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PHASE II

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project El Paso Emerald Isle Line 1 Spr A 5½ Field date 4-6-66 Data page 2 Comp. date 4-6-66 Comp by

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	6-7000	5-6000	→	4-5000	→	→	3-4000	→	→	→		
(C) ~~n separation~~ RANGE	300	300	100	300	100	30	300	100	30	10		
(D) I	6.0	→	→	→	→	→	→	→	15.5	→		
(E) Vdc (avg)	236.5	206.5	56.7	104.5	36.5	14.23	129.5	32.7	248.75	7.08		
(F) DCcal	.918	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	109	95	104	48	65	66	59	60	71	65		
(I) Vac Σ	205.0	180.5	50.5	92.0	32.2	12.7	120.0	28.4	42.8	6.32		
(J) AC noise x 2	.03	.04		.05			.03					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	13.2	12.1	10.2	11.4	11.2	10.0	5.8	12.8	11.8	9.9		
(O) MCF=(M-1)(10^5)/H	121	128	98	238	173	152	98	214	166	152		
	-4.3	+11.3		-0.4			+23.7					

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		2-3		
(B) Receive	2-3000	→	→	→	1-2000	→	→	→		2.000		
(C) ~~n separation~~ RANGE	100	30	30	10	30	10	10	3				
(D) I	6.0	→	→	→	→	→	→	→		218		
(E) Vdc (avg)	50.9	17.85	9.76	5.00	16.32	6.52	~~4.44~~ 3.97	2.13				
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	94	82	90	80	75	60	71	55				
(I) Vac Σ	46.2	15.6	8.6	4.48	14.9	5.78	3.55	1.90		214		
(J) AC noise x 2	.03				.02							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.981											
(M) ρdc/ρac =ExL/K		12.2										
(N) PFE=(M-1)(10^2)	7.9	~~18.2~~	11.2	9.4	7.3	10.6	~~22.4~~ 9.8	9.8				
(O) MCF=(M-1)(10^5)/H	84	~~222~~	124	117	97	177	~~315~~ 138	178				
	-5.2				-1.1							

N 1/2

EL PASO

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project Emerald Isle Line 1 Spr A Field date 4-6-66 Data page 1 Comp. date 4-6-66. 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	7-8000	8-9000	→	9-10,000	→	→	10-11000	→	→	→		
(C) n separation	300	300	100	300	100	30	300	100	30	30		
(D) I	6.0	→	→	→	→	→	→	→	→	→		
(E) Vdc (avg)	.914	→	→	→	→	→	→	→	→	→		
(F) DCcal	201.0	224.0	54.82	246.5	49.2	19.83	175.0	44.3	14.7	8.05		
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	92	102	100	113	90	91	80	81	67	74		
(I) Vac Σ	178.0	195.0	49.8	219.0	43.8	17.9	164.0	40.2	13.4	7.2		
(J) AC noise x 2	.05	.05	→	.05	→	→	.05	→	→	→		
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	10.8	12.7	8.0	10.4	10.2	8.6	4.8	8.0	7.4	9.6		
(O) MCF=(M-1)(10^5)/H	117	125	80	92	113	95	60	99	110	130		
	+4.3	-14.6		+8.5			+0.9					

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		3-4		
(B) Receive	11-12000	→	→	→	12-13000	→	→	→		CAL		
(C) n separation	100	30	30	10	100	30	10	10		2.000		
(D) I	6.0	→	→	→	→	→	→	→				
(E) Vdc (avg)	60.1	24.02	9.50	5.98	34.2	15.75	7.20	4.97		219.0		
(F) DCcal	.914	→	→	→	→	→	→	→				
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	110	110	87	96	156	144	115	127				
(I) Vac Σ	57.2	21.9	8.5	5.35	32.2	14.2	6.35	4.22		215.0		
(J) AC noise x 2	.03				.04							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.981											
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	3.1	7.6	9.6	9.8	4.1	8.7	11.2	15.4				
(O) MCF=(M-1)(10^5)/H	28	69	110	102	26	60	97	121				

Re RUN

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project El Paso Emerald Isle Line 2A-N½ Field date 4-13-66 Data page _____ Comp. date 4-14-66 Comp by DA

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	7-8000	8-9 →	→	9-10 →	→	→	10-11 →	→	→	→		
(C) n separation	300	300	100	300	100	30	300	100	30	30		
(D) I	6.0 →	→	→	→	→	→	→	→	5.0 →	→		
(E) Vdc (avg)	168.5	137.5	33.7	166.0	43.0	17.3	190.0	62.75	19.25	8.9		
(F) DCcal	.914 →	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	77	63	62	76	79	79	87	115	106	98		
(I) Vac Σ	155.0	126.0	30.2	152.0	38.5	15.0	177.5	58.2	17.3	7.9		
(J) AC noise x 2	.10	.13		.07			.03					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.991 →	→	→	→	→	→	→	→	→	→		
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	7.7	8.1	10.4	8.1	10.6	14.1	6.0	6.8	10.1	11.4		
(O) MCF=(M-1)(10^5)/H	100	128	168	106	134	178	69	59	95	116		
	+0.8	-9.5		+4.6			+4.8					

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		3-4		
(B) Receive	11-12000 →	→	→	→	12-13000 →	→	→	→		CAL		
(C) n separation	100	100	30	10	30	30	10	10		300		
(D) I	5.0 →	→	→	→	→	→	→	→		2.0		
(E) Vdc (avg)	62.1	28.5	11.81	6.48	26.15	14.24	6.82	4.02		219.0		
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	12A 105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	136	156	130	~~156~~	143	156	131	123				
(I) Vac Σ	58.8	26.5	11.00	5.58	24.7	13.1	6.02	3.32		217.0		
(J) AC noise x 2	.03				.03							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	4.7	6.5	6.5	14.9	4.9	7.7	12.2	19.8				
(O) MCF=(M-1)(10^5)/H	35	42	50	120	34	54	93	161				
	+12.9				+2.0							

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: El Paso Emerald Isle Line: 2-A N½ Int.Cal _____ Date: 4-13-66

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		3-4		
Rec.	11-12,000	→	→	→	12-13	→	→	→		CAT		
Time	100	100	30	103	30	v30	103	x10		300		
DC-1	62.2 62.0	28.5 28.5	12.1 12.6	6.48 6.35	26.4 25.8	14.3 14.0	6.75 6.95	3.82 4.02		219		
DC-2	62.2 62.0	28.5 28.5	11.9 12.5	6.40 6.38	26.7 25.6	14.3 14.3	6.42 7.00	3.80 4.02		219		
Σ												
DC-3			12.8 12.9	6.45 6.60	26.1 26.3	13.6 14.9	6.68 7.02	3.82 3.98		219		
Dc-4			11.4 12.9	6.45 6.70			6.55 7.15	4.02 4.70		219		
Σ												
DC-AV										217		
AC-1	58.8	26.5	11.05	5.58	24.7	13.1	6.02	3.32		"		
AC-2			16.95									
Σ			11.00									
S. P.	+12.9				+2.0							
AC-N	.03				.03							
Pot.Res.												

387
3
1161

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: El Paso Emerald Isle Line: 2-A N½ (Rerun) Int.Cal _____ Date: 4-13-66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	7-8000	8-9 →		9-10 →			10-11 →					
Time	300	300	100	300	100	30	300	100	30	30		
DC-1	169.0 168.0	137.0 138.0	35.5 32.0	166.0 166.0	42.2 43.8	17.1 17.5	190.0 190.0	63.5 62.0	19.0 19.5	9.4 9.0		
DC-2	169.0 168.0	137.0 138.0	34.2 33.0	166.0 166.0	42.2 43.8	16.9 17.7	190.0 190.0	63.5 62.0	19.0 19.5	9.1 8.5		
Σ			33.6									45
DC-3			33.8							9.4 8.3		24
Dc-4										9.4 8.2		
Σ												
DC-AV												
AC-1	155.0	126.0	30.2	152.0	38.5	15.0	177.5	58.2	17.3	7.9		
AC-2	"							"	17.3			
Σ												
S. P.	+0.8	-9.5		+4.6			+4.8					
AC-N	.010	.13		.07			.03					
Pot.Res.												

RE RUN

INDUCED POLARIZATION SENDER NOTES

Project: Emerald Isle Line: 2A - N 1/2 Date: 4-13-6

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive	7-8000	8	9000	9		10000	10000			11000		
Time	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
Range	220V	200V	220V	200V	200V	230V	480V	200V	160V	200V		
Current	6A	6A	6A	6A	6A	6A	6A	6A	5A	5A	CAL	
Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2			3-4	
Receive	11000			12000	12000			13000				
Time	↓	↓	↓	↓	↓	↓	↓	↓				
Range	380V	180V	160V	200V	380V	180V	160V	200V			100V	
Current	5A	5A	5A	5A	5A	5A	5A	5A			2A	

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project El Paso Emerald Isle Line 2-A N½ 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	7-8000	8-9000	→	9-10	→	→	10-11	→	→	→		
(C) n separation	300	300	100	300	100	300	300	100	30	30		
(D) I	6.0	→	→	→	→	→	→	→	→	→		
(E) Vdc (avg)	154.0	125.5	30.0	166.0	42.83	17.15	190.0	62.85	23.05	10.62		
(F) DCcal	.918	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	71	58	55	76	78	79	87	115	106	98		
(I) Vac Σ	149.0	120.0	29.0	151.0	38.2	14.9	176.0	57.8	20.6	9.4		
(J) AC noise x 2	.25	.18		.07			.05					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.985											
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.7	2.9	1.9	8.2	10.3	13.2	6.2	6.9	~~[illegible]~~ 10.1	11.2		
(O) MCF=(M-1)(10^5)/H												
	-13.7	-12.0	←	-2.7			+5.0		↑			

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		3-4		
(B) Receive	11-12	→	→	→	12-13	→	→	→		CAL		
(C) n separation	100	100	30	10	100					300		
(D) I	6.0	→	→	→	→	→	→	→		2.0		
(E) Vdc (avg)	68.5	31.45	13.38	7.07	29.0					218.0		
(F) DCcal	.918	→	→	→	→							
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	126	144	123	113	133							
(I) Vac Σ	67.8	30.2	12.5	6.32	28.5					214.5		
(J) AC noise x 2	.20				.28							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K	995											
(N) PFE=(M-1)(10^2)	-0.5	2.6	5.3	10.2	0.2							
(O) MCF=(M-1)(10^5)/H												
	-2.2				-16.0							

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: EL PASO Emerald Isle Line: 2-A-N½ Int.Cal _____ Date: _____

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	7-8000	8-9	→	9-10	→	→	10-11	→	→	→		
Time	300	300	100	300	100	30	300	100	30	30		
DC-1	153.0 155.0	127.0 124.0	31.2 29.5	167.0 163.0	40.5 45.0	16.3 18.0	190.0 190.0	63.8 62.0	22.5 23.6	10.1 11.3		
DC-2	153.0 155.0	127.0 124.0	30.2 30.0	168.0 164.0	42.2 43.5	16.8 17.6	190.0 190	63.8 61.8	22.5 23.6	10.7 10.6		
Σ												
DC-3					42.0 43.8							
Dc-4												
Σ												
DC-AV												
AC-1	149.0	120.0	29.0	151.0	38.2	14.9	176.0	57.8	20.6	9.4		
AC-2	"	"	"	"	"	"	"	"	"			
Σ												
S. P.	-13.7	-12.0		-2.7			+5.0					
AC-N	.25	.18		.07			.05					
Pot.Res.												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Emerald Isle Line: 2-AN 1/2 Int.Cal _____ Date: _____

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		3-4		
Rec.	11-12	→	→	→	12-13	→	→	→		CAL		
Time	100	100	30	10	100	30				300		
DC-1	68.8 68.5	31.2 31.8	12.9 13.9	7.10 7.05	30.0 28.0					218.0		
DC-2	68.2 68.8	30.8 31.8	13.1 13.7	6.90 7.20	29.8 28.2					218.0		
Σ												
DC-3	68.2 68.5	31.2 32.0								218.0		
Dc-4										218.0		
Σ												
DC-AV												
AC-1	67.8	30.2	12.5	6.30	28.5							
AC-2	"	"	"	"	"					214.5		
Σ										214.5		
S. P.	-2.2				-16.0							
AC-N	.20				.19							
Pot.Res.												

Line 2-A N½ (Re-run)

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project El Paso Emerald Isle Line 2-A N½ 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												
(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) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

Project_____ Line 2-A N½ Field date 4-11-66 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					12.13000	N →	→	→				
(C) n separation					30	30	10	10				
(D) I					5.0 →	→	→	→				
(E) Vdc (avg)					24.2	13.3	6.34	3.64				
(F) DCcal					.918							
(G) Kn x 10^{-3}					30	60	105	168				
(H) ρ dc=ExFxGx10^3/D					133	146.	122	112				
(I) Vac Σ					23.1	12.2	5.62	3.08				
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.					.982							
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)					2.8	7.0	10.6	16.1				
(O) MCF=(M-1)(10^5)/H												

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project El Paso Emerald Isle Line 2-A 5½ Field date 4-11-66 Data page _____ Comp. date 4-11-66. Comp by DO

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	6-7000	5-6 →		4-5 →			3-4 →					
(C) n separation	300	300	30	300	100	30	300	100	30	10		
(D) I	5.0 →											
(E) Vdc (avg)	111.0	141.0	29.42	123.0	33.1	10.9	169.5	36.2	14.85	5.92		
(F) DCcal	.918 →											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	61	77	65	68	73	60	93	80	81	65		
(I) Vac Σ	102.0	129.0	263.0	~~29.8~~	29.8	9.5	158.0	32.2	13.05	5.20		
(J) AC noise x 2	.05	.04		113.0			.05					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$				↖ .05								
(L) AC-DC cal.	.982											
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	6.8	7.2	9.9	6.9	9.1	12.8	5.3	10.6	11.7	11.7		
(O) MCF=(M-1)(10^5)/H	111	94	152	99	125	214	57	133	144	180		
	+4.7	-1.1		+5.7			-6.0					

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		2-3		
(B) Receive	2-3 →			→	1-2 →			→		Cal		
(C) n separation	100	30	10	10	30	10	10	3		300		
(D) I	5.0 →							→		2.0		
(E) Vdc (avg)	37.15	13.80	6.66	2.94	14.35	6.45	3.35	1.62		218		
(F) DCcal	.918 →							→				
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	82	76	73	57	79	71	65	50				
(I) Vac Σ	34.2	12.4	5.95	2.60	13.1	5.75	2.95	1.41		214		
(J) AC noise x 2	.05				.04							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	6.9	9.3	9.9	11.0	7.6	10.1	11.3	12.9				
(O) MCF=(M-1)(10^5)/H	84	122	135	193	96	142	174	258				
	-0.9				+1.8							

INDUCED POLARIZATION - RECEIVER NOTES PAGE 3

Project: El Paso Emerald Hill Line: 2-A 5 1/2 Int.Cal 93.0 Date: 4-11-66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.	6-7000	5-6 →		4-5	→		3-4	→				
Time	300	300	30	300	100	30	300	100	30	10		
DC-1	111.0 111.0	141.0 141.0	29.4 29.5	121.0 124.0	33.2 33.0	11.0 10.8	169.0 170.0	36.0 36.5	15.4 14.3	5.78 6.00		
DC-2	111.0 111.0	141.0 141.0	29.0 29.8	123.0 123.0	33.0 33.2	11.0 10.7	169.0 170.0	35.8 36.5	15.2 14.5	5.95 5.95		
Σ												
DC-3				123.0						6.00 5.95		
Dc-4										5.98 5.80		
Σ												
DC-AV												
AC-1	102.0	129.0	26.3	113.0	29.8	9.5	158.0	32.2	13.05	5.20		
AC-2	"	"	"	"	"	"	"	"				
Σ												
S. P.	+4.7	-1.1		+5.7			-6.0					
AC N	.05	.04		.05			.05					
Pot.Res.												

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 4

Project: El Paso Emerald Lake Line: 2A 5½ Int.Cal 92.0 Date: 4-11-66

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		2-3		
Rec.	2-3 →				1-2 →					CAL		
Time	100	30	10	10	30	10	10	30		300		
DC-1	36.8 37.5	13.7 13.9	7.20 6.10	33.42 2.45	14.3 14.4	6.45 6.45	3.35 3.35	1.55 1.70		218		
DC-2	36.8 37.5	13.9 13.7	6.78 6.60	3.10 2.82	14.2 14.5	6.45 6.45	3.35 3.35	1.57 1.65		218		
Σ												
DC-3			6.78 6.52	3.10 2.78				1.66 1.56		218		
Dc-4			6.82 6.50	3.18 2.70				1.64 1.58		218		
Σ			63530	23535				4 91				
DC-AV			6.60	2.94				1.62				
AC-1	34.2	12.4	5.95	2.60	13.1	5.75	2.95	1.41				
AC-2	"	"	"	"	"	"				214 "		
Σ												
S. P.	-0.9				+1.8							
AC-N	.05				.04							
Pot.Res.												

$8 \overline{)26^{3}24}$

3.3

$6 \overline{)38^{3}.03}$

6.34

26

18

23

$8 \overline{)5^{5}.133}$

64

INDUCED POLARIZATION - RECEIVER NOTES PAGE 5

Project: _____ Line: 2-4 N 1/2 Int.Cal 93 Date: 7-11-66

Send					4-5	3-4	2-3	1-2				
Rec.					12-13	N →						
Time					30	30	10	10				
DC-1					24.0 24.5	13.1 13.3	6.80 5.78	3.38 3.95				
DC-2					24.3 24.1	12.9 13.8	6.35 6.35	3.45 3.95				
Σ												
DC-3						13.0 13.8	6.35 6.40	3.38 3.55				
Dc-4						12.2 14.3		3.65 3.88				
Σ												
DC-AV												
AC-1					23.1	12.2	5.62	3.08				
AC-2					"	"	"	"				
Σ												
S. P.					+5.8							
AC-N					.07							
Pot.Res.												

14.85
14.85

3 3
8) 47.74
5.92

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: El Paso Emerald Isle Line: 3-A N½ Int.Cal 94.0 Date: 4-7-66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	7-8000	8-9000	→	9-10	—	→	10-11	—	—	→		
Time	300	300	100	300	100	30	1000	100	30	30		
DC-1	237.0 236.0	175.0 176.0	62.8 64.5	213.0 214.0	46.8 48.2	23.4 22.5	338.0 335.0	83.8 80.0	25.2 26.2	14.2 14.0		
DC-2	237.0 236.0	175.0 176.0	62.8 64.5	213.0 214.0	46.5 48.5	23.4 22.5	338.0 335.0	82.8 80.5	25.2 26.2	14.1 14.1		
Σ			1.7					1.3 81.1 80.9				
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1	220.0	163.0	58.0	200.0	44.0	20.55	315.0	76.0	23.4	12.45		
AC-2	"	"	"	"	"	"	"	"	"	"		
Σ												
S. P.	+3.3	-0.7		-7.7			-10.0					
AC-N	.08	.07		.04			.04					
Pot.Res.												

Power line at Sta 11,900 North

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Emerald Isle Line: 3-A N½ Int.Cal _____ Date: 4-7-66

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		3-4		
Rec.	11-12	→	→	→	12-13	→	→	→		CAL		
Time	100	100	30	10	100	30	10	10		300		
DC-1	~~234~~	28.5 29.8	11.0 10.7	6.50 6.82	37.5 37.2	19.6 19.7	7.62 8.62	5.80 5.92		218		
DC-2	74.0 73.8	28.5 29.8	10.9 10.8	6.50 6.80	28.0 36.8	19.3 19.6	8.10 8.18	5.20 5.45		218		
Σ												
DC-3	73.8 73.8					19.3 19.3	8.18 8.10	5.80 5.50		218		
Dc-4						19.8 18.4	4880	5.30 5.10		218		
Σ												
DC-AV												
AC-1	~~214~~.0	26.5	9.6	5.80	34.2	17.5	7.15	4.65				
AC-2	67.8	"	"	"	"	"	"			214.0		
Σ	"									"		
S. P.	+3.6				+7.2							
AC-N	.04				.04							
Pot.Res.												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 3

Project: El Paso Emerald Isle Line: 3-A 5½ Int.Cal _____ Date: 4-7-66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.	6-1000	7-6000	→	4-5	→	→	3-4	→	→	→		
Time	300	300	100	300	100	30	300	100	30	10		
DC-1	169.0 169.0	239.0 239.0	62.2 61.8	166.0 169.0	54.0 55.0	19.5 18.9	215.0 216.0	52.2 49.8	21.2 21.2	8.15 8.42		
DC-2	169.0 169.0	239. "	62.5 61.5	166.0 169.0	54.0 55.0	19.2 19.3	215 216.0	51.2 50.8	21.3 21.1	8.15 8.45		
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1	155.5	219.5	~~58.0~~	1.55.0	49.8	17.05	200.0	46.8	18.9	7.20		
AC-2	"	"	56.0	155.0	"	"	"	"	"			
Σ			"									
S. P.	+4.5	-0.7		-13.0			+1.1					
AC-N	.05		.05	.05			.03					
Pot.Res.												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 4

Project: Emerald Isle Line: 3-A 5½ Int.Cal _____ Date: 4-7

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		2-3		
Rec.	2-3 →				1-2 →					CAL		
Time	300	100	30	10	100	30	10	10				
DC-1	97.0 97.0	30.5 30.5	14.3 14.1	5.85 6.00	34.5 35.5	12.5 13.1	6.42 6.72	2.78 2.78		218		
DC-2	97.0 97.0	30.5 30.5	14.3 14.1	5.85 6.00	35.2 35.0	12.6 13.0	6.42 6.40	2.98 3.00		218		
Σ												
DC-3							6.55 6.05	2.60 2.95		218		
Dc-4							6.82 6.05	2.75 3.18		218		
Σ												
DC-AV												
AC-1	89.0	27.8	12.4	5.15	31.9	11.3	5.50	2.40		212.0		
AC-2	"	"	"	"	"	"	"			"		
Σ												
S. P.	+6.0				-7.2							
AC-N	.03				.04							
Pot.Res.												

