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INDUCED POLARIZATION SURVEY

BARNHARD PROSPECT, SILVER REEF MINING DISTRICT
Pinal County, Arizona

for

C. C. HUSTON & ASSOCIATES
Toronto, Ontario, Canada

January 1964

by

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

INTRODUCTION

On January 27 and 28, 1964, at the request of Mr. George S. Disler of C. C. Huston & Associates, Heinrichs Geoexploration Company completed an induced polarization survey on the Barnhard Prospect in the Silver Reef Mountains in Pinal County, Arizona. This survey consisted of two spreads of 500-foot dipole spaced lines, giving a total of 11,500 feet of line surveyed and 6,500 feet of plotted data.

The data was obtained by the dual frequency mode induced polarization method with a dipole-dipole electrode configuration. A plan overlay of claim plat showing the line locations and two sectional data sheets are included.

Personnel involved were Chris S. Ludwig, geophysicist, and F. F. Hanly and R. Palmer, technical assistants.

CONCLUSIONS AND RECOMMENDATIONS

1. No indication of pervasive, porphyry-type sulfide mineralization was encountered in the vicinity of either line down to a depth of about 750 feet.
2. As there are good oxide copper surface exposures, it is quite possible that either the primary sulfide source (if present) was too deep, or was too narrow and weakly mineralized -- or both -- to have been detected with 500-foot dipole spacing.

3. A larger dipole spaced I. P. line for greater depth penetration may detect the sulfide source if it is large enough -- say having a minimum dimension of 1,000 feet and being no deeper than 1,000-1,500 feet below the surface.

4. Otherwise, unless deep drilling down the smaller exposed vein-like structures is considered, it is recommended that the property be dropped.

INTERPRETATION

Line 1: Only background-magnitude frequency effects and metallic conduction factors were noticed on this line.

Resistivities indicate a near vertical higher conductivity dike-like zone between 0.0N/S and 0.5S. A near vertical contact appears around 1.5N separating the better conducting rocks to the south from the poorer conductors to the north.

Line 2: Again, only background induced polarization effects were noted.

Resisitivities indicate a high resistivity zone around 1.5SW, possibly a dike. Northeast of this zone, resistivities gradually attenuate, possibly from deepening alluvium.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig

Chris S. Ludwig
Geophysicist

Approved By:

Walter E. Heinrichs, Jr.
President and General Manager

January 30, 1964
P. O. Box 5671
Tucson, Arizona 85703

INDUCED POLARIZATION SURVEY

BARNHARD PROSPECT, SILVER REEF MINING DISTRICT
Pinal County, Arizona

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C. C. HUSTON & ASSOCIATES
Toronto, Ontario, Canada

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COPY

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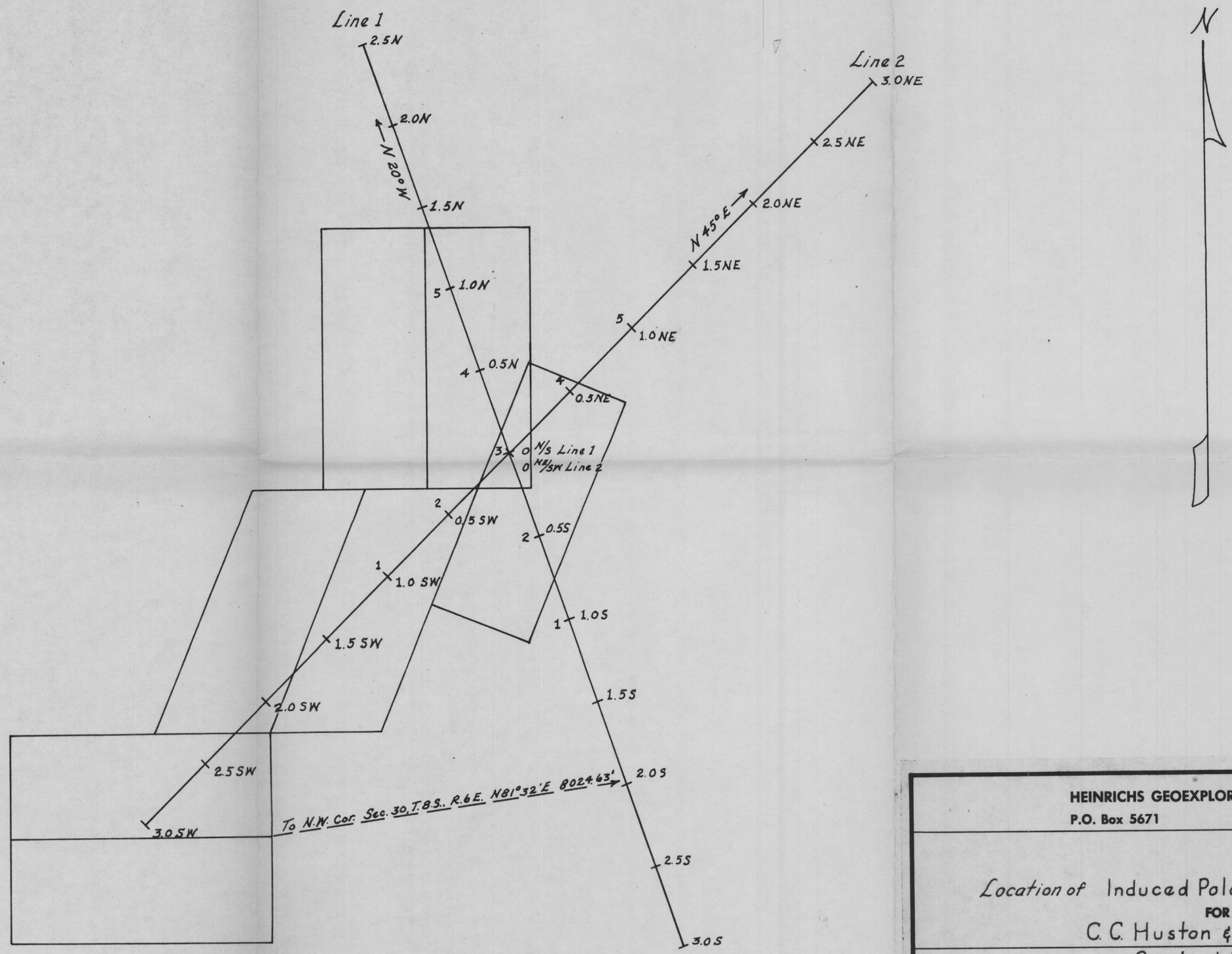
P. O. Box 5671
Tucson, Arizona 85703

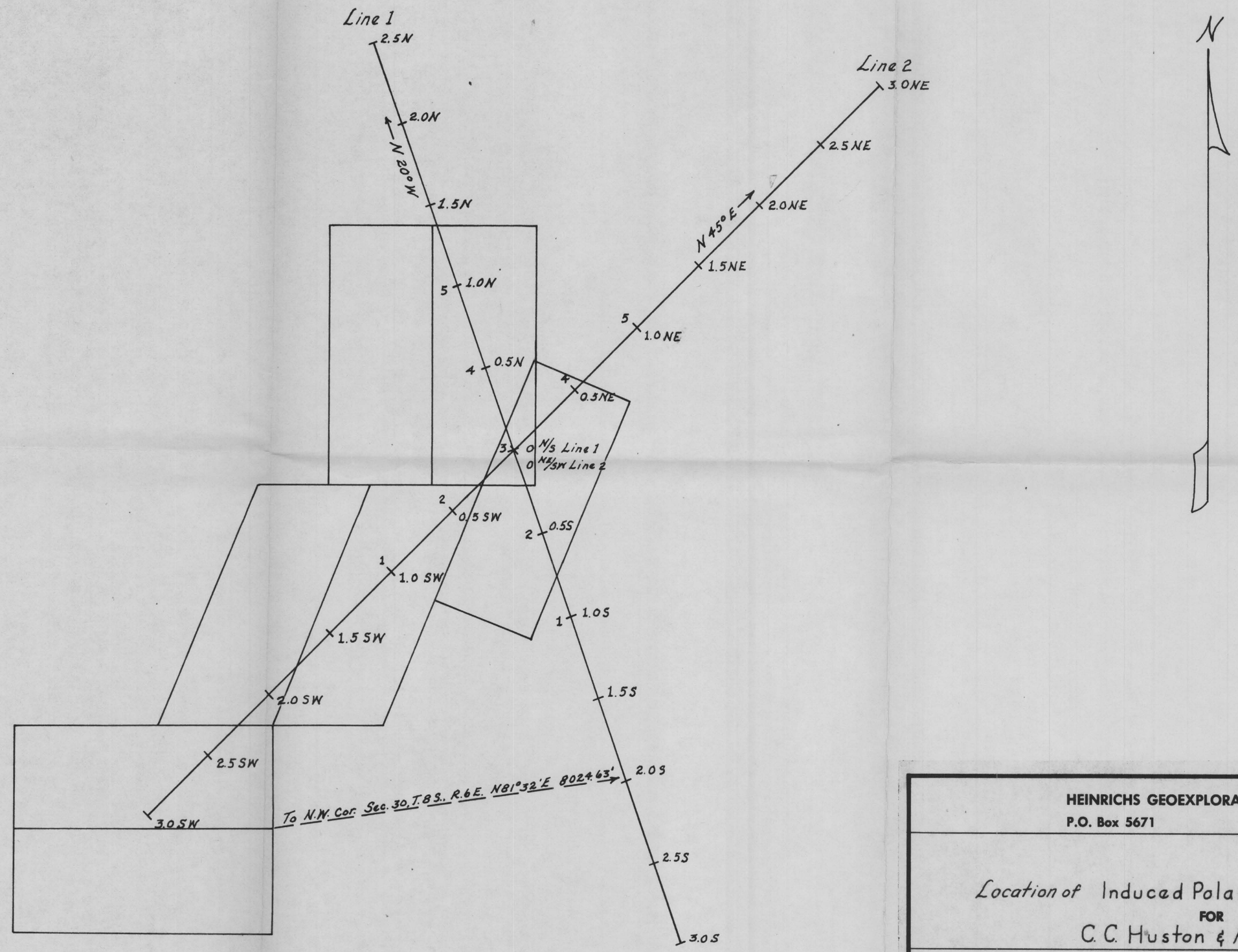
COPY



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

Location of Induced Polarization Traverses
FOR
C. C. Huston & Associates
Barnhard Prospect
Approximate Location: Secs. 23 & 26, T.8S., R.5E. Unsurveyed
Silver Reef Mining District

