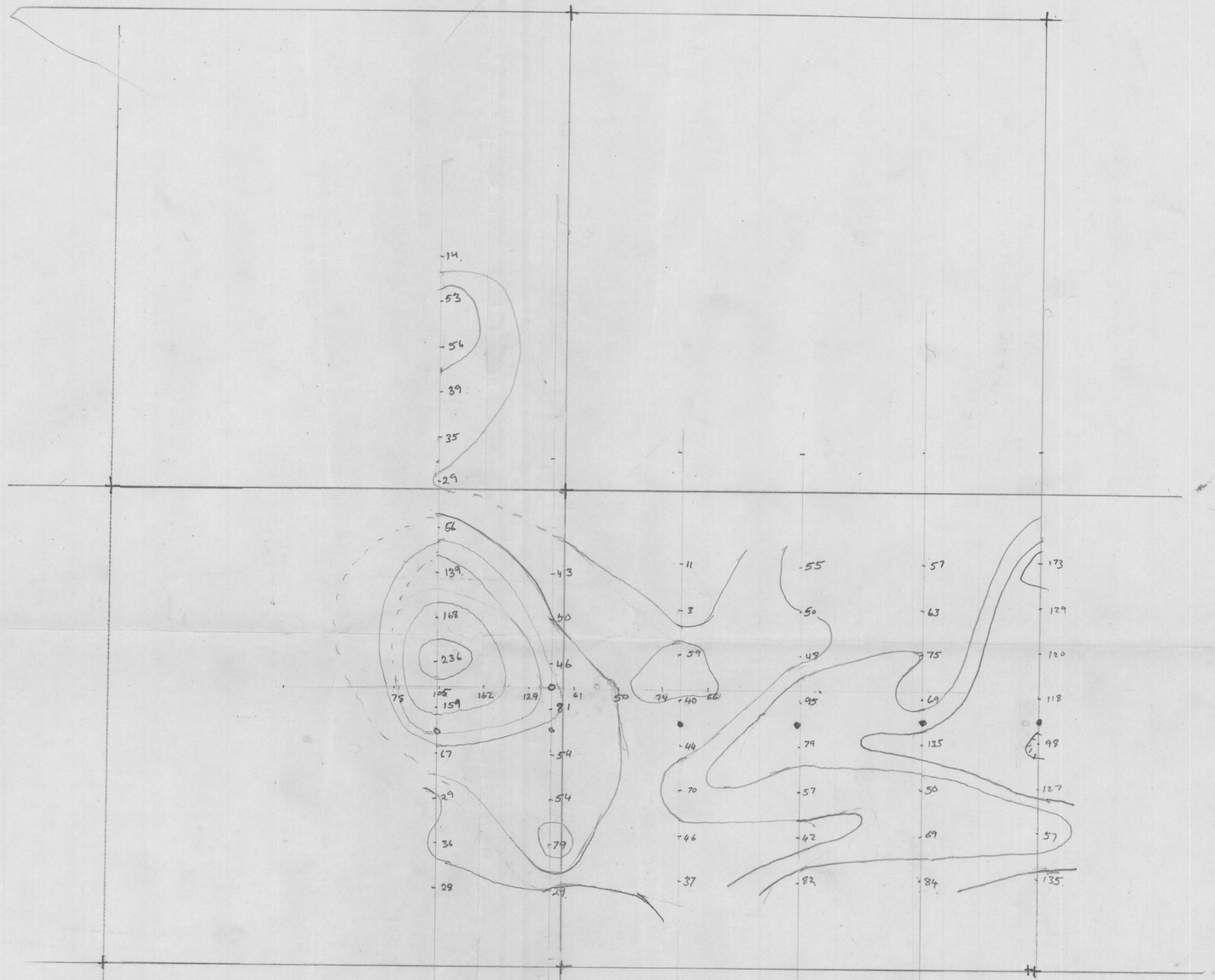

Banner.
3rd Sep
McF.

3/

.09375/in. = 100'

37/3.00

1" = 1066.667'

June 18, 1959

TR. MK. REG. U.S. PAT. OFF.

Bannock - Twin Buttes
Line 1 - South 20E
from a ranch road

Sta.	High Az.	High Angle	Low Az.	Low Angle	
1.	N80E	W18	N70E	W25	
2	N75E	W19	N75E	W26	9+00
3	N72E	W20	N72E	W26	8+00
4	N70E	W24	N70E	W30	12+00
5	N65E	~~W30~~	N65E	W35	16+00
6	N65E	W31	N65E	W35	20+00
7	N62E	W31	N62E	W35	22+00
8	N57E	W30	N57E	W35	24+00
9	N62E	W35	N62E	W37	26+00 at back pit holes
10	N56E	W43	N56E	W46	28+00
11	N65E	W49	N65E	W53	32+00
12	N73E	W54	N73E	W57	34+00 on dump by old Shaft
13	N78E	W57	N78E	W58	38+00 in wash
14	N78E	W61	N78E	W63	42+00
15	N80E	W66	N80E	W67	46+00
16	N75E	W72	N75E	W73	50+00

ORIGINAL COPR. 1910 BY J. C. PARKER
LEFAX, PHILADELPHIA 7, PA., MADE IN U.S.A.

Banner-Twin Buttes

Line 2 - North 20 W

1500 east of line 1 from Sta 16

June 15 1989

Sta					
1	N50E	W68	N50E	W70	50+00 S
2	N52E	W60	N52E	W61	46+00 S
3	N60E	W51	N60E	W54	42+00 S
4	N70E	W44	N70E	W47	38+00 S in wash
5	N73E	W37½	N73E	W40	34+00 S
6	N67E	W30	N67E	W33	30+00 S claim corr & drill hole
7	N65E	W24	N65E	W27	26+00 S
8	N67E	W23	N67E	W27	22+00 S

TR. MK. REG. U.S. PAT. OFF.

ORIGINAL COPR. 1910 BY J. C. PARKER

LEFAX, PHILADELPHIA 7, PA., MADE IN U.S.A.

Enclosed Public Law 85-876

January 27, 1961

Mr. Allen B. Bowman, Vice President
Banner Mining Company
P. O. Box 5605
Tucson, Arizona

Re: Twin Buttes Area Geophysics

Dear Allen:

This is per the above and our conversation in your office last Tuesday with yourself, Mr. Radditz and Mr. MacKenzie, and constitutes our recommendations and proposal as you requested.

Since you have infinitely more detailed knowledge and information on the area than we, I cannot presume to say more than that the general location and approach would seem to have definite merit. As you know, the most common custom in recent years is to first cover an area magnetically, follow by induced polarization (I.P.), and then drill any favorable indications.

Old data in my personal files indicates United covered the area fairly well magnetically and I assume you have those results. There are some large gaps, especially in the extreme NW, South and Eastern parts, over which additional coverage would be useful. However there is enough to go on now that this would not appear immediately mandatory. Later, following preliminary I.P. results, such added coverage could be rapidly obtained by mobile magnetics, for the most part, for about $1,000.00 or maybe even less, and might be desirable, if you do not already have it. Exactly what you do have should be determined right away on order to take maximum advantage of the useful information available in planning the best layout and avoiding duplication. This would also apply to electromagnetic (E.M.) work and drill hole data. All that I know of this was the old United work and drill hole data was confined to the NW-SE trend in about the center of the Republic group.

Based on the above, the 1000 - scale map you loaned to me, and assuming alluvial depths from 0' to 400' + and water

COPY

table at about 400', we propose initial I.P. station spacing of 750' on 3 long reconnaissance lines oriented as follows:

1. From near common westerly corner of Republic S 18 & 19 SE along their common side line to near the A. S. & R. drill hole.
2. From Aug 5 claim ENE across DDH 142 to Jan 63 claim near SE cor. of Sec. 32.
3. North from near Feb 13 claim along the common end lines of the group between Madison & Republic 6 across DDH 204 to near the Petro 15.

This will bive sufficient preliminary coverage approximately to the boundaries specified, with minimum added survey control and equipment and very brief activity on adjoining ground outside your ownership, with maximum known tie points and orientation normal to known or suspected trends. Many alternate variations are possible at any time and may be recommended based on prior results.

Three such lines will require 6 set-ups (2 per line) and will take about 10 days at an approximate cost of $3,000.00. This estimate is based on charges of $250.00 per field working day, plus vehicle rates at $10.00 per day + 10¢ per mile per vehicle and any direct expendable reimbursable expenses. One vehicle will be used every day and some days two. Breakdown time is not charged, nor is office computation, drafting, etc.

If results warrant additional coverage and such is desired, it can be obtained for about $400.00 per profile mile + or - $100.00, depending on electrode spacing used.

Our present availability calls for a crew being free about the middle of February, Our billings are every two weeks.

If this meets with your approval, this letter can serve as the contract between us, in which case, we would appreciate your executing as provided below on the attached copy of this letter and returning to us.

Very truly yours,
HEINRICHS GEOEXPLORATION CO.

Walter E. Heinrichs , Jr.
President & General Manager

Accepted:_____

by:_____
Banner Mining Company

COPY

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Accepted:_____

Walter E. Heinrichs , Jr.
President & General Manager

by:_____
Banner Mining Company

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Badger Line: 1E Int. Cal [illegible] Date 3-A

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		1103	1104	1119	1122	1124	1134	1135	1137	1139	1154	1156
DC-1		41.4 41.4	10.9 11.0	39.2 38.9	12.0 12.1	4.41 4.47	36.1 36.2	11.8 11.7	5.18 5.08	2.45 2.30	10.01 10.01	4.57 4.53
DC-2		41.0 40.8	10.8 10.6	39.3 39.2	12.0 11.6	4.40 4.46	36.3 36.1	11.4 11.2	5.06 5.18	2.16 2.40	10.00 10.00	4.26 4.32
Σ		82.4 82.2	21.7 21.6	78.5 78.1	24.0 23.7	8.81 8.93	72.4 72.3	23.2 22.9	10.18 10.26	4.61 4.78	20.01 20.01	8.83 8.85
DC-3		41.2 41.3	11.0 11.0	38.7 38.3	12.0 12.0	4.80 4.47	36.1 36.0	11.7 11.8	5.27 5.18	2.22 2.25	10.02 10.03	4.58 4.53
DC-4		41.0 40.5	10.5 10.7	39.4 39.0	12.0 11.7	4.03 4.28	36.1 36.1	11.1 11.1	4.90 5.18	2.43 2.38	9.99 9.99	4.25 4.28
Σ		82.2 81.8	21.5 21.7	78.1 77.3	24.0 23.7	8.83 8.75	72.2 72.1	22.8 22.9	10.17 10.36	4.65 4.63	20.01 20.02	8.83 8.81
DC-AV.		82.2	21.6	78.0	23.9	8.83	72.3	22.9	10.24	4.66	20.01	8.83
AC-1		41.0	10.4	39.2	11.7	4.26	36.3	11.1	4.92	2.12	.980	4.30
AC-2		41.0	10.4	39.2	11.7	4.26	36.3	11.1	4.92	2.12	9.80	4.30
Σ		82.0	20.8	78.4	23.4	8.52	72.6	22.2	9.84	4.24	19.60	8.60
S.P.		-7.5		+7.3			+4.3			+8.5		
AC-N		.03		.05			.02			.03		

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: 1E Int.Cal Date: 3-14

Send	3-4	4-5	1-2	2-3	3-4	4-5				
Rec.										
Time	1158	1205	1220	1224	1227	1228				
DC-1	2.56 2.56	1.36 1.28	3.70 3.61	1.87 1.99	1.16 1.31	.66 .39				
DC-2	2.22 2.19	1.10 1.12	3.80 3.80	2.06 1.92	1.08 1.04	.70 .74				
Σ	4.78 4.75	2.46 2.40	7.50 7.41	3.93 3.91	2.24 2.35	1.30 1.33				
DC-3	2.54 2.51	1.21 1.28	3.66 3.79	2.05 1.80	1.20 1.31	.55 .60				
DC-4	2.23 2.24	1.14 1.12	3.74 3.65	2.10 2.10	1.10 .96	.77 .70				
Σ	4.77 4.75	2.35 2.40	7.40 7.44	4.15 3.90	2.30 2.27	1.32 1.30				
DC-AV	4.76	2.40	7.44	3.97	2.29	1.31				
AC-1	2.20	1.14	3.60	1.88	1.11	.63				
AC-2	2.20	1.14	3.60	1.88	1.11	.63				
Σ	4.40	2.28	7.20	3.76	2.22	1.26				
S. P.	+8.5		+1.8							
AC-N	.03		.03							

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: 1E Int. Cal Date 3-14

Send	2-3	2-3	2-3		2-3	2-3	2-3					
Rec	Cal	Cal	Cal									
Time	1055	1056	1058		1305	1306	1307					
DC-1	14.0	25.2	35.2		14.2	25.9	36.0					
DC-2	14.0	25.2	35.2		14.2	25.9	36.0					
Σ	28.0	50.4	70.4		28.4	51.8	72.0					
DC-3	14.0	25.2	35.2		14.2	25.9	36.0					
DC-4	14.0	25.2	35.2		14.2	25.9	36.0					
Σ	28.0	50.4	70.4		28.4	51.8	72.0					
DC-AV.	28.0	50.4	70.4		28.4	51.8	72.0					
AC-1	13.8	23.3	35.8		14.0	24.2	36.3					
AC-2	13.8	23.2	35.8		14.0	24.2	36.3					
Σ	27.6	46.5	71.6		28.0	48.1	72.6					
S.P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: 1E Date: 4 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		1103	1104	1119	1122	1124	1134	1135	1137	1139	1154	1156
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	1410	1430	1415	1400	1420	1405	1400	1380	1410	1400
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3					
Receive							CAL					
Time	1158	1205	1220	1224	1227	1228	1055	1056	1058	1305	1306	1307
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1395	1370	1385	1390	1380	1370	280	495	685	275	490	695

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project Banner Line 1 E Field date Mar. 14, 61 Data page _____ Comp. date Mar. 14, 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											
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1430	1410	1430	1415	1400	1420	1405	1400	1380	1410	1400
(E) Vdc (avg)		82.2	21.6	78.0	23.9	8.83	72.3	22.9	10.24	4.66	20.01	8.83
(F) DCcal USED	.975											
(G) Kn x 10^{-3} (a = 750')		2.25	9.00	2.25	9.00	22.5	2.25	9.00	22.5	45.0	9.00	22.5
(H) ρ dc=ExFxGx10^3/D		126.0	134.1	119.6	148.1	138.2	111.4	142.9	160.4	148.1	124.4	138.1
(I) Vac Σ		82.0	20.8	78.4	23.4	8.52	72.6	22.2	9.84	4.24	19.60	8.60
(J) AC noise x 2		.06	.06	.10	.10	.10	.04	.04	.04	.06	.06	.06
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		82.0	20.8	78.4	23.4	8.52	72.6	22.2	9.84	4.24	19.60	8.60
(L) AC-DC cal. USED	1.020											
(M) ρ dc/ρac=ExL/K		1.022	1.060	1.015	1.041	1.057	1.016	1.051	1.063	1.121	1.041	1.048
(N) PFE=(M-1)(10^2)		2	6	2	4	6	2	5	6	12	4	5
(O) MCF=(M-1)(10^5)/H		17	45	13	28	41	14	36	39	82	33	35