EL PASO N.G.

INDUCED POLARIZATION SENDER NOTES

Project: Emerald Isle Line: 3A S½ Date: 4-8-6

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Receive	6-7000	5—6000		4—5000		—	3—		4000	—		
Time												
Range	240	175	240	140	190	240	140	140	180	240		
Current	6A	6A	6A	6A	6A	6A	6A	6A	6A	6A CAL		
Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5			2-3	
Receive	2—	—	3000	—	1—	—	2000	—			60	
Time												
Range	140	140	190	240	140	140	190	240			2A	
Current	6A	6A	6A	6A	6A	6A	6A	6A				

CAL 2A

INDUCED POLARIZATION SENDER NOTES

Project: El Paso Emerald Pole Line: 3A N½ Date: 4-7-66

Send	1-2 ~~4-5~~	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive	7-8000	8-9000 →		9-10 →			10-11 →					
Time												
Range	140	140	"	190	140	140	240	140	140	140		
Current	6A	6A		6A	6A	6A	6A	6A	6A	6A		
Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		3-4		
Receive	11-12 →				12-13 →					CAL		
Time												
Range	240	190	140	140	240	190	140	140		100		
Current	6A	6A	6A	6A	6A	6A	6A	6A		2AMP		

El Paso

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Emerald Isle Line 3-A-S½ 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		
(B) Receive	6-7000	5-6000	→	4-5	→	→	3-4	→	→	→		
(C) n separation	300	300	100	300	100	30	300	100	30	10		
(D) I	6.0	→	→	→	→	→	→	→	→	→		
(E) Vdc (avg)	169.0	239.0	62.0	167.5	54.5	19.22	215.5	51.0	21.2	8.30		
(F) DCcal	.918											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	78	110	114	77	100	88	99	94	97	76		
(I) Vac Σ	155.5	219.5	56.0	155.0	49.8	17.05	200.0	46.8	18.9	7.20		
(J) AC noise x 2	.05	05		.05			.03					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.973											
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	5.9	5.9	7.5	4.8	6.4	9.6	4.5	6.0	9.1	12.2		
(O) MCF=(M-1)(10^5)/H												
	+4.5	-0.7		-13.0			+1.1					

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		2-3		
(B) Receive	2-3	→	→	→	1-2	→	→	→		CAL		
(C) n separation	300	100	30	10	100	30	10	10				
(D) I	6.0	→	→	→	→	→	→	→		2.0		
(E) Vdc (avg)	97.0	30.5	14.2	5.92	35.05	12.8	6.86	2.88		218		
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	178	140	130	95	161	118	110	74				
(I) Vac Σ	89.0	27.8	12.4	5.15	31.9	11.3	550	2.40				
(J) AC noise x 2	.03				.04					212		
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	6.0	6.8	11.3	11.9	7.0	10.2	21.2	17.6				
(O) MCF=(M-1)(10^5)/H												
	+6.0				-7.2							

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project El Paso Emerald Lake Line 3 A N½ 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	7-8000	8-9 →		9-10 →			10-11 →					
(C) n separation	300	300	100	300	100	30	1000	100	30	30		
(D) I	6.0 →											
(E) Vdc (avg)	236.5	175.5	63.6	213.5	47.5	23.0	336.5	81.0	25.7	14.1		
(F) DCcal	.918											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	109	81	117	98	87	106	155	149	118	129		
(I) Vac Σ	220.0	163.0	58.0	200.0	44.0	20.55	315.0	76.0	23.4	12.45		
(J) AC noise x 2	.08	.07		.04			.04					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.982											
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	5.6	5.6	7.7	4.7	5.9	10.0	4.8	4.6	7.7	11.1		
(O) MCF=(M-1)(10^5)/H												
	+3.3	-0.7		-7.7			-10.0					

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		3-4		
(B) Receive	11-12 →				12-13 →					CAL		
(C) n separation	100	100	30	10	100	30	10	10		2.0		
(D) I												
(E) Vdc (avg)	73.85	29.2	10.85	6.66	37.38	19.4	8.13	5.51		218		
(F) DCcal						153	old					
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	136	134	100	107	172	178	130	142				
(I) Vac Σ	67.8	26.5	9.60	5.80	34.2	17.5	7.15	4.65				
(J) AC noise x 2	.04				.04					214		
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.982											
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	6.0	8.2	10.9	12.7	7.1	8.9	11.4	16.3				
(O) MCF=(M-1)(10^5)/H					5.8 old							
	+3.6				+7.2							

$$\begin{array}{r} 3\ \ 2 \\ 8\overline{)3.423} \\ 6.86 \end{array}$$

$$\begin{array}{r} 5\ \ 4 \\ 8\overline{)23.7062} \\ 2.88 \end{array}$$

E-W Fence line 135' South of station #2000 N
1160' West along fence to chloride Road

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project El Paso Emerald Isle Line 4-A 5½ Field date 4-12-66 Data page 2 Comp. date 4-12-66 Comp by DA

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	6-7000	5-6 →		4-5 →			3-4 →					
(C) n separation	300	300	100	100	30	30	100	30	30	10		
(D) I	5.0 →											
(E) Vdc (avg)	133.0	98.0	36.95	86.2	25.1	12.4	87.28	23.55	10.3	5.76		
(F) DCcal	.922											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	74	54	82	48	56	69	48	52	57	64		
(I) Vac Σ												
(J) AC noise x 2	122.0	88.0	33.2	76.2	22.1	10.9	78.0	21.2	9.1	5.18		
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	.05	.04		.05			.06					
(L) AC-DC cal.	.986 →											
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	7.3	9.7	9.6	11.5	11.9	12.1	10.2	9.2	11.6	9.7		
(O) MCF=(M-1)(10^5)/H	99	180	117	240	212	175	212	177	204	151		
	-3.8	+0.3		-6.7		1	+5.4					

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		2-3		
(B) Receive	2-3 →			→	1-2 →			→		CAL		
(C) n separation	30	30	10	10	10	10	3	3		300		
(D) I	5.0 →						→	4.0		2.0		
(E) Vdc (avg)	24.65	10.96	5.55	3.31	6.76	3.69	2.04	1.04		217		
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	55	60	61	64	37	41	39	40				
(I) Vac Σ	22.55	9.9	4.98	2.98	6.18	3.32	1.82	0.91		214		
(J) AC noise x 2	.05				.04							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.986 →							→				
(M) ρdc/ρac =ExL/K					5.0							
(N) PFE=(M-1)(10^2)	7.9	9.1	9.8	9.3	7.8	9.6	11.6	12.8				
(O) MCF=(M-1)(10^5)/H												
	+0.8				-6.5							

$$\begin{array}{r} {}^{2}\,{}^{2} \\ 4\overline{)41589} \\ 698 \end{array}$$

$$\begin{array}{r} 6\overline{)25^{10}} \\ 42 \end{array}$$

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project El Paso Emerald Isle Line 4-A NK Field date 4-12-66 Data page 1 Comp. date 4-12-66. Comp by DOP

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	7-8000	8-9 →		9-10 →			10-11 →					
(C) n separation	300	300	100	300	100	30	300	100	30	10		
(D) I	5.0 →											
(E) Vdc (avg)	100	134.5	37.7	179.0	45.0	17.25	184.5	39.85	14.42	6.98		
(F) DCcal	.926											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	56	75	84	99	100	96	103	89	79	78		
(I) Vac Σ	90.0	124.5	33.8	168.5	41.5	15.4	176.0	37.2	13.1	6.15		
(J) AC noise x 2	.21	.10		.04			.25					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.981											
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	9.2	7.0	9.3	4.2	6.3	9.8	2.8	5.1	8.6	11.2		
(O) MCF=(M-1)(10^5)/H	164	93	110	42	63	102	27	57	109	144		
	+7.0	-5.7		+0.9			+3.6					

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		4-5		
(B) Receive	11-12 →				12-13 →					CAL		
(C) n separation	100	30	10	10	30	30	10	10		300		
(D) I	5.0 →									1.0		
(E) Vdc (avg)	45.0	15.42	7.40	4.12	20.35	8.85	4.89	3.12		108		
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	100	86	82	80	113	98	95	97				
(I) Vac Σ	42.8	14.4	6.70	3.62	19.2	8.20	4.35	2.68		106		
(J) AC noise x 2	.04				.10							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	3.2	5.1	8.3	11.7	4.1	5.9	10.0	14.2				
(O) MCF=(M-1)(10^5)/H	32	59	101	146	36	60	105	147				
	+6.2				+9.6							

Jim & I to North Carolina for T.C.C.

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: Emerald Tale Line: 4-A N 1/2 Int.Cal 94.0 Date: 4-12-66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	7-8	8-9 →		9-10		→	10-11			→		
Time	300	300	100	300	100	30	300	100	30	10		
DC-1	100 100.	134.0 135.0	38.2 37.2	1780.0 1800.0	44.8 45.2	16.9 17.6	184.0 185.0	39.2 40.5	14.10 14.8	7.48 6.42		
DC-2	100 100	134.0 135.0	38.2 37.2	1780.0 1800.0		16.7 17.8	184.0 185.0	39.2 40.5	14.0 14.8	7.02 6.95		
Σ												
DC-3				179.0	44.8 45.2				14.1 14.7	6.95 7.05		
Dc-4					45.5 44.5	45.0						
Σ												
DC-AV												
AC-1	90.0	124.5	33.8	1685.0	18.05	15.4	176.0	37.5	13.1	6.15		
AC-2	"	"	"	"	41.5		176.0	"	"			
Σ												
S. P.	+7.0	-5.7		+0.9			+3.6					
AC-N	.21	.10		.04			.25					
Pot. Res.												

$6\overline{)239.4}$

39

$6\overline{)24.714}$

4 12

$8\overline{)39.069}$

4.89

$8\overline{)9.6}$

12

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Emerald Lake Line: 4-A N 1/2 Int.Cal 92 Date: 4-12-66

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		4-5 ~~3-4~~		
Rec.	11-12	→		→	12-13			→		CAL		
Time	100	30	10	10	30	30	10	10		300		
DC-1	45.5 44.5	15.5 15.4	7.05 7.76	4.20 4.05	20.1 20.6	9.1 8.6	4.98 4.82	3.12 3.08		108		
DC-2	45.5 44.5	15.1 15.9	7.42 7.40	4.28 3.98	20.0 20.7	9.0 8.7	5.05 4.75	3.15 3.15		108		
Σ												
DC-3			7.52 7.30	4.05 4.18			5.08 4.65	3.08 3.18		108		
Dc-4							5.18 4.58	3.05 3.15		108		
Σ												
DC-AV												
AC-1	42.8	14.4	6.68	3.62	19.2	8.20	4.35	2.68		106.0		
AC-2	"	"	6.72	"		"				"		
Σ												
S. P.	+6.2				+9.6							
AC-N	.04				.10							
Pot.Res.												

16 37.0
38.9

3
6 | 37.0 40
6.16

25.1

4 | 1130
28

5.5

3
6 | 6.19
10.3

4 1
6 | 4.537
.76
5.

INDUCED POLARIZATION - RECEIVER NOTES PAGE 3

Project: Emerald Isle Line: 4A 5½ Int.Cal 72 Date: 4-12-66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.	6-7000	5-6 →		4-5 →			3-4 →					
Time	300	300	100	100	30	30	100	30	30	10		
DC-1	134.0 132.0	97.0 99.0	36.2 37.8	87.2 85.2	25.4 24.8	12.7 12.1	86.5 86.2	23.7 23.4	10.0 10.4	5.82 5.65		
DC-2	134.0 132.0	97.0 99.0	36.5 37.2	86.8 85.5	25.4 24.8	12.5 12.3	86.2 86.2	23.8 23.3	9.9 10.4	5.95 5.55		
Σ												
DC-3				86.8 85.0	✓	✓	✓		9.9 10.3	5.80 5.70		
Dc-4												
Σ												
DC-AV												
AC-1	122.0	88.0	33.2	76.2	22.1	10.9	78.0	21.2	9.1	5.18		
AC-2	"	"	"	"	"	"	"		"			
Σ												
S. P.	-3.8	+0.3		-6.7			+5.4					
AC-N	.05	.04		.05			.06					
Pot.Res.												

Fence line 135' South of sta. 2 North
1160' West along fence to Chloride Rd.

INDUCED POLARIZATION - RECEIVER NOTES PAGE 4

Project: Emerald Isle Line: 4-A 5½ Int.Cal _____ Date: 4-12-66

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		2-3		
Rec.	2-3 →			→	1-2	→		→		CAL		
Time	30	30	10	10	10	10	3	3				
DC-1	24.8 24.5	11.2 10.6	5.55 5.55	3.25 3.45	6.85 6.60	3.65 3.65	1.90 2.15	1.07 1.05		217		
DC-2	24.7 24.6	11.3 10.7	5.45 5.65	3.18 3.42	6.85 6.80	3.78 3.60	1.92 2.17	.94 1.06		217		
Σ												
DC-3		11.4 10.6		3.22 3.35	6.75 6.80	3.92 3.55	1.84 2.24	1.01 1.04		217		
Dc-4		✓	✓	✓	6.62 6.85	3.85 3.55	1.85 2.27	1.03 1.09		217		
Σ					✓	✓						
DC-AV												
AC-1	22.55	9.9	4.98	2.98	6.18	3.32	1.82	.91		214		
AC-2	"	"	"		"	"	"			"		
Σ												
S. P.	+0.8				-6.5							
AC-N	.05				.64							
Pot.Res.												

INDUCED POLARIZATION SENDER NOTES

Project: EL Paso Line: 3 - 5 1/2 Date: 3/2/66

Send	4/5	3/4	4/5	2/3	3/4	4/5	1/2	2/3	3/4	4/5	1/2	2/3
Receive	→	←	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A
Send	3/4	4/5	1/2	2/3	3/4	4/5		cal.				
Receive	→	→	→	→	→	→		2/3				
Time												
Range												
Current	2A	2A	2A	2A	2A	2A		1A				

INDUCED POLARIZATION SENDER NOTES

Project: EL Paso Line: 3 - N 1/2 Date: 3/2/66

Send	1/2	2/3	1/2	3/4	2/3	1/2	4/5	3/4	2/3	1/2	4/5	3/4
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A
Send	2/3	1/2	4/5	3/4	2/3	1/2		cal.				
Receive	→	→	→	→	→	→		3/4				
Time												
Range												
Current	2A	2A	2A	2A	2A	2A		1A				

8

1 6

2 250 mm

1 x 25 mm

12/62250 "

25 0

2 250 mm x 2 "

mm

70 pt

70

2 500

5000

1000

1

INDUCED POLARIZATION - RECEIVER NOTES PAGE 9

Project: El Paso Line: 3 - S½ Int.Cal _____ Date: 3/2/66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
Time	100	100	30	300	30	30	100	30	30	10	100	30
DC-1	57 56	65.8 65.5	22.2 22.3	85 84	20.4 19.9	9.5 8.4	67.0 66.2	20.0 21.6	8.8 7.0	4.45 5.12	34.1 33.9	15.0 14.1
DC-2	57 56	65.9 65.4	22.1 22.2	86 83	20.5 19.7	9.5 8.4	67.0 66.0	20.0 21.7	8.8 7.0	4.39 5.20	34.2 33.7	14.9 14.3
Σ	113 113	131.3 131.3	44.5 44.5	169 169	40.3 40.2	17.9 17.9	133.2 133.0	41.6 41.7	15.8 15.8	9.57 9.59	68.0 67.9	29.1 29.2
DC-3			22.1 22.15	85.5 84	20.5 19.7					4.23 5.25		15.0 14.2
Dc-4			44.25	169.5	40.2					9.48		29.8
Σ												
DC-AV	113	131.3	44.3	169	40.2	17.9	133.1	41.65	15.8	9.55	67.95	29.2
AC-1	55	63.4	21.5	81	19.3	8.5	62.2	19.4	7.4	4.41	32.1	13.7
AC-2	55.5	63.6	21.5	81	19.3	8.5	62.2	19.5	7.4	4.41	32.0	13.8
Σ	110.5	127.0	43.0	162	38.6	17.0	124.4	38.9	14.8	8.82	64.1	27.5
S. P.	-5	+8	→	-4	→	→	+12	→	→	→	-19	→
AC-N	.04	.04	→	.05	→	→	.05	→	→	→	.04	→

INDUCED POLARIZATION - RECEIVER NOTES PAGE 10

Project: El Paso Line: 3 - S ½ Int.Cal Date: 3/2/66

Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3				
Rec.	→	→	50-60	→	→	→		cal.				
Time	10	10	30	10	10	3		300				
DC-1	6.62 6.81	4.14 4.20	12.1 12.6	6.22 5.70	2.65 3.10	2.16 1.75		109 110				
DC-2	6.71 6.72	4.14 4.30	12.4 12.5	6.06 5.79	2.64 3.13	2.16 1.79		109 110				
Σ	13.43 13.43	8.34 8.44	24.9 24.9	11.92 11.94	5.45 5.77	3.91 3.95		219 219				
DC-3	6.60 6.78	4.10 4.21	12.6 12.4	5.99 5.81	2.62 3.20	2.11 1.81						
Dc-4	13.52	8.31	25.0	11.80	5.82	3.98						
Σ												
DC-AV	13.47	8.36	24.9	11.9	5.79	3.93		219				
AC-1	6.44	3.99	11.6	5.57	2.72	1.94		109				
AC-2	6.44	4.0	11.6	5.56	2.72	1.94		109				
Σ	12.88	7.99	23.2	11.13	5.44	3.68		218				
S. P.	→	→	+13	→	→	→						
AC-N	→	→	.04	→	→	→						

INDUCED POLARIZATION - RECEIVER NOTES PAGE 11

Project: El Paso Line: 3-N½ Int.Cal _____ Date: 3/2/66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
Time	100	100	30	300	30	30	100	30	10	10	100	30
DC-1	66.0 65.0	57.0 57.5	21.3 23.1	81 79	20.7 17.9	8.1 12.8	65.0 64.0	17.9 17.4	6.4 5.98	3.86 3.62	24.3 22.8	10.1 7.9
DC-2	66.0 65.0	56.9 57.9	21.4 23.0	80 79	21.0 17.7	8.1 12.4	64.9 64.0	17.6 17.4	6.5 4.94	3.79 3.78	24.4 22.8	10.1 7.9
Σ	131.0 131.0	114.5 113.8	44.4 44.4	160 159	38.6 38.7	20.4 20.5	129.0 128.9	35.1 35.0	12.39 11.44	7.48 7.57	47.1 47.2	18.0 18.0
DC-3		56.7 57.9	21.4 22.9		21.1 17.6	8.0 12.4	64.8 64.1		6.55 6.14	3.88 3.83	24.3 22.7	10.2 7.9
Dc-4		114.6	44.3		38.7	20.4	128.9		12.47	7.71	47.0	18.1
Σ												
DC-AV	131.0	114.4	44.4	159.5	38.7	20.4	128.9	35.05	12.~~35~~ 12.45	7.58	47.1	18.0
AC-1	63.2	55.5	21.5	75	18.5	9.7	62.2	16.8	5.93	3.61	22.7	8.6
AC-2	63.2	55.5	21.4	76	18.5	9.7	62.2	16.8	5.93	3.61	22.7	8.6
Σ	126.4	111.0	42.9	151	37.0	19.4	124.4	33.6	11.86	7.22	45.4	17.2
S. P.	-11	-2	→	+9	→	→	-7	→	→	→	-1	→
AC-N	.08	.08	→	.06	→	→	.06	→	→	→	.05	→

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 12

Project: El Paso Line: 3-N ½ Int.Cal _____ Date: 3/2/66

Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4				
Rec.	→	→	50-60	→	→	→		cal.				
Time	10	10	30	10	10	3		300				
DC-1	4.57 4.25	2.98 3.06	11.9 10.5	5.36 4.62	2.61 2.91	1.95 2.20		110 109				
DC-2	4.60 4.25	2.62 3.10	12.0 10.4	5.39 4.64	2.70 2.97	1.95 2.15		110 109				
Σ	8.85 8.85	5.94 5.92	22.4 22.4	9.98 10.02	5.62 5.57	4.15 4.10		219 219				
DC-3	4.57 4.21	2.60 3.15	12.0 10.4	5.31 4.63	2.70 2.96	1.81 2.12						
Dc-4	8.78	5.75	22.4	9.94	5.56	3.93						
Σ												
DC-AV	8.79	5.78	22.4	9.97	5.55	3.96		219				
AC-1	4.2	2.67	10.5	4.62	2.53	1.80		109				
AC-2	4.2	2.67	10.6	4.62	2.53	1.80		109				
Σ	8.4	5.34	21.1	9.24	5.06	3.60		218				
S. P.	→	→	-9	→	→	→						
AC-N	→	→	.05	→	→	→						

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 6

Project El Paso Line 3-N ½ Field date 3/2/66 Data page 11 & 12 Comp. date 3/3/66. Comp by R.B.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
(C) n separation												
(D) I	2000	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	131.0	114.4	44.4	159.5	38.7	20.4	128.9	35.05	12.~~55~~ 43	7.58	47.1	18.0
(F) DCcal	.456	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60	12	30
(H) ρ dc=ExFxGx10^3/D	89.6	78.1	121.2	109.1	106.0	139.6	~~[illegible]~~ 88	95.9	84.4	103.5	129.1	122.9
(I) Vac Σ	126.4	111.0	42.9	151.0	37.0	19.4	124.4	33.6	11.86	7.22	45.4	17.2
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.996	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.029	1.026	1.030	1.051	1.041	1.047	1.031	1.038	1.0~~37~~ 45	1.047	1.036	1.043
(N) PFE=(M-1)(10^2)	2.9	2.6	3.0	5.1	4.1	4.7	3.1	3.8	~~3.7~~ 4.5	4.7	3.6	4.3
(O) MCF=(M-1)(10^5)/H	32	33	25	47	42	34	~~[illegible]~~ 35	42	~~44~~ 53	45	28	35

Project Line Field date Data page Comp. date Comp by

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4				
(B) Receive	→	→	50-60	→	→	→		cal				
(C) n separation												
(D) I	→	→	→	→	→	→		1000				
(E) Vdc (avg)	8.79	5.78	22.4	9.97	5.55	3.96		219.0				
(F) DCcal	→	→	→	→	→	→		.456				
(G) Kn x 10^{-3}	60	105	30	60	105	168						
(H) ρ dc=ExFxGx10^3/D	120.1	138.2	153.1	136.3	132.9	151.6						
(I) Vac Σ	8.4	5.34	21.1	9.24	5.06	3.50		218.0				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→	→		.996				
(M) ρdc/ρac =ExL/K	1.041	1.080	1.058	1.076	1.092	1.128						
(N) PFE=(M-1)(10^2)	4.1	8.0	5.8	7.6	9.2	12.8						
(O) MCF=(M-1)(10^5)/H	34	58	38	51	69	~~[illegible]~~ 84						

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 5

Project El Paso Line 3-5 ½ Field date 3/2/66 Data page 9210 Comp. date 3/3/66. Comp by R.B.