SCALE: 1" = 500'	CONTOUR INTERVAL:	REVISIONS
	DATA BY: C. S. L.	
DATE: January 29, 1964	SHEET 1 OF 3	
DRAWN BY: S. I. G.	DRAWING NO.:	FILE:



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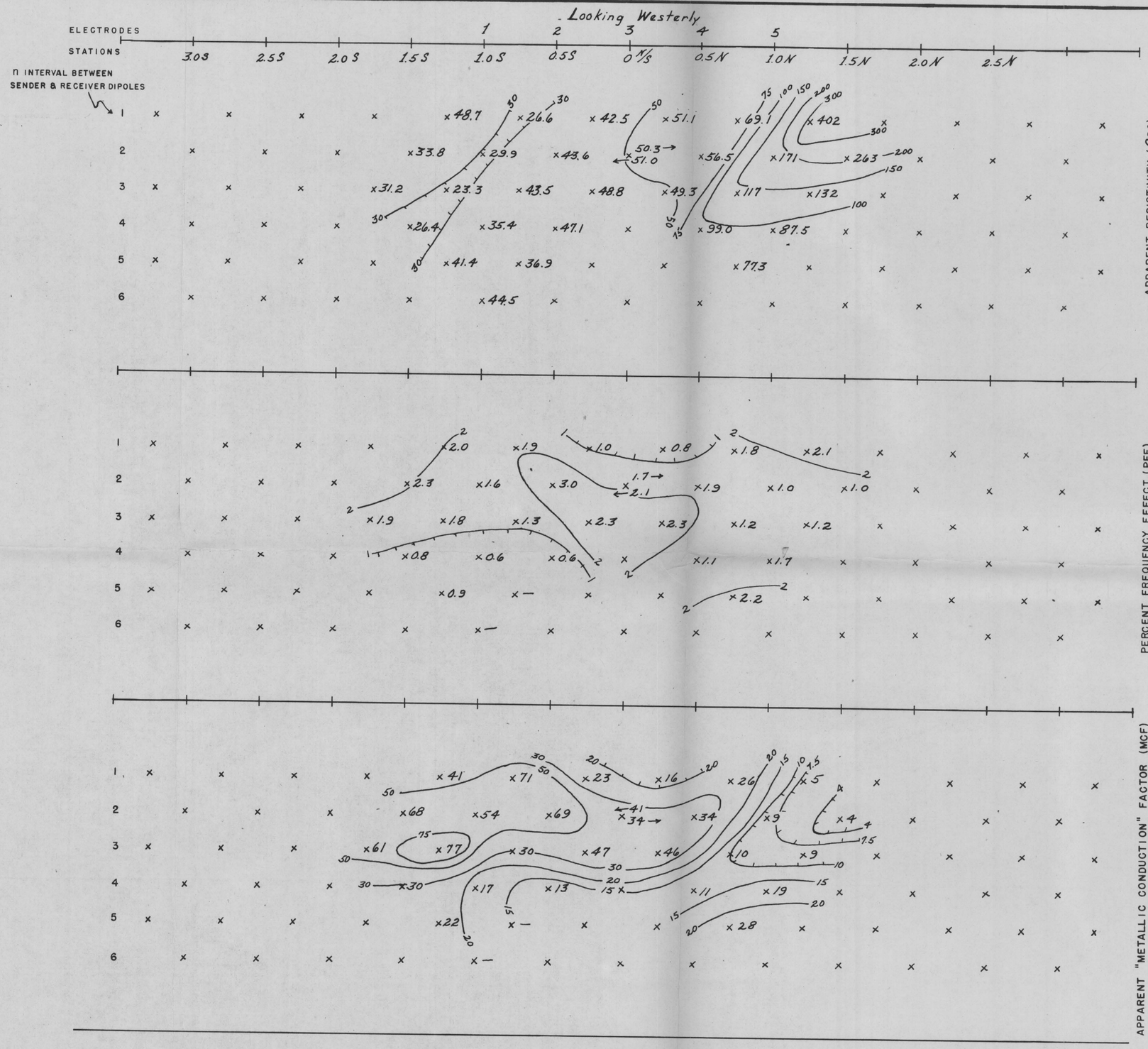
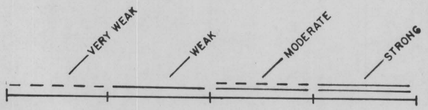
DRAWN BY: S.I.G.	DRAWING NO.:	FILE:



EXPLANATION

ELECTRODE ARRAY: 500' — n × 500' — 500'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH



SECTIONAL DATA SHEET

LINE No. 1, *Spread* 1

INDUCED POLARIZATION TRAVERSE

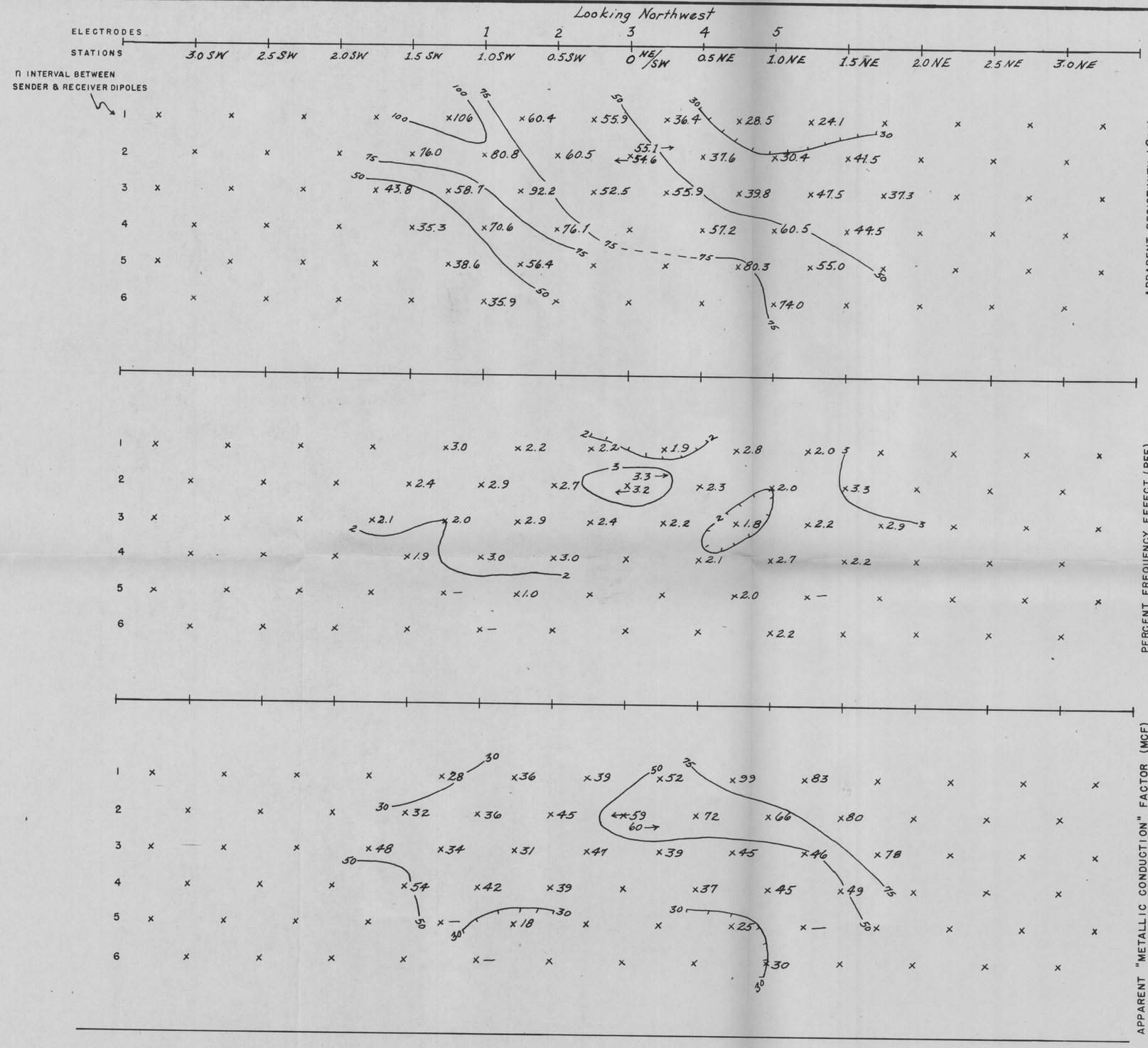
Barnhard Prospect ~ Silver Reef Mts, Ariz.