Project Banner Line 1 E Field date Mar. 14, 61 Data page _____ Comp. date Mar. 14, 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							CAL	CAL					
(C) n separation	4	5	3	4	5	6							
(D) I	1395	1370	1385	1390	1380	1370		280	495	685	275	490	695
(E) Vdc (avg)	4.76	2.40	7.44	3.97	2.29	1.31		28.0	50.4	70.4	28.4	51.8	72.0
(F) DCcal						USED	.975	1.000	.983	.974	.969	.946	.957
(G) Kn x 10^{-3}	45.0	78.75	22.5	45.0	78.75	126			(.975)				
(H) ρ dc=ExFxGx10^3/D	149.8	134.4	117.8	125.1	130.7	117.3							
(I) Vac Σ	4.40	2.28	7.20	3.76	2.22	1.26		27.6	46.5	71.6	28.0	48.1	72.6
(J) AC noise x 2	.06	.06	.06	.06	.06	.06							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	4.40	2.28	7.20	3.76	2.22	1.26							
(L) AC-DC cal.						USED	1.020	.986	.924	1.018	.986	.929	1.009
(M) ρdc/ρac =ExL/K	1.104	1.073	1.052	1.077	1.051	1.060							
(N) PFE=(M-1)(10^2)	10	7	5	7	5	6			(1.020)				
(O) MCF=(M-1)(10^5)/H	70	54	44	62	39	51							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Banner Line 2E Field date 3-15 Data page _____ Comp. date Mar. 20, 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	3.75-3.0W →		3.0-2.25W →			2.25-1.5W →				1.5-.75W →	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1435	1425	1430	1420	1410	1420	1410	1400	1400	1420	1400
(E) Vdc (avg)		44.9	9.12	41.2	8.18	2.84	35.1	6.85	2.37	1.20	6.53	2.25
(F) DCcal USED	.950											
(G) Kn x 10^{-3} (a = 750')		2.25	9.00	2.25	9.00	22.5	2.25	9.00	22.5	45.0	9.00	22.5
(H) ρ dc=ExFxGx10^3/D		67.0	54.8	61.6	49.2	43.1	52.8	41.6	36.2	36.6	39.4	34.4
(I) Vac Σ		42.6	8.84	39.6	7.98	2.78	34.0	6.70	2.32	1.20	6.40	2.20
(J) AC noise x 2		.10	.10	.04	.04	.04	.04	.04	.04	.04	.06	.06
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		42.6	8.84	39.6	7.98	2.78	34.0	6.70	2.32	1.20	6.40	2.20
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.053	1.031	1.041	1.023	1.021	1.029	1.021	1.021	1.000	1.020	1.022
(N) PFE=(M-1)(10^2)		5	3	4	2	2	3	2	2	0	2	2
(O) MCF=(M-1)(10^5)/H		79	57	67	48	49	55	51	58	0	51	64

Project Banner Line 2E Field date Mar. 15, 61 Data page _____ Comp. date Mar. 20, 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	1.5-.75W →		.75W-0 →				Cal	CAL				
(C) n separation	4	5	3	4	5	6						
(D) I	1395	1395	1420	1400	1395	1400		283	500	700	278	505	700
(E) Vdc (avg)	1.08	.66	2.22	1.07	.62	.42		29.8	53.6	73.4	29.2	53.4	73.4
(F) DCcal						USED	.950	.950	.933	.954	.953	.946	.954
(G) Kn x 10^{-3} (a = 750')	45.0	78.75	22.5	45.0	78.75	126						
(H) ρ dc=ExFxGx10^3/D	33.0	35.4	33.4	32.7	33.2	35.9						
(I) Vac Σ	1.06	.62	2.20	1.02	.60	.42		29.2	50.8	74.4	28.6	50.2	74.6
(J) AC noise x 2	.06	.06	.08	.08	.08	.08							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.06	.62	2.20	1.02	.59	.41							
(L) AC-DC cal.						USED	1.000	.980	.949	1.013	.980	.995	1.017
(M) ρdc/ρac =ExL/K	1.019	1.064	1.009	1.050	1.050	1.024							
(N) PFE=(M-1)(10^2)	2	6	1	5	5	2							
(O) MCF=(M-1)(10^5)/H	58	181	27	153	151	67							

[illegible] POLARIZATION [illegible] RECEIVER NOTES PAGE

Project Banner Line 2E Int. Cal. 53.0 Date: 3-15

d	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
	3.75-3.0W →		3.0-2.25W →			2.25-1.5W →				1.5-.75W →	
c	1049	1050	1103	1105	1106	1116	1118	1119	1120	1134	1135
	22.5	4.67	20.6	4.00	1.40	17.7	3.58	1.22	.59	3.26	1.25
	22.4	4.69	20.6	3.98	1.39	17.7	3.58	1.26	.58	3.25	1.28
	22.5	4.48	20.7	4.22	1.45	17.5	3.28	1.14	.62	3.27	.98
-2	22.5	4.43	20.6	4.21	1.47	17.5	3.28	1.11	.62	3.32	.96
Σ	45.0 44.9	9.15 9.12	41.3 41.2	8.22 8.19	2.85 2.86	35.2 35.2	6.86 6.86	2.36 2.37	1.21 1.20	6.53 6.57	2.23 2.24
3	22.4	4.70	20.5	3.95	1.38	17.6	3.58	1.27	.58	3.18	1.07
	22.3	4.76	20.5	3.97	1.40	17.6	3.58	1.27	.58	3.13	1.08
	22.5	4.41	20.6	4.20	1.44	17.4	3.27	1.10	.62	3.40	1.20
-4	22.3	4.35	20.6	4.19	1.45	17.4	3.25	1.10	.62	3.31	1.17
Σ	44.9 44.6	9.11 9.11	41.1 41.1	8.15 8.16	2.83 2.85	35.0 35.0	6.85 6.83	2.37 2.37	1.20 1.20	6.58 6.44	2.27 2.25
Av	44.9	9.12	41.2	8.18	2.84	35.1	6.85	2.37	1.20	6.53	2.25
-1	21.3	4.42	19.8	3.99	1.39	17.0	3.35	1.16	.60	3.20	1.10
-2	21.3	4.42	19.8	3.99	1.39	17.0	3.35	1.16	.60	3.20	1.10
Σ	42.6	8.84	39.6	7.98	2.78	34.0	6.70	2.32	1.20	6.40	2.20
P	-11.7		+17.0			-0.8				11.0	
C-N	.05		.02			.02				.03	

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Banner Line: 2E Int. Cal Date: 3-13

end	3-4	4-5	1-2	2-3	3-4	4-5
ec.	1.5-.75W →		.75-0W →			
ime	1137	1138	1154	1156	1157	1158
C-1	.61	.36	1.12	.51	31	18
	.66	.29	1.10	.48	21	19
	.47	.31	1.13	.60	28	23
C-2	.36	.37	1.11	.57	41	22
Σ	1.08	.67	2.25	1.11	59	41
	1.02	.66	2.21	1.05	62	41
C-3	.70	.30	1.12	.50	31	10
	.60	.35	1.12	.51	17	12
	.42	.34	1.09	.55	30	32
C-4	.50	.30	1.10	.55	47	30
Σ	1.12	.64	2.21	[illegible]	61	42
	1.10	.63	2.22	1.06	64	42
C-AV	1.08	.66	222	1.07	.62	.42
C-1	.53	.31	1.10	.51	.30	.21
AC-2	.53	.31	1.10	.51	30	.21
Σ	1.06	.62	2.20	1.02	.60	.42
S. P.	+11.0		-12.9			
AC-N	.03		.04			

INDUCED POLARIZATION SURVEY RECEIVER NOTES

Project: Bunner Line: 2E Int. Cal. Date:

Send	2-3	2-3	2-3		2-3	2-3	2-3					
Rec.	Cal	Cal	Cal		Cal	Cal	Cal					
Time	1044	1045	1046		1220	1221	1222					
DC-1	14.9	26.8	36.7		14.6	26.7	36.7					
DC-2	14.9	26.8	36.7		14.6	26.7	36.7					
Σ	29.8	53.6	73.4		29.2	53.4	73.4					
DC-3	14.9	26.8	36.7		14.6	26.7	36.7					
DC-4	14.9	26.8	36.7		14.6	26.7	36.7					
Σ	29.8	53.6	73.4		29.2	53.4	73.4					
DC-AV.	29.8	53.6	73.4		29.2	53.4	73.4					
AC-1	14.6	25.4	37.2		14.3	25.1	37.3					
AC-2	14.6	25.4	37.2		14.3	25.1	37.3					
Σ	29.2	50.8	74.4		28.6	50.2	74.6					
S.P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

Project: Banner Line: 2 E Date: 15 Mar 61

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											
Time		1049	1050	1103	1105	1106	1116	1118	1119	1120	1134	1135
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	1430	1420	1410	1420	1410	1400	1400	1420	1400
Send	3-4	4-5	1-2	2-3	3-4	4-5	Cal	→				→
Receive							2-3	→				→
Time	1137	1138	1154	1155	1157	1158	1044	1045	1046	1220	1221	1222
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1395	1395	1420	1400	1395	1400	283	500	700	278	505	700

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ____

Project BANNER Line 2W Field date 3-15-61 Data page ____ Comp. date Mar. 20, 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	5.25-6.0W →		6.0-6.75W →		→	6.75-7.50W →			→	7.50-8.25 →	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1435	1420	1440	1420	1410	1420	1405	1390	1390	1400	1390
(E) Vdc (avg)		47.7	9.11	48.9	9.74	3.23	63.4	12.64	3.84	1.84	16.70	4.83
(F) DCcal USED	.950											
(G) Kn x 10^{-3} (a = 750')		2.25	9.0	2.25	9.0	22.5	2.25	9.0	22.5	45.0	9.0	22.5
(H) ρ dc=ExFxGx10^3/D		71.1	54.9	72.5	58.6	49.0	95.4	77.1	59.1	56.6	102	74.3
(I) Vac Σ		44.8	8.80	46.0	9.56	3.12	63.6	12.20	3.76	1.64	15.60	4.62
(J) AC noise x 2		.06	.06	.10	.10	.10	.04	.04	.04	.04	.10	.10
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		44.8	8.80	46.0	9.56	3.12	63.6	12.20	3.76	1.64	15.60	4.62
(L) AC-DC cal. USED	1.005											
(M) ρ dc/ρac=ExL/K		1.070	1.041	1.069	1.023	1.040	1.002	1.041	1.027	1.128	1.077	1.050
(N) PFE=(M-1)(10^2)		7	4	7	2	4	0	4	3	13	8	5
(O) MCF=(M-1)(10^5)/H		98	75	95	39	82	2	53	46	226	76	67

Project Banner Line 2W Field date Mar. 15, 61 Data page ____ Comp. date Mar. 20, 61 Comp by C.S.L.

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4					
(B) Receive	7.50-8.25W →		8.25-9.0W →			→	Cal					
(C) n separation	4	5	3	4	5	6						
(D) I	1380	1380	1390	1380	1370	1370		280	500	700	278	503	690
(E) Vdc (avg)	1.92	1.05	7.76	2.79	1.31	?		298	536	740	294	538	720
(F) DCcal	→					→	USED .950	.940	.933	.946	.946	.935	.958
(G) Kn x 10^{-3} (a = 750')	45.0	78.75	22.5	45.0	78.75	126							
(H) ρ dc=ExFxGx10^3/D	59.5	56.9	119	86.4	71.5								
(I) Vac Σ	1.86	1.00	7.50	2.70	1.26	?		292	508	744	286	502	728
(J) AC noise x 2	.10	.10	.10	.10	.10	.10							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.86	1.00	7.50	2.70	1.26								
(L) AC-DC cal.	→					→	USED 1.005	.980	.948	1.005	.973	.988	1.011
(M) ρdc/ρac =ExL/K	1.038	1.056	1.041	1.040	1.044								
(N) PFE=(M-1)(10^2)	4	6	4	4	4								
(O) MCF=(M-1)(10^5)/H	64	99	34	46	62								

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: 2W Int.Cal. Date: 3-15

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	5.25-6.0W →		6.0-6.75 →			6.75-7.50W →				7.50-8.25 →	
Time	1312	1314	1341	1342	1344	1352	1354	1357	1359	1409	1411
DC-1	2.39	4.54	24.6	4.90	1.69	31.7	6.03	1.96	.77	8.45	2.36
	2.39	4.57	24.6	4.98	1.56	31.8	6.28	1.93	.58	8.37	2.32
DC-2	2.38	4.58	24.4	4.83	1.53	31.7	6.56	1.96	1.09	8.22	2.59
	2.39	4.58	24.4	4.78	1.68	31.6	6.40	1.86	1.20	8.40	2.41
Σ	4.77	9.12	49.0	9.73	3.22	63.4	12.59	3.80	1.85	16.67	4.89
	4.78	9.15	49.0	9.76	3.24	63.4	12.68	3.79	1.78	16.77	4.73
DC-3	2.39	4.50	24.6	4.88	1.50	31.8	6.18	1.40	1.02	8.50	2.51
	2.40	4.32	24.3	4.88	1.53	31.8	6.10	2.18	.83	8.27	2.48
DC-4	2.38	4.63	24.3	4.86	1.72	31.6	6.47	1.89	.82	8.18	2.32
	2.37	4.72	24.5	4.84	1.69	31.6	6.53	1.78	1.05	8.40	2.40
Σ	4.77	9.13	48.9	9.74	3.22	63.4	12.65	3.79	1.84	16.68	4.83
	4.77	9.04	48.8	9.72	3.22	63.4	12.63	3.96	1.88	16.67	4.88
DC-AV	4.77	9.11	48.9	9.74	3.23	63.4	12.64	3.84	1.84	16.70	4.83
AC-1	22.4	4.40	23.0	4.78	1.56	31.8	6.10	1.88	.82	7.80	2.32
AC-2	22.4	4.40	23.0	4.78	1.56	31.8	6.10	1.88	.82	7.80	2.32
Σ	44.8	8.80	46.0	9.56	3.12	63.6	12.20	3.76	1.64	15.60	4.64
S. P.	-.93		-5.3			-2.8				-15.5	
AC-N	.03		.05			.02				.05	

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Banner Line: 7 2W Int.Cal Date: 3/15

end	2-3	1-2	4-5	3 4	2-3	1-2
ec.	7.50-8.25 →		8.25-9.0 →			
me	1414	1415	1426	1433	1435	
C-1	94	64	4.21	1.60	.70	
	96	43	4.22	1.70	.92	
	99	42	3.48	1.12	.55	
C-2	98	61	3.49	1.08	.41	
Σ	1.93	1.06	7.69	2.72	1.25	
	1.94	1.04	7.71	2.78	1.33	
C-3	1.00	48	4.08	1.20	.70	
	1.02	47	4.38	1.13	.68	
C-4	92	56	3.68	1.75	.62	
	88	57	3.50	1.58	.65	
Σ	1.92	1.04	7.76	2.95	1.32	
	1.90	1.04	7.88	2.71	1.33	
AV	1.92	1.05	7.76	2.79	1.31	
-1	.93	.50	3.75	1.35	.63	
C-2	.93	.50	3.75	1.35	.63	
Σ	1.86	1.00	7.50	2.70	1.26	
P.	-45.5		+7.3			
C-N	.05		.05			

