CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
3550 N. Central Ave, 2nd floor
Phoenix, AZ, 85012
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the Walter E. Heinrichs, Jr. Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

INDUCED POLARIZATION INVESTIGATIONS
Pioneer Group
Pinal County, Arizona
for
CERRO CORPORATION
April 1961

April 21, 1961

Mr. Robert R. Reynolds
Cerro Corporation
3656 E. Speedway Blvd.
Tucson, Arizona

Dear Bob:

Enclosed are two copies of our report on Induced Polarization Investigations of the Pioneer Group, Pinal County, Arizona.

I only wish that I could offer a more rigerous interpretation of the data to aid you in a decision as to the advisability of further exploration work and its location and/or the future disposition of the property. In the final analysis I don't think that the I. P. data should be used to detract from other factors which may make the property appealing to a more or less degree.

Perhaps further roundtable discussion and analysis of all the factors and data involved is warranted and could provide a more definitive solution to the problem.

It has been a distinct pleasure to work with you on this project and we look forward to future associations.

Very truly yours,

HEINRICHS GEOEXPLORATION CO.

Franklin A. Seward, Jr.
Geophysicist

FAS:jh
Enclosures

INDUCED POLARIZATION INVESTIGATIONS

Pioneer Group
Pinal County, Arizona

for

CERRO CORPORATION

April 1961

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

TABLE OF CONTENTS

	Page
Introduction	1
Conclusions and Recommendations	2
Method	3
Procedure	4
Interpretation	6
Sectional Data Sheets, Lines #1, #2, and #3	following page 8
MCF Maps, 2d, 3d, and 4th Separations	back pocket
Resistivity Maps, 2d and 3d Separations	back pocket
PFE Map, 3d Separation	back pocket
Anomaly Map	back pocket

INTRODUCTION

During the month of April 1961, Heinrichs Geoexploration Company conducted induced polarization investigations on the Pioneer Group, located on the north side of the Gila River across from the abandoned railroad watering station at Cochran (?). This work was performed at the request of Mr. Robert R. Reynolds, chief of the Arizona Exploration Unit, Cerro Corporation, and consisted of three observed lines totaling 18,000 ft of profile traverse.

The crew consisted of F. A. Seward, Jr., geophysicist in charge; H. L. Andres, field engineer; C. S. Ludwig and J. F. King, assistant field engineers, and D. G. Burgett, field assistant.

Six days were required to conduct the survey, not including breakdown time on April 3 & 4. The remoteness of the area, requiring two hours travel time from Florence to the field and return, and the ruggedness of the terrain contributed to this somewhat excessive survey time which in "normal" local areas would be from four to five days for an equivalent amount of work.

CONCLUSIONS AND RECOMMENDATIONS

1. The observed I. P. anomalism is due to sulfide mineralization of a somewhat indefinite or marginal nature.

2. The complex geology and associated variable electrical properties of the different rock types tends to confuse and obscure the I. P. interpretation.

3. There is some indication of a southwesterly trend in the northeast portion of the area investigated that may be of interest.

4. There is no evidence of the existence of any zone or area of mineralization more intense than that observed between zero and .5 south on Line #2.

5. The intensity of mineralization as interpreted from I. P. anomalism would appear to be constant throughout the area examined; however, the direction of decreasing mineralization, if any can be determined from the I. P. data, is to the east.

6. Because of rather weak or marginal definition of I. P. anomalism as well as the high cost of data acquisition in this rugged terrain, it is difficult at this stage to recommend further investigation of the area by this method. Alternative geophysical methods of investigation offering a possibility of success might be hand magnetics, audio frequency magnetics (AFMAG), or self potential.

7. The data does not indicate any highly favorable I. P. drill targets. On the other hand, a categorical write off based on <u>only</u> weak or negative I. P. results can be risky. If any

drilling is contemplated, based solely on these data, the following locations may be considered:

#1) between 0 and .5north on Line #2

#2) between 0 and .5 north on Line #1

#3) between 0.5 and 1.0 north on Line #3

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 first two electrodes. Three separate quantities are computed from the data acquired in the field. The first is the D. C. resistivity. The second is the percent frequency effect. The third quantity is the so called "metallic conduction factor" (a misnomer) which is simply the frequency effect divided by the D. C. resistivity.

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

In field practice five equally spaced co-linear current electrodes are set. Observations are made in accordance with the dipole-dipole or Eltran configuration mode of operation in which the distance between the receiver or potential electrodes is equal to the distance between each pair of current electrodes and the separation between the center of each potential electrode set-up from the center of each pair of current electrodes is some multiple of the electrode spacing.

PROCEDURE

The three lines were laid out by Mr. Reynolds of Cerro Corp. and Mr. Seward of GEOEX to take advantage of existing geological information and the most gentle terrain conditions, and to effectively reconnoiter and define an area of interested delineated by Mr. Reynolds. A 500 foot dipole spacing was selected as optimum to fit the requirement of the survey and the above noted topographic and geological conditions.

Line #1 was run north-south and station .85 south was located about 250 ft. west of drill hole C-2. Line #2 was run N 3° E and station .25 south was located about 400 ft. east of drill hole C-3. Line #3 was run north-south with its center located about 1550 ft. east of station .50 north on Line #2.

The setting and selection of electrode positions was somewhat complicated by combinations of terrain and preferred orientation with the known geological conditions. High surface resistivity required the use of as much as 20 gallons of water at each electrode. The only telluric or self potential "noise" experienced was at the south end of Line #3 and this must be attributed to local oxidation reduction reaction in as much as geomagnetic activity reported by the U. S. Bureau of Standards CRPL Radio Warning Service is reported very quiet on this date (April 9, 1961).

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. In addition to this standard technique of presentation, plan contour maps of the metal factor values on

the 2nd, 3rd and 4th dipole separation levels were prepared in an attempt to aid the interpretation in this geologically complex area as well as resistivity plans of the second and third separations and a PFE plan of the third separation.

INTERPRETATION

The extreme complexity of the local geology is obvious in the resistivity data. Resistivity changes along the lines are rapid and of great magnitude and range and indicate major lithologic changes both laterally and with depth. There is an unusual lack of continuity of character from line to line which further indicates the lateral complexity of the geology.

It is felt that the existence of from 3% to 5% total sulfides reported in the Cerro drill holes should have provided for more positive boundary definition particularly in the case of Line #2 which crossed a definite lithologic contact from mineralized Pinal schist to barren pre-Cambrian granite. This boundary was quite sharply defined in the resistivity but was not as pronounced as expected in the MCF's. This could mean that either the lines did not get far enough away from the sulfide influence in the schist or that the sulfide effect is unusually weak or is actually less overall than the estimated amounts observed.

Line #1 shows some degree of anomalism throughout its length although not of great magnitude. The most significant feature is an apparently vertically bounded anomalous zone existing from at least .5S to 1.5S and possibly extending both further north

and south. The north end is less anomalous than the south end and the cut off is somewhat more obvious on the north. A confusing factor is that a probably vertical zone of higher resistivity is coincident with the most anomalous area which of course tends to reduce the metallic conduction factors obscuring the overall picture to some extent.

Line #2 presents the closest thing to a "normal" I. P. picture and is possibly the most discrete of interpretation. An apparently nearby vertical lithogic boundary exists between 0.5S and 1.5S as is evidenced by the resistivity plot and is somewhat less obvious in the MCF plot. There is possibly some contact mineralization indicated by the PFE's in this region. The most significant indication of anomalism is between .5S and .5N as reflected in all three computed values. However, the high MCF's appearing north of the center of the spread can be directly related to an unusually low resistivity zone and cannot be considered anomalous on the basis of the background magnitude of the percent frequency effects.

A comparison of drill hole data with I. P. data on line #2 shows a possible correlation in that the most intense anomalism seems to correspond to hole #C-3 which also had the best assay results of the three holes drilled by Cerro though the depth to sulfides was considerably greater than in C-1 and C-2. A significant difference in the resistivity pattern from that observed

on Line #1 is the rather abrupt decrease in resistivity to the north indicating a thickening of alluvium or conglomerate on Line #2. Bedrock is obviously very shallow on the north end of Line #1.

Line #3 is again difficult to interpret. Some degree of anomalism is noted throughout the length of the profile with no discrete boundary conditions apparent. The strongest anomalism is also south of the center on this line. However, another zone of hard to interpret anomalism is beginning to appear at the north end of the line and although the resistivity decreases abruptly to the north which correspondingly increases the magnitude of the metal factors, the frequency effects remain anomalous. This may be indicative of another mineralized zone not "closed off" at the north end of this line. An alternate interpretation is of mineralization from some point north of 1.0N to 1.0S.

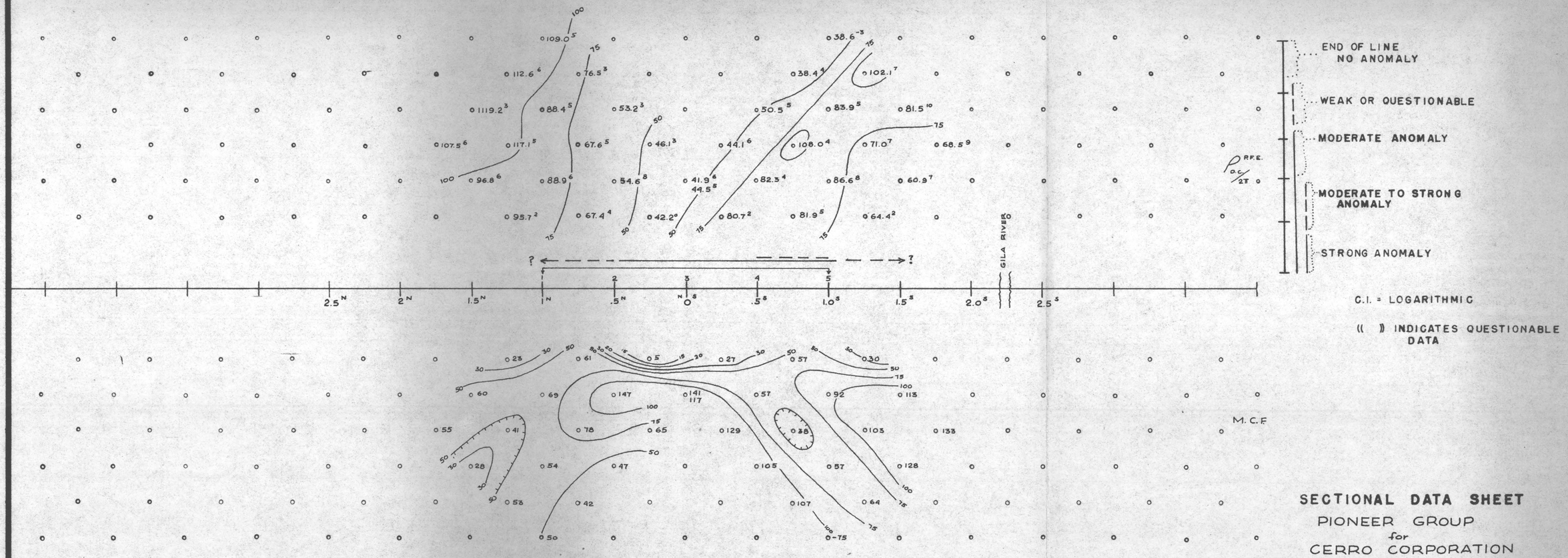
The plan map presentations of the metal factors at the various depth levels show some consistency with the most significant feature being a southwest trending "high" appearing in the northeast corner of the area examined. This may be directly a function of the decreasing resistivity in this direction. However a PFE plan on third separation shows this same feature which should not be a function of the resistivity. The PFE presentation also accentuates the anomalous high on Line #2 between zero and 1S.

Respectfully submitted,

Franklin A. Seward, Jr.

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

21 April 1961
P. O. Box 5671
Tucson, Arizona



SECTIONAL DATA SHEET

PIONEER GROUP

for

CERRO CORPORATION

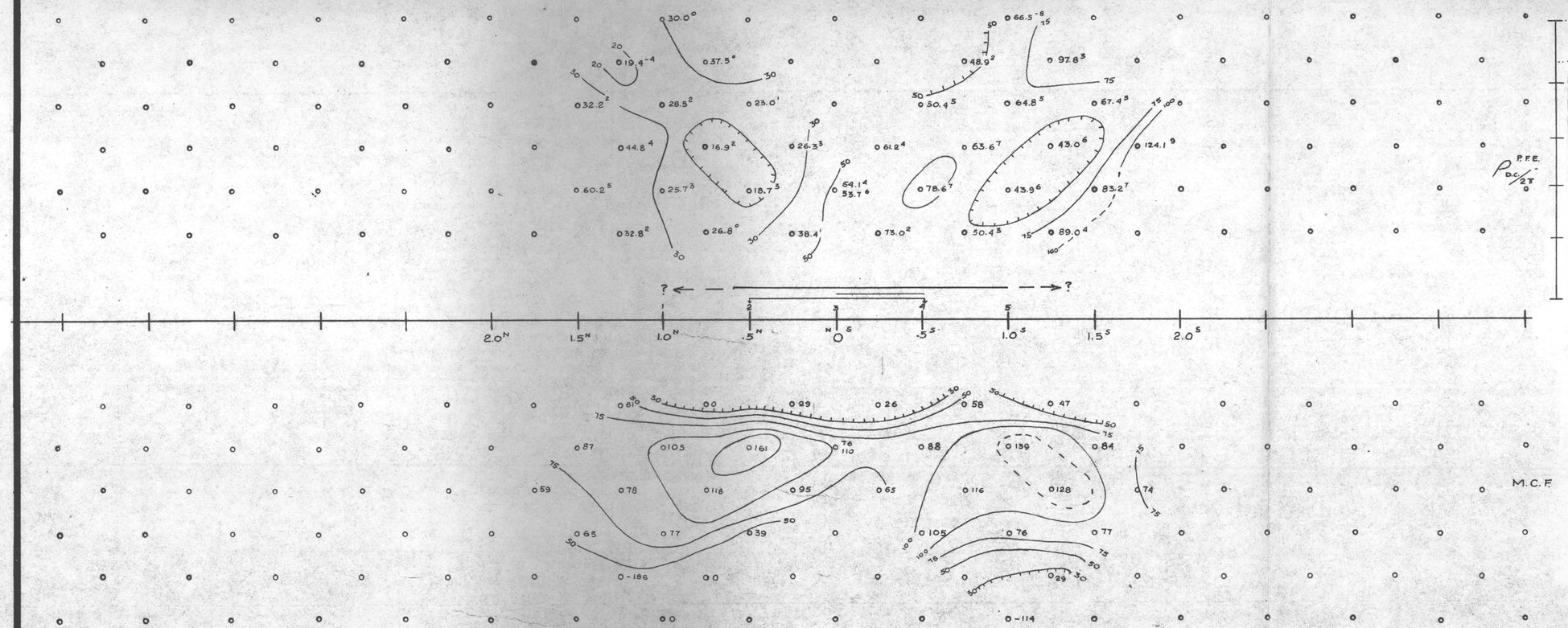
LINE No. 1

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

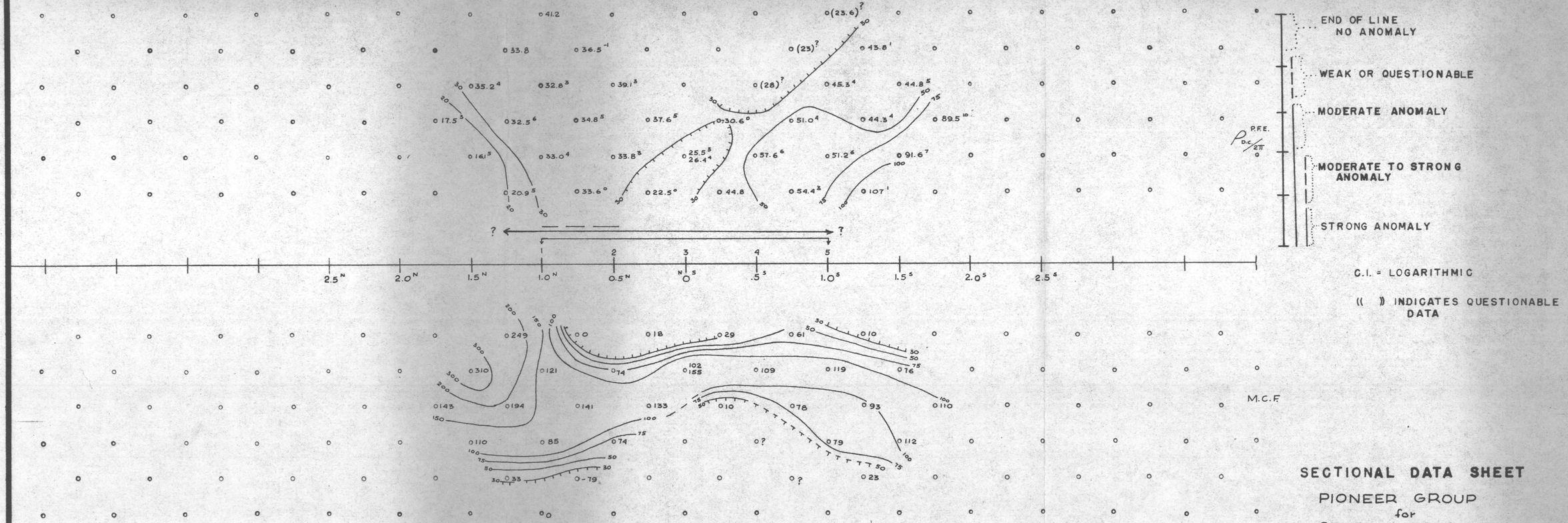
SECTIONAL DATA SHEET
PIONEER GROUP
for
CERRO CORPORATION

