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I. P. Field

Notes

INDUCED POLARIZATION - RECEIVER NOTES N70E PAGE 1

Project: Todd Line: 1 AW Int.Cal 44.5 Date: 3-16-85

Send	45	34	45	23	34	45	12	23	34	45		
Rec.	0 5	5-10		10-15			15-20					
Time	100	100	30	100	30	30	100	30	10	10		
DC-1	44.5 43.5	33.5 34	14.0 14.0	30.1 29.	11.5 13	6 7.7	26 25.5	7.5 7.2	4.66 4.4	3.0 3.05		
DC-2	44.5 43.5	33.5 34	14.0 14.0	30 29	11.5 13	6 7.7	26 25.5	7.5 7.2	4.65 4.4	2.95 3.05		15.2 15.2
Σ	88.0											
DC-3	44.5 43.5	33.5 34.	14.0 14.0	30 29	11.4 13	6 7.7	26 25.5	7.5 7.2	4.4 4.10	2.95 3.05		
Dc-4	44.5 43.5	33.5 34.	14.0 14.0	30 29	11.4 13	6 7.7	26 25.5	7.5 7.2	4.4 4.6	2.95 3.05		
Σ	98	67.5	28	59	24.45	13.7	51.5	14.7	9.0	6.00		
DC-AV												
AC-1	42.5	32	13.5	28.5	11.6	6.6	25	7.0	4.3	2.95		15.0
AC-2	42.5	32	13.5	28.5	11.6	6.6	25	7.0	4.3	2.95		15.0
Σ	85	64	27	57.0	23.2	13.2	50	14	8.6	5.9		
S. P..	+2.3	-1.5		+3.1			-8.0					
AC-N	.13	.02		.14	.12		.12					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Todd Line: 1 AW Int.Cal Date: 3-16-65

Send	12	23	34	45	12	23	34	45				
Rec.	20-25				25-30							
Time	30	10	10	10	10	10	3	3				
DC-1	10.5 10.6	4.6 4.65	3.25 3.25	2.4 2.35	4.8 5.2	2.45 2.55	1.85 2.05	1.47 1.54				
DC-2	10.5 10.6	4.6 4.65	3.25 3.25	2.4 2.35	4.8 5.2	2.45 2.55	1.85 2.05	1.47 1.54				
Σ			3									
DC-3	10.5 10.6	4.6 4.65	3.25 3.25	2.4 2.35	4.8 5.2	2.45 2.55	1.85 2.05	1.47 1.54				
Dc-4	10.5 10.6	4.6 4.65	3.25 3.25	2.4 2.35	4.8 5.2	2.45 2.55	1.85 2.05	1.47 1.54				
Σ	21.1	9.25	6.50	4.75	10.0	5	3.9	3.01				
DC-AV												
AC-1	1.03	4.5	3.1	2.3	4.9	2.45	1.85	1.45				
AC-2	1.03	4.5	3.1	2.3	4.85	2.45	1.85	1.45				
Σ	2.06	9	6.2	4.6	9.75	4.9	3.7	2.9				
S. P.	+11.5				+5.3							
AC-N	AN .02				.08							

INDUCED POLARIZATION SENDER NOTES

Project: Todd Line: 1A W 1/2 Date: 3-16-65

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	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Send	3/4	4/5	1/2	2/3	3/4	4/5		CAL				
Receive								2/3				
Time												
Range												
Current	2000	2000						300				

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: Todd Line: 2A5 Int.Cal 45 Date: 3 18 65

Send	45	34	45	23	34	45	1-2	2-3	3-4	4-5	(34)	
Rec.	0 5	5 10		10 15			15 20					
Time	100	100	30	100	30	10	30	30	10	10	(10)	
DC-1	44.5 45.	30.5 31.5	8.4 9.6	21.0 21.5	7.4 7.0	3.4 3.7	19.5 19.7	10.7 10.9	5.2 5.6	2.95 3.2	5.35 5.55	14.6
DC-2	44.5 45.	30.5 31.5	8.4 9.6	21.0 21.5	7.4 7.0	3.4 3.7	19.5 19.7	10.7 10.9	5.4 5.55	2.95 3.2	5.35 5.55	14.6
Σ	89.5	62.0	18.0	42.5	14.4	7.1	39.2	21.6		6.15		29.2
DC-3	44.5 45.	30.5 31.5	8.4 9.6	21.0 21.5	7.5 7.0	3.4 3.7	19.5 19.7	10.7 10.9	5.35 5.55	2.95 3.2		
Dc-4					7.4 7.0				5.35 5.55			
Σ									10.90			
DC-AV												
AC-1	43	30.5	8.7	20.5	7.0	3.45	19.3	10.5	5.25	2.95		14.6
AC-2	43	30.5	8.7	20.5	7.0	3.45	19.3	10.5	5.25	2.95		14.6
Σ	86	61.0	17.4	41.0	14.0	6.90	38.6	21.0	10.50	5.90		29.2
S. P.	+2.8	+7.2		+11.7			-0.2					
AC-N	.10	.06		.07			.11					
	en	800 (80x10)										

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Todd Line: 2A5 Int.Cal Date: 3-18-65

Send	12	23	34	45	1-2	2-3	3-4	4-5				
Rec.	2035				2530							
Time	30	10	10	3	10	10	10	3				
DC-1	7.1 7.	5.6 5.65	3.15 3.10	1.85 1.95	3.85 3.75	3.8 3.6	2.4 2.25	1.47 1.63				
DC-2	7.1 7	5.60 5.65	3.15 3.10	1.85 1.95	3.85 3.25	3.8 3.6	2.40 2.25	1.47 1.63				
Σ	14.1	11.25	6.25	3.80	7.60	7.4	4.65	3.10				
DC-3	7.1 7.0	5.6 5.65	3.15 3.1	1.85 1.85	3.85 3.75		2.4 2.25	1.47 1.63				
Dc-4												
Σ	14.1											
DC-AV												
AC-1	6.8	5.4	3.0	1.82	3.6	3.6	2.2	1.46				
AC-2	6.8	5.4	3.0	1.83	3.6	3.6	2.2	1.46				
Σ	13.6	10.8	6.0	3.65	7.2	7.2	4.4	2.92				
S. P.	+4.1				-21.3							
AC-N	.06				.03							
	@ 2500											

INDUCED POLARIZATION SENDER NOTES

Project: Todd Line: 2A SE 1/2 Date: 3-18-65

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	1.8A	2A	2A	2A	1.8A	2A
Send	3/4	4/5	1/2	2/3	3/4	4/5		CAL				
Receive								3/4				
Time												
Range												
Current	2A	2A	1.8A	2A	2A	2A		300				

INDUCED POLARIZATION - RECEIVER NOTES N70E PAGE 1

Project: Todd Line: 1AE Int.Cal Date: 3-16-65

Send	12	23	12	3-4	23	12	45	34	23	12		
Rec.	0-5	5-10		10-15			15-20					
Time	100	100	30	100	30	10	100	30	10	10		
DC-1	31.5	44 43.5	14.5 12.2	32 32	11.5 12.2	5.0 5.8	42 41.5	10.5 9.5	5.2 5.6	3.2 2.8		15.0
DC-2	32.5	44 43.5	14.5 13.2	32 32	11.5 12.2	5.0 5.8	42 41.5	10.5 9.5	5.2 5.6	3.2 2.8		15.0
Σ										3		
DC-3	31.5	44 43.5	14.5 13.2	32 32	11.5 12.2	5.0 5.8	41.9 41.0	10.5 9.5	5.2 5.6	3.2 2.8		
Dc-4	32.5		14.5 13.2	32 32	11.5 12.2	5.0 5.8	42 41	10.5 9.5	5.2 5.6	3.2 2.8		
Σ	64	87.5	27.7	64	23.7	10.8	83.3	20	10.8	6.0		14.9
DC-AV												14.8
AC-1	31	42	13.5	31	11.5	5.3	40	9.5	5.25	2.9		.1
AC-2	31	42.1	13.5	30.5	11.5	5.3	40	9.5	5.25	2.9		
Σ	62	84.1	27	61.5	23	10.6	80	19	10.5	5.8		
S. P.	+1.8	+24.6		-2.4			-1.9					
AC-N	.03	.2		.03			.2					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Todd Line: 1 A E Int.Cal Date: 3-16-65

