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INDUCED POLARIZATION SURVEY

BRENDA AREA

YUMA COUNTY, ARIZONA

For
Gunnex Limited

March - April 1967

By

Heinrichs Geoexploration Company
P. O. Box 5671 Tucson, Arizona 85703
Phone: 623-0578 Area Code: 602

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BASIS OF INDUCED POLARIZATION METHOD	1a

° IN MAP POCKET: (Total 7 pieces)

- Induced Polarization Location and Interpretation Plan
- Sectional Data Sheets
  - Line 1
  - Line 2 - Spread A
  - Line 2 - Spread B
  - Line 3
  - Line 4
  - Line 5

INTRODUCTION

At the request of Dr. John Walker of Gunnex Corporation Limited, Toronto, Canada, Heinrichs Geoexploration Company of Tucson, Arizona conducted and completed an induced polarization survey in the Brenda Area, Yuma County, Arizona during the interim March 27 to April 12, 1967.

Five lines were run, consisting of six spreads total. Lines 1, 2A, 4 and 5 were run on 500 foot dipole spacing and Lines 2B and 3 on 1,000 foot dipoles giving a total surface coverage of 45,000 feet of which 26,500 feet is subsurface plotted data.

Lines 1, 2, 3 and 4 are all oriented from N-S to about N20W-S20E, while Line 5 is about NW-SE. The detailed location is indicated on the Induced Polarization Location and Interpretation Plan.

The induced polarization work was done on the dual frequency system utilizing sending frequencies of 0.05 and 3.0 cycles per second. The dipole-dipole electrode array was used on all lines and should have given penetration down to at least 1,200 feet below surface on the 1,000 foot spacing and about 600 feet on the 500 foot spaced lines.

The induced polarization work was done to delineate the sulfide distribution in the vicinity of the lines on a reconnaissance basis.

Data are presented on sectional data sheets, one for each spread, showing resistivity, percent frequency effect (PFE) and metallic conduction factor (MCF) contoured in section and self potential (SP) in profile form.

Heinrichs personnel involved in the field work were Robert Fedelchak, geophysical crew chief, Loren Turner and Bryan Terrell, technical assistants. Report, compilation and interpretation by the Geoex staff under the supervision of Chris S. Ludwig, Senior Geophysicist.

CONCLUSIONS, RECOMMENDATIONS AND INTERPRETATION

The only significant, possible sulfide related anomalism noted on this survey was a weak anomaly between 0 N-S and 10S on Line 3. The source of this anomaly is likely a tabular, steeply dipping sulfide (or graphite) body whose top may be from 1,000 to 1,500 feet below surface. Thickness of this zone is likely less than 500 feet with unknown depth extent. Percentage total sulfides by volume is from 1 to 2% if the body is 500 feet thick, if thinner, the percentage would proportionally increase.

If only because of potential dimensions, this anomaly could possibly be of economic importance although it is quite deep and apparently has limited strike extent to the west since it wasn't noticed on Line 2. On the other hand, there could be major offsets, or other more complex reasons why this was the only anomalism noted. If there is favorable geology associated with this anomaly as apparently there is, then deep drilling is recommended although preferably after further delineation by additional parallel I.P. lines to the east and at least one line with deeper penetration (1,500 foot dipoles) across the zone. It is possible that this anomaly is caused by the unoxidized down-dip projection of the oxidized copper show just to the north.

Resistivities suggest that the source of this anomaly is just south of a narrow, (less than 1,000 feet) high resistivity zone. Line 2 has a similar high resistivity zone and with Line 3 indicates a structural trend of from NE-SW to E-W.

The resistivities on Line 4 show a sharp change near Station 5S probably indicating a fault zone trending along the base of the mountain. No sulfides are seen associated with this feature geophysically.

Self potentials show only minor background variations typical of rugged terrain and indicating no significant quantities of oxidizing sulfides within several hundred feet of the surface.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

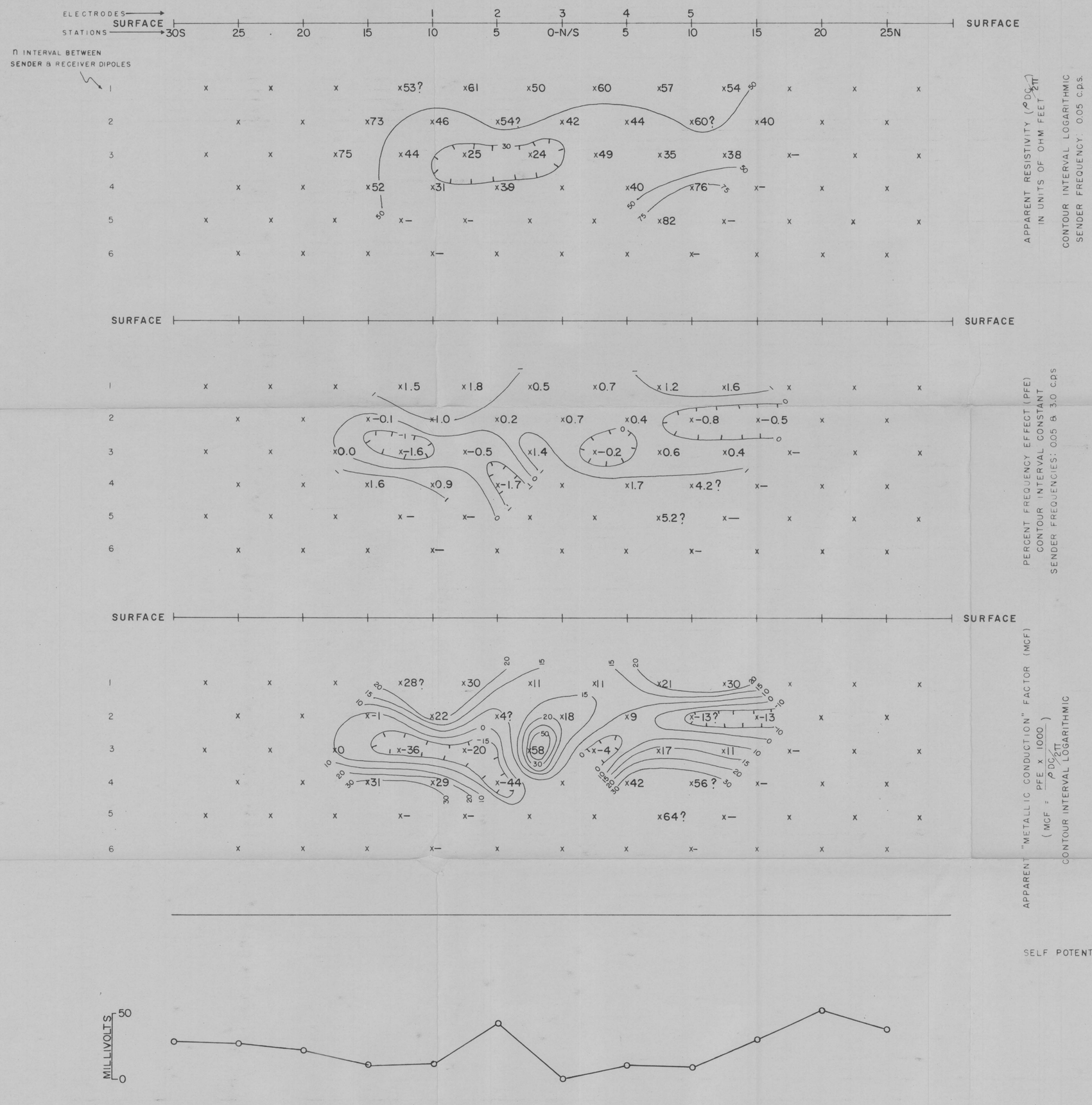
Chris S. Ludwig

Chris S. Ludwig
Senior Geophysicist

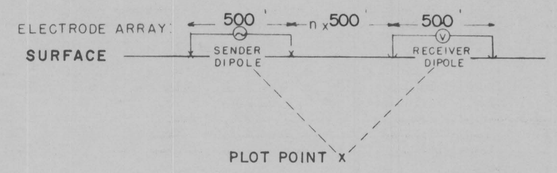
APPROVED: W. E. Heinrichs, Jr.
Walter E. Heinrichs, Jr.
President & General Manager

May 10, 1967
Tucson, Arizona

R 13 W
T 3 N
TO U.S. HWY. 60-70
TRAIL
JEEP
I.P. LINE 1
I.P. LINE 2
I.P. LINE 3
I.P. LINE 4
I.P. LINE 5
60N
25N
0·N/S
30S
40S
60S
30NW
30N
0·NW/SE
30SE
25S
SPREAD A
SPREAD B
TWIN PEAKS
THE EAGLES EYE
EAGLE EYE MINE
HIDDEN TANK
RELATIVE ANOMALY STRENGTH
VERY WEAK
WEAK
MODERATE
STRONG
STATIONS
INTERFACE
ELECTRODES
I.P. LINE
GEO EX
HEINRICHS GEOEXPLORATION CO.
POST OFFICE BOX 5671, TUCSON, ARIZONA, 85703
INDUCED POLARIZATION LOCATION
AND INTERPRETATION PLAN
BRENDA AREA
YUMA COUNTY, ARIZ.
FOR
GUNNEX LIMITED
Scale: 1" = 1000'
Date APRIL 1967



EXPLANATION



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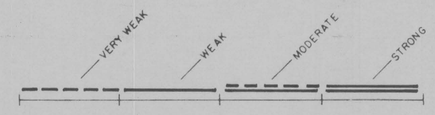


LOOKING WEST

BRENDA AREA

SECTIONAL DATA SHEET

LINE NO. 1

INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

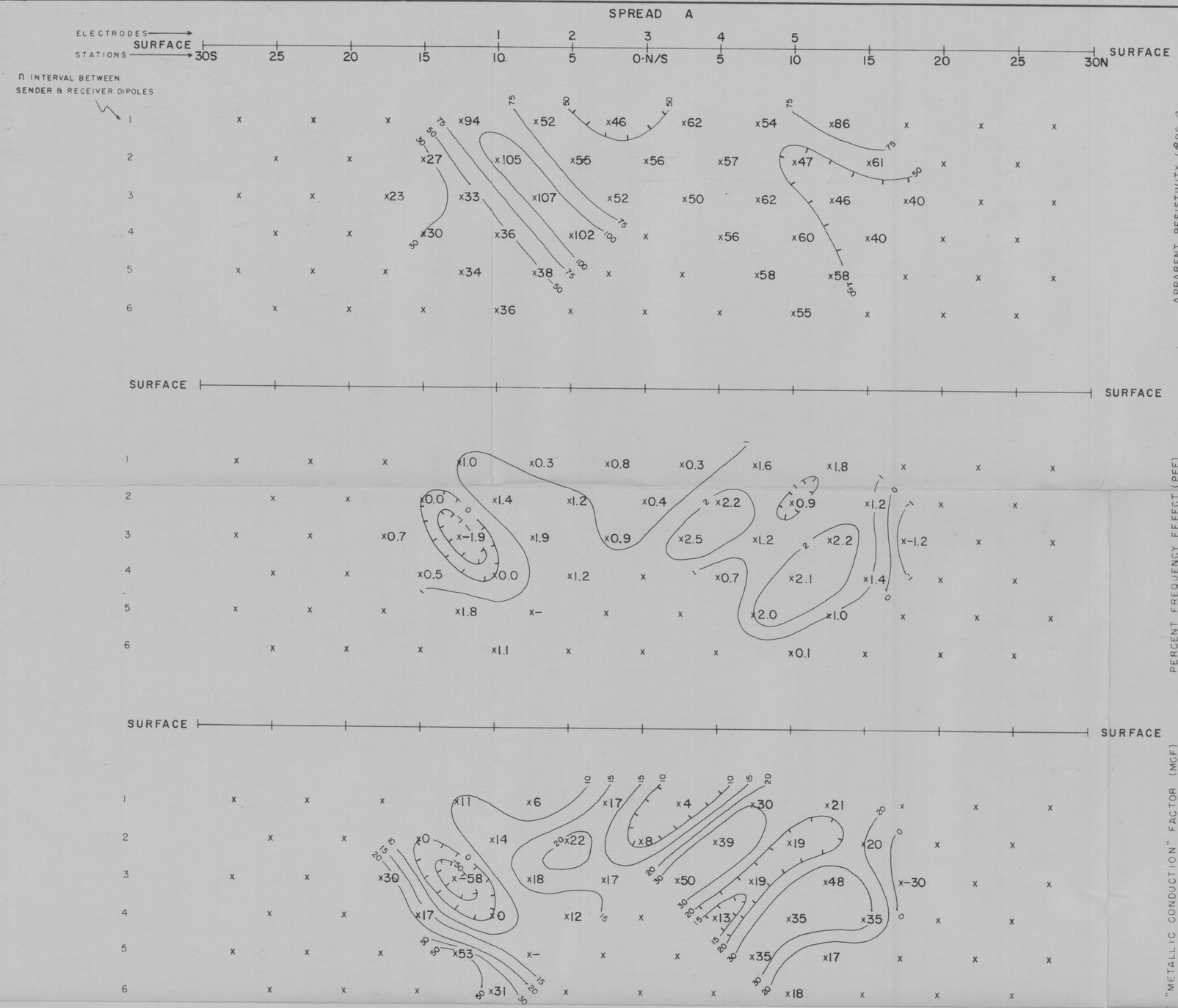
SCALE: 1" = 500' DATE: MAR 1967

FOR

GUNNEX LIMITED

SELF POTENTIAL

HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA



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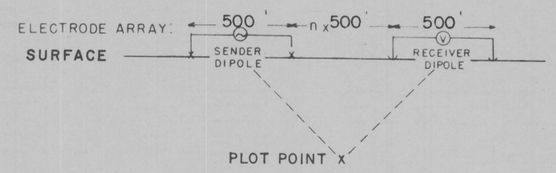

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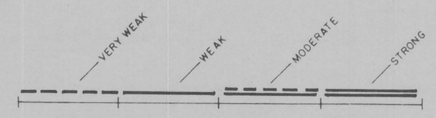


LOOKING S 80° W

BRENDA AREA

SECTIONAL DATA SHEET

LINE NO. 2 (SPREAD A)

INDUCED POLARIZATION TRAVERSE

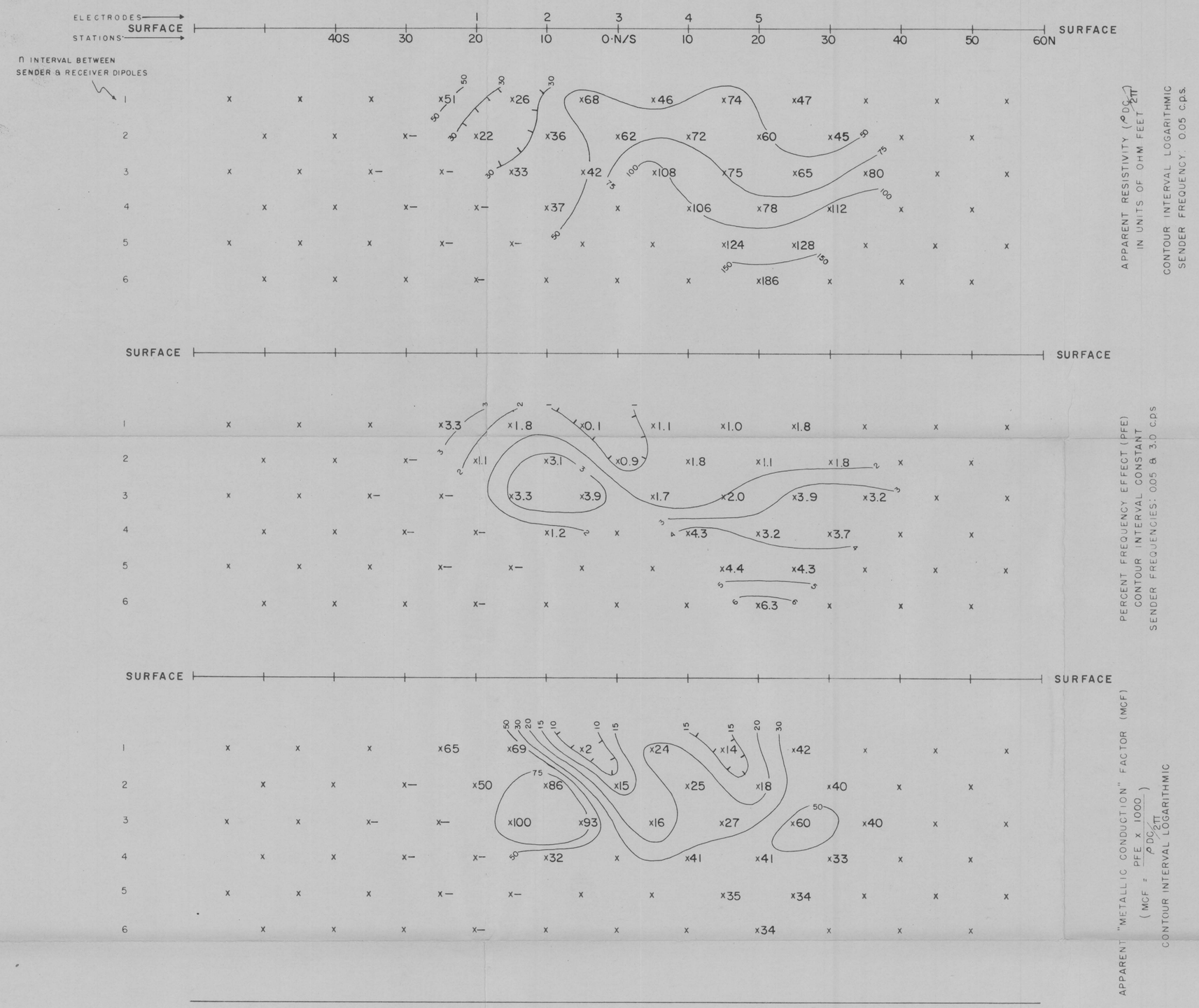
HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 500' DATE: MAR 1967