LINE No. 2

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'
DATE APRIL 1961



SECTIONAL DATA SHEET

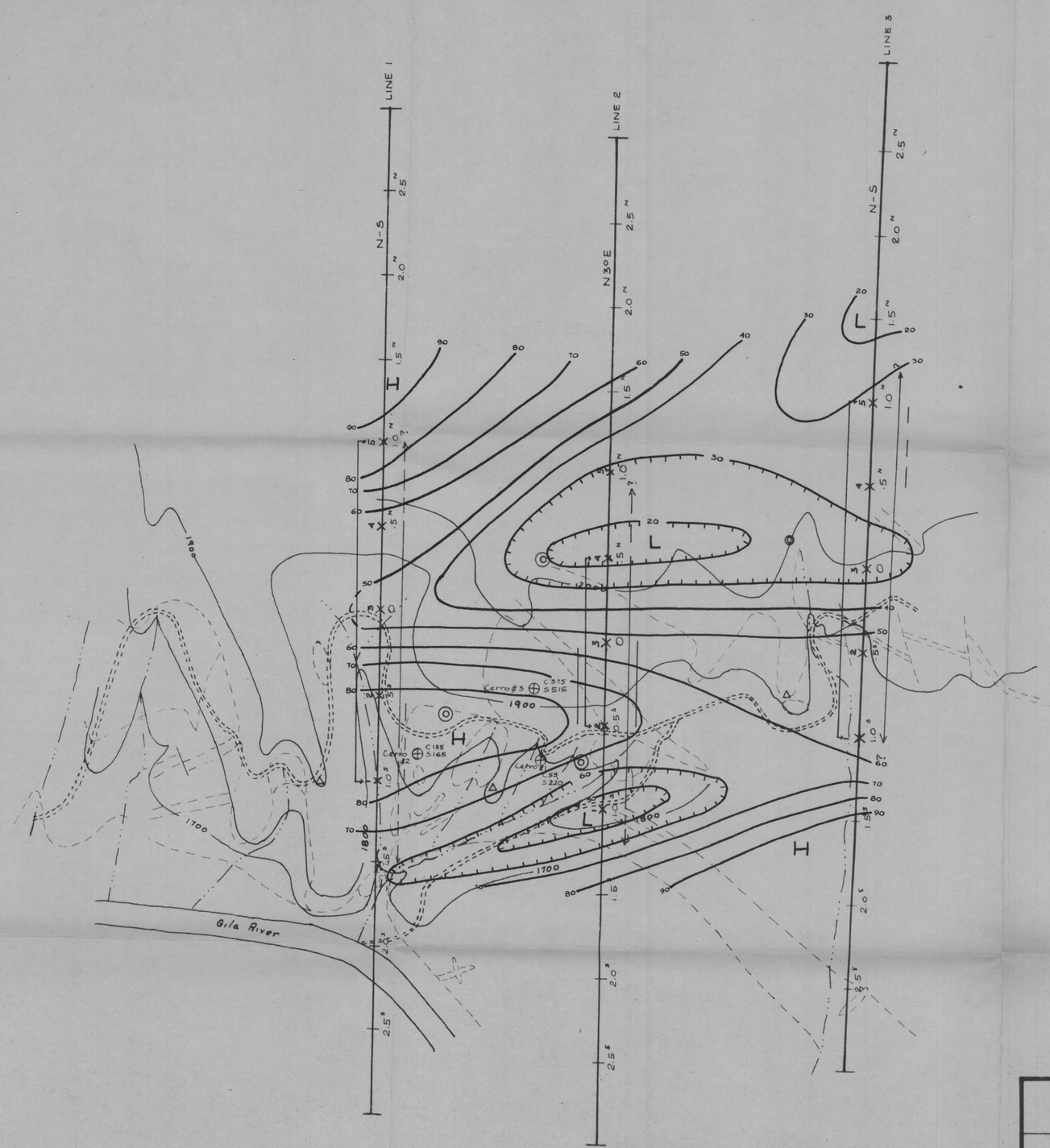
PIONEER GROUP
for
CERRO CORPORATION

LINE No. 3

INDUCED POLARIZATION SURVEY

HEINRICHS GEOEXPLORATION COMPANY

SCALE 1" = 500'
DATE APRIL 1961



DRILL HOLES BY CERRO CORPORATION

Cerro#3 ⊕ C55 Bottom White Tail Conglamerate
S165 Top Sulfide Zone

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

SKETCH MAP - PIONEER GROUP

Pinal County, Arizona

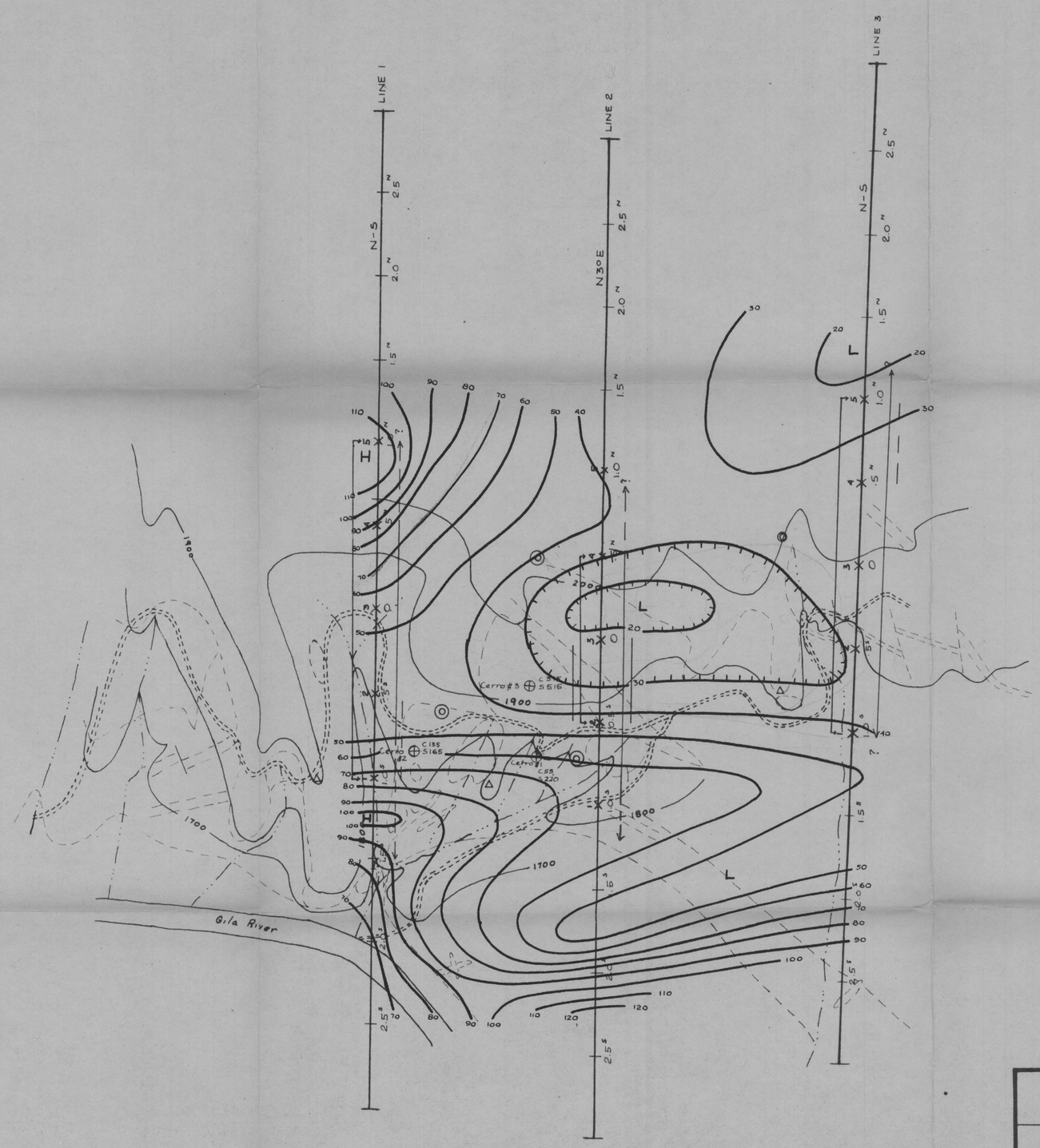
FOR

CERRO CORPORATION

INDUCED POLARIZATION SURVEY

RESISTIVITY 2nd SEPARATION

SCALE: 1" = 500 Approx	**CONTOUR INTERVAL:** 100'	**REVISIONS**
PANTOGRAPH REDUCTION after RRR	**DATA BY:** F.A.S. Geology by R.R.R.	
DATE: APRIL 1961	**SHEET** OF	
DRAWN BY: F.A.S.	**DRAWING NO.:**	**FILE:**



DRILL HOLES BY CERRO CORPORATION

Cerro #3 ⊕ C55 Bottom White Tail Conglamerate
S165 Top Sulfide Zone

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

SKETCH MAP - PIONEER GROUP

Pinal County, Arizona

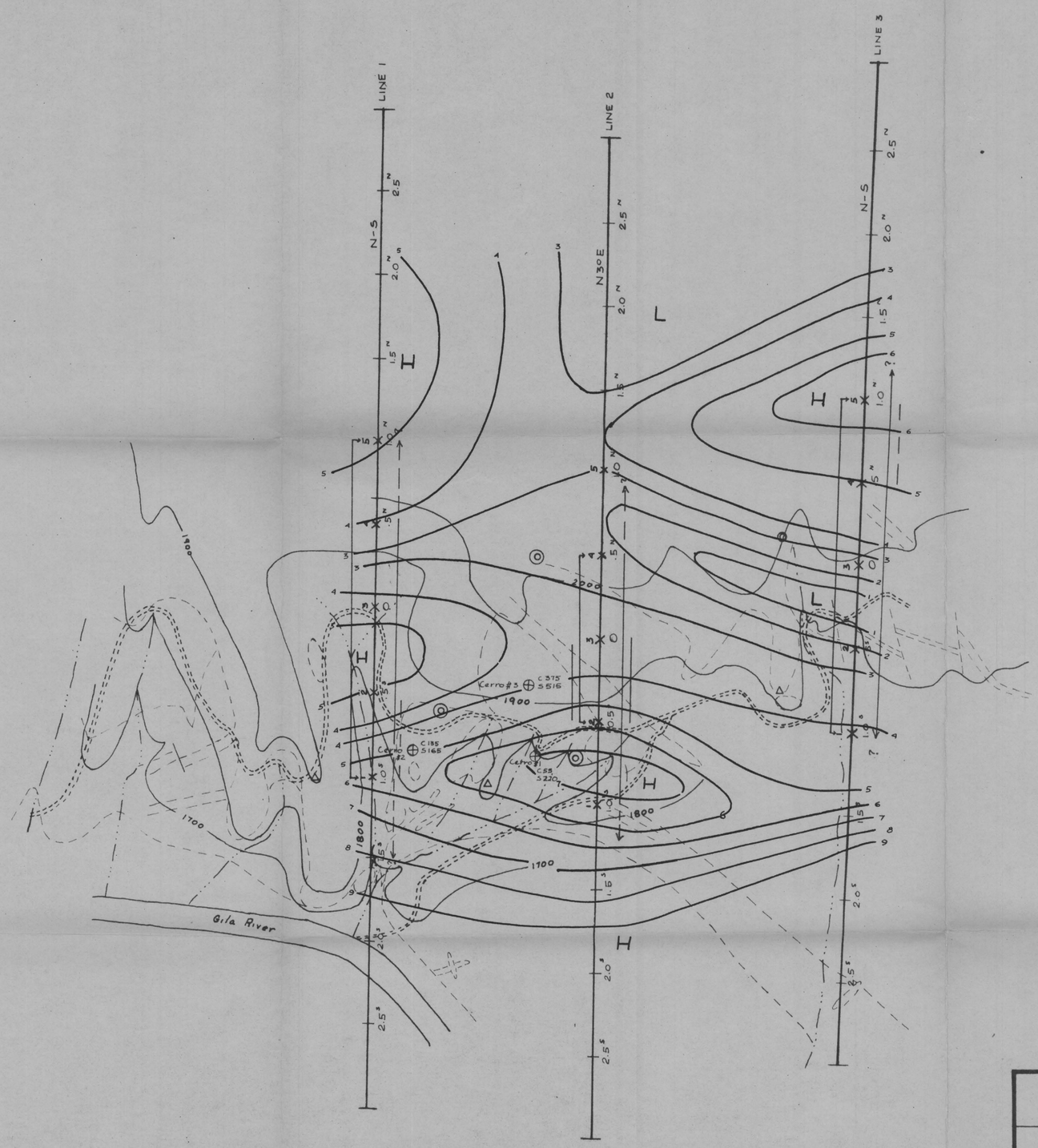
FOR

CERRO CORPORATION

INDUCED POLARIZATION SURVEY

RESISTIVITY 3rd SEPARATION

SCALE: 1" = 500 Approx	**CONTOUR INTERVAL:** 100'	**REVISIONS**
PANTOGRAPH REDUCTION after RRR	**DATA BY:** F.A.S. Geology by R.R.R.	
DATE: APRIL 1961	**SHEET** OF	
DRAWN BY: F.A.S.	**DRAWING NO.:**	**FILE:**



DRILL HOLES BY CERRO CORPORATION

Cerro #3 ⊕ C55 Bottom White Tail Conglamerate
S165 Top Sulfide Zone

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

SKETCH MAP - PIONEER GROUP

Pinal County, Arizona

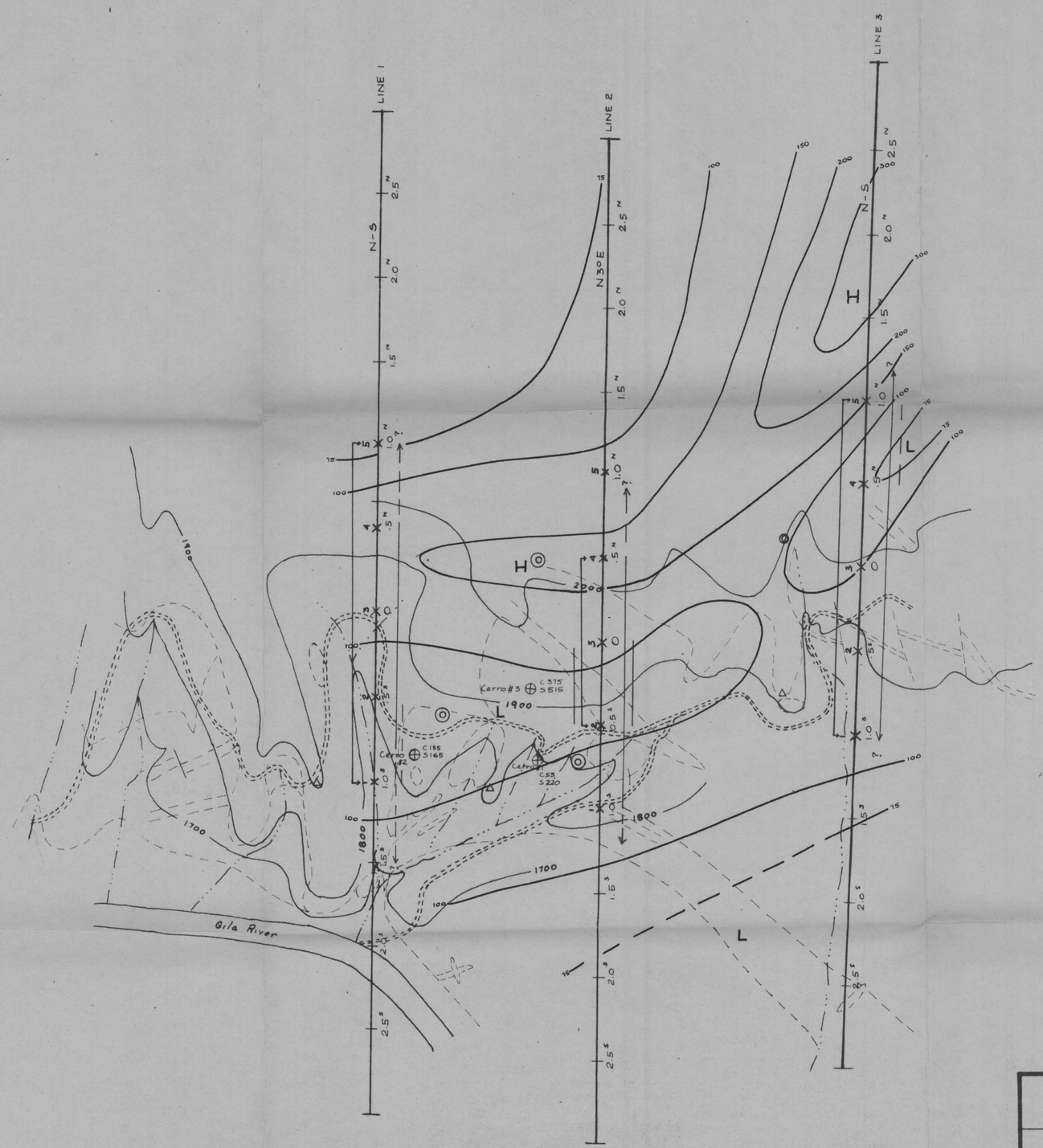
FOR

CERRO CORPORATION

INDUCED POLARIZATION SURVEY

PFE 3rd SEPARATION

SCALE: 1" = 500 Approx	**CONTOUR INTERVAL:** 100'	**REVISIONS**
PANTOGRAPH REDUCTION after RRR	**DATA BY:** F.A.S. Geology by R.R.R.	
DATE: APRIL 1961	**SHEET** OF	
DRAWN BY: F.A.S.	**DRAWING NO.:**	**FILE:**



DRILL HOLES BY CERRO CORPORATION

Cerro#3 ⊕ C55 Bottom White Tail Conglamerate
S165 Top Sulfide Zone

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

SKETCH MAP - PIONEER GROUP

Pinal County, Arizona

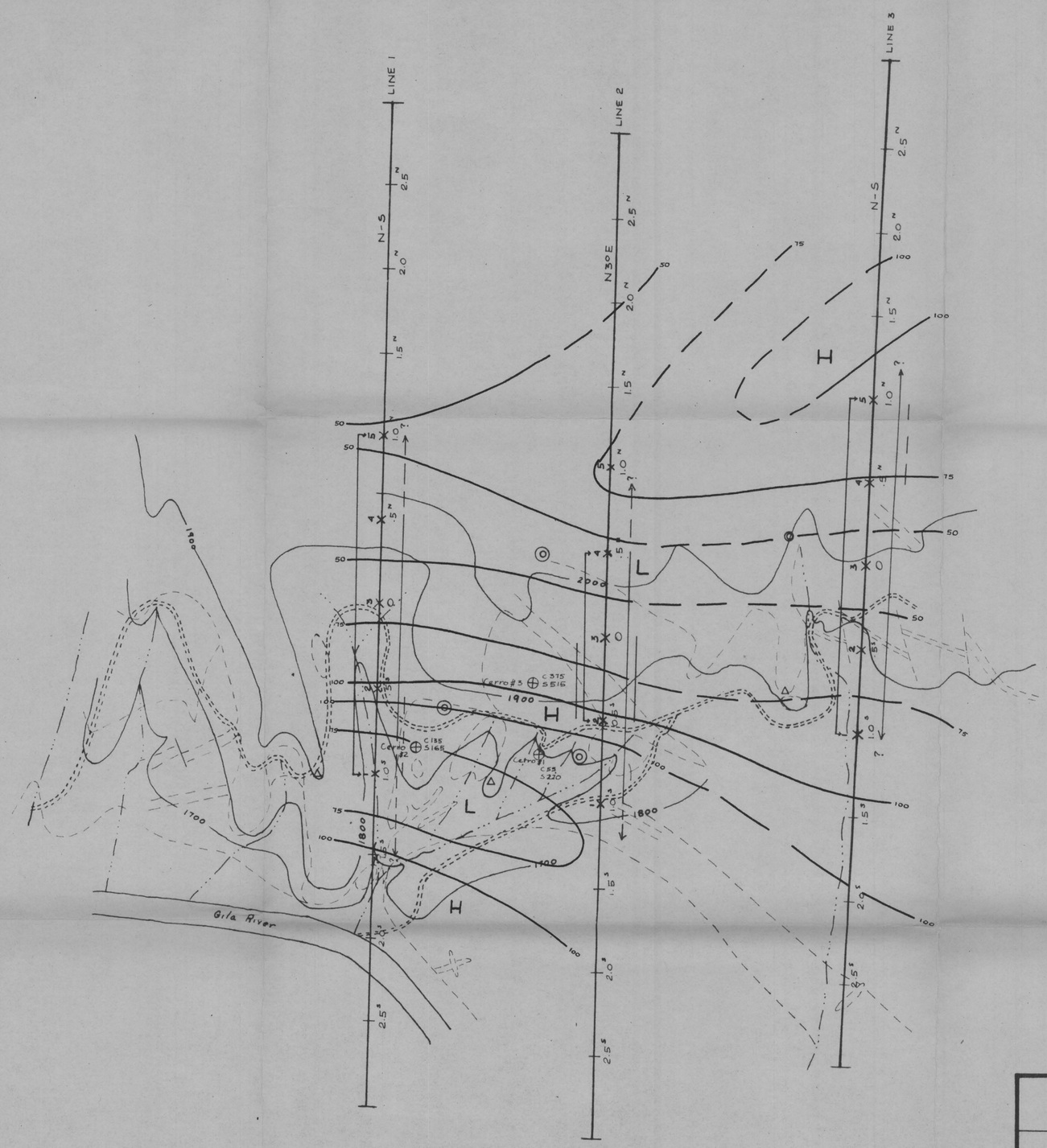
FOR

CERRO CORPORATION

INDUCED POLARIZATION SURVEY

MCF 2nd SEPARATION

SCALE: 1" = 500 Approx	**CONTOUR INTERVAL:** 100'	**REVISIONS**
PANTOGRAPH REDUCTION after RRR	**DATA BY:** F.A.S. Geology by R.R.R.	
DATE: APRIL 1961	**SHEET** **OF**	
DRAWN BY: F.A.S.	**DRAWING NO.:**	**FILE:**