HEINRICHS GEOEXPLORATION COMPANY

SCALE: *1" = 500'* DATE: *January 29, 1964*

FOR

C. C. Huston & Associates
Toronto, Ontario, Canada



EXPLANATION

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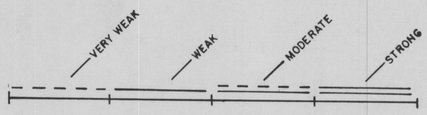
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH



SECTIONAL DATA SHEET

LINE No. 2, Spread 1

INDUCED POLARIZATION TRAVERSE

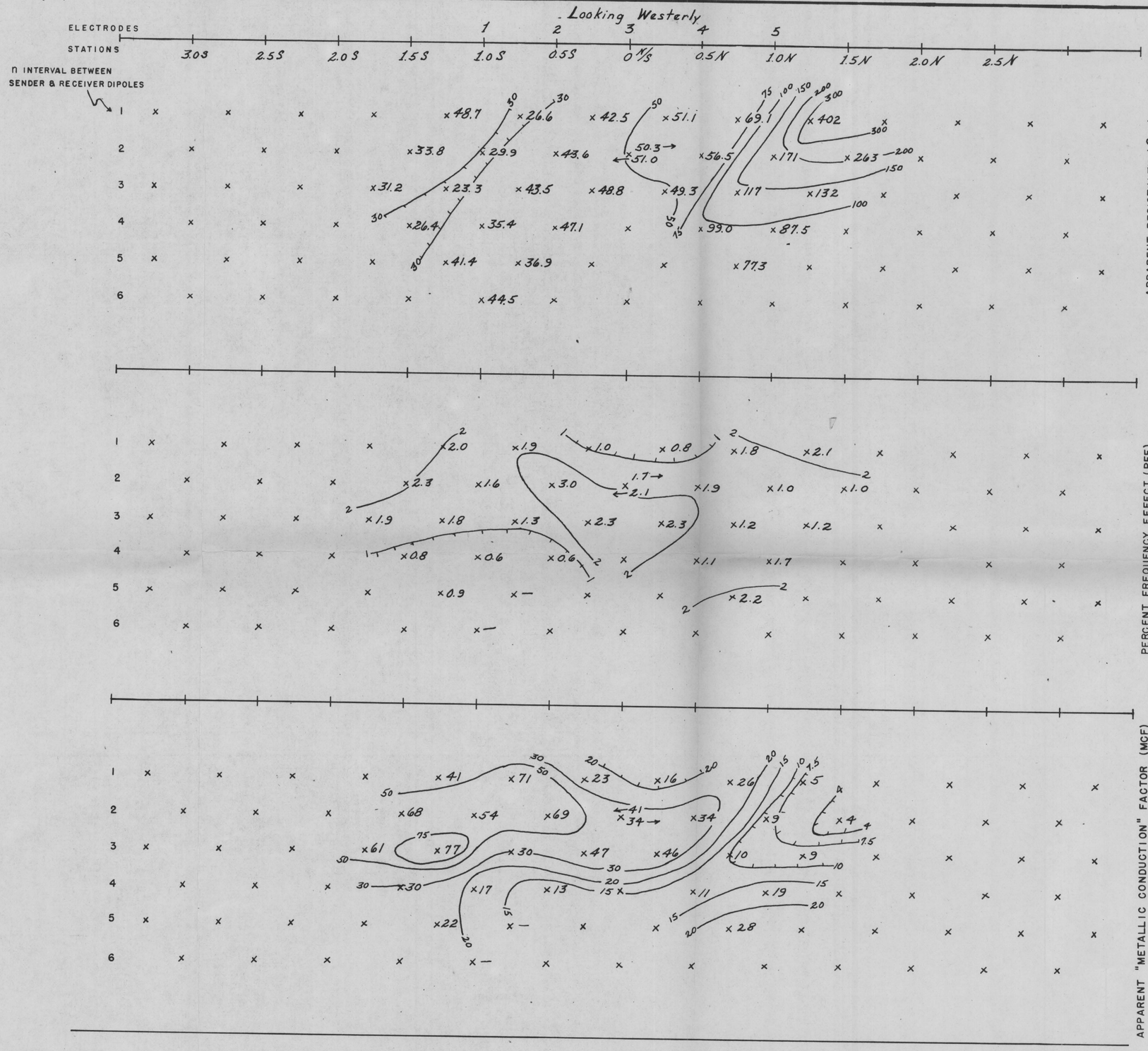
Barnhard Prospect ~ Silver Reef Mts, Ariz.

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 500' DATE: *January 29, 1964*

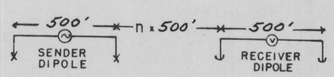
FOR

C. C. Huston & Associates
Toronto, Ontario, Canada

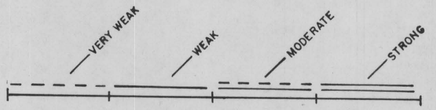


EXPLANATION

ELECTRODE ARRAY:



RELATIVE ANOMALY STRENGTH



SECTIONAL DATA SHEET

LINE No. 1, *Spread 1*

INDUCED POLARIZATION TRAVERSE

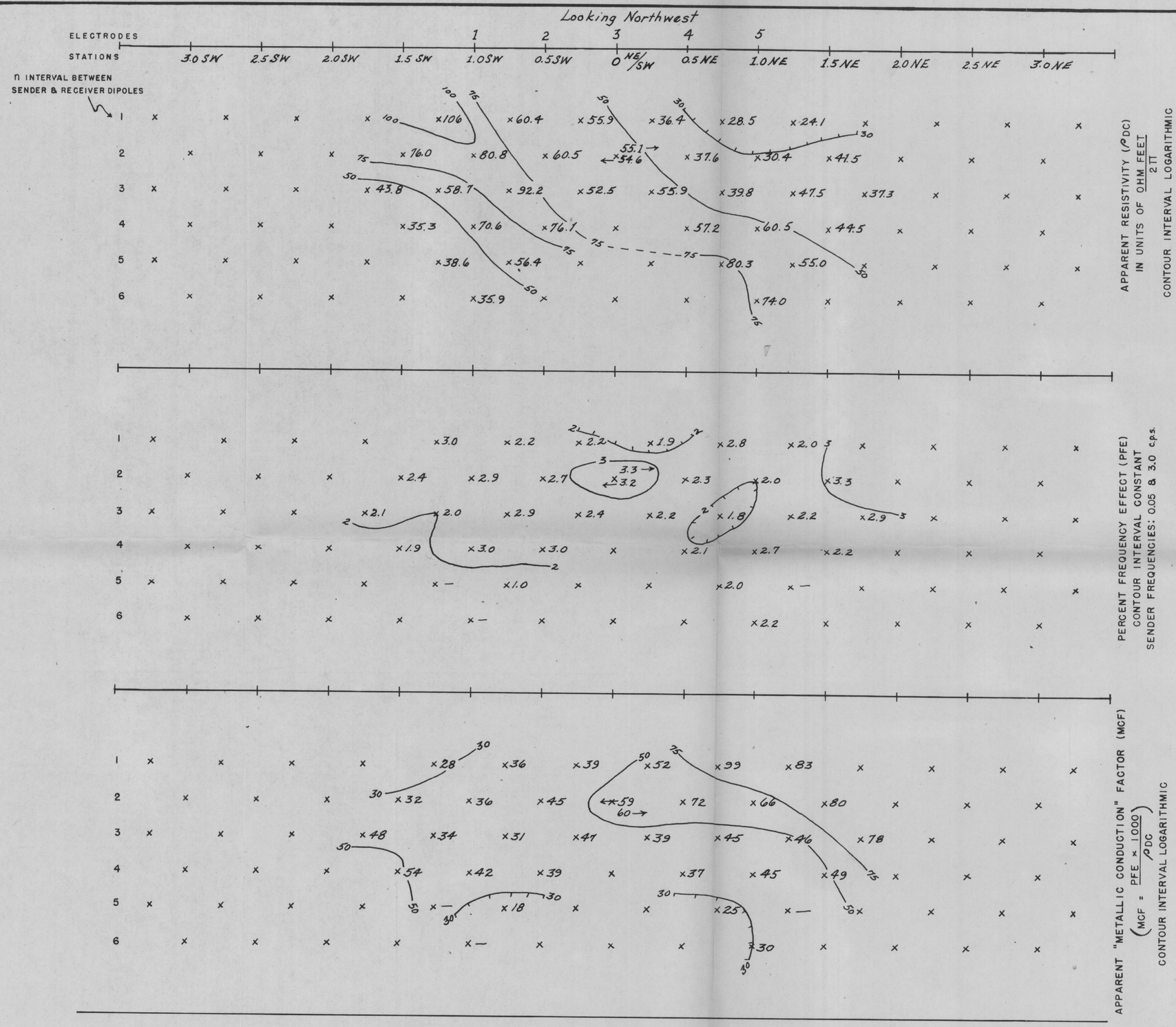
Barnhard Prospect - Silver Reef Mts, Ariz.

HEINRICHS GEOEXPLORATION COMPANY

SCALE: *1" = 500'* DATE: *January 29, 1964*

FOR

C. C. Huston & Associates
Toronto, Ontario, Canada

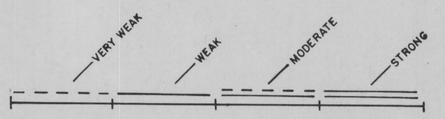


EXPLANATION

ELECTRODE ARRAY: 500' — n × 500' — 500'

SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH



SECTIONAL DATA SHEET

LINE No. 2, Spread 1

INDUCED POLARIZATION TRAVERSE

Barnhard Prospect ~ Silver Reef Mts, Ariz.