FOR

GUNNEX LIMITED

HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA



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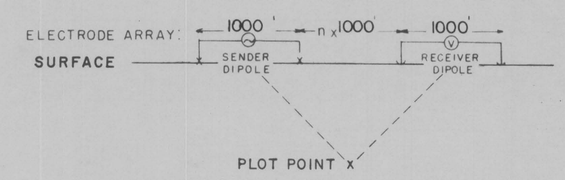

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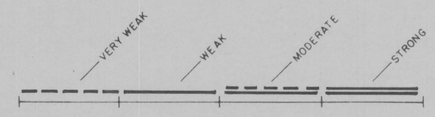


LOOKING S 80° W

BRENDA AREA

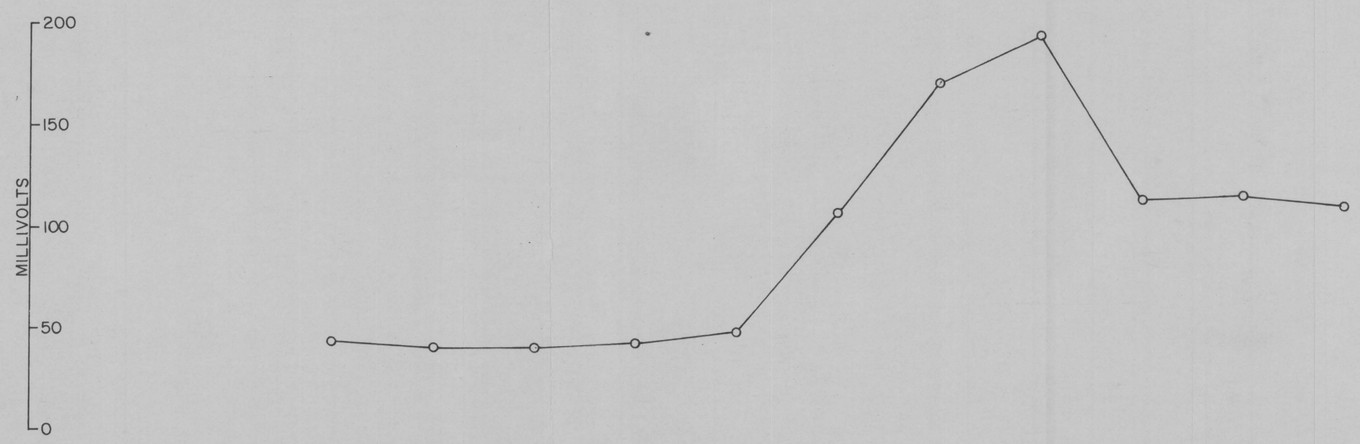
SECTIONAL DATA SHEET
LINE NO. 2 (SPREAD B)
INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY
SCALE: 1" = 1000' DATE: APRIL 1967

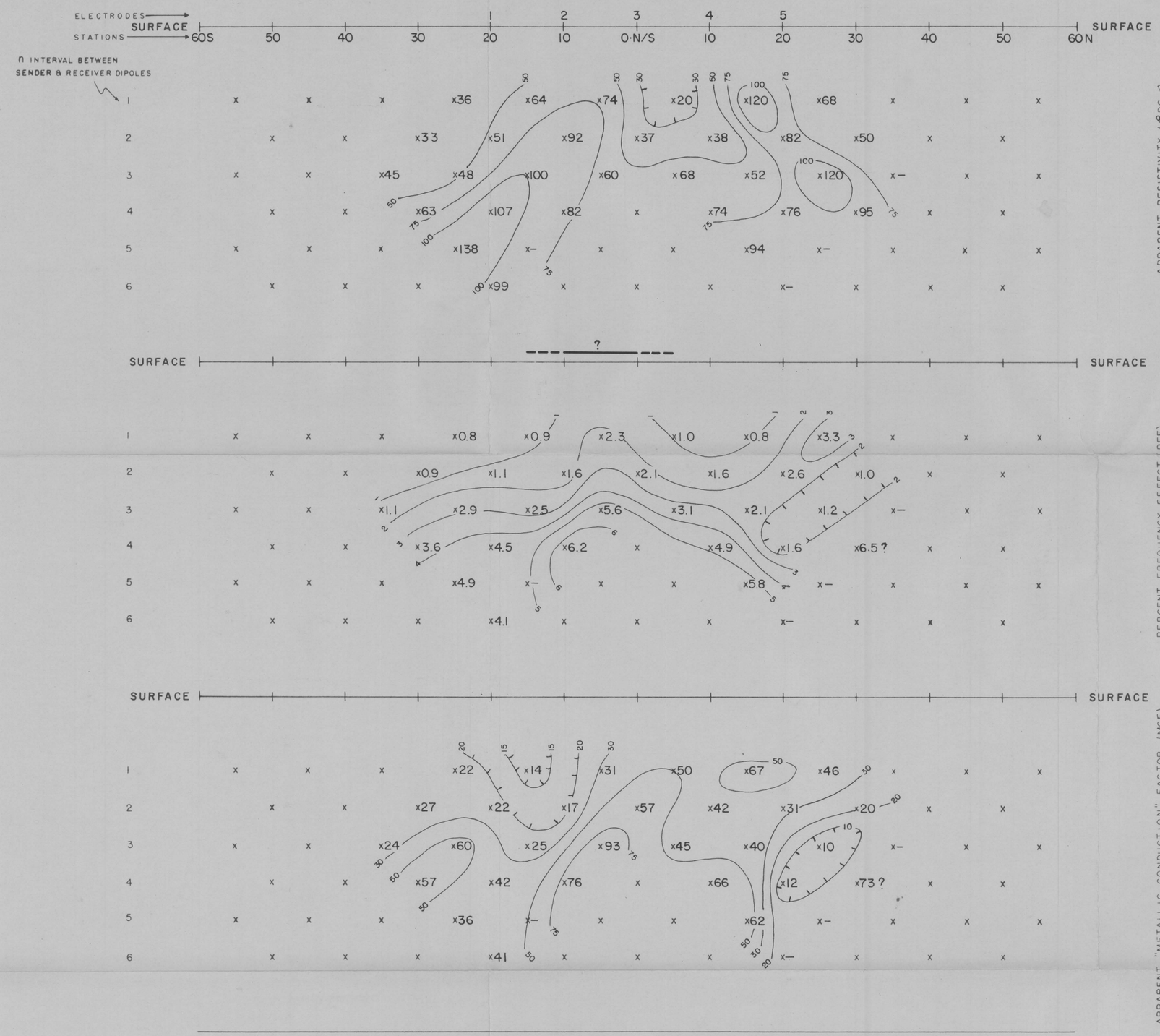
FOR

GUNNEX LIMITED

SELF POTENTIAL



HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS TUCSON, ARIZONA



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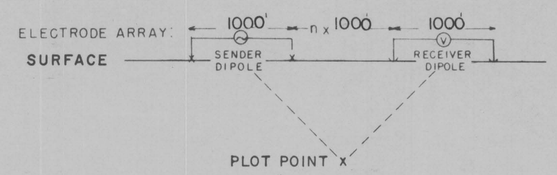

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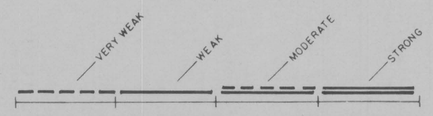


LOOKING S 80° W

BRENDA AREA

SECTIONAL DATA SHEET

LINE NO. 3

INDUCED POLARIZATION TRAVERSE

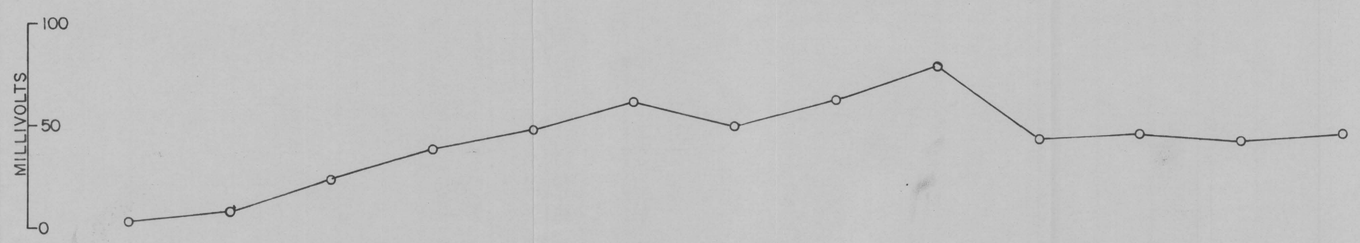
HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: APRIL 1967

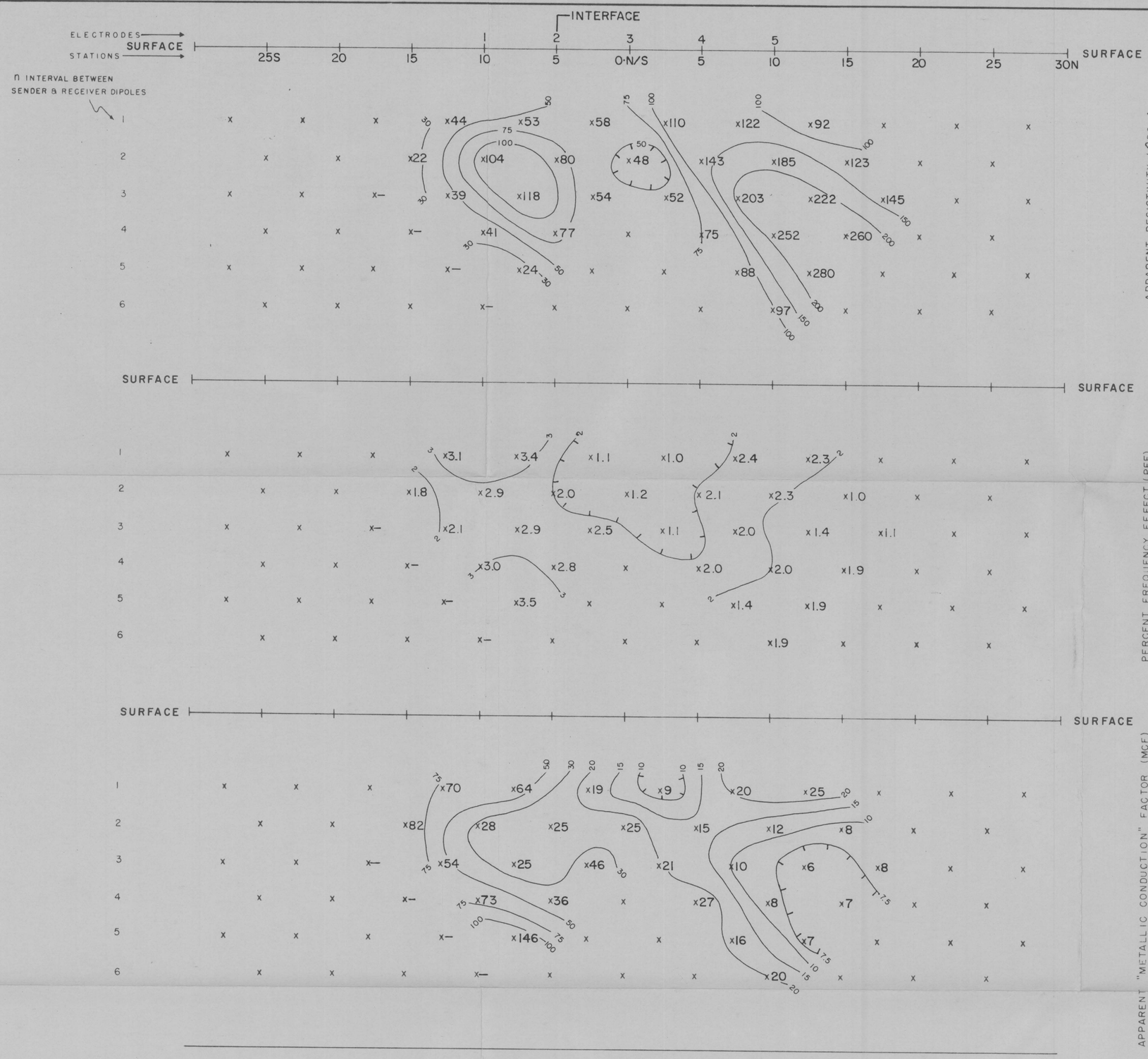
FOR

GUNNEX LIMITED

SELF POTENTIAL



HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA



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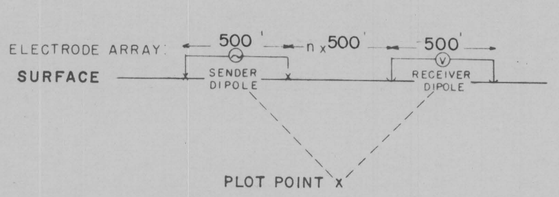

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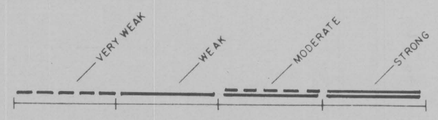


LOOKING WEST

BRENDA AREA

SECTIONAL DATA SHEET

LINE NO. 4

INDUCED POLARIZATION TRAVERSE

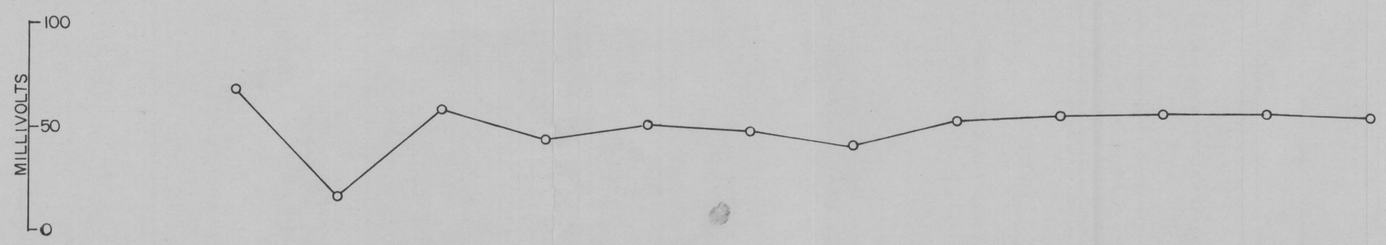
HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 500' DATE: APRIL 1967