DRILL HOLES BY CERRO CORPORATION

Cerro #3 ⊕ C55 Bottom White Tail Conglamerate
S165 Top Sulfide Zone

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

SKETCH MAP - PIONEER GROUP

Pinal County, Arizona

FOR

CERRO CORPORATION

INDUCED POLARIZATION SURVEY

MCF 4th SEPARATION

SCALE: 1" = 500 Approx	**CONTOUR INTERVAL:** 100'	**REVISIONS**
PANTOGRAPH REDUCTION after RRR	**DATA BY:** F.A.S. Geology by R.R.R.	
DATE: APRIL 1961	**SHEET** **OF**	
DRAWN BY: F.A.S.	**DRAWING NO.:**	**FILE:**

DRILL HOLES BY CERRO CORPORATION

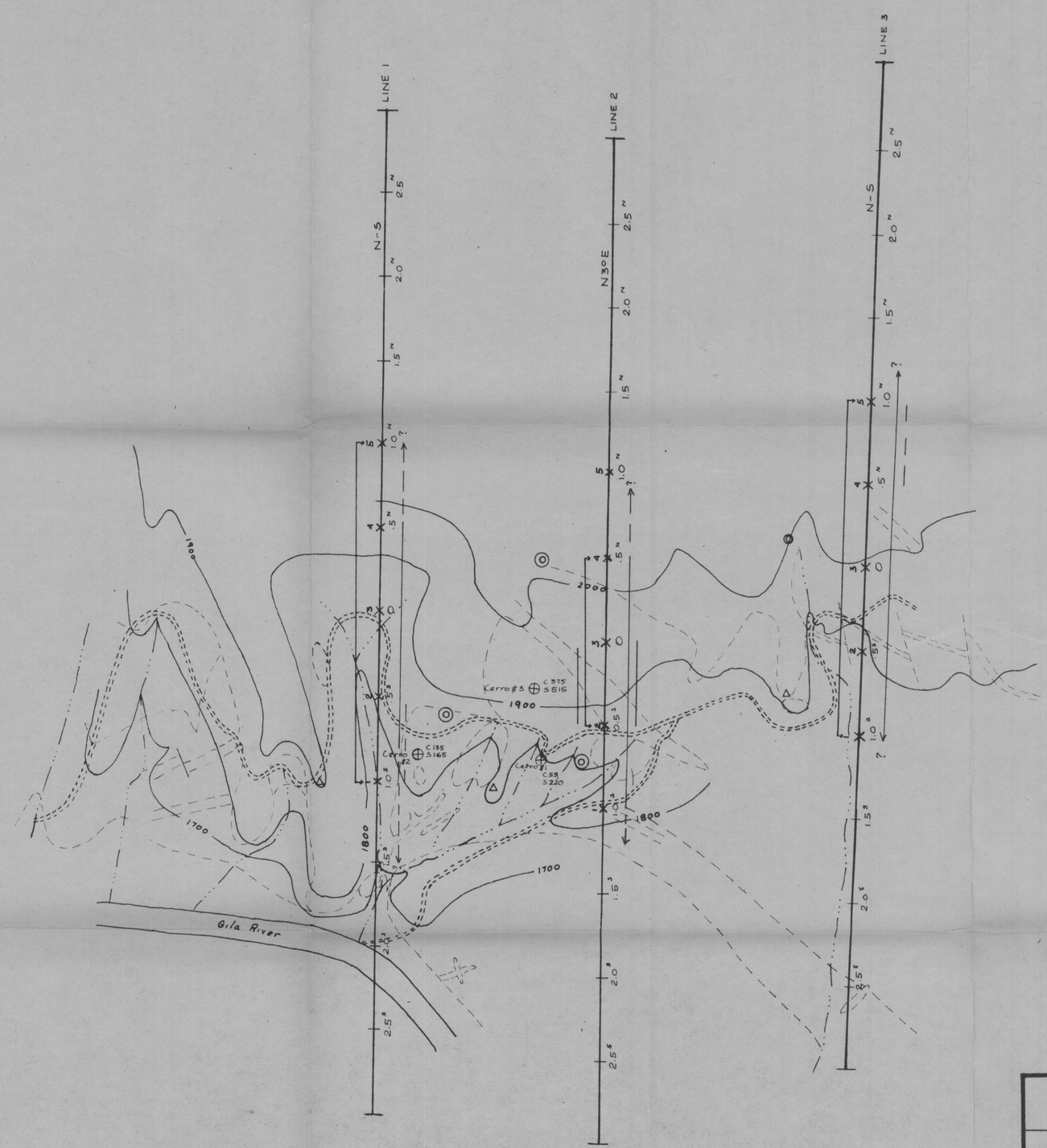
Cerro #3 ⊕ C55 Bottom White Tail Conglamerate
S165 Top Sulfide Zone

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

SKETCH MAP - PIONEER GROUP
Pinal County, Arizona
FOR
CERRO CORPORATION

INDUCED POLARIZATION SURVEY
MCF 3rd SEPARATION

SCALE: 1" = 500 Approx	CONTOUR INTERVAL: 100'	REVISIONS
PANTOGRAPH REDUCTION after RRR	DATA BY: F.A.S. Geology by R.R.R.	
DATE: APRIL 1961	SHEET OF	
DRAWN BY: F.A.S.	DRAWING NO.:	FILE:



END OF LINE
NO ANOMALY

WEAK OR QUESTIONABLE

MODERATE ANOMALY

MODERATE TO STRONG ANOMALY

STRONG ANOMALY

DRILL HOLES BY CERRO CORPORATION

Cerro #3 ⊕ C55 Bottom White Tail Conglamerate
S165 Top Sulfide Zone

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

SKETCH MAP - PIONEER GROUP

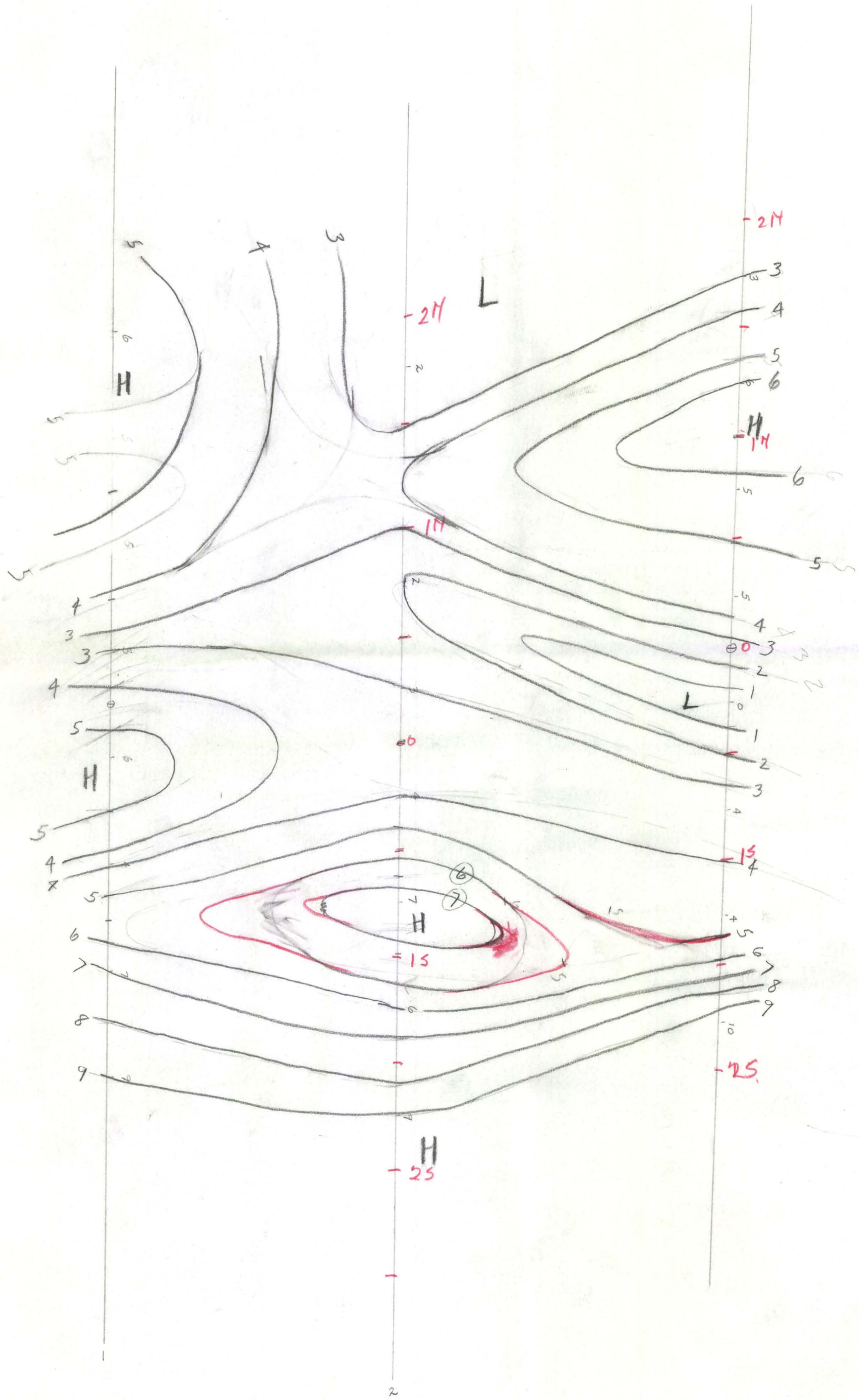
Pinal County, Arizona

FOR

CERRO CORPORATION

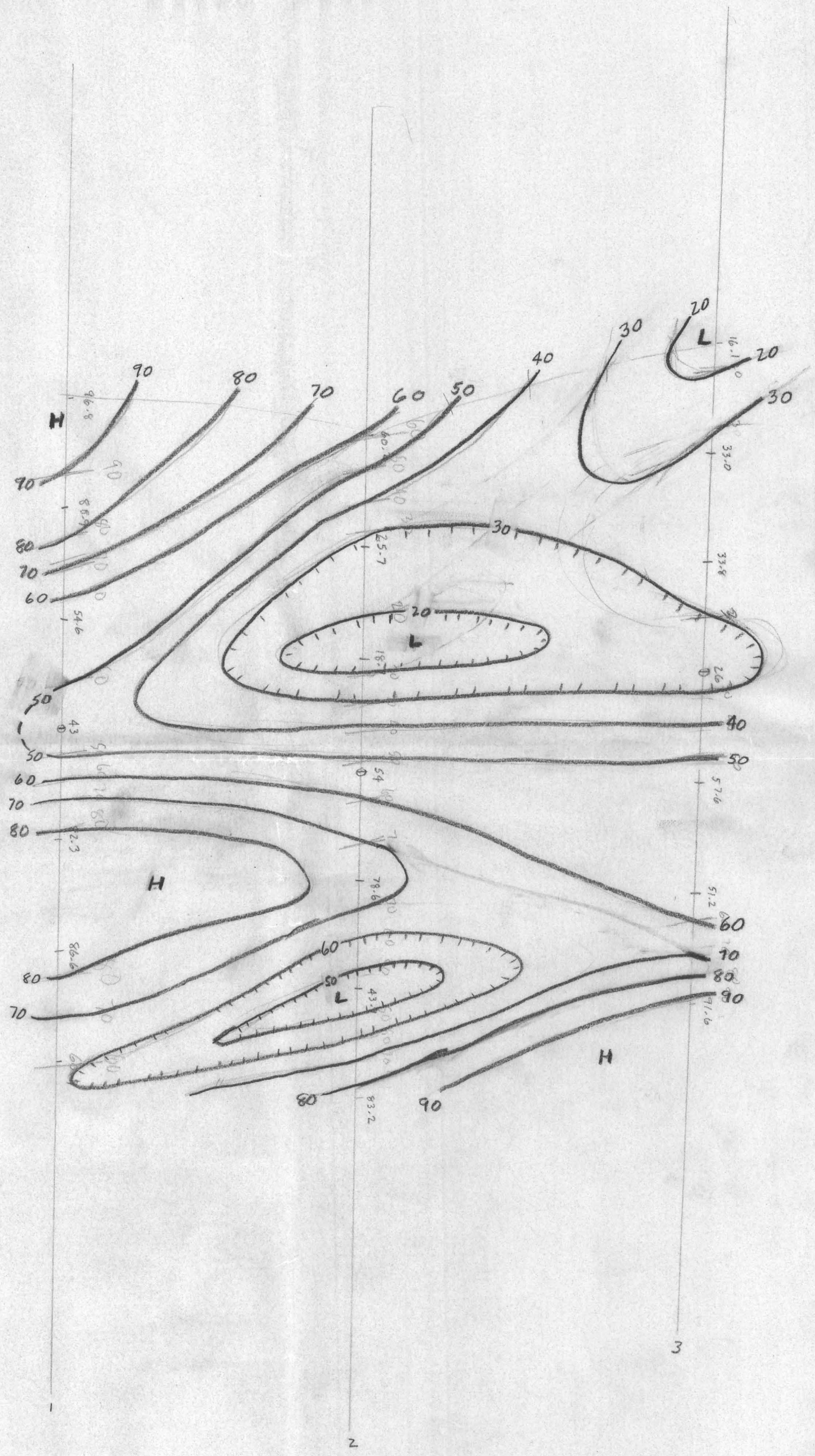
INDUCED POLARIZATION SURVEY

SCALE: 1" = 500 Approx	**CONTOUR INTERVAL:** 100'	**REVISIONS**
PANTOGRAPH REDUCTION after RRR	**DATA BY:** F.A.S. Geology by R.R.R.	
DATE: APRIL 1961	**SHEET** **OF**	
DRAWN BY: F.A.S.	**DRAWING NO.:**	**FILE:**