Project Banner Line 2W Int. Cal. Date 3-15

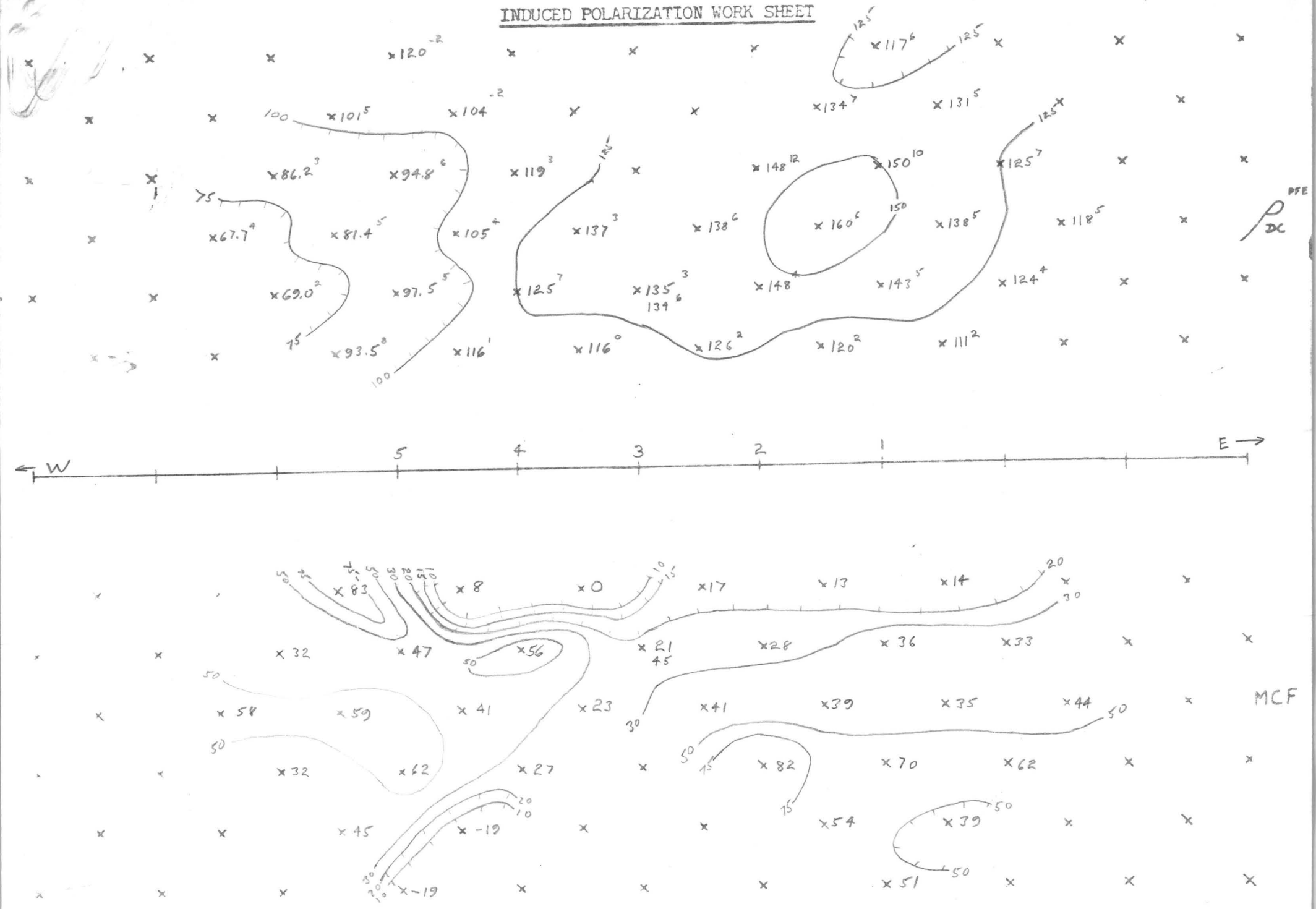
	3-4	3-4	3-4		3-4	3-4	3-4				
	Cal	Cal	Cal		Cal	Cal	Cal				
	1305	1306	1310		1446	1452	1454				
	14.9	26.8	37.0		14.7	26.9	36.0				
	14.9	26.8	37.0		14.7	26.9	36.0				
	29.8	53.6	74.0		29.4	53.8	72.0				
	14.9	26.8	37.0		14.7	26.9	36.0				
	14.9	26.8	37.0		14.7	26.9	36.0				
	29.8	53.6	74.0		29.4	53.8	72.0				
Av	29.8	53.6	74.0		29.4	53.8	72.0				
1	14.6	25.4	37.2		14.5	25.1	36.4				
2	14.6	25.4	37.2		14.3	25.1	36.4				
	29.2	50.8	74.4		28.6	50.2	72.8				

INDUCED POLARIZATION SENDER NOTES

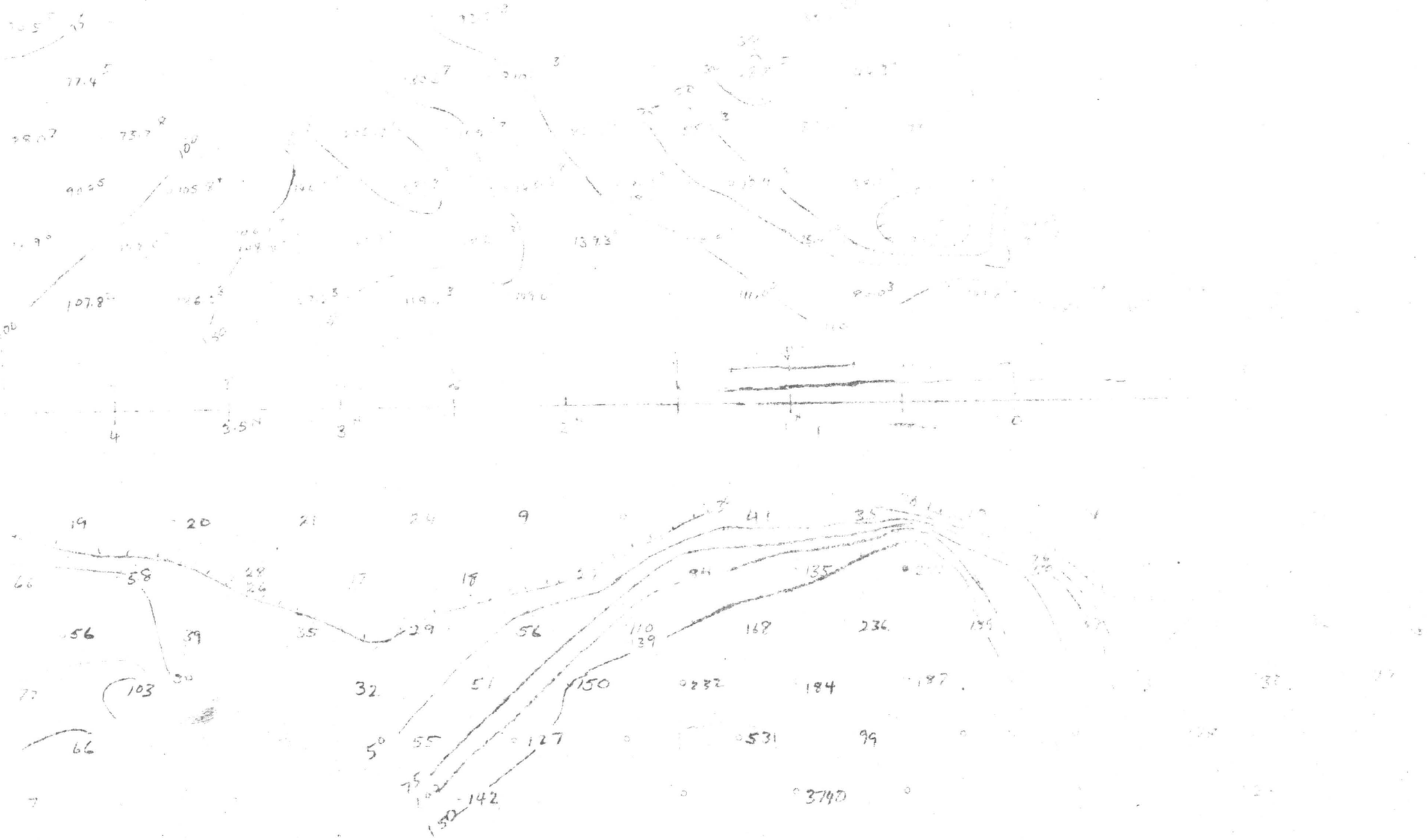
Project: Banner Line: 2 W Date: 15 Mar 61

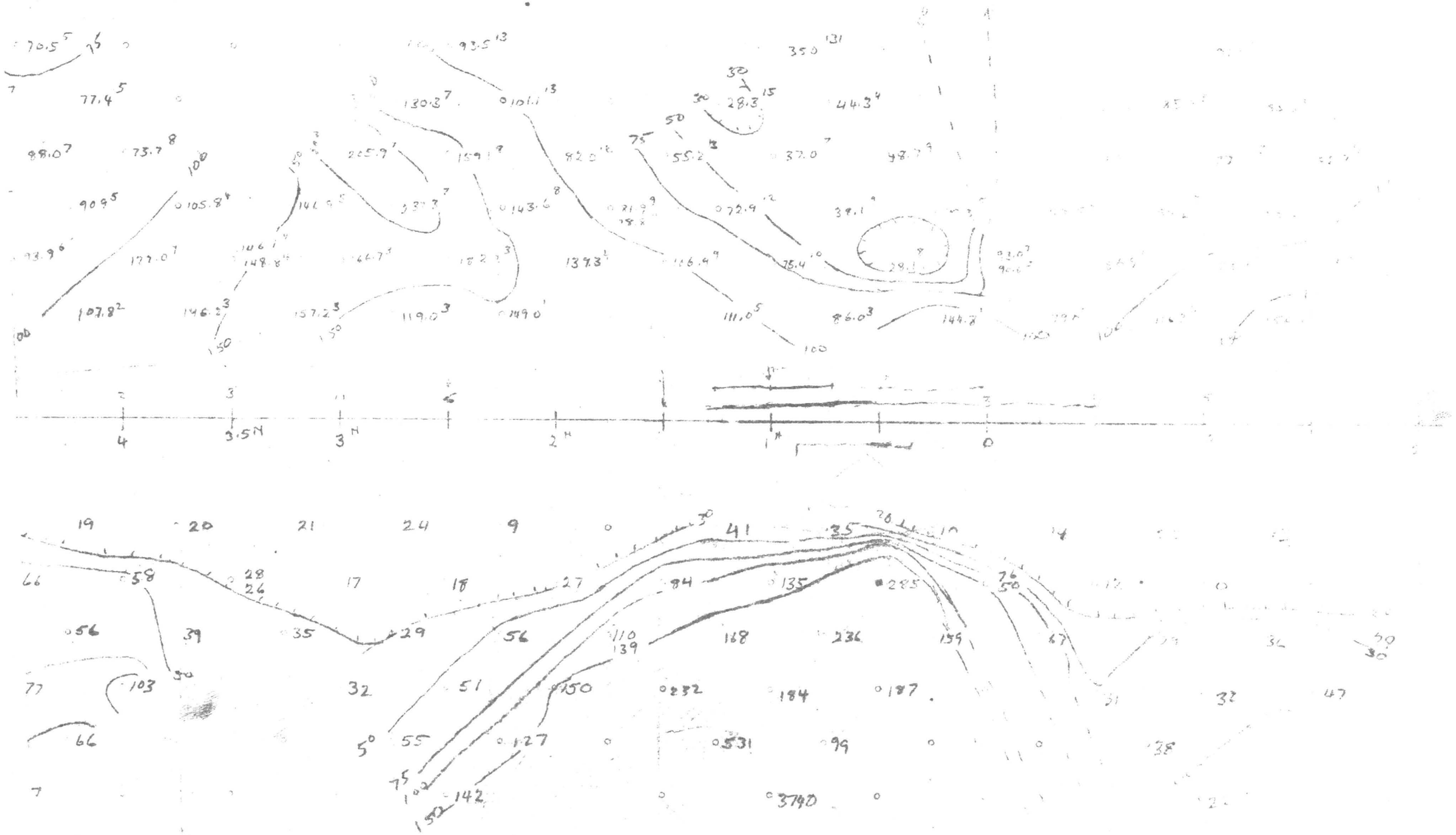
Send	Cal	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	3-4											
Time		1312	1314	1341	1342	1344	1352	1354	1357	1359	1409	1411
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1435	1420	1440	1420	1410	1420	1405	1390	1390	1400	1390
Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal	→				
Receive							3-4	→				
Time	1414	1415	1426	1433	1435	1436	1305	1306	1307	1451	1452	1454
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1380	1380	1390	1380	1370	1370	280	500	700	278	503	690