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	0-10	10-20	→	20-30		→	30-40			→	40-50	→
(C) n separation												
(D) I	2000											→
(E) Vdc (avg)	113.0	131.3	44.3	169.0	40.2	17.9	133.1	41.65	15.8	9.55	67.95	29.2
(F) DCcal	.456											→
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60	12	30
(H) ρ dc=ExFxGx10^3/D	77.3	89.8	121.1	115.6	110.0	122.3	91.1	113.9	108.1	130.8	185.4	200.0
(I) Vac Σ	110.5	127.0	43.0	162.0	38.6	17.0	124.4	38.9	14.8	8.82	64.1	27.5
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.996											→
(M) ρ dc/ρac=ExL/K	1.014	1.031	1.025	1.039	1.037	1.049	1.069 66	1.067	1.062	1.028	1.052	1.059
(N) PFE=(M-1)(10^2)	1.8	3.1	2.5	3.9	3.7	4.9	6.9 66	6.7	6.2	2.8	5.2	5.9
(O) MCF=(M-1)(10^5)/H	23	34	21	34	37	40	26 72	63	55	60	28	29

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3				
(B) Receive	→	→	50-60			→		cal.				
(C) n separation												
(D) I						→		1000				
(E) Vdc (avg)	13.47	8.36	24.9	11.9	5.79	3.93		219.0				
(F) DCcal						→		.456				
(G) Kn x 10^{-3}	60	105	30	60	105	168						
(H) ρ dc=ExFxGx10^3/D	184.0	200.0	170.5	162.9	138.4	150.7						
(I) Vac Σ	12.88	7.99	23.2	11.13	5.44	3.68		218.0				
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.						→		.996				
(M) ρdc/ρac =ExL/K	1.041	1.042	1.069	1.067	1.062	1.064						
(N) PFE=(M-1)(10^2)	4.1	4.2	6.9	6.7	6.2	6.4						
(O) MCF=(M-1)(10^5)/H	22	21	40	41	45	42						

All corrections made with electronic calculator
only those with X's are considered significant errors - rest are just for slide rule accuracy comparisons

7 significant independent errors - needs improvement

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 7

Project El Paso Line 4-5½ Field date 3/3/66 Data page 13 & 14 Comp. date 3/4/66. Comp by [illegible]

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
(C) n separation												
(D) I	9000	9000	9000	9000	9000	9000	5000	9000	9000	9000	5000	9000
(E) Vdc (avg)	151.0	197.0	33.9	255.0	38.9	11.84 11.85	139.2	51.3 51.2	15.96 ~~16.95~~	6.71	23.0	18.23 18.3
(F) DCcal	.413											→
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60	12	30
(H) ρ dc=ExFxGx10^3/D Round off →	20.8 21	27.1 27	18.6 19	35.0 35	21.3 21	16.3 16	34.4 34	~~16~~ 28	22.1 22	18.4 18	22.8 23	25.1 25
(I) Vac Σ	143.0	186.0	32.0	242.0	36.1	10.92	131.9	47.8	14.34	5.93	21.3	16.2
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.923											→
(M) ρ dc/ρac=ExL/K	1.027	1.031	1.0~~34~~	1.032	1.048	1.054	1.059	1.040	1.022	1.020	1.056	1.098
(N) PFE=(M-1)(10^2)	2.7	3.1	3.1 ~~3.9~~	3.4 3.2	4.9	5.5 5.4	2.9	4.4 4.0	8.3 ~~2.4~~	1.9 1.0	5.1 5.0	9.5 9.2
(O) MCF=(M-1)(10^5)/H	129 130	115 114	~~24~~ 163	91 97	225 229	331 324	~~54~~ 79	~~56~~ 157	399 377	~~1~~ 561	220 222	271 280

Project Line Field date Data page Comp. date Comp by

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3				
(B) Receive	→	→	50-60	→	→	→		cal.				
(C) n separation												
(D) I	9000	9000	5000	9000	9000	9000		3000				
(E) Vdc (avg)	~~3.21~~	4.02 4.08	10.09 10.1	10.22 10.18	4.95 4.93	~~2.23~~		727.5				
(F) DCcal						→		.413				
(G) Kn x 10^{-3}	60	105	30	60	105	168						
(H) ρ dc=ExFxGx10^3/D	22.1 23	19.6 20	24.9 25	27.9 28	22.1 24	20.2 21						
(I) Vac Σ	7.19	3.6	9.16	9.0	4.36	2.31		709.0				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.						→		.923				
(M) ρdc/ρac =ExL/K	1.119	1.103	1.071	1.099	1.099	~~1.076~~						
(N) PFE=(M-1)(10^2)	11.1 ~~3.9~~	10.0 10.3	7.2 7.1	10.3 9.9	10.5 9.8	13.3 ~~3.5~~						
(O) MCF=(M-1)(10^5)/H	524 483	526 500	295 288	255 368	414 438	~~54~~ 633						

Round off Cx (as in operator manual) in your head - saves time & plenty accurate for plotting & MCF computations.

Much better: only two significant independent errors

366

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 8

Project El Paso Line 4-N½ Field date 3/3/66 Data page 15 & 16 Comp. date 3/4/66. Comp by D.B.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
(C) n separation												
(D) I	5000	9000	5000	9000	9000	5000	9000	9000	9000	5000	9000	9000
(E) Vdc (avg)	112.1	149	18.3	189	53.25	11.60 (11.63)	167.0	56.15	25.1	~~6.51~~ (6.56)	45.17	27.8
(F) DCcal	.404											→
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60	12	30
(H) ρ dc=ExFxGx10^3/D	27.8 27	20.1 20	17.4 18	25.5 25	27.9 29	28.1 28	22.5 22	30.2 30	33.7 34	31.5 32	24.3 24	37.5 [illegible]
(I) Vac Σ	106.1	142	17.2	178	50.6	10.82	158.0	53.0	23.4	6.09	41.2	24.8
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.968 (.966)											→
(M) ρ dc/ρac=ExL/K	1.022	1.015	1.030	1.028	1.016	1.039	1.022	1.025	1.038	1.050	1.061	1.083
(N) PFE=(M-1)(10^2)	2.1 2.2 .4	1.4 1.5 1.1	2.8 3.0 3.9	2.6 2.8 .9	1.7 1.6 2.2	3.8 4.7	2.1 2.2 1.0	2.5 1.9	3.6 3.8 3.9	5.6 ~~5.7~~ 7.5	5.9 6.1 2.7	8.3 3.4
(O) MCF=(M-1)(10^5)/H	81 78	75 70	170 156	112 104	57 59	~~[illegible]~~ 136	96 95	83 77	113 106	~~[illegible]~~ 175	251 246	221 [illegible]
	1.4	0.4	-0.9	1.6	-2.6	-0.9	1.2	0.6	-0.1	-2.5	2.4	3.9

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

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4				
(B) Receive	→	→	50-60	→	→	→		cal.				
(C) n separation												
(D) I	9000	5000	9000	9000	9000	5000		3000				
(E) Vdc (avg)	14.5	4.72	21.8	15.27	3.56 (3.57)	3.06 (3.07)		744.5				
(F) DCcal	→	→	→	→	→	→		.404				
(G) Kn x 10^{-3}	60	105	30	60	105	168						
(H) ρ dc=ExFxGx10^3/D	39.0 39	39.8 40	29.3 28	41.1 41	45.1 45	41.7 42						
(I) Vac Σ	13.0	4.08	18.8	13.4	8.4	2.66		718.0				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→	→		.968 (.966)				
(M) ρdc/ρac =ExL/K	1.080	1.114	1.081	1.101	1.102	1.141						
(N) PFE=(M-1)(10^2)	7.7 8.0 6.0	11.8 11.4	7.4 8.1 4.7	10.1 5.6	9.9 10.2	13.7 14.1						
(O) MCF=(M-1)(10^5)/H	205 197	296 295	296 264	246	226 220	338 326						
	2.0		2.4	4.5								

I'll check your Blue light data next and see how you are coming

C. S. L.

INDUCED POLARIZATION SENDER NOTES

Project: El Paso Line: 4 - 5 1/2 Date: 3/3/66

Send	4/5	3/4	4/5	2/3	3/4	4/5	1/2	2/3	3/4	4/5	1/2	2/3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	9A	9A	9A	9A	9A	9A	5A	9A	9A	9A	5A	9A
Send	3/4	4/5	1/2	2/3	3/4	4/5		cal.				
Receive	→	→	→	→	→	→		2/3				
Time												
Range												
Current	9A	9A	5A	9A	9A	9A		3A				

X 30 1 667 = 5001 MA ON 1-2

INDUCED POLARIZATION SENDER NOTES

Project: El Paso Line: 4 - N 1/2 Date: 3/3/68

Send	1/2	2/3	1/2	3/4	2/3	1/2	4/5	3/4	2/3	1/2	4/5	3/4
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	5A	9A	5A	9A	9A	5A	9A	9A	9A	5A	9A	9A
Send	2/3	1/2	4/5	3/4	2/3	1/2		cal.				
Receive	→	→	→	→	→	→		3/4				
Time												
Range												
Current	9A	5A	9A	9A	9A	5A		3A				

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 13

Project: El Paso Line: 4-5½ Int.Cal Date 3/3/66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
Time	300	300	30	300	30	10	100	30	10	10	30	30
DC-1	75 76	97 100	15.5 18.4	126 129	17.3 21.6	6.1 5.85	73.0 66.2	24.6 26.1	8.60 7.05	3.59 3.20	11.1 11.9	8.5 10.2
DC-2	75 76	97 100	15.5 18.4	126 129	17.1 21.9	6.1 5.7	73.0 66.0	24.5 27.1	9.10 7.01	3.28 3.40	11.2 12.1	7.9 9.9
Σ	151 151	197 197	33.9 33.9	255 255	38.9 39.0	11.95 11.80	139.2 139.0	50.7 51.6	15.65 16.11	6.79 6.68	23.0 23.3	18.7 17.8
DC-3					16.9 21.9	6.15 5.6	73.8 66.0	24.4 27.2	9.03 7.10	3.19 3.31	10.7 12.0	8.4 9.8
Dc-4					38.8	6.41 5.43	139.3	51.6	16.13	3.50 3.38	22.7	8.2 10.0
Σ						11.75 11.84				6.50 6.88		18.2 18.2
DC-AV	151	197	33.9	255	38.9	11.84 11.95	139.2	51.3 51.2	15.96 16.05	6.71	23.0	18.23 18.3
AC-1	71	93	16	120	18.0	5.46	65.9	23.9	7.17	2.96	10.7	8.1
AC-2	72	93	16	120	18.1	5.46	66.0	23.9	7.17	2.97	10.6	8.1
Σ	143	186	32	240	36.1	10.92	131.9	47.8	14.34	5.93	21.3	16.2
S. P.	-7	+20	→	-20	→	→	+14	→	→	→	+1	→
AC-N	.05	.10	→	.06	→	→	.04	→	→	→	.02	→

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 14

Project: El Paso Line: 4-5½ Int.Cal Date 3/3/66

Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3				
Rec.	→	→	50-60	→	→	→		cal.				
Time	10	3	10	10	10	3		1000				
DC-1	4.56 3.82	2.06 1.98	5.22 4.99	4.30 5.96	3.40 1.42	1.16 1.51		366 362				
DC-2	4.30 3.69	2.25 1.78	5.20 4.82	4.29 5.94	3.66 1.43	1.05 1.67		368 361				
Σ	8.38 7.99	4.04 4.03	10.21 10.02	10.20 10.23	4.82 5.03	2.67 2.78		728 729				
DC-3	4.60 3.65	2.23 1.92	5.23 4.80	4.21 5.95	3.50 1.50	1.05 1.48						
Dc-4	4.40 3.84	4.15	10.03	10.16	5.00	1.12 1.74						
Σ	8.25 8.24					2.53 3.86						
DC-AV	8.21 8.27	4.07 4.08	10.09 10.10	10.20 10.18	4.95 4.93	2.69 2.63		728.5				
AC-1	3.6	1.80	4.58	4.50	2.18	1.16		353				
AC-2	3.59	1.80	4.58	4.50	2.18	1.15		356				
Σ	7.19	3.60	9.16	9.00	4.36	2.31		709				
S. P.	→	→	+20	→	→	→						
AC-N	→	→	.03	→	→	→						

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 15

Project: El Paso Line: 4-N½ Int.Cal Da 3/3/66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
Time	100	300	30	300	100	10	300	100	30	10	30	30
DC-1	55.5 56.6	74 75	8.9 9.5	95 94	26.2 27.0	6.1 5.5	83 84	27.8 28.4	12.6 12.5	3.8 2.6	22.3 22.8	13.6 14.3
DC-2	55.5 56.6	74 75	8.7 9.5	95 94	26.3 27.0	6.12 5.6	83 84	28.0 28.1	12.6 12.5	3.87 2.80	22.2 23.0	13.4 14.4
Σ	112.1 112.1	149 149	18.4 18.2	189 189	53.2 53.3	11.60 11.72	167 167	56.2 56.1	25.1 25.1	6.40 6.67	45.1 45.2	27.9 27.8
DC-3			8.7 9.6			6.08 5.49				3.45 3.15	22.2 23.0	13.3 14.4
Dc-4			18.3			11.57				6.60	45.2	27.7
Σ												
DC-AV	112.1	149	18.3	189	53.25	11.63 11.60	167	56.15	25.1	6.36 ~~6.51~~	45.17	27.8
AC-1	53	71	8.6	89	25.3	5.41	79	26.5	11.7	3.0	20.6	12.4
AC-2	53.1	71	8.6	89	25.3	5.41	79	26.5	11.7	3.0	20.6	12.4
Σ	106.1	142	17.2	178	50.6	10.82	158	53.0	23.4	6.0	41.2	24.8
S. P.	-3	+2	→	-5	→	→	+1	→	→	→	-9	→
AC-N	.04	.04	→	.04	→	→	.03	→	→	→	.04	→

S DUCED POLARIZATION - RECEIVER NOTES PAGE 16

Project: El Paso Line: 4-N ½ Int.Cal Da 3/3/66

Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4				
Rec.	→	→	50-60	→	→	→		cal.				
Time	30	3	30	30	10	3		1000				
DC-1	6.9 7.8	2.34 2.38	10.4 10.6	7.1 8.1	5.18 4.38	1.56 1.49		367 378				
DC-2	6.7 7.8	2.28 2.41	10.3 10.7	7.3 8.0	5.19 4.42	1.59 1.42		369 375				
Σ	14.5	4.72 4.69	21.0 21.0	15.8 15.3	9.56 9.61	3.05 3.01		745 744				
DC-3		2.28 2.46	10.1 10.7	7.2 8.1	5.09 4.41	1.63 1.52						
Dc-4		4.74	20.8	15.3	9.50	1.56 1.46						
Σ						3.15 3.08						
DC-AV	14.5	4.72 4.70	20.9 21.0	15.27	9.56 9.57	3.06 3.07		744.5				
AC-1	6.5	2.04	9.4	6.7	4.2	1.30		358				
AC-2	6.5	2.04	9.4	6.7	4.2	1.30		361				
Σ	13.0	4.08	18.8	13.4	8.4	2.60		719				
S. P.	→	→	+4	→	→	→						
AC-N	→	→	.04	→	→	→						

.948

.990
.980

AC/DC
.864
.871
.876

2 amp AC-DC

1 amp

1.2 w

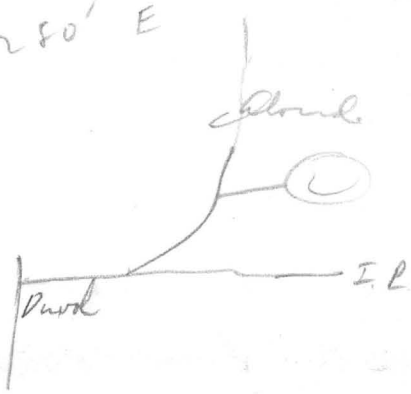
AC-1 107
107

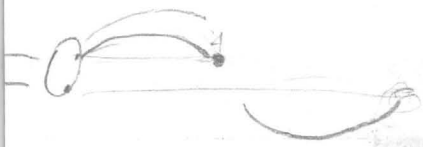
DC-1 124
124

AC-2 215
215

DC-2 245
246

1250' E





Small

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 2

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

		New		Old		Little						
Send	2-3	→										
Rec.												
Time	300	→										
DC-1	111.3 111.4	225 225	107 107	210 210	107 107	211 211						
DC-2	111.3 111.4											
Σ	222.7 222.7	450	214	420	214	422						
DC-3	111.3 111.4											
Dc-4	222.7											
Σ												
DC-AV	222.7	450	214	420	214	422						
AC-1	111	219	105	204	106	206						
AC-2	111	219	105	204	105	206						
Σ	222	438	210	408	211	412						
S. P.												
AC-N	.993	.972	.991	.994	.986	.976						
	1	2	1	2	1	2						

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: down Line: Int.Cal up Date:

		new			old			old		new	
Send	2-3	→			2-3	→		2-3	→		
Rec.											
Time	300	300	1000		300	1000		300	1000	300	1000
DC-1	120 121	121 122	363 365		114 114	385 336		111 111	328 330	121 122	363 361
DC-2											
Σ	241	243	728		228	671		222	658	243	724
DC-3											
Dc-4											
Σ											
DC-AV	242		728		228	671		222	658	243	724
AC-1	106	106	308		101	280		95	265	106	295
AC-2	106	106	308		101	281		95	265	106	294
Σ	212	212	616		202	561		190	530	212	589
S. P.											
AC-N	.881		.846		.886	.836		.856	.805	.874	.814
		1	3		1	3		1	3	1	3

b19

w/c.m. gends 120 M.V. Toc

big

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 3

Project: w/c.m. Line: new Int.Cal up Date:

Send	2-3											
Rec.												
Time	300											
DC-1	112 112											
DC-2	224											
Σ												
DC-3												
Dc-4												
Σ												
DC-AV	224											
AC-1	99											
AC-2	99											
Σ	198											
S. P.												
~~AC-N~~	.893											

big

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 4

Project: w/resist. Line: new Int.Cal up Date:

Send												
Rec.												
Time	300	300										
DC-1	132 131	132 131										
DC-2	132 131	132 131										
Σ	263 263	263 263										
DC-3												
Dc-4												
Σ												
DC-AV	263	263										
AC-1	166	166										
AC-2	166	166										
Σ	332	332										
S. P.												
~~AC-N~~	1.262	1.262										
	1	1										

$$\frac{117 \times .5 \times 3\cancel{000}}{\cancel{600}}$$

Sag 1.5 legend

2 3.5 guessed PFE

6.5 measured PFE avg n = 3

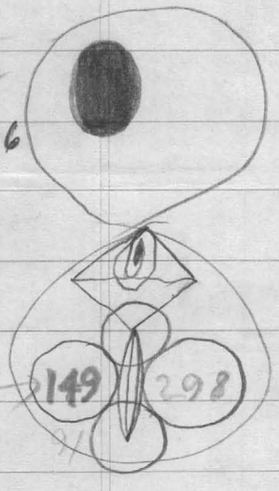
117
105
225
55
69.5
52.5
6.6
52
104

~ 55 = 1

~ 2 PFF avg

read 6.5 ∴ cal ≈ .952 - .950

.932
.960
1.892
0.946



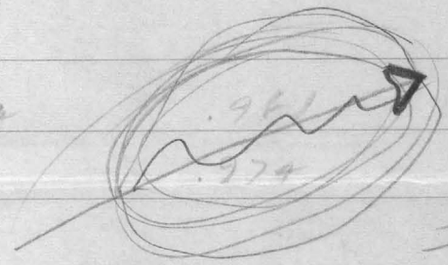
Nerve

→ .983 lamp

→ .972
.976

+ 21

22



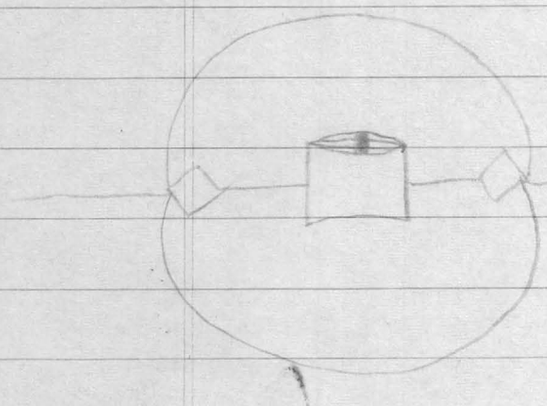
OFF

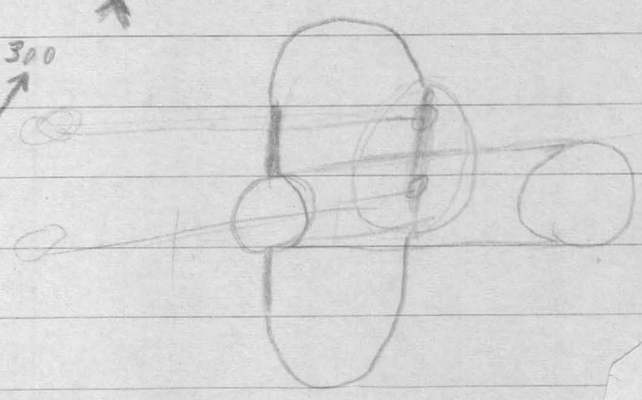
3 → 6

×30

× 10

100 200 300





.881
.846
3 | 3.5
1.17

.983
.972
2 | 1.1
.55

1 amp pite 1-2

110 AC
110
220

117 117
117 117
234

220 / 234 = 0.940

3 amp

330 AC
329
659
706.5

357 354
357 358
706 707

4-5 hrs

0.977 = Parse per

1 amp 2-3

110 AC
110
220

117
117
234

.940

3 amp

328 AC
328
656

351
351
702

.935

AC

116.5
116.5
233

116 116.5
116.5 116
232.5

11001

1a

113 AC
117
226

117
117
234

.966

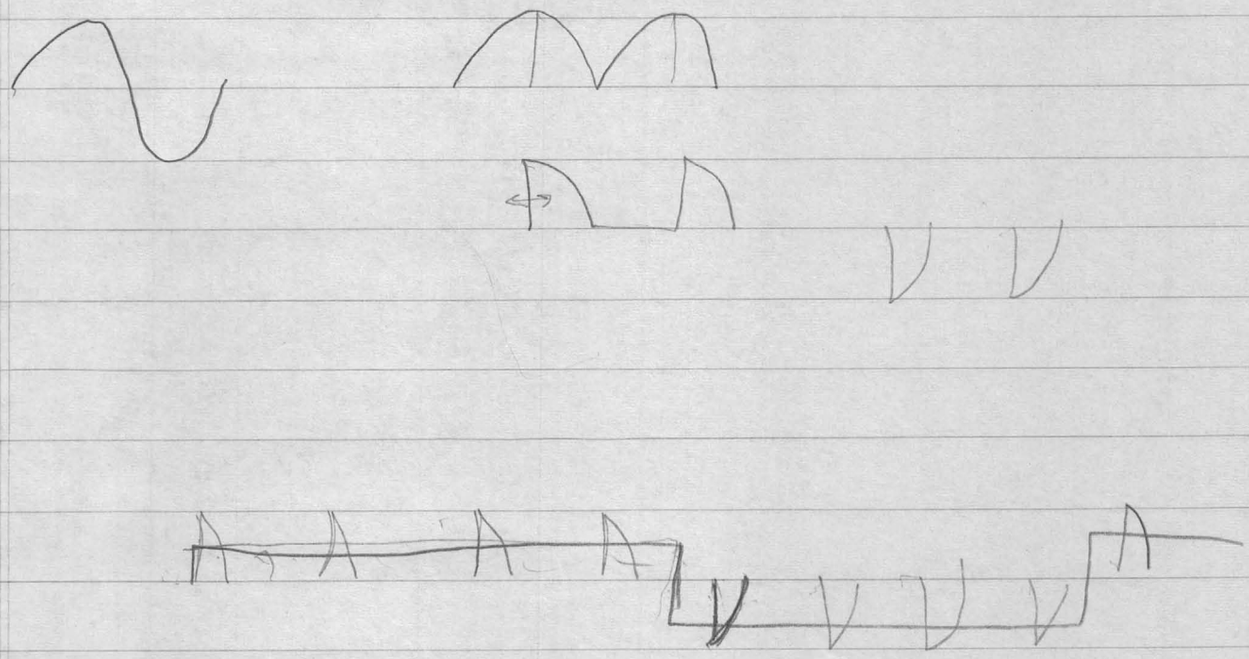
2a

338 AC
338
676

349
351
700

.966

765 IR



w/o Σ suppressor

1a

117 AC 117 117
117.5 116 116
226.5 233

.972

3a

338 AC 350
339 349
677 699

.966 .969

208 DC 208.5 .962 DC

102
50.5
52

.971 .858 DC

207 3.52 High

.928 AC/DC

.932

326 347 324+C 351

326 348 328 351

652 695 327

329

330

331

.939 330 352

.940 352

.939

.923

.938

Near site

	1	2	3
R.	300		1000
AC	113.5		~~116.5~~
	113.5		339
	227.0		339
			678
DC	116		353
	116.5		352
	232.5		705
Cal.	.976		~~114~~ ~~116.5~~
			.963

320 357

321 359

640 716

.895

Madden

1 amp

108 AC
107
215

109
109
218

.987

2 amp

220
217
217
217
434
444.5

222.5
222.5
445

222
222
444

.974

1 amp

106.5 AC
106
212.5

106.5
213
216

107
107
214

108
108
108
216

.986

Runs

.966 → .970

107 AC
106.5
213.5

109
109
218

.974
.961

Recovery 1a Madden

3 way 2.23 AC 2.14 2.53 1.92

2.27 2.53 1.92 2.72 1.12

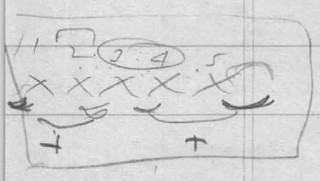
4.67 4.45 4.64 12.9

4.46 AC 2.42 2.23 46

2.23 2.27 2.87

4.65 4.46 4.57

4.57 DC



4.57 .986

1.1

Recovery 1a MK4

2.25 2.61 2.72 2.53 2.38

3 way 2.32 2.61 2.32 2.53 2.38 2.48

2.33 4.86 4.93 4.85 4.91 4.86

4.88 4.65 4.88

.966

±0.3 PFE 1.2

O.K.

4.66 3a MK4

6.99 AC 7.12 7.56 7.16 7.45 7.22

6.98 7.56 7.16 7.45 7.22 7.48

13.97 14.68 14.72 14.61 14.67 14.66

1.3 14.67

10 way

3 5a 11.3 AC 12.1 11.7

4.77 11.3 11.7 12.1

22.6 23.8 23.8

.966

1.7

INDUCED POLARIZATION SENDER NOTES

project: EL Paso Line: 2 5 1/2 Date: 2-28-66

Send	4/5	3/4	4/5	2/3	3/4	4/5	1/2	2/3	3/4	4/5	1/2	2/3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	2A	1.4A	2A	2A	1.4A	2A	2A	2A	1.4A	2A	2A	2A
Send	3/4	4/5	1/2	2/3	3/4	4/5		cal				
Receive	→	→	→	→	→	→		2/3				
Time												
Range												
Current	1.4A	2A	2A	2A	1.4A	2A		1A				

INDUCED POLARIZATION SENDER NOTES

Project: EL Paso Line: 2 N 1/2 Date: 2-28-66

Send	1/2	2/3	1/2	3/4	2/3	1/2	4/5	3/4	2/3	1/2	4/5	3/4
Receive	0-10	10	-20	20	—	30	30			40		
Time												
Range												
Current	2A	2A	2A	1.4A	2A	2A	2A	1.4A	2A	2A	2A	1.4A
Send	2/3	1/2	4/5	3/4	2/3	1/2		cal.				
Receive	40 -	50	50			60		3/4				
Time												
Range												
Current	2A	2A	2A	1.4A	2A	2A		1A				

INDUCED POLARIZATION - RECEIVER NOTES PAGE 5

Project: El Paso Line: 2-S ½ Int.Cal _____ Date: 2/28/66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
Time	100	100	30	100	30	10	100	30	10	10	30	10
DC-1	29.3 29.8	23.9 24.0	9.4 9.3	32.0 30.0	10.7 9.5	6.38 6.50	35.5 38.0	12.4 15.4	4.91 8.66	6.75 3.00	12.6 12.5	5.75 2.43
DC-2	29.2 29.8	23.9 24.1	9.4 9.3	30.2 29.9	10.8 9.4	6.35 6.55	35.4 38.0	12.3 15.4	4.72 8.80	6.71 2.68	12.6 12.5	5.69 2.54
Σ	59.1 59.0	47.9 48.0	18.7 18.7	62.0 60.1	20.2 20.2	12.88 12.90	73.5 73.4	27.8 27.7	13.57 13.58	9.75 9.39	25.1 25.1	13.18 13.83
DC-3	29.2 29.7	23.9 24.1		31.0 29.9	10.8 9.3	6.29 6.60	35.4 37.9	12.3 15.4	4.68 8.69	7.10 2.66	12.3 12.4	5.50 2.65
Dc-4	58.9	48.0		60.9	20.1	12.89	73.3	27.7	13.37	6.95 2.65	13.0 12.2	13.15
Σ										9.76 9.60	25.2 25.2	
DC-AV	59.0	48.0	18.7	61.0	20.17	12.89	73.4	27.73	13.48	9.60	25.15	13.18
AC-1	29.1	21.8	8.9	28.4	9.5	5.92	34.0	12.8	6.24	4.47	11.75	6.1
AC-2	28.0	21.8	8.9	28.4	9.5	5.93	34.1	12.8	6.23	4.47	11.75	6.1
Σ	56.1	43.6	17.8	56.8	19.0	11.85	68.1	25.6	12.47	8.94	23.50	12.2
S. P.	-8	-3	→	+2	→	→	-8	→	→	→	+22	→
AC-N	.04	.04	→	.04	→	→	.04	→	→	→	.04	→

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 6

Project: El Paso Line: 2-5½ Int.Cal Date: 2/28/66

Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3				
Rec.	→	→	50-60	→	→	→		cal.				
Time	10	10	10	10	3	3		300				
DC-1	2.19 4.83	4.60 1.29	6.95 4.36	3.00 3.59	1.94 1.86	2.01 1.36		114 113				
DC-2	2.19 4.90	4.62 1.24	7.10 4.31	3.01 3.54	1.89 1.89	2.04 1.28		114 113				
Σ	7.02 7.09	5.89 5.86	11.31 11.41	6.59 6.55	3.80 3.78	3.32 3.32		227 227				
DC-3	2.07 4.98	4.66 1.21	7.14 4.20	3.07 3.45	1.87 1.93	2.06 1.16						
Dc-4	2.05 4.99	4.70 1.19	7.3 4.07	3.14 3.50	1.84 1.98	2.18 1.10						
Σ	7.05 7.04	5.87 5.89	11.34 11.37	6.52 6.64	3.80 3.82	3.22 3.28						
DC-AV	7.06	5.87	11.36	6.57	3.80	3.28		227				
AC-1	3.28	2.72	5.29	3.05	1.74	1.51		109				
AC-2	3.27	2.71	5.29	3.05	1.76	1.51		109				
Σ	6.55	5.43	10.58	6.10	3.50	3.02		218				
S. P.	→	→	-15	→	→	→						
AC-N	→	→	.04	→	→	→						

INDUCED POLARIZATION - RECEIVER NOTES PAGE 7

Project: El Paso Line: 2-N½ Int.Cal Date: 2/28/66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	0-10	10-20	→	20-30		→	30-40			→	40-50	→
Time	100	100	30	100	30	10	300	30	10	3	30	10
DC-1	34.8 35.7	29.0 29.3	9.4 9.7	36.1 35.8	7.6 7.8	3.92 3.45	67.0 66.0	11.0 11.3	4.27 3.47	2.24 2.06	10.8 11.7	3.25 3.03
DC-2	34.6 35.8	29.0 29.6	9.4 9.7	36.1 35.6	7.6 7.3	3.91 3.43	67.0 66.0	10.9 11.3	4.20 3.51	2.20 2.04	10.7 11.7	3.80 3.00
Σ	70.5 70.4	58.3 58.6	19.1 19.1	71.9 71.7	14.9 14.9	7.37 7.34	133.0 133.0	22.3 22.2	7.94 7.71	4.30 4.24	22.5 22.4	6.88 6.30
DC-3	34.4 35.8	29.1 29.7	9.4 9.7	36.1 35.8	7.6 7.3	3.91 3.41		10.8 11.3	4.10 3.58	2.21 2.05	10.6 11.8	3.30 3.05
Dc-4	70.2	29.1 29.6	19.1	71.9	14.9	7.32		22.2	4.05 3.66	2.26 2.06	10.6 11.8	6.35
Σ		58.8 58.7							7.68 7.71	4.26 4.32	22.4 22.4	
DC-AV	70.4	58.5	19.1	71.8	14.9	7.35	133.0	22.2	7.71	4.28	22.4	6.31
AC-1	33.7	28.0	9.1	34.1	7.0	3.45	63.0	10.6	3.66	2.1	10.5	2.95
AC-2	33.7	28.0	9.1	34.1	7.1	3.44	63.0	10.6	3.66	2.0	10.5	2.93
Σ	67.4	56.0	18.2	68.2	14.1	6.89	126.0	21.2	7.32	4.1	21.0	5.88
S. P.	-10	-8	→	-10	→	→	+1	→	→	→	+1	→
AC-N	.04	.04	→	.04	→	→	.04	→	→	→	.04	→

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 8

Project: El Paso Line: 2 - N½ Int.Cal Date: 2/28/66

Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4				
Rec.	→	→	50-60	→	→	→		Cal.				
Time	3	3	10	10	10	10		300				
DC-1	1.27 1.77	1.27 0.53	5.75 2.38	4.90 0.30	4.65 2.43	4.28 2.81		113.0 113.5		4.28 2.81	4.25 2.82 1.43	
DC-2	1.23 1.77	1.22 0.59	5.63 2.39	4.45 0.30	4.72 2.50	4.25 2.82		113.0 113.5		1.47 .7.35	.715	4.23 2.79 1.44
Σ	3.04 3.00	1.80 1.81	13.13 13.02	5.20 5.25	7.08 7.22	7.09 7.07		226.5 226.5		.715 .720		.720
DC-3	1.78 1.72	1.16 .62	5.60 2.48	5.10 0.35	4.71 2.48	4.23 2.79				2.70 .726		
Dc-4	1.27 1.72	1.16 0.62	5.58 2.50	5.35 0.40	4.63 2.47	7.02						
Σ	2.90 2.99	1.78 1.78	13.08 13.08	5.45 5.75	7.19 7.10							
DC-AV	2.96	1.79	13.06	5.38	7.10	1.9.726 ~~7.05~~		226.5				
AC-1	1.39	0.81	5.95	2.05	0.98	0.60		109				
AC-2	1.37	0.81	5.95	2.05	0.97	0.60		109				
Σ	2.76	1.62	11.90	4.10	1.95	1.20		218				
S. P.	→	→	-7	→	→	→						
AC-N	→	→	.04	→	→	→						

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 3

Project El Paso Line 2-S 5 Field date 2/28/66 Data page 5 & 6 Comp. date 2/28/66. Comp by R.B.

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
(C) n separation	100	100	30	100	30	10	100	30	10	10	30	10
(D) I	2000	1400	2000	2000	1400	2000	2000	2000	1400	2000	2000	2000
(E) Vdc (avg)	59.0	48.0	18.7	61.0	20.17	12.89	73.4	27.73	13.48	9.60	25.15	13.18
(F) DCcal	.440	→	→	→	→	→	→	→	→	→	→	→
(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	12.0	30.0
(H) ρ dc=ExFxGx10^3/D	39.1	45.1	~~44.1~~ 49.1	40.2	75.9	85.0	48.4	61.0	126.7	125.8	55.4	87.0
(I) Vac Σ	56.1	43.6	17.8	56.8	19.0	11.85	68.1	25.6	12.47	8.94	23.5	12.2
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.961	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.010	1.058	1.010	1.032	1.019	1.045	1.036	1.041	1.038	1.032	1.027	1.038
(N) PFE=(M-1)(10^2)	1.0	5.8	1.0	3.2	1.9	4.5	3.6	4.1	3.8	3.2	2.7	3.8
(O) MCF=(M-1)(10^5)/H	26	128	24	79	25	53	74	67	30	25	49	44

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3				
(B) Receive	→	→	50-60	→	→	→		cal.				
(C) n separation	10	10	10	10	3	3		300				
(D) I	1400	2000	2000	2000	1400	2000		1000				
(E) Vdc (avg)	7.06	5.87	11.36	6.57	3.80	3.28		227				
(F) DCcal	→	→	→	→	→	→		.440				
(G) Kn x 10^{-3}	60.0	105.0	30.0	60.0	105.0	168.0						
(H) ρ dc=ExFxGx10^3/D	132.8	135.6	75.0	86.1	125.4	121.2						
(I) Vac Σ	6.55	5.43	10.58	6.1	3.5	3.02		218				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→	→		.961				
(M) ρdc/ρac =ExL/K	1.037	1.038	1.031	1.036	1.043	1.043						
(N) PFE=(M-1)(10^2)	3.7	3.8	3.1	3.6	4.3	4.3						
(O) MCF=(M-1)(10^5)/H	28	28	41	48	41	29						

diabolic
φ+z

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 4

Project El Paso Line 2-N½ Field date 2/28/66 Data page 7 & 8 Comp. date 2/28/66. Comp by D.F.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
(C) n separation	100	100	30	100	30	10	300	30	10	3	30	10
(D) I	2000	2000	2000	1400	2000	2000	2000	1400	2000	2000	2000	1400
(E) Vdc (avg)	70.4	58.5	19.1	71.8	14.9	7.35	133.0	22.2	7.71	4.28	22.4	6.31
(F) DCcal	.441	→	→	→	→	→	→	→	→	→	→	→
(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	12.0	30.0
(H) ρ dc=ExFxGx10^3/D	46.5	38.6	50.5	67.5	32.8	48.5	87.8	83.6	50.8	56.6	49.4	59.4
(I) Vac Σ	67.4	56.0	18.2	68.2	14.1	6.89	126.0	21.2	7.32	4.1	21.0	5.88
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.963	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	0.6	0.7	1.1	1.2	1.7	2.7	1.6	0.9	1.2	0.6	2.6	3.2
(O) MCF=(M-1)(10^5)/H	13	18	22	17	52	56	18	11	24	11	53	54

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

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4				
(B) Receive	→	→	50-60	→	→	→		cal.				
(C) n separation	3	3	10	10	10	10		300				
(D) I	2000	2000	2000	1400	2000	2000		1000				
(E) Vdc (avg)	2.96	1.79	13.06	~~5.38~~	~~7.10~~	~~7.05~~		226.5				
(F) DCcal	→	→	→	→	→	→		.441				
(G) Kn x 10^{-3}	60.0	105.0	30.0	60.0	105.0	168.0						
(H) ρ dc=ExFxGx10^3/D	39.1	46.4	86.2	72.2	45.1	44.4						
(I) Vac Σ	2.76	1.62	11.9	(4.1)	(1.95)	(1.2)		218				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→	→		.963				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	3.2	6.3	5.6	—	—	—						
(O) MCF=(M-1)(10^5)/H	82	150	65	—	—	—						