Send	45	34	23	12	45	34	23	12				
Rec.	20-25				25-30							
Time	30	10	10	3	10	10	3	3				
DC-1	10.8 11.7	4.4 4.5	2.8 2.7	1.75 1.77	4.8 4.9	2.25 2.45	1.5 1.8	1.04 1.25				
DC-2	10.8 11.7	4.4 4.5	2.8 2.7	1.75 1.77	4.8 4.9	2.25 2.45	1.5 1.8	1.04 1.25				
Σ												
DC-3	10.8 11.7	4.4 4.5	2.8 2.7	1.75 1.77	4.8 4.9	2.25 2.45	1.5 1.8	1.04 1.25				
Dc-4	10.8 11.7	4.4 4.5	2.8 2.7	1.75 1.77	4.8 4.9	2.25 2.45	1.5 1.8	1.04 1.25				
Σ	22.5	8.9	5.5	3.52	9.7	4.7	3.3	2.29				
DC-AV												
AC-1	10.8	4.2	2.65	1.7	4.65	2.2	1.57	1.07				
AC-2	10.8	4.2	2.65	1.7	4.65	2.2	1.57	1.07				
Σ	21.6	8.4	5.3	3.4	9.3	4.4	3.14	2.14				
S. P.	≈2.6				-0.2							
AC-N	≈.025				.02							

INDUCED POLARIZATION SENDER NOTES

Project: Todd Line: 1A E 1/2 Date: 3-16-65

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	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Send	2/3	1/2	4/5	3/4	2/3	1/2		CAL				
Receive								2/3				
Time												
Range												
Current	2000	2000	2000	2000	2000	2000		300				

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: Todd Line: 1 BE Int.Cal Date: 3-16-65

Send	1 2	2 3	1 2	3 4	2 3	1 2	4 5	3 4	2 3	1 2		
Rec.	0-5	5-10		10-15			15-20					
Time	100	100	30	100	30	10	100	10	10	3		
DC-1	22 22.5	39 39.5	7.7 6.4	28. 27.5	10.3 9.9	3.50 2.55	23 21.5	5.85 5.55	4.1 3.6	1.6 1.57		
DC-2	21.5 22.5	39 39.5	7.9 6.5	28 27.5	10.3 10.	3.6 2.8	23 21.5	5.85 5.5	4.2 3.6	1.55 1.54		
Σ						6.05 6.4						
DC-3	22 22.5	39 39.5	7.7 6.4	28 27.5	10.3 10.	3.6 2.8	23 21.5	5.85 5.5	4.2 3.6	1.56 1.53		
Dc-4	22. 22.5	39. 39.5	7.9 6.5	28 27.5	10.3 10.	3.6 2.8	23 21.5	5.85 5.50	4.2 3.6	1.56 1.53		
Σ	44.5	78.5	14.2	55.5	20.3	6.41	44.5	11.35	7.8	3.09		
DC-AV												
AC-1	21	37.9	6.9	27.	9.7	3.1	22.	5.5	3.8	1.5		
AC-2	21	37.9	6.9	27.	9.8	3.1	22.	5.5	3.8	1.5		
Σ	42	75.8	13.8	54	19.5	6.2	44.	11.0	7.6	3.0		
S. P.	-2.2	+14.7		-4.2			+7.6					
AC-N	.02	.08		.02			+.02					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Todd Line: 1 RE Int.Cal Date: 7/6/84

Send	45	34	23	12	45	34	23	12				
Rec.	2025				2530							
Time	30	10	10	3	10	10	10	3				
DC-1	7.1 8.4	4.4 2.8	3.7 2.3	1.3 1.44	4.45 4.6	2.4 2.45	2.3 2.1	9.2 1.14				
DC-2	7.1 8.4	4.4 2.8	3.7 2.3	1.31 1.44	4.5 4.7	2.4 2.45	2.3 2.15	9.4 1.13				
Σ								2.06 2.07				
DC-3	7.1 8.4	4.4 2.75	3.7 2.3	1.31 1.44	4.5 4.6	2.4 2.45	2.3 2.15	9.20 1.15				
Dc-4	7.1 8.4	4.4 2.7	3.7 2.3	1.31 1.44	4.5 4.6	2.4 2.45	2.3 2.15	9.1 1.13				
Σ								2.07 2.09				
DC-AV	15.5	7.17	6.0	2.75	9.12	4.85	4.42	2.06				
AC-1	7.5	3.5	3.0	1.30	4.45	2.35	2.1	1.0				
AC-2	7.5	3.5	3.0	1.31	4.45	2.35	2.1	1.0				
Σ	15.0	7.0	6.0	2.61	8.90	4.70	4.2	2.0				
S. P.	-6.0				-3.1							
AC-N	.09				.03							

INDUCED POLARIZATION SENDER NOTES

Project: Todd Line: 1B E 1/2 Date: 3-17-65

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	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Send	2/3	1/2	4/5	3/4	2/3	1/2		CAL				
Receive								3/4				
Time												
Range												
Current	1800	1800	1800	1800	1800	1800						

INDUCED POLARIZATION - RECEIVER NOTES N45W PAGE 1

Project: Todd Line: 2A N Int.Cal Date: 3-18-65

Send	12	23	12	34	23	12	45	34	23	12		
Rec.	0 5	5-10		10-15			15-20					
Time	100	100	30	100	30	10	100	30	30	10		
DC-1	29.5 30.	47 48	9.4 9.2	47. 47.5	18.8 18.5	5.4 5.2	52.5 54	17 15.4	9.0 8.9	3.0 2.9		14.7
DC-2	29.5 30	47 48	9.4 9.2	47. 47.5	18.8 18.5	5.4 5.2	52.5 54	17 15.4	9.0 8.9	3.0 2.9		14.8
Σ	59.5	95	18.6	94.5		10.6	106.5	32.4	17.9	5.9		
DC-3	29.5 30.	47 48	9.3 9.3	47. 47.5	18.9 18.4	5.35 5.25	52.5 54	17 15.4	9.0 8.9	3.0 2.9		
Dc-4			9.4 9.2	47 47.5	18.8 18.5	5.35 5.25	↓	↓		3.0 2.9		
Σ					37.3	10.60				5.9		29.5
DC-AV												
AC-1	29	46	9.0	46	18	5.1	51.5	15.9	8.6	2.9		
AC-2	29	46	9.0	46	18	5.1	52.5	15.9	8.6	2.9		
Σ	58	92	18.0	92	36	10.2	104.0	31.8	17.2	5.8		
S. P.	-7.1	-1.0		+4.9			+3.5					14.7
AC-N	.02	.06		.03			.06					14.7
	(∞	1500	(150	X10)	(∞	1150	(115 X10)					29.4

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Todd Line: 2 A N Int.Cal _____ Date: 3-18-65

Send	45	34	23	12	45	34	23	12				
Rec.	20-25				25-30							
Time	30	30	10	3	30	10	10	3				
DC-1	16.9 16.4	7.6 7.1	4.95 5.0	1.6 1.72	7.3 6.3	3.9 3.6	2.6 2.7	1.0 1.15				
DC-2	16.9 16.4	7.6 7.1	4.95 5.0	1.72 1.6	7.3 6.3	3.8 3.6	2.6 2.7	1.0 1.15				
Σ	33.3	14.7	9.95	3.32	13.6		5.3	2.15				
DC-3	16.9 16.4	7.7 7.0	4.95 5.0	1.72 1.6	7.4 6.2	3.8 3.6	2.6 2.7	1.0 1.15				
Dc-4		7.7 7.0			7.5 6.1	3.8 3.6						
Σ		14.7			13.6	7.4						
DC-AV	(FENCE)											
AC-1	16.2	7.2	4.8	1.6	6.6	3.6	2.55	1.05				
AC-2	16.2	7.2	4.8	1.6	6.4	3.6	2.6	1.05				
Σ	32.4	14.4	9.6	3.2	13.2	7.2	5.15	2.10				
S. P.	+0.7				-5.3							
AC-N	.08				.07							