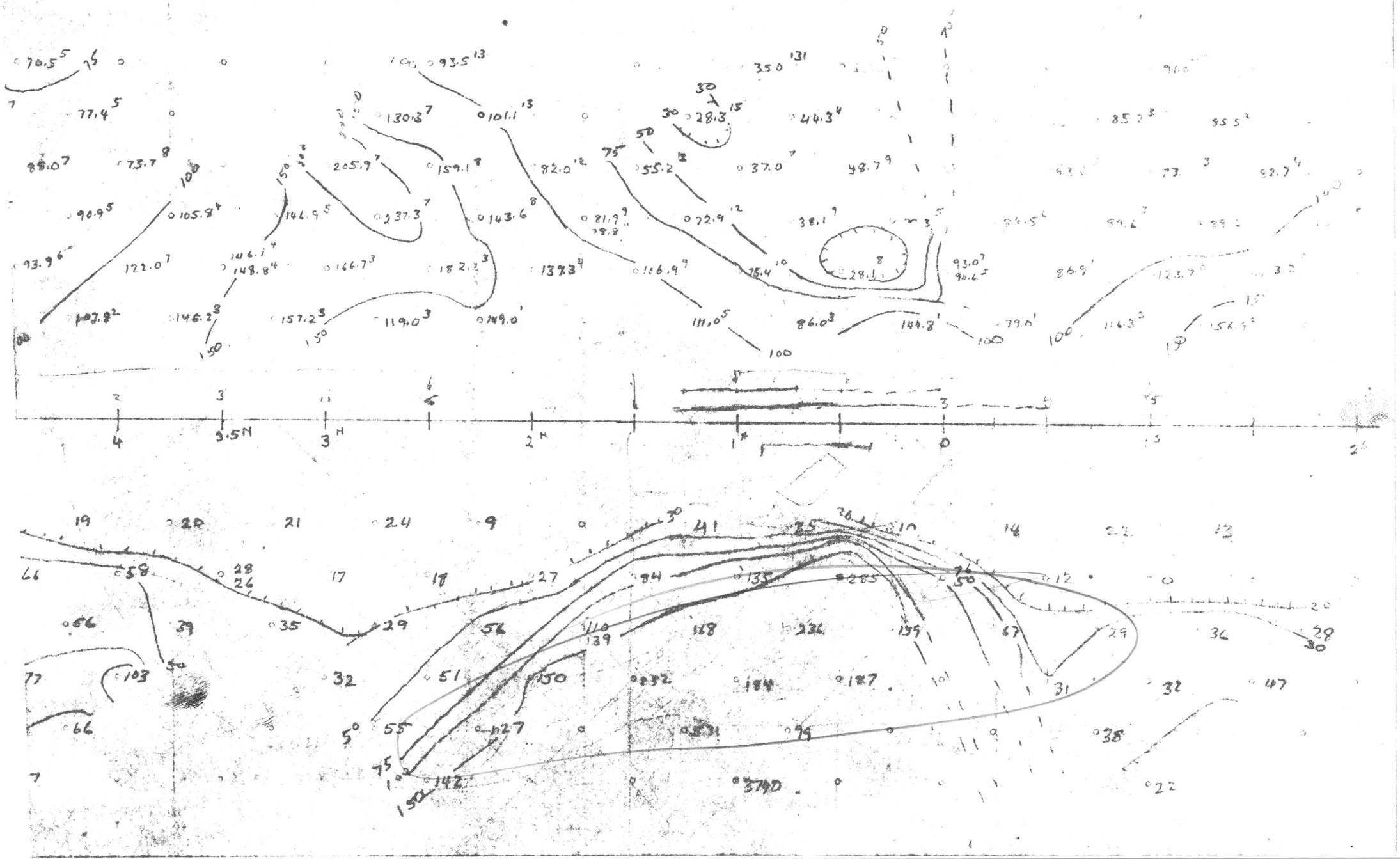
INDUCED POLARIZATION WORK SHEET

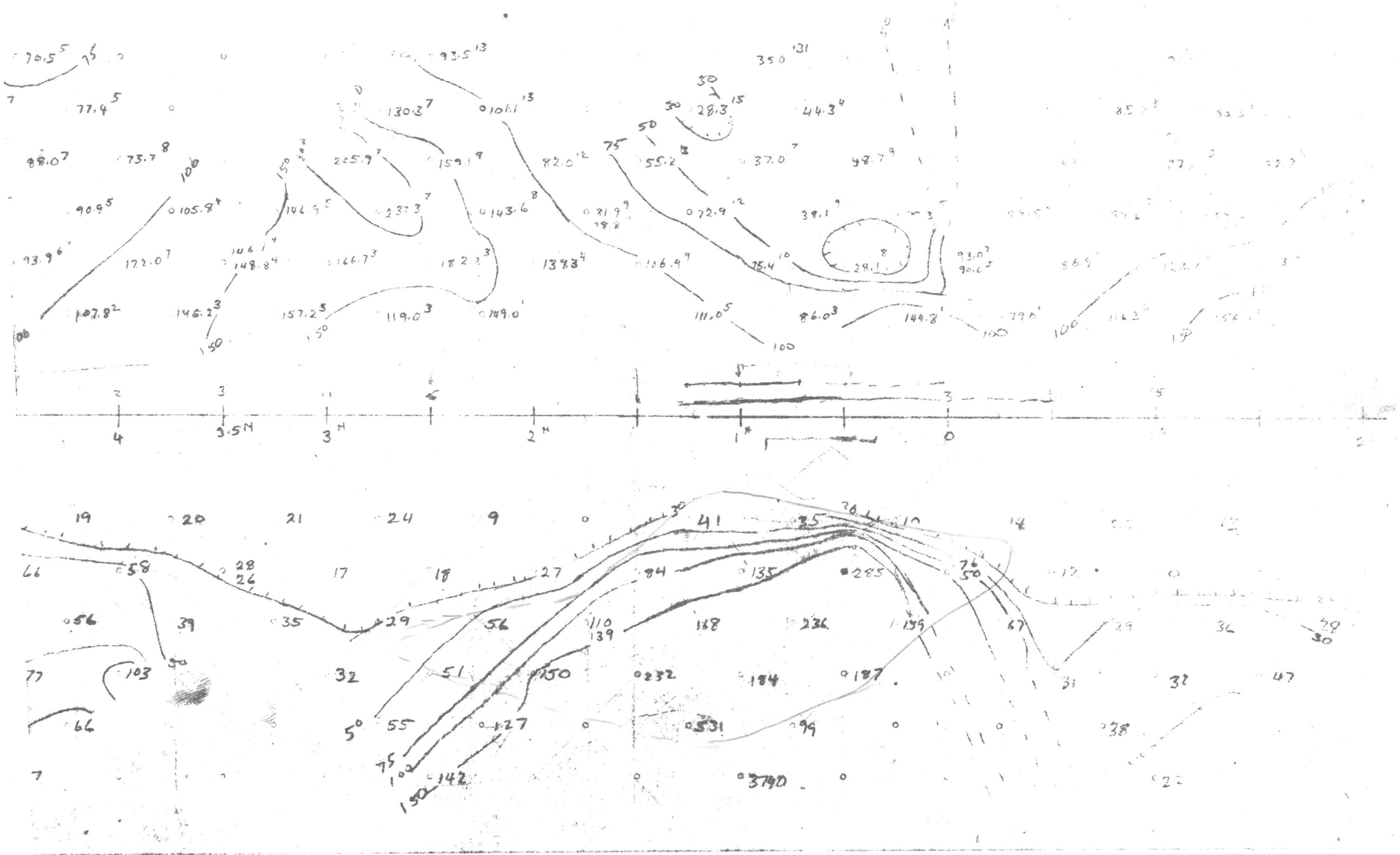


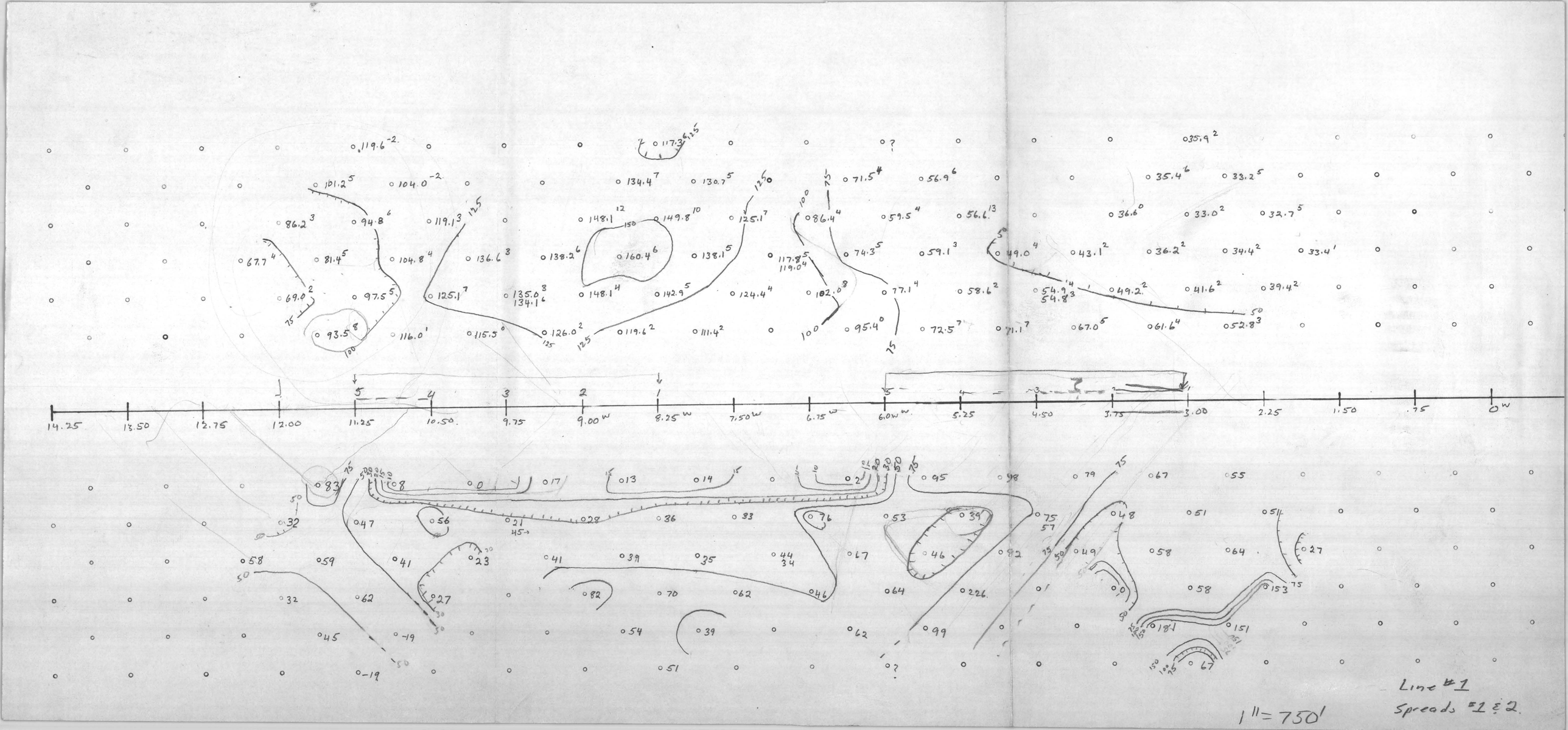
Area Banner Lines 1W & 1E Scale 1" = 750' Date Mar. 14, 61