Call John Reynolds

4/7/66

on El Paso

CALL

Sky line 72556

753.2556

INDUCED POLARIZATION - RECEIVER NOTES PAGE 4

Project: EMERALD ISLE EL PASO Line: 1 Spr A Int.Cal _____ Date: 4-6-66

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				2-3
Rec.	40-50	→	→	→	50-60	→	→	→				CAL
Time	100	30	30	10	30	10	10	3				300
DC-1	51.0 50.8	17.5 18.2	9.3 9.9	5.22 4.82	16.7 15.7	6.40 6.85	3.85 4.05	2.21 2.03				218
DC-2	51.2 50.5	17.8 17.9	9.6 10.4	4.70 5.05	15.9 16.9	6.35 6.86	3.98 3.95	2.33 1.86				218
Σ							7.90 7.93					
DC-3			9.6 9.9	5.25 5.25	16.0 16.6	6.55 6.65	3.95 3.80	2.14 2.26				218
Dc-4			9.4 10.0	4.78 4.99	15.9 16.8	6.55	4.20 3.78	1.97 2.26				218
Σ			✓	✓			7.98					
DC-AV						✓	7.94					
AC-1	46.2	15.6	8.6	4.48	14.9	5.78	3.55	1.90				214
AC-2	"	"	"	"	"	"	"					214
Σ							7.10					
S. P.	-5.2				-1.1							
AC-N	.03				.02		7.90 7.93					
							7.98					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 3

Project: EL PASO EMERALD Isle Line: 1 Set A 5k Int.Cal _____ Date: _____

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.	0-1000	10-20	→	20-30	→	→	30-40	→	→	→		
Time	300	300	100	300	100	30	300	100	30	10		
DC-1	237.0 236.0	207.0 206.0	56.0 58.5	105.0 104.0	36.5 36.2	14.2 14.4	129.0 130.0	33.5 32.0	47.5 49.5	7.22 6.95		
DC-2	237.0 236.0	207.0 206.0	56.2 57.2	105.0 104.0	37.2 36.5	14.1 14.0	129.0 130.0	33.0 32.2	48.0 50.2	7.10 6.95		
Σ												
DC-3			56.1		36.8 36.2	14.2 14.5			48.0 49.0	7.15 6.90		
Dc-4					36.4 36.2				48.0 49.8	7.35 7.05		
Σ			56.7									
DC-AV												
AC-1	205.0	180.5	50.5	92.0	32.2	12.7	120.0	28.4	42.8	6.32		
AC-2	"	"	"	"	"	"	"	"	"	"		
Σ												
S. P.	-4.3	+11.3		-0.4			+23.7					
AC-N	.03	.04		.05			.03					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: EMERALD ISLE (El Paso) Line: 1A N 1/2 Int.Cal 93.0 Date: 4-6-66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	0-1000	1-2000	→	2-3000	→	→	3-4000	→	→	→		
Time	300	300	100	300	100	30	300	100	30	30		
DC-1	201.0 201.0	224.0 224.0	55.2 54.5	243.0 250.0	49.2 49.2	19.3 20.3	175.0 175.0	44.8 43.8	14.6 14.6	8.2 7.9	8.05	
DC-2	201.0 201.0	224.0 224.0	55.0 54.6	243.0 250.0	49.2 49.2	19.6 20.1	174.0 176.0	44.8 43.8	14.3 14.5	8.4 7.7		
Σ												
DC-3			54.8 54.85			19.6 20.1			14.4 15.7			
Dc-4						19.8 19.85						
Σ	201.0	224.0	54.82	246.5	49.2	19.83	175.0	44.3	14.7	8.05		
DC-AV												
AC-1	178.0	195.0	49.8	219.0	43.8	17.9	164.0	40.2	13.4	7.2		
AC-2	178.0	"	"	"	"	"	"	"	"	"		
Σ												
S. P.	+4.3	-14.6		+8.5			+0.9					
AC-N	.05	.05		.05			.05					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Emerald Isle Line: 1A N/2 Int.Cal _____ Date: 4-6-66

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2			3-4	
Rec.	4-5000	→		→	5-6000	→		→			CAL	
Time	100	30	30	10	100	30	10	10			300	
DC-1	60.2 60.0	23.5 24.9	10.0 8.8	6.15 5.58	34.2 34.2	15.9 15.6	7.18 7.45	4.72 5.60			219 219	
DC-2	60.2 60.0	23.4 24.4	9.4 9.6	5.82 6.18	34.2 34.2	15.8 15.7	6.98 7.42	4.58 5.78			219 219	
Σ								5.20				
DC-3			9.7 9.5	5.78 6.20			6.82 7.58	4.82 3.98				
Dc-4				5.92 6.20			7.30 6.95	6.00 5.20				
Σ	60.	7						3.78				
DC-AV	60.0	24.02	9.5	5.98	34.2	15.75	7.20	4.97				
AC-1	57.2	21.9	8.5	5.35	32.2	14.2	6.35	4.22				
AC-2	"	"	"	"	"	"	"	"			215.0 "	
Σ												
S. P.	-11.2				+12.7							
AC-N	.03				.04							

STA # B 13N under power line

CAC 2A 95V

INDUCED POLARIZATION SENDER NOTES

Project: _____ Line: 1A- 5½ Date: _____

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Receive												
Time												
Range	220	220	205	250	310	305	220	245	310	300		
Current	6A											
Send												
Receive												
Time												
Range												
Current												

23 14.6

6 | 88.4
14.7

CAL 2A

INDUCED POLARIZATION SENDER NOTES

Project: EL PASO Line: 1A N 1/2 Date: 4/6/66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive	3-4	4-5	4-5	5-6	5-6	5-6	6-7	6-7	6-7	6-7		
Time												
Range VOLTS	230	250		330			300					
Current	6A	6A	6A	6A	6A	6A	6A	6A	6A	6A		
Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
Receive	7-8	7-8	7-8	7-8	8-9	8-9	8-9	8-9				
Time												
Range												
Current	6A	6A	6A	6A	6A	6A	6A	6A				

INDUCED POLARIZATION SENDER NOTES

Project: _____ Line: 4-A N/2 Date: 4-12-66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive	7-8 00	8-9 →		9-10	→		10-11	→				
Time												
Range	150V	120V	150V	110V	120V	150V	400V	120V	120V	150V		
Current	5A	5A	5A	5A	5A	5A	5A	5A	5A	5A		
Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2			CAC	4-5
Receive	11			12	12			13				
Time												260V
Range	400V	120V	120V	100V	400V	110V	110V	160V				
Current	5A	5A	5A	5A	5A	5A	5A	5A				1A

5.7	2.7	0.7
6.6	3.6	1.6
9.2	6.2	4.2
11.6	8.6	6.6
12.3 ?	9.3	7.3
17	14	11

EL PASO
N.G.

INDUCED POLARIZATION SENDER NOTES

Project: EMERALD ISLE Line: 2A N 1/2 Date: 4-9-6

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive												
Time												
Range	220V	190V	22p	20p	190	22p	360V	200	190	220		
Current	6A	6A	6A	6A	6A	6A	6A	6A	6A	6A	CAL	3-4
Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				100
Receive	360V											N
Time					450V	160V						6A
Range	360A	200V	190	220	360V	200	140V	180V				
Current	6A	6A	6A	6A	5A	5A	5A	5A				

EL PASO NAT. GAS.

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 4-11-6

Project: Em. Isle Line: 2A - S 1/2 Int.Cal _____ Date: _____

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.	(	(		)			)			)		
Time												
DC-1												
DC-2	440	170	470	160	170	470	195	160	170	460	CAL	
Σ	5A	5A	5A	5A	5A	5A	5A	5A	5A	5A		
DC-3	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5			2-3	
Dc-4	(190	160	170	460)	(190	160	175	460)				
Σ	5A	5A	5A	5A	5A	5A	5A	5A				
DC-AV											100V	
AC-1												
AC-2												
Σ											2A	
S. P.												
AC-N												
Pot.Res.												

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

EL PASO

Project: EMERALD ISLE Line: 4A-5 1/2 Int.Cal _____ Date: 4-12-66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.	6-7000	5 — 6000		4 —		5000	3 —		4000	→		
Time	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
DC-1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
VOLTAGE DC-2	400V	120V	400V	110V	110V	390V	160V	110V	110V	400V		
Σ AMP	5AMP	5AMP	5A	5A	5A	5A	5A	5A	5A	5A		
DC-3												
Dc-4	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5			CAC	2-3
Σ	2000	—	3000 →		← 1000		—	2000				1
DC-AV	↓	↓	↓	↓	↓	↓	↓	↓				90V
AC-1	↓	↓	↓	↓	↓	↓	↓	↓				1
AC-2 V	160V	110V	110V	390V	160V	110V	110V	320V				2A
Σ A	5A	5A	5A	5A	5A	5A	5A	4A				
S. P.								=				
AC-N												

174
6
1044
209

CAR

300

216.P

216.0

216.0
216.0

213.0
213.0

PHASE I

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project El Paso Line 1-N½ Field date 2/25/66 Data page _____ Comp. date 3/16/66. Comp by C.J.L.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	0-1N	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→
(C) n separation												
(D) I	6A	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	141.5	116.6 117.6	44.1	167 170.0	56.3 56.1	27.5	126.8	43.8	20.3	11.10	50.6	24.9
(F) DCcal USED	.410	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60	12	30
(H) ρ dc=ExFxGx10^3/D	29	24 24	36	34 35	46	56	26	36	42	45	41	51
(I) Vac Σ	130.8	109.8 112.4	41.1	156 161.2	53.1 53.6	25.4	120.5	41.2	18.8	10.20	47.0	23.0
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.957	.957 .971	.957	.957 .971	.957 .971	.957	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	3.6	1.7 1.4	2.6	2.3 2.3	1.5 1.7	3.6	0.6	1.6	3.1	4.1	2.9	3.6
(O) MCF=(M-1)(10^5)/H	124	71 58	72	68 66	33 37	64	23	44	74	91	71	71

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

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2		C4L				
(B) Receive	→	→	5-6N	→	→	→						
(C) n separation												
(D) I	→	→	→	→	→	→		3				
(E) Vdc (avg)	12.68	7.50	34.2	19.25	10.69	6.65		730.5				
(F) DCcal	→	→	→	→	→	→		.410				
(G) Kn x 10^{-3}	60	105	30	60	105	168						
(H) ρ dc=ExFxGx10^3/D	52	54	70	79	77	76						
(I) Vac Σ	11.8	6.66	30.5	17.20	9.44	5.60		710.0				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→	→		.971				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	2.8	7.7	7.2	7.1	8.3	13.6						
(O) MCF=(M-1)(10^5)/H	54	143	103	90	108	179						

.953 .975 avg .967

.972

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project El Paso Line 1-5½ Field date 2-24-66 Data page_____ Comp. date 3/16/66. Comp by C.S.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	2-3
(B) Receive	0-1.5	1-2.5	→	2-3.5	→	→	3-4.5	→	→	→	4-5.5	→
(C) n separation												
(D) I	6 amp	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	116.8	140 142.3	41.9	147 147.6	51.3 49.9	25.9	120.2	37.3	21.0	11.83	64.0	26.3
(F) DCcal USED	.410	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60	12	30
(H) ρdc=ExFxGx10^3/D	24	29 29	34	30 30	42 41	53	25	31	43	48	52	54
(I) Vac Σ	112.1	132 133.8	41.3	136 138.3	47.8 46.2	23.8	111.8	34.2	19.4	10.78	58.5	23.9
(J) AC noise x 2 O.K.												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.967	.967 .969	.967	.967 .969	.967 .969	.967	→	→	→	→	→	→
(M) ρdc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.5 0.5	2.5 1.5 3.1	~~-17~~	4.4 2.4 3.2	3.8 2.8 4.7	5.1 4.1	4.0 3.0	5.4 4.4	4.6 3.6	6.1 5.1	5.8 4.8	6.3 5.3
(O) MCF=(M-1)(10^5)/H	21	52 107	~~-~~	113 107	67 115	77	120	142	84	106	92	98

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5		CAL				
(B) Receive	→	→	5-6.5	→	→	→		Field				
(C) n separation									*			
(D) I	→	→	→	→	→	→		3	3			
(E) Vdc (avg)	16.3	9.55	21.1	10.01	6.76	4.08		537	733			
(F) DCcal								.558	.409			
(G) Kn x 10^{-3}	60	105	30	60	105	168						
(H) ρdc=ExFxGx10^3/D	67	69	43	41	48	47						
(I) Vac Σ	14.8	8.60	19.2	9.08	6.02	3.60		500	710			
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→	→			.969			
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	6.3 5.3	7.2 6.2	6.2 5.2	6.8 5.8	8.5 7.5	9.5 8.5						
(O) MCF=(M-1)(10^5)/H	79	90	121	141	156	181						

5.0
2.0

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project_____ Line 1 N½ Field date_____ Data page_____ Comp. date_____. Comp by_____

(A) Send	1-2	2-3	1-2									
(B) Receive	0-10	10-20	→									
(C) n separation	100	100	30									
(D) I	6A	→	→									
(E) Vdc (avg)	141.5	116.6	44.1									
(F) DCcal	0.415	→	→									
(G) Kn x 10^{-3}	3	3	12									
(H) ρ dc=ExFxGx10^3/D	29.35.3	24.29.1	26.44.1									
(I) Vac Σ	170.8	109.8	41.05									
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.958	.983										
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	8.262	1.642	2.947									
(O) MCF=(M-1)(10^5)/H	280	66	79									

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send								CAL				
(B) Receive								3-4				
(C) n separation								1000				
(D) I								3A				
(E) Vdc (avg)								723		361.5		
(F) DCcal								.415				
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D												
(I) Vac Σ								694				
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.								960				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

.98 ? 8.3 .93 +

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project El Paso Line Center of section Field date 2/24 Data page_____ Comp. date_____. Comp by_____

	1		5½									
(A) Send	4-5	3-4	4-5	2-3	3-4	4-5						
(B) Receive	0-10	10-20s	→	20-30s	→	→						
(C) n separation	100	200	100	300	100	30	100	30	30	10	100	30
(D) I	6A	→	→									
(E) Vdc (avg)	116.8	140	41.88	147	51.3	25.8	120.2	37.3	21.0	11.83	64.0	26.3
(F) DCcal	.5											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60	12	30
(H) ρ dc=ExFxGx10^3/D	29.2	35.0	41.2	36.7	51.3	64.5	30.0	37.3	52.5	59.1	64.0	65.8
(I) Vac Σ	112.1	132	41.3	136	47.8	23.8	111.8	34.2	19.4	10.77	58.5	23.9
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	0.983											
(M) ρ dc/ρac=ExL/K	5.2	7.1	2.9									
(N) PFE=(M-1)(10^2)	~~7.2~~ 2.2	8.8 4.1	4.5 -0.3	0.8 6.0	0.1 5.4	1.1 6.5	8.6 5.8	1.8 7.2	0.96 3	1.7 7.8	2.8 6.6	2.6 8.0
(O) MCF=(M-1)(10^5)/H	221	224	96	19	1.7	15	25.6	43	63	28	39	35

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send								cal				
(B) Receive								2-3				
(C) n separation	30	10	30	10	10	3		1000				
(D) I								30				
(E) Vdc (avg)	16.3	9.45	21.0	10.1	6.76	4.10		536.7		266		
(F) DCcal								.56				
(G) Kn x 10^{-3}	60	105	30	60	105	168						
(H) ρ dc=ExFxGx10^3/D	81.5	82.6	52.5	50.5	59.1	57.4						
(I) Vac Σ	14.8	8.60	19.2	9.08	6.02	3.50		500				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.								.932				
(M) ρdc/ρac =ExL/K				3.7								
(N) PFE=(M-1)(10^2)	2.7 8.3	2.5 7.9	2.4 7.6	6.1 9.3	4.8 10.2	9.2 15.0						
(O) MCF=(M-1)(10^5)/H	30	27	41	108	78	147						

5 PFE 0.950

INDUCED POLARIZATION SENDER NOTES

project: El Paso Line: 1-5½ Date: 3/3/66

Send	4-5	3-4	4-5	2-3	3-4	4-5		2-3				
Receive	0-10	10-20	→	20-30	→	→		cal.				
Time												
Range												
Current		6A		6A	6A			3A				
Send												
Receive												
Time												
Range												
Current												

INDUCED POLARIZATION SENDER NOTES

project: El Paso Line: 1-N½ Date: 3/3/66

Send	1-2	2-3	1-2	3-4	2-3	1-2		3-4				
Receive	0-10	10-20	→	20-30	→	→		cal.				
Time												
Range												
Current		6A		6A	6A			3A				
Send												
Receive												
Time												
Range												
Current												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: El Paso Line: 1-5+ Int.Cal Date 3/3/66

Send	4-5	3-4	4-5	2-3	3-4	4-5		2-3				
Rec.	0-10	10-20	→	20-30	→	→		cal.				
Time		100		100	100			1000				
DC-1		71.5 20.8		72.6 75.0	23.7 26.2			365 368				
DC-2		71.7 20.7		72.6 75.0	23.7 26.3			365 368				
Σ		142.3 142.4		147.6 147.6	49.9 50.0			733 733				
DC-3		71.6 20.7			23.7 26.1							
Dc-4		142.3			49.8							
Σ												
DC-AV		142.3		147.6	49.9			733				
AC-1		66.9		69.1	23.1			356				
AC-2		66.9		69.2	23.1			354				
Σ		133.8		138.3	46.2			710				
S. P.		-16		+50	→							
AC-N		.10		.10	→							

INDUCED POLARIZATION - RECEIVER NOTES PAGE 3

Project: El Paso Line: 1-N 1/2 Int.Cal Date 3/3/66

Send	1-2	2-3	1-2	3-4	2-3	1-2		3-4				
Rec.	0-10	10-20	→	20-30	→			cal.				
Time		100		100	100			1000				
DC-1		59.3 58.2		85.7 84.3	26.2 29.9			364 367				
DC-2		59.4 58.2		86.0 84.0	26.0 30.0			363 367				
Σ		117.5 117.6		170.0 170.0	56.1 56.0			731 730				
DC-3				86.4 83.6								
Dc-4				170.0								
Σ												
DC-AV		117.55		170.0	56.05			730.5				
AC-1		56.3		80.6	26.8			353				
AC-2		56.1		80.6	26.8			357				
Σ		112.4		161.2	53.6			710				
S. P.		-3		+18	→							
AC-N		.06		.09	→							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project El Paso Line 1-5½ Field date 3/3/66 Data page 1 Comp. date 3/4/66 . Comp by R.R.

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5		2-3				
(B) Receive	0-10	10-20	→	20-30	→	→		cal.				
(C) n separation												
(D) I		6000		6000	6000			3000				
(E) Vdc (avg)		142.3		147.6	49.9			733.0				
(F) DCcal	.409					→		.409				
(G) Kn x 10^{-3}		3		3	12							
(H) ρ dc=ExFxGx10^3/D		29.1		30.1	40.7							
(I) Vac Σ		133.8		138.3	46.2			710.0				
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.969					→		.969				
(M) ρ dc/ρac=ExL/K		1.031		1.032	1.044							
(N) PFE=(M-1)(10^2)		3.1		3.2	4.4							
(O) MCF=(M-1)(10^5)/H		110		110	110							

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 COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project El Paso Line 1-N½ Field date 3/3/66 Data page 3 Comp. date 3/4/66. Comp by D.D.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2		3-4				
(B) Receive	0-10	10-20	→	20-30	→	→		cal.				
(C) n separation												
(D) I		6000		6000	6000			3000				
(E) Vdc (avg)		117.55		170.0	56.05			430.5				
(F) DCcal	.411				→			.411				
(G) Kn x 10^{-3}		3		3	12							
(H) ρ dc=ExFxGx10^3/D		24.2		34.9	27.6							
(I) Vac Σ		112.4		161.8	53.6			710.0				
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.971				→			.971				
(M) ρ dc/ρac=ExL/K		1.015		1.023	1.015							
(N) PFE=(M-1)(10^2)		1.5		2.3	1.5							
(O) MCF=(M-1)(10^5)/H		62		66	54							

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

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

INDUCED POLARIZATION SENDER NOTES

Project: El Paso Line: 1 - 8 1/2 Date: 2-24-66

Send	4/5	3/4	4/5	2/3	3/4	4/5	1/2	2/3	3/4	4/5	1/2	2/3
Receive	0-1000	1000 - 2000		2000 - 3000			3000	—	4000		4000 -	
Time												
Range												
Current	6A	6A	6A	6A	6A	6A	6A	6A	6A	6A	6A	6A
Send	3/4	4/5	1/2	2/3	3/4	4/5		cal				
Receive	5000		5000 - 6000					2/3				
Time												
Range												
Current	6A	6A	6A	6A	6A	6A		3A				

INDUCED POLARIZATION SENDER NOTES

Project: El Paso Line: 1 - N½ Date: 2/25/66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
Time												
Range												
Current	6A	6A	6A	6A	6A	6A	6A	6A	6A	6A	6A	6A
Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4				
Receive	→	→	50-60	→	→	→		cal.				
Time												
Range												
Current	6A	6A						3A				