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 500' DATE: *January 29, 1964*

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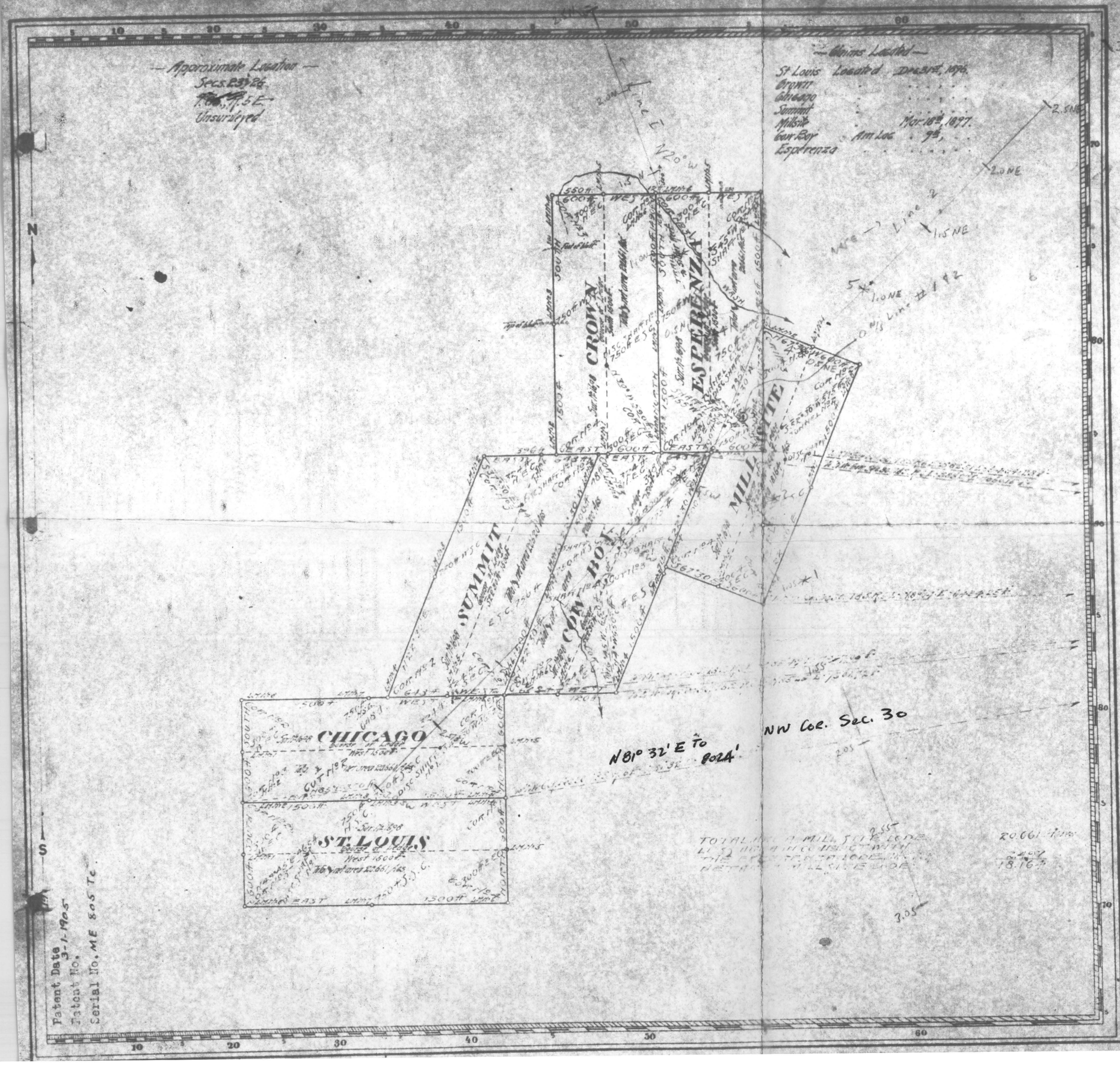


Claim Located _____ 190

Mineral Survey No. 1698.

Lot No.

Gila Land District.

PLAT

OF THE CLAIM OF

The Standard Copper Company of Arizona

KNOWN AS THE

Esperenza, Cow Boy, Chicago, Crown, St. Louis, Summit and Mill Site.

IN Silver Reef MINING DISTRICT,

Pinal COUNTY, Arizona.

Containing an Area of 14.2048 Acres.

Scale of 500 Feet to the inch.

Variation 13° 10' E.

SURVEYED August 6 to 22, 1902. BY

Albert J. Colton, U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of The Standard Copper Company of Arizona known as the

~~Esperenza, Cow Boy, Chicago, Crown~~ St. Louis, Summit and Mill Site.

from which this plat has been made under my direction, have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claims by claimant or its grantors, and that said improvements consist of [illegible] and stamp mill and other improvements, Sec. 12, 1898, "10100".

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

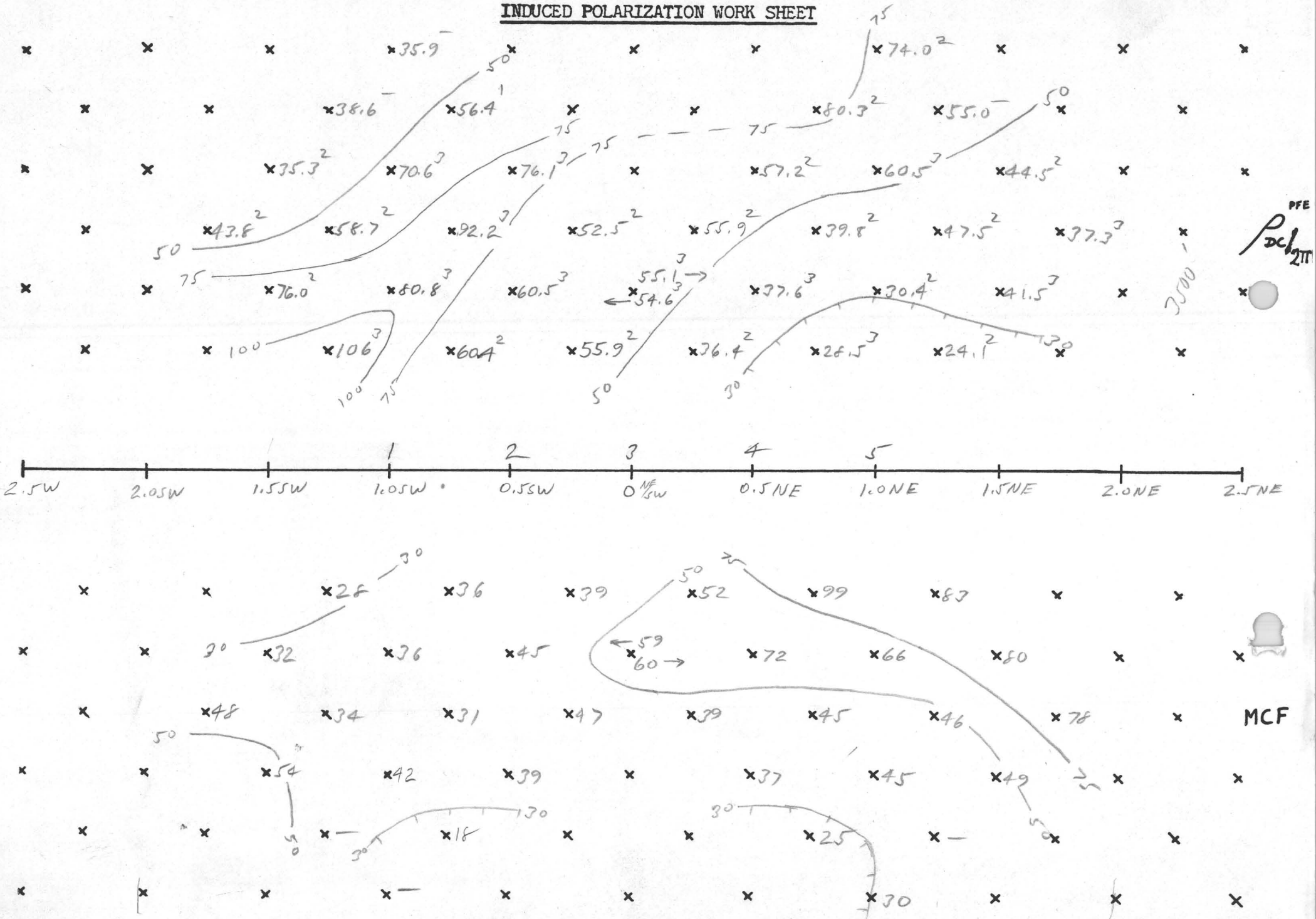
U.S. Surveyor General's Office, Phoenix, Arizona. Jan. 6, 1904.

Frank A. Ingalls
U.S. Surveyor General for Arizona.