INDUCED POLARIZATION SENDER NOTES

Project: Todd Line: 2A NW 1/2 Date: 3-18-65

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	2000	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	1800	1800	1800	1800	1800		300				

INDUCED POLARIZATION - RECEIVER NOTES N60E PAGE 1

Project: Todd Line: 1B W Int.Cal 45 Date: 3-17-65

Send	45	34	45	23	34	45	12	23	34	45		
Rec.	0-5	5-10		10-15			15-20					
Time	100	100	30	100	30	10	100	30	10	10		
DC-1	39 38.5	22 21.5	7.4 6.7	29.5 31.	6.5 7.2	3.8 3.95	25. 24.	11.6 10.7	3.7 3.65	2.6 2.4		14.6 14.6
DC-2	39. 38.5	22 21.5	7.4 6.7	29.5 31.	6.5 7.2	3.8 3.95	25. 24.	11.6 10.7	3.7 3.65	2.6 2.4		
Σ												
DC-3	39 38.5	22. 21.5	7.4 6.7	29.5 31.	6.5 7.2	3.8 3.95	25. 24.	11.6 10.7	3.70 3.65	2.6 2.4		
Dc-4	77.5.	43.5	14.1	60.6	13.7	7.7.5	49.0	22.3	7.35	5.0		
Σ												29.2
DC-AV												
AC-1	37.5	21	6.7	29.5	6.7	3.75	23.5	10.7	3.55	2.3		
AC-2	37.5	21	6.7	29.5	6.7	3.75	23.5	10.7	3.55	2.3		
Σ	75.0	42	13.4	59.0	13.4	7.50	47.0	21.4	7.10	4.6		
S. P.	~~-~~0.2	-2.9	~~-3.2~~	-3.7			+2.2					14.6
AC-N	~~-~~0.2	.02	~~.02~~	.02			.02					14.6 29.2

INDUCED POLARIZATION SENDER NOTES

Project: Todd Line: 1B W1/2 Date: 3-17-65

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	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Send	3/4	4/5	1/2	2/3	3/4	4/5		CAL				
Receive								3/4				
Time												
Range												
Current	1800	1800						300				

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: Todd Line: 1B w Int.Cal Date: 3-17-

Send	12	23	34	45	12	23	34	45				
Rec.	2025				25-30							
Time	30	10	3	3	10	10		3				
DC-1	7.1 7.1	5.2 4.7	1.93 2.1	1.6 1.38	4.1 4.4	3.9 3.5	1.65 1.75	1.35 1.45				
DC-2	7.1 7.1	5.2 4.7	1.93 2.1	1.6 1.38	4.1 4.45	3.95 3.5		1.35 1.45				
Σ												
DC-3	7.1 7.7	5.2 4.7	1.93 2.1	1.60 1.38	4.10 4.45	3.95 3.50		1.35 1.45				
Dc-4												
Σ	14.2	9.9	4.03	2.98	8.55	7.45	3.40	2.80				
DC-AV												
AC-1	6.9	4.70	1.92	1.43	4.1	3.55	1.65	1.33				
AC-2	6.9	4.75	1.92	1.43	4.1	3.55	1.65	1.33				
Σ	13.8	9.45	3.84	2.86	8.2	7.10	3.30	2.66				
S. P.	-20.5				+22.1							
AC-N	.07				.09							

BASIC FINDINGS
FOR RECORDING

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project TODD Line 1BW Field date 3-17-65 Data page 1 Comp. date 3-18-65. Comp by F.M.J.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-5	5-10		10-15			15-20					
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	66.5	37.3	48.4	51.9	47.0	66.5	42.0	76.6	63.1	85.8		
(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)	3.3	3.6	5.2	2.5	2.2	3.3	4.3	4.2	3.5	8.7		
(O) MCF=(M-1)(10^5)/H	50	96	108	49	48	50	102	55	56	102		

Project _____ Line _____ Field date _____ Data page 2 Comp. date _____ Comp by _____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	20-25				25-30							
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	48.8	85.0	69.3	89.5	73.5	128	102	134				
(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)	2.9	4.8	5.0	4.1	4.3	5.0	3.0	5.3				
(O) MCF=(M-1)(10^5)/H	59	56	72	46	59	39	29	40				

HEINRICHS GEOEXPLORATION COMPANY

806 WEST GRANT ROAD, TUCSON, ARIZONA, 85703. P.O. BOX 5671. PHONE: (AREA CODE 602) 623-0578

April 5, 1965

LETTER REPORT

Mr. Russell A. Todd
Route 3, Box 748 M
Tucson, Arizona

Re: INDUCED POLARIZATION SURVEY, Pima County, Arizona
Unpatented Mining Claims Twin Buttes Mining Dist.
New Opportunity 1 thru 12
Suzie 1 thru 4
Suzie Extension, Criss Cross, Turkey Trot

Dear Mr. Todd:

From March 16 through March 18, 1965, Heinrichs Geoexploration Company of Tucson, Arizona conducted an Induced Polarization Survey over eighteen (18) unpatented mining claims at your request. Personnel working in the field were Mr. Fred Johnson, party chief, Mr. R. Palmer, Mr. J. Beeler and Mr. D. Godfrey, assistants. Office interpretation and compilation was by Mr. Chris Ludwig, Sr. Geophysicist and Mr. J. P. Matthews.

The total surface profile coverage was 18,000 ft. Lines 1A and 1B overlapped approximately 2,400 ft. in the vicinity of Suzie No. 2 and Line 2A crossed 1A and 1B as near to 90° as possible and still remain on the claim group.

The results of the survey show some extremely weak sulfide anomalism (less than 0.5% sulfides by volume) in the vicinity of electrodes 1 and 2 on Line 1B at the 4th separation zone; the zone appears to be just a little over background and not to continue at depth, therefore of little possible economic significance.

The other feature that is somewhat over background and appears to represent some very weak sulfide anomalism is located between electrodes 3 and 4 on Line 1A and appears to be related to a minor resistivity change. This feature is the more significant of the two zones discussed.

The Self Potential Survey indicates a 25 millivolt low in the vicinity of electrodes 3 and 4 on Line 1A and a similar magnitude low is indicated through the center of Line 1B. The amount of S. P. measured is not much over background and little importance can be attached to it.

In summary, the I. P. survey indicates no significant zone of sulfides in the areas touched by the survey to a depth of at least 500 ft. This does not mean, however, that small volume veinlets of sulfides do not exist on the property surveyed and if some drilling is planned in the future we would recommend testing the zone on Line 1-A as being the more favorable, based on our interpretation of the existing data.

Line 2A showed no anomalous effects.

Respectfully submitted,
HEINRICHS GEOEXPLORATION CO.