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 1

Project: El Paso Line: 1 - 5 ½ Int.Cal _____ Date: 2/24/66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
Time	100	300	100	300	100	30	100	30	30	10	100	30
DC-1	58.6 58.1	69 71	22.0 19.8	74 73	24.5 27.0	14.0 11.9	60.0 60.2	19.8 17.6	11.5 9.7	7.0 4.82	32.1 31.8	12.7 13.6
DC-2	58.6 58.1	69 71	22.1 19.8	74 73	24.5 26.8	13.8 11.9	60.0 60.2	19.8 17.3	11.5 9.6	7.23 4.6	32.1 32	12.9 13.4
Σ	116.7 116.7	140 140	41.8 41.8	147 147	51.5 51.3	25.9 25.7	120.2 120.2	37.4 37.1	20.7 20.1	11.88 11.83	63.9 64.1	26.3 26.3
DC-3	58.7 58.1	69 71	22.1 19.8	74 73	24.5 26.7	14.1 11.6	60.0 60.2	20.1 17.3	11.7 9.4	7.23 4.58	32.1 31.9	13 13.3
Dc-4	116.8	140	41.9	147	51.2	14.3 12.0	120.2	19.1 17.5	11.7 9.4	7.4 4.55	64.0	13 13.3
Σ						25.7 26.3		37.2	21.1 21.1	11.81 11.95		26.3 26.3
DC-AV	116.77	140	41.88	147	51.3	25.9	120.2	37.3	21.0	11.83	64.0	26.3
AC-1	56.1	66	20.8	68	23.9	11.8	55.9	17.1	9.7	5.38	29.2	11.9
AC-2	56.0	66	20.5	68	23.9	12.0	55.9	17.1	9.7	5.395	29.3	12.0
Σ	112.1	132	41.3	136	47.8	23.8	111.8	34.2	19.4	10.775	58.5	23.9
S. P.	+13	-9	→	+32	→	→	+16	→	→	→	+3	→
AC-N	.04	.03	→	.04	→	→	.04	→	→	→	.04	→

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: El Paso Line: 1-S ½ Int.Cal Date: 2/24/66

Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3				
Rec.	→	→	50-60	→	→	→		cal.				
Time	30	10	30	10	10	3		1000				
DC-1	8.5 7.8	4.85 4.75	9.7 11.6	4.37 5.6	3.7 3.05	1.73 2.25		266 270				
DC-2	8.5 7.8	4.84 4.66	9.6 11.4	4.35 5.7	3.74 2.9	1.18 2.76		267 270				
Σ	16.3 16.3	9.60 9.50	21.3 21.0	9.97 10.05	6.75 6.64	3.98 3.94		536 537				
DC-3	8.6 7.7	4.91 4.78	9.7 11.2	4.48 5.35	3.8 3.0	1.64 2.64		270 267				
Dc-4	16.3	5.12 4.35	9.8 11.4	4.7 5.51	3.85 2.93	1.34 2.76		537				
Σ		9.64 9.47	20.9 21.2	9.83 10.21	6.8 5.93	4.28 4.10						
DC-AV	16.3	9.45	21.0	10.01	6.76	4.09 10		536.7				
AC-1	7.4	4.3	9.6	4.54	3.01	1.79		250				
AC-2	7.4	4.3	9.6	4.54	3.01	1.81		250				
Σ	14.8	8.6	19.2	9.08	6.02	3.60		500				
S. P.	→	→	-5	→	→	→						
AC-N	→	→	.04	→	→	→						

INDUCED POLARIZATION - RECEIVER NOTES PAGE 3

Project: El Paso Line: 1 N ½ Int.Cal Date: 2/25/66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Rec.	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
Time	100	100	30	300	100	30	100	30	30	10	30	30
DC-1	71.3 70.3	58.7 58.1	21.2 22.7	83 84	27.5 28.8	14.2 13.1	63.0 64.2	22.1 21.3	11.0 10.3	5.6 5.6	24.7 25.6	13.6 11.6
DC-2	71.0 70.3	58.8 57.9	21.6 22.2	83 84	27.3 28.6	14.5 13.4	62.8 63.0	21.7 21.6	10.1 9.6	5.1 5.9	24.9 25.8	13.4 11.4
Σ	141.6 141.3	116.6 116.7	43.8 43.9	167 167	56.3 55.9	27.3 27.9	127.2 125.8	43.4 43.3	21.3 19.7	11.2 11.0	50.3 50.7	25.2 24.8
DC-3	71.5 69.8	59.5 56.9	22.2 22.3		27.9 28.6	14.1 13.0	65.0 63.0	22.6 21.6	10.5 9.2	5.4 5.63	25.0 25.7	12.8 11.9
Dc-4	71.4 70.3	59.3 52.5	22.0 22.2		27.3 29.1	14.6 13.1	62.8 63.5	22.4 21.9	10.6 9.9	5.3 5.78	24.6 26.1	12.5 12.4
Σ	141.3 141.7	116.4 116.8	44.5 44.2		56.5 56.4	27.1 27.7	128.0 126.3	44.3 44.3	19.7 20.5	11.03 11.08	50.7 50.7	24.7 24.9
DC-AV	141.5	116.6	44.1	167	56.3	27.5	126.8	43.7	20.4	11.1	50.6	24.9
AC-1	65.3	54.8	20.55	78	26.6	12.7	60.3	20.6	9.4	5.1	23.5	11.5
AC-2	65.5	55.0	20.5	78	26.5	12.7	60.2	20.6	9.4	5.1	23.5	11.5
Σ	130.8	109.8	41.05	156	53.1	25.4	120.5	41.2	18.8	10.2	47.0	23.0
S. P.	-1	-4	→	-15	→	→	-20	→	→	→	-6	→
AC-N	.06	.04	→	.04	→	→	.04	→	→	→	.03	→

INDUCED POLARIZATION - RECEIVER NOTES PAGE 4

Project: El Paso Line: 1-N½ Int.Cal Date: 2/25/66

Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4				
Rec.	→	→	50-60	→	→	→		cal.				
Time	10	10	30	30	10	10		1000				
DC-1	6.9 5.7	3.25 4.35	17.6 16.7	8.6 10.5	6.1 4.5	2.1 4.1		361 362				
DC-2	7.7 5.3	2.98 4.62	17.4 16.8	9.1 10.3	5.5 5.0	2.4 4.3		361 362				
Σ	12.6 13.0	7.60 7.40	34.3 34.2	19.1 19.4	10.6 10.5	6.2 6.7		723 723				
DC-3	7.2 5.8	2.5 4.82	16.9 16.8	8.8 10.5	5.95 4.6	2.25 4.8						
Dc-4	6.8 5.3	2.48 5.18	17.4 17.2	8.8 10.4	5.8 5.3	7.05						
Σ	13.0 12.1	7.32 7.66	33.7 34.6	19.3 19.2	10.55 11.1							
DC-AV	12.8	7.5	34.6	19.3	10.7	6.65 6.8		723				
AC-1	5.9	3.33	15.25	8.6	4.72	2.8		346				
AC-2	5.9	3.33	15.25	8.6	4.72	2.8		348				
Σ	11.8	6.66	30.50	17.2	9.44	5.6		694				
S. P.	→	→	-9	→	→	→						
AC-N	→	→	.04	→	→	→						

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project El Paso Line 1-S½ Field date 2/24/66 Data page 1 2 Comp. date 2/24/66. Comp by R.S.

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
(C) n separation	100	300	100	300	100	30	100	30	30	10	100	30
(D) I	6000	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	116.77	140.0	41.88	147.0	51.3	25.8	120.2	37.3	21.0	11.83	64.0	26.3
(F) DCcal	.56	→	→	→	→	→	→	→	→	→	→	→
(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	12.0	30.0
(H) ρ dc=ExFxGx10^3/D	32.6	39.2	46.9	41.2	57.4	72.3	33.9	41.8	58.7	66.3	71.6	73.6
(I) Vac Σ	112.1	132	41.3	136	47.8	23.8	111.8	34.2	19.4	10.77	58.5	23.9
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.933	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	.972	.988	.945	1.008	1.001	1.011	1.005	1.018	1.019	1.025	1.021	1.026
(N) PFE=(M-1)(10^2)	-2.8	-1.2	-5.5	0.8	0.1	1.1	0.5	1.8	1.9	2.5	2.1	2.6
(O) MCF=(M-1)(10^5)/H	-86	-30	-12	19	1.7	15	15	43	32	38	29	35

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5		2-3				
(B) Receive	→	→	50-60	→	→	→		cal.				
(C) n separation	30	10	30	10	10	3		1000				
(D) I	→	→	→	→	→	→		3000				
(E) Vdc (avg)	16.3	9.45	21.0	10.1	6.76	4.1		536.7				
(F) DCcal	→	→	→	→	→	→		.56				
(G) Kn x 10^{-3}	60.0	105.0	30.0	60.0	105.0	168.0						
(H) ρ dc=ExFxGx10^3/D	92.5	92.6	58.7	56.6	66.3	64.0						
(I) Vac Σ	14.8	8.6	19.2	9.08	6.02	3.5		500				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→	→		.933				
(M) ρdc/ρac =ExL/K	1.027	1.025	1.020	1.039	1.048	1.098						
(N) PFE=(M-1)(10^2)	2.7	2.5	2.0	3.9	4.8	9.2						
(O) MCF=(M-1)(10^5)/H	29	27	34	69	72	144						

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project El Paso Line 1-N ½ Field date 2/25/66 Data page 3 & 4 Comp. date 2/25/66. Comp by D.B.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
(B) Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→	40-50	→
(C) n separation	100	100	30	300	100	30	100	30	30	10	30	30
(D) I	6000	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	141.5	116.6	44.1	167	56.3	27.5	126.8	43.7	20.4	11.1	50.6	24.9
(F) DCcal	.415	→	→	→	→	→	→	→	→	→	→	→
(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	12.0	30.0
(H) ρ dc=ExFxGx10^3/D	29.3	24.1	36.6	34.5	41.7	56.9	26.2	36.3	42.2	46.1	42.0	51.5
(I) Vac Σ	130.8	109.8	41.05	156	53.1	25.4	120.5	41.2	18.8	10.2	47.0	23.0
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.958	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.038	1.017	1.029	1.026	1.017	1.038	1.007	1.016	1.040	1.042	1.031	1.038
(N) PFE=(M-1)(10^2)	3.8	1.7	2.9	2.6	1.7	3.8	0.7	1.6	4.0	4.2	3.1	3.8
(O) MCF=(M-1)(10^5)/H	130	71	79	75	41	67	27	44	95	91	74	74

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

(A) Send	2-3	1-2	4-5	3-4	2-3	1-2		3-4				
(B) Receive	→	→	50-60	→	→	→		cal.				
(C) n separation	10	10	30	30	10	10		1000				
(D) I	→	→	→	→	→	→		3000				
(E) Vdc (avg)	12.8	7.5	34.6	19.3	10.7	6.8		723				
(F) DCcal	→	→	→	→	→	→		.415				
(G) Kn x 10^{-3}	60.0	105.0	30.0	60.0	105.0	168.0						
(H) ρ dc=ExFxGx10^3/D	53.1	54.4	71.6	80.1	77.7	79.1						
(I) Vac Σ	11.8	6.66	30.50	17.2	9.44	5.6		694				
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→	→		.958				
(M) ρdc/ρac =ExL/K	1.040	1.079	1.088	1.075	1.088	1.163						
(N) PFE=(M-1)(10^2)	4.0	7.9	8.8	7.5	8.8	6.3						
(O) MCF=(M-1)(10^5)/H	75	145	123	93	113	80						

INDUCED POLARIZATION SURVEY
PHASE II

EMERALD ISLE AREA

MINERAL PARK DISTRICT

MOJAVE COUNTY, ARIZONA

for

El Paso Natural Gas Company

April 1966

by

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

TABLE OF CONTENTS

	Page No.
INTRODUCTION	1
CONCLUSIONS AND RECOMMENDATIONS	2
INTERPRETATION	3

IN MAP POCKET (5 maps)

- Induced Polarization Location and Interpretation Plan
- Sectional Data Sheets
  - Line 1
  - Line 2
  - Line 3
  - Line 4

INTRODUCTION

At the request of Mr. John Reynolds of El Paso Natural Gas Company, Heinrichs Geoexploration Company conducted and completed a continuation of an induced polarization survey in the Emerald Isle Area, Mojave County, Arizona, run in February 1966, during the interim March 31 to April 13, 1966.

The work consists of four additional spreads, continuing all four lines to the north in an attempt to better define some anomalous indications noticed on the extreme north ends of the four original spreads. A total of 48,000 feet of surface coverage (of which 20,000 feet overlap on the original project) was surveyed giving 28,000 feet of new subsurface plotted data.

Again, 1000 foot dipole separations were used to obtain the necessary depth penetration and coverage. Our extra high power I. P. equipment was used to give the best signal-to-noise-recovery in the fairly low resistivities in the area. The same sending frequencies, 0.05 and 3.0 cycles per second, were used in order to directly compare the new data with that previously obtained.

The results are presented as additions to previous sectional data sheets and the location and interpretation plan.

Heinrichs personnel involved in the field work were Dan Anderson, Geophysical Crew Chief; Michael Ludden, Electronics Engineer; Jim Bauersachs and Ernie Campbell, Technical Assistants. Interpretation, compilation and report are by the Tucson Geoex staff under the supervision of Chris S. Ludwig, Senior Geophysicist.

CONCLUSIONS AND RECOMMENDATIONS

The anomalous indications on the north ends of the original four lines were verified and found to be the fringe of a definite, moderate to strong induced polarization anomaly, lying mainly in the north half of Section 15.

The anomaly is interpreted as a zone of disseminating sulfides about 2000 feet wide, deepening to the east from less than 500 feet on Lines 1 and 4 to greater than 1000 feet on Line 3. The amount of sulfides in the stronger anomalous zones is likely from 1 to 3 percent total sulfides by volume, 2 to 6 percent by weight, or possibly more, if some of the sulfides are in relatively thin, enriched, or concentrated zones. If enough of this sulfide is chalcopyrite and molybdenite, this could be an economic deposit and, therefore, definitely warrants drilling, particularly considering the proximity to the producing, low grade Ithaca Peak deposit. About one mile east of the anomaly, there is an outcrop of Ithaca Peak Granite, shown on Plate 18, U.S.G.S. Bulletin 978, and the I. P. anomaly could be due to a mineralized westward projection of this granite, since the resistivities are in the usual range for mineralized granites and quartz monzonites.

The proposed vertical diamond drill sites are recommended to initially test this sulfide zone for economic potential: PDH-1 at 6.5 N on Line 1 should be drilled to at least 500 feet, and perhaps to 750 feet; PDH-2 at 5 N on Line 4 to 500 plus feet; and PDH-3 at 6.5 N on Line 2 to 1000 plus feet.

If the initial drilling is encouraging, additional induced polarization work is recommended to the west as far as is necessary to close off the sulfide zone. Previous work in this district has shown a good correlation between magnetics, geology and mineralization, and we feel that a hand or mobile magnetometer survey is justified here. The magnetics could possibly help work out some of the details of the structure that may be missed by the I. P.

The anomaly on Line 4 is shifted at least 1000 feet southward, suggesting some structural complexity between Line 1 and 4. This effect could complicate the drilling particularly on PDH-2.

Self potentials show a slight correlation with the anomalous zone in that there are associated broad minor lows. Their low amplitude, however, does not allow much significance to be attached to them except that they indicate the absence of any major concentrations of oxidizing sulfides within several hundred feet of the surface - in accordance with the I. P. data.

INTERPRETATION

Line 1 - Spread B:

This line shows a well defined anomalous zone in both PFE and MCF. The source is likely a disseminated sulfide body having steeply dipping north and south boundaries but with gradational contacts. The sulfides probably suboutcrop within 500 feet of the surface, perhaps nearer 250 feet. The resistivities do not show any well defined pattern associated with the anomaly, although there is the suggestion of an ill defined contact between higher resistivity material to the north and lower resistivity material to the south in the anomalous zone. The percentage of sulfide appears to remain relatively constant with depth in the zone.

Line 2 - Spread B:

This line is about 1280 feet east of Line 1 and still shows the anomaly, but indicating increased depth of burial - perhaps as much as 1000 feet. The anomaly is at least as strong as on Line 1, particularly considering the attenuating effect of increased depth. Again, the anomaly shows in PFE and MCF but only as a subtle contact effect in resistivity. In addition to the main anomaly, there is an indication of a narrow, more shallow, weak sulfide zone between 9 N and 10 N in both the I. P. and S. P. data.

Line 3 - Spread B:

Another 1280 feet east of Line 1, the anomaly also shows on about the same place on the line but at a significantly greater depth - perhaps as much as 1500 feet. There may be weak sulfides much nearer surface but the strong sulfide mineralization is probably below 1000 feet. There is a possibility that this anomaly is the lateral effect of the termination of the sulfide zone between Lines 2 and 3 (see Plan) but it is considered more likely that it continues at depth below Line 3, perhaps all the way east to the outcrop of Ithaca Peak Granite in Section 13. If the main anomaly does continue through at depth, it indicates sulfides of about the same strength as on Lines 1 and 2. Similar to Line 2, a near surface, narrow, weak sulfide indication was noticed between 11 N and 12 N in both I. P. and S. P.

Line 4 - Spread B:

Line 4 is 1000 feet west of Line 1 and shows the anomalous zone shifted about 1000 feet southerly, but at about the same

depth and strength as on Line 1. The northern boundary to the zone appears quite gradational as if it were dipping gently to the north, or the I. P. line was crossing at an acute angle. The southern boundary is still quite sharp.

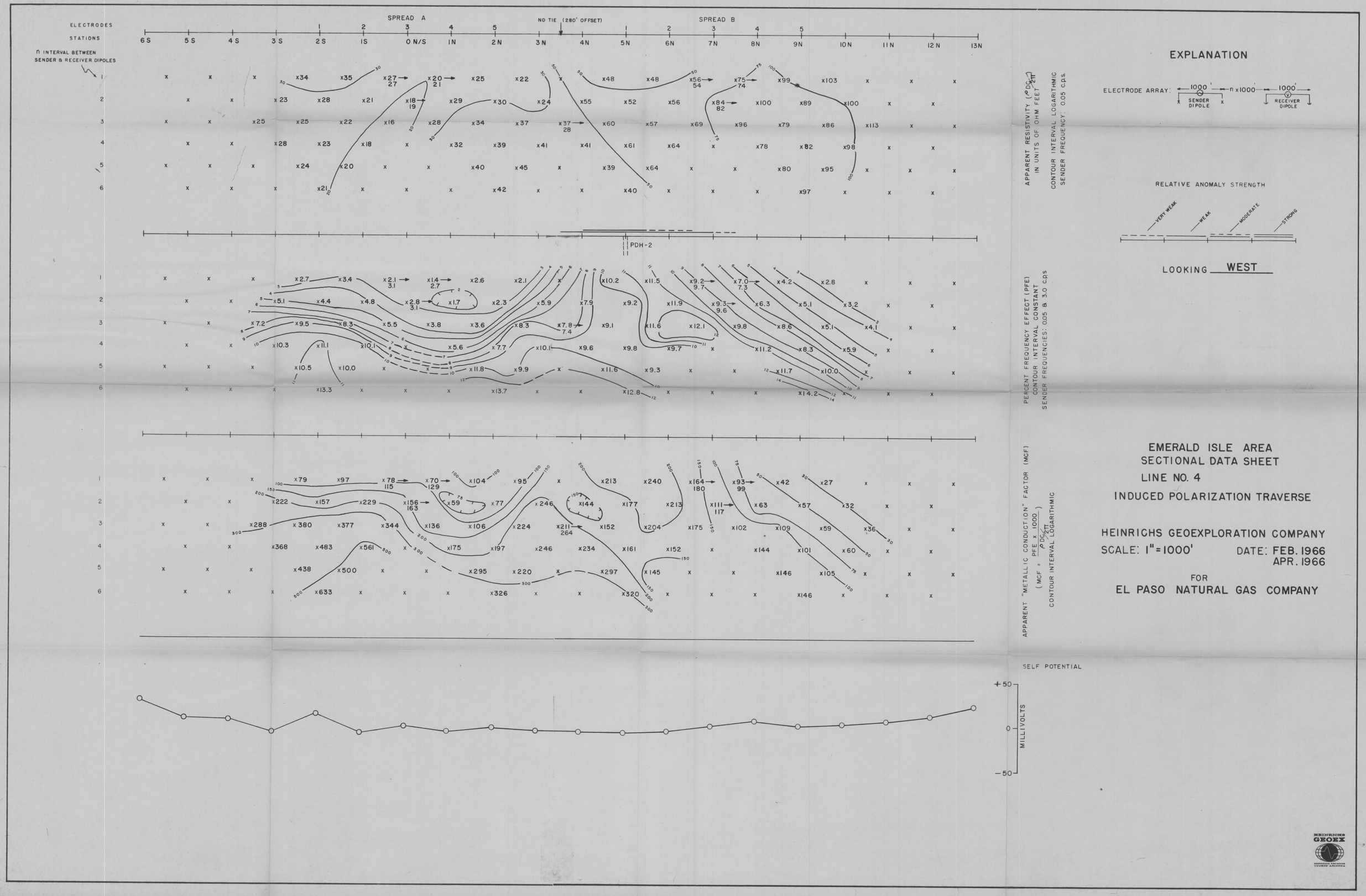
Respectfully submitted,

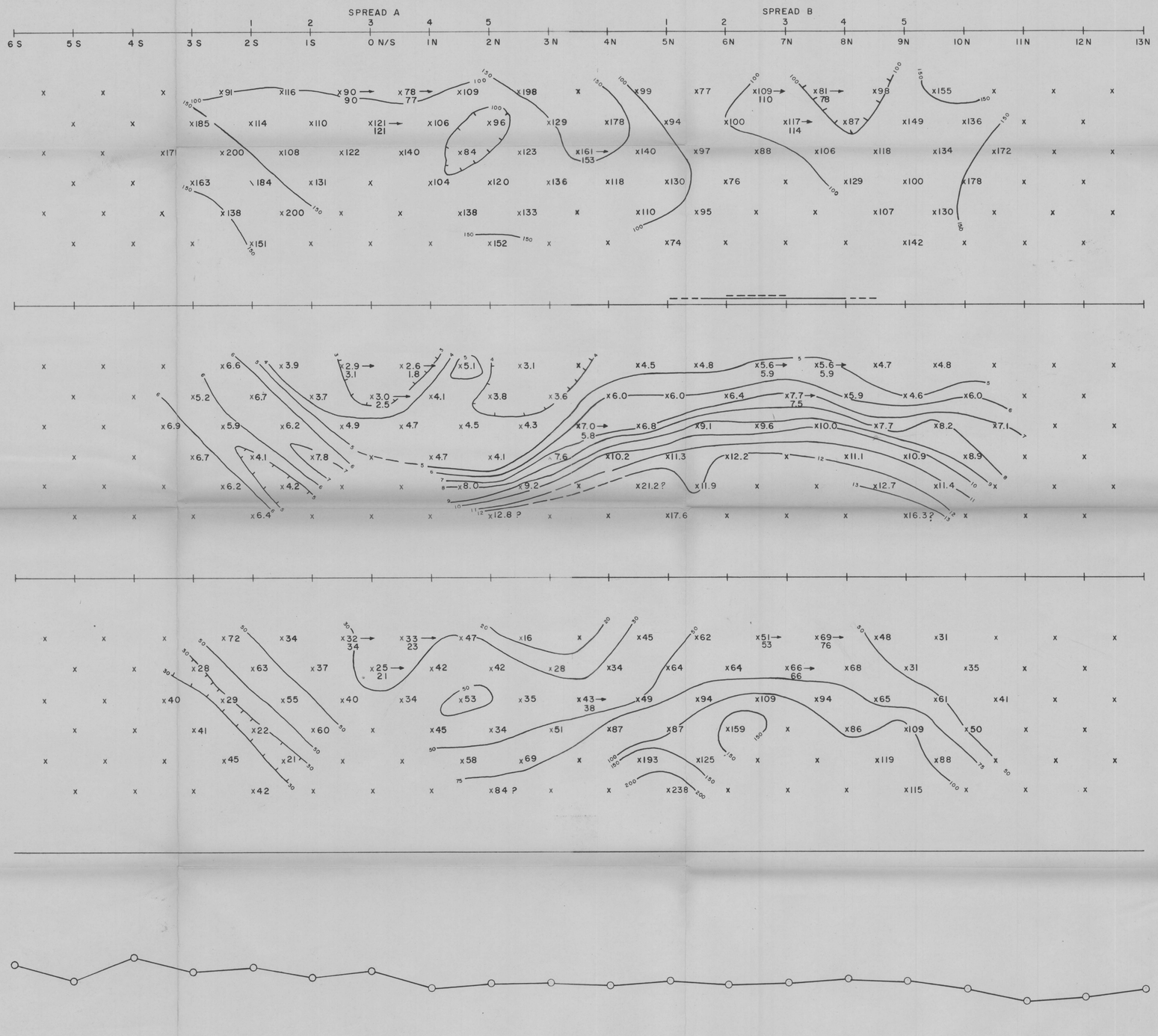
HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig

Chris S. Ludwig
Senior Geophysicist

April 21, 1966


ELECTRODES
STATIONS
n INTERVAL BETWEEN SENDER & RECEIVER DIPOLES
SPREAD A
NO TIE (280' OFFSET)
SPREAD B
6S 5S 4S 3S 2S 1S 0 N/S 1N 2N 3N 4N 5N 6N 7N 8N 9N 10N 11N 12N 13N
PDH-2
APPARENT RESISTIVITY (ρ_{DC}) IN UNITS OF OHM FEET
CONTOUR INTERVAL LOGARITHMIC
SENDER FREQUENCY: 0.05 c.p.s.
PERCENT FREQUENCY EFFECT (PFE)
CONTOUR INTERVAL CONSTANT
SENDER FREQUENCIES: 0.05 & 3.0 c.p.s
APPARENT "METALLIC CONDUCTION" FACTOR (MCF)
(MCF = PFE x 1000 / ρ_{DC})
CONTOUR INTERVAL LOGARITHMIC
SELF POTENTIAL
+50
0
−50
MILLIVOLTS
EXPLANATION
ELECTRODE ARRAY: 1000' n x 1000' 1000'
SENDER DIPOLE
RECEIVER DIPOLE
RELATIVE ANOMALY STRENGTH
VERY WEAK
WEAK
MODERATE
STRONG
LOOKING WEST
EMERALD ISLE AREA
SECTIONAL DATA SHEET
LINE NO. 4
INDUCED POLARIZATION TRAVERSE
HEINRICHS GEOEXPLORATION COMPANY
SCALE: 1"=1000'
DATE: FEB. 1966
APR. 1966
FOR
EL PASO NATURAL GAS COMPANY
HEINRICHS GEOEX



EXPLANATION

ELECTRODE ARRAY: 1000' — n x 1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING WEST

EMERALD ISLE AREA
SECTIONAL DATA SHEET
LINE NO. 3
INDUCED POLARIZATION TRAVERSE

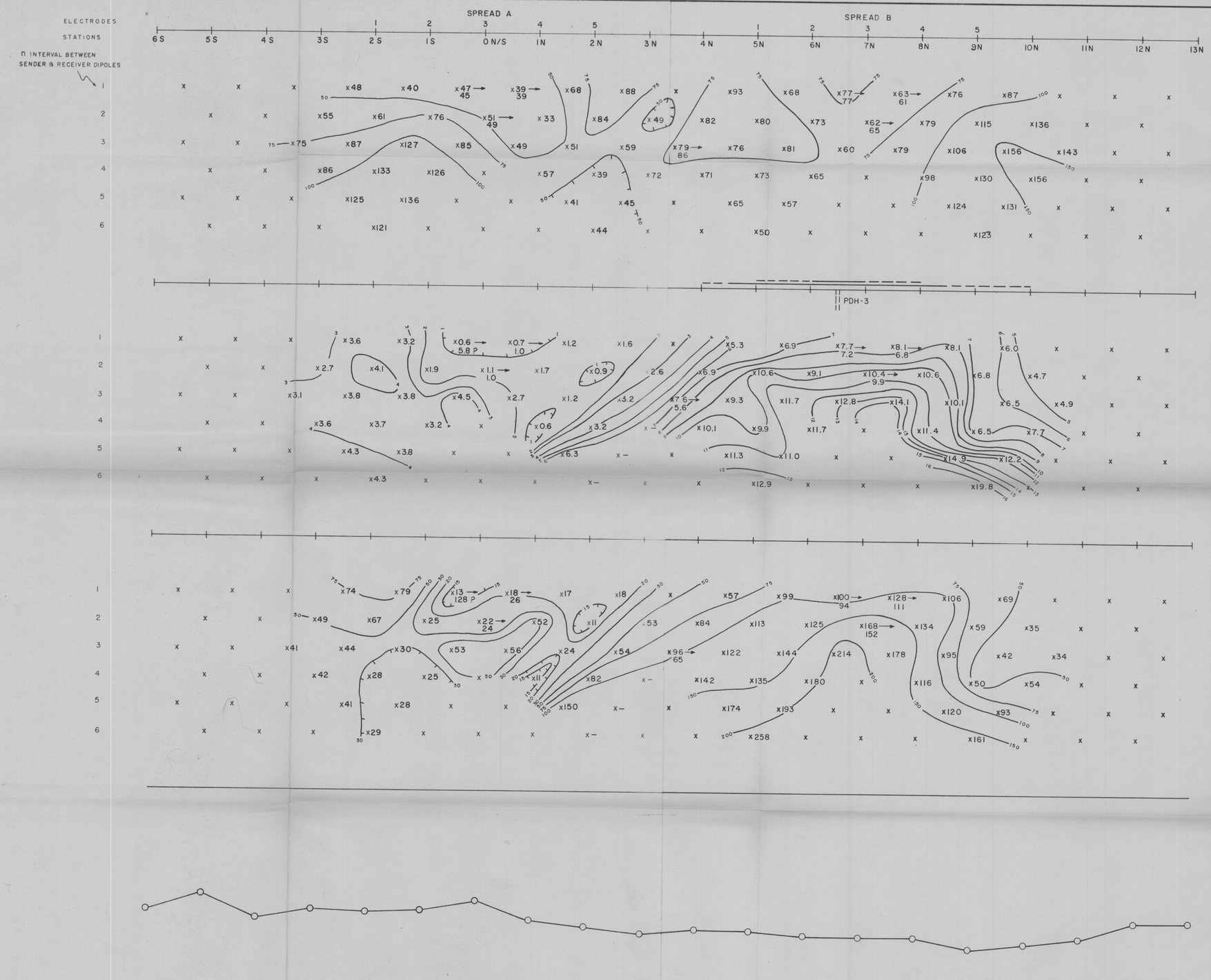
HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000'

DATE: FEB. 1966
APR. 1966

FOR

EL PASO NATURAL GAS COMPANY



APPARENT RESISTIVITY (ρ_{DC} IN UNITS OF OHM FEET)
CONTOUR INTERVAL LOGARITHMIC
SENDER FREQUENCY: 0.05 c.p.s.

PERCENT FREQUENCY EFFECT (PFE)
CONTOUR INTERVAL CONSTANT
SENDER FREQUENCIES: 0.05 & 3.0 c.p.s

APPARENT "METALLIC CONDUCTION" FACTOR (MCF)
$\left(MCF = \frac{PFE \times 1000}{\rho_{DC}}\right)$
CONTOUR INTERVAL LOGARITHMIC

EXPLANATION

ELECTRODE ARRAY: 1000' — n x 1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING **WEST**

EMERALD ISLE AREA

SECTIONAL DATA SHEET

LINE NO. 2

INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000'

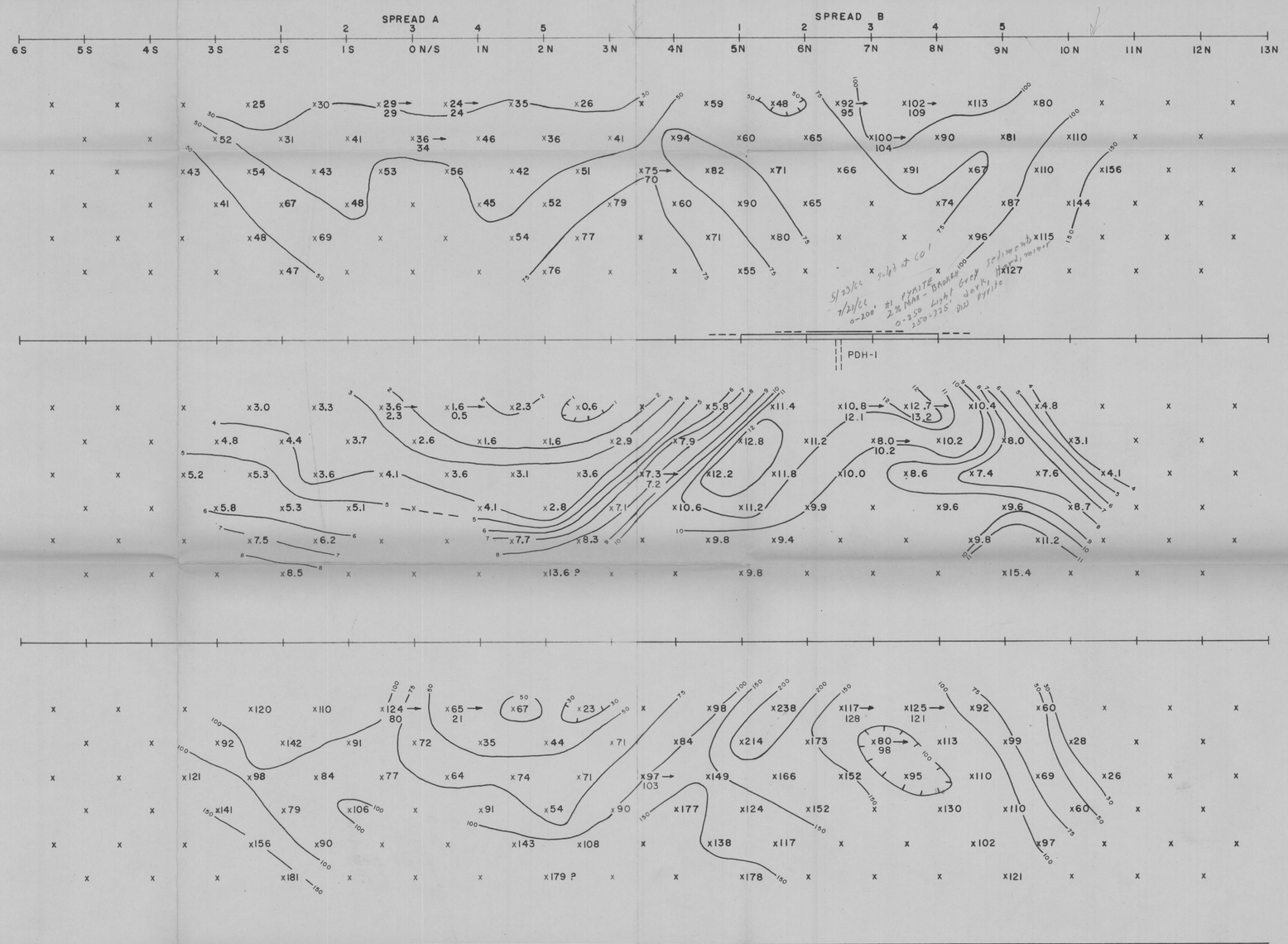
DATE: FEB. 1966
APR. 1966

FOR

EL PASO NATURAL GAS COMPANY

SELF POTENTIAL

HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON ARIZONA



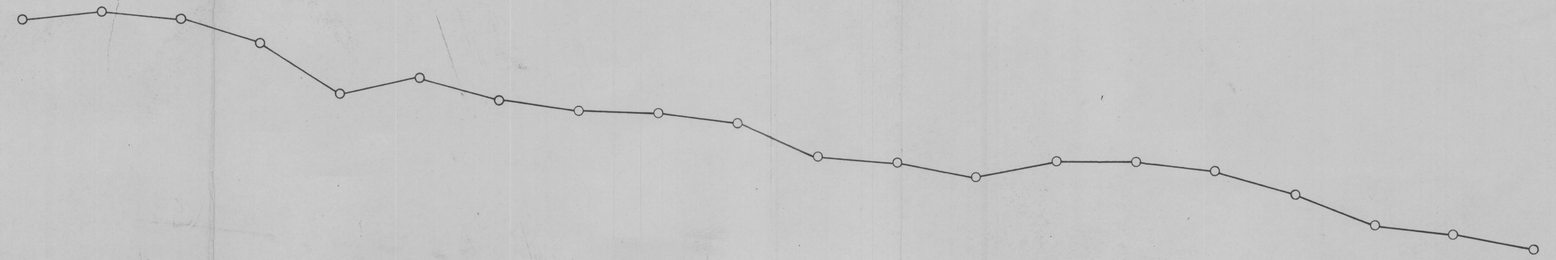
APPARENT RESISTIVITY (ρ_{DC}) IN UNITS OF OHM FEET

CONTOUR INTERVAL LOGARITHMIC
SENDER FREQUENCY: 0.05 c.p.s.

PERCENT FREQUENCY EFFECT (PFE)
CONTOUR INTERVAL CONSTANT
SENDER FREQUENCIES: 0.05 & 3.0 c.p.s.

APPARENT "METALLIC CONDUCTION" FACTOR (MCF)
$\left(MCF = \frac{PFE \times 1000}{\rho_{DC}}\right)$
CONTOUR INTERVAL LOGARITHMIC

SELF POTENTIAL



EXPLANATION

ELECTRODE ARRAY: 1000' — n x 1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING WEST

EMERALD ISLE AREA
SECTIONAL DATA SHEET
LINE NO. 1
INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000'

DATE: FEB. 1966
APR. 1966

FOR
EL PASO NATURAL GAS COMPANY

HEINRICHS GEOEX
TUCSON, ARIZONA
SUMMIT, ARIZONA

INDUCED POLARIZATION SURVEY

Emerald Isle Area
Mineral Park District
Mojave County, Arizona

For

EL PASO NATURAL GAS COMPANY

February 1966

by

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

TABLE OF CONTENTS

	Page
Introduction----------	1
Conclusions, Recommendations and Interpretation----------	2
Basis of I. P. Method----------	1a

In Map Pocket:

Induced Polarization Location and Interpretation Plan Map.

Sectional Data Sheets (Four) Lines 1 through 4

INTRODUCTION

At the request of Mr. John Reynolds of El Paso Natural Gas Company, Heinrichs Geoexploration Company conducted and completed an induced polarization survey in the Emerald Isle Area, Mojave County, Arizona during the interim February 23 to March 4, 1966. Some induced polarization field training was given to Mr. Claude Barron of El Paso in anticipation of possible purchase of I. P. equipment by The Company.

Four induced polarization lines were run giving a total surface coverage of 48,000 ft. of which 28,000 ft. is subsurface plotted data. All lines were oriented north-south and centered 3,630 ft. north of Section Line 22/27. Line 1 went through the quarter corner 22/27; Line 2, 1,280 ft. east; Line 3, 2,560 ft. east and Line 4, 1,280 ft. west of Line 1. All of these lines utilized a 1,000 ft. dipole spacing.

Selection of a 1,000 ft. dipole separation and a 1,280 ft. line spacing was made to maximize ground coverage per unit time, data resolution and probability of locating economically sized disseminated sulfide zones within about 1,200 ft. of the surface.

Measurements were made, in part using extra high power to aid in penetrating the relatively low resistivities which are characteristic of parts of the area, with the dual frequency technique on a dipole-dipole electrode configuration. The sending frequencies used were 0.05 and 3.0 cycles per second.

Results are presented on sectional data sheets; one for each line, showing resistivity, percent frequency effect (PFE) and metallic conduction factor (MCF), contoured in section; and self potential in profile form. An induced polarization location and interpretation plan map is also included.

Heinrichs personnel involved in the field work were Dave Godfrey, Crew Chief; Rex Montierth and Bill Pierot, Technical assistants. Interpretation, compilation and report are by the Geoex staff in Tucson, under the supervision of Chris S. Ludwig, Senior Geophysicist.

CONCLUSIONS, RECOMMENDATIONS AND INTERPRETATION

The only anomaly considered of possible significance occurs on the extreme north ends of all four lines, in part north of the indicated El Paso ground. The rest of the area shows only varying levels of background effects and some inductive coupling interference as are typically encountered in relatively barren granitic rocks and alluvial cover.

This northern zone is poorly defined because it occurs at the end of the lines where detailed interpretation is impossible and supporting data lacking. Therefore, before any drilling and if the ground is available, at least one more spread of I. P. should be run north of the present survey and tying in with it. This would help to better determine the significance of the anomalism by giving much more definitive information on width, grade, and depth and for planning drill sites if warranted.

From the data available, it appears that the anomaly is an easterly-western trending zone of unknown extent to the north as well as east-west. It could be just the southern fringe of a stronger anomaly to the north. Anomalism has been rumored to exist somewhere between the Emerald Isle and Chloride which may have never been drilled. Reported reason for not drilling was several recent failures, lack of confidence and budget.

We feel, therefore, that the area is worthy of additional work and so recommend.

Resistivity results show alluvium generally deepening to the west in a trough roughly through the center of Section 22 to a probable maximum depth of about 1,000 ft. on Line 4.

Self potentials suggest a low to the north correlating with the I. P. anomaly. Although such a low may only be a regional background gradient of no economic significance, it could also be indicative of oxidizing sulfides.

This survey has shown the probable absence, in the area tested, of any large sulfide zones from about 300 ft. below the surface to 1,200 ft. below surface except to the extreme north. It is possible however, that narrow (less than 100 ft.) sulfide vein-like bodies could have been missed because of the small total volume they present to the 1,000 ft. dipole electrode configuration. If it is felt, geologically, that such deposits may exist here and be of economic interest, we then suggest shorter spaced I. P. lines where the alluvium is shallow enough to attempt to locate them.

Often, any kind of new information obtained in an area will have profound significance in the interpretation of prior geophysical results. Therefore, it can be most important to maintain liaison regarding the results of any future work whether geology, geophysics, geochem or drilling.