Patent Date 3-1-1905
Patent No.
Serial No. ME 805 Tc

LINE 2

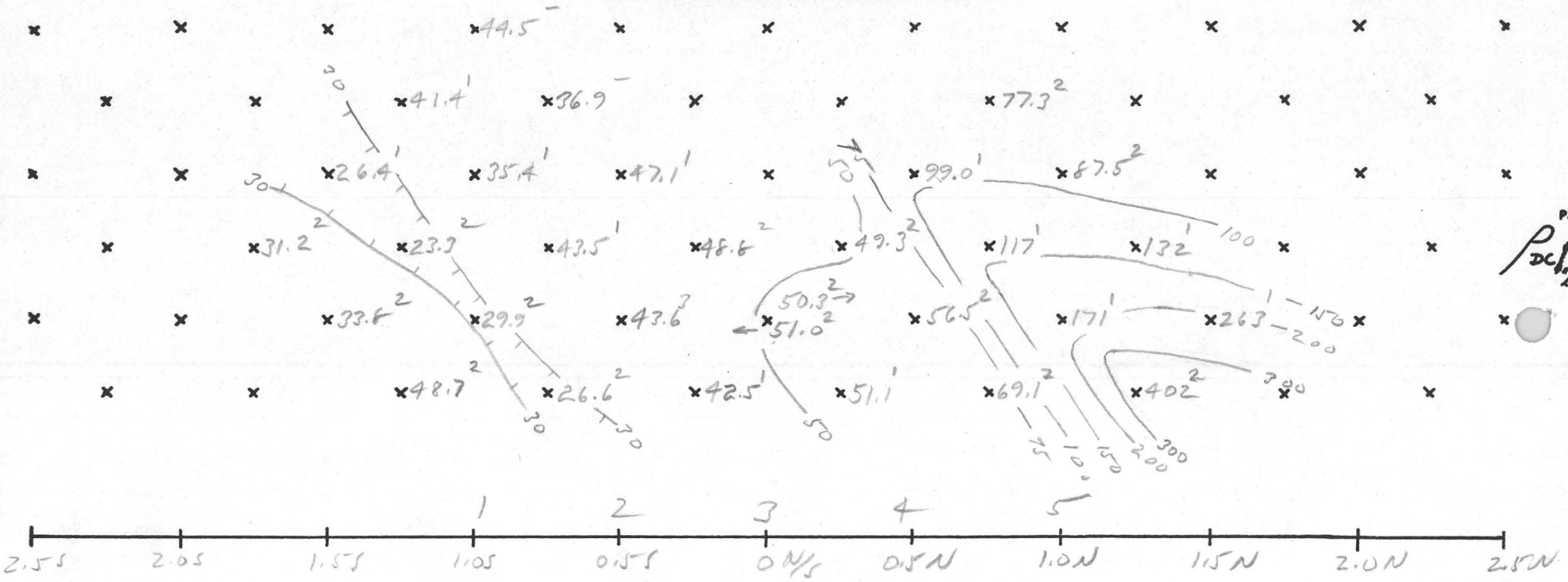
INDUCED POLARIZATION WORK SHEET

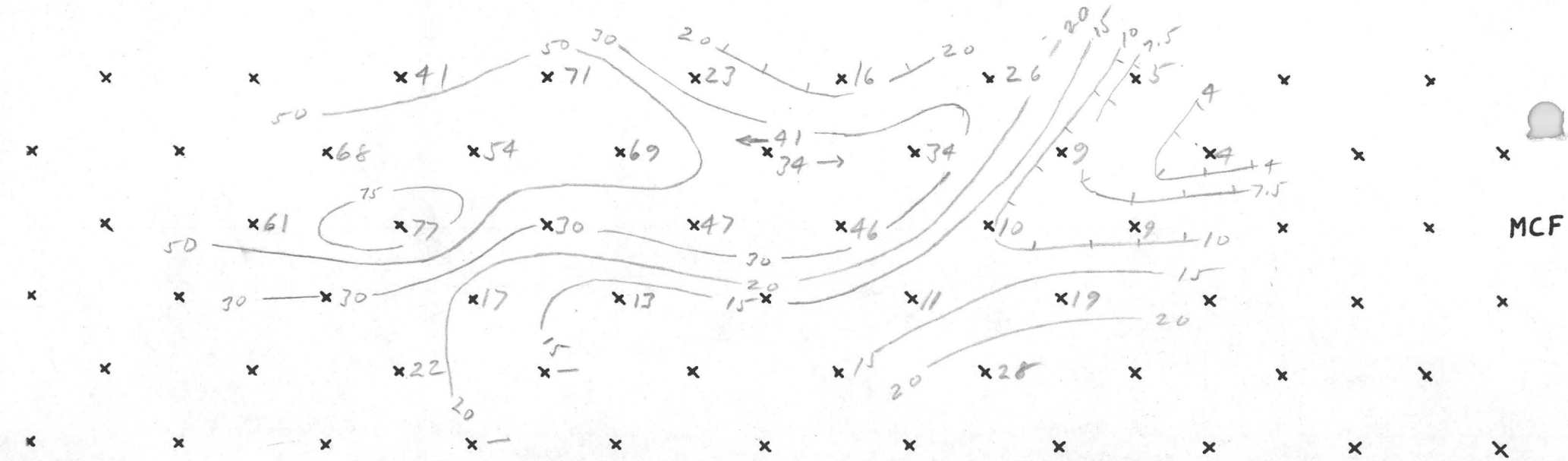


Area Barnhard Line 2 - Spr. 1 - NE & SW½ Scale 1" = 500' Date 1/29/64

LINE 1

INDUCED POLARIZATION WORK SHEET





Area Barnhard - Line 1 - Spr. 1 - MFS 2 Scale 1" = 500' Date 1/27/64

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: Barnhard Line: 1 - Sp. 1 - N½ Int.Cal Date: 1/27/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	.5-1.0N →		1.0-1.5N →			1.5-2.0N →			→	2.0-2.5N →		
Time	100	30	100	30	10	300	100	30	10	100	30	10
DC-1	26.1 26.1	6.3 6.3	35.7 35.7	7.1 7.2	2.59 2.55	147 148	21.9 21.8	6.0 5.8	2.58 2.50	24.0 23.3	6.1 7.2	2.20 2.1 2.10 2.28
DC-2	25.7 26.1	6.2 6.3	34.0 37.8	7.0 7.0	2.42 2.37	146 145	21.0 21.8	5.8 6.0	2.41 2.48	23.2 24.1	7.2 6.1	2.15 2.2 2.23 2.5
Σ	51.8 51.8	12.5 12.6	69.7 69.5	14.1 14.2	4.96 4.95	289 289	42.9 42.9	11.8 11.8	4.99 4.92	47.5 47.4	13.3 13.3	4.35 4.47 4.40 4.91
DC-3	26.0 26.4	6.2 6.2	37.8 36.0	7.0 7.1	2.37 2.59	146 146	21.9 20.9	6.0 5.8	2.53 2.40	24.1 23.0	6.1 7.1	2.21 2.35
Dc-4	25.4 25.7	6.1 6.3	35.6 33.7	7.2 7.0	2.59 2.37	143 143	21.0 21.8	5.8 6.0	2.42 2.58	23.2 24.1	7.2 6.2	2.22 2.07
Σ	51.8 51.4	12.6 12.6	69.5 69.7	14.2 14.1	4.96 4.96	289 289	42.9 42.7	11.8 11.8	4.95 4.98	47.3 47.1	13.3 13.3	4.43 4.42
DC-AV	51.5	12.6	69.6	14.15	4.96	289	42.9	11.80	4.98	47.2	13.3	4.41
AC-1	25.5	6.2	34.1	6.95	2.42	141	21.2	5.85	2.45	23.4	6.6	2.17 2.20
AC-2	25.6	6.2	34.3	6.95	2.43	142	21.3	5.80	2.47	23.4	6.6	2.17 2.20
Σ	51.1	12.4	68.4	13.90	4.85	283	42.5	11.65	4.92	46.8	13.2	4.34
S. P.	-13.5	→	-3.9	→		+60.5			→	-5.9		
AC-N	.09	→	.13	→		.32			→	.65 .50		
I. C.	49.9	→	49.7	→					→	47.9		

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Bavinhard Line: 1 Spur I Int.Cal _____ Date: 1/22/64

Send	1-2	4-5	3-4	2-3	1-2		C 42 →					
Rec.	→	2.5-3.0 N		→			4-5					
Time	2						100	30	100			
DC-1	1.07 1.24						18.0	19.5	42.0			
DC-2	1.22 .97						18.8	19.6	42.1			
Σ	2.23 2.23		@	1.55			37.8	39.1	42.1			
DC-3	.96 1.08	300					18.8	19.5	42.1			
Dc-4	1.07 .92		@ 2.8 N				18.8	19.6	42.0			
Σ	2.22 2.20						37.6	39.1	84.1			
DC-AV	2.22						37.7	39.1	84.1			
AC-1	1.28						18.8	~~18.90~~	42.2			
AC-2	1.25						18.8	19.1	42.9			
Σ	2.53						37.6	38.1	84.1			
S. P.	→											
AC-N	.60											
I.C.	→											

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 3

Project: Barnard Line: 1 Spur 1 - 5½ Int.Cal ____ Date: 1/27/74

Send	3 - 4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	.5-1.0	→	1.0-1.5	→	→	1.5-2.0	→	→	→	2.0-2.5		
Time	100	10	30	10	3	100	10	10	3	10	3	3
DC-1	21.0 21.6	4.52 4.77	13.7 13.5	5.40 5.26	1.90 1.64	25.9 24.0	3.82 3.82	2.27 2.21	.92 .80	4.37 4.44 4.37 4.25	1.26 1.14	.82 1.00
DC-2	21.5 21.6	4.78 4.5	13.4 13.6	5.26 5.27	1.66 1.92	23.9 25.9	3.81 3.81	2.21 2.22	.80 .92	4.37 4.22 4.37 4.41	1.13 1.23	.89 .88
Σ	42.4 43.2	9.34 9.26	27.1 27.1	11.16 11.15	3.56 3.56	49.8 49.9	7.63 7.63	4.44 4.43	1.72 1.72	8.74 8.62 8.72 8.66	2.39 2.37	1.81 1.81
DC-3	21.9 21.6	4.56 4.76	13.6 13.5	5.27 5.28	1.94 1.62	25.9 23.8	3.84 3.80	2.23 2.23	.92 .81	4.36 4.41 4.40 4.32	1.23 1.17	.82 .98
Dc-4	21.5 21.8	4.76 4.56	13.5 13.6	5.26 5.26	1.62 1.93	23.7 25.9	3.80 3.84	2.22 2.21	.80 .91	4.34 4.21 4.28 4.40	1.14 1.21	.99 .83
Σ	43.4 43.4	9.24 9.32	27.1 27.1	11.17 11.14	3.56 3.56	49.6 49.7	7.64 7.64	4.45 4.44	1.72 1.72	8.79 8.62 8.78 8.80	2.39 2.38	1.81 1.81
DC-AV	43.4	9.32	27.1	11.14	3.56	49.7	7.64	4.44	1.72	8.68	2.38	1.81
AC-1	21.7	4.56	13.3	5.41	1.73	24.4	3.77	2.21	.89	4.21	1.18	.91
AC-2	21.6	4.55	13.3	5.41	1.75	24.4	3.75	2.20	.90	4.21	1.18	.92
Σ	43.0	9.11	26.6	10.82	3.48	48.8	7.52	4.41	1.79	8.42	2.36	1.83
S. P.	+28.7	→	-2.3	→	→	+12.4	→	→	→	+1.3	→	→
AC-N	.11	→	.12	→	→	.23	→	→	→	.16 N	→	→
I.C.	49.8	→	49.8	→	→	49.8	→	→	→	49.7	→	→