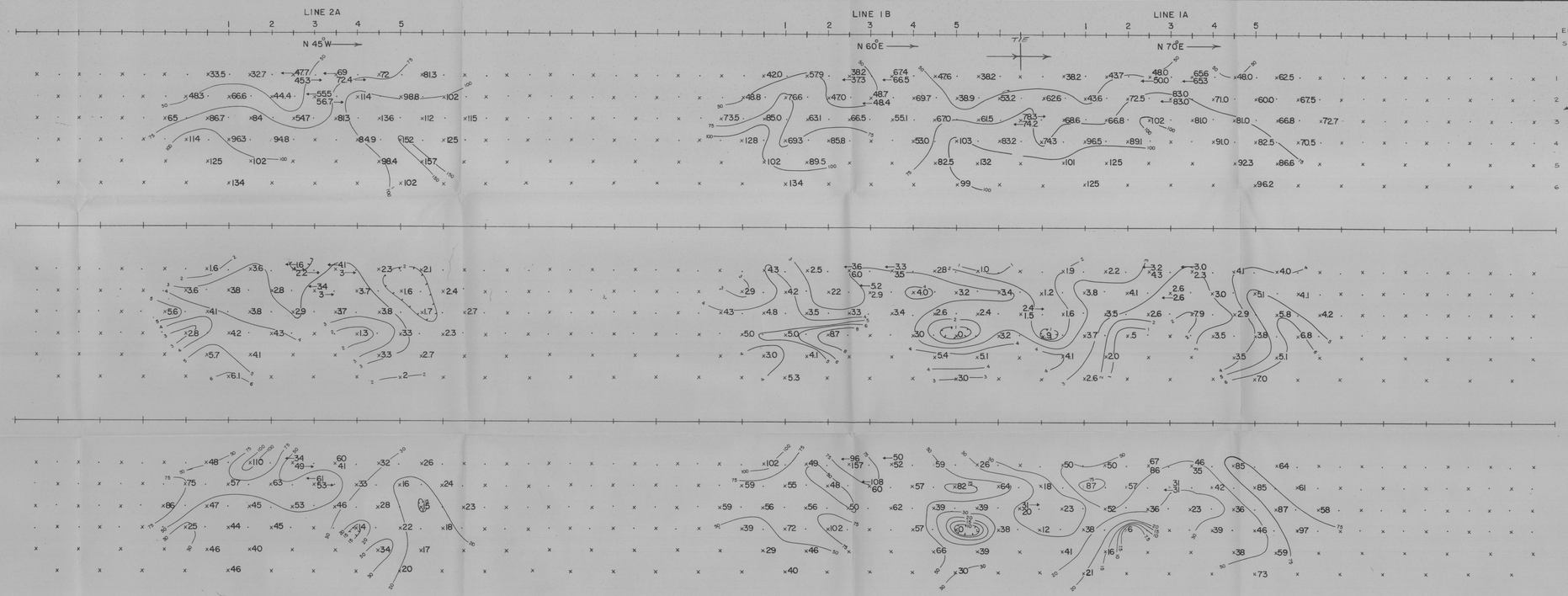
Chris S. Ludwig

Chris S. Ludwig
Sr. Geophysicist

Walter E. Heinrichs, Jr.
President & General Manager

Registered Professional Engineer (Mining) CERTIFICATE EXPIRES WALTER E. HEINRICHS, JR. DEC. 31, 1965 ARIZONA, U. S. A.

Enclosures:
I. P. Location Map
Sectional Data Sheet
Affidavit of Labor
Six (6) computation sheets
S. P. Profiles



Apparent Resistivity (ρ_a) in units of OHM-Feet-2π
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_a)
Contour Interval Logarithmic
(Madden Parameter)

EXPLANATION

ELECTRODE ARRAY: 500' (SENDER DIPOLE) — 500'n — 500' (RECEIVER DIPOLE)