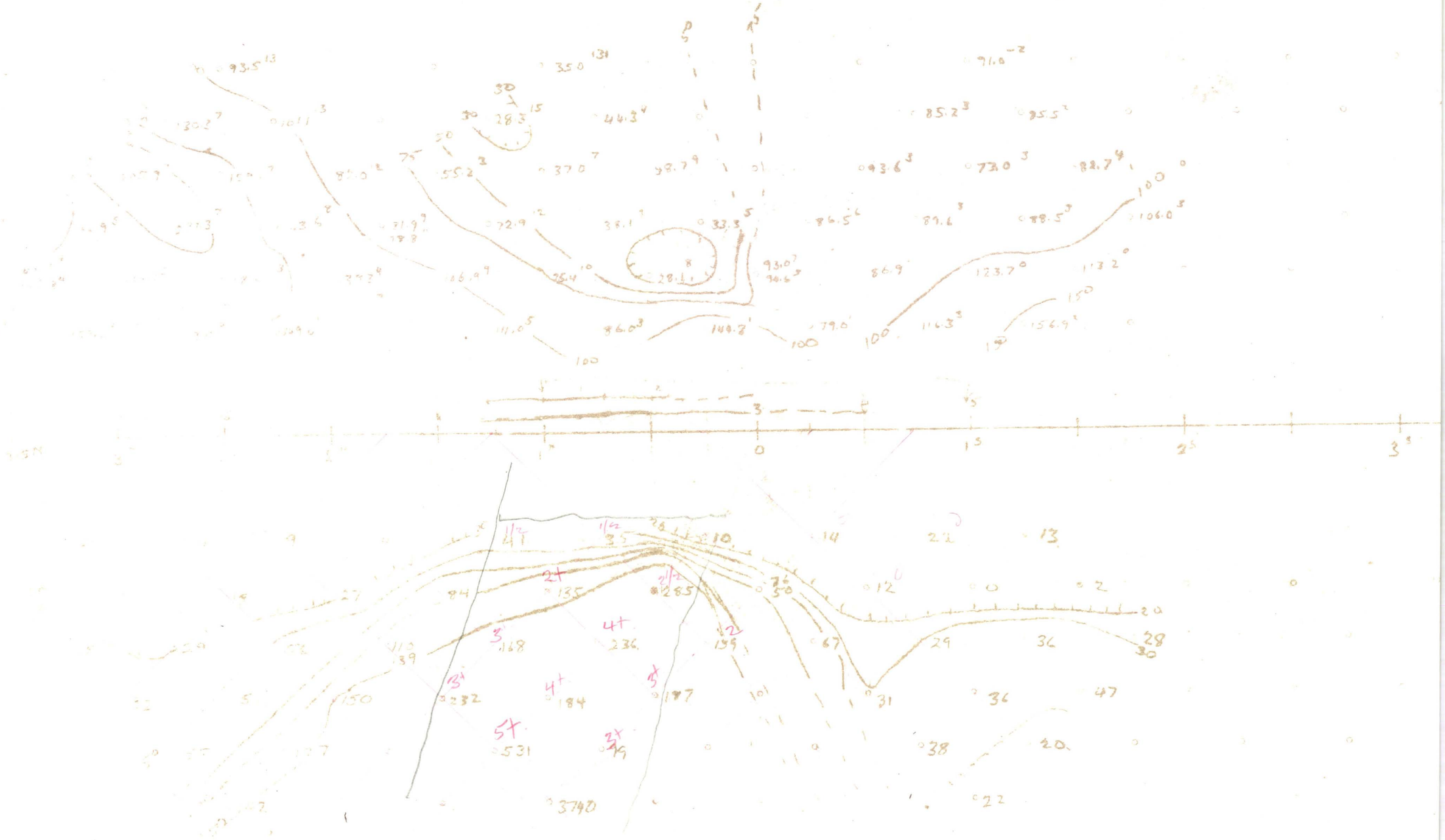


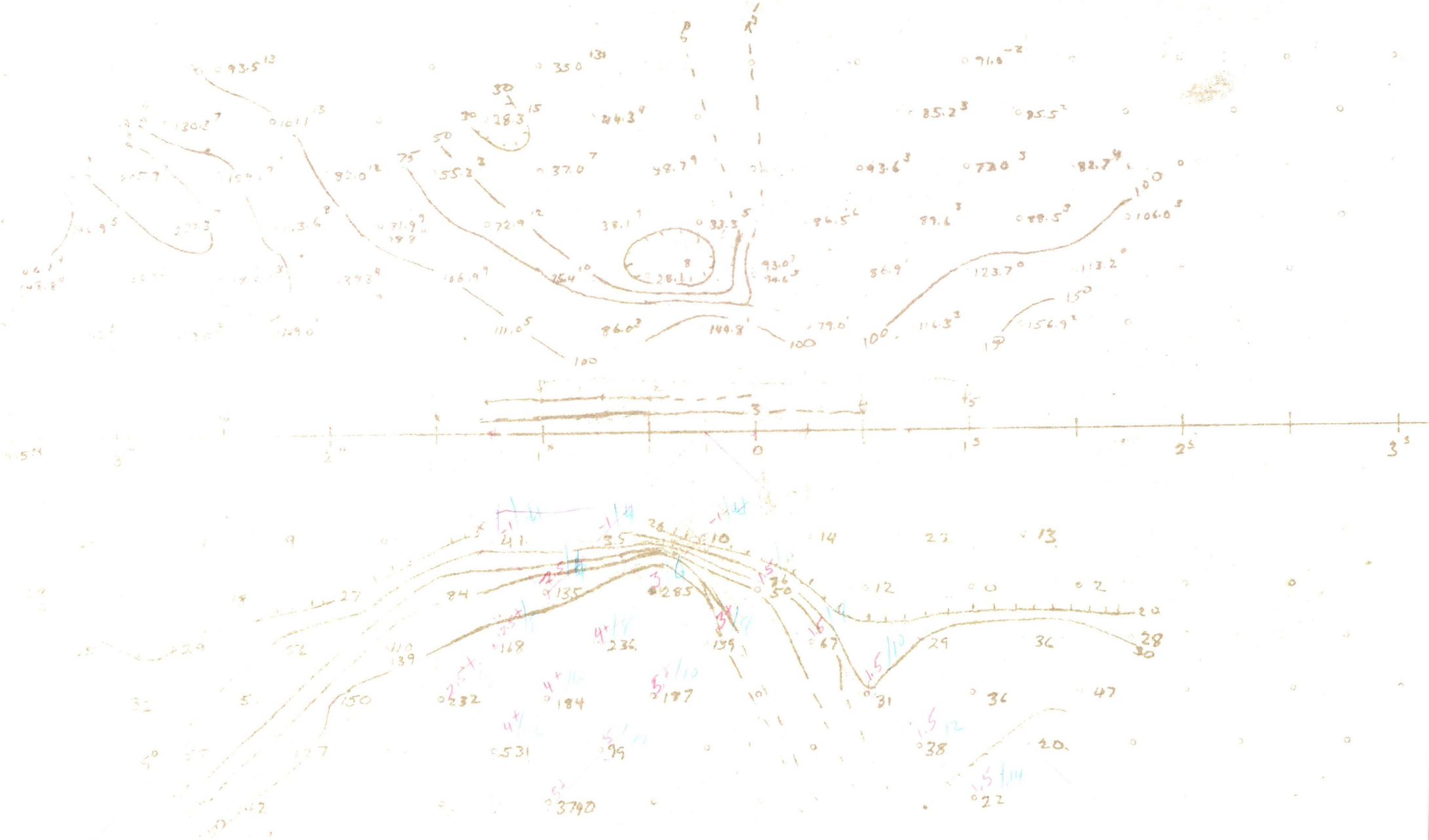

4
3.5N
3N
2N
1N
0

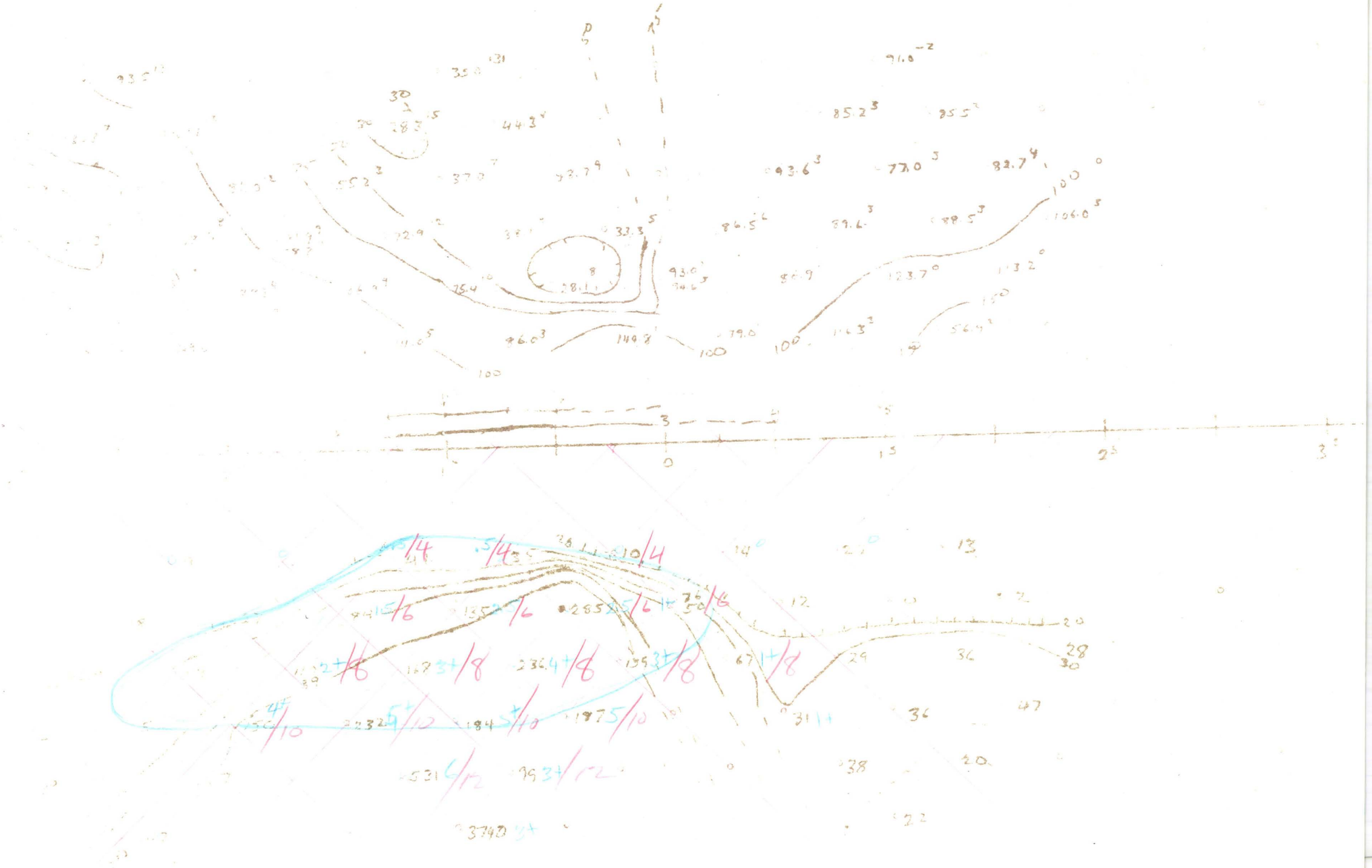

4
3.5N
3 H
2 H
1 H
0


4
3.5N
3 H
2 H
1 H
0


14.25
13.50
12.75
12.00
11.25
10.50
9.75
9.00 W
8.25 W
7.50 W
6.75 W
6.0 W
5.25
4.50
3.75
3.00
2.25
1.50
.75
0 W
Line #1
Spreads #1 & 2
1" = 750'







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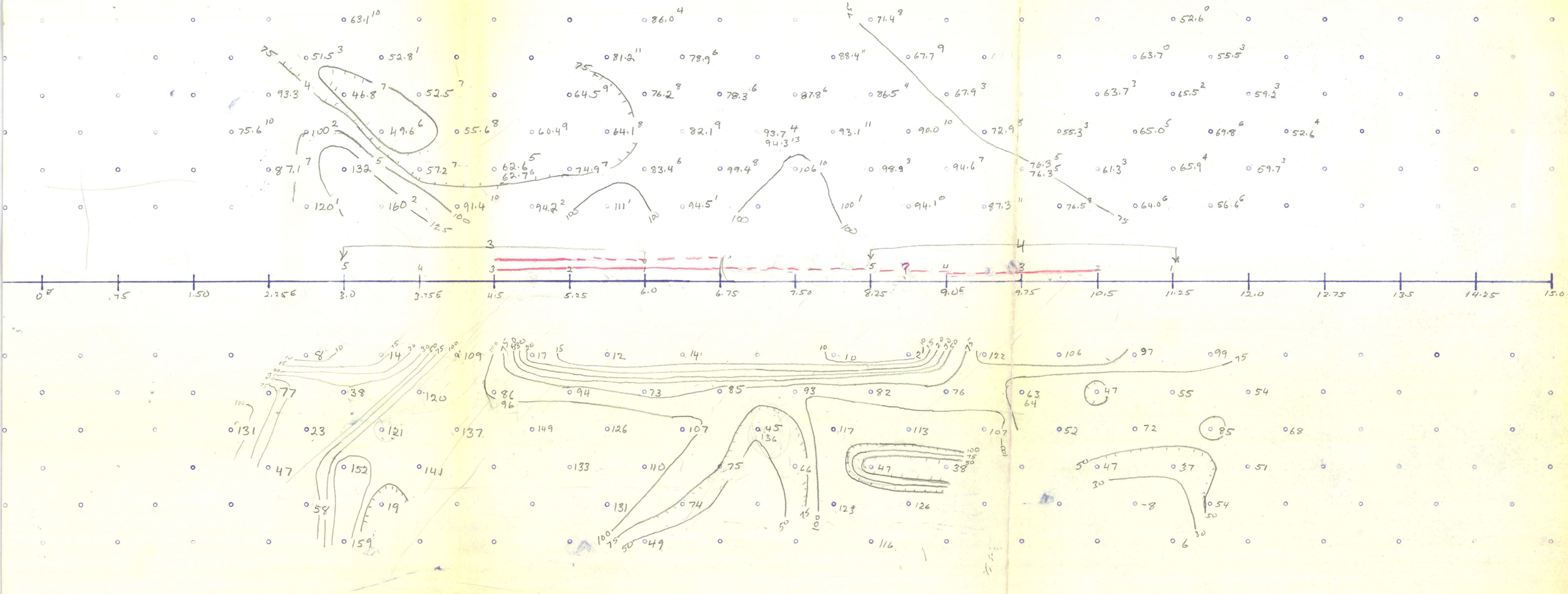
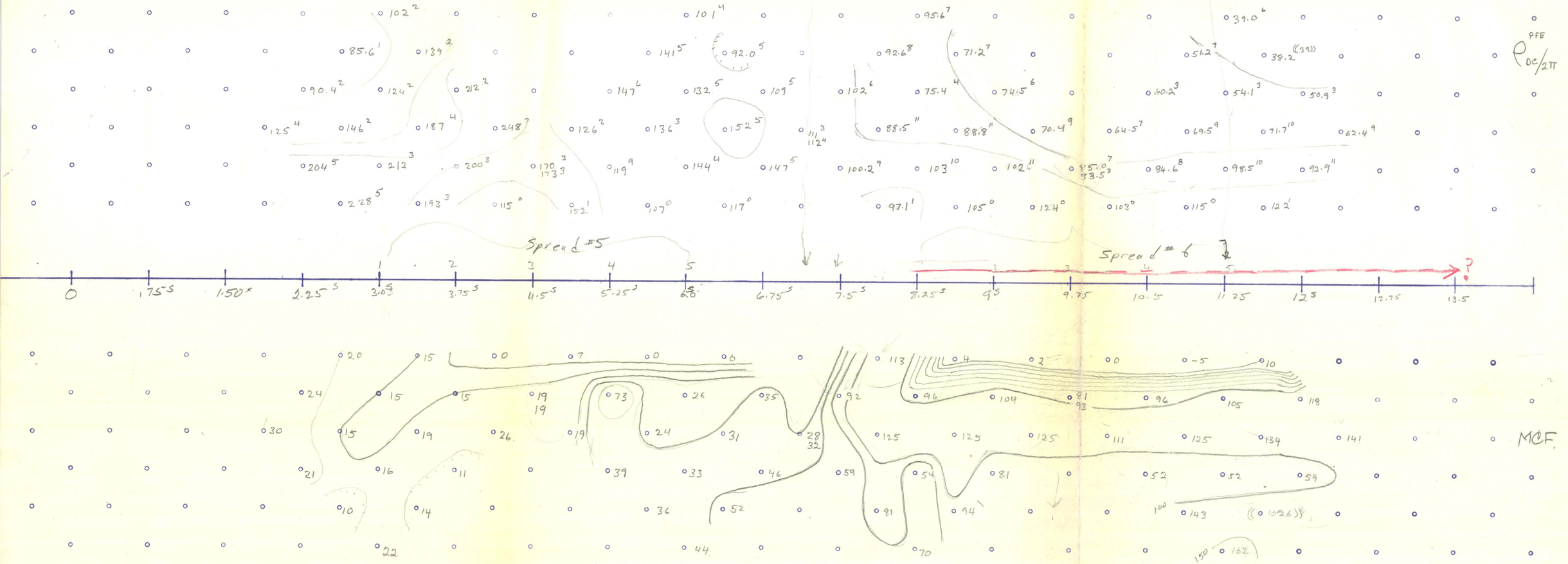
INDUCED POLARIZATION DATA SHEET



spreads #3 & #4

Line # 2 Scale: 1" = 750'

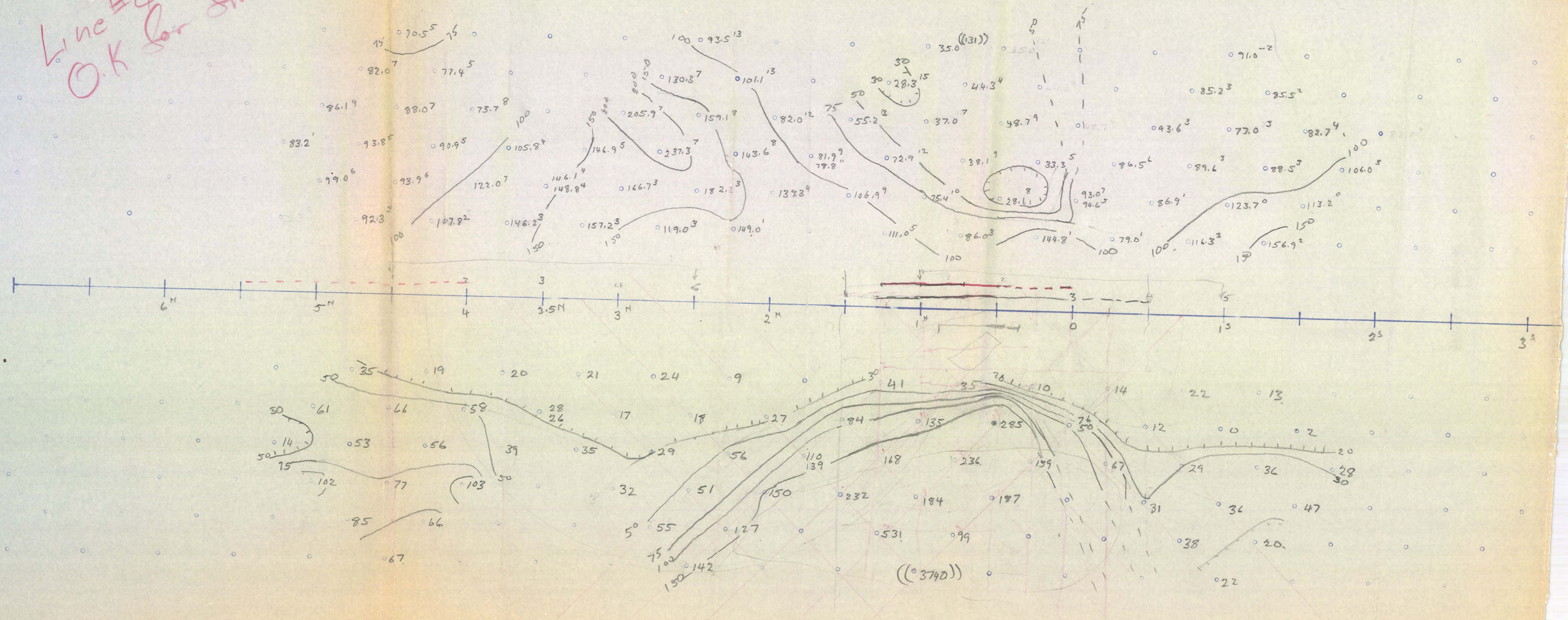
Date: _____



Spread #5
Spread # 6
0
.75s
1.50s
2.25s
3.0s
3.75s
4.5s
5.25s
6.0s
6.75s
7.5s
8.25s
9s
9.75
10.5
11.25
12s
12.75
13.5
?
MCF

Line # 3

Line #4
O.K for Final.



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INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

a = 750'

Project: Banner Line: 1W Inst. Cal _____ Date: 3-13

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		1345	1346	1407	1409	1410	1431	1434	1435	1437	1503	1505
DC-1		37.0 37.0	10.5 10.6	37.8 37.0	9.93 9.92	4.20 4.15	30.0 30.0	7.80 7.68	3.32 3.45	1.68 1.76	5.33 5.30	2.55 2.59
DC-2		37.0 37.0	10.8 10.9	37.2 37.3	9.89 9.87	4.40 4.41	29.8 29.8	7.63 7.70	3.25 3.12	2.01 1.95	5.62 5.68	2.53 2.51
Σ		74.0 74.0	21.3 21.5	75.0 74.0	19.82 19.79	8.60 8.56	59.8 59.8	15.43 15.38	6.57 6.57	3.69 3.71	10.95 10.98	5.08 5.10
DC-3		37.3 37.2	10.4 10.3	37.0 37.0	9.92 9.92	4.17 4.08	29.9 29.9	7.80 7.73	3.40 3.33	2.70 2.76	5.60 5.60	2.60 2.58
Dc-4		36.7 37.0	11.0 10.8	37.4 37.0	9.86 9.86	4.41 4.40	29.8 29.8	7.60 7.62	3.21 3.18	2.01? 2.96	5.30 5.28	2.50 2.53
Σ		74.0 74.2	21.4 21.1	74.4 74.0	19.78 19.78	8.58 8.48	59.7 59.7	15.40 15.35	6.61 6.51	3.71 3.72	10.90 10.88	5.10 5.11
DC-AV		74.0	21.3	74.4	19.79	8.56	59.8	15.39	6.57	3.71	10.93	5.10
AC-1		40.0	11.2	39.8	9.96	4.48	30.0	7.95	3.40	1.94	5.77	2.63
AC-2		40.0	11.2	39.8	9.96	4.48	30.0	7.95	3.40	1.94	5.77	2.63
Σ		80.0	22.4	79.6	19.92	8.96	60.0	15.90	6.80	3.88	11.54	5.26
S. P.		+14.2		+11.0			+8.4				+7.3	
AC-N		.06		.04			.07				.12	

1529	1531
90	67
84	52
88	74
94	66
[illegible]	67
[illegible]	[illegible]
82	72
94	74
.93	.73
.93	[illegible]

1526	1527	1528
67	2.10	1.40
68	2.08	1.36
67	2.20	1.36
68	2.17	1.27
70	2.08	1.40
[illegible]	[illegible]	[illegible]
65	2.19	1.32
69	2.18	1.29
[illegible]	2.22	1.41
[illegible]	2.22	1.41

C-C .09

[illegible]

INDUCED POLARIZATION RECEIVER NOTES PAGE

Project Benner . Line 1 W Int. Cal. Date: 3-13

Send	2-3	1-2	4-5	3-4	2-3	1-2						
Rec.												
Time	1506	1508	1527	1528	1529	1531						
DC-1	1.54 1.41	.93 82	2.10 2.08	1.40 1.35	.90 .84	.67 .52						
DC-2	1.42 1.48	.96 90	2.20 2.17	1.36 1.27	.88 94	.74 .66						
Σ	2.96 2.89	1.89 1.72	4.30 4.25	2.76 2.62	1.78 1.78	1.41 1.18						
DC- 3	1.60 1.32	1.08 96	2.08 2.10	1.40 1.32	.96 .87	.67 .50						
DC-4	1.45 1.56	.76 .91	2.18 2.18	1.32 1.29	.82 .94	.73 .74						
Σ	3.05 2.88	1.83 1.87	4.26 4.28	2.72 2.61	1.78 1.81	1.39 1.24						
DC-Av	2.95	1.83	4.27	2.68	1.79	1.31						
AC-1	1.55	1.02	2.22	1.41	.93	.73						
AC- 2	1.55	1.02	2.22	1.41	.93	.73						
Σ	3.10	2.04	4.44	2.82	1.86	1.46						
S.P.	+7.4		+5.3									
AC-N	.12		.09									