INDUCED POLARIZATION - RECEIVER NOTES PAGE 4

Project: Barnhard Line: 1 - Spur 1-5½ Int.Cal Date: 1/27/68

Send	4-5	1-2	2-3	3-4	4-5		C A2	→	→			
Rec.	→	2.5-3.05	→		→		1-2	→	→			
Time	3	3	3	3	3		30	100				
DC-1	.39 .40	1.60 1.59	.70 .66	.64 .67 .54 .58	.31 .26		19.6	19.3				
DC-2	.38 .37	.59 1.60	.65 .69	.56 .56 .68 .63	.27 .32		19.0	19.3				
Σ	.77 .77	3.19 3.19	1.35 1.35	1.20 1.27 1.22 1.21	.58 .58		38.0	38.6				
DC-3	.38 .39	1.60 1.62	.70 .69	.68 .53	.31 .27		19.0	19.3				
Dc-4	.39 .38	1.60 1.57	.64 .72	.54 .68	.28 .31		19.0	19.3				
Σ	.77 .77	3.20 3.28	1.34 1.35	1.22 1.21	.58 .58		38.0	38.6				
DC-AV	.77	3.19	1.35	1.21	.58		38.0	38.6				
AC-1	.42	1.55	.69	.62	.32		19.0	19.0				
AC-2	.42	1.58	.69	.62	.32		19.0	19.0				
Σ	.84	3.13	1.38	1.24	.64		38.0	38.1				
S. P.	→	+12.5	→		→							
AC-N	.13	.12	→	.12	→							
I-h	→	49.7	→		→							

INDUCED POLARIZATION SENDER NOTES

Project: BARNHARD Line: 1 N½ Date: 1-27-64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range	2x7	2x7	2x7	2x7	2x7	2x5	2x7	2x7	2x7	2x5	2x7	2x7
Current	1400	1400	1400	1400	1400	1000	1400	1400	1400	1000	1400	1400
Send	1-2	4-5	3-4	2-3	1-2		CAL	4-5				
Receive	→	→	→	→	→							
Time												
Range	2x7											
Current	1400							350	800			

INDUCED POLARIZATION SENDER NOTES

Project: Barnhard Line: 1 5½ Date: 1-27-64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range	2x7	2x5	2x7	2x7	2x5	2x7	2x7	2x7	2x5	2x7	2x7	2x7
Current	1400	1000	1400	1400	1000	1400	1400	1400	1000	1400	1400	1400
Send	4-5	1-2	2-3	3-4	4-5		CAL	1-2				
Receive	→	→	→	→	→							
Time												
Range	2x5	2x7	2x7	2x7	2x5							
Current	1000	1400	1400	1400	1000		356					

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project Barnhard Line 1 Spr. 1-5½ Field date 1/27/64 Data page _____ Comp. date 1/27/64. Comp by C.S.L.

(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	.5-1.05	→	1.0-1.55	→	→	1.5-2.0	→	→	→	2.0-2.55	→	
(C) n separation	1	2	1	2	3	1	2	3	4	2	3	4
(D) I	1400	1000	1400	→	1000	1400	→	→	1000	1400	→	
(E) Vdc (avg)	43.4	9.32	27.1	11.14	3.56	49.7	7.64	4.44	1.72	8.62	2.38	1.81
(F) DCcal USED	.914	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	1.5	6	1.5	6	15	1.5	6	15	30	6	15	30
(H) ρ dc=ExFxGx10^3/D	42.5	51.0	26.6	43.6	48.8	48.7	29.9	43.5	47.1	33.8	23.3	3[illegible]4
(I) Vac Σ	43.0	9.11	26.6	10.82	3.48	48.8	7.52	4.41	1.79	8.42	2.36	1.83
(J) AC noise x 2								.48	.52		.32	.32
(K) Vac(corr) = $\sqrt{I^2 - J^2}$								4.38	1.71		2.34	1.80
(L) AC-DC cal. USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.010	1.021	1.019	1.030	1.023	1.020	1.016	1.013	1.006	1.023	1.018	1.006
(N) PFE=(M-1)(10^2)	1	2	2	3	2	2	2	1	1	2	2	1
(O) MCF=(M-1)(10^5)/H	23	41	71	69	47	41	54	30	13	68	77	17

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

(A) Send	4-5	1-2	2-3	3-4	4-5		C.A.L.	→	→	→		
(B) Receive	→	2.5-3.05	→	→	→		1-2	→	→	→		
(C) n separation	5	3	4	5	6							
(D) I	1000	1400	→	→	1000		350	350				
(E) Vdc (avg)	.77	3.19	1.35	1.21	.58		38.0	38.6				
(F) DCcal	→	→	→	→	→		.921	.907				
(G) Kn x 10^{-3}	52.5	15	30	52.5	84		.914					
(H) ρ dc=ExFxGx10^3/D	36.9	31.2	26.4	41.4	44.5							
(I) Vac Σ	.64	3.13	1.38	1.24	.64		38.0	38.1				
(J) AC noise x 2	.32	.32	→	→	→							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.729		1.34	1.20	.556							
(L) AC-DC cal.	→	→	→	→	→		1.000	.988				
(M) ρdc/ρac =ExL/K	X	1.019	1.008	1.009	X							
(N) PFE=(M-1)(10^2)		2	1	1								
(O) MCF=(M-1)(10^5)/H		61	30	22								

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project Barnhard Line 1 - Spur 1-N½ Field date 1/27/64 Data page _____ Comp. date 1/27/64. Comp by C.S.L.

(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	.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	4
(D) I	1400	→	→	→	→	1000	1400	→	→	1000	1400	→
(E) Vdc (avg)	51.5	12.6	69.6	14.15	4.96	289	42.9	11.80	4.98	47.2	13.30	4.41
(F) DCcal USED	.928											
(G) Kn x 10^{-3}	1.5	6	1.5	6	15	1.5	6	15	30	6	15	30
(H) ρ dc=ExFxGx10^3/D	51.1	50.3	69.1	56.5	49.7	402	171	117	99.0	263	132	8[illegible]5
(I) Vac Σ	51.1	12.4	68.4	13.90	4.85	283	42.5	11.65	4.92	46.8	13.20	~~4.40~~
(J) AC noise x 2											1.28	1.24
(K) Vac(corr) = $\sqrt{I^2 - J^2}$											13.13	4.34
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K	1.008	1.017	1.018	1.019	1.023	1.021	1.010	1.012	1.011	1.010	1.012	1.017
(N) PFE=(M-1)(10^2)	1	2	2	2	2	2	1	1	1	1	1	2
(O) MCF=(M-1)(10^5)/H	16	34	26	34	46	5	9	10	11	4	9	19

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

(A) Send	1-2					4-5	→	→				
(B) Receive	→					4-5	→	→				
(C) n separation	5											
(D) I	→					350	350	800				
(E) Vdc (avg)	222					37.7	39.1	84.1				
(F) DCcal	→					.928	.895	.950				
(G) Kn x 10^{-3}	52.5					~.928						
(H) ρ dc=ExFxGx10^3/D	77.3											
(I) Vac Σ	2.53					37.6	38.1	84.1				
(J) AC noise x 2	1.30											
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	2.17											
(L) AC-DC cal.	→					.998	.975	1.000				
(M) ρdc/ρac =ExL/K	1.022											
(N) PFE=(M-1)(10^2)	2											
(O) MCF=(M-1)(10^5)/H	28											