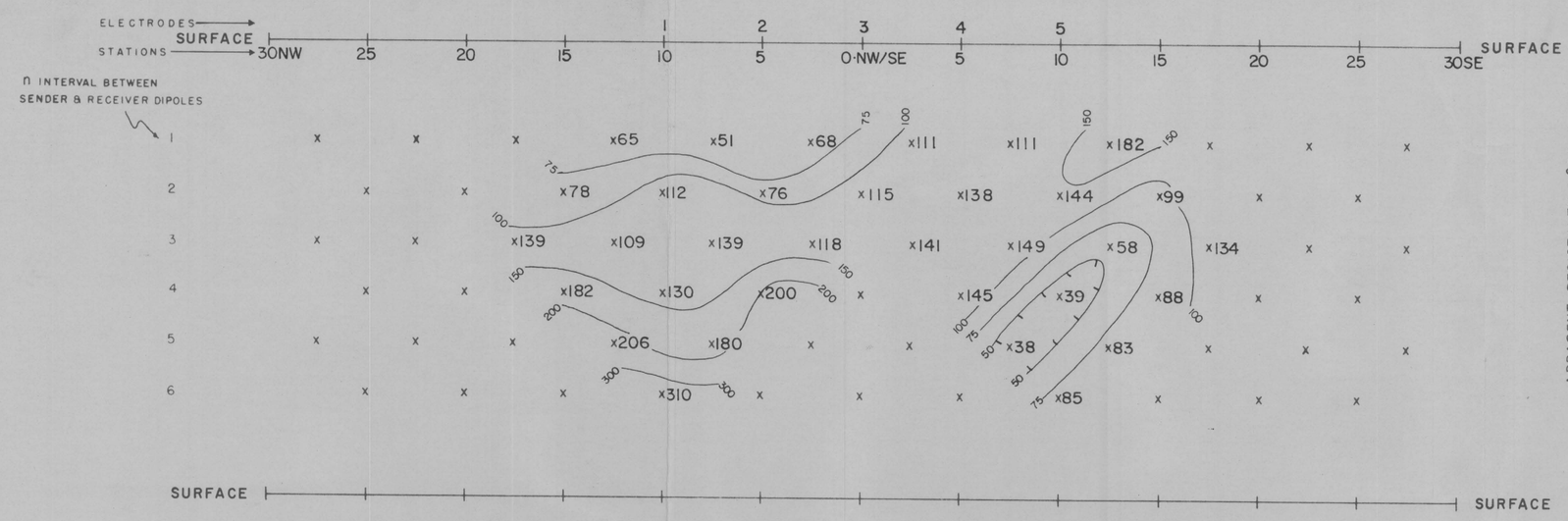
FOR

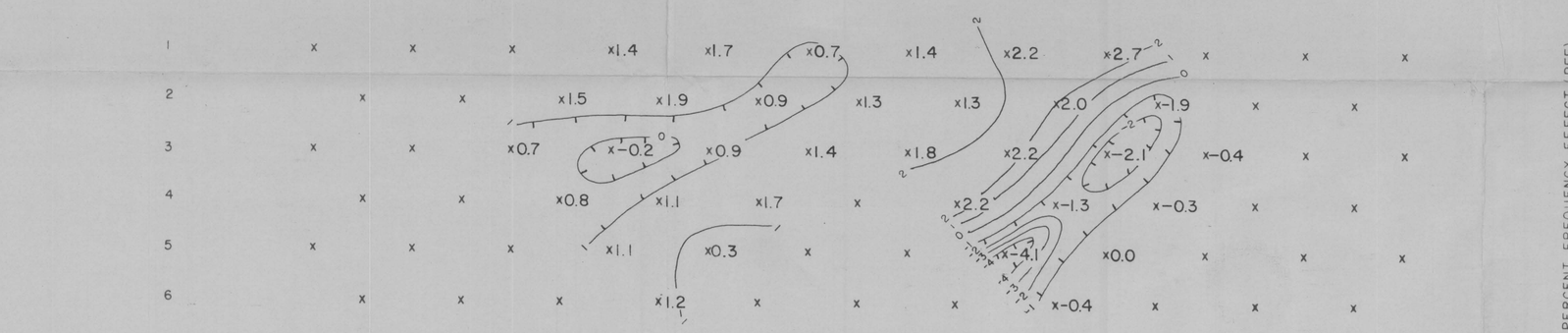
GUNNEX LIMITED

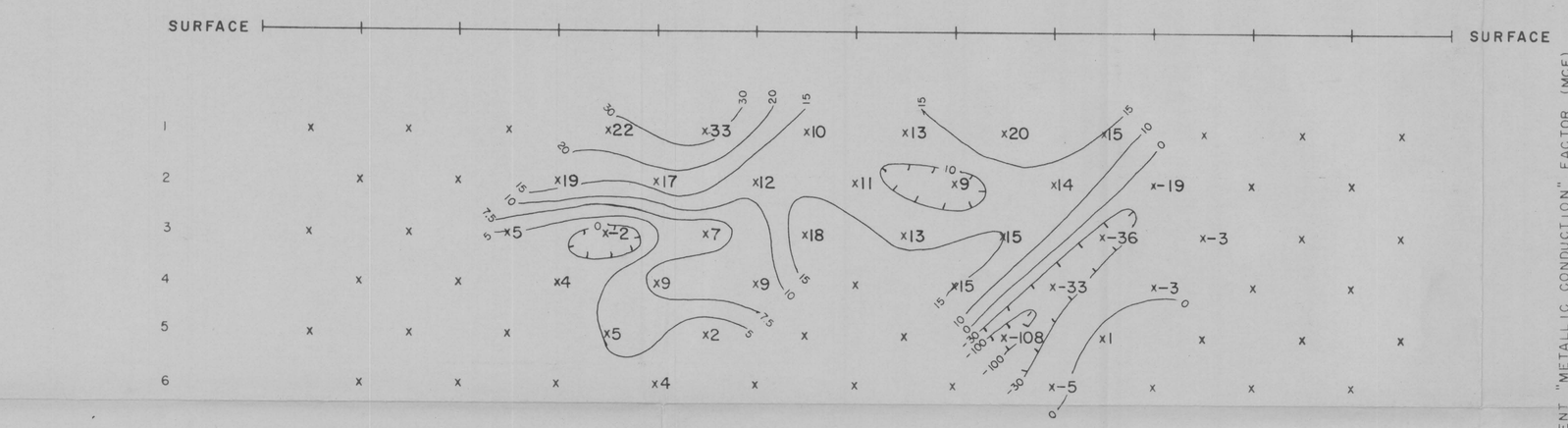
SELF POTENTIAL



HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA







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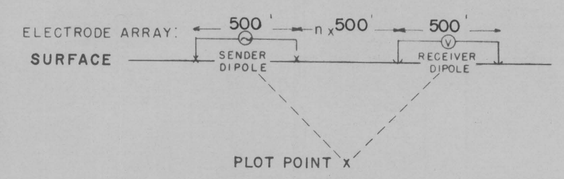

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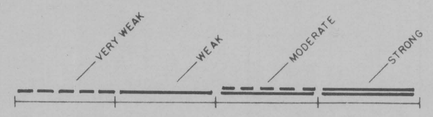


LOOKING NORTHEASTERLY

BRENDA AREA

SECTIONAL DATA SHEET

LINE NO. 5

INDUCED POLARIZATION TRAVERSE

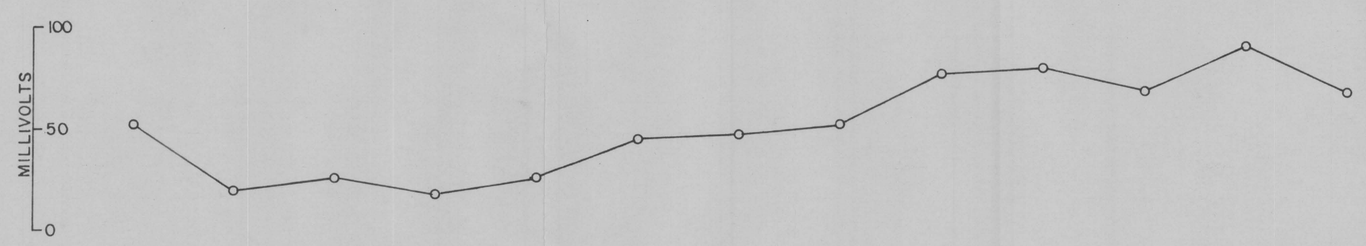
HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 500' DATE: APRIL 1967

FOR

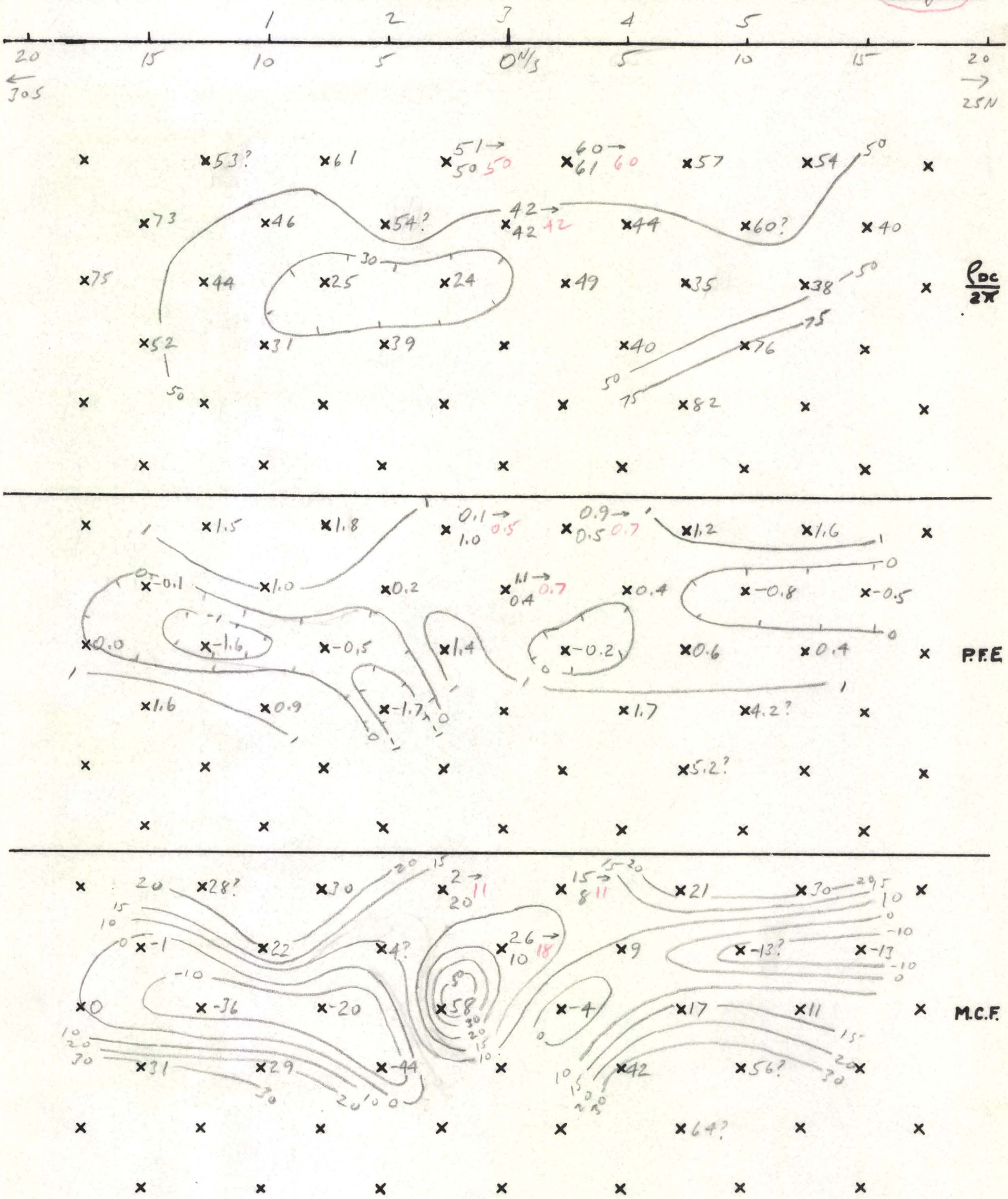
GUNNEX LIMITED

SELF POTENTIAL



HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA

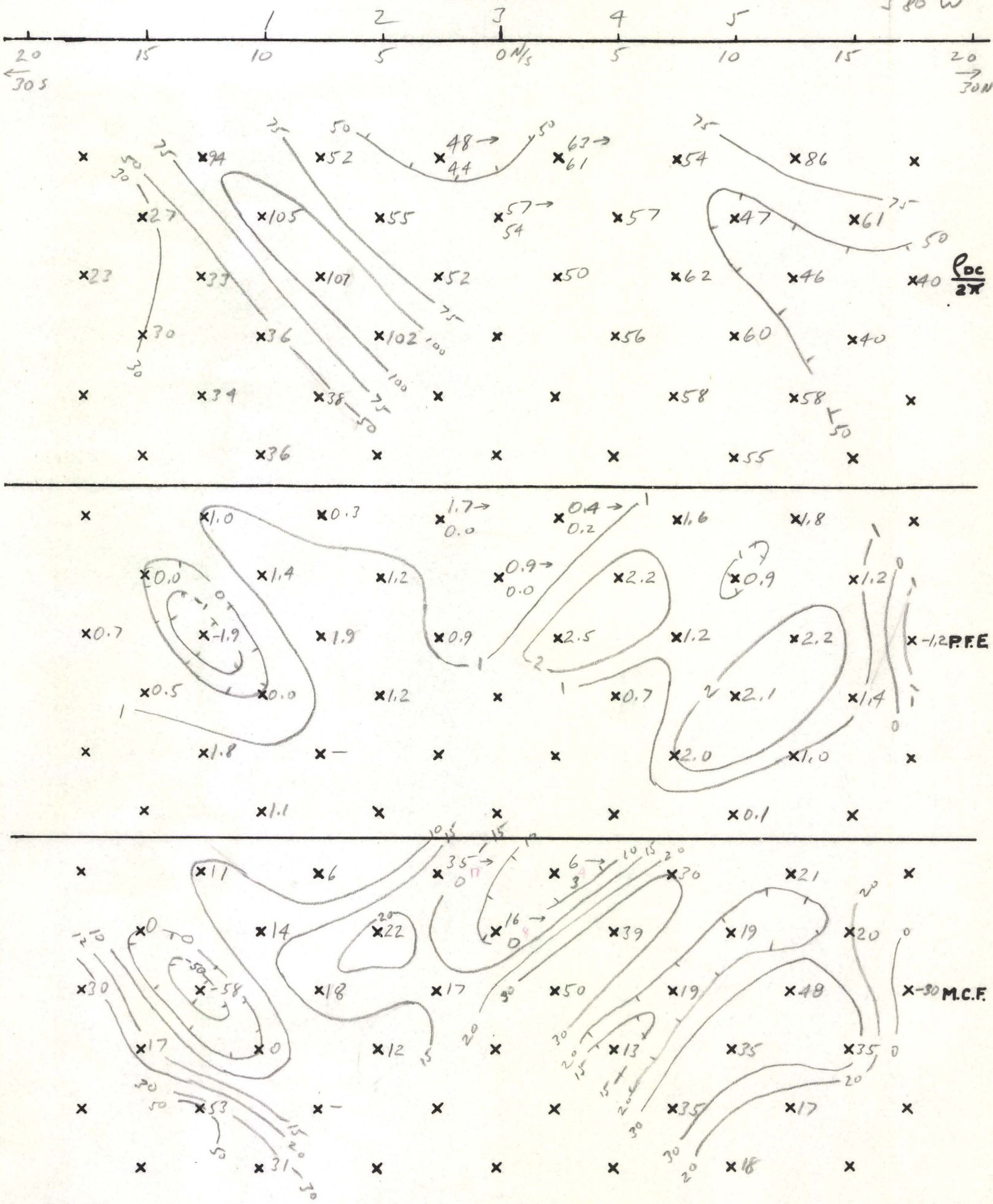
HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING W