Relative Anomaly Strength

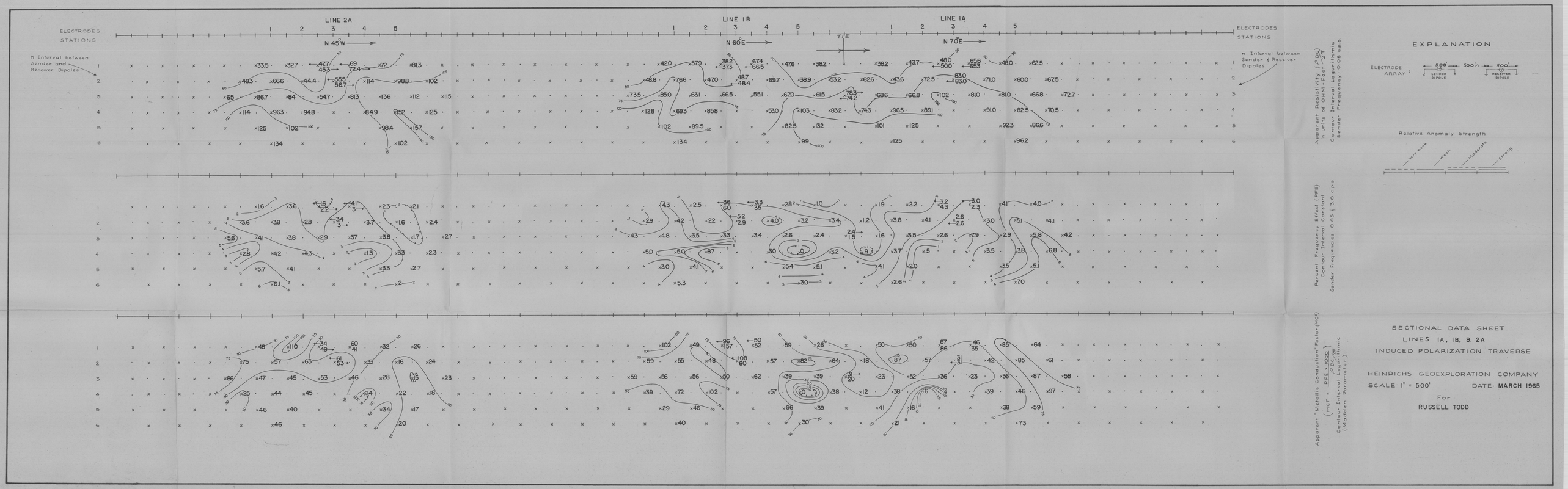
Very weak — Weak — Moderate — Strong

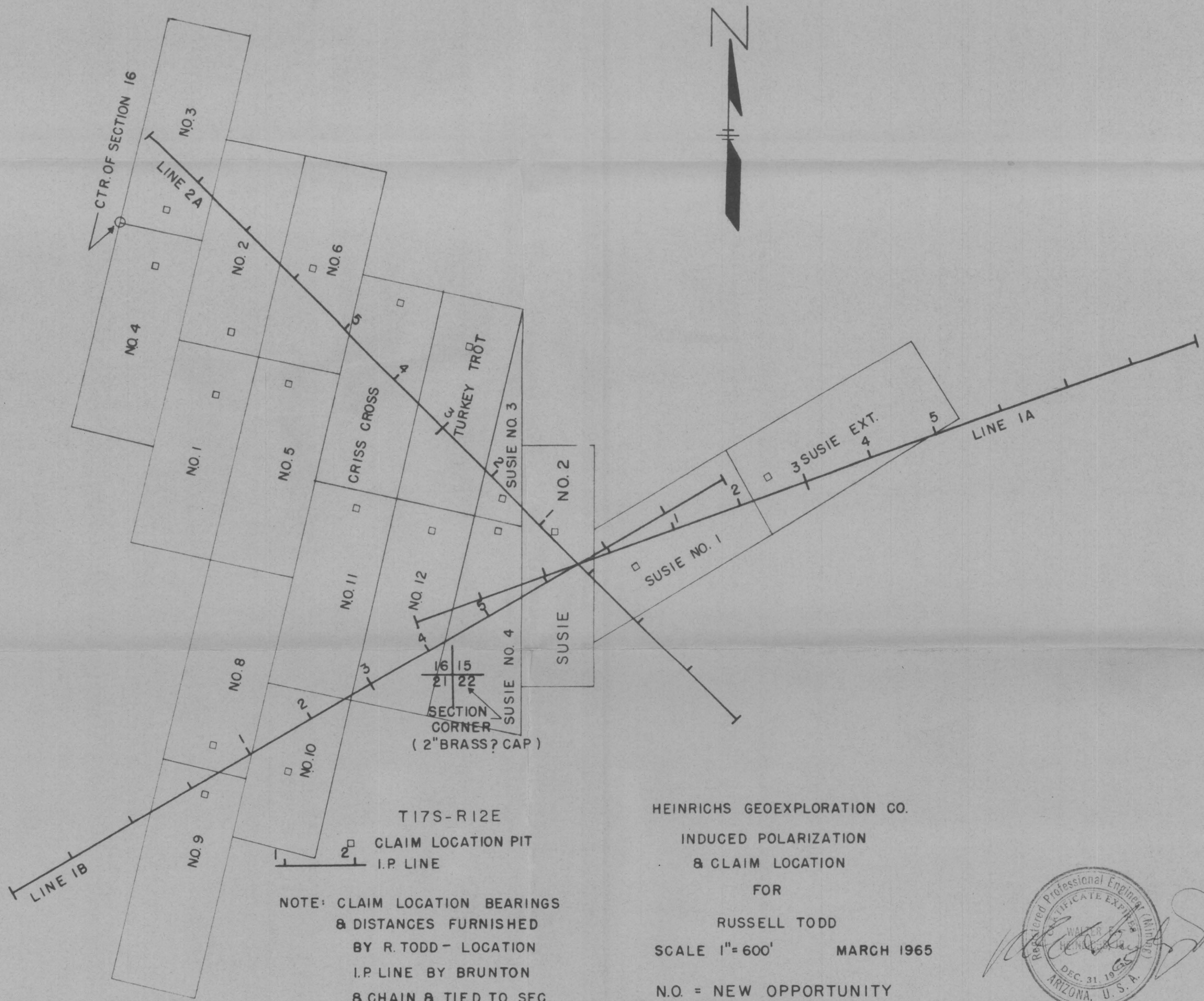
SECTIONAL DATA SHEET
LINES 1A, 1B, & 2A
INDUCED POLARIZATION TRAVERSE

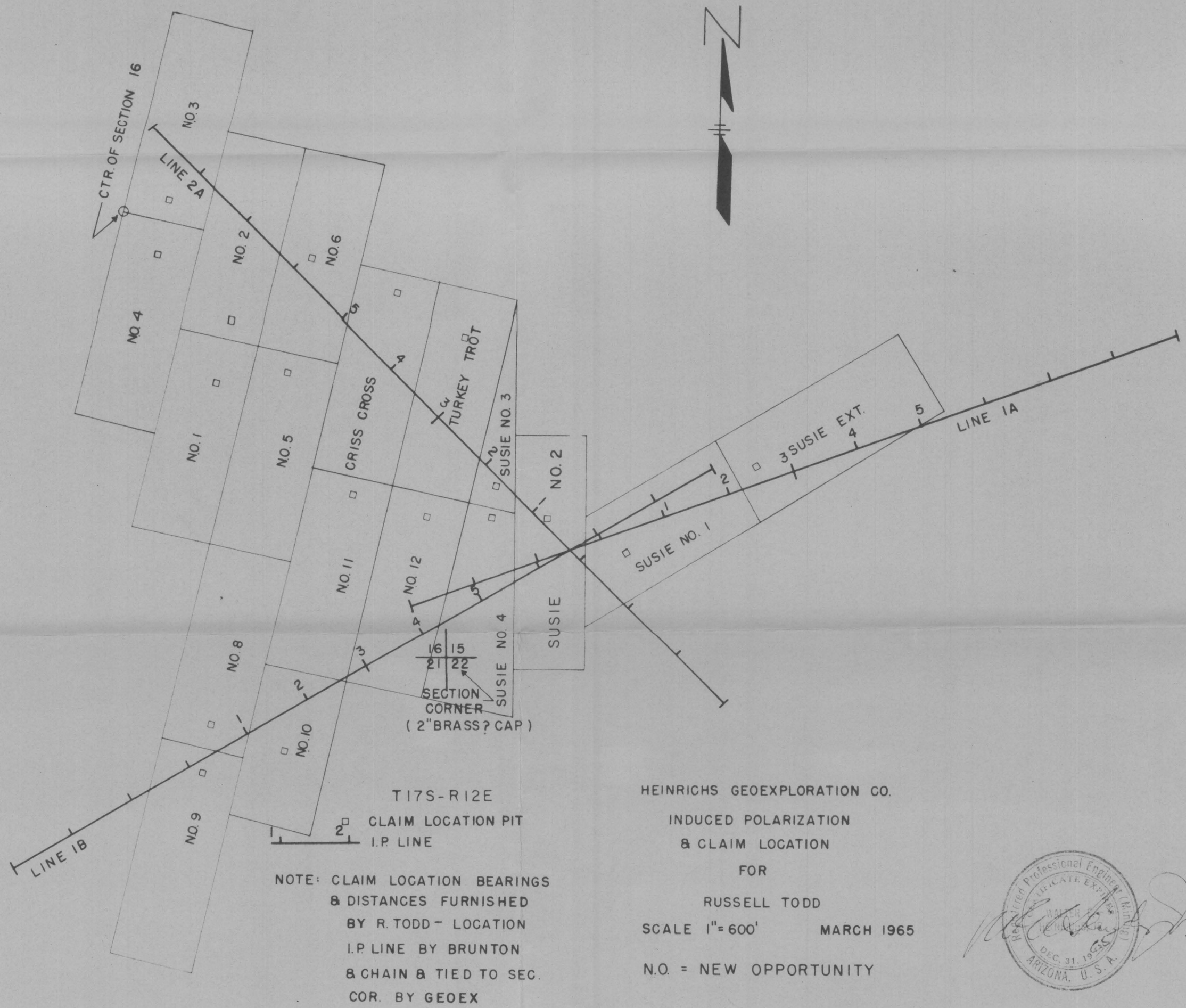
HEINRICHS GEOEXPLORATION COMPANY

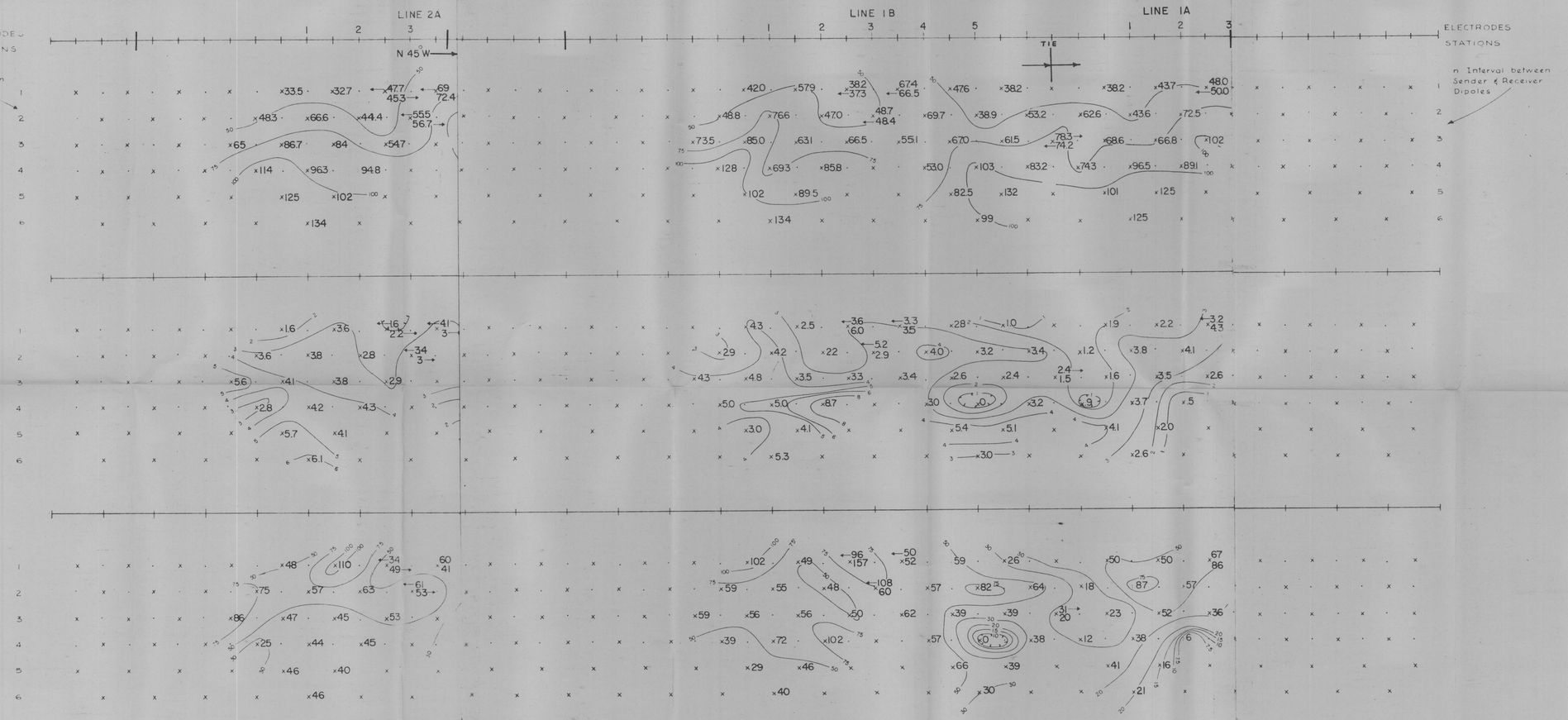
SCALE 1" = 500' DATE: MARCH 1965

For
RUSSELL TODD


LINE 2A
LINE 1B
LINE 1A
ELECTRODES
STATIONS
N 45°W
N 60°E
T/E
N 70°E
n Interval between Sender and Receiver Dipoles
Apparent Resistivity (ρa)
In units of OHM-Feet 2π
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 / ρa 2π)
Contour Interval Logarithmic
(Madden Parameter)
EXPLANATION
ELECTRODE ARRAY:
500'
SENDER DIPOLE
500'n
500'
RECEIVER DIPOLE
Relative Anomaly Strength
Very weak
Weak
Moderate
Strong
SECTIONAL DATA SHEET
LINES 1A, 1B, & 2A
INDUCED POLARIZATION TRAVERSE
HEINRICHS GEOEXPLORATION COMPANY
SCALE 1" = 500'
DATE: MARCH 1965
For
RUSSELL TODD