INDUCED POLARIZATION - RECEIVER NOTES PAGE 5

Project: Barnhard Line: 2-Spr.1-SW½ Int.Cal Date: 1/28/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	.5-1.05	→	1.0-1.55	→	→	1.5-2.05	→	→	→	2.0-2.55	→	
Time	100	10	100	30	10	100	30	10	3	30	10	3
DC-1	27.9 29.7	4.92 4.97 5.12 4.97	26.0 27.0	7.9 7.6	1.97 1.62	34.7 35.2	8.8 8.8 9.0 8.9	4.60 4.85 4.55 4.55	1.27 1.23 1.24 1.19	6.2 6.4	2.50 2.77	1.88 1.77
DC-2	29.3 27.9	5.05 5.02 4.85 5.0	27.0 26.0	7.6 7.9	1.83 2.02	34.9 34.5	9.0 8.9 8.8 8.8	4.84 4.89 4.60 4.58	1.22 1.22 1.25 1.33	6.3 6.1	2.66 2.79	1.72 1.89
Σ	57.2 57.6	10.00 9.99 9.97 10.02	53.0 53.0	15.5 15.5	3.80 3.84	69.6 69.7	17.8 17.7 17.8 17.7	9.44 9.42 9.45 9.41	2.51 2.45 2.49 2.54	12.5 12.5	5.16 5.16	3.60 3.62
DC-3	29.7 27.9	4.83 5.10	28.0 27.0	7.9 7.6	2.06 1.78	34.6 35.2	8.8 8.9	4.62 4.82	1.28 1.30	6.0 6.7	2.38 2.73	1.91 1.97 1.70 1.65
Dc-4	27.7 29.7	5.10 4.80	27.0 26.0	7.6 7.9	1.79 2.09	35.0 34.5	8.9 8.8	4.81 4.61	1.22 1.21	6.6 5.8	2.76 2.42	1.70 1.65 1.93 1.97
Σ	57.4 57.6	9.93 9.90	53.0 53.0	15.5 15.5	3.85 3.87	69.6 69.7	17.7 17.7	9.43 9.42	2.51 2.51	12.6 12.5	5.14 5.15	3.61 3.62 3.63 3.62
DC-AV	57.3	9.98	53.0	15.5	3.84	69.6	17.7	9.43	2.50	12.5	5.15	3.61
AC-1	28.0	4.83	25.9	7.6	1.87	33.7	8.6	4.58	1.22	6.1	2.53	1.75
AC-2	28.0	4.83	25.9	7.5	1.88	33.8	8.6	4.58	1.22	6.1	2.52	1.75
Σ	56.0	9.66	51.8	15.1	3.75	67.5	17.2	9.16	2.44	12.2	5.05	3.50
S. P.	+12.6	→	-6.5	→	→	+7.4	→	→	→	+4.4	→	
AC-N	.09	→	.08	→	→	.13	→	→	→	.11	→	
I.C.	49.9	→	49.8	→	→	49.8	→	→	→	49.9	→	

INDUCED POLARIZATION - RECEIVER NOTES PAGE 6

Project: Bamford Line: 2 - Spur 1 - SW½ Int.Cal _____ Date: 1/26/86

Send	4-5	1-2	2-3	3-4	4-5		CAL	→	→	→	
Rec.	→	2.5-3.5	→	→	→		1-2	→	→	→	
Time	3	3	3	3	3		100	100	30		
DC-1	.53 .52	1.84 1.42 1.33 1.49	.78 .83 .77 .70	.55 .52 .60 .60	.11 .21		43.0 43.3	21.8	22.1		
DC-2	.53 .54	1.33 1.48 1.54 1.39	.77 .71 .79 .85	.55 .61 .52 .53	.22 .21		43.5 43.4	21.8	22.2		
Σ	1.06 1.06	2.53 2.90 2.87 2.88	1.55 1.54 1.56 1.55	1.12 1.13 1.12 1.13	.43 .42		86.5 86.7	43.6	44.3		
DC-3	.56 .50	1.53 1.40 1.41 1.55	.81 .85 .73 .80	.52 .55 .61 .57	.23 .21 .19 .20		43.6 43.7	21.8	22.2		
Dc-4	.50 .56	1.39 1.49 1.44 1.3	.72 .70 .82 .85	.61 .59 .52 .56	.20 .21 .22 .22		43.2 43.3	21.8	22.1		
Σ	1.06 1.06	2.89 2.89 2.85 2.86	1.53 1.55 1.55 1.57	1.13 1.12 1.17 1.12	.42 .42 .41 .42		86.6 86.5	43.6	44.3		
DC-AV	1.06	2.88	1.55	1.13	.42		86.6	43.6	44.3		
AC-1	.54	1.41	.77	.58	.22		43.0	21.8	21.4		
AC-2	.54	1.41	.77	.59	.22		43.0	21.8	21.4		
Σ	1.08	2.82	1.54	1.17	.44		86.0	43.6	42.8		
S. P.	→	+0.3	→	→	→						
AC-N	.11	.11	→	.10	.11						
I.C.	→	49.8	→	→	→						

INDUCED POLARIZATION - RECEIVER NOTES PAGE 7

Project: Barnhard Line: 2-Spr. 1-NE½ Int.Cal ____ Date: 1/22/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	.5-1.0N	→	1.0-1.5N	→	→	1.5-2.0N	→	→	→	2.0-2.5N	→	
Time	100	10	30	10	10	30	10	10	3	10	10	3
DC-1	19.0 18.2	4.13 4.16	14.9 14.3	4.78 4.62 4.95 5.02	1.92 2.01 1.97 1.69	1.82 1.79	4.00 3.77	1.78 1.81 1.67 1.77	1.86 .90 1.06 6.97	3.75 3.88 3.26 2.87	2.43 2.46	1.32 1.34
DC-2	18.2 19.2	4.16 4.31	14.3 14.9	4.75 5.09 4.61 4.61	1.80 1.66 1.75 1.79	1.72 1.60	3.80 5.03	1.71 1.71 1.79 1.90	1.02 .96 8 7.92	2.99 2.97 3.60 3.99	2.43 2.40	1.36 1.32
Σ	37.2 37.8	8.47 8.07	29.2 29.2	9.73 9.66 9.56 9.63	3.72 3.67 3.68 3.68	1.54 1.59	7.80 7.80	3.49 3.52 3.46	1.88 1.86 1.89 1.87	6.74 6.85 6.86 6.86	4.86 4.86	2.68 2.66
DC-3	19.2 18.1	4.34 4.37 4.70 4.72	14.9 14.3	4.65 4.62 5.03 5.06	1.71 1.78 2.03 1.75	1.60 .78	4.00 3.79	1.60 1.68 1.66 1.63	1.60 1.02	2.66 3.08	2.50 2.46	1.31 1.84
Dc-4	18.1 19.2	4.69 4.72 4.77 4.78	14.3 14.9	5.02 5.05 4.60 4.63	1.88 1.76 1.65 1.92	.79 1.61	3.78 4.03	1.65 1.64 1.81 1.67	1.06 84	3.13 3.78	2.39 2.40	1.36 1.21
Σ	37.3 37.3	9.03 9.12 9.18 9.18	29.2 29.2	9.67 9.67 9.63 9.69	3.69 3.64 3.68 3.67	1.59 1.59	7.78 7.82	3.45 3.52 3.47 3.50	1.88 1.86	6.79 6.86	4.89 4.88	2.67 2.65
DC-AV	37.3	9.07	29.2	9.65	3.68	15.9	7.79	3.49	1.88	6.83	4.87	2.66
AC-1	18.3	4.39	14.2	4.70	1.60	7.8	3.83	1.70	.92	3.30	2.40	1.31
AC-2	18.3	4.39	14.2	4.70	1.80	7.8	3.81	1.70	.92	3.30	2.40	1.31
Σ	36.6	8.78	28.4	9.40	3.60	15.6	7.64	3.43	1.84	6.60	4.80	2.62
S. P.	+13.8	→	+35.4	→	→	-47.8	→	→	→	+34.2	→	
AC-N	.07	→	.18	.18	.17	.22	→	→	→	.20	→	
I.C.	49.8	→	49.7	→	→	←	49.8	→	→	49.4	→	

INDUCED POLARIZATION - RECEIVER NOTES PAGE 8

Project: Barnhard Line: 2-Spur 1-NE½ Int.Cal Date: 1/28/64

Send	1-2	4-5	3-4	2-3	1-2		C-K2	→	→			
Rec.	→	2.5-3.0	→	→	→		4-5	→	→			
Time	3	3	3	3	3		100	30	100			
DC-1	.20 .179	1.13 1.27 1.31 1.16	1.11 .93 1.17 1.37	.72 .64 .61 .77	.39 .64 .56 .21		21.8	22.2	38.3			
DC-2	.187 .172	1.28 1.19 1.24 1.34	1.16 1.36 1.09 .91	.62 .76 .76 .63	.48 .23 .37 .69		21.8	22.1	38.3			
Σ	1.51 1.51	2.41 2.46 2.45 2.46	2.27 2.29 2.26 2.28	1.34 1.40 1.37 1.40	.83 .86 .83 .86		43.6	44.3	76.6			
DC-3	.22 .180	1.24 1.34 1.18 1.14	1.04 .88 1.25 1.41	.74 .62 .70 .74	.29 .22 .62 .23		21.8	22.2	38.3			
Dc-4	.179 .171	1.20 1.13 1.28 1.31	1.27 1.42 .98 .86	.65 .76 .67 .66	.61 .20 .22 .62		21.8	22.1	38.3			
Σ	1.51 1.51	2.44 2.45 2.46 2.45	2.31 2.30 2.26 2.27	1.39 1.35 1.37 1.40	.90 .85 .84 .85		43.6	44.3	76.6			
DC-AV	1.51	2.45	2.28	1.38	.87		43.6	44.3	76.6			
AC-1	.74	1.19	1.11	.70	.43		21.8	21.4	38.2			
AC-2	.74	1.19	1.13	.70	.42		21.8	21.3	38.2			
Σ	1.48	2.38	2.24	1.40	.85		43.6	42.7	76.4			
S. P.	→	+6.0	→	→	→							
AC-N	→	.10	→	→	.09							
I.C.	→	49.6	→	→	→							

INDUCED POLARIZATION SENDER NOTES

Project: Barnhard Line: 2 S½ Date: 1-28-64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Receive	→		→		→	→			→	→		
Time												
Range												
Current	1400	1000	1200	1400	1000	900	1200	1400	900	900	1200	1400
Send	4-5	1-2	2-3	3-4	4-5		CAL	1-2				
Receive	→	→			→							
Time												
Range												
Current	900	900	1200	1400	900			800	400			