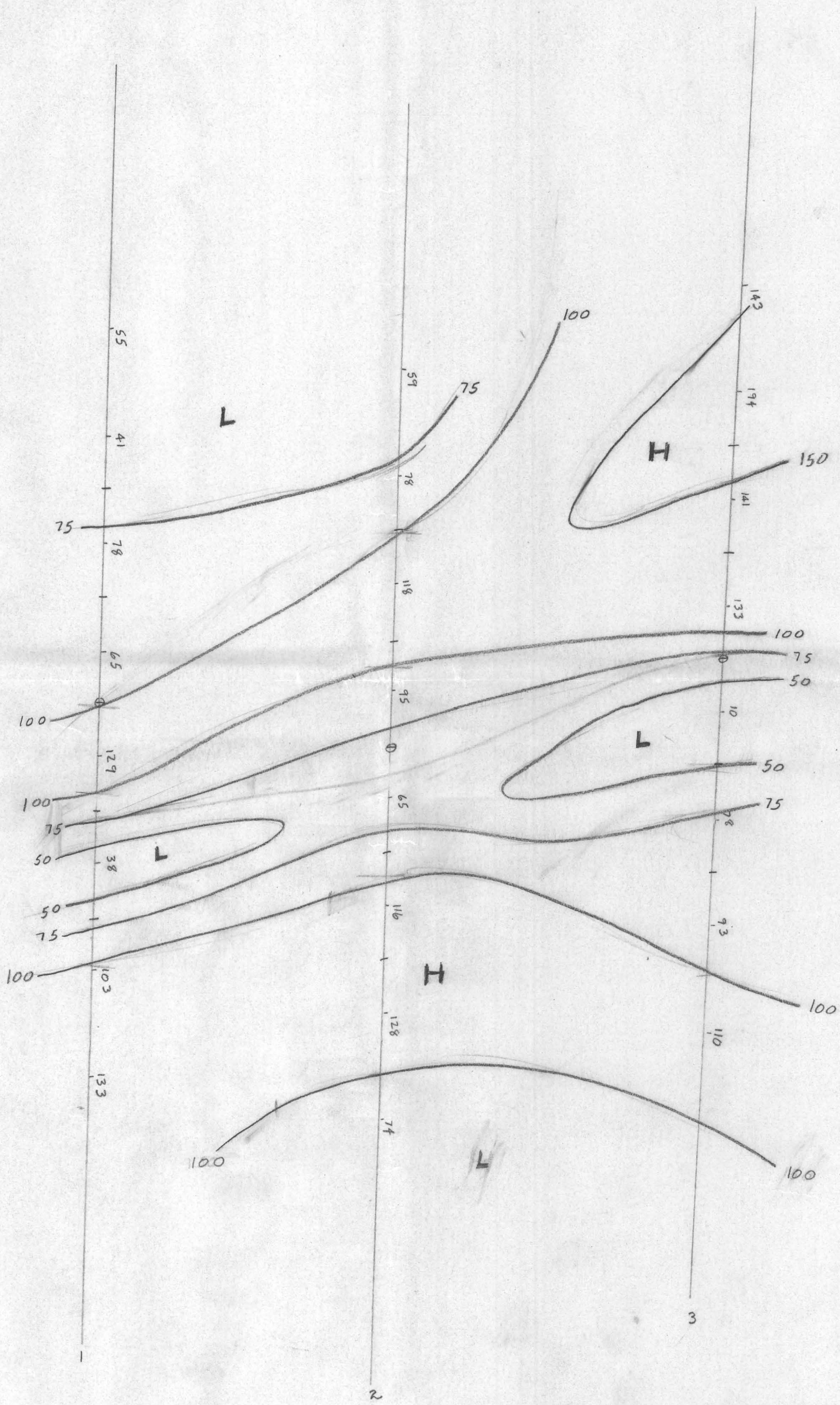


PFE

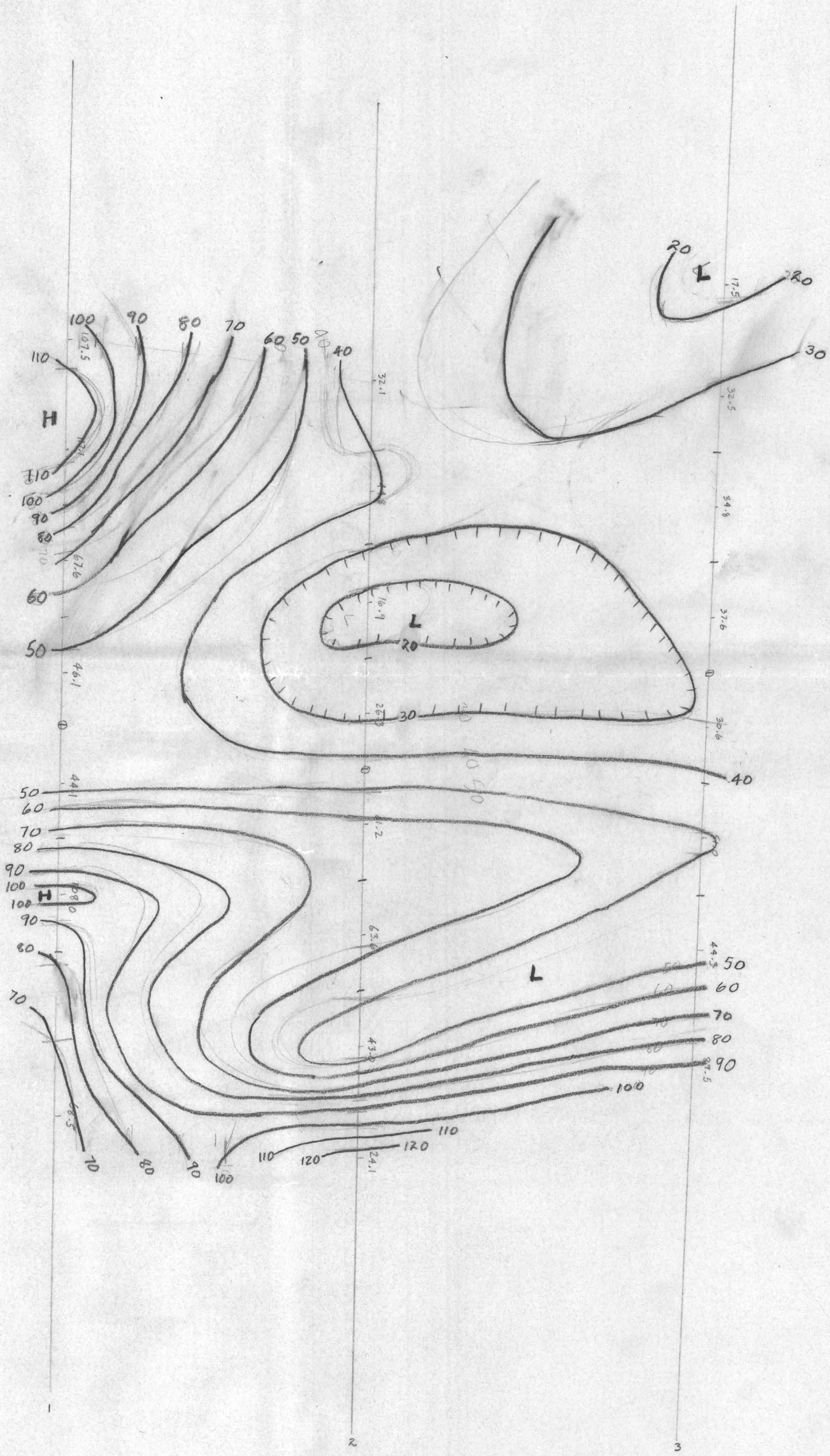
3D LEVEL



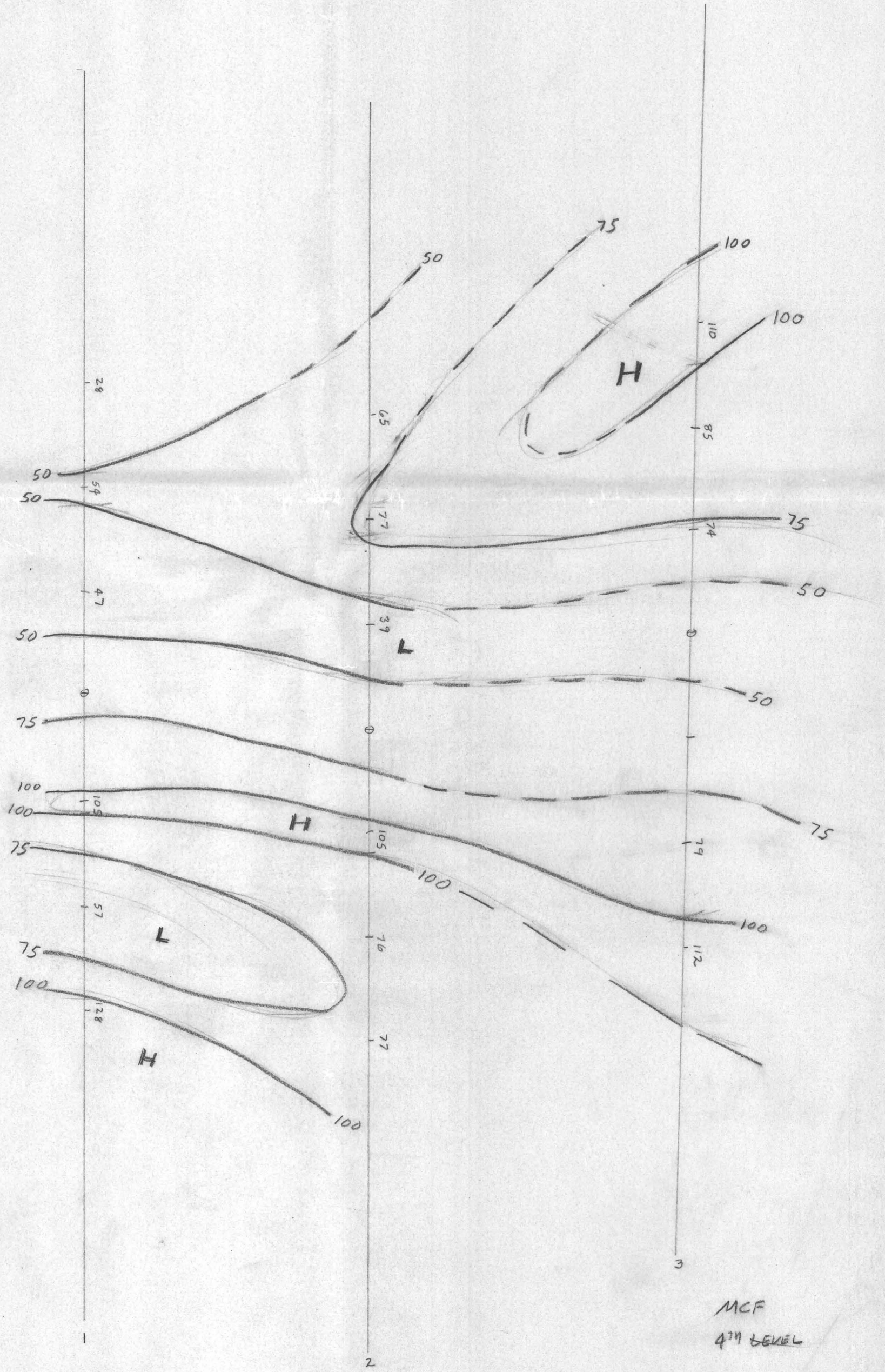
RESISTIVITY
2D LEVEL



MCF
3D LEVEL

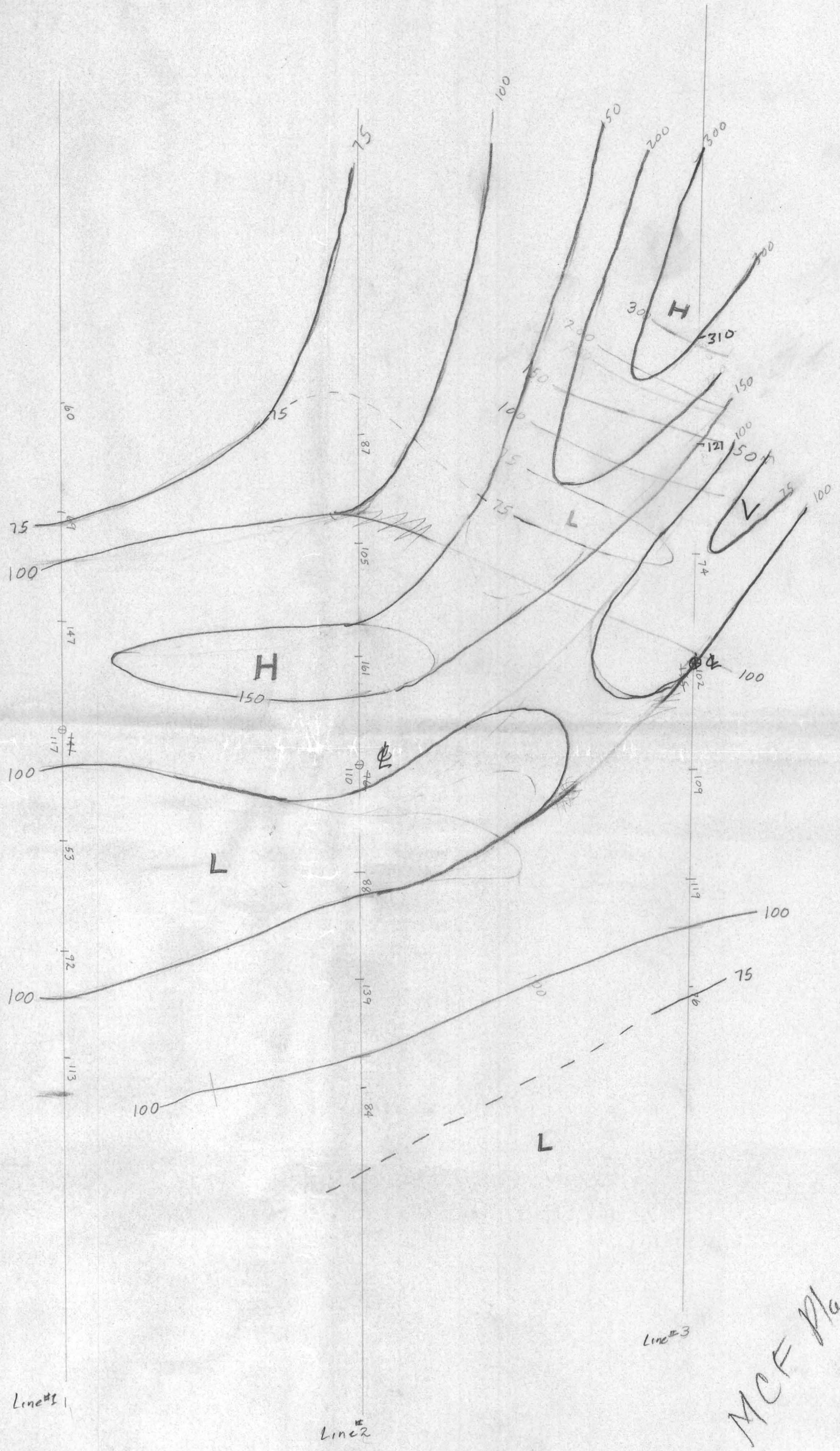


RESISTIVITY
3D LEVEL



MCF

4TH LEVEL

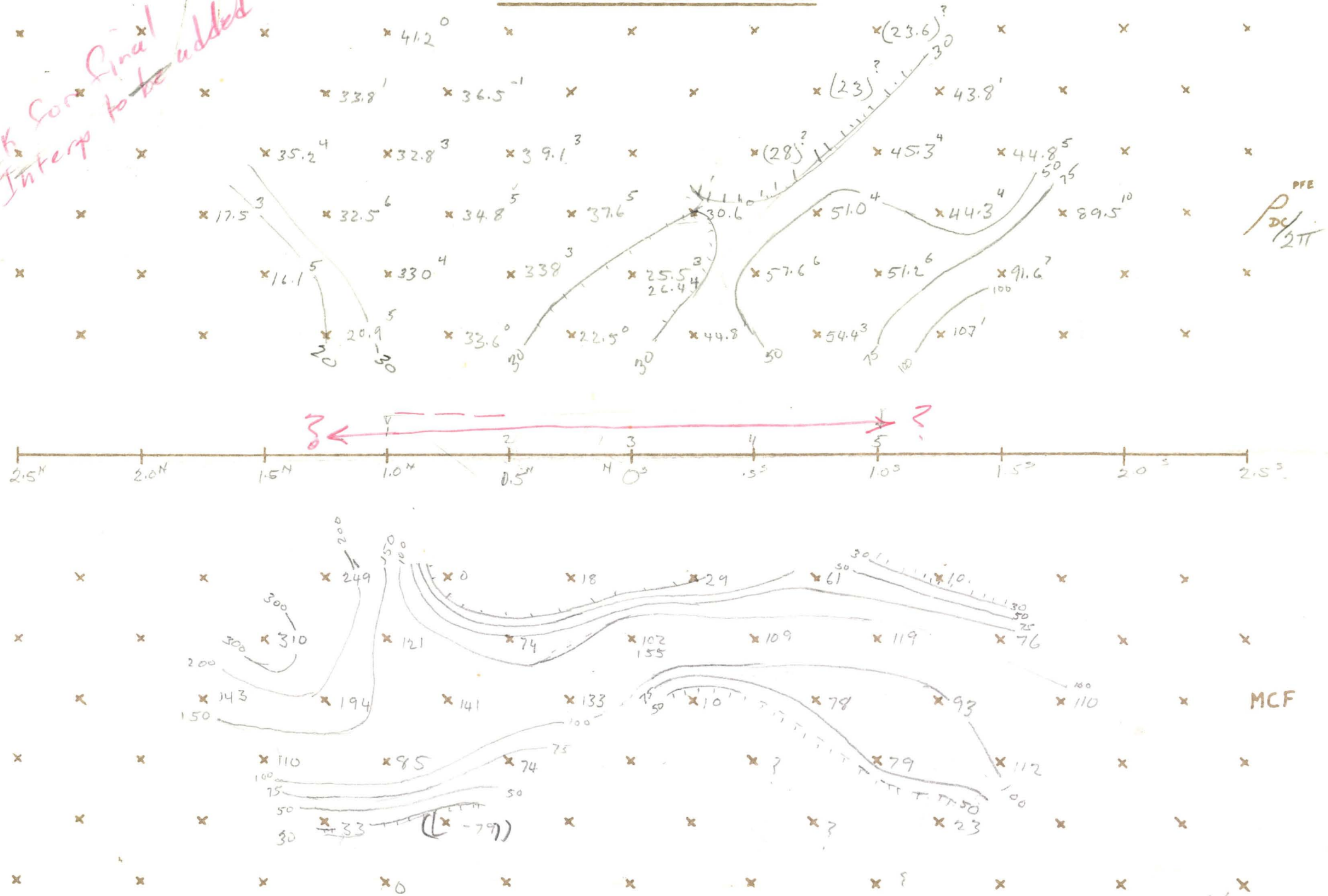


MCF Plan 1nd Separation

MCF
2D ~~LEVEL~~
SECOND SEPARATION

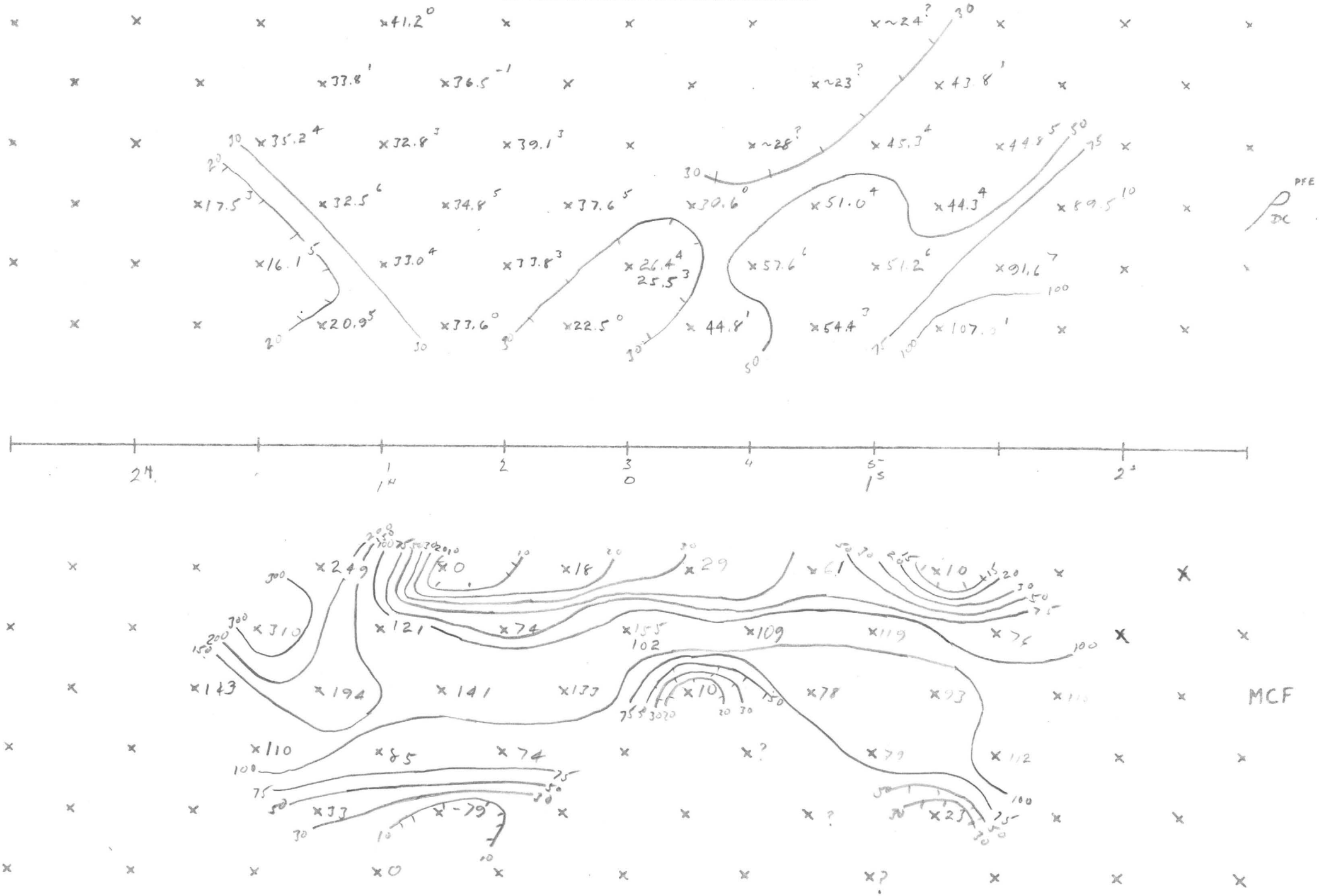
9

INDUCED POLARIZATION WORK SHEET



Area Pioneer - Line #3 Scale 1" = 500' Date of 11 April 1961

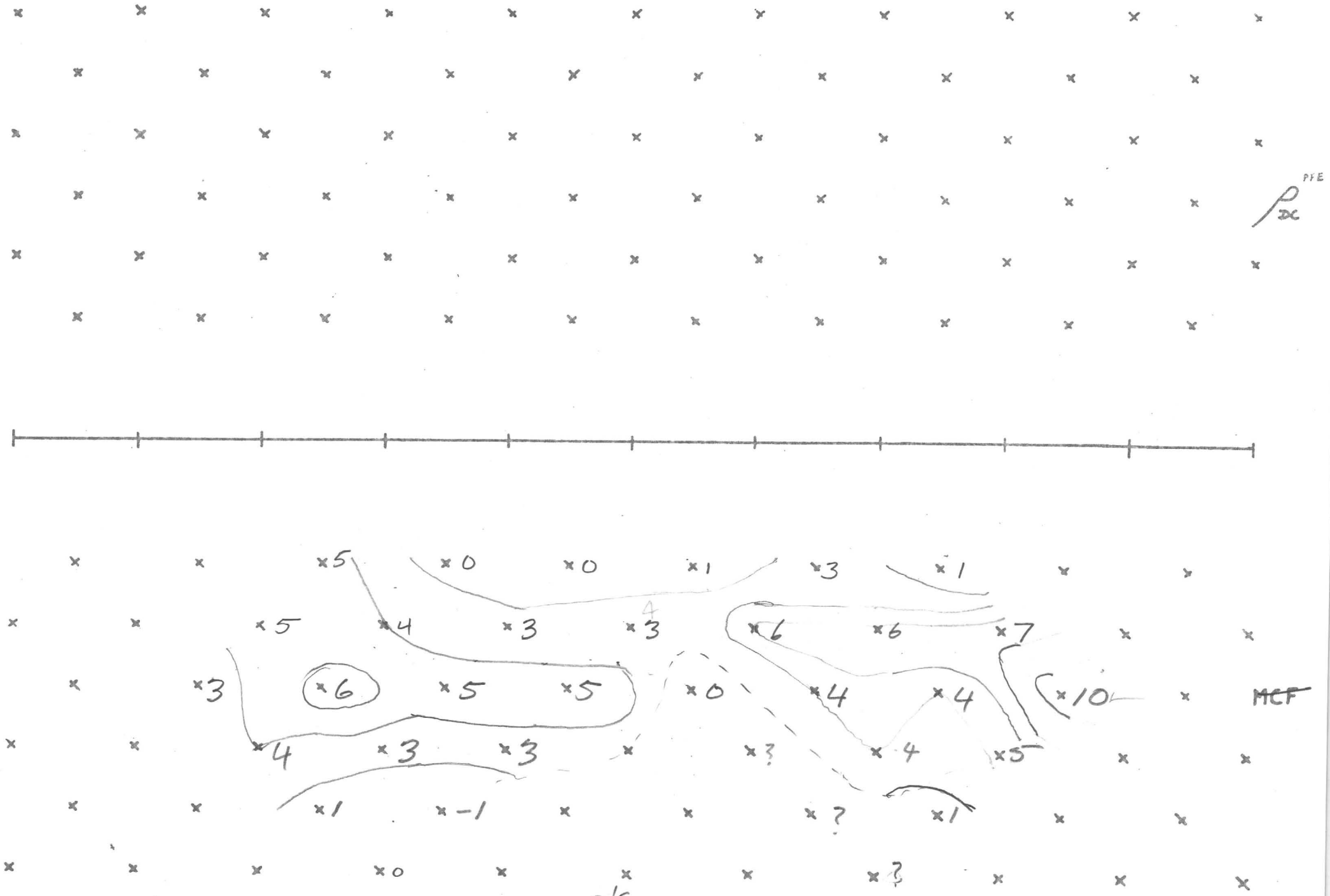
INDUCED POLARIZATION WORK SHEET



Area Pioneer - Line 3 N & S Scale 1" = 500' Date Apr. 11, 61

C.L.