S Gunnex 2

AREA Brenda LINE 1 a = 500 ' SCALE: 1" = 500' DATE: 3/30/67

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING ~~W ly~~ S 80 W



AREA Brenda Gunnex LINE 2 Spr. A a = 500' SCALE: 1" = 500' DATE: 3/30/67

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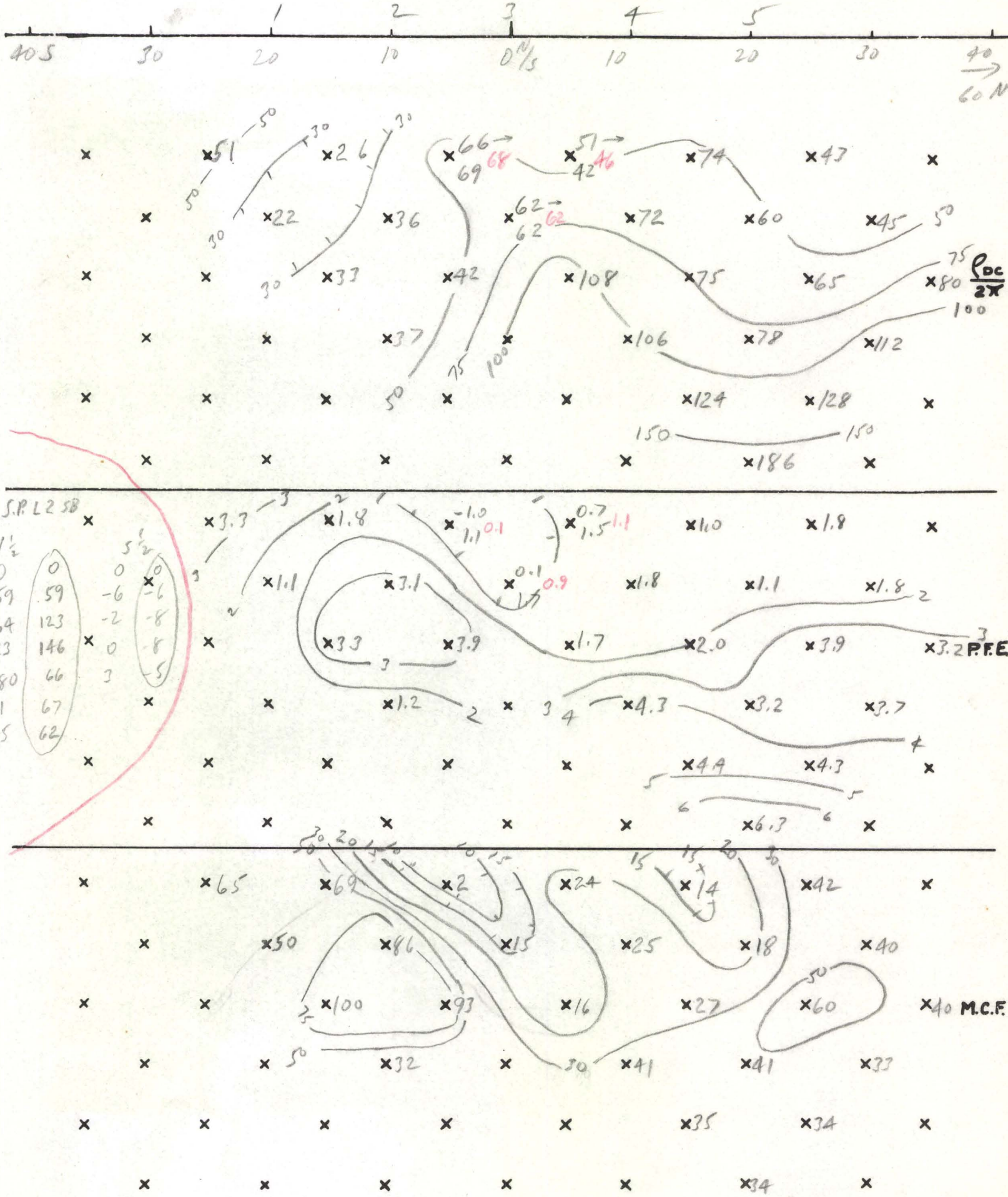

AREA Brenda Gunnex LINE 2 Spread B a = 1000' SCALE: 1" = 1000' DATE: Apr. 67

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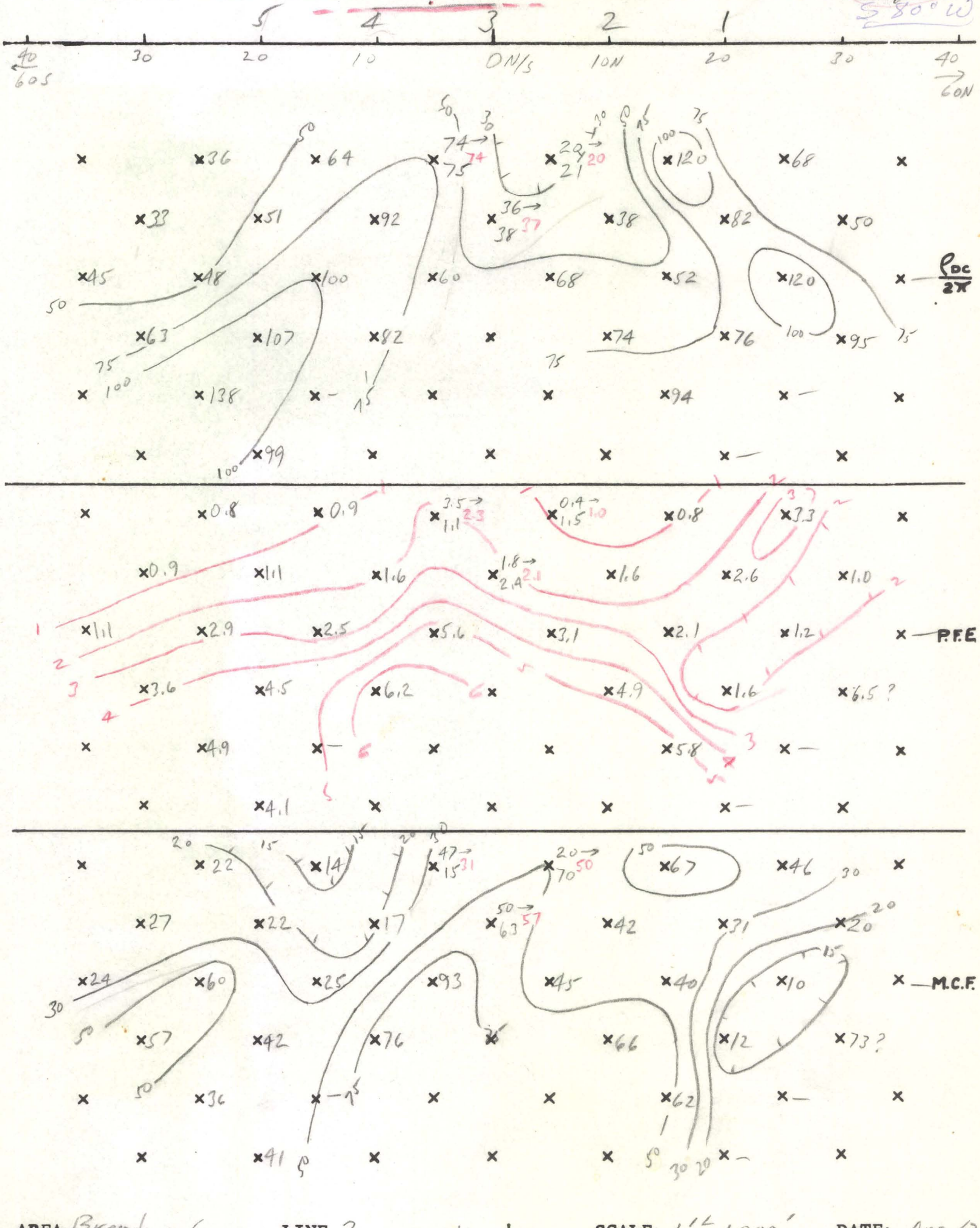

AREA Brenda - Gunnex LINE 3 a = 1000' SCALE: 1" = 1000' DATE: Apr. 67

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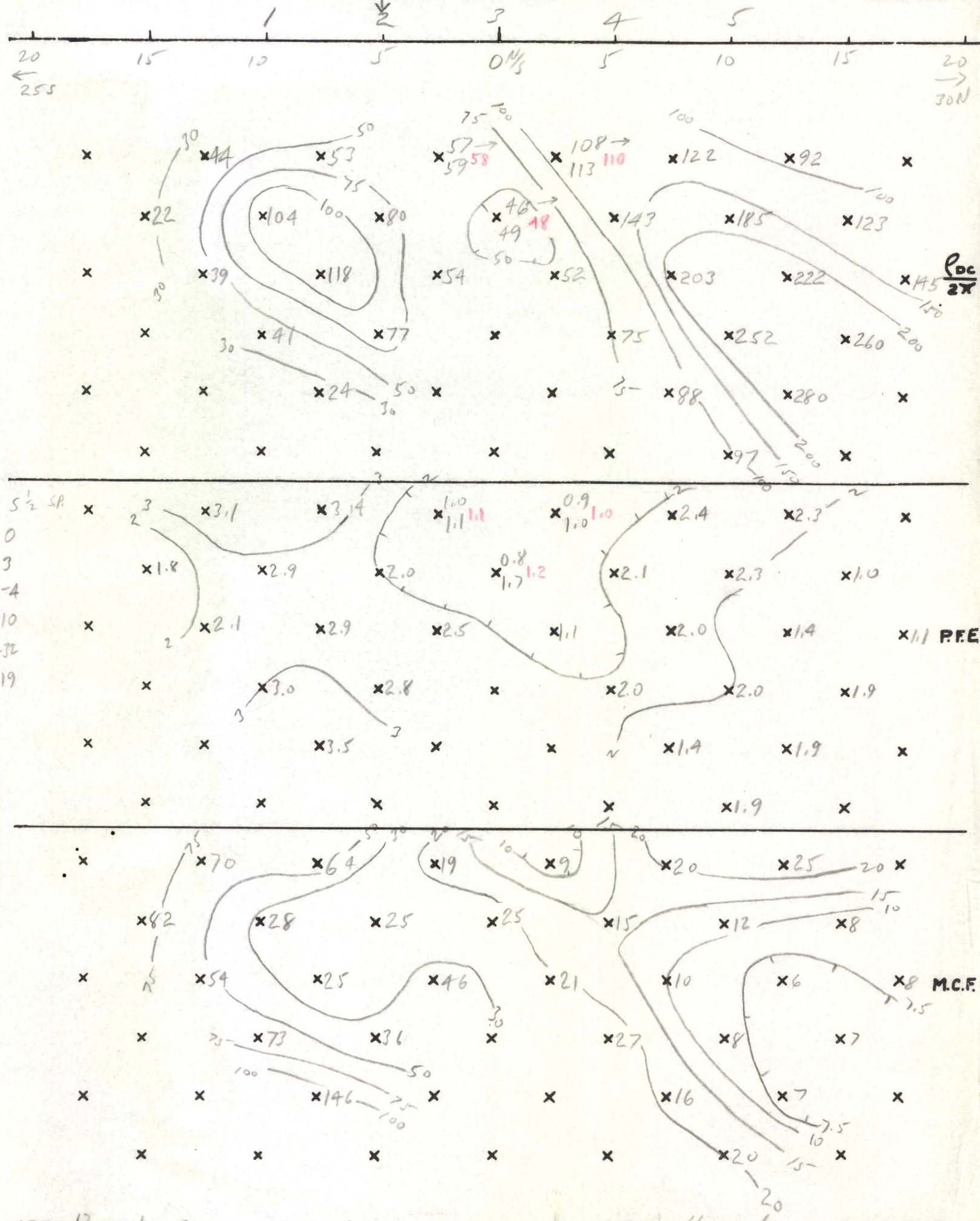
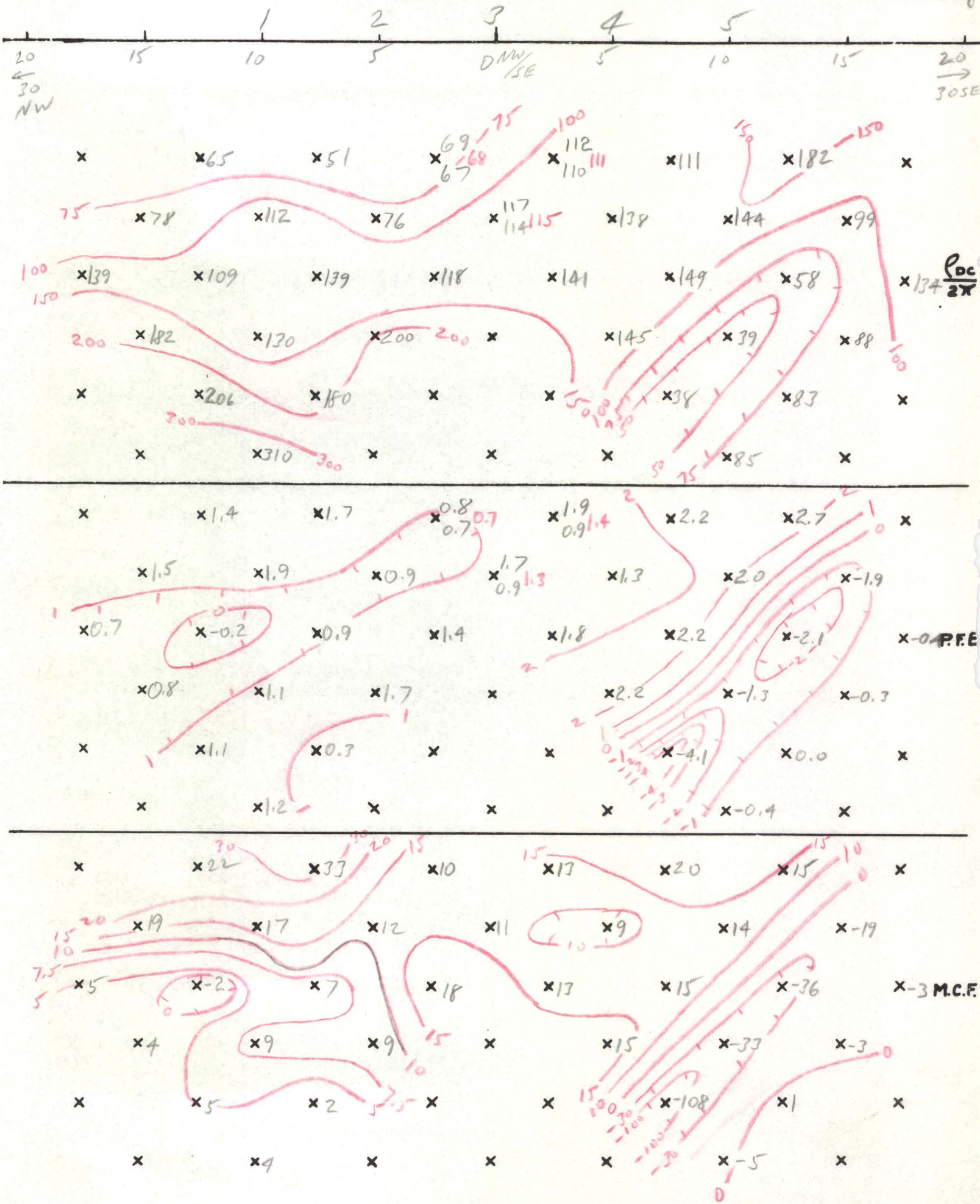


AREA Brenda Gunner LINE 4 a = 500' SCALE: 1" = 500' DATE: Dec. 67

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING Northeasterly



AREA Brenda Gunnes LINE 5 a = 500 ' SCALE: 1" = 500' DATE: Apr. 67

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project BRENDA Line #1 Field date 3-23 Data page _____ Comp. date 3-23 . Comp by RPF