Respectfully submitted,
HEINRICHS GEOEXPLORATION COMPANY

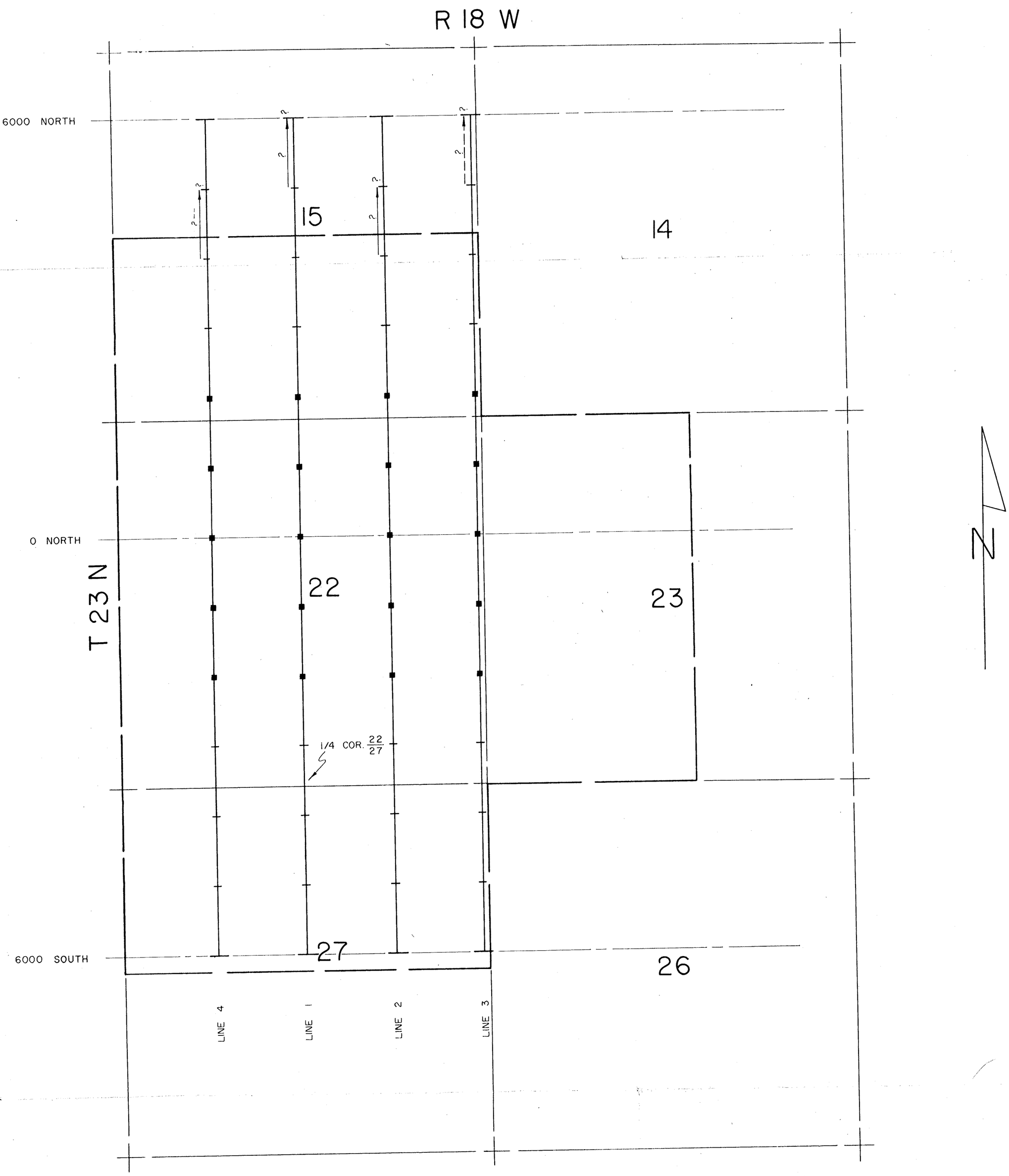
Chris S. Ludwig

Chris S. Ludwig
Senior Geophysicist

W. E. Heinrichs Jr.

Walter E. Heinrichs, Jr.
President & General Manager

March 19, 1966
P. O. Box 5671
Tucson, Arizona



LEGEND

- ■ SENDING ELECTRODE
- RECEIVER STATION
- SECTION CORNER & LINE
- APPROXIMATE BOUNDARY OF EL PASO PROPERTY

RELATIVE ANOMALY STRENGTH

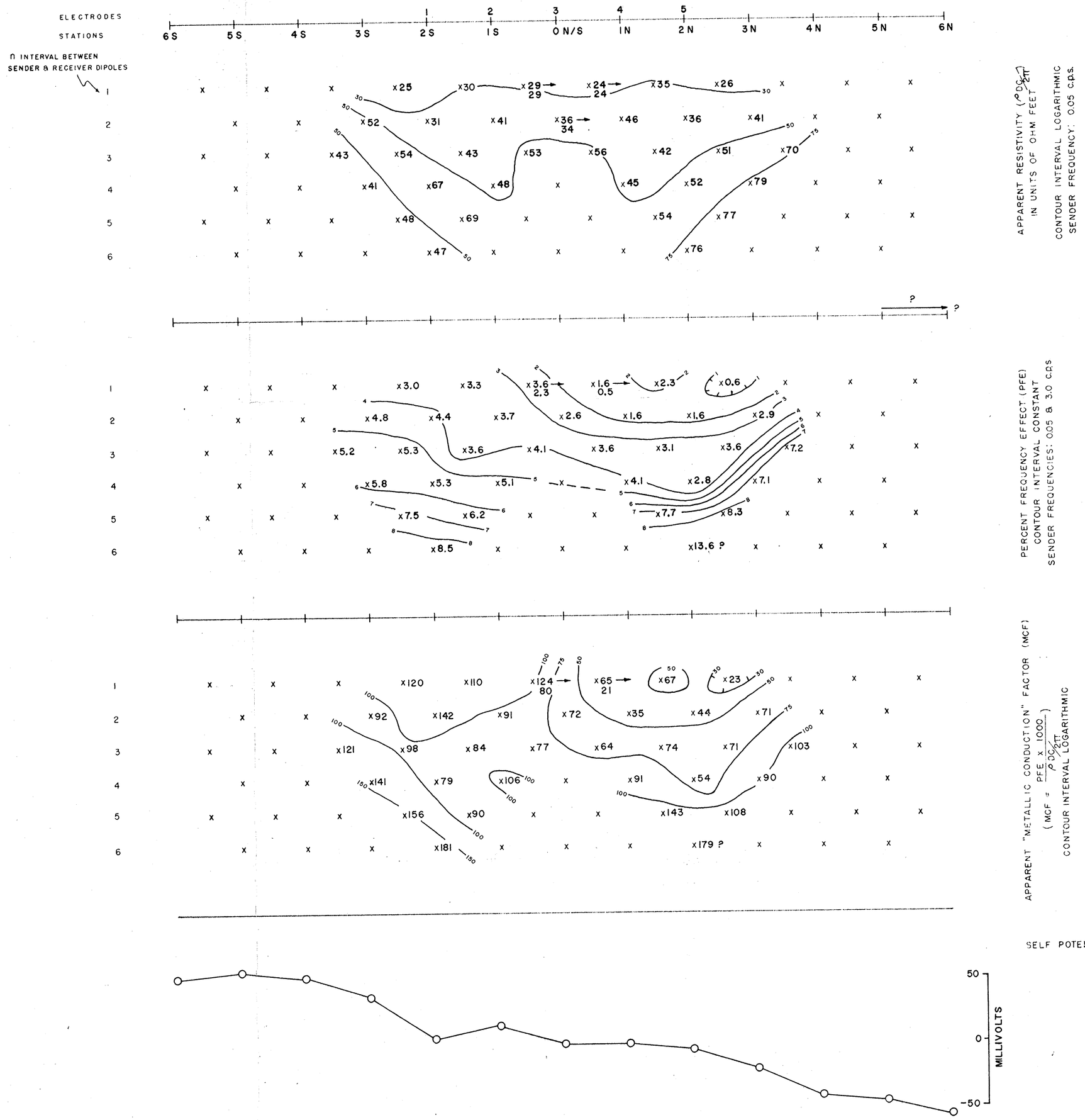
VERY WEAK — WEAK — MODERATE — STRONG

HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS TUCSON ARIZONA

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

INDUCED POLARIZATION LOCATION AND INTERPRETATION PLAN
FOR
EL PASO NATURAL GAS COMPANY
EMERALD ISLE AREA
MOHAVE COUNTY, ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL:	REVISIONS
	DATA BY: D.G. & C.S.L.	
DATE: MARCH 1966	SHEET OF	
DRAWN BY: J.P.M.	DRAWING NO.:	FILE:



EXPLANATION

ELECTRODE ARRAY: 1000' — n x1000' — 1000'; SENDER DIPOLE; RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING W

EMERALD ISLE AREA

SECTIONAL DATA SHEET
LINE NO. 1
INDUCED POLARIZATION TRAVERSE

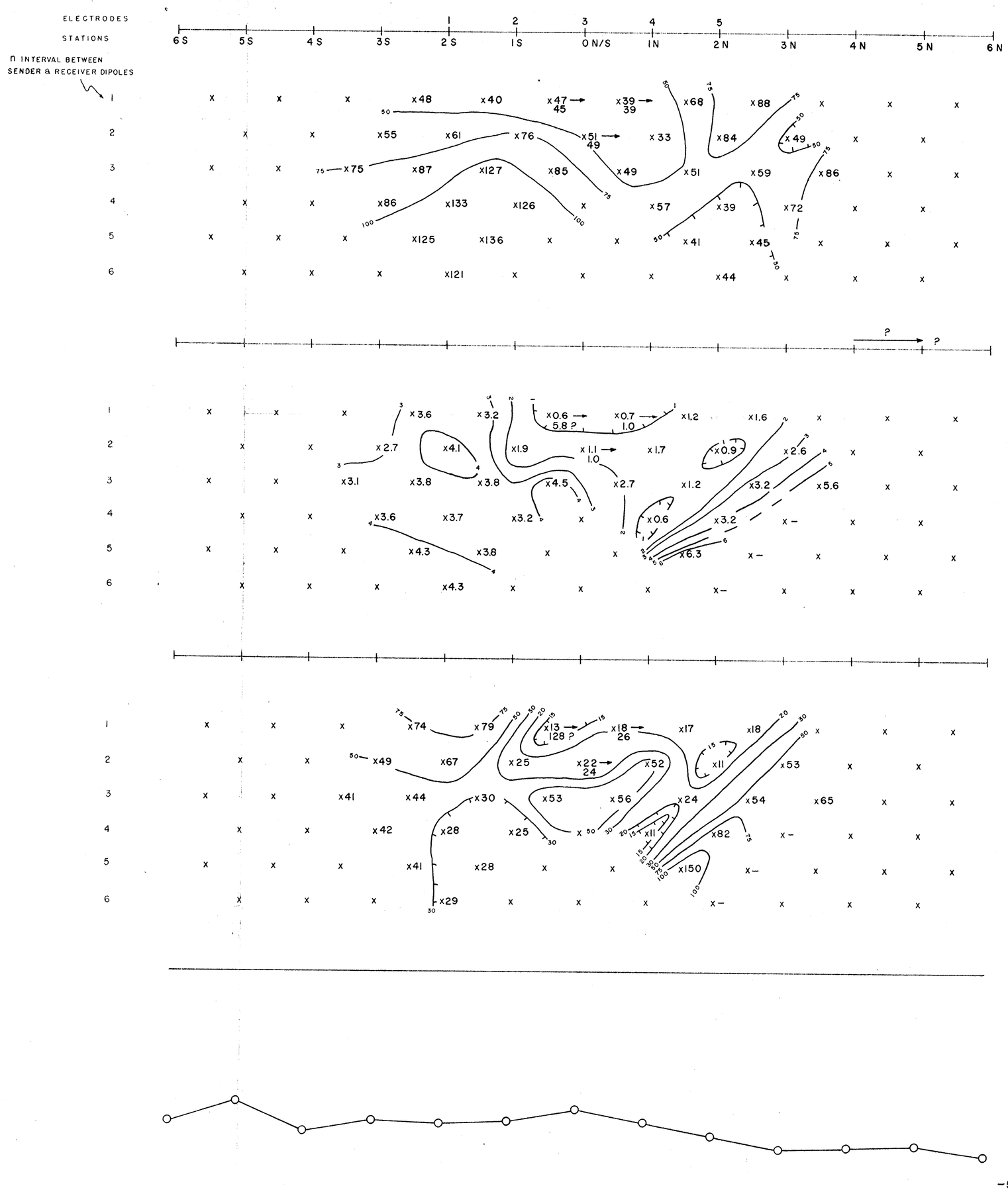
HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: FEB. 24, 1966

FOR

EL PASO NATURAL GAS COMPANY

HEINRICHS GEOEXPLORATION COMPANY
GEOPHYSICAL ENGINEERS TUCSON, ARIZONA
BOX 5671, TUCSON, ARIZONA, 85703.
PHONE: (AREA CODE 602) 623-0578
Cable: GEOEX



EXPLANATION

ELECTRODE ARRAY: 1000' — n x1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING W

EMERALD ISLE AREA

SECTIONAL DATA SHEET
LINE NO. 2
INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY
SCALE: 1" = 1000' DATE: FEB. 1966

FOR

EL PASO NATURAL GAS COMPANY

HEINRICHS GEOEXPLORATION COMPANY
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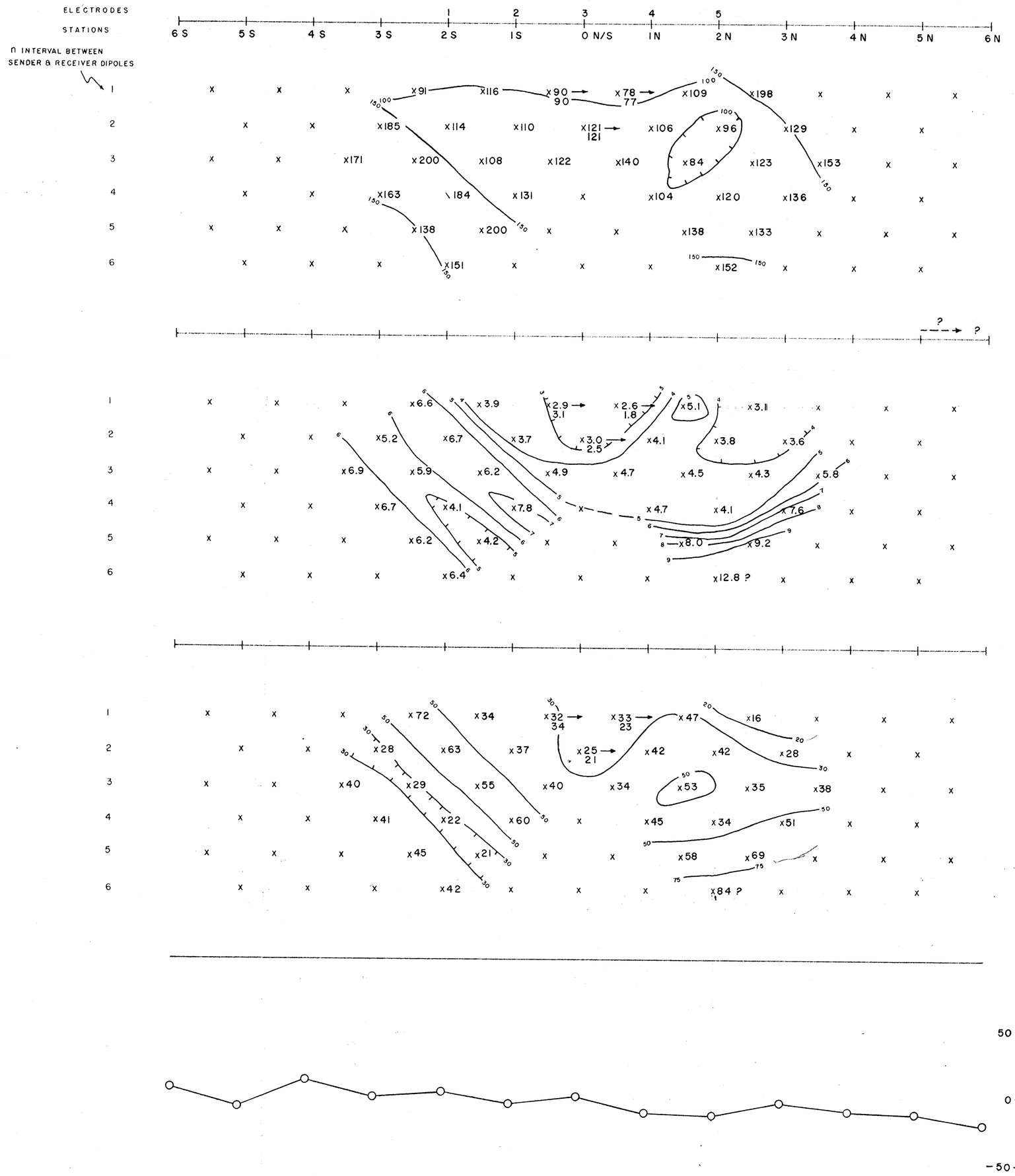
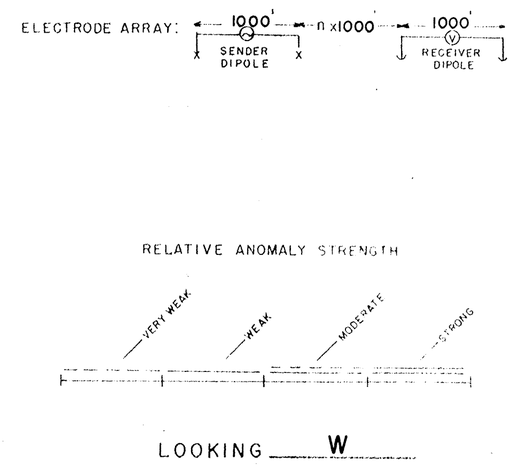


EXPLANATION



EMERALD ISLE AREA

SECTIONAL DATA SHEET

LINE NO. 3

INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: FEB. 1966

FOR

EL PASO NATURAL GAS COMPANY

HEINRICHS GEOEXPLORATION COMPANY
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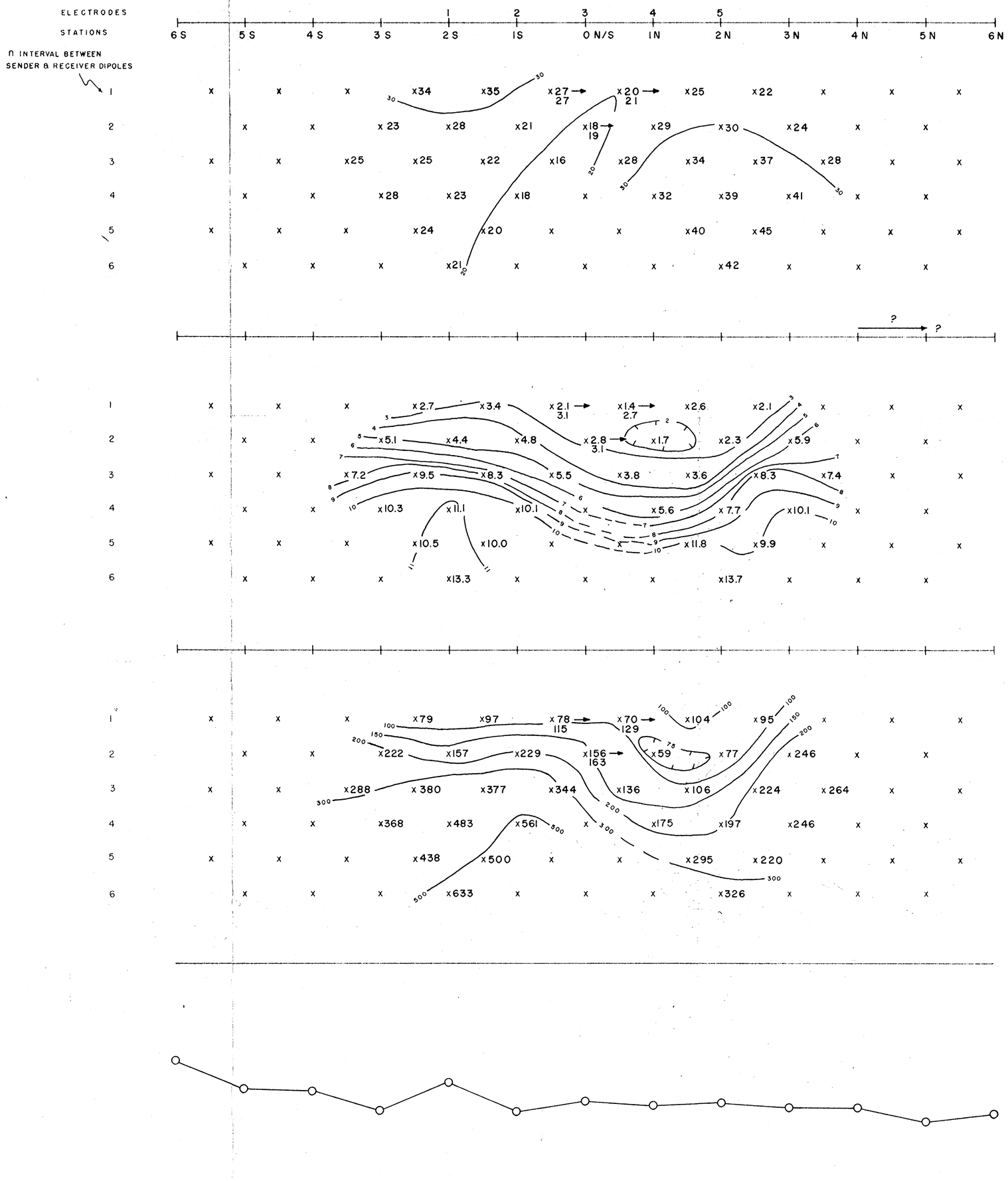

EXPLANATION

ELECTRODE ARRAY: 1000' — n x 1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING W

EMERALD ISLE AREA

SECTIONAL DATA SHEET

LINE NO. 4

INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: FEB. 1966

FOR

EL PASO NATURAL GAS COMPANY

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