INDUCED POLARIZATION WORK SHEET



Area Pioneer Line #3 PFE's Scale 1" = 500' Date

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project *Pioneer* Line *3 N* Field date *4-9-61* Data page _____ Comp. date *4-11-61* 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	-	1450	1400	1430	1420	1400	1420	1400	1400	1390	1410	1385
(E) Vdc (avg)		21.7	5.95	32.0	8.00	3.51	19.8	7.70	3.25	1.81	3.78	3.00
(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		22.5	25.5	33.6	33.8	37.6	20.9	33.0	37.8	39.1	16.1	32.5
(I) Vac Σ		21.6	5.80	32.0	7.80	3.34	18.8	7.40	3.10	1.76	3.60	2.82
(J) AC noise x 2		.06	.06	.04	.04	.04	.08	.08	.08	.08	.08	.08
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		21.6	5.80	32.0	7.80	3.34	18.8	7.40	3.10	1.76	3.60	2.82
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.004	1.026	1.000	1.025	1.050	1.052	1.040	1.049	1.029	1.050	1.063
(N) PFE=(M-1)(10^2)		0	3	0	3	5	5	4	5	3	5	6
(O) MCF=(M-1)(10^5)/H		18	102	0	74	133	249	121	141	74	310	194

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	1390	1395	1410	1380	1380	1385	275	495	690	283	496	700
(E) Vdc (avg)	1.52	.97	1.64	1.62	.89	.68	27.0	49.6	69.0	27.8	49.6	69.0
(F) DCcal						USED 1000	1.019	.999	1.000	1.018	1.000	1.013
(G) Kn x 10^{-3} (a = 500')	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	32.8	36.5	17.5	35.2	33.8	41.2						
(I) Vac Σ	1.48	.98	1.60	1.56	.88	.68	27.0	49.6	69.0	27.8	49.6	68.4
(J) AC noise x 2	.08	.08	.06	.06	.06	.06						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.48	.98	1.60	1.56	.88	.68						
(L) AC-DC cal.						USED →	1.000	1.000	1.000	1.000	1.000	.991
(M) ρdc/ρac =ExL/K	1.028	.990	1.025	1.039	1.011	1.000						
(N) PFE=(M-1)(10^2)	3	-1	3	4	1	0						
(O) MCF=(M-1)(10^5)/H	85	-79	143	110	33	0						

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Pioneer . Line 3-N Int.Cal. Date: 9-9-61

Send	Cal	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	2-3	0-.5N	→	.5-1.N		→	1-1.5N			→	1.5-2N	→
Time		1502	1505	1547	1549	1551	1615	1616	1621	1640	1642	1643
DC-1		10.8	3.1	16.0	4.00	1.45	10.2	3.8	1.60	.92	1.90	1.45
		10.8	3.1	16.0	4.00	2.20	10.3	3.4	1.60	.93	1.85	1.30
DC-2		11.0	2.9	16.0	4.00	2.05	9.7	4.0	1.65	.90	1.90	1.55
		11.0	2.9	16.0	4.00	1.30	9.6	4.2	1.65	.88	1.92	1.65
Σ		21.8 21.8	6.0 6.0	32.0 32.0	8.00 8.00	3.50 3.50	19.9 19.9	7.8 7.6	3.25 3.25	1.82 1.81	3.80 3.77	3.00 2.95
DC- 3		10.5	3.1	16.1	4.05	1.25	10.3	3.3	1.58	.94	1.82	1.25
		10.5	3.2	16.1	4.05	1.55	10.6	3.2	1.60	.96	1.80	1.15
DC-4		11.2	2.8	15.9	3.95	2.25	9.4	4.3	1.62	.84	1.97	1.75
		11.0	2.7	16.9	3.95	2.00	9.2	4.5	1.70	.84	1.95	1.90
Σ		21.7 21.5	5.9 5.9	32.0 32.0	8.00 8.00	3.50 3.55	19.7 19.8	7.6 7.7	3.30 3.20	1.78 1.80	3.79 3.75	3.00 3.05
DC-Av		21.7	5.95	32.0	8.00	3.51	19.8	7.70	3.25	1.81	3.78	3.00
AC-1		10.8	2.9	16.0	3.90	1.67	9.4	3.7	1.55	.88	1.80	1.41
AC- 2		10.8	2.9	16.0	3.90	1.67	9.4	3.7	1.55	.88	1.80	1.41
Σ		21.6	5.80	32.0	7.80	3.34	18.8	7.40	3.10	1.76	3.60	2.82
S.P.		+12.9	+12.9	-16.2	→		-5.9	→				
AC-N		.03	.03	.02	→		.04	.04	.04	.04		

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Pioneer Line: 3 - N Int.Cal _____ Date: _____

Send	3-4	4-5	1-2	2-3	3-4	4-5	Cal	→	→	→	→	→
Rec.	1.5-2 →		2-2.5 →				2-3					→
Time	1645	1648	1702	1706	1710	1712	1453	1954	1955	1738	1739	1740
DC-1	.70 .70	.60 .63	.70 .62	.70 .55	.45 .38	.38 .30	13.5	24.8	34.5	13.9	24.8	34.5
DC-2	.80 .85	.36 .38	1.00 1.02	.98 1.08	.45 .50	.35 .38	13.5	24.8	34.5	13.9	24.8	34.5
Σ	1.50 1.55	.96 1.01	1.70 1.64	1.68 1.63	.90 .88	.68 .68	27.0	49.6	69.0	27.8	49.6	69.0
DC-3	.80 .73	.58 .60	.60 .67	.50 .50	.38 .38	.27 .25	13.5	24.8	34.5	13.9	24.8	34.5
Dc-4	.70 .82	.39 .32	1.02 .95	1.08 1.08	.52 .50	.41 .42	13.5	24.8	34.5	13.9	24.8	34.5
Σ	1.50 1.55	.97 .92	1.62 1.62	1.58 1.58	.90 .88	.68 .67	27.0	49.6	69.0	27.8	49.6	69.0
DC-AV	1.52	.97	1.64	1.62	.89	.68	27.0	49.6	69.0	27.8	49.6	69.0
AC-1	.74	.49	.80	.78	.44	.34	13.5	24.8	34.5	13.9	24.8	34.2
AC-2	.74	.49	.80	.78	.44	.34	13.5	24.8	34.5	13.9	24.8	34.2
Σ	1.48	.98	1.60	1.56	.88	.68	27.0	49.6	69.0	27.8	49.6	68.4
S. P.	←	-18.3	←			-8.9						
AC-N	←	.04	←			.03						

INDUCED POLARIZATION SENDER NOTES

Project: Pioneer Line: 3N Date: 4-9

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive		.5-1N	→	1-1.5N	→		1.5-2N	→			2-2.5N	→
Time		1502	1505	1546	1549	1555	1615	1618	1621	1624	1640	1643
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	1400	1430	1420	1400	1420	1400	1400	1390	1410	1385
Send	3-4	4-5	1-2	2-3	3-4	4-5	2-3	2-3	2-3	2-3	2-3	2-3
Receive	2-2.5N	→	2.5-3N	→			Cal	Cal	Cal	Cal	Cal	Cal
Time	1645	1648	1702	1706	1710	1712	1453	1454	1455	1738	1739	1740
Range	1.5	1.5	1.5	1.5	1.5	1.5	.30	.50	.75	.30	.50	.75
Current	1390	1395	1410	1380	1380	1385	275	495	690	283	496	700

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project Pioneer Line #3-5 Field date 4/9/61 Data page _____ Comp. date 4/10/61 Comp by [illegible]

(A) Send	3-4	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive		0-.55 →		.5-1.5	→		1-1.55 →				1.5-2.5	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1425	1420	1440	1400	1370	1405	1395	1350	1350	1400	1390
(E) Vdc (avg)		42.6	6.25	52.1	13.4	2.79?	100.1	11.9	4.58?	?	21.4	4.11
(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	15
(H) ρ dc=ExFxGx10^3/D		44.8	26.4	54.4	57.6	30.6	107.0	51.2	51.0	~?28	91.6	44.3
(I) Vac Σ		42.0	6.0	50.4	12.6	2.78	99.0	11.2	4.40	1.26	20.0	3.94
(J) AC noise x 2		OK										
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		42.0	6.0	50.4	12.6	2.78	99.0	11.2	4.40	1.26	20.0	3.94
(L) AC-DC cal.	1.000	→										
(M) ρ dc/ρac=ExL/K		1.013	1.041	1.033	1.063	1.003	1.011	1.061	1.040	—	1.070	1.041
(N) PFE=(M-1)(10^2)		1	4	3	6	0	1	6	4	—	7	4
(O) MCF=(M-1)(10^5)/H		29	155	61	109	10	10	119	78	?	76	93

Project	Line		Field date		Data page		Comp. date				Comp by	
(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	→				→
(B) Receive	1.5-2.5 →		2-2.5	→		→	Cal	→				→
(C) n separation	4	5	3	4	5	6						
(D) I	1370	1350	1460	1380	1355	1355	282	504	700	277	495	695
(E) Vdc (avg)	2.07	?	8.35	2.06	1.13	?	280	500	700	278	484	690
(F) DCcal	1.000	→					1.007		1.000		→	
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	45.3	~?23	89.5	44.8	43.8	~?23.6						
(I) Vac Σ	2.00	.60	7.60	1.96	1.12	.38	280	500	700	278	490	690
(J) AC noise x 2	"											
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.00	.60	7.60	1.96	1.12	.38	"	"	"	"	"	"
(L) AC-DC cal.	1.000	→										
(M) ρdc/ρac =ExL/K	1.036	—	1.099	1.050	1.010	—						
(N) PFE=(M-1)(10^2)	4	—	10	5	1	—						
(O) MCF=(M-1)(10^5)/H	79	?	110	112	23	?						

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Pioneer Line: 3 S Int.Cal _____ Date: 4-9-61

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	0-.55 →		.5-15 →			1-1.55 →				1.5-25 →	
Time		1052	1053	1106	1110	12.17	12.40	12:44	12:50	12:58	1:16	1:17
DC-1		21.5 21.5	3.6 3.7	26.0 26.0	6.2 6.2	1.2[illegible] 1.20	50.0 50.0	6.7 7.0			10.7 10.2	1.79 1.72
DC-2		21.3 21.1	2.6 2.6	26.2 26.2	7.2 7.2	1.59 1.80	50.0 50.0	5.4 4.9			11.0 10.9	2.26 2.20
Σ		42.8 42.6	6.2 6.3	52.2 52.2	13.4 13.4	2.79 2.80	100.0 100.0	on [illegible]			21.7 21.1	4.05 4.12
DC-3		21.5 21.5	3.5 3.3	25.8 26.0	6.2 6.4	BAD S.P.	50.5 50.0	7.0 6.2			10.6 10.6	1.80 1.86
Dc-4		21.1 21.1	2.8 2.9	26.2 26.0	7.3 7.0	DRIFT	50.0 50.0	5.1 5.4			10.5 11.0	2.19 2.20
Σ		42.6 42.6	6.3 6.2	52.0 52.0	13.5 13.4	on [illegible]	100.5 100				21.1 21.6	4.19 4.06
DC-AV		42.65	6.25	52.1	13.4	2.79?	100.1	11.9	4.58?		21.4	4.11
AC-1		21.0	3.0	25.2	6.3	1.39	49.5	5.6	2.20	.63	10.0	1.97
AC-2		21.0	3.0	25.2	6.3	1.39	49.5	5.6	2.20	.63	10.0	1.97
Σ		42.0	6.00	50.4	12.6	2.78	99.0	11.2	4.40	1.26	20.0	3.94
S. P.		+9.8	+9.8	+16.0	→	→	120=5	→	→	→	-40.0	→
AC-N		.05	.05	.06	→	→	.07	→	→	→	.02	→

1.5	.9	1.4	1.8	1.2	2.0
1.5	2.0	.8	1.0	1.3	1.5
1.1	1.95	1.8	1.4	1.25	1.6
1.7	.55	1.3	1.3	1.8	1.7
	1.1		1.55		
1.4	.6			1.3	
1.3	1.55	1.3	1.6		
1.35	1.65	1.3	1.3		
1.25		1.7	1.6		
		1.5	1.45		

1.22
1.60
.31
2.05

5.0	5.0	1-1.55
5.9	5.1	2-4
6.9	6.9	USE
7.0	6.7	
11.9	11.9	
11.9	11.7	

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE

Project: Pioneer Line: 3-S Int.Cal. Date: 4-9-61

Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal					
Rec.	1.5-25	→	2-2.5S	→		→	3-4					
Time	12:19	12:20	12:30	12:32	12:34	12:35	1044	1046	1047			
DC-1	.86 .79	.34 .52	4.0 3.7	1.18 1.22	.44 .41		14.0	25.0	35.0	13.9	24.2	34.5
DC-2	1.18 1.28	.12 .08	4.3 4.4	.95 .81	.68 .70		14.0	25.0	35.0	13.9	24.2	34.5
Σ	2.04 2.07	[illegible]	8.3 8.3	2.13 2.03	1.12 1.12		28.0	50.0	70.0	27.8	48.4	69.0
DC-3	1.00 .86	.25 .21	3.8 3.3	1.17 1.38	.42 .40		14.0	25.0	35.0	13.9	24.2	34.5
DC-4	1.06 1.22	.49 .18	4.6 4.7	.86 .72	.74 .73		14.0	25.0	35.0	13.9	24.2	34.5
Σ	2.10 2.08		8.4 8.4	1.99 2.09	1.16 1.13		28.0	50.0	70.0	27.8	48.4	69.0
DC-AV	2.07		8.35	2.06	1.13		28.0	50.0	70.0			
AC-1	1.00	.30	3.80	.98	.56	.19	14.0	25.0	35.0	13.9	24.5	34.8
AC-2	1.00	.30	3.80	.98	.56	.19	14.0	25.0	35.0	13.9	24.5	34.8
Σ	2.00	.60	7.60	1.96	1.12	.38	28.0	50.0	70.0	27.8	49.0	
S. P.	→	→	+8.0	→	→	→						
AC-N	→	→	.03	→	→	→						

INDUCED POLARIZATION SURVEY - RECEIVER NOTES

Project: Pioneer Line: 3-5 Int. Cal. 4-9-61

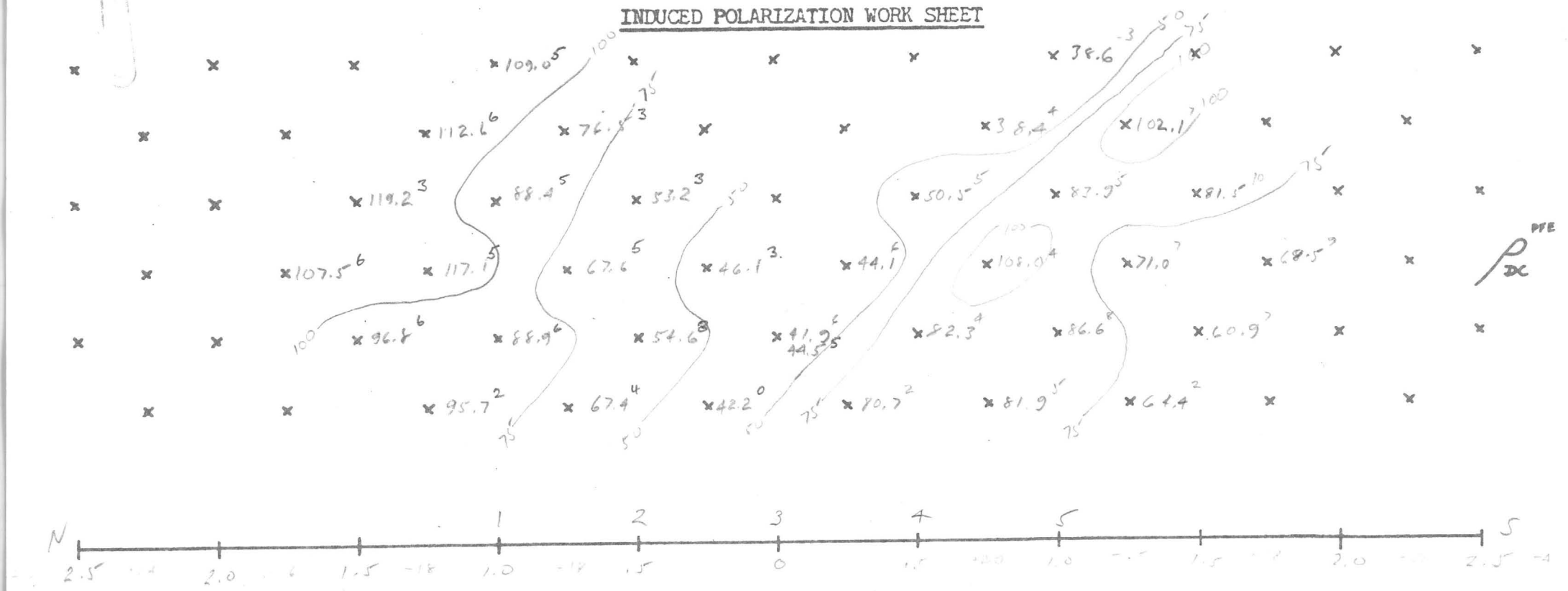
Send	2-3										
Rec	1-1.55										
Time											
DC-1	2.52 2.24	1.90 1.82	1.80 2.22	3.05 2.18	1.21 2.30	2.20 2.10	2.10 1.80	1.65 2.08	3.00 1.10	2.71 2.50	2.55 2.80
DC-2	1.25 2.80	2.60 2.00	2.46 2.00	2.03 3.70	3.00 1.80	1.70 2.20	2.80 2.20	3.35 2.10	2.30 2.80	2.00 1.79	1.67 2.15
Σ	4.17 5.04	4.50 3.82	4.26 4.93	5.08 5.88	4.69 4.10	4.40 3.70	4.90 4.00	5.00 4.12	5.30 4.20	4.11 4.38	4.19 4.95
DC-3	1.70 3.05	2.50 2.02	2.42 1.20	1.76 2.88	2.30 1.40	1.60 2.40	1.6 2.80	2.70 3.60	2.70 2.92	2.61 2.40	1.68 3.95
DC-4	2.61 2.14	2.39 2.12	3.18 1.85	1.80 2.39	2.60 2.60	2.50 2.10	2.10 2.38	1.98 1.52	1.45 2.42	1.80 2.52	2.40 1.88
Σ	4.31 5.19	5.02 4.14	5.60 3.05	3.55 5.27	4.98 4.08	4.10 4.50	3.70 5.18	4.68 5.12	4.15 5.34	4.41 4.92	4.08 4.33
DC-AV.											
AC-1	2.20										
AC-2	2.2[illegible]			Avg	4.55						
Σ	[illegible]				4.58						
S.P.											
AC-N											