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL.
(B) Receive	0-50	50 —	— 100	100 —	—	— 150	150 —	—	—	— 200		
(C) n separation												
(D) I	500	→										
(E) Vdc (avg)	17.4	20.5	3.586	19.5	3.81	1.69	18.66	1.605	1.216	0.6915		
(F) DCcal	.970	→										
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρ dc=ExFxGx10^3/D	50.6	59.7	42	56.7	44	49.2	54.3	19.60	35.4	40.2		
(I) Vac Σ	16.85	19.7	3.49	18.7	3.68	1.645	17.8	1.57	1.17	0.680		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.970	→										
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	0.1	0.9	1.1	1.2	0.4	-0.2	1.6	-0.8	0.6	1.70		
(O) MCF=(M-1)(10^5)/H	2	15	26	21	9	-4	30	-45 -13	17	42		

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

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2			CAL	
(B) Receive	200 —	—	—	— 250	250 —	—	—	— 300				
(C) n separation												
(D) I	500	→										
(E) Vdc (avg)	3.39?	0.940?	1.30?	0.805							103	
(F) DCcal	.970	→									.970	
(G) Kn x 10^{-3}	6	15	30	52.5								
(H) ρ dc=ExFxGx10^3/D	40	37.8	75.7	82.0								
(I) Vac Σ	3.30	.915	1.21	0.75							100	
(J) AC noise x 2	.12	→										
(K) Vac (corr) = $\sqrt{I^2 - J^2}$		.908		0.741								
(L) AC-DC cal.	.970	→									.970	
(M) ρdc/ρac =ExL/K	.995	1.004	4.2?	5.2?								
(N) PFE=(M-1)(10^2)	-0.5	0.4	4.2?	5.2?								
(O) MCF=(M-1)(10^5)/H	-13	11	56	64								

1.02 I/D.C.

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT BRENDA BABY
LINE 1 HALF N SP. ____ DATE 3-23

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-50	50 —	100	100 —		150	154 —			200
RANGE	30	30	10	30	10	3	30	3	3	1
DC 1	172 173	203 207	352 364	192 198	369 392	157 183	176 196	158 160	125 116	690 692
DC 2	172 177	203 207	350 370	192 198	362 400	158 175	174 200	166 155	130 114	734 648
DC 3	173 177		340 376	191 199	354 408	162 175	172 202	169 152	130 115	740 630
DC 4					355 402	162 175		172 153		688 709
DC 5										638 748
DC 6										
DC 7										
DC 8										
DC AVG.	17.4	20.5	3.586	19.5	3.81	1.69	18.66	1.605	1.216	.6915
AC 1	16.9	19.7	3.44	18.7	3.68	1.65	17.8	1.58	1.17	.680
AC 2	16.8	19.7	3.44	18.7	3.68	1.64	17.8	1.56	1.17	.680
AC AVG.										
S.P.	+9.0	-0.2 →		+21.0	→		+21.6			
AC NOISE	.40	.20 →		.14	→		.20			
POT RES.										

$\frac{20}{500} \times 1500$

$5\overline{)300}$ 60

3 $\frac{4}{500} \times 3000$

$5\overline{)120}$

20

$\frac{1}{500}$ 150

$\frac{W}{900}$

$\frac{17}{500}$

$\frac{20}{1000}$ × 1500

30

3000 / 2100 $5\overline{)210}$

$\frac{.7}{500}$

$\frac{2}{500}$

$\frac{3}{900}$

500
.45
.525

$\frac{1}{90}$

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT BRENDA BABY
LINE 1 HALF N SP. - DATE 3-23

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE	200			250	250			300		3-4
RANGE	10	3	3	3						100
DC 1	348 378	103 078	125 137	075 089	✓	✓	✓	✓		51.5
DC 2	345 334	103 081	121 141	085 096	N	O	I	S	E	51.5
DC 3	344 338	102 084	119 154	076 078						51.5
DC 4	338 342	100 095	107 138	076 075						51.5
DC 5		094 096	108 137	076 089						
DC 6		086 108	129 145	069 080						
DC 7		083 110	115 134							
DC 8		080 118								
DC AVG.	6.78	1.88?	2.59?	1.61?						
AC 1	3.30	0.92	1.21	0.75						50.0
AC 2	3.30	0.91	1.21	0.75						50.0
AC AVG.	6.60	1.83	2.42	1.50						
S.P.	-14.3	→	→	→						
AC NOISE	.12	→	→	→						
POT RES.										

INDUCED POLARIZATION SENDER NOTES

Project: _____ Line: 1 N½ _____ Date: _____

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive	0-5	5	10	10		15	15			20		
Time ✓	250	190	250	180	185	240	340	180	180	240		
Range	Low ×10	"	"	"	"	"	"	"	Hi	10N		
Current	.50 A											
Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2			Cal.	
Receive	20			25	25			30			3-4	
Time	355	190	180	240	X	X	X	X			280	
Range	low ×10		Hi	low	X	X	X	X			×10	
Current	.50 A				X	X	X	X			.5	

a = 500'

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Brenda Line 1 5½ Field date 3/23/67 Data page 2 Comp. date_____. Comp by H.L.

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		1-2
(B) Receive	0-500	500 —	1000	1000 —	—	1500	1500 —	—	—	2000		Cal.
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	0.5 A	1.0	0.5	1.0	1.0	0.5	0.6	0.6	0.5	0.5		0.5
(E) Vdc (avg)	20.7	34.0	3.60	41.5	28.9	.830	69.1	4.70	.84	.668		51.0
(F) DCcal	~~1.02~~ →		.980									.980
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρ dc=ExFxGx10^3/D	63.3 61	52 50	44 42	64 61	177 170	25 24	~~176~~ 169	48 46	26 25	41 39		
(I) Vac Σ	20.0	32.7	3.48	39.6	28.0	.795	66.1	4.52	.82	.660		49.5
(J) AC noise x 2	—											
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	.971 →											
(M) ρ dc/ρac=ExL/K	1.005	1.0096	1.0045	1.018	1.0022	1.014	1.015	1.0097	.995	.983		
(N) PFE=(M-1)(10^2)	.5	.96 1.0	.45 .4	1.8	.2	1.4	1.5	~~.87~~ 1.0	-0.5	-1.7		
(O) MCF=(M-1)(10^5)/H	8	~~+8~~ 20	10	~~28~~ 30	1 4	5 8	~~85~~ 9	20 22	~~-19~~ -20	~~-41~~ -44		
	+41.0	-29.0		-1.0			+11.4 28					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	2000 —	—	—	2500	2500 —	—	—	3000				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	0.5	0.5	0.5		0.7	0.7						
(E) Vdc (avg)	6.17	1.48	.53		3.56	1.24	Too					
(F) DCcal	1.02 →						much					
(G) Kn x 10^{-3}	6	15	30		15	30		noise				
(H) ρ dc=ExFxGx10^3/D	76 73	45 44	32 31		78 75	54 52						
(I) Vac Σ	6.0	1.46	.51		3.455	1.185						
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.971 →											
(M) ρdc/ρac =ExL/K	~~1.059~~	.984	1.009		1.00	1.016						
(N) PFE=(M-1)(10^2)	5.9 -0.1	-1.6	0.9		0.0	1.6						
(O) MCF=(M-1)(10^5)/H	~~78~~ -1	-36	~~28~~ 29		0	~~30~~ 31						
	+3.7				+1.9							

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT BRENDA

LINE 1 HALF S SP. ____ DATE 3-23

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-50	50 —	— 100	100 —	—	— 150	150 —	—	—	— 200
RANGE	30	100	10	100	10	1	100	10	3 (*)	1 *
DC 1	208 206	33.0 35.0	3.58 3.60	428 400	300 272	820 780	709 672	495 440	090 075	730 584
DC 2	209 208	33.0 35.0	3.65 5.50	432 398	309 264	785 890	710 669	512 426	093 070	745 590
DC 3	204 210	32.7 35.3	3.75 3.40	434 392	320 254	762 920	715 668	530 400	105 055	745 590
DC 4	202 212		3.90 3.28	440 390	330 248	824 820	718 661	490 450	092 088	725 670
DC 5			3.47 3.15	444 384	340 236	708 775	720 660	502 434	095 095	
DC 6						800 868		526 421	092 073	
DC 7						768 959		538 400	0.67 105	
DC 8						~~714~~				
DC AVG.	20.7	34.0	3.6	41.5	28.9	.830	69.1	4.70	.84	668
AC 1	20.0	32.7	3.48	39.6	2.80	.795	66.1	4.52	0.83	.660
AC 2	20.0	32.7	3.48	39.6	2.80	.795	66.1	4.52	0.82	.660
AC AVG.	20.0	65.4	6.96			.795	66.1	4.52	.82	.66
S.P.	+41.0	-29.0	→	-1.0	→	→	+11.4	→	→	→
AC NOISE	.22	.15	→	.10	→	→	.12	→	→	→
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT BRENDA

LINE 1 HALF S SP. ____ DATE 3-23

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
RECEIVE	200			250	250			300		1-2
RANGE	30									100
DC 1	7.5 7.2	1.73 1.86								51.0
DC 2	7.7 7.0	1.73 1.83								"
DC 3	7.7 7.0	1.73 1.83								"
DC 4		1.72 1.84								"
DC 5		1.72 1.84								
DC 6										
DC 7		not	used	see 3/24/67						
DC 8										
DC AVG.	7.35	1.78								
AC 1	7.2	1.73								49.5
AC 2	7.1	1.73								49.5
AC AVG.	14.3	3.46								
S.P.	+1.6	+1.6								
AC NOISE	.01	.01								
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT BRENDA
LINE 1 HALF S SP. ____ DATE 3-24

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
RECEIVE			single pair							
RANGE	30	3	1		10	3				
DC 1	6.7 5.7	1.50 1.42	.58 .47	TOO	340 372	115 128	TOO			
DC 2	6.7 5.5	1.48 1.45	.40 .70	much	335 374	120 118	MUCH			
DC 3	6.8 5.5	1.48 1.58	.42 .68	noise	335 380	134 110	NOISE			
DC 4	7.0 5.3	1.49 1.53	.61 .46		332 378	140 104				
DC 5		1.50 1.45	.39 .71		334 378					
DC 6		1.35 1.65	.38 .74							
DC 7		1.26 1.77								
DC 8										
DC AVG.	6.17	1.48	.53		3.56	1.24				
AC 1	6.0	1.46 ?	.51 ?		3.46	1.18	.318			
AC 2	6.0	1.46	.51		3.45	1.19				
AC AVG.	12.0	2.92	.51		3.455	1.185				
S.P.	+3.7				+1.9					
AC NOISE					.09					
POT RES.										

INDUCED POLARIZATION SENDER NOTES

Project: Brenda Line: 1 S 1/2 Date: 3/23

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Receive	0-5.	5 —	10	10 —	—	15	15 —	—	—	20		
Time	360 V.	340	350	340	350	340	280	210	180	340		
Range	×10	×10	"	"	"	"	"	"	"	"		
Current	0.50A	1.0	0.5	1.0	1.0	.5	.60	.60	.50	.50		
Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5			Cal 1-2	
Receive	20 —	—	—	25	25 —	—	—	30				
Time	180	210									300	
Range	×10	"										
Current	0.6	0.6									0.50	

PAGE

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Brenda

LINE 1 HALF S½ SP. ____ DATE 3/24

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
RECEIVE										
RANGE	×10				×10					
VOLTAGE	200	180	180		320	240	190			
CURRENT	0.5	0.5	→		0.7	0.7	0.5			
SEND										
RECEIVE										
RANGE										
VOLTAGE										
CURRENT										

FREQUENCIES ____ ____

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT BRENDA

LINE 2 HALF N SP. ____ DATE ____

PAGE

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-500	500	1000	1000		1500	LOW 1500			2000
RANGE	x 10	→						→		
VOLTAGE	330	170	330	150	170	330	145	110	120	235
CURRENT	3.5 A					→	0.5	2.5		→
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		Cal.
RECEIVE	2000			2500	2500			3000		3-4
RANGE	x10	→								10 A
VOLTAGE	235	150	180	320	235	150	165	320		104
CURRENT	1.0	3.5	3.5	3.5	1.0	3.5	3.5	3.5		

FREQUENCIES ____ ____

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

PAGE

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Brenda

LINE 2 HALF S SP. ___ DATE m-27

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-500	500	1000	1000		1500	1500			2000
RANGE			LOW			LOW				LOW
VOLTAGE	250	50	250	50	50	225	100	50	50	225
CURRENT	1	1	1	1	1	1	1	1	1	1
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL 2-3
RECEIVE	2000			2500	2500			3000		
RANGE				LOW				LOW		
VOLTAGE	100	50	50	225	100	50	50	225		100
CURRENT	1	1	1	1	1	1	1	1		1

FREQUENCIES A C D C

SENDER NO. 13671-S

OPERATOR Loren

RECEIVER NO. 3641

OPERATOR Bob

COMMENTS:

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT BRENDA
LINE 2 HALF N SP. ____ DATE 3-27

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-50	50 —	— 100	100 —	—	— 150	150 —	—	—	— 200
RANGE	300	300	100	300	100	30	100	30	30	10
DC 1	110 110	140 146	332 330	124 125	336 314	115 115	277 272	193 186	96 105	450 470
DC 2	110 110	140 147	348 322	124 125	336 314	114 116	280 288	194 187	96 106	468 464
DC 3			348 314				280 292	193 184	96 105	470 466
DC 4			354 308				280 290	193 190		466 460
DC 5								190 190		
DC 6										
DC 7										
DC 8										
DC AVG.	110	143.2	33.1	124.5	32.5	11.5	28.42	19.0	100.5	4.61
AC 1	106	139.5	32.8	120	31.0	11.0	27.4	18.5	9.7	4.48
AC 2	106	140	32.8	120	31.0	11.0	27.6	18.4	9.7	4.48
AC AVG.	106	139.7	32.8	120	31.0	11.0	27.5	18.45	9.7	4.48
S.P.	+22.4	+59.2	→	-12.2	→	→	+31.7			
AC NOISE	.12	.08	→	.26	→	→	.04			
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT BRENDA BABY

LINE 2 HALF N SP. DATE 3-27

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE	250			250	250			300		3-4
RANGE	10	10	10	10	10	10	10	3		
DC 1	930 930	949 956	670 704	380 380	258 248	470 458	384 373	241 245		98
DC 2	930 920	929 960	668 708	388 368	270 236	464 460	390 370	237 220		"
DC 3		939 960	688 678	388 378	282 227	457 464	388 376	238 220		"
DC 4			686 670		282 230	454 470	384 366	237 210		"
DC 5						448 477	384 364	243 205		
DC 6								227 227		
DC 7								227 218		
DC 8										
DC AVG.	9.30	9.49	6.875	3.803	2.56	4.622	3.78	2.25		
AC 1	9.00	9.12	6.62	3.66	2.52	4.46	3.65	2.20		96
AC 2	9.00	9.12	6.62	3.65	2.54	4.45	3.65	2.20		96
AC AVG.	9.00				2.53					
S.P.	-16.6				+4.9					
AC NOISE	.06				.08					
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT BRENDA BABY
LINE 2 HALF S SP. ____ DATE 3-27

PAGE 1

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-50	50 —	100	100	—	150	150 —		—	200
RANGE	100	30	10	100	10	10	100	30	10	10
DC 1	402 400	292 289	875 890	337 338	900 890	340 339	602 628	173 169	700 694	336 330
DC 2	402 400	291 287	880 884	337 338	894 902	335 352	600 627	177 167	690 716	348 329
DC 3		292 288	888 876		884 908	324 350	600 629	177 166	686 718	335 338
DC 4			906 870		902 886	324 352		176 167	690 714	320 330
DC 5			910 852						698 702	317 334
DC 6										
DC 7										
DC 8									7.01	
DC AVG.	40.1	28.95	8.85	33.7.5	897.6	3.38	61.35	17.17	7.12	3.313
AC 1	39.2	28.4	8.68	33.0	8.68	3.28	59.5	16.6	6.75	3.21
AC 2	39.2	28.4	8.67	32.9	8.68	3.28	59.5	16.6	6.74	3.20
AC AVG.	39.2	28.4		32.95			59.5			
S.P.	+9.3	-11.3	—	-.1	→	→	-3.2	→	→	→
AC NOISE	.22	.08	—	.19	→	→	.10	→	→	→
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES INT 95

PROJECT BRENDA
LINE 2 HALF S SP. ____ DATE 3-27

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		Cal.
RECEIVE	200			250	250			300		2-3
RANGE	10	3	3	1	3	3	1 ?	1 ?		300
DC 1	430 448	220 210	122 104		155 149	96 99	398 690	438 390		98
DC 2	438 436	224 192	122 105	TOO	160 148	97 97	664 590	470 354		98
DC 3	446 430	213 205	105 132	MUCH	162 144	97 98	670 588	400 428		98
DC 4	452 416	230 200	114 115	NOISE	157 149	96 100	700 552	406 460		98
DC 5		214 219	104 123	+ DRIFT	161 144	94 102	640 598	372 494		
DC 6		212 228	107 123				666 570	430 400		
DC 7							638 650	457 380		
DC 8							598 716	460 362		
DC AVG.	4.39	2.135	1.18		1.53	.975	.631	.420		
AC 1	4.32	2.13	1.15	.710	1.49	0.95	.608	.408		96
AC 2	4.30	2.13	1.14		1.49	0.95	.606	.406		96
AC AVG.	4.31									
S.P.	+5.0				+0.3					
AC NOISE	.10				.10					
POT RES.										