CTR. OF SECTION 16
LINE 2A
NO. 3
NO. 2
NO. 6
NO. 4
NO. 1
NO. 5
CRISS CROSS
TURKEY TROT
SUSIE NO. 3
NO. 2
SUSIE NO. 1
3 SUSIE EXT.
LINE 1A
NO. 11
NO. 12
NO. 8
SUSIE NO. 4
SUSIE
16 15
21 22
SECTION CORNER
(2"BRASS? CAP)
NO. 10
NO. 9
LINE 1B
T17S-R12E
CLAIM LOCATION PIT
I.P. LINE
NOTE: CLAIM LOCATION BEARINGS & DISTANCES FURNISHED BY R. TODD - LOCATION I.P. LINE BY BRUNTON & CHAIN & TIED TO SEC. COR. BY GEOEX
HEINRICHS GEOEXPLORATION CO.
INDUCED POLARIZATION & CLAIM LOCATION
FOR
RUSSELL TODD
SCALE 1"= 600'
MARCH 1965
N.O. = NEW OPPORTUNITY
Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
WALTER E. HEINRICHS
DEC. 31, 1965
ARIZONA, U.S.A.


CTR. OF SECTION 16
LINE 2A
NO. 3
NO. 2
NO. 6
NO. 4
NO. 1
NO. 5
CRISS CROSS
TURKEY TROT
SUSIE NO. 3
NO. 2
NO. 11
NO. 12
NO. 8
NO. 10
NO. 9
SUSIE NO. 4
SUSIE
SUSIE NO. 1
3 SUSIE EXT.
LINE 1A
LINE 1B
16 15
21 22
SECTION CORNER
(2" BRASS? CAP)
N
T17S-R12E
CLAIM LOCATION PIT
I.P. LINE
NOTE: CLAIM LOCATION BEARINGS & DISTANCES FURNISHED BY R. TODD - LOCATION I.P. LINE BY BRUNTON & CHAIN & TIED TO SEC. COR. BY GEOEX
HEINRICHS GEOEXPLORATION CO.
INDUCED POLARIZATION
& CLAIM LOCATION
FOR
RUSSELL TODD
SCALE 1" = 600'
MARCH 1965
N.O. = NEW OPPORTUNITY
Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
DEC. 31, 1965
ARIZONA, U.S.A.



EXPLANATION

ELECTRODE ARRAY: 500' (SENDER DIPOLE) — 500'n — 500' (V) (RECEIVER DIPOLE)