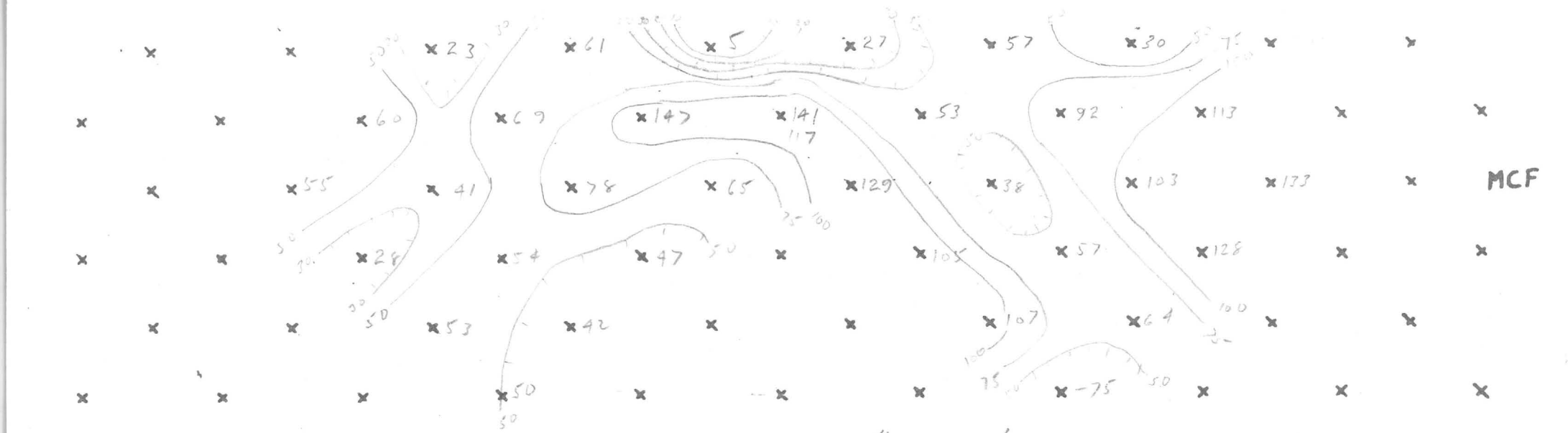
INDUCED POLARIZATION SENDER NOTES

Project: Rhodes Line: 3 S 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
Receive		5-15	→	1-155	→		1-5 25	→			2-255	→
Time		1032	1053	1106	1110	1217	1230	1232	1254	1258	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	1420	1440	1400	1370	1405	1395	1350	1350	1400	1390
Send	2-3	1-2	4-5	3-4	2-3	1-2	3-4	3-4	3-4	3-4	3-4	3-0
Receive	2-255	→	25-35	→			Col	Col	Col	Col	Col	Col
Time	1318	1321	1330	1334	1335	1336	1044	1046	1047	1402	1404	1405
Range	1.5	1.5	1.5	1.5	1.5	1.5	.30	.50	.75	.3	.5	.75
Current	1370	1350	1400	1380	1355	1355	282	504	700	277	495	695

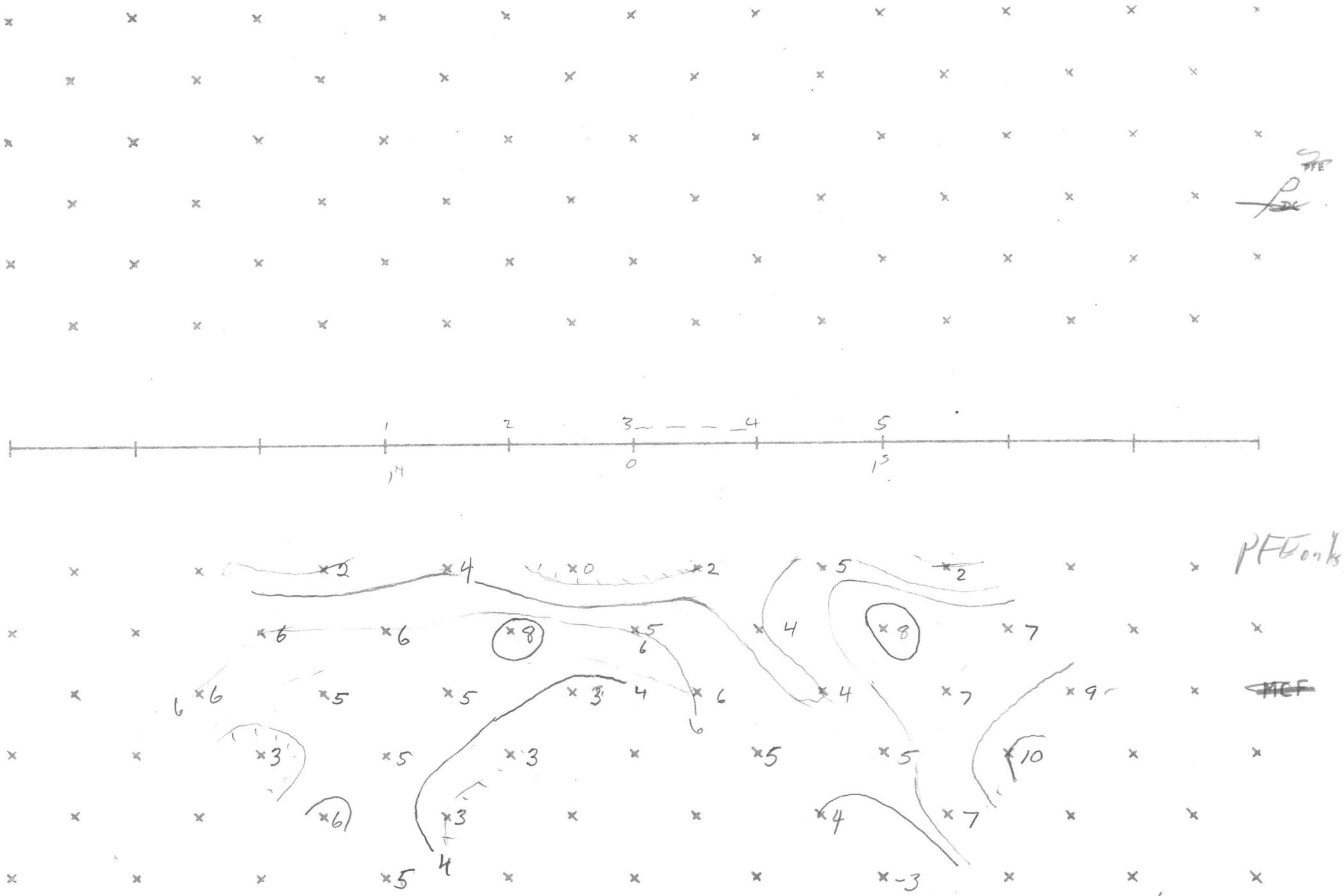
INDUCED POLARIZATION WORK SHEET





Area Pioneer Line # 1 - N & S **Scale** 1" = 500' **Date** April 7, 81

INDUCED POLARIZATION WORK SHEET



Area Pioneer Line #1 Scale 1" = 500' Date of 4/6/61.

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page ____

Project Pioneer Line 1-N Field date Apr. 6, 61 Data page ____ Comp. date Apr. 2, 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	1.5-1.0N →		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		1425	1420	1025	1425	1410	690	1015	1405	1400	695	1020
(E) Vdc (avg)		40.4	10.6	44.4	12.05	4.36	44.3	15.18	6.37	2.50	11.30	8.01
(F) DCcal USED	.993											
(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		42.2	44.5	67.4	64.6	46.1	95.7	88.9	67.6	53.2	36.8	117.1
(I) Vac Σ		40.0	10.0	44.2	12.00	4.20	43.0	14.20	6.00	2.42	10.60	7.60
(J) AC noise x 2		.04	.04	.08	.08	.08	.14	.14	.14	.14	.08	.08
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		40.0	10.0	44.2	12.00	4.20	43.0	14.20	6.00	2.42	10.60	7.60
(L) AC-DC cal. USED	.992											
(M) ρ dc/ρac=ExL/K		1.002	1.052	1.041	1.080	1.030	1.022	1.061	1.053	1.025	1.058	1.048
(N) PFE=(M-1)(10^2)		0	5	4	8	3	2	6	5	3	6	5
(O) MCF=(M-1)(10^5)/H		5	117	61	147	65	23	69	78	47	60	41

Project	Line		Fie	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	1405	695	1020	1405	1400		266	500	695		
(E) Vdc (avg)	4.20	2.06	5.01	4.08	3.03	1.83		26.2	50.4	70.0		
(F) DCcal						USED	.992	.993	.993	.993		
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	88.4	76.5	107.5	119.2	112.6	109.0						
(I) Vac Σ	3.98	1.98	4.70	3.92	2.64	1.72		27.2	50.0	69.4		
(J) AC noise x 2	.08	.08	.14	.14	.14	.14						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	3.98	1.98	4.70	3.92	2.64	1.72						
(L) AC-DC cal.						USED	.992	.964	.993	.992		
(M) ρdc/ρac =ExL/K	1.048	1.032	1.059	1.033	1.060	1.054						
(N) PFE=(M-1)(10^2)	5	3	6	3	6	5						
(O) MCF=(M-1)(10^5)/H	54	42	55	28	53	50						

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Pioneer Line: 1N Int.Cal. _____ Date: 4 6

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	→	→	→	2-2.4N	→
Time		1508	1509	15:[illegible]	15:33	15:35	15:[illegible]	16:03	16:05	16:07	16:26	16:27
DC-1		20.3	5.5	22.[illegible]	6.5	2.40	22.6	7.4	3.25	1.02	5.60	[illegible]
		20.3	5.6	[illegible]	6.5	2.54	22.6	[illegible]	3.78	1.09	5.6	2.07
DC-2		20.0	5.2	24.[illegible]	6.[illegible]	1.98	21.6	7.8	3.10	1.48	5.7	4.01
		20.2	4.9	24.0	6.6	1.79	21.7	7.8	2.98	1.42	5.7	4.4
Σ		40.7 40.5	10.7 10.5	46.2 46.7	12.10 12.10	4.38 4.33	44.2 44.7	15.20 15.20	6.33 6.36	2.50 2.51	11.30 11.30	8.01 8.01
DC-3		20.4	5.7	22.2	6.5	2.62	22.6	[illegible]	3.54	[illegible]	5.50	[illegible]
		20.2	5.6	22.1	6.6	[illegible]	22.6	7.5	3.61	[illegible]	5.[illegible]	[illegible]
DC-4		20.0	5.0	24.2	6.5	[illegible]	21.6	7.8	2.80	[illegible]	5.8	4.03
		20.0	4.9	24.4	6.4	1.74	21.8	7.6	2.60	[illegible]	5.7	[illegible]
Σ		40.4 40.2	10.7 10.5	46.4 46.1	12.00 12.00	4.37 4.36	44.2 44.4	15.20 15.10	6.34 6.41	2.43 2.42	11.30 11.30	8.01 8.00
DC-AV		40.4	10.6	46.4	12.05	4.36	44.3	15.18	6.37	2.50	11.30	8.01
AC-1		20.0	5.0	22.1	6.0	2.10	21.5	7.1	3.00	1.21	5.30	3.80
AC-2		20.0	5.0	22.1	6.00	2.10	21.5	7.1	3.00	1.21	5.30	3.80
Σ		40.0	10.0	44.2	12.00	4.20	43.0	14.20	6.00	2.42	10.60	7.60
S. P.		+18.4	→	-18.3	→	→	-5.6	→	→	→	+24.1	→
AC-N		.02	→	.04	→	→	.07	→	→	→	.04	→

INDUCED POLARIZATION SURVEY - RECEIVER NOTES - PAGE 4-6

Project: Pioneer Line: 1N Int. Cal.

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.	2.25N →		2.5-3N	→			Co 1					
Time	[illegible]	16:30	[illegible]	17:3			1351	1352	1353			
DC-1	2.07 [illegible]	1.11 1.14	[illegible]	2.45 2.42	[illegible]	.96 .92	14.1	25.2	35.0			
DC-2	2.20 2.21	.96 [illegible]	[illegible]	.88 1.66	[illegible]	.89 1.10	14.1	25.2	35.0			
Σ	4.20 4.21	2.07 2.06	5.07 4.98	4.08 4.08	3.76 3.11	1.85 1.90	28.2	50.4	70.0			
DC-3	[illegible]	1.17		[illegible]	[illegible]	.92 .72	14.1	25.2	35.0			
DC-4	[illegible]	.89 .67		2.45 2.47	[illegible]	.97 1.00	14.1	25.2	35.0			
Σ	4.12 4.32	2.06 2.04	5.00 4.98	4.05 4.90	3.05 2.80	1.69 1.72	28.2	50.4	70.0			
DC-AV.	4.20	2.06	5.01	4.08	3.07	1.83	28.2	50.4	70.0			
AC-1	1.99	.99	2.75	1.96	1.42	.86	13.6	25.0	34.7			
AC-2	1.99	.99	2.75	1.96	1.42	.86	13.6	25.0	34.7			
Σ	3.98	1.98	4.70	3.92	2.84	1.72	27.2	50.0	69.4			
S.P.	→		18.1									
AC-N	→		.07	→								

INDUCED POLARIZATION SENDER NOTES

Project: Pioneer Line: 1 - N Date: 4-6-61

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		1508	1509	1531	1533	1535	1556	1603	1605	1607	1626	1627
Range		1.5	1.5	1.0	1.5	1.5	.75	1.0	1.5	1.5	.75	1.0
Current		1425	1420	1025	1425	1410	690	1015	1405	1400	695	1020
Send	3-4	4-5	1-2	2-3	3-4	4-5	Cal					
Receive							23					
Time	1628	1630	1704	1707	1709	1711	1351	1352	1353			
Range	1.5	1.5	.75	1.0	1.5	1.5	.3	.5	.75	.3	.5	.75
Current	1415	1405	695	1020	1405	1400	280	500	695			

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Pioneer . Line 5 Int.Cal. Date: 46

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	→	→	15-25	→	→	→	2-2.35	→
Time		10:28	10:30	10:50	10:52	10:55	11:09	11:20	11:22	11:27		
DC-1	28.7	27.2	2.26	39.1	6.99	.96	30.4	10.0	4.02	.45	6.8	3.10
	28.4	27.2	2.26	39.8	7.00	1.14	30.6	10.0	4.00	.50	6.8	3.10
DC-2	27.3	28.0	2.66	38.9	7.07	1.10	30.6	10.6	3.21	.62	7.1	3.42
	27.5	28.0	2.60	38.6	6.96	.92	30.5	10.3	3.31	.64	7.1	3.40
Σ		55.2	4.86	78.0	14.06	2.06	61.0	20.6	7.23	1.07	13.9	6.52
		55.2	4.86	77.8	13.96	2.06	61.1	20.3	7.31	1.14	13.9	6.50
DC- 3	28.3	27.0	2.26	39.2	7.08	.92	30.5	10.1	3.35	.70	6.8	3.42
	28.1	27.2	2.36	39.2	7.18	.87	30.2	10.2	3.18	.81	6.9	3.09
DC-4	27.6	27.9	2.55	38.6	6.91	.96	30.6	10.1	3.22	.56	7.1	3.40
	27.7	28.9	2.51	38.5	6.66	.98	30.8	10.0	3.26	.58	7.0	3.40
Σ		55.2	4.81	77.8	13.99	2.04	61.1	20.2	7.27	1.26	13.9	6.52
		55.2	4.87	77.8	13.99	2.05	61.0	20.2	7.28	1.19	13.9	6.49
DC-Av		55.2	4.85	77.8	14.00	2.05	61.1	20.3	7.27	1.17	13.9	6.51
AC-1	27.3	27.0	2.29	37.2	6.70	.97	30.0	9.4	3.49	.56	6.5	3.03
AC- 2	27.3	27.0	2.29	37.2	6.70	.97	30.0	9.4	3.49	.56	6.5	3.03
Σ		54.0	4.58	74.4	13.40	1.94	60.0	18.8	6.98	1.12	13.0	6.06
S.P.		+20.2	→	-0.5	→	→	+17.9	→	→	→	+27.2	→
AC-N		.06	→	.05	→	→	.06	→	→	→	.05	→

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Pioneer . Line 15 Int.Cal. Date: 4-6

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	11:54	11:55	12:23	12:25	12:26	12:28	9.45	9.46	9.47	1325	1326	1327
DC-1	1.43 1.50	.23 .6	2.71 2.62	1.97 .66	1.04 .7	.9 .21	13.9	25.1	34.0	14.2	25.3	35.1
DC-2	1.46 1.51	.21 .22	2.73 2.78	1.83 1.94	.89 .45	.10 .11	13.9	25.1	34.0	14.2	25.3	35.1
Σ	2.89 2.81	.37 .50	6.44 6.40	3.80 3.82	1.93 1.88	.39 .32	27.8	50.2	68.0	28.4	50.6	70.2
DC- 3	1.35 1.31	.13 .16	2.50 2.45	1.58 1.20	1.00 1.02	.18 .23	13.9	25.1	34.0	14.2	25.3	35.1
DC-4	1.51 1.51	.22 .22	3.91 3.84	2.05 2.05	.96 .97	.14 .10	13.9	25.1	34.0	14.2	25.3	35.1
Σ	2.86 2.82	.50 .45	6.41 6.29	3.61 3.35	1.85 1.99	.33 .33	27.8	50.2	68.0	28.4	50.6	70.2
DC-Av	2.85	.51	6.42	3.80	1.96	.32	27.8	50.2	68.0	28.4	50.6	70.2
AC-1	1.36	.25	2.94	1.72	.92	.17	13.2	24.9	34.0	13.6	25.2	35.0
AC- 2	1.36	.25	2.94	1.72	.92	.17	13.2	24.9	34.0	13.6	25.2	35.0
Σ	2.72	.50	5.88	3.44	1.84	.34	26.4	49.8	68.0	27.2	50.4	70.0
S.P.		→	-9.1			→						
AC-N		→	.05			→						

INDUCED POLARIZATION SENDER NOTES

Project: Pioneer Line: 1-S Date: 4-6-61

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		1028	1033	1050	1051	1055	1119	1120	1125	1131	1150	1151
Range		1.0	.75	1.5	1.0	.75	1.5	1.5	1.0	.75	1.5	1.5
Current		1025	695	1425	1020	697	1425	1407	1010	695	1430	1408
Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal					
Receive							3-4					
Time	1154	1155	1223	1225	1226	1228	0945	0946	0947	1325	1326	1327
Range	1.0	.75	1.5	1.5	1.0	.75	.3	.5	.75	.3	.5	.75
Current	1020	698	1408	1400	1008	698	281	510	700	284	512	707