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project BRENDA Line #2 N½ Field date 3-27 Data page 3 Comp. date 3-27. Comp by BOB

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
(B) Receive	0-50	50	100	100		150	150			200		3-4
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	3.5	3.5	3.5	3.5	3.5	3.5	0.5	2.5	2.5	2.5		1
(E) Vdc (avg)	110	143.2	33.1	124.5	32.5	11.5	28.42	19.0	100.5	4.61		98
(F) DCcal	1.02									→		
(G) Kn x 10^{-3}	1.5	1.5	6.0	1.5	6.0	15.0	1.5	6.0	15.0	30.0		
(H) ρ dc=ExFxGx10^3/D	48	63	57	54	57	50	86	47	62	56		
(I) Vac Σ	106	139.7	32.8	120	31.0	11.0	27.5	18.45	09.7	4.48		96
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.980									→		
(M) ρ dc/ρac=ExL/K							1.013					
(N) PFE=(M-1)(10^2)	1.7	0.4	0.9	1.6	2.2	2.5	1.8	0.9	1.2	0.7		
(O) MCF=(M-1)(10^5)/H	35	6.4	16	29.7	38.6	50	21	19	19	12.5		

Project_____ Line_____ Field date_____ Data page 4 Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	200			250	250			300				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	1.0	3.5	3.5	3.5	1.0	3.5	3.5	3.5				
(E) Vdc (avg)	9.30	9.49	6.88	3.80	2.56	4.622	3.78	2.25				
(F) DCcal	1.02							→				
(G) Kn x 10^{-3}	6.0	15.0	30.0	52.5	15.0	30.0	52.5	84.0				
(H) ρ dc=ExFxGx10^3/D	61	46	60	58	40	40	58	55				
(I) Vac Σ	9.00	9.12	6.62	3.655	2.53	4.455	3.65	2.20				
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.980							→				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	1.2	2.2	2.1	2.0	-1.2	1.4	1.0	0.1				
(O) MCF=(M-1)(10^5)/H	19.7	48	35	35	-30	35	17	18				

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Brenda Line 2 5½ Field date 3/27 Data page_____ Comp. date_____. Comp by W.L.

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		Cal.
(B) Receive	0-500	500 —	— 1000	1000 —	—	— 1500	1500 —	—	—	— 2000		2-3
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
(E) Vdc (avg)	40.1	28.95	8.85	33.75	8.976	3.38	61.35	17.17	7.~~2~~31	3.315		98
(F) DCcal	1.02 →											
(G) Kn x 10^{-3}	1.5	1.5	6.0	1.5	6.0	15.0	1.5	6.0	15.0	30.0		
(H) ρdc=ExFxGx10^3/D	64 61	46 44	56 54	52	55	52	94	105	109	102		
(I) Vac Σ	39.2	28.4	8.675	32.95	8.68	3.28	59.5	16.6	6.745	3.205		96
(J) AC noise x 2	—											
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	.980 →											
(M) ρdc/ρac=ExL/K	1.002	1.000	1.000	1.003	1.012	1.009	1.010	1.014	1.0~~35~~19	1.012		
(N) PFE=(M-1)(10^2)	0.2	0	0	0.3	1.2	0.9	1.0	1.40	~~3.5~~ 1.9	1.2		
(O) MCF=(M-1)(10^5)/H	3.1	0	0	5.8	22	17	10.6	13.9	~~32~~ 18	11.8		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	2000 —	—	—	— 2500	2500 —	—	—	— 3000				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0				
(E) Vdc (avg)	4.39	2.135	1.18		1.53	.975	.631	.420				
(F) DCcal	1.02 →											
(G) Kn x 10^{-3}	6.0	15	30	52.5	15	30	52.5	84				
(H) ρdc=ExFxGx10^3/D	27	33	36	38	23	30	34	36				
(I) Vac Σ	4.31	2.13	1.145	.71	1.49	.95	.607	.407				
(J) AC noise x 2	—											
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	.980 →											
(M) ρdc/ρac =ExL/K	1.000	.981			1.007	1.005	1.018	1.011				
(N) PFE=(M-1)(10^2)	0	-1.9	0		0.7	0.5	1.8	1.1				
(O) MCF=(M-1)(10^5)/H	0	-58	0		30	17	53	31				

5½ - 1000'

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Brenda Line 2 B Field date_____ Data page_____ Comp. date_____. Comp by_____

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		Cal.
(B) Receive	0-1000	1000 —	— 2000	2000	—	— 3000	3000 —	—	—	— 3500		3-4
(C) n separation	1	1	2	1	2	3	1	2	3	4		–
(D) I	2.0	1.0	2.0	2.0	1.0	1.5	2.0	2.0	1.0	2.0		0.5
(E) Vdc (avg)	28.83	23.78	10.73	17.96	3.08	2.16	24.63	2.39	.665	.736		51.5
(F) DCcal	.97 →											
(G) Kn x 10^{-3}	3	3	12	3	12	30	4.29	19.09	50.4	104.2		
(H) ρ dc=ExFxGx10^3/D	42	69	62	26	36	42	51	22	33	37		
(I) Vac Σ	28.0	23.2	10.4	17.4	2.945	2.05	23.5	2.33	.635	.717		50.8
(J) AC noise x 2	—											
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	.986 →											
(M) ρ dc/ρac=ExL/K	1.015	1.011	1.017	1.018	1.031	1.039	1.033	1.011	1.033	1.012		
(N) PFE=(M-1)(10^2)	1.5	1.1	1.7	1.8	3.1	3.9	3.3	1.1	3.3	1.2		
(O) MCF=(M-1)(10^5)/H	36	16	27	69	86	93	65	50	100	32		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

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

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES INT 93

PROJECT BRENDA
LINE 2 HALF S SP. B DATE 3-30

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-10	10 —	— 20	20 —	—	— 30	30	—	—	— 40
RANGE	100	30	30	30	10	3	100	16	1	1
DC 1	292 286	245 235	111 103	184 174	318 300	216 221	244 248	230 230	630 690	776 727
DC 2	290 286	234 244	112 103	177 170	318 296	208 228	245 248	246 232	612 720	795 690
DC 3				189 170		210 216	244 249	246 233	680 652	780 600
DC 4				179 172		211 220			655 663	
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.	28.83	23.78	10.73	17.96	3.08	2.16	24.63	2.39	.665	.736
AC 1	28.0	23.2	10.4	17.4	2.94	2.05	23.5	2.33	.635	.717
AC 2	28.0	23.2	10.4	17.4	2.95	2.05	23.5	2.33	.635	.717
AC AVG.										
S.P.	-5.5	-2.3		-0.1			+3.4			
AC NOISE		.05		0.6			.02			
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT BRENDA
LINE 2 HALF S SP. B DATE 3-30

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CAL 1	CAL 2
RECEIVE	40			30	50			60	3-4	2-3
RANGE									100	
DC 1									51.5	
DC 2									51.5	
DC 3									51.5	
DC 4									51.5	
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1									50.8	
AC 2									50.8	
AC AVG.										
S.P.										
AC NOISE										
POT RES.										

PAGE

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Brenda Baby

LINE 2 HALF S SP. B DATE

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-1000									
RANGE	X/D low	low	low	low						
VOLTAGE	620	220	630	150	—	480	220	150	220	620
CURRENT	2.0	1.0	2.0	2.0	1.0	1.5	2.0	2.0	1.0	2.0
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	Cal.	Cal.
RECEIVE									3-4	2-3
RANGE									low	low
VOLTAGE									120	180
CURRENT									0.5	1.0

FREQUENCIES _____ _____

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Brenda Line 2 B Field date_____ Data page_____ Comp. date_____. Comp by_____

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-1000	1000	2000	2000		3000	3000			4000		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2.0	1.0	1.0	2.0	2.0	2.0	2.0	1.2	2.0	2.0		
(E) Vdc (avg)	43.0	16.6	5.06	48.6	11.77	7.00	28.2	5.89	4.88	3.45		
(F) DCcal	1.026 →											
(G) Kn x 10^{-3}	3.0	3.0	12.0	3.0	12.0	30.0	3.0	12.0	30.0	60.0		
(H) ρ dc=ExFxGx10^3/D	66	51	62	74	72	108	43	60	75	106		
(I) Vac Σ	43.2	16.4	5.02	47.8	11.5	6.85	27.55	5.80	4.76	3.29		
(J) AC noise x 2	–											
(K) Vac(corr) $=\sqrt{I^2 - J^2}$	–											
(L) AC-DC cal.	.995 →											
(M) ρ dc/ρac=ExL/K	.990	1.007	1.001	1.010	1.018	1.017	1.018	1.011	1.020	1.043		
(N) PFE=(M-1)(10^2)	-1.0	0.7	0.1	1.0	1.8	1.7	1.8	1.1	2.0	4.3		
(O) MCF=(M-1)(10^5)/H	-15	14	2	14	25	16	42	18	27	41		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2			Cal	
(B) Receive	4000			5000	5000			6000			2-3	
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	2.0	1.0	3.0	2.5	2.0	1.0	3.5	2.8			1.0	
(E) Vdc (avg)	7.28	2.12	3.81	2.87	5.18	1.825	4.17	2.735			97.5	
(F) DCcal	1.026 →											
(G) Kn x 10^{-3}	12.0	30.0	60.0	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	45	65	78	124	80	112	128	186				
(I) Vac Σ	7.12	2.03	3.67	2.735	5.00	1.75	3.975	2.56			97.0	
(J) AC noise x 2	–											
(K) Vac (corr) $=\sqrt{I^2 - J^2}$	–											
(L) AC-DC cal.	.995											
(M) ρdc/ρac =ExL/K	1.018	1.039	1.032	1.044	1.032	1.370	1.430	1.063				
(N) PFE=(M-1)(10^2)	1.8	3.9	3.2	4.4	3.2	3.7	4.30	6.3				
(O) MCF=(M-1)(10^5)/H	40	60	41	35	40	33	34	34				

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES INT 87

PROJECT Brenda
LINE 2 HALF N SP. B DATE

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-1000	1000	2000	2000		3000	3000			4000
RANGE	100	30	10	30	10	10				
DC 1	492 380	166 166	590 495	245 236	604 570	385 284				
DC 2	400 464	165 167	515 496	248 235	600 559					
DC 3	392 478		524 490	245 234	600 568					
DC 4	426 444		510 488	248 245	604 577					
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.	43.0	16.6	5.06							
AC 1	43.2	16.4	5.02	23.9	5.74	3.34				
AC 2	43.2	16.4	5.02	23.9	5.76					
AC AVG.	43.2	16.4	5.02							
S.P.	+58.6	+64.4	→							
AC NOISE	.08	.04	→							
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT B RENDA
LINE 2 HALF N SP. B DATE 3-30

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-10	10 —	20	20 —		30	30 —			40
RANGE				100	30	10	100	10	10	10
DC 1				495 478	120 113	692 704	286 278	590 595	495 476	365 300
DC 2				472 496	122 114	662 739	286 278	626 560	511 480	340 328
DC 3				498 478	122 115	685 710		624 536	478 470	348 360
DC 4						718 670		592 594	524 456	337 342
DC 5									532 450	
DC 6										
DC 7										
DC 8										
DC AVG.				48.6	11.77	7.00	28.2	5.89	4.88	3.45
AC 1	—	—	—	47.8	11.5	6.85	27.5	5.80	4.75	3.28
AC 2				47.8	11.5	6.85	27.6	5.80	4.77	3.30
AC AVG.										
S.P.				+23.3	—	7	− 80.4			
AC NOISE				.10	—	0	.06			
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT BRENDA

LINE 2 HALF N SP. B DATE

PAGE 2

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE	4000			5000	5000			6000		2-3
RANGE	10	3	10	3	10	3	10	3		300
DC 1	737 718	210 206	370 397	285 287	523 506	184 179	416 414	264 207		98
DC 2	740 712	214 212	368 386	280 294	529 506	200 160	425 408	265 277		97
DC 3	748 706	208 223	366 384	288 288	535 503	187 170	437 400	276 285		98
DC 4		216 208	366 394	280 287	531 503	210 162	430 404	262 285		97
DC 5		215 195	388 377	293 280		185 185		260 285		
DC 6				290 281		183 188				
DC 7										
DC 8										
DC AVG.	7.28	2.12	3.81	2.87	5.18	1.825	4.17	2.735		
AC 1	7.12	2.03	3.67	2.74	5.00	1.75	3.98	2.56		97
AC 2	7.12	2.03	3.67	2.73	5.00	1.75	3.97	2.56		97
AC AVG.										
S.P.	+0.6	→	→	→	-5.0	→				
AC NOISE	.08	→	→	→	.08	→				
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PAGE

PROJECT Brenda

LINE 2 HALF ____ SP. B DATE March 29

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3 4	2-3	1 2
RECEIVE										
RANGE	x10 Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
VOLTAGE	210	100	125	400	225	300	640	270	230	300
CURRENT	2	1	1	2	2	2	2.0	1.2	2.0	2.0
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL 2-3
RECEIVE										
RANGE	x10 Low	Low	Hi	Hi	Low	Low	Hi	Hi		Low
VOLTAGE	640	230	340	375	640	220	380	40		100
CURRENT	2.0	1.0	3.0	2.5	2.0	1.0	3.5	2.8		1

FREQUENCIES AC DC

SENDER NO. 13671-S

OPERATOR Loren

RECEIVER NO.