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Bandoc Line: 1W Int.Cal. _____ Date: 3-13

Send	3-4	3-4	3-4		3-4	3-4	3-4					
Rec.	Cal	Cal	Cal		Cal	Cal	Cal					
Time	1338	1339	1340		1555	1556	1557					
DC-1	14.1	25.8	35.2		13.9	25.0	34.2					
DC-2	14.1	25.8	35.2		13.9	25.0	34.2					
Σ	28.2	51.6	70.4		27.8	50.0	68.4					
DC-3	14.1	25.8	35.2		13.9	25.0	34.2					
DC-4	14.1	25.8	35.2		13.9	25.0	34.2					
Σ	28.2	51.6	70.4		27.8	50.0	68.4					
DC-AV	28.2	51.6	70.4		27.8	50.0	68.4					
AC-1	15.0	26.7	38.6		14.7	26.1	37.9					
AC-2	15.0	26.7	38.6		14.7	26.1	37.9					
Σ	30.0	53.4	77.2		29.4	52.2	75.8					
S. P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

Project: BANKER Line: 1W Date: 13 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		1345	1346	1408	1409	1410	1433	1434	1435	1437	1503	1504
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	1420	1440	1420	1410	1440	1420	1410	1400	1425	1410
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	—	—	—	—	—
Receive							CAL	—	—	—	—	—
Time	1506	1508	1521	1522	1524	1525	1338	1339	1340	1554	1555	1556
Range	1.5	1.5	1.5	1.5	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1400	1385	1420	1400	1390	1380	285	510	710	280	500	700

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

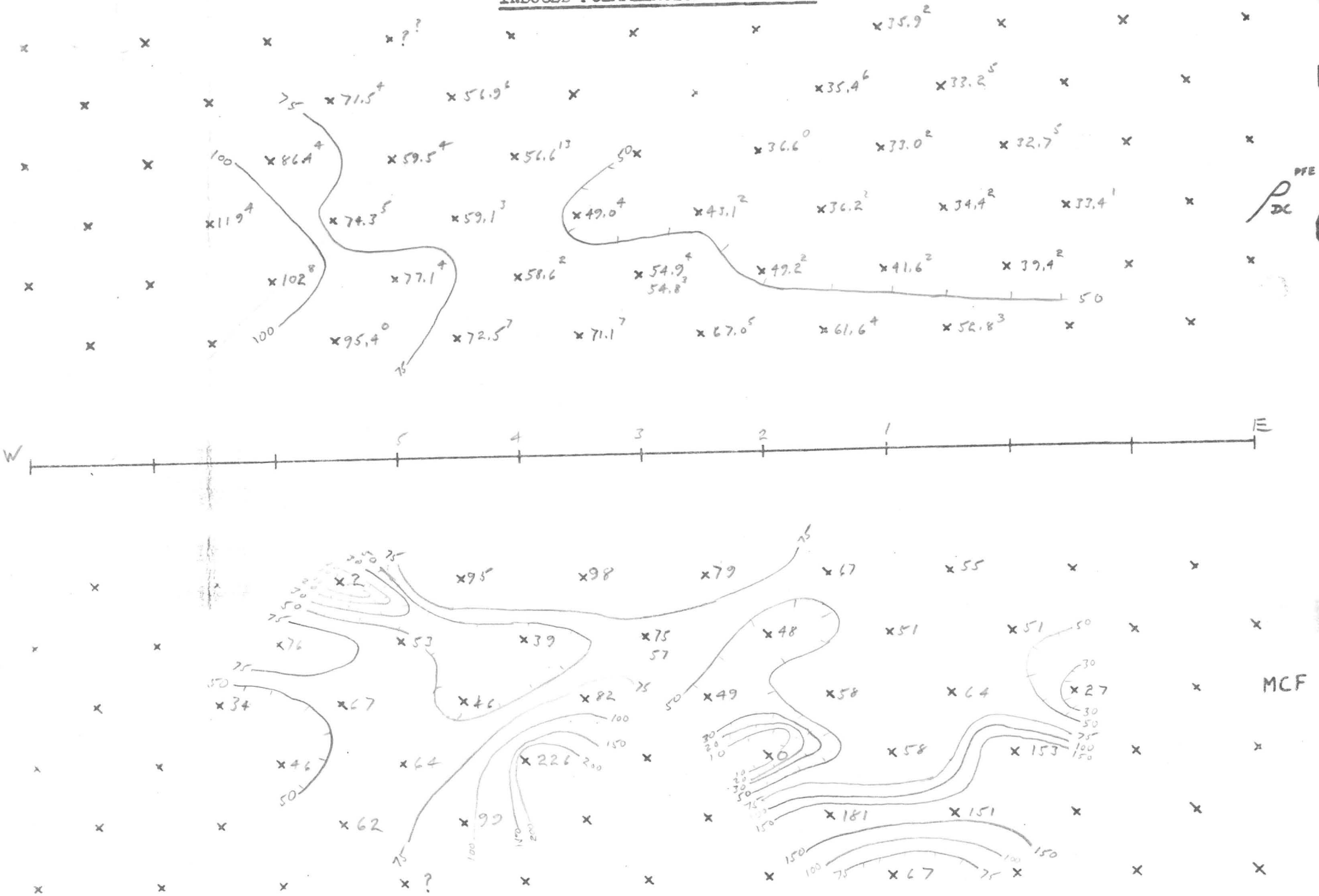
Project Banner Line 1W Field date Mar. 13, 61 Data page _____ Comp. date Mar. 14, 61. Comp by C.S.L.

(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											
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1440	1420	1440	1420	1410	1440	1420	1410	1400	1425	1410
(E) Vdc (avg)		74.0	21.3	74.4	19.79	8.56	59.8	15.39	6.57	3.71	10.93	5.10
(F) DCcal USED	1.000											
(G) Kn x 10^{-3} (a = 750')		2.25	9.00	2.25	9.00	22.5	2.25	9.00	22.5	45.0	9.00	22.5
(H) ρ dc=ExFxGx10^3/D		115.5	135.0	116.0	125.1	136.6	93.5	97.5	104.8	119.1	69.0	81.4
(I) Vac Σ		80.0	22.4	79.6	19.92	8.96	60.0	15.90	6.80	3.88	11.54	5.26
(J) AC noise x 2		.12	.12	.08	.08	.08	.14	.14	.14	.14	.24	.24
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		80.0	22.4	79.6	19.92	8.96	60.0	15.90	6.80	3.88	11.54	5.26
(L) AC-DC cal. USED	1.080											
(M) ρ dc/ρac=ExL/K		1.000	1.028	1.009	1.070	1.031	1.078	1.046	1.043	1.032	1.022	1.048
(N) PFE=(M-1)(10^2)		0	3	1	7	3	8	5	4	3	2	5
(O) MCF=(M-1)(10^5)/H		0	21	8	56	23	83	47	41	27	32	59

Project Banner Line 1W Field date Mar. 13, 61 Data page _____ Comp. date Mar. 14, 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							CAL	CAL	→			→
(C) n separation	4	5	3	4	5	6						
(D) I	1400	1385	1420	1400	1390	1380		285	510	710	280	500	700
(E) Vdc (avg)	2.95	1.83	4.27	2.68	1.79	1.31		28.2	51.6	70.4	27.8	50.0	68.4
(F) DCcal						→ USED	1.000	1.010	.989	1.009	1.008	1.000	1.023
(G) Kn x 10^{-3}	45.0	78.75	22.5	45.0	78.75	126							
(H) ρ dc=ExFxGx10^3/D	94.8	104.0	67.7	86.2	101.2	119.6			1.000				
(I) Vac Σ	3.10	2.04	4.44	2.82	1.86	1.46		30.0	53.4	77.2	29.4	52.2	75.8
(J) AC noise x 2	.24	.24	.18	.18	.18	.18							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	3.09	2.02	4.44	2.82	1.85	1.45							
(L) AC-DC cal.					→	USED	1.080	1.062	1.033	1.098	1.058	1.043	1.109
(M) ρdc/ρac =ExL/K	1.059	.980	1.039	1.028	1.045	.977							
(N) PFE=(M-1)(10^2)	6	-2	4	3	5	-2			1.080				
(O) MCF=(M-1)(10^5)/H	62	-19	58	32	45	-19							

INDUCED POLARIZATION WORK SHEET



Area Banner : Lines 2E & 2W Scale a = 250' Date Nov. 29, 61

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project BANNER Line 3E Field date 3-17-61 Data page _____ Comp. date Mar. 20, 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	5.25 – 6.00		6.0 – 6.75E →			6.75 – 7.50 →				7.5 – 8.25 →	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1445	1415	1450	1420	1400	1440	1415	1400	1395	1420	1400
(E) Vdc (avg)		61.1	9.95	72.5	11.91	3.80	61.0	13.23	4.03	2.02	15.85	5.16
(F) DCcal USED	.990											
(G) Kn x 10^{-3} (a = 750')		2.25	9.00	2.25	9.00	22.5	2.25	9.00	22.5	45.0	9.00	22.5
(H) ρ dc=ExFxGx10^3/D		94.2	62.7	111	74.9	60.4	94.5	83.4	64.1	64.5	99.4	82.1
(I) Vac Σ		61.4	9.58	73.2	11.36	3.56	61.4	12.72	3.80	1.90	14.90	4.84
(J) AC noise x 2		.04	.04	.12	.12	.12	.06	.06	.06	.06	.12	.12
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		61.4	9.58	73.2	11.36	3.56	61.4	12.72	3.80	1.90	14.90	4.84
(L) AC-DC cal. USED	1.020											
(M) ρ dc/ρac=ExL/K		1.016	1.060	1.013	1.070	1.090	1.013	1.061	1.081	1.086	1.084	1.088
(N) PFE=(M-1)(10^2)		2	6	1	7	9	1	6	8	9	8	9
(O) MCF=(M-1)(10^5)/H		17	96	12	94	149	14	73	126	133	85	107

Project Banner Line 3E Field date Mar. 17, 61 Data page _____ Comp. date Mar. 20, 61 Comp by C.S.L.

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3					
(B) Receive	7.5 – 8.25E →		8.25 – 9.0E →				Cal					
(C) n separation	4	5	3	4	5	6						
(D) I	1380	1375	1410	1395	1375	1365		288	500	710	287	496	700
(E) Vdc (avg)	2.36	1.43	5.93	2.45	1.39	.94		292	520	720	280	514	704
(F) DCcal							USED .990	.986	.962	.986	1.025	.965	.994
(G) Kn x 10^{-3} (a = 750')	45.0	78.75	22.5	45.0	78.75	126							
(H) ρ dc=ExFxGx10^3/D	76.2	81.2	93.7	78.3	78.9	86.0							
(I) Vac Σ	2.22	1.32	5.80	2.36	1.34	.92		284	492	736	278	486	724
(J) AC noise x 2	.12	.12	.06	.06	.06	.06							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.22	1.32	5.80	2.36	1.34	.92							
(L) AC-DC cal.							USED 1.020	.973	.946	1.022	.993	.946	1.028
(M) ρdc/ρac =ExL/K	1.084	1.106	1.042	1.059	1.058	1.042							
(N) PFE=(M-1)(10^2)	8	11	4	6	6	4							
(O) MCF=(M-1)(10^5)/H	110	131	45	75	74	49							

INDUCED POLARIZATION SURVEY - RECEIVER NOTES

Project: Bodoc Line: 3E Int. Cal. Date: 3-17

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	5.25-6.00		6.0-6.75	3E →		6.75-7.50		→		7.5-8.25 →	
Time	1416	1418	1434	1435	1437	1453	1455	1456	1458	1508	1511
DC-1	31.0	5.2	36.6	6.20	1.90	30.9	6.40	2.09	92	8.04	2.78
	30.0	4.95	36.5	6.15	1.87	30.7	6.49	2.04	82	8.03	2.61
DC-2	30.9	4.95	36.0	5.72	1.90	30.5	6.80	1.92	1.15	7.79	2.43
	30.9	4.89	36.0	5.79	1.96	30.5	6.80	1.98	1.18	7.88	2.52
Σ	61.9	10.15	72.6	11.92	3.80	61.4	13.20	4.01	2.07	15.83	5.21
	60.9	9.84	72.5	11.94	3.82	61.2	13.29	4.02	2.00	15.91	5.13
DC-3	30.3	5.20	36.5	6.08	1.79	30.6	6.40	2.12	89	8.06	2.49
	30.5	5.39	36.5	6.05	1.92	30.5	6.40	2.03	93	8.00	2.49
DC-4	30.3	4.60	36.0	5.81	1.98	30.2	6.81	1.88	1.07	7.80	2.67
	30.5	4.62	36.0	5.83	1.89	30.1	6.81	2.06	1.10	7.85	2.68
Σ	60.6	9.80	72.5	11.89	3.77	60.8	13.21	4.00	1.96	15.80	5.15
	61.0	10.01	72.5	11.88	3.81	60.6	13.21	4.09	2.03	15.85	5.16
DC-AV.	61.1	9.95	72.5	11.91	3.80	61.0	13.23	4.02	2.02	15.85	5.16
AC-1	30.7	4.79	36.6	5.68	1.78	30.7	6.36	1.90	.95	7.45	2.42
AC-2	30.7	4.79	36.6	5.68	1.78	30.7	6.36	1.90	.95	7.45	2.42
Σ	61.4	9.58	73.2	11.36	3.56	61.4	12.72	3.80	1.90	14.90	4.84
S.P.	+6.7		+6.5			+0.9				+1.0	
AC-N	.02		.06			.03				.06	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Line: Int. Cal. Date:

Send	3-4	4-5	1-2	2-3	3-4	4-5
Rec.	7.5	8.25E	8.25	9.0E	→	
Time	1512	1513	1525	1529	1533	1537
DC-1	1.21	.73	3.20	1.02	.67	.49
	1.21	.74	3.16	.97	.88	.47
	1.14	.70	2.81	1.44	.67	.43
DC-2	1.14	.69	2.82	1.46	.49	.49
Σ	2.35	1.43	6.01	2.46	1.34	.92
	2.35	1.43	5.92	2.43	1.37	.96
DC-3	1.21	.73	2.98	1.39	.89	.37
	1.18	.71	3.00	1.41	.78	.26
DC-4	1.17	.70	3.02	1.09	.59	.62
	1.19	.72	2.80	1.05	.59	.63
Σ	2.38	1.43	6.00	2.43	1.48	.99
	2.37	1.42	5.80	2.46	1.37	.89
DC-AV	2.36	1.43	5.93	2.45	1.39	.94
AC-1	1.11	.66	2.90	1.18	.67	.46
AC-2	1.11	.66	2.90	1.18	.67	.46
Σ	2.22	1.32	5.80	2.36	1.34	.92
S. P.	+1.0		+6.1			
AC-N	.06		.03			

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Banna Line: 3E Inv.Cal _____ Date: 3-4