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

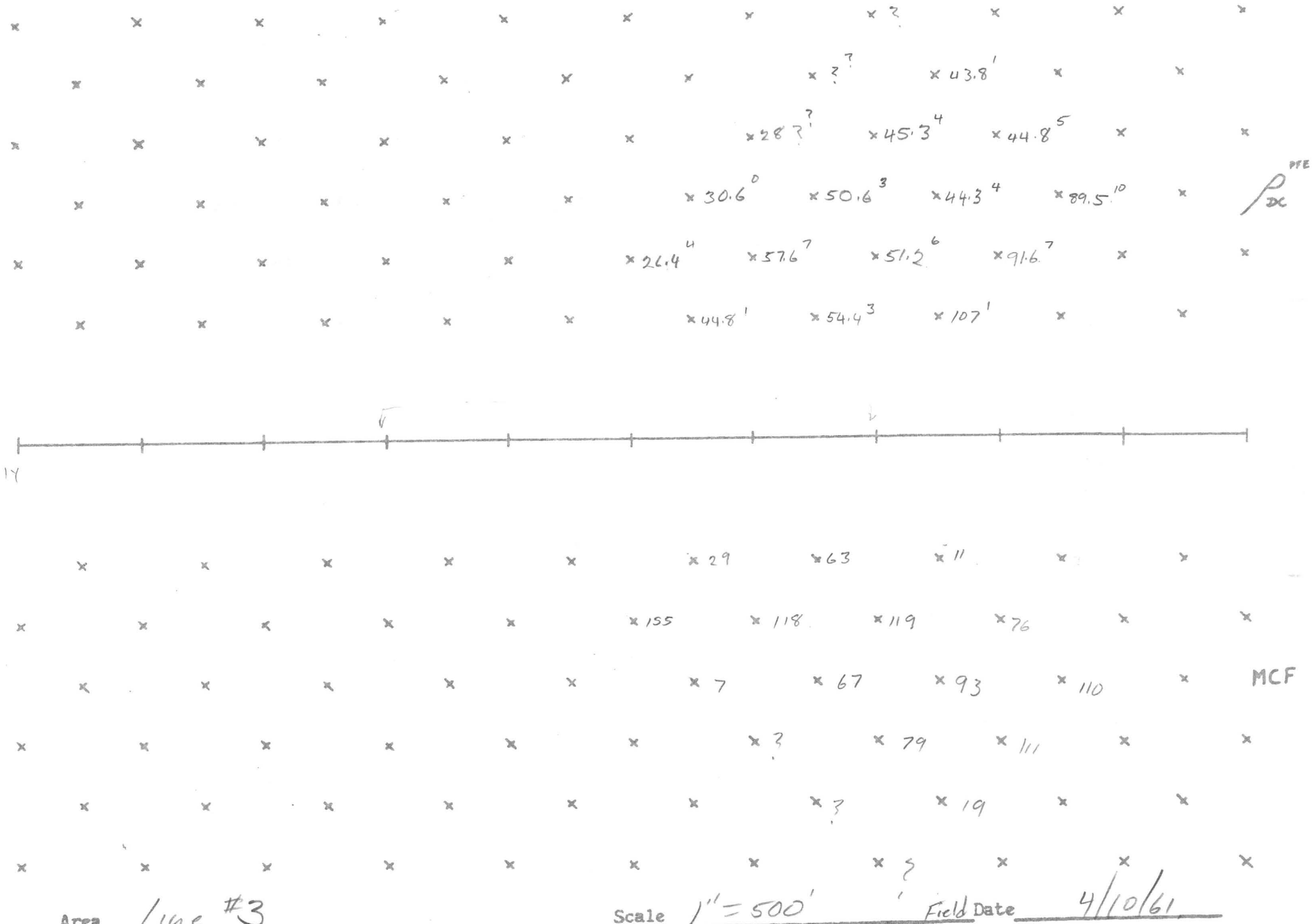
Page _____

Project Pioneer Line 1 - S Field date 4-6-61 Data page _____ Comp. date Apr 7, 61 . Comp by C.S.L

(A) Send	Cal	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	3-4	.5-1S →		1-1SS		→	1.5-2S			→	2-2.5S	
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1025	695	1425	1020	697	1425	1407	1010	695	1430	1408
(E) Vdc (avg)		55.2	4.85	77.8	14.00	2.05	61.1	20.3	7.27	1.17	13.9	6.51
(F) DCcal USED	1.000											
(G) Kn x 10^{-3} (a = 500')		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		80.7	41.9	81.9	82.3	44.1	61.4	86.6	108.0	50.5	60.9	71.0
(I) Vac Σ		54.0	4.58	74.4	13.4	1.94	60.0	18.8	6.98	1.12	13.0	6.06
(J) AC noise x 2		.12	.12	.10	.10	.10	.12	.12	.12	.12	.10	.10
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		54.0	4.58	74.4	13.4	1.94	60.0	18.8	6.98	1.11	13.0	6.06
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.022	1.059	1.047	1.044	1.057	1.019	1.080	1.041	1.053	1.069	1.073
(N) PFE=(M-1)(10^2)		2	6	5	4	6	2	8	4	5	7	7
(O) MCF=(M-1)(10^5)/H		27	141	57	53	129	30	92	38	105	113	103

Project	Line		Field date			Data page	Comp. date			Comp by		
(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	Cal					
(B) Receive	2-2.5S →		2.5-3S			→	3-4					
(C) n separation	4	5	3	4	5	6						
(D) I	1020	698	1408	1400	1008	698	281	510	700	284	512	707
(E) Vdc (avg)	2.85	1.57	6.42	3.80	1.96	.32	27.8	50.2	68.0	28.4	50.6	70.2
(F) DCcal							1.011	1.015	1.030	1.000	1.012	1.008
(G) Kn x 10^{-3} (a = 500')	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	83.9	38.4	68.5	81.5	102.1	38.6						
(I) Vac Σ	2.72	.50	5.88	3.44	1.84	.34	26.4	49.8	68.0	27.2	50.4	70.0
(J) AC noise x 2	.10	.10	.10	.10	.10	.10						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.72	.49	5.88	3.44	1.84	.33						
(L) AC-DC cal.							.950	.991	1.000	.958	.996	.996
(M) ρdc/ρac =ExL/K	1.048	1.041	1.091	1.104	1.065	.971						
(N) PFE=(M-1)(10^2)	5	4	9	10	7	-3						
(O) MCF=(M-1)(10^5)/H	57	107	133	128	64	-75						

INDUCED POLARIZATION WORK SHEET



Area Line #3 Scale 1" = 500' Field Date 4/10/61

INDUCED POLARIZATION SENDER NOTES

Project: Pioneer Line: 2s Date: 4-7

Send		2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive		.5-1s →		1.-1.5s	→		1.5-2s	→			2-2.35s →	
Time		1249	1252	1310	1312	1316	1333	1337	1342	1348	1404	1406
Range		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Current		1490	1410	1440	1420	1400	1440	1420	1395	1380	1420	1400
Send	2-3	1-2	4-5	3-4	2-3	1-2	4-5	4-5	4-5	4-5	4-5	4-3
Receive	2-2.5s →		2.5-3s	→			Col	Col	Col	Col	Col	Col
Time	1409	1414	1435	1437	1440	1443	1231	1235	1237	1508	1510	1512
Range	1.5	1.5	1.5	1.5	1.5	1.5	.30	.50	.75	.30	50	.75
Current	1380	1375	1425	1405	1400	1390	280	496	700	286	498	700

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Pioneer Line: 2-5 Int.Cal _____ Date: 4-7-61

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.	4-5	.5-15	→	1-155	→	→	1.5-25			→	2-2.55	
Time		1249	1252	1310	1312	1316	1333	1337	1342	1348	1404	1406
DC-1		35.0 35.3	6.3 6.7	25.0 25.0	10.5 10.0	3.2 3.5	41.5 41.5	5.2 5.1	2.95 2.93	1.05 1.10	9.5 9.5	2.1 2.1
DC-2		35.8 35.6	6.3 6.0	23.7 23.7	8.4 8.8	2.40 2.30	44.2 44.0	5.3 5.2	2.98 3.02	1.28 1.18	10.3 10.2	1.9 1.9
Σ		70.8 70.9	12.6 12.7	48.7 48.7	18.9 18.8	3.60 5.80	85.7 85.5	10.3 10.3	5.93 5.95	2.33 2.28	19.8 19.7	4.0 4.0
DC-3		35.2 35.1	6.7 6.5	24.5 24.2	9.8 10.0	3.35 3.35	41.3 41.3	5.3 5.2	2.95 2.90	1.10 .90	9.5 9.3	2.10 2.05
Dc-4		34.0 34.3	6.3 6.0	23.8 23.7	8.7 8.3	2.05 2.50	44.0 44.0	5.2 5.2	2.90 3.00	1.35 1.32	10.3 10.2	1.95 1.95
Σ		69.2 69.4	13.0 12.5	48.3 47.9	18.3 18.3	5.60 5.85	85.3 85.3	10.5 10.4	5.85 5.92	2.45 2.32	19.8 19.2	4.00 4.00
DC-AV		70.1	12.7	48.4	18.6	5.71	85.5	10.4	5.91	2.32	19.7	4.01
AC-1		34.4	6.1	23.5	8.7	2.75	41.0	4.9	2.75	1.10	9.2	1.90
AC-2		34.4	6.1	23.5	8.7	2.75	41.0	4.9	2.75	1.10	9.2	1.90
Σ		68.8	12.2	47.0	17.4	5.50	82.0	9.8	5.50	2.20	18.4	3.80
S. P.		-5.9	-5.9	←		-22.5	←			+14.9		
AC-N		.05	.05	←		.08	←			.07		

1.5-2

1-2

1.28

1.15

1.0

1.1

1.20

1.18

1.1

1.08

.026

41

INDUCED POLARIZATION SURVEY - RECEIVER NOTES PAGE _____

Project: Kimberley Line: L-5 Int.Cal. _____ Date: 4-7-61

Send	2-3	1-2	4-5	3-4	2-3	1-2	4-5					
Rec.	2-2.5 →		2.5-3 →				C.S.					
Time	1409	1414	1435	1437	1440	1443	1231	1235	1237			
DC-1	1.5 1.5	.3 .4	6.2 6.3	1.6 1.55	1.25 1.50	.80 .40	13.9	25.0	35.2	14.0	24.9	34.7
DC-2	1.5 1.45	.9 .9	5.7 5.4	1.6 1.7	1.40 1.10	.30 .70	13.9	25.0	35.2	14.0	24.9	34.7
Σ	3.0 2.95	1.2 1.3	11.9 11.7	3.2 3.25	2.65 2.60	1.1 1.1	27.8	50.0	70.4	28.0	49.8	69.4
DC-3	1.5 1.40	.25 .35	6.3 6.2	1.45 1.5	1.30 1.50	.70 .80	13.9	25.0	35.2	14.0	24.9	34.7
DC-4	1.48 1.60	1.0 1.0	5.7 5.5	1.65 1.60	1.30 1.1	.40 .30	13.9	25.0	35.2	14.0	24.9	34.7
Σ	2.98 3.00	1.25 1.35	12.0 11.7	3.10 3.10	2.67 2.61	1.1 1.1	27.8	50.0	70.4	28.0	49.8	69.4
DC-AV	2.98	1.28	11.8	3.16	2.61	1.10	27.8	50.0	70.4	28.0	49.8	69.4
AC-1	1.42	.63	5.5	1.50	1.27	.60	13.3	25.2	35.2	13.2	24.9	34.7
AC-2	1.42	.63	5.5	1.50	1.27	.60	13.3	25.2	35.2	13.2	24.9	34.7
Σ	2.84	1.26	11.0	3.00	2.54	1.20	26.6	50.4	70.4	26.4	49.8	69.4
S. P.	←	-4.9	←			-5.2						
AC-N	←	.05	←			.08						

85712 48910

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Pioneer Line 2N Field date 4-8 Data page_____ Comp. date_____. Comp by HA & CL

(A) Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive		.5-1N	→	1-1.5N	→	→	1.5-2N	→	→	→	2-2.5N	→
(C) n separation		1	2	1	2	3	1	2	3	4	2	3
(D) I		1440	1420	1400	1400	1400	1420	1400	1390	1395	1425	1405
(E) Vdc (avg)		36.8	12.7	25.0	4.36	2.46	31.0	5.99	1.57	1.07	14.3	4.20
(F) DCcal Use	1.00 →											
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		38.4	53.7	26.4	18.7	26.3	38.8	25.7	16.9	23.0	60.2	44.9
(I) Vac Σ		36.4	12.0	25.0	4.24	2.40	30.4	5.84	1.54	1.06	13.6	4.06
(J) AC noise x 2		.10	.10	.04	.04	.04	.06	.06	.06	.06	.06	.06
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		36.4	12.0	25.0	4.24	2.40	3.04	5.84	1.54	1.06	13.6	4.06
(L) AC-DC cal. Use	1.00 →											
(M) ρ dc/ρac=ExL/K		1.011	1.059	1.000	1.030	1.025	1.020	1.027	1.020	1.009	1.052	1.035
(N) PFE=(M-1)(10^2)		1	6	0	3	3	2	3	2	1	5	4
(O) MCF=(M-1)(10^5)/H		29	110	0	161	95	61	105	116	39	87	78

Project	Line		Field date		Data page		Comp. date			Comp by		
(A) Send	3-4	4-5	1-2	2-3	3-4	4-5	1-2	1-2	1-2	1-2	1-2	1-2
(B) Receive	2-2.5N →		2.5-3N		→		Cal					
(C) n separation	4	5	3	4	5	6						
(D) I	1400	1400	1415	1400	1395	1400	280	500	700	280	500	700
(E) Vdc (avg)	1.33	1.00	2.85	1.41	.51	.50	280	500	700	278	500	692
(F) DCcal Use	1.00 →											
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	28.5	37.5	32.1	32.2	19.4	30.0						
(I) Vac Σ	1.30	1.00	2.80	1.38	.53	.50	266	500	700	262	500	692
(J) AC noise x 2	.06	.06	.06	.06	.06	.06						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.30	1.00	2.80	1.38	.53	.50						
(L) AC-DC cal. Use	1.00 →											
(M) ρdc/ρac =ExL/K	1.022	1.00	1.019	1.021	.964	1.000						
(N) PFE=(M-1)(10^2)	2	0	2	2	-4	0						
(O) MCF=(M-1)(10^5)/H	77	0	59	65	-186	0						

INDUCED POLARIZATION SURVEY - RECEIVER NOTES

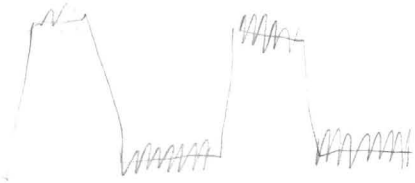
Project: Pioneer Line: 2-N Int. Cal. 4-8-61

Send	Cal	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	1-2	.5-1N →		1-1.5N			1.5-2N				2-2.5N →	
Time		1115	1117	1156	1159	1202	1220	1222	1226	1229	1249	1251
DC-1		19.0	6.3	12.3	2.2	1.2	15.5	3.12	.79	.50	7.1	2.15
		18.8	6.4	12.3	2.25	1.25	15.3	3.15	.79	.49	7.1	2.1
DC-2		18.2	6.5	12.7	2.15	1.2	15.5	2.85	.78	.58	7.2	2.05
		18.2	6.2	12.5	2.15	1.2	15.7	2.83	.78	.59	7.2	2.1
Σ		37.2 37.0	12.8 12.6	25.0 24.8	4.35 4.40	2.40 2.45	31.0 31.0	5.97 5.98	1.57 1.57	1.08 1.07	14.3 14.3	4.20 4.20
DC-3		18.5	6.7	12.5	2.2	1.2	15.3	3.18	.78	.47	7.0	2.1
		18.2	6.5	12.2	2.3	1.2	15.0	3.20	.77	.47	7.0	2.1
DC-4		18.2	6.0	12.7	2.1	1.3	15.7	2.82	.79	.60	7.2	2.1
		18.2	6.2	12.8	2.1	1.3	16.0	2.80	.81	.59	7.3	2.1
Σ		36.7 36.8	12.7 12.7	25.2 25.0	4.30 4.40	2.5 2.6	31.0 31.0	6.0 6.0	1.59 1.58	1.07 1.06	14.3 14.3	4.20 4.20
DC-AV.		36.8	12.7	25.0	4.36	2.46	31.0	5.99	1.57	1.07	14.3	4.20
AC-1		18.2	6.0	12.5	2.12	1.2	15.2	2.92	.77	.53	6.8	2.03
AC-2		18.2	6.0	12.5	2.12	1.2	15.2	2.92	.77	.53	6.8	2.03
Σ		36.4	12.0	25.0	4.24	2.40	30.4	5.84	1.54	1.06	13.6	4.06
S.P.		+2.8	+2.8	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.7	-5.7
AC-N		.05	.05	.02	.02	.02	.03	.03	.03	.03	.03	.03

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project Pioneer . Line 2 - N Int.Cal. Date: 7-8-61

Send	3-4	4-5	1-2	2-3	3-4	4-5	Cal 1-2					
Rec.	2-2.5N	→	2.5-3N			→	1-2					→
Time	1253	1255	1315	1317	1320	1323	1106	1108	1109	1355	1356	1357
DC-1	.68 .70	.40 .40	1.55 1.60	.71 .64	.35 .36	.23 .25	14.0	25.0	35.0	13.9	25.0	34.6
DC-2	.65 .63	.60 .60	1.30 1.20	.70 .80	.17 .16	.21 .25	14.0	25.0	35.0	13.9	25.0	34.6
Σ	1.33 1.33	1.00 1.00	2.85 2.80	1.41 1.44	.52 .52	.50 .50	28.0	50.0	70.0	27.8	50.0	69.2
DC- 3	.62 .60	.42 .30	1.50 1.55	.58 .54	.40 .38	.25 .26	14.0	25.0	35.0	13.9	25.0	34.6
DC-4	.73 .73	.58 .70	1.35 1.35	.80 .88	.11 .13	.25 .24	14.0	25.0	35.0	13.9	25.0	34.6
Σ	1.35 1.33	1.00 1.00	2.85 2.90	1.38 1.42	.51 .51	.50 .50	28.0	50.0	70.0	27.8	50.0	69.2
DC-Av	1.33	1.00	2.85	1.41	.515	.50	28.0	50.0	70.0	27.8	50.0	69.2
AC-1	.65	.50	1.40	.69	.265	.25	13.3	25.0	35.0	13.1	25.0	34.6
AC- 2	.65	.50	1.40	.69	.265	.25	13.3	25.0	35.0	13.1	25.0	34.6
Σ	1.30	1.00	2.80	1.38	.530	.50	26.6	50.0	70.0	26.2	50.0	69.2
S.P.	-5.7	-5.7	+4.0	+4.0	+4.0	.4.0						
AC-N	.03	.03	.03	.03	.03	.03						



INDUCED POLARIZATION SENDER NOTES

Project: Pioneer Line: 2N Date: 4-8

Send		3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive		5-1N	→	1-1.5N	→		15-2N	→			2-2.5N	→
Time		1115	1117	1136	1159	1202	1220	1222	1226	1229	1249	1251
Range		1.5	1.5	1.5	15	15	1.5	1.5	1.5	15	1.5	1.5
Current		1440	1420	1400	1400	1400	1420	1400	1390	1395	1425	1405
Send	3-4	4-5	1-2	2-3	3-4	4-5	1-2	1-2	1-2	1-2	1-2	1-2
Receive	2-2.5N	→	2.5-3N	→			Cal	Cal	Cal	Cal	Cal	Cal
Time	1253	1255	1315	1317	1320	1323	1106	1108	1109	1355	1356	1357
Range	1.5	1.5	1.5	1.5	1.5	15	.30	.50	.75	.30	.50	.75
Current	1400	1400	1415	1400	1395	1400	280	500	700	280	500	700