OPERATOR Bob

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT BRENDA
LINE 3 HALF N SP. ____ DATE 4-4

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-10	10 —	20	20 —	—	30	30 —	—	4	
RANGE										
VOLTAGE	175	375	175	500	275	180	285	480	360	170
CURRENT	2	2	2	2	1.5	2	.450	2	2	2
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL	
RECEIVE	40 —	—	—	50	50 —	—	—	60		
RANGE	HI									
VOLTAGE	280	500	375	175		500	350	200	250	
CURRENT	.450	2	2	2	X	2	2	2	1	

FREQUENCIES 3 .05
SENDER NO. 13671-5
OPERATOR 1303
RECEIVER NO. 3641
OPERATOR HARRY

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Brenda Baby

LINE 3 HALF N SP. A DATE 4-21

PAGE 1

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	2-1
RECEIVE	0-1000	1000 —	2000	2000 —		3000	3000 —			4000
RANGE	100	30	10	100	10	10	10	30	10	3
DC 1	50.0	13.5 / 13.6	6.1 / 6.08	80.5 / 78.5	6.52 / 6.32	5.32 / 5.70	4.22 / 5.04	14.25 / 12.75	3.4 / 3.3	2.25 / 2.76
DC 2	47.2	13.3 / 13.8	5.95 / 5.55	80.9 / 79.4	6.4 / 6.22	4.6 / 4.35	4.3 / 5.02	14.5 / 12.75	2.85 / 3.95	2.08 / 3.02
DC 3	50.2	13.6 / 13.7	6.00 / 5.85	81.0 / 80.0	6.43 / 6.80	3.95 / 5.0	4.84 / 4.65	14.6 / 13.0	3.35 / 4.06	1.96 / 3.12
DC 4	46.5	13.8 / 13.3	5.80 / 6.08	80.7 / 79.2	6.7 / 6.62	4.14 / 4.82	4.3 / 4.68	14.6 / 12.8	3.25 / 4.0	2.32 / 2.33
DC 5	50.3		5.9 / 6.6	80.8 / 80.0		4.0 / 4.68	4.2 / 5.36		3.0 / 4.2	2.25 / 2.67
DC 6	47.2		6.2 / 5.95			4.8 / 5.7	4.5 / 4.9		3.2 / 4.4	2.1 / 2.6
DC 7	49.6					5.48 / 4.3			2.5 / 4.6	
DC 8	47.2					4.77				
DC AVG.	49.7	13.62	6.007	80.01	6.48	~~4.47~~	4.81	13.70	3.50	2.42
AC 1	47.3	13.45	5.85	78.5	6.3	4.57	4.6	13.25	3.42	2.27
AC 2	47.3	13.50	5.85	78.3	6.3	4.58	4.6	13.25	3.40	2.27
AC AVG.										
S.P.	+13.0	+29.7	+30.1	-48.5	-48.9	-48.9	+1.5	—	—	+2.8
AC NOISE	0.08	0.03								0.2
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Brenda
LINE 3 HALF N SP. ____ DATE ____

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		Cal.
RECEIVE	4000			5000	5000			6000		3-4
RANGE	3	10	3	3	?	10	3			
DC 1	2.06 2.64	7.05 8.38	2.9 2.46	2.17 1.85	?	612 632				
DC 2	1.27 2.00	7.78 8.8	2.65 2.04	2.2 1.80	TOO	600 698				100.0
DC 3	1.4 1.82	7.5 8.5	3.14 1.90	2.03 1.77	MUCH	594 636				100.0
DC 4	1.69 1.67	7.6 8.7		2.27 1.08	NOISE	612 631				100
DC 5	2.07 2.28	7.1 8.32	?	1.62 1.15		690 628				
DC 6	1.81 1.85		0	2.18 1.68						
DC 7										
DC 8										
DC AVG.	1.87	8.00	2.54	1.81		6.33				
AC 1	1.83	7.92	2.48	1.69		5.92	2.08	1.46		99.0
AC 2	1.83	7.80	2.48	1.69		5.92				98.5
AC AVG.	1.83	7.86	2.48	1.69		5.92				
S.P.	-2.9	-3.2	-2.4	-2.5	+4.2					
AC NOISE	0.1 mv					0.8				
POT RES.										

N ½

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project *Brenda* Line *#3* Field date *4/4* Data page_____ Comp. date *4/4*. Comp by *Bob*

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-1000	1000 —	2000	2000 —	—	3000	3000 —	—	—	4000		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2.0	2.0	2.0	2.0	1.5	2	0.45	2	2	2		
(E) Vdc (avg)	49.7	13.62	6.0	80.01	6.48	4.77	4.81	13.70	3.50	2.42		
(F) DCcal	1.00 →											
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρ dc=ExFxGx10^3/D	37 74	10.220	1836	60120	1938	3468	3.468	4182	2652	3774		
(I) Vac Σ	47.3	13.45	5.85	78.5	6.30	4.57	4.60	13.25	3.41	2.27		
(J) AC noise x 2	—											
(K) Vac(corr) =$\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	.988 →											
(M) ρ dc/ρac=ExL/K	—	1.000	—		1.016							
(N) PFE=(M-1)(10^2)	3.5	0.4	1.8	0.8	1.6	3.1	3.3	2.6	2.1	4.9		
(O) MCF=(M-1)(10^5)/H	95	39	100	133	84	91	92	63	81	132		
	47	20	50	67	42	45	46	31	40	66		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	4000 —	—	—	5000	5000 —	—	—	6000				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	0.45 A	2	2	2	0.45	2	2	2				
(E) Vdc (avg)	1.87	8.00	2.54	1.81		6.33						
(F) DCcal	1.000 →											
(G) Kn x 10^{-3}	6	15	30	52.5		30						
(H) ρ dc=ExFxGx10^3/D	25 50	60120	3876	4794		95						
(I) Vac Σ	1.83	7.86	2.46	1.69		5.92						
(J) AC noise x 2	—		?									
(K) Vac (corr) =$\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	.988 →											
(M) ρdc/ρac =ExL/K	1.010											
(N) PFE=(M-1)(10^2)	1.0	1.2	1.6	5.8		6.5						
(O) MCF=(M-1)(10^5)/H	40	20	24	124		146						
	20	10	12	62		73						

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES INT 89

PROJECT BRENDA

LINE 3 HALF S SP. ____ DATE 4-8

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-10	10 —	— 20	20 —	—	— 30	30 —	—	—	— 48
RANGE	30	100	10	100	30	10	100	30	30	3
DC 1	141 140	747 750	632 632	631 640	221 234	380 409	368 340	125 125	100 98	265 272
DC 2	144 138	740 750	621 628	630 647	217 238	403 411	373 331	125 133	105 97	246 291
DC 3	141 139	742 750	648 630	627 640	217 235	418 416	367 336	117 135	101 94	255 272
DC 4			618 610			350 428	378 330	120 136	103 95	255 275
DC 5						365 414				
DC 6						393 408				
DC 7										
DC 8										
DC AVG.	14.1	74.65	6.273	63.58	22.73	3.94	35.25	12.7	9.95	2.69
AC 1	13.6	72.3	6.00	61.7	21.9	3.70	34.2	12.3	9.5	2.48
AC 2	13.6	72.3	6.00	61.7	21.9	3.70	34.3	12.3	9.5	
AC AVG.	13.6	72.3	6.00	61.7	21.9	3.70	34.25	12.3	9.5	2.48
S.P.	+12.3	-14.3	—	-9.3	→	→	-14.8			
AC NOISE	.02	.16	—	.04	→	→	.62			
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT B RENDA
LINE 3 HALF 3 SP. ____ DATE 4-8

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		Col
RECEIVE	10	10	10	3	10	10	10	3		3-4
RANGE	810 828	444 486	521 530		457	321 304	392 400	106 129		
DC 1	790 824	472 432	509 549		455	289 299	386 359	102 134		99
DC 2	810 828	509 452	536 580		460	327 322	400 400	110 133		99
DC 3	808 824	424 477	522 526	TOO	410	316 318	370 422	98 135		99
DC 4	778 812	493 447	547 479	MUCH	465	328 321	371 426	120 107		99
DC 5			491 482	NOISE	418	309 280	377 355	124 165		
DC 6					453	303 313	422 391			
DC 7					431		424 347			
DC 8					~~449~~					
DC AVG.	8.13	4.74	5.28		4.48	3.10	3.91	1.17		
AC 1	7.88	4.50	4.91		4.33	2.92	3.65	1.10		97
AC 2	7.90	4.52	4.98		4.35	2.94	3.65	1.10		97
AC AVG.	7.89	4.51	4.945		4.34	2.93	3.65	1.10		
S.P.	-16.3	→	→	→	-5.4	→	→	→		
AC NOISE	.12	→	→	→	.09	→	→	→		
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Bude

LINE 3 HALF 5 SP. ____ DATE 4-7-61

PAGE

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	→	→	→	→	→	→	→	→	→	→
RANGE	220									
VOLTAGE	900	650	900	500	650	900	250	500	650	900
CURRENT	2	3	2	3	3	2	3	3	3	2
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL 3-4
RECEIVE	→	→	→	→	→	→	→	→		
RANGE										
VOLTAGE	225	500	650	900	225	500	650	900		275
CURRENT	3	3	3	2	3	3	3	2		1

FREQUENCIES A L D L

SENDER NO. 11664-S

OPERATOR Louis

RECEIVER NO.

OPERATOR Bob

COMMENTS:

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project BRENDA BABY Line 3-5 Field date 4-8 Data page_____ Comp. date 4-10 . Comp by BOB

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CAL	
(B) Receive	0—10	10—20		20—		—30	30—			—40	3-4	
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2	3	2	3	3	2	3	3	3	2		
(E) Vdc (avg)	14.1	74.65	6.273	63.58	22.73	3.99	35.25	12.7	9.95	2.69	99.0	
(F) DCcal	1.01	—								→		
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	21	75	38	64	92	60	36	51	100	82		
(I) Vac Σ	13.6	72.3	6.00	61.7	21.9	3.70	34.25	12.3	9.5	2.48	97	
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.977	—								→ .979		
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.5	1.1	2.4	0.9	1.6	5.6	0.8	1.1	2.5	6.2		
(O) MCF=(M-1)(10^5)/H	71	15	63	14	17	93	22	22	25	76		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	40—			—50	50—			—60				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	3	3	3	2	3	3	3	2				
(E) Vdc (avg)	8.13	4.74	5.28	—	4.48	3.10	3.91	1.17				
(F) DCcal	1.01	—						→				
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	33	48	107		45	63	138	99				
(I) Vac Σ	7.89	4.51	4.945	—	4.34	2.93	3.65	1.10				
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.977	—						→ .979				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	0.9	2.9	4.5		1.1	3.6	4.9	4.1				
(O) MCF=(M-1)(10^5)/H	27	60	42		24	57	36	41				

$N\frac{1}{2}$	
0	0
13	13
30	43
-49	-6
2	-4
-3	-7
4	-3

-52
49

$L3$	$S\frac{1}{2}$
0	0
12	12
-14	-2
-9	-11
-15	-26
-16	-42
-5	-47

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES INT 88

PROJECT BRENDA BABY
LINE 4 HALF N SP. ___ DATE 4-11

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	-0-10-	10	20		-20- 30-			30	40	
RANGE	300	300	30	300	100	30	300	100	100	10
DC 1	113 114	216 216	230 230	243 245	707 718	105 104	123 123	920 932	408 402	750 741
DC 2	113 113	216 216	230 230	243 245	706 719	105 103	123 123	920 931	408 402	757 724
DC 3										772 721
DC 4										748 743
DC 5										750 748
DC 6										
DC 7										
DC 8										
DC AVG.	113.2	216	23.0	244	71.25	10.42	123	92.55	40.5	7.45
AC 1	111	212	22.6	236	69.1	10.2	119	89.6	39.3	7.23
AC 2	111	212	22.6	236	69.1	10.2	119	89.6	39.3	7.23
AC AVG.	111	212	22.6	236	69.1	10.2	119	89.6	39.3	7.23
S.P.	-5.8	+11.8	→	+1.9	→		+2.2			
AC NOISE	.26	.08	→	.12	→		.06			
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT BRENDA BABY
LINE 4 HALF N SP. ____ DATE 4-11

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE		40	50			50	60			2-3
RANGE	100	100	30	10	30	30	30	10		
DC 1	408 410	440 447	252 251	504 502	194 192	256 268	160 160	344 348		160
DC 2	408 412	440 447	252 252	512 499	195 191	255 264	162 160	358 339		11
DC 3	409 414		253 250	509 501			161 160	344 350		11
DC 4				510 503			160 160	342 352		11
DC 5				510 500						
DC 6										
DC 7										
DC 8										
DC AVG.	41.0	44.35	25.2	5.05	19.3	25.95	160	3.47		
AC 1	40.2	43.3	24.5	4.93	18.9	25.2	15.5	3.37		99
AC 2	40.2	43.3	24.4	4.93	18.9	25.2	15.6	3.37		99
AC AVG.	40.2	43.3	24.45	4.93	18.9	25.2	15.55	3.37		
S.P.	+1.2	→	→	→	-1.8					
AC NOISE	.05	→	→	→	.05					
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT BRENDA

LINE A HALF N SP. ____ DATE 4-[illegible]-62

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	→	→	→	→	→	→	→	→	→	→
RANGE										
VOLTAGE	540v	500v	540v	620v	500v	540v	600v	620v	500v	540v
CURRENT	3.0A	3.0A	3.0A	3.0A	3.0A	3.0A	2.0A	3.0A	3.0A	3.0A
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL 2-3
RECEIVE	→	→	→	→	→	→	→	→		
RANGE										
VOLTAGE	600v	620v	500v	540v	600v	620v	500v	540v		180v
CURRENT	2.0A	3.0A	3.0A	3.0A	2.0A	3.0A	3.0A	3.0A		1.0A

FREQUENCIES A C D C

SENDER NO. 11664 S

OPERATOR TERRELL

RECEIVER NO. 3641

OPERATOR BOB

COMMENTS:

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project BRENDA Line 4-N Field date 4-11-67 Data page_____ Comp. date 4-11 . Comp by BOB

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL.	
(B) Receive	0 — 50	—	— 100	—	—	— 150	—	—	—	— 200	2-3	
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	3	3	3	3	3	3	2	3	3	3		
(E) Vdc (avg)	113.2	216	23.0	244	71.25	10.42	123	92.55	40.5	7.45	100	
(F) DCcal	1.00	—	—	—	—	—	—	—	—	→		
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρdc=ExFxGx10^3/D	57	108	46	122	143	52	92	185	203	75		
(I) Vac Σ	111	212	22.6	236	69.1	10.2	119	89.6	39.3	7.23	99	
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.990	—	—	—	—	—	—	—	—	→		
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.0	0.9	0.8	2.4	2.1	1.1	2.3	2.3	2.0	2.0		
(O) MCF=(M-1)(10^5)/H	18	8.3	17	20	15	21	25	12	9.9	2.7		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	200 —	—	—	— 250	—	—	—	— 300				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	2	3	3	3	2	3	3	3				
(E) Vdc (avg)	41.0	44.35	25.2	5.05	19.3	25.95	16.0	3.47				
(F) DCcal	1.00	—	—	—	—	—	—	→				
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρ dc=ExFxGx10^3/D	123	222	252	88	145	260	280	97				
(I) Vac Σ	40.2	43.3	24.45	4.93	18.9	25.2	15.55	3.37				
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.990	—	—	—	—	—	—	→				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	1.0	1.4	2.0	1.4	1.1	1.9	1.9	1.9				
(O) MCF=(M-1)(10^5)/H	8.1	6.3	8.0	16	7.6	7.3	6.8	20				

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES INT 88

PROJECT BRENDA

LINE 4 HALF 3 SP. ____ DATE 4-10

PAGE 1

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-10	10 —	— 20	20 —	—	— 30	30 —	—	—	— 40
RANGE	300	300	30	300	100	10	100	100	30	10
DC 1	149 147	117 116	162 161	104 103	390 390	721 685	866 870	518 500	244 219	472 520
DC 2	149 147	117 116	162 161	104 103	388 392	736 686	864 871	518 500	231 233	490 522
DC 3						725 691	864 871		231 234	480 528
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.	147.5	116.5	161.5	103.5	390	7.09	86.7	50.9	23.2	5.05
AC 1	144.5	114	15.7	99	37.8	6.84	83.2	48.8	22.3	4.86
AC 2	144.5	114	15.7	99	37.8	6.84	83.2	49.0	22.8	4.86
AC AVG.	144.5	114	15.7	99.0	37.8	6.84	83.2	48.9	22.3	4.86
S.P.	+2.8	-4.3	→	+4.7	→	→	-32.3			
AC NOISE	.04	.04	→	.08	→	→	.04			
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 13 RENDA
LINE 4 HALF S SP. ____ DATE 4-10

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
RECEIVE	40			50	60			60		3-4
RANGE	30	10	10	3 ?						300
DC 1	105 109	752 734	400 404	81 102						98
DC 2	105 110	759 728	389 413	92 89						98
DC 3		762 722	389 411	85 94						98
DC 4		763 725		80 100						98
DC 5				93 88						
DC 6				84 95						
DC 7										
DC 8										
DC AVG.	10.7	7.43	4.01	.90						
AC 1	10.4	7.20	3.85	.86						97
AC 2	10.4	7.20	3.85	.86						97
AC AVG.	10.4	7.20	3.85	.86						
S.P.	+19.3									
AC NOISE	.06									
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Brenda