Relative Anomaly Strength

Very weak — Weak — Moderate — Strong

Revised

SECTIONAL DATA SHEET
LINES 1A, 1B, & 2A
INDUCED POLARIZATION TRAVERSE

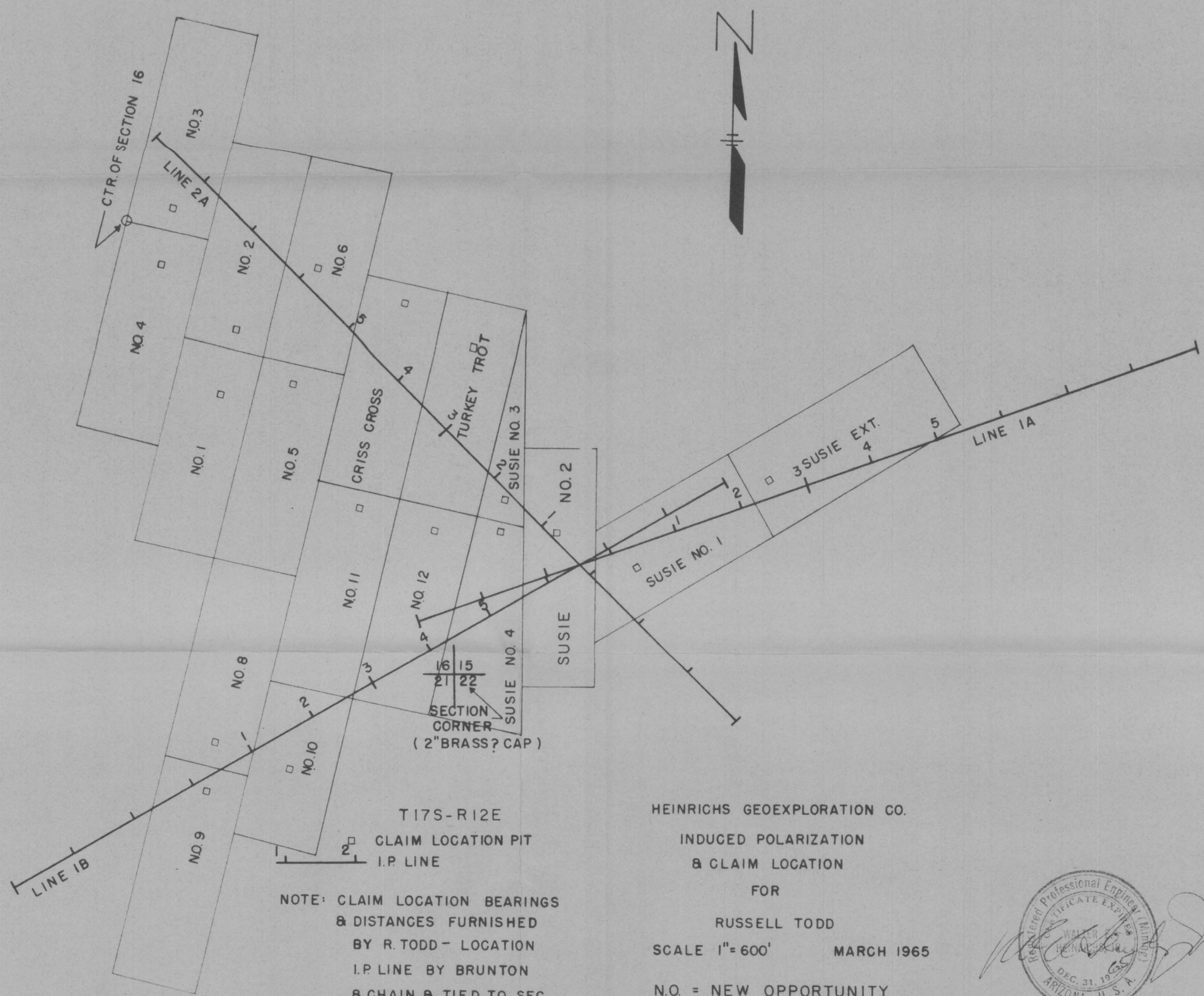
HEINRICHS GEOEXPLORATION COMPANY

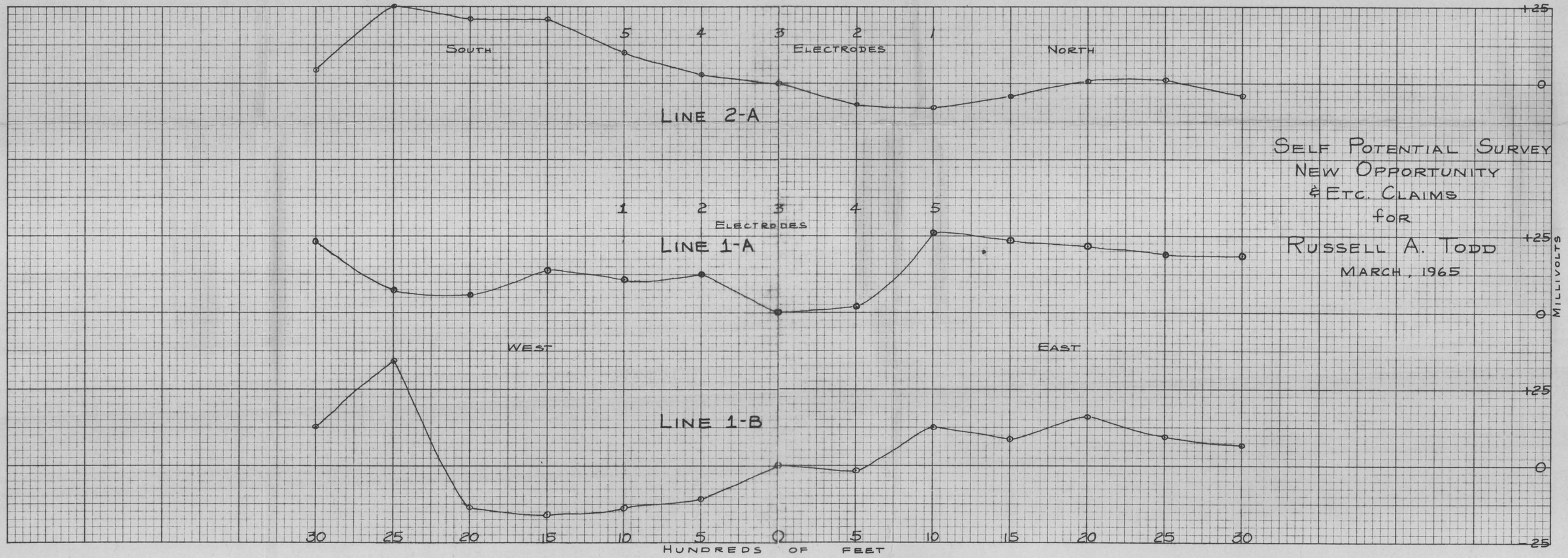
SCALE 1" = 500' DATE MARCH 1965

For

RUSSELL TODD

Revised to eliminate data of the claim group.


N
CTR. OF SECTION 16
LINE 2A
NO. 3
NO. 4
NO. 2
NO. 6
NO. 1
NO. 5
CRISS CROSS
TURKEY TROT
SUSIE NO. 3
NO. 2
SUSIE NO. 1
3 SUSIE EXT.
LINE 1A
NO. 11
NO. 12
SUSIE NO. 4
SUSIE
NO. 8
16 15
21 22
SECTION CORNER
(2" BRASS? CAP)
NO. 10
NO. 9
LINE 1B
T17S-R12E
CLAIM LOCATION PIT
I.P. LINE
NOTE: CLAIM LOCATION BEARINGS & DISTANCES FURNISHED BY R. TODD - LOCATION I.P. LINE BY BRUNTON & CHAIN & TIED TO SEC. COR. BY GEOEX
HEINRICHS GEOEXPLORATION CO.
INDUCED POLARIZATION
& CLAIM LOCATION
FOR
RUSSELL TODD
SCALE 1" = 600'
MARCH 1965
N.O. = NEW OPPORTUNITY
Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
DEC. 31, 19
ARIZONA, U.S.A.


SELF POTENTIAL SURVEY
NEW OPPORTUNITY
& ETC. CLAIMS
FOR
RUSSELL A. TODD
MARCH, 1965
LINE 2-A
SOUTH
NORTH
5 4 3 2 1
ELECTRODES
LINE 1-A
1 2 3 4 5
ELECTRODES
WEST
EAST
LINE 1-B
+25
0
+25
0
+25
0
-25
MILLIVOLTS
30 25 20 15 10 5 0 5 10 15 20 25 30
HUNDREDS OF FEET

REPORT OF GEOPHYSICAL SURVEY

This is a report of a geophysical survey of the claims hereinafter described, done as a part of the requirements for annual labor for the period from September 1, 1964 to September 1, 1965 and is made as of 30 March 1965.

These claims consist of a contiguous group situated in sec. 21 and 22,15 and 16, T 17 S, R 12 E, G & S R B & M in the Twin Buttes Mining District, Pima County, Arizona. The claims are owned by Mr. Russell A. Todd and the work was performed by the undersigned at the request of and at the expense of said owners.

The claims are more particularly described on the claim notices which are recorded in the records of Pima County, Arizona as follows:

NAME OF CLAIM		DOCKET NO.	PAGE NO.
New Opportunity	1		
" "	2		
" "	3		
" "	4		
" "	5		
" "	6		
" "	7		
" "	8		
" "	9		
" "	10		
" "	11		
" "	12		
Criss Cross			
Turkey Trot			
Suzie	1		
"	2		
"	3		
"	4		

The work was done on these claims and was done for the benefit of the group as a whole. The geophysical work done consists of three Induced Polarization profiles. The location of the work performed in relation to points of discovery and boundaries of the claims and thennature and extent thereof is shown on a plat identified as: "Induced Polarization and Claim Location", as well as six plats identified as "Computation Sheets" and all six plats are further identified as Heinrichs Geoexploration Company, March 1965, Todd Project, Lines 1AE, 1AW, 1BE, 1BW, 2AN, 2AS and are attached hereto by this reference and are made a part hereof.

The cost of the geophysical work done on this group of claims during this assessment period was in excess of $800.00.

The basic findings from the geophysical work are as follows:

Line No. 1A & 1B run diagonally northeasterly-southwesterly across the southern part of the claim group (see accompanying sketch map) was surveyed on 500 ft. spacings to detect sulfides down to 500 ft. below surface. Minor weak anomalism frequency effects were found from 0.5 to 1.0 on Line 1B and weak effects in the vicinity of electrode 4, Line 1A. The resistivities show rather high values from 38 to a high of 134 Rho DC/2pi and increasing with depth.

Line No. 2 is bearing northwest-southeast & crosses Line 1A at 2,000 ft. west of electrode 3 on 1A, crosses Line 1B 1,500 ft. east of electrode 3 on 1B (see attached sketch). No anomalous effects were measured. The resistivities vary from 32.7 to 134 Rho DC/2pi and increasing with depth.

All of this geophysical work was done under the direction of Mr. Walter E. Heinrichs, Jr., President & General Manager of Heinrichs Geoexploration Company, Tucson, Arizona at the request of said owner. The persons who worked on said survey in addition to Mr. Walter E. Heinrichs, Jr. are as follows: E. Grover Heinrichs, John Beeler, Fred Johnson, Phil Matthews, and Chris S. Ludwig, all employees of Heinrichs Geoexploration Company.

Mr. Walter E. Heinrichs, Jr., is a registered professional mining engineer, No. 2447, State of Arizona, with many years of experience in making geophysical surveys, and all of the other persons performing said work are either grdduate geophysical engineers, geologists, technicians or helpers.

Walter E. Heinrichs, Jr.

STATE OF ARIZONA)
) ss.
COUNTY OF PIMA)

WALTER E. HEINRICHS, JR., being first duly sworn, deposes and says:

That he is the president and general manager of Heinrichs Geoexploration Company of Tucson, Arizona; that he has read the foregoing report of Geophysical Survey, knows the contents thereof, and that the same is true.

Walter E. Heinrichs, Jr.

Subscribed and sworn to before me this March 31 day of March 1965.

Notary Public

My commission expires: July 20, 1965.

Line No. 2 is bearing northwest-southeast & crosses Line 1A at 2,000 ft. west of electrode 3 on 1A, crosses Line 1B 1,500 ft. east of electrode 3 on 1B (see attached sketch). No anomalous effects were measured. The resistivities vary from 32.7 to 134 Rho DC/2pi and increasing with depth.

All of this geophysical work was done under the direction of Mr. Walter E. Heinrichs, Jr., President & General Manager of Heinrichs Geoexploration Company, Tucson, Arizona at the request of said owner. The persons who worked on said survey in addition to Mr. Walter E. Heinrichs, Jr. are as follows: E. Grover Heinrichs, John Beeler, Fred Johnson, Phil Matthews, and Chris S. Ludwig, all employees of Heinrichs Geoexploration Company.