37.5
14.5

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

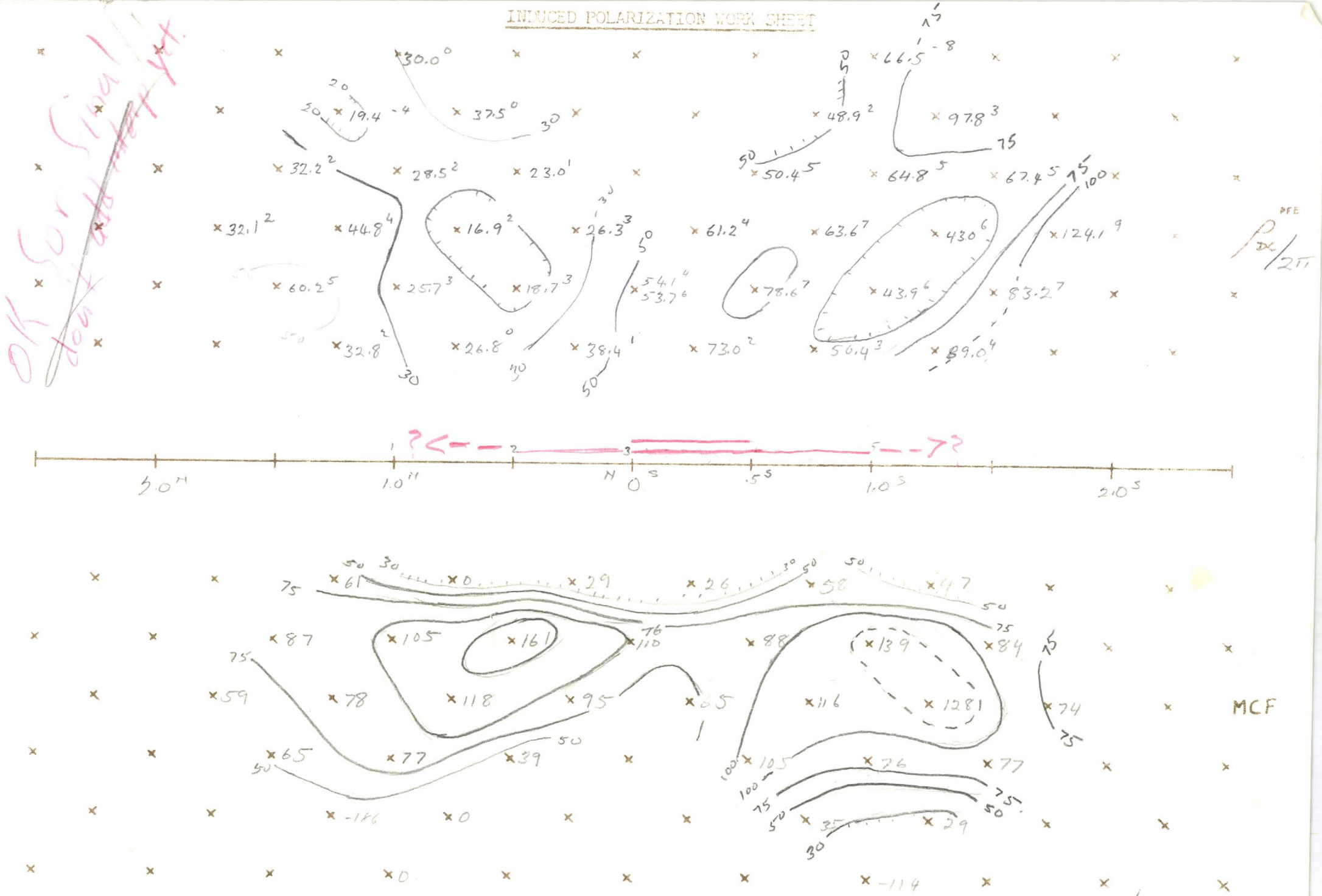
Project Pioneer Line 2-S Field date 4-7-61 Data page _____ Comp. date _____. Comp by _____

(A) Send	4-5	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		1440	1410	1440	1420	1400	1440	1420	1395	1380	1420	1400
(E) Vdc (avg)		70.1	12.7	48.4	18.6	5.71	85.5	10.4	5.91	2.32	19.7	4.01
(F) DCcal USED	1.000											
(G) Kn x 10^{-3}		1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D		73.0	54.1	50.4	78.6	61.2	89.0	43.9	63.6	50.4	83.2	43.0
(I) Vac Σ		68.8	12.2	47.0	17.4	5.50	82.0	9.8	5.50	2.20	18.4	3.80
(J) AC noise x 2		.10	.10	.16	.16	.16	.14	.14	.14	.14	.10	.10
(K) Vac(corr) = $\sqrt{I^2 - J^2}$		68.8	12.2	47.0	17.4	5.50	82.0	9.8	5.50	2.20	18.4	3.80
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K		1.019	1.041	1.029	1.069	1.040	1.042	1.061	1.074	1.053	1.070	1.055
(N) PFE=(M-1)(10^2)		2	4	3	7	4	4	6	7	5	7	6
(O) MCF=(M-1)(10^5)/H		26	76	58	88	65	47	139	116	105	84	128

Project Pioneer Line 2-S Field date 4-7-61 Data page _____ Comp. date _____ Comp by _____

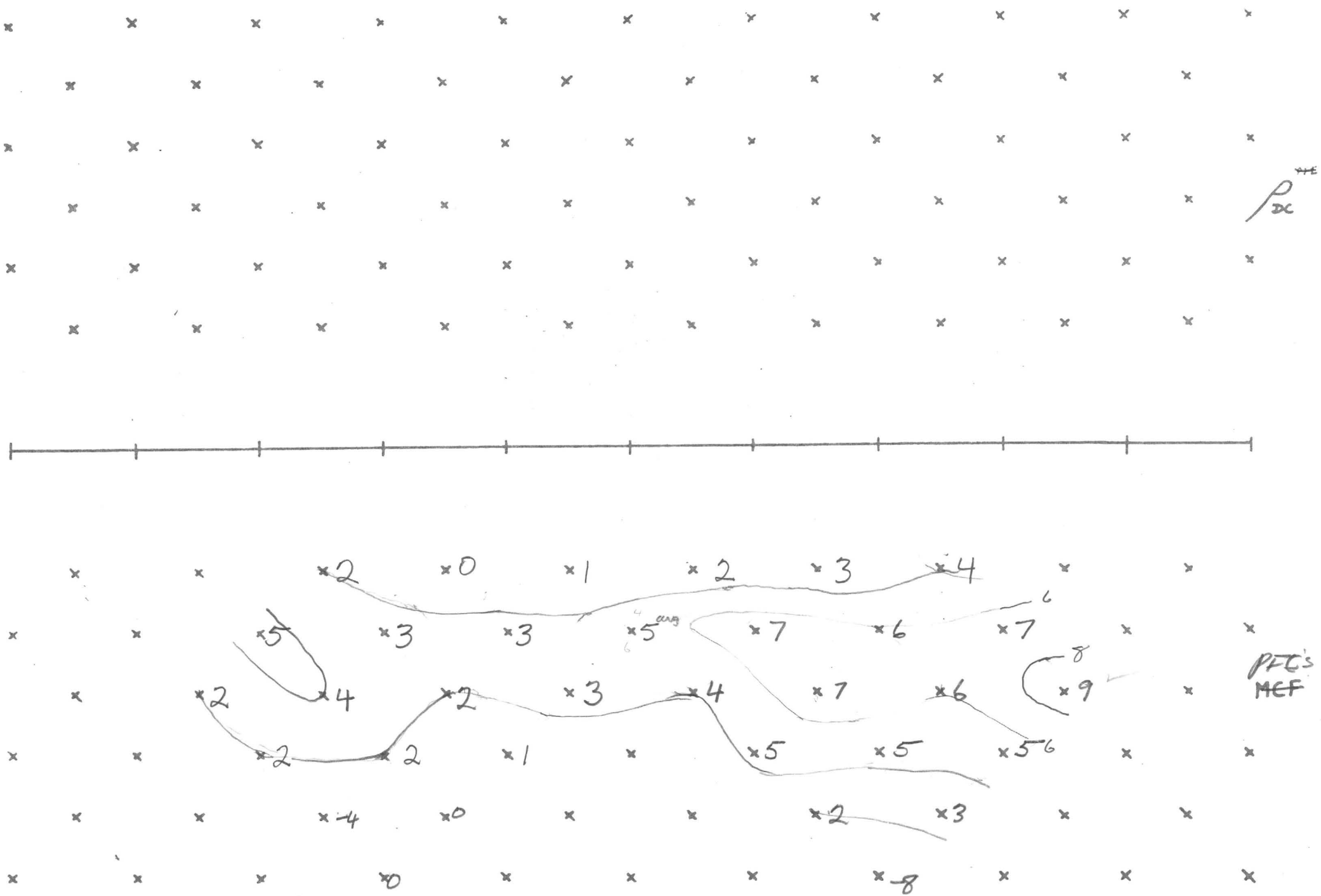
(A) Send	2-3	1-2	4-5	3-4	2-3	1-2	4-5						
(B) Receive	→	→	2.5-3.05	→	→	→	Cal.						
(C) n separation	4	5	3	4	5	6							
(D) I	1380	1375	1425	1405	1400	1390		280	496	700	286	498	700
(E) Vdc (avg)	2.98	1.28	11.8	3.16	2.61	1.10		27.8	50.0	70.4	28.0	49.8	69.4
(F) DCcal						USED	1.000	1.016	.996	.996	1.020	1.000	1.010
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84							
(H) ρ dc=ExFxGx10^3/D	64.8	48.9	124.1	67.4	97.8	66.5							
(I) Vac Σ	2.84	1.26	1.10	3.00	2.54	1.20		26.6	50.4	70.4	26.4	49.8	69.4
(J) AC noise x 2	.10	.10	.16	.16	.16	.16							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.84	1.26	1.08	3.00	2.54	1.19							
(L) AC-DC cal.						USED	1.000	.956	1.009	1.000	.943	1.000	1.000
(M) ρdc/ρac =ExL/K	1.049	1.017	1.092	1.052	1.028	.924							
(N) PFE=(M-1)(10^2)	5	2	9	5	3	-8							
(O) MCF=(M-1)(10^5)/H	76	35	74	77	29	-114							

INDUCED POLARIZATION WORK SHEET



Area Pioneer - Line #2 Scale 1" = 500' Date of 4/8/61

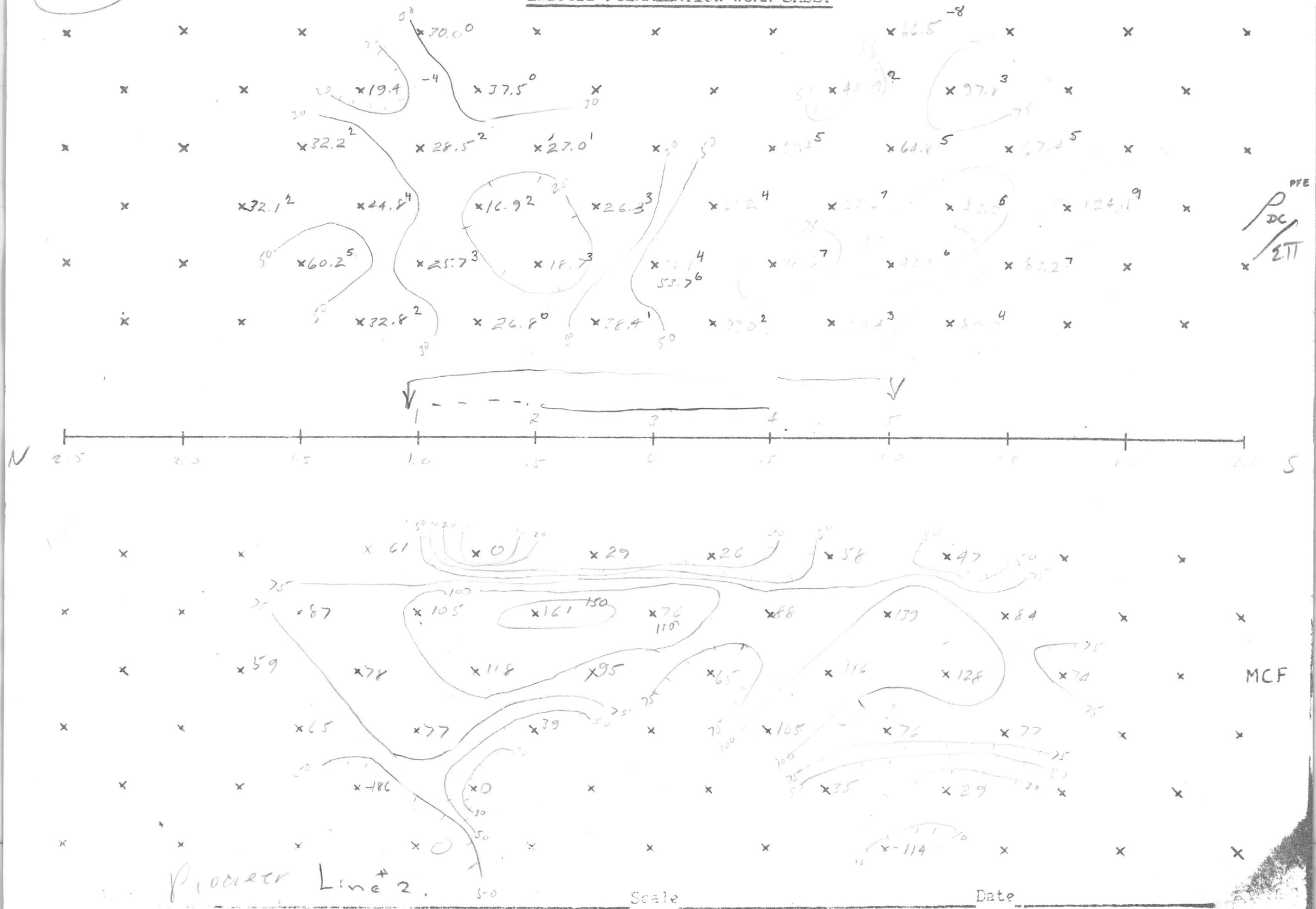
INDUCED POLARIZATION WORK SHEET



Area Line #2 PFE's Scale Date

2

INDUCED POLARIZATION WORK SHEET



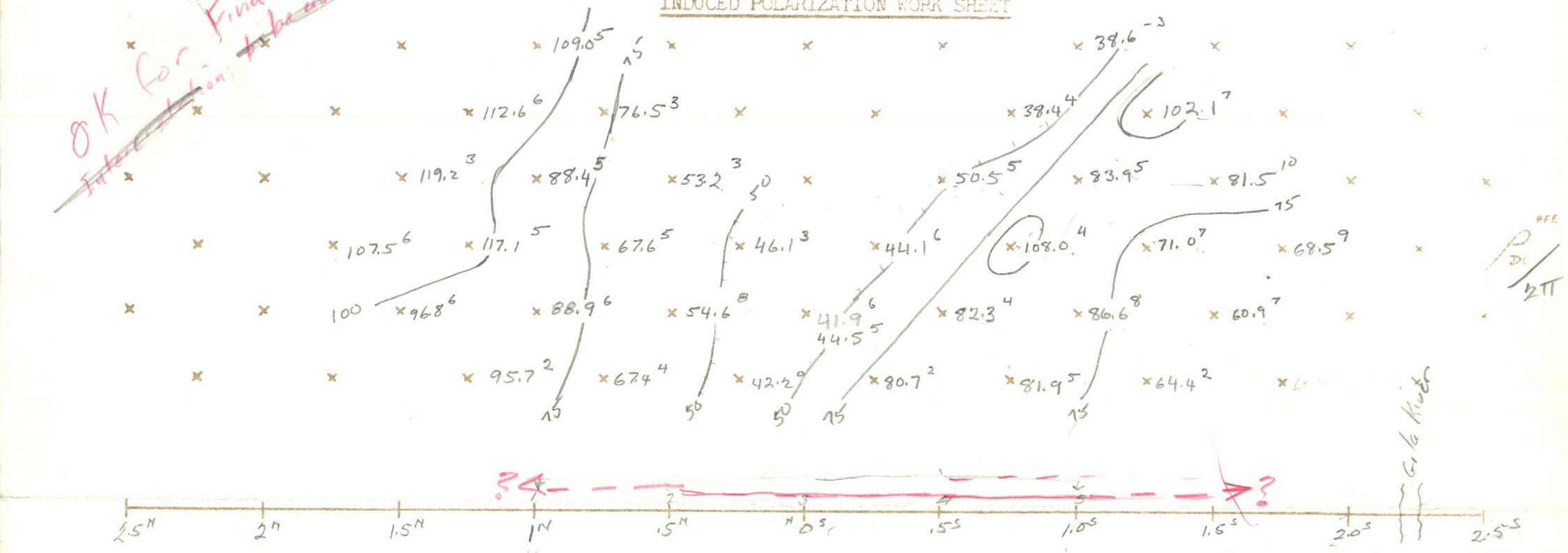
Scale _____ Date _____

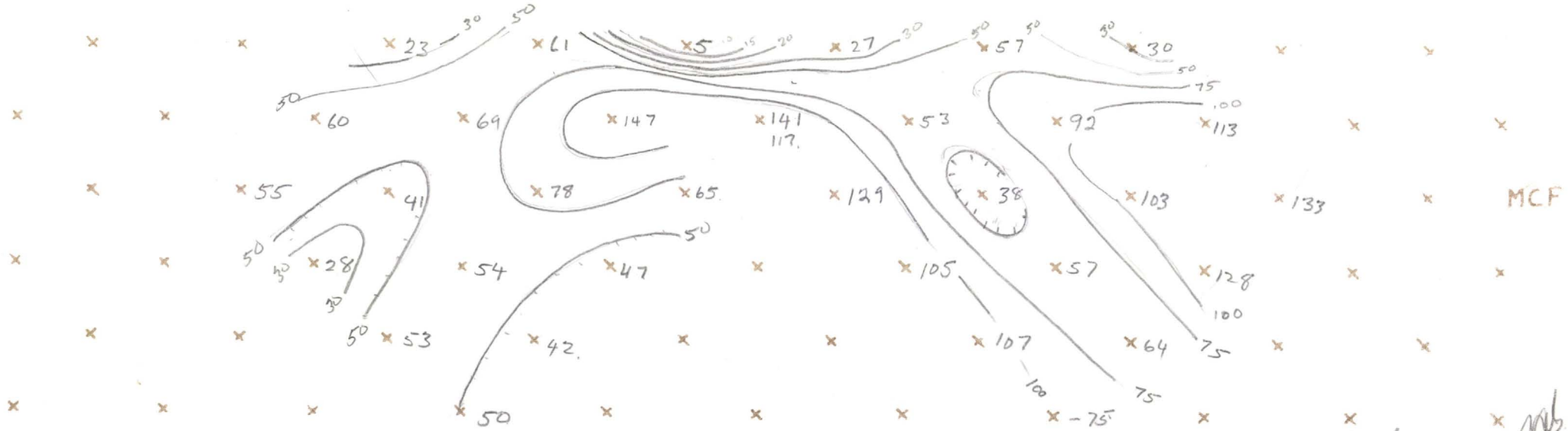
.2812
.0036

.2774

INDUCED POLARIZATION WORK SHEET

OK for Final Interpretation to be added





Area Line #1 Scale 1" = 500' Field Data 4/6/61