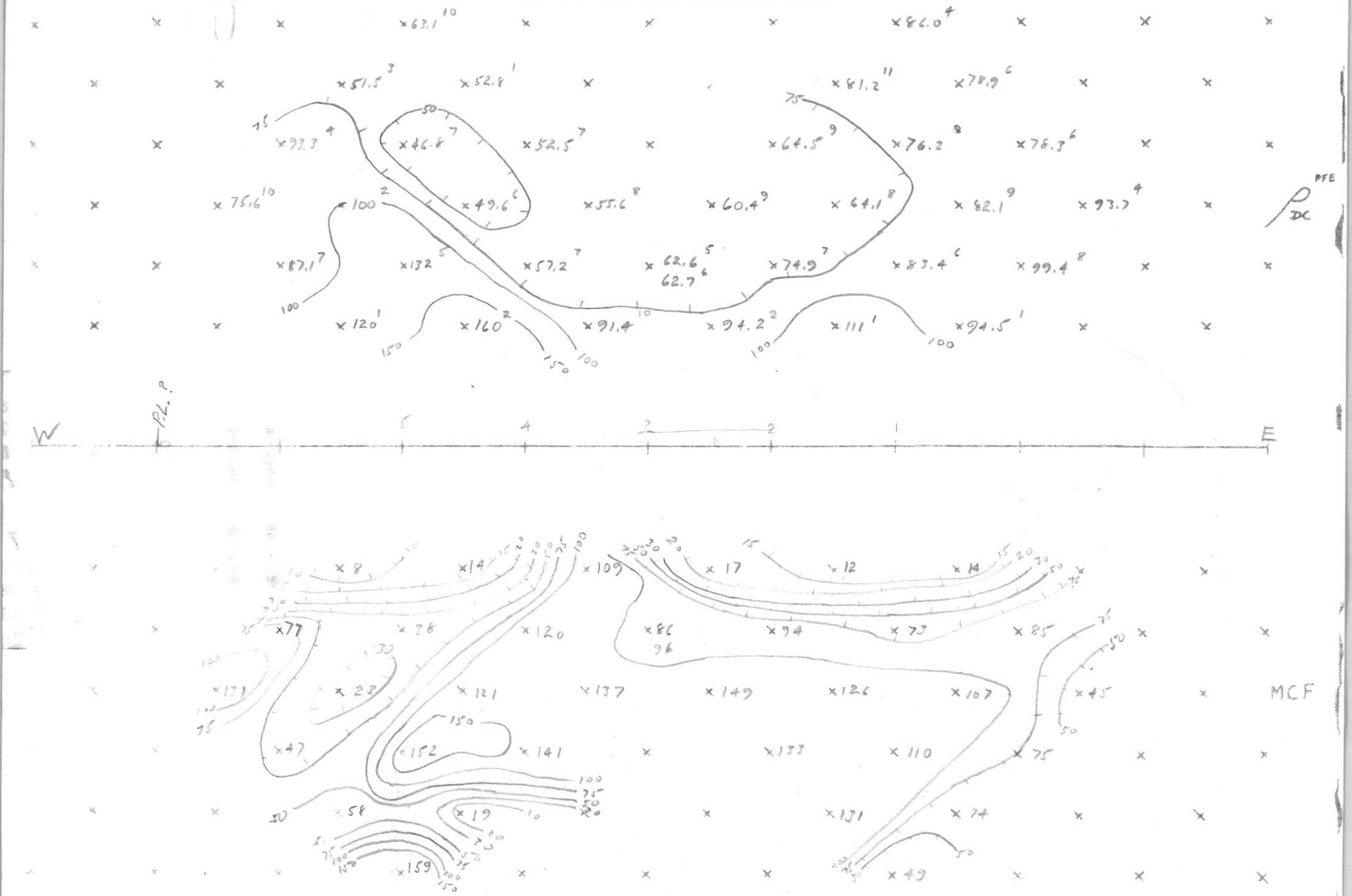
Send	2-3	2-3	2-3		2-3	2-3	2-3					
Rec.	Cal	Cal	Cal		Cal	Cal	Cal					
Time	1410	1411	1412		1555	1556	1557					
DC-1	14.6	26.0	36.0		14.0	25.7	35.2					
DC-2	14.6	26.0	36.0		14.0	25.7	35.2					
Σ	29.2	52.0	72.0		28.0	51.4	70.4					
DC-3	14.6	26.0	36.0		14.0	25.7	35.2					
Dc-4	14.6	26.0	36.0		14.0	25.7	35.2					
Σ	29.2	52.0	72.0		28.0	51.4	70.4					
DC-AV	29.2	52.0	72.0		28.0	51.4	70.4					
AC-1	14.2	24.6	36.8		13.9	24.3	36.2					
AC-2	14.2	24.6	36.8		13.9	24.3	36.2					
Σ	28.4	49.2	73.6		27.8	48.6	72.4					
S. P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: 3E Date: 17MAR

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		1416	1418	1434	1435	1437	1453	1455	1456	1458	1508	1511
Range		1.5	—	—	—	—	—	—	—	—	—	→
Current		1445	1415	1450	1420	1400	1440	1415	1400	1395	1420	1400
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	—	—	—	—	→
Receive							CAL	—	—	—	—	→
Time	1512	1515	1525	1529	1533	1537	1410	1411	1412	1555	1556	1557
Range	—	—	—	—	—	→	.3	.5	.75	.3	.5	.75
Current	1380	1375	1410	1395	1375	1365	288	500	710	287	496	700

INDUCED POLARIZATION WORK SHEET



Banner Lines 3E & 3W Scale a = 750' Date Mar. 20, 61

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project BANNER Line 3 W Field date 3-17-61 Data page _____ Comp. date Mar. 20, 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	3.0 – 3.75E →		2.25 – 3.0E →			1.5 – 2.25E →				.75 – 1.5E →	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1455	1425	1450	1425	1410	1440	1420	1410	1400	1420	1410
(E) Vdc (avg)		60.0	10.08	105.0	9.20	3.54	77.9	21.2	3.16	1.66	13.95	6.38
(F) DCcal USED	.985											
(G) Kn x 10^{-3} (a = 750')		2.25	9.0	2.25	9.0	22.5	2.25	9.0	22.5	45.0	9.0	22.5
(H) ρdc=ExFxGx10^3/D		91.4	62.6	160	57.2	55.6	120	132	49.6	52.5	87.1	100
(I) Vac Σ		55.6	9.76	104.8	8.82	3.48	78.6	20.6	3.20	1.92	13.34	6.36
(J) AC noise x 2		.28	.28	.90	.90	.90	1.00	1.00	1.00	1.00	.28	.28
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		55.6	9.76	104.8	8.78	3.36	78.6	20.6	3.04	1.575	13.34	6.36
(L) AC-DC cal. USED	1.020											
(M) ρdc/ρac=ExL/K		1.100	1.054	1.022	1.069	1.076	1.010	1.050	1.060	1.074	1.067	1.037
(N) PFE=(M-1)(10^2)		10	5	2	7	8	1	5	6	7	7	2
(O) MCF=(M-1)(10^5)/H		109	86	14	120	137	8	38	121	141	77	23

Project Banner Line 3 W Field date Mar. 17, 61 Data page _____ Comp. date Mar. 20, 61 C.S.L.

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4					
(B) Receive	.75 – 1.5E →		0 – .75E →				Cal					
(C) n separation	4	5	3	4	5	6						
(D) I	1400	1395	1420	1400	1390	1375		285	495	690	289	498	700
(E) Vdc (avg)	1.48	.95	4.85	2.95	.92	.70		282	510	704	282	516	712
(F) DCcal							USED .985	1.011	.971	.980	1.023	.965	.983
(G) Kn x 10^{-3} (a = 750')	45.0	78.75	22.5	45.0	78.75	126							
(H) ρdc=ExFxGx10^3/D	46.8	52.8	75.6	93.3	51.5	62.1							
(I) Vac Σ	1.48	1.00	4.50	2.88	.92	.66		280	486	720	280	486	726
(J) AC noise x 2	.28	.28	.12	.12	.12	.12							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.41	.96	4.50	2.88	.911	.65							
(L) AC-DC cal.							USED-1.020	.993	.953	1.023	.993	.942	1.020
(M) ρdc/ρac =ExL/K	1.071	1.010	1.100	1.044	1.030	1.100							
(N) PFE=(M-1)(10^2)	7	1	10	4	3	10							
(O) MCF=(M-1)(10^5)/H	152	19	131	47	58	159							

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Bandar Line: 3 W Int.Cal Date: 3-17

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		3-0-3.75E →		2.25-3.0E →			1.5-2.25E →				.75-1.5E →	
Time		1051	1053	1106	1107	1108	11:37	1138	1140	1142	1158	1200
DC-1		30.0	5.10	52.8	4.72	1.80	39.9	11.7	1.48	.70	7.00	3.10
		30.0	5.17	52.7	4.71	1.76	39.8	11.8	1.38	.82	6.94	3.18
DC-2		30.0	5.02	52.7	4.49	1.78	38.2	9.4	1.72	1.03	7.00	3.30
		30.0	4.88	52.7	4.49	1.82	38.0	9.5	1.78	.80	7.01	3.18
Σ		60.0	10.12	105.5	9.21	3.58	78.1	21.1	3.20	1.73	14.00	6.40
		60.0	10.05	105.4	9.20	3.52	77.8	21.3	3.16	1.63	13.95	6.36
DC-3		30.0	5.23	52.5	4.75	1.69	39.9	11.5	1.56	.66	6.93	3.20
		30.0	5.26	52.4	4.68	1.80	39.9	11.6	1.50	1.01	6.99	3.05
Dc-4		30.0	4.80	52.4	4.42	1.84	38.0	9.8	1.62	.98	7.00	3.21
		30.0	4.82	52.3	4.55	1.71	38.0	9.4	1.65	.62	6.93	3.31
Σ		60.0	10.06	104.9	9.17	3.53	77.9	21.3	3.12	1.64	13.93	6.41
		60.0	10.08	104.7	9.23	3.51	77.9	21.0	3.15	1.63	13.92	6.36
C-AV		60.0	10.08	105.0	9.20	3.54	77.9	21.2	3.16	1.66	13.95	6.38
C-1		27.8	4.88	52.4	4.41	1.74	39.3	10.3	1.60	.96	6.67	3.18
AC-2		27.8	4.88	52.4	4.41	1.74	39.3	10.3	1.60	.96	6.67	3.18
Σ		55.6	9.76	104.8	8.82	3.48	78.6	20.6	3.20	1.92	13.34	6.36
S. P.		-2.3		+10.7			+9.3				+8.2	
AC-N		.14		.45			.50				.19	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: 3W Int.Cal. Date: 3-16

Send	2-3	1-2	4-5	3-4	2-3	1-2
Rec.	.75-1.5 E →		0-.75 E →			
Time	1201	1202	1216	1220	1222	1225
DC-1	74	49	2.49	1.40	48	31
	66	60	2.50	1.45	41	17
	78	42	2.34	1.60	40	38
DC-2	80	33	2.36	1.52	51	52
Σ	1.52	.91	4.83	3.00	.88	.69
	1.46	.93	4.86	2.97	.92	.69
DC-3	76	63	2.21	1.35	42	56
	77	51	2.25	1.30	31	27
DC-4	72	31	2.63	1.60	49	24
	70	52	2.60	1.57	69	40
Σ	1.48	.94	4.84	2.95	.91	.74
	1.47	1.03	4.85	2.87	.85	.67
DC-AV	1.48	.95	4.85	2.95	.92	.70
AC-1	74	.50	2.25	1.44	46	33
AC-2	74	50	2.25	1.44	.46	.33
Σ	1.48	1.00	4.50	2.88	.92	.66
S. P.	+8.2		+1.6			
AC-N	.14		.06			

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Banner Line: 3W Int.Cal. 53.0 Date: 3-17

Send	3-4	3-4	3-4		3-4	3-4	3-4				
Rec.	Cal	Cal	Cal		Cal	Cal	Cal				
Time	1045	1046	1047		1255	1256	1257				
DC-1	14.1	25.5	35.2		14.1	25.8	35.6				
DC-2	14.1	25.5	35.2		14.1	25.8	35.6				
Σ	28.2	51.0	70.4		28.2	51.6	71.2				
DC-3	14.1	25.5	35.2		14.1	25.8	35.6				
DC-4	14.1	25.5	35.2		14.1	25.8	35.6				
Σ	28.2	51.0	70.4		28.2	51.6	71.2				
DC-AV	28.2	51.0	70.4		28.2	51.6	71.2				
AC-1	14.0	24.3	36.0		14.0	24.3	36.3				
AC-2	14.0	24.3	36.0		14.0	24.3	36.3				
Σ	28.0	48.6	72.0		28.0	48.6	72.6				
S. P.											
AC-N											

INDUCED POLARIZATION SENDER NOTES

Project: BAUNER Line: 3W Date: 17 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		1051	1053	1106	1107	1108	1137	1138	1140	1141	1158	1200
Range		1.5	→									
Current		1455	1425	1450	1425	1410	1440	1420	1410	1400	1420	1410
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	→				
Receive							CAL	→				
Time	1201	1202	1215	1220	1222	1225	1045	1046	1047	1255	1256	1257
%Range	→						.3	.5	.75	.3	.5	.75
Current	1400	1395	1420	1400	1390	1375	285	495	690	289	498	700

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project Banner Line 4E Field date Mar. 20, 61 Data page _____ Comp. date Mar. 21, 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	10.50 —	11.25 →	11.25 —	12.00	→	12.00 —	12.75	→	→	12.75 —	13.50
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1450	1420	1445	1420	1405	1425	1410	1400	1385	1415	1405
(E) Vdc (avg)		49.8	12.15	41.5	9.76	3.49	36.2	10.42	4.08	1.98	9.47	4.40
(F) DCcal USED	.990											
(G) Kn x 10^{-3} (a = 750')		2.25	9.00	2.25	9.00	22.5	2.25	9.00	22.5	45.0	9.00	22.5
(H) ρ dc=ExFxGx10^3/D		76.5	76.3	64.0	61.3	55.3	56.6	65.9	65.0	63.7	59.7	69.8
(I) Vac Σ		47.0	11.82	39.8	9.68	3.46	35.0	10.28	3.98	1.96	9.36	4.24
(J) AC noise x 2		.08	.08	.08	.08	.08	.06	.06	.06	.06	.06	.06
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		47.0	11.82	39.8	9.68	3.46	35.0	10.28	3.98	1.96	9.36	4.24
(L) AC-DC cal. USED	1.020											
(M) ρ dc/ρac=ExL/K		1.081	1.049	1.062	1.023	1.029	1.056	1.036	1.047	1.030	1.032	1.059
(N) PFE=(M-1)(10^2)		8	5	6	3	3	6	4	5	3	3	6
(O) MCF=(M-1)(10^5)/H		106	64	97	47	52	99	55	72	47	54	85

Project Banner Line 4E Field date Mar. 20, 61 Data page _____ Comp. date Mar. 21, 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	→	→	13.50 —	14.25 —		→	CAL	CAL				
(C) n separation	4	5	3	4	5	6						
(D) I	1395	1385	1410	1400	1390	1375		285	500	710		
(E) Vdc (avg)	2.05	1.13	3.33	1.86	.99	.58		28.8	52.0	71.8		
(F) DCcal						USED	.990	.990	.962	.989		
(G) Kn x 10^{-3} (a = 750')	45.0	78.75	22.5	45.0	78.75	126						
(H) ρ dc=ExFxGx10^3/D	65.5	63.7	52.6	59.2	55.5	52.6						
(I) Vac Σ	2.04	1.16	3.28	1.84	.98	.60		28.2	49.4	73.4		
(J) AC noise x 2	.06	.06	.08	.08	.08	.08						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.04	1.16	3.28	1.84	.98	.59						
(L) AC-DC cal.						USED	1.020	.980	.950	1.021		
(M) ρdc/ρac =ExL/K	1.024	.995	1.036	1.030	1.030	1.003						
(N) PFE=(M-1)(10^2)	2	0	4	3	3	0						
(O) MCF=(M-1)(10^5)/H	37	-8	68	51	54	6						

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Banna . Line 4 E Int.Cal. Date: 3-20