INDUCED POLARIZATION SENDER NOTES

Project: Barnhard Line: 2 IV ½ Date: 1-28-64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	1400	900	1400	1400	900	900	1400	1200	900	900	1400	1200
Send	1-2	4-5	3-4	2-3	1-2		CAL	4-5				
Receive	→	→	→	→	→							
Time												
Range												
Current	900	900	1400	1200	900			400	700			

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 4

Project BARNHARD Line 2-Sp×1N½ Field date 1-28-64 Data page _____ Comp. date 1-29-64 . Comp by CSL

(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	.5-1.0N →		1.0-1.5N	→		1.5°N 2.0N	→			2.0N-2.5N	→	
(C) n separation	1	2	1	2	3	1	2	3	4	2	3	4
(D) I	1400	900	1400	1400	900	900	1400	1200	900	900	1400	1200
(E) Vdc (avg)	37.3	9.07	29.2	9.65	3.68	15.9	7.79	3.49	1.88	6.83	4.87	2.66
(F) DCcal USED	.911	→										
(G) Kn x 10^{-3}	1.5	6	1.5	6	15	1.5	6	15	30	6	15	30
(H) ρ dc=ExFxGx10^3/D	36.4	55.1	28.5	37.6	55.9	24.1	30.4	39.8	57.2	41.5	47.5	6[illegible]5
(I) Vac Σ	36.6	8.78	29.4	9.40	3.60	15.6	7.64	3.43	1.84	6.60	4.80	2.62
(J) AC noise x 2											.40	.40
(K) Vac(corr) = $\sqrt{I^2 - J^2}$											4.77	2.59
(L) AC-DC cal. USED	1.000	→										
(M) ρ dc/ρac=ExL/K	1019	1033	1028	1027	1022	1020	1020	1018	1021	1033	1022	1.027
(N) PFE=(M-1)(10^2)	2	3	3	3	2	2	2	2	2	3	2	3
(O) MCF=(M-1)(10^5)/H	52	60	99	72	39	83	66	45	37	80	46	45

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

(A) Send	1-2	4-5	3-4	2-3	1-2		CLL					
(B) Receive	→	2.5N-3.0N	→				4-5					
(C) n separation	5	3	4	5	6							
(D) I	900	900	1400	1200	900		900	400	700			
(E) Vdc (avg)	1.51	2.45	2.28	1.38	.87		43.6	44.3	76.6			
(F) DCcal	.911	→			→		.916	.907	.914			
(G) Kn x 10^{-3}	52.5	15	30	52.5	84			.911				
(H) ρ dc=ExFxGx10^3/D	80.3	37.3	44.5	55.0	74.0							
(I) Vac Σ	1.48	2.38	2.24	1.40	.85		43.6	42.7	76.4			
(J) AC noise x 2			.20	.20								
(K) Vac (corr) = $\sqrt{I^2 - J^2}$			2.23									
(L) AC-DC cal.					→		1.002	X	.997			
(M) ρdc/ρac =ExL/K	1020	1029	1.022	X	1.022							
(N) PFE=(M-1)(10^2)	2	3	2		2							
(O) MCF=(M-1)(10^5)/H	25	78	49		30							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 3

Project Barnhard Line 2-Spnl SW½ Field date 1/28/64 Data page _____ Comp. date 1/29/64. Comp by C.S.C.

(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	.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	4
(D) I	1400	1000	1200	1400	1000	900	1200	1400	900	900	1200	1400
(E) Vdc (avg)	57.3	9.98	53.0	15.5	3.84	69.6	17.7	9.43	2.50	12.5	5.15	3.61
(F) DCcal USED	.912											
(G) Kn x 10^{-3}	1.5	6	1.5	6	15	1.5	6	15	30	6	15	30
(H) ρ dc=ExFxGx10^3/D	55.9	54.6	60.4	60.5	52.5	106	80.8	92.2	76.1	76.0	58.7	76
(I) Vac Σ	56.0	9.66	51.8	15.1	3.75	67.5	17.2	9.16	2.44	12.2	5.05	3.50
(J) AC noise x 2						.26	.26	.26	.26	.22	.22	.22
(K) Vac(corr) = $\sqrt{I^2 - J^2}$									2.425			
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K	1022	1032	1022	1027	1024	1030	1029	1029	1030	1024	1020	1030
(N) PFE=(M-1)(10^2)	2	3	2	3	2	3	3	3	3	2	2	3
(O) MCF=(M-1)(10^5)/H	39	59	36	45	47	28	36	31	39	32	34	42

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

(A) Send	4-5	1-2	2-3	3-4	4-5		<4L	→	→			
(B) Receive	→	2.5-3.05	→	→	→		1-2	→	→			
(C) n separation	5	3	4	5	6							
(D) I	900	900	1200	1400	900		400	400	400			
(E) Vdc (avg)	1.06	2.88	1.55	1.13	.42		44.3	43.6	86.6			
(F) DCcal	→	→	→	→	→		904	.918	.924			
(G) Kn x 10^{-3}	52.5	15	30	52.5	84			.912				
(H) ρ dc=ExFxGx10^3/D	56.4	43.8	35.3	38.6	35.9							
(I) Vac Σ	1.08	2.82	1.54	1.17	.44		42.8	43.6	86.0			
(J) AC noise x 2	.22	.22	.22	.22	.22							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.05		1.522	~~1.1~~	~~X~~							
(L) AC-DC cal.	→	→	→	→	→		.965	1.000	.905			
(M) ρdc/ρac =ExL/K	1010	1021	1019									
(N) PFE=(M-1)(10^2)	1	2	2									
(O) MCF=(M-1)(10^5)/H	18	48	54									

500

500

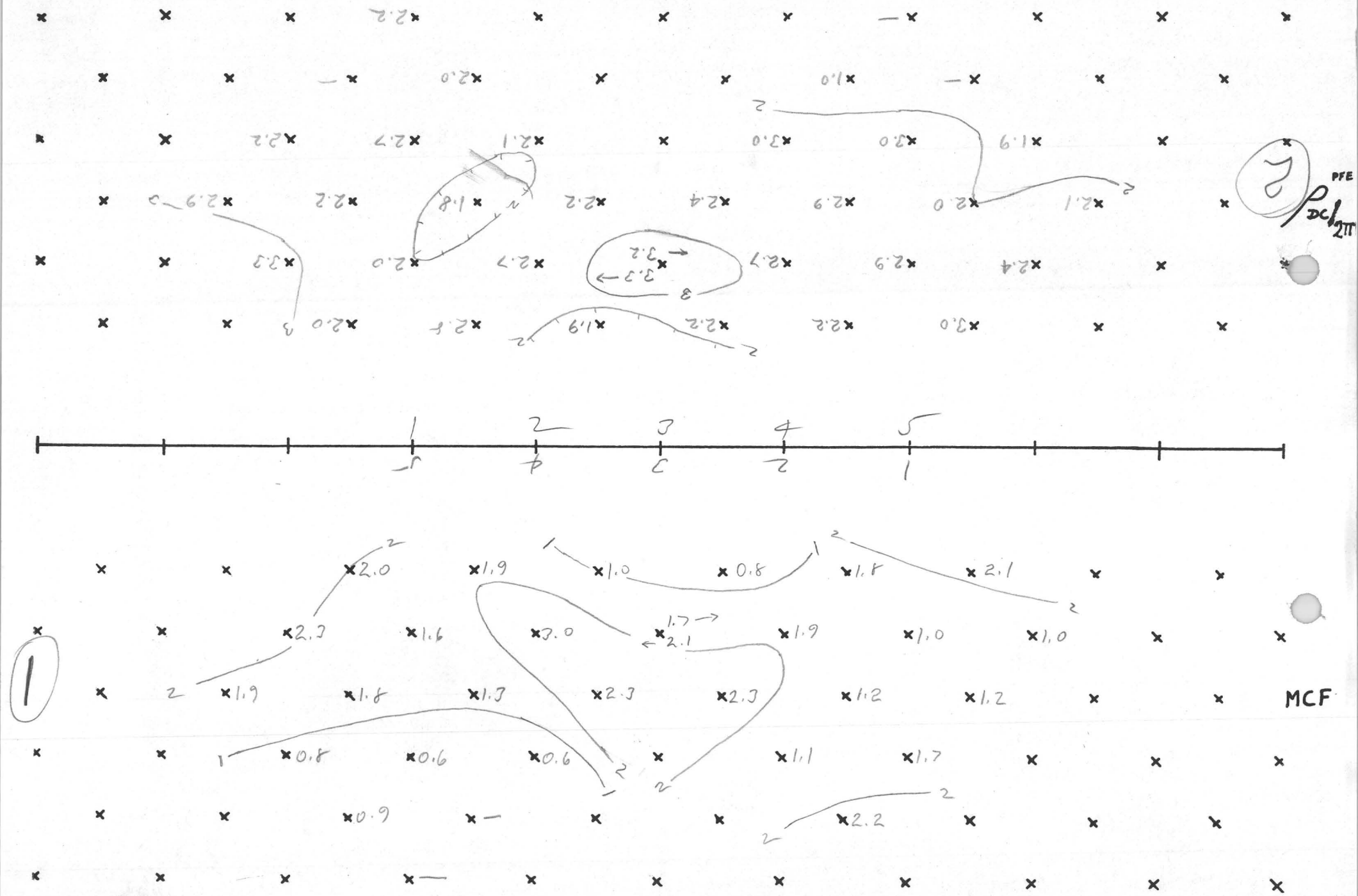
125 : 421.875 : 1000

500 : 750 : 1000

1 : 3.37 : 8

7.5
7.5
37.5
52.5
56.25
7.5
28125
39375
421.875

INDUCED POLARIZATION WORK SHEET



Area _____ Scale _____ Date _____