LINE 4 HALF S SP. ____ DATE 4 12 67

PAGE 1

SEND	4 - 5	3 - 4	4 - 5	2 - 3	3 - 4	4 - 5	1 - 2	2 - 3	3 - 4	4 - 5
RECEIVE	→	→	→	→	→	→	→	→	→	→
RANGE										
VOLTAGE	700	700	700	525	700	650	600	520	650	600
CURRENT	2	3	2	3	3	2	3	3	3	2
SEND	1 - 2	2 - 3	3 - 4	4 - 5	1 - 2	2 - 3	3 - 4	4 - 5		CAL 3-4
RECEIVE	→	→	→	→	→	→	→	→		
RANGE										
VOLTAGE	600	525	650	600						225
CURRENT	3	3	3	2						1

FREQUENCIES A c b c

SENDER NO. 11664 S

OPERATOR Loren

RECEIVER NO. 3641

OPERATOR Bob

COMMENTS:

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project BRENDA Line 4-S Field date 4-10 Data page _____ Comp. date 4-12 . Comp by BOB

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CAL.	
(B) Receive	0 — 50	—	— 100	—	—	— 150	—	—	—	— 200	3-4	
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2	3	2	3	3	2	3	3	3	2		
(E) Vdc (avg)	147.5	116.5	16.15	103.5	39.0	7.09	86.7	50.9	23.2	5.05	98	
(F) DCcal	1.02	→										
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρ dc=ExFxGx10^3/D	113	59	49	53	80	54	44	104	118	77		
(I) Vac Σ	144.5	114	15.7	99.0	37.8	6.84	83.2	48.9	22.3	4.86	97	
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.989	→										
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.0	1.4	1.7	3.4	2.0	2.5	3.1	2.9	2.9	2.8		
(O) MCF=(M-1)(10^5)/H	8.8	19	35	64	25	46	70	28	25	36		

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

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	200 —	—	—	— 250	—	—	—	— 300				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	3	3	3	2								
(E) Vdc (avg)	10.7	7.43	4.01	.90								
(F) DCcal	1.02	→	→	→								
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρ dc=ExFxGx10^3/D	22	39	41	24								
(I) Vac Σ	10.4	7.20	3.85	.86								
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.989	→	→	→								
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	1.8	2.1	3.0	3.5								
(O) MCF=(M-1)(10^5)/H	82	54	73	146								

PAGE

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT BRENDA BABY

LINE 6 HALF SE SP. ____ DATE 4-12

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-5	5-10	→	10-15	→	→	15-20	→	→	→
RANGE	100	300	100	300	100	30	300	100	30	30
DC 1	898 894	146 144	378 366	143 143	444 446	185 180	237 235	380 360	192 196	93 97
DC 2	888 886	146 143	378 366	143 143	444 446	185 180	237 235	380 360	192 193	90 95
DC 3									194 190	90 98
DC 4									195 193	91 100
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.	89.15	144.75	37.2	143	44.5	18.25	236	37.0	19.31	9.392
AC 1	86.6	138	35.8	137	43.0	17.55	225	35.5	18.5	9.0
AC 2	86.5	139	35.8	137	43.0	17.55	225	35.5	18.5	9.0
AC AVG.	86.55	139	35.8	137	43.0	17.55	225	35.5	18.5	9.0
S.P.	+4.6	+25.4	→	+3.4	→	→	-10.6			
AC NOISE	.10	.12	→	.08	→	→	.05			
POT RES.										

PAGE

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES INT 87

PROJECT BRENDA BABY

LINE 5 HALF SE SP. ____ DATE 4-12

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
RECEIVE	20-25	→	→	→	25-30	→	→	→		2-3
RANGE	100	10	10	3	30	10	10	3		
DC 1	324 310	763 745	238 270	147 143	173 170	558 589	300 324	204 195		97
DC 2	333 306	766 737	224 299	162 123	179 168	352 580	279 342	186 194		97
DC 3	338 300	798 699	268 236	150 146	180 167	554 586	310 296	208 182		97
DC 4		752 771	254 258	148 131	180 167	570 557	331 276	207 183		97
DC 5		723 800	298 280	172 100		590 542	298 322	216 174		
DC 6							308 294	210 185		
DC 7		LOT 8	OF NOISE &					195 197		
DC 8		DRIFT								
DC AVG.	31.85	7.55	2.52	1.42	17.3	5.67	3.066	1.95		
AC 1	31.8	7.55	2.50	1.45	17.0	5.57	3.00	1.92		95
AC 2	31.8	7.55	2.50	1.45	17.0	5.57	3.00	1.92		95
AC AVG.										
S.P.	+22.9	→	→	→	-22.7	→	→	→		
AC NOISE	.05	→	? →	→	.04	→	?	→		
POT RES.										

PAGE

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Brenda

LINE 5 HALF ____ SP. ____ DATE ____

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	→	→	→	→	→	→	→	→	→	→
RANGE										
VOLTAGE	800	950	800	700	950	800	625	700	950	800
CURRENT	2	2	2	2	2	2	2	2	2	2
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL 2-8
RECEIVE	→	→	→	→	→	→	→	→		
RANGE										
VOLTAGE	625	700	950	800	600	650	950	800		500
CURRENT	2	2	2	2	2	2	2	2		1

FREQUENCIES A C D C

SENDER NO. 11664 S

OPERATOR [illegible]

RECEIVER NO. 3641

OPERATOR Bob

COMMENTS:

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project BRENDA Line 5-SE Field date 4-12 Data page_____ Comp. date 4-13 . Comp by BOB

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL	
(B) Receive	0 — 50	—	— 100	—	—	— 150	—	—	—	— 200	2-3	
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2	—	—	—	—	—	—	—	—	→		
(E) Vdc (avg)	89.15	144.75	37.2	143	44.5	18.25	236	37.0	19.31	9.392	97	
(F) DCcal	1.03	—	—	—	—	—	—	—	—	→		
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρ dc=ExFxGx10^3/D	69	112	117	111	138	141	182	144	149	145		
(I) Vac Σ	86.55	134	35.8	137	43.0	17.55	225	35.5	18.5	9.0	95	
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.979	—	—	—	—	—	—	—	—	→		
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	0.8	1.9	1.7	2.2	1.3	1.8	2.7	2.0	2.2	2.2		
(O) MCF=(M-1)(10^5)/H	12	17	15	20	9.4	13	15	14	15	15		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	200 —	—	—	— 250	—	—	—	— 300				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	2	—	—	—	—	—	—	→				
(E) Vdc (avg)	31.85	7.55	2.52	1.42	17.3	5.67	3.066	1.954				
(F) DCcal	1.03	—	—	—	—	—	—	→				
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρ dc=ExFxGx10^3/D	99	58	39	38	134	88	83	85				
(I) Vac Σ	31.8	7.55	2.50	1.45	17.0	5.57	3.00	1.92				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.979	—	—	—	—	—	—	→				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	-1.9	-2.1	-1.3	-4.1	-0.4	-0.3	0.05	-0.4				
(O) MCF=(M-1)(10^5)/H	-19	-36	-33	-108	-3.0	-3.4	0.6	-4.4				

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Brenda Baby
LINE 5 HALF NW SP. ____ DATE 4-11

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	10-10	10	20			30				40
RANGE	300	100	100	100	30	30	100	30	30	30
DC 1	145 145	880 874	368 383	500 500	250 252	153 157	639 637	272 281	180 184	~~134~~ ~~128~~
DC 2	145 145	882 870	366 387	504 498	250 251	152 158	638 637	272 281	180 185	130 133
DC 3		~~874~~ ~~868~~	364 ~~388~~	502 500			638 638			130 133
DC 4			372 378							
DC 5			372 ~~378~~							
DC 6										
DC 7										
DC 8										
DC AVG.	145	87.56	37.5	50.6	25.1	15.5	63.78	27.65	18.2	13.15
AC 1	140	84.7	~~34.3~~	48.5	24.3	14.9	61.3	26.6	17.6	12.6
AC 2	140	84.8	36.2	48.5	24.2	14.9	61.3	26.3	17.6	12.6
AC AVG.			36.2							
S.P.	-2.8	-19.4	→	-8.8	→	→	78.0			
AC NOISE	.12	.08	→	.06	→	→	.03			
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT BRENDA BABY
LINE 5 HALF NW SP. ____ DATE 4-11

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
RECEIVE	40			50				60		3-4
RANGE	30	30	10	10	30	10	10	10		300
DC 1	190 194	107 108	852 860	697 669	134 142	903 890	776 774	657 660		99
DC 2	188 195	107 107	852 860	699 668	132 143	900 898	770 774	654 662		98
DC 3	188 195	108 107		702 559	136 137	896 900	768 779	650 660		99
DC 4				670 672	136 138	896 900	763 780	651 668		95
DC 5				670 677			763 780	658 651		
DC 6				692 670						
DC 7										
DC 8										
DC AVG.	19.16	10.75	8.56	6.76	13.74	8.97	7.72	6.57		
AC 1	18.4	10.5	8.25	6.57	13.3	8.67	7.44	6.32		96
AC 2	18.4	10.5	8.25	6.57	13.3	8.67	7.44	6.34		96
AC AVG.										
S.P.	-6.9	→	→	→	+32.2	→	→	→		
AC NOISE	.08	→	→	→	.10	→	→	→		
POT RES.										

PAGE

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Brenda
LINE 5 HALF ____ SP. ____ DATE ____

SEND	4 - 5	3 - 4	4 - 5	2 - 3	3 - 4	4 - 5	1 - 2	2 - 3	3 - 4	4 - 5
RECEIVE	→	→	→	→	→	→	→	→	→	→
RANGE										
VOLTAGE	640 V	700 V	640 V	740 V	700 V	640 V	620 V	720 V	700 V	620 V
CURRENT	2.0 A	2.0 A	2.0 A	1.5 A	2.0 A	2.0 A	1.5 A	1.5 A	2.0 A	2.0 A
SEND	1 - 2	2 - 3	3 - 4	4 - 5	1 - 2	2 - 3	3 - 4	4 - 5		CAL 3-4
RECEIVE	→	→	→	→	→	→	→	→		
RANGE										
VOLTAGE	620 V	720 V	680 V	620 V	600 V	700 V	680 V	620 V		340 V
CURRENT	1.5 A	1.5 A	2.0 A	2.0 A	1.5 A	1.5 A	2.0 A	2.0 A		1.0 A

FREQUENCIES A C D C
SENDER NO. 11664 S
OPERATOR
RECEIVER NO. 3641
OPERATOR Bob

COMMENTS:

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

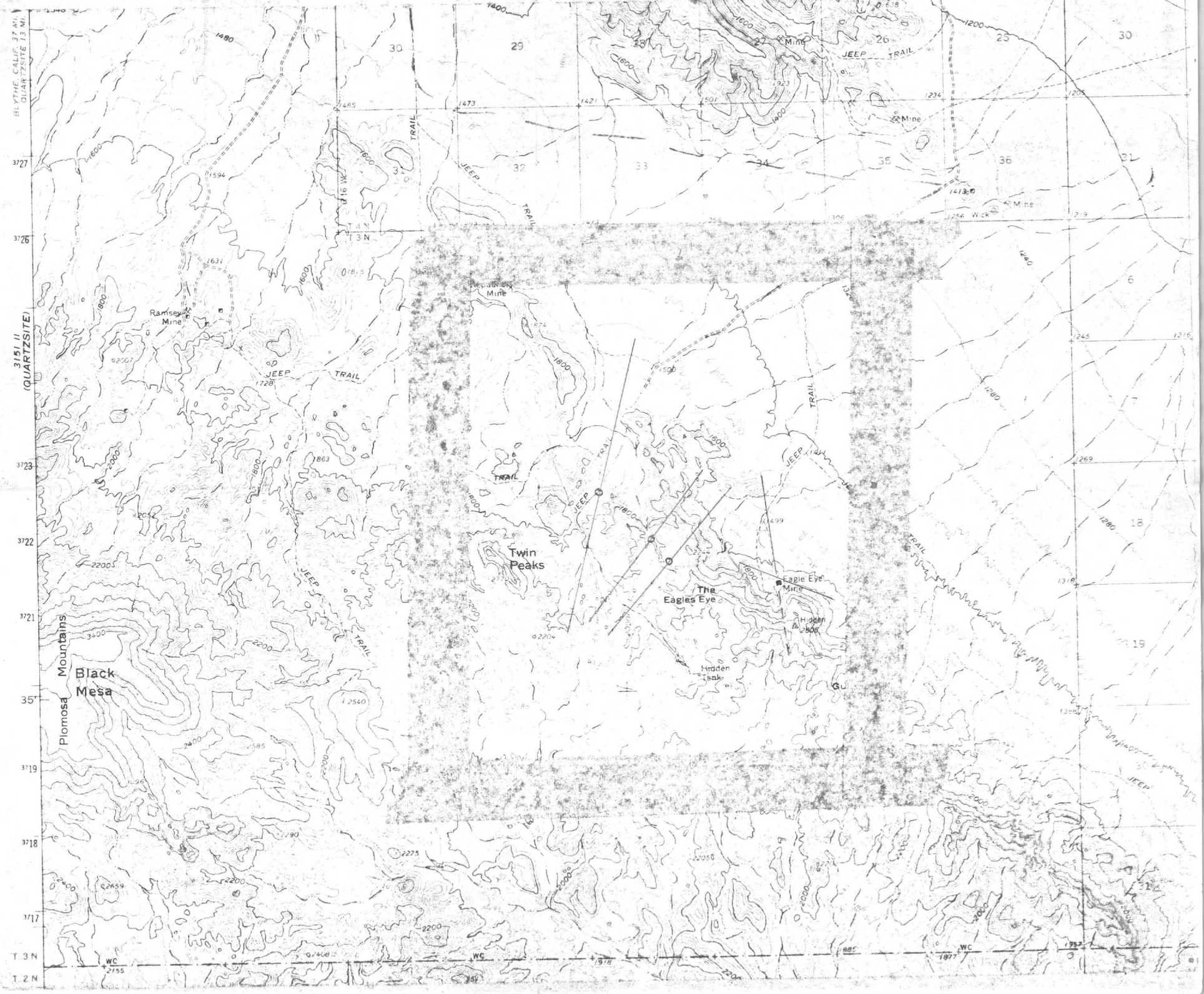
Page_____

Project BRENDA Line 5- NW Field date 4-11 Data page_____ Comp. date 4-11 . Comp by BOB

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CAL	
(B) Receive	0 — 50	—	— 100	—	—	— 150	—	—	—	— 200	3-4	
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2	2	2	1.5	2	2	1.5	1.5	2	2		
(E) Vdc (avg)	145	87.56	37.5	50.6	25.1	15.5	63.78	27.65	18.2	13.15	98.5	
(F) DCcal	1.015	—	—	—	—	—	—	—	—	→		
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρ dc=ExFxGx10^3/D	110	67	114	51	76	118	65	112	139	200		
(I) Vac Σ	140	84.75	36.2	48.5	24.25	14.9	61.3	26.45	17.6	12.6		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.9746	—	—	—	—	—	—	—	—	→	96	
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	0.9	0.7	0.9	1.7	0.9	1.4	1.4	1.9	0.9	1.7		
(O) MCF=(M-1)(10^5)/H	8.2	10	7.9	33	12	18	22	17	6.5	8.5		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	200 —	—	—	— 250	—	—	—	— 300				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	1.5	1.5	2	2	1.5	1.5	2	2				
(E) Vdc (avg)	19.16	10.75	8.56	6.76	13.74	8.97	7.72	6.57				
(F) DCcal	1.015	—	—	—	—	—	—	→				
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρ dc=ExFxGx10^3/D	78	109	130	180	139	182	206	310				
(I) Vac Σ	18.4	10.5	8.25	6.57	13.3	8.67	7.44	6.33				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.9746	—	—	—	—	—	—	→				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	1.5	-0.2	1.1	0.3	0.7	0.8	1.1	1.2				
(O) MCF=(M-1)(10^5)/H	19	-1.8	8.5	1.7	5.0	4.4	5.3	3.9				


BLYTHE, CALIF. 37 MI.
QUARTZSITE 13 MI.
3151 II
(QUARTZSITE)
Ramsey Mine
Mine
JEEP TRAIL
Twin Peaks
The Eagles Eye
Eagle Eye Mine
Hidden Tank
Hidden
Black Mesa
Plomosa Mountains
T. 3 N
T. 2 N
WC