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.		10.50	11.25 →	11.25	2.00	→	12.00	12.75	→	→	12.75	13.50
Time		1217	1219	1233	1235	1239	1251	1253	1254	1256	1307	1308
DC-1		24.9 24.8	5.91 5.78	20.8 20.8	5.00 5.00	1.61 1.86	18.4 18.2	5.13 5.06	1.81 1.82	98 1.12	4.60 4.60	2.19 2.13
DC-2		25.0 25.0	6.19 6.40	20.8 20.8	4.79 4.81	1.81 1.59	18.0 18.0	5.39 5.34	2.24 2.25	97 84	4.95 4.86	2.24 2.25
Σ		49.9 49.8	12.10 12.18	41.6 41.6	9.79 9.81	3.42 3.45	36.4 36.2	10.52 10.40	4.05 4.07	1.95 1.96	9.55 9.46	4.43 4.38
DC- 3		24.8 24.8	5.86 5.79	20.8 20.7	4.72 4.92	1.86 1.80	18.2 18.1	5.30 5.39	1.80 1.70	1.04 97	4.70 4.60	2.18 2.18
DC-4		24.9 24.9	6.21 6.46	20.7 20.6	5.00 4.78	1.72 1.69	18.0 18.0	5.06 5.02	2.30 2.41	98 1.02	4.81 4.84	2.20 2.22
Σ		49.7 49.7	12.07 12.25	41.5 41.3	9.72 9.70	3.58 3.49	36.2 36.1	10.36 10.41	4.10 4.11	2.02 1.99	9.50 9.44	4.38 4.40
DC-Av		49.8	12.15	41.5	9.76	3.49	36.2	10.42	4.08	1.98	9.49	4.40
AC-1		23.5	5.91	19.9	4.84	1.73	17.5	5.14	1.99	98	4.68	2.12
AC- 2		23.5	5.91	19.9	4.84	1.73	17.5	5.14	1.99	98	4.68	2.12
Σ		47.0	11.82	39.8	9.68	3.46	35.0	10.28	3.98	1.96	9.36	4.24
S.P.		+8.5		+0.1			+7.1				+0.9	
AC-N		.04		.04			.03				.03	

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Banner Line: 4E Int.Cal Date: 3-20

Send	3-4	4-5	1-2	2-3	3-4	4-5						
Rec.	1275-135E		135-1425E		→							
Time	1310	1311	1322	1324	1326	1327						
DC-1	94 96	50 56	1.51 1.51	90 88	49 50	36 36						
DC-2	1.12 1.08	62 55	1.92 1.84	98 98	50 48	25 30						
Σ	2.06 2.04	1.12 1.11	3.38 3.35	1.88 1.86	.99 .98	.61 .60						
DC-3	98 1.08	64 59	1.41 1.51	87 92	50 30	29 33						
Dc-4	1.10 93	52 50	1.89 1.82	1.00 92	50 48	25 24						
Σ	2.08 2.01	1.16 1.13	3.30 3.33	1.87 1.84	1.00 .98	.54 .57						
DC-AV	2.05	1.13	3.33	1.86	.99	.58						
AC-1	1.02	.58	1.64	.92	49	30						
AC-2	1.02	.58	1.64	.92	.49	.30						
Σ	2.04	1.16	3.28	1.84	.98	.60						
S. P.	40.9		r6.1									
AC-N	.03		.04									

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project Banno . Line 4 E-W Int.Cal. Date: 3-20

Send	2-3	2-3	2-3		2-3	2-3	2-3					
Rec.	CAL											
Time	1209	1209	1210									
DC-1	14.4	26.0	35.9									
DC-2	14.4	26.0	35.9									
Σ	28.8	52.0	71.8									
DC- 3	14.4	26.0	35.9									
DC-4	14.4	26.0	35.9									
Σ	28.8	52.0	71.8									
DC-Av	28.8	52.0	71.8									
AC-1	14.1	24.7	36.7									
AC- 2	14.1	24.7	36.7									
Σ	28.2	49.4	73.4									
S.P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: 4 E Date: 20 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		1217	1219	1233	1235	1239	1251	1253	1254	1256	1307	1308
Range		1.5	—	—	—	—	—	—	—	—	—	—
Current		1450	1420	1445	1420	1405	1425	1410	1400	1385	1415	1405
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	—	—	—	—	—
Receive							CAL	—	—	—	—	—
Time	1310	1311	1322	1324	1326	1327	1208	1209	1210			
Range	—	—	—	—	—	—	.3	.5	.75	.3	.5	.75
Current	1395	1385	1410	1400	1390	1375	285	500	710			

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Banner Line 4 W Field date Mar. 21, 61 Data page _____ Comp. date Mar. 21, 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	9.0 — 8.25E →		8.25 — 7.50E →			7.50 — 6.75E →				6.75 — 6.00E	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1450	1435	1450	1425	1420	1440	1415	1410	1400	1420	1405
(E) Vdc (avg)		56.2	12.16	60.7	14.98	4.60	64.1	15.54	5.64	2.11	16.76	5.81
(F) DCcal USED	1.000											
(G) Kn x 10^{-3} (a = 750')		2.25	9.00	2.25	9.00	22.5	2.25	9.00	22.5	45.0	9.00	22.5
(H) ρ dc=ExFxGx10^3/D		87.3	76.3	94.1	94.6	72.9	100	98.9	90.0	67.9	106	93.1
(I) Vac Σ		52.4	11.96	62.4	14.38	4.40	65.4	14.80	5.26	2.12	15.72	5.40
(J) AC noise x 2		.06	.06	.10	.10	.10	.08	.08	.08	.08	.10	.10
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		52.4	11.96	62.4	14.38	4.40	65.4	14.80	5.26	2.12	15.72	5.40
(L) AC-DC cal. USED	1.030											
(M) ρ dc/ρac=ExL/K		1.106	1.048	1.002	1.072	1.078	1.010	1.081	1.102	1.026	1.098	1.109
(N) PFE=(M-1)(10^2)		11	5	0	7	8	1	8	10	3	10	11
(O) MCF=(M-1)(10^5)/H		122	63	2	76	107	10	82	113	38	93	117

Project Banner Line 4 W Field date Mar. 21, 61 Data page _____ Comp. date Mar. 21, 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	→	→	6.00 —	5.25E	→	→	CAL	CAL					
(C) n separation	4	5	3	4	5	6							
(D) I	1400	1395	1420	1400	1400	1395		285	500	720	286	500	710
(E) Vdc (avg)	2.69	1.20	5.95	2.73	1.57	.79		28.6	52.0	71.4	28.6	51.4	70.4
(F) DCcal						USED	1.000	.998	.962	1.009	1.000	.974	1.009
(G) Kn x 10^{-3} (a = 750')	45.0	78.75	22.5	45.0	78.75	126							
(H) ρ dc=ExFxGx10^3/D	86.5	67.7	94.3	87.8	88.4	71.4							
(I) Vac Σ	2.66	1.14	5.44	2.66	1.46	.76		28.5	49.2	73.2	27.8	48.4	72.4
(J) AC noise x 2	.10	.10	.10	.10	.10	.10							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.66	1.14	5.44	2.66	1.46	.75							
(L) AC-DC cal.						USED	1.030	.998	.946	1.025	.973	.942	1.028
(M) ρdc/ρac =ExL/K	1.041	1.085	1.128	1.058	1.109	1.083							
(N) PFE=(M-1)(10^2)	4	9	13	6	11	8							
(O) MCF=(M-1)(10^5)/H	47	126	136	66	123	116							

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: Banner Line: 4W Int.Cal Date: 3-21

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.		90-8.25 →		8.25-7.50 →			750-6.75 →				675-6.00 →	
Time		1025	1026	1034	1035	1036	1046	1048	1049	1052	1103	1106
DC-1		28.2 28.2	6.13 6.12	30.8 30.7	7.42 7.47	2.39 2.31	32.2 32.1	7.90 7.99	2.92 2.98	1.23 1.01	8.36 8.31	2.81 2.80
DC-2		28.2 28.1	6.05 6.03	30.0 30.0	7.58 7.50	2.26 2.29	32.0 32.0	7.60 7.63	2.68 2.65	.88 1.09	8.48 8.43	3.01 3.00
Σ		56.4 56.3	12.18 12.15	60.8 60.7	15.00 14.97	4.65 4.60	64.2 64.1	15.50 15.62	5.60 5.63	2.11 2.10	16.84 16.74	5.82 5.80
DC-3		28.1 28.1	6.13 6.12	30.6 30.5	7.49 7.43	2.35 2.38	32.0 32.0	7.80 7.81	2.96 2.91	.98 1.06	8.32 8.38	2.80 2.77
Dc-4		28.0 28.0	6.02 6.05	30.0 30.0	7.51 7.53	2.21 2.20	32.0 32.0	7.73 7.69	2.71 2.73	1.13 1.05	8.40 8.37	3.02 3.09
Σ		56.1 56.1	12.15 12.17	60.6 60.5	15.00 14.96	4.56 4.58	64.0 64.0	15.53 15.50	5.67 5.64	2.11 2.11	16.72 16.75	5.82 5.81
DC-AV		56.2	12.16	60.7	14.98	4.60	64.1	15.54	5.64	2.11	16.76	5.81
AC-1		26.2	5.98	31.2	7.19	2.20	32.7	7.40	2.63	1.06	7.86	2.70
AC-2		26.2	5.98	31.2	7.19	2.20	32.7	7.40	2.63	1.06	7.86	2.70
Σ		52.4	11.96	62.4	14.38	4.40	65.4	14.80	5.26	2.12	15.72	5.40
S. P.		+5.4		+7.0			+9.9				+6.3	
AC-N		.03		.05			.04				.05	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Banner Line: 4w Int. Cal. _____ Date: 3-2

Send	2-3	1-2	4-5	3-4	2-3	1-2						
Rec.	6.75-6.0E (+)		6.00-5.25E									
Time	1108	1109	1118	1119	1121	1122						
DC-1	1.47 1.48	59 59	2.99 2.99	1.32 1.35	92 95	26 28						
DC-2	1.20 1.24	60 61	2.97 3.00	1.40 1.39	64 65	35 50						
Σ	2.67 2.72	1.19 1.20	5.96 5.99	2.72 2.74	1.56 1.60	61 78						
DC-3	1.43 1.46	58 56	2.92 2.80	1.34 1.32	93 93	30 30						
DC-4	1.25 1.24	62 63	3.04 3.01	1.39 1.41	63 64	50 47						
Σ	2.68 2.70	1.20 1.19	5.96 5.93	2.73 2.73	1.55 1.57	80 77						
DC-AV.	2.69	1.20	5.95	2.73	1.57	.79						
AC-1	1.33	57	2.72	1.33	.73	.38						
AC-2	1.33	57	2.72	1.33	.73	.38						
Σ	2.66	1.14	5.44	2.66	1.46	.76						
S.P.	+6.3		+6.5									
AC-N	.05		.05									

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE 1

Project: Banner Line: 4 w Int.Cal. Date:

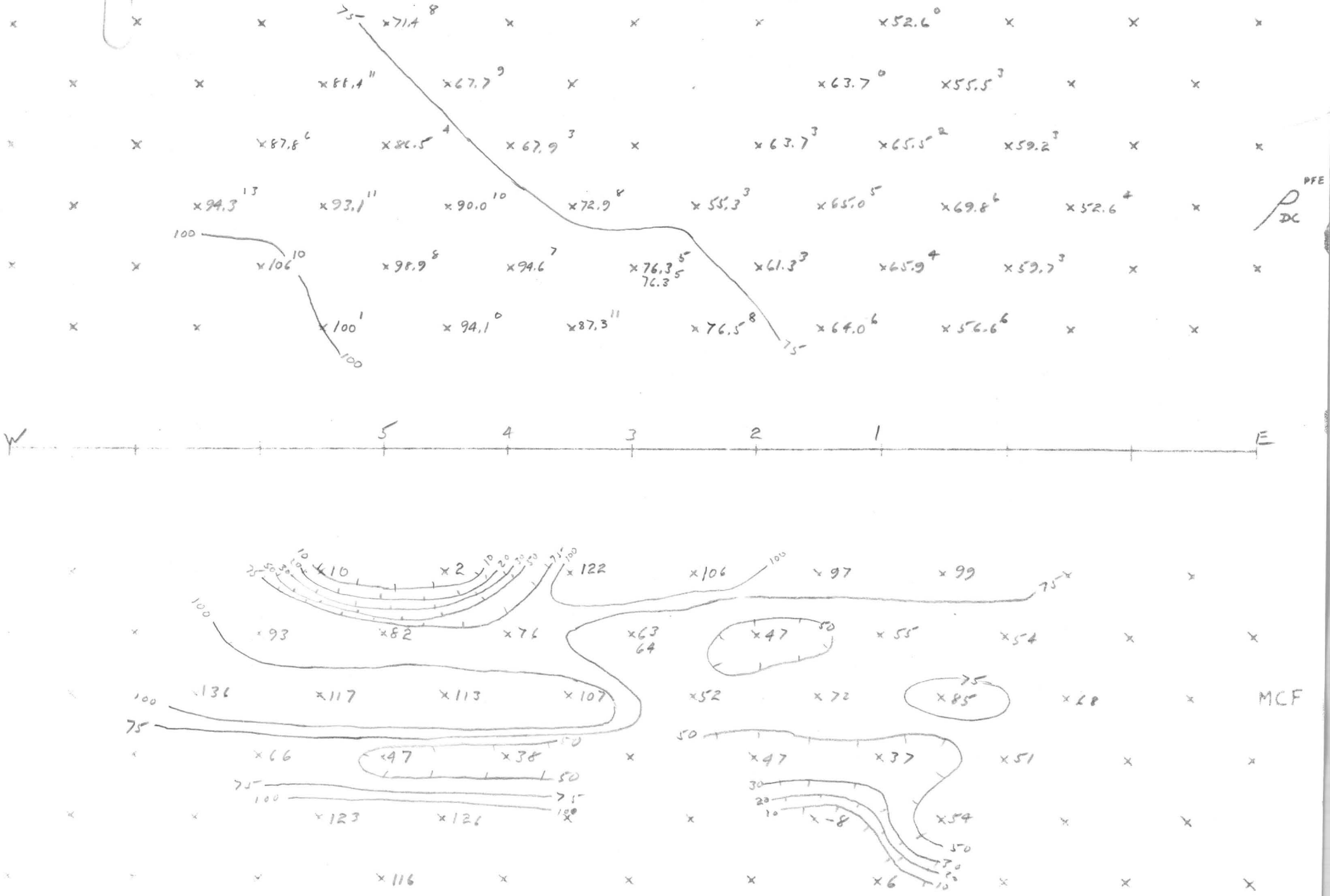
	285	500	720									
Send	3-4	3-4	3-4		3-4	3-4	3-4					
Rec.	cal	cal	cal		cal	cal	cal					
Time	1016	1017	1018		1139	1141	1142					
DC-1	14.3	26.0	35.7		14.3	25.7	35.2					
DC-2	14.3	26.0	35.7		14.3	25.7	35.2					
Σ	28.6	52.0	71.4		28.6	51.4	70.4					
DC-3	14.3	26.0	35.7		14.3	25.7	35.2					
DC-4	14.3	26.0	35.7		14.3	25.7	35.2					
Σ	28.6	52.0	71.4		28.6	51.4	70.4					
DC-AV	28.6	52.0	71.4		28.6	51.4	70.4					
AC-1	14.2	24.6	36.6		13.9	24.2	36.2					
AC-2	14.3	24.6	36.6		13.9	24.2	36.2					
Σ	28.5	49.2	73.2		27.8	48.4	72.4					
S. P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

Project: BANNER Line: 4W Date: 21 MAR 61

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		1025	1026	1034	1035	1036	1046	1048	1049	1052	1103	1106
Range		1.5	→									→
Current		1450	1435	1450	1425	1420	1440	1415	1410	1400	1420	1405
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	→				→
Receive							CAL	→				→
Time	1108	1109	1118	1119	1121	1122	1016	1017	1018	1139	1141	1142
Range	→					→	.3	.5	.75	.3	.5	.75
Current	1400	1395	1420	1400	1400	1395	285	500	720	286	500	710

INDUCED POLARIZATION WORK SHEET



Banner : Lines 4 E & 4 W Scale a = 750' Date Mar. 21, 61