Mr. Walter E. Heinrichs, Jr., is a registered professional mining engineer, No. 2447, State of Arizona, with many years of experience in making geophysical surveys, and all of the other persons performing said work are either graduate geophysical engineers, geologists, technicians or helpers.

Registered Professional Engineer (Mining) CERTIFICATE EXPIRES WALTER E. HEINRICHS, JR. DEC. 31, 1965 ARIZONA, U. S. A.

Walter E. Heinrichs, Jr.

STATE OF ARIZONA)
) ss.
COUNTY OF PIMA)

WALTER E. HEINRICHS, JR., being first duly sworn, deposes and says:

That he is the president and general manager of Heinrichs Geoexploration Company of Tucson, Arizona; that he has read the foregoing report of Geophysical Survey, knows the contents thereof, and that the same is true.

Walter E. Heinrichs, Jr.

Subscribed and sworn to before me this March 31 day of March 1965.

M. Jean Heinrichs
Notary Public

My commission expires: July 20, 1965.

REPORT OF GEOPHYSICAL SURVEY

This is a report of a geophysical survey of the claims hereinafter described, done as a part of the requirements for annual labor for the period from September 1, 1964 to September 1, 1965 and is made as of 30 March 1965.

These claims consist of a contiguous group situated in sec. 21 and 22, 15 and 16, T 17 S, R 12 E, G & S R B & M in the Twin Buttes Mining District, Pima County, Arizona. The claims are owned by Mr. Russell A. Todd and the work was performed by the undersigned at the request of and at the expense of said owners.

The claims are more particularly described on the claim notices which are recorded in the records of Pima County, Arizona as follows:

NAME OF CLAIM		DOCKET NO.	PAGE NO.
New Opportunity	1		
" "	2		
" "	3		
" "	4		
" "	5		
" "	6		
" "	7		
" "	8		
" "	9		
" "	10		
" "	11		
" "	12		
Criss Cross			
Turkey Tret			
Suzie	1		
"	2		
"	3		
"	4		

The work was done on these claims and was done for the benefit of the group as a whole. The geophysical work done consists of three Induced Polarization profiles. The location of the work performed in relation to points of discovery and boundaries of the claims and thennature and extent thereof is shown on a plat identified as: "Induced Polarization and Claim Location", as well as six plats identified as "Computation Sheets" and all six plats are further identified as Heinrichs Geoexploration Company, March 1965, Todd Project, Lines 1AE, 1AW, 1BE, 1BW, [illegible]N, 2AS and are attached hereto by this reference and are made a part hereof.

The cost of the geophysical work done on this group of claims during this assessment period was in excess of $800.00.

The basic findings from the geophysical work are as follows:

Line No. 1A & 1B run diagonally northeasterly-southwesterly across the southern part of the claim group (see accompanying sketch map) was surveyed on 500 ft. spacings to detect sulfides down to 600 ft. below surface. Minor weak anomalism frequency effects were found from 0.5 to 1.0 on Line 1B and weak effects in the vicinity of electrode 4, Line 1A. The resistivities show rather high values from 38 to a high of 134 Rho DC/2pi and increasing with depth.

REPORT OF GEOPHYSICAL SURVEY

This is a report of a geophysical survey of the claims hereinafter described, done as a part of the requirements for annual labor for the period from September 1, 1964 to September 1, 1965 and is made as of 30 March 1965.

These claims consist of a contiguous group situated in sec. 21 and 22,15 and 16, T 17 S, R 12 E, C & S R B & M in the Twin Buttes Mining District, Pima County, Arizona. The claims are owned by Mr. Russell A. Todd and the work was performed by the undersigned at the request of and at the expense of said owners.

The claims are more particularly described on the claim notices which are recorded in the records of Pima County, Arizona as follows:

NAME OF CLAIM		DOCKET NO.	PAGE NO.
New Opportunity	1		
" "	2		
" "	3		
" "	4		
" "	5		
" "	6		
" "	7		
" "	8		
" "	9		
" "	10		
" "	11		
" "	12		
Criss Cross			
Turkey Trot			
Suzie	1		
"	2		
"	3		
"	4		

The work was done on these claims and was done for the benefit of the group as a whole. The geophysical work done consists of three Induced Polarization profiles. The location of the work performed in relation to points of discovery and boundaries of the claims and thennature and extent thereof is shown on a plat identified as: "Induced Polarization and Claim Location", as well as six plats identified as "Computation Sheets" and all six plats are further identified as Heinrichs Geoexploration Company, March 1965, Todd Project, Lines 1AE, 1AW, 1BE, 1BW, 2AN, 2AS and are attached hereto by this reference and are made a part hereof.

The cost of the geophysical work done on this group of claims during this assessment period was in excess of $800.00.

The basic findings from the geophysical work are as follows:

Line No. 1A & 1B run diagonally northeasterly-southwesterly across the southern part of the claim group (see accompanying sketch map) was surveyed on 500 ft. spacings to detect sulfides down to 500 ft. below surface. Minor weak anomalism frequency effects were found from 0.5 to 1.0 on Line 1B and weak effects in the vicinity of electrode 4, Line 1A. The resistivities show rather high values from 30 to a high of 134 Rho DC/2pi and increasing with depth.

Line No. 2 is bearing northwest-southeast and crosses Line 1A at 2,000 ft. west of electrode 3 on 1A, crosses Line 1B 1,500 ft. east of electrode 3 on 1B [see attached sketch]. No anomalous effects were measured. The resistivities vary from 32.7 to 134 Rho DC/2pi and increasing with depth.

All of this geophysical work was done under the direction of Mr Walter E. Heinrichs, Jr., President & General Manager of Heinrichs Geoexploration Company, Tucson, Arizona at the request of said owner. The persons who worked on said survey in addition to Mr. Walter E. Heinrichs, Jr. are as follows: E.Grover Heinrichs, John Beeler, Fred Johnson, Phil Matthews, and Chris S. Ludwig, all employees of Heinrichs Geoexploration Company.

Mr. E.Grover Heinrichs is a qualified expert in the field of geophysical exploration with many years experience in making geophysical surveys, and all other persons performing said work are either graduate geophysical engineers, geologists, technicians or helpers.

E. Grover Heinrichs

E. Grover Heinrichs
Vice President,Heinrichs Geoexploration Co.

STATE OF ARIZONA)
) ss.
COUNTY OF PIMA)

E.Grover Heinrichs, being first duly sworn, deposes and says:

That he is Vice President of Heinrichs Geoexploration Company of Tucson, Arizona; that he has read the foregoing report of Geophysical Survey, knows the contents thereof and that the same is true.

E. Grover Heinrichs

E.Grover Heinrichs

August 26, 1965

Helen G. Shay

My Commission Expires June 14, 1966

BASIC FINDINGS
FOR RECORDING

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project TODD Line 1BW Field date 3-17-65 Data page 1 Comp. date 3-18-65. Comp by F.M.J.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-5	5-10		10-15			15-20					
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	66.5	37.3	48.4	51.9	47.0	66.5	42.0	76.6	63.1	85.8		
(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)	3.3	3.6	5.2	2.5	2.2	3.3	4.3	4.2	3.5	8.7		
(O) MCF=(M-1)(10^5)/H	50	96	108	49	48	50	102	55	56	102		

Project Line Field date Data page 2 Comp. date Comp by

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	20-25				25-30							
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	48.8	85.0	69.3	89.5	73.5	128	102	134				
(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)	2.9	4.8	5.0	4.1	4.3	5.0	3.0	5.3				
(O) MCF=(M-1)(10^5)/H	59	56	72	46	59	39	29	40				

BASIC FINDINGS
FOR RECORDING

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project TODD Line 1B EAST Field date 3-17-65 Data page 1 Comp. date 3-17-65 Comp by EM.

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-5	5-10	→	10-15	→	→	15-20	→	→	→		
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	38.2	67.4	48.7	47.6	69.7	55.1	38.2	38.9	67.0	53		
(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)	6.0	3.5	2.9	2.8	4.0	3.4	1.0	5.2	2.6	3.0		
(O) MCF=(M-1)(10^5)/H	157	52	60	59	57	62	26	82	39	57		

Project Line Field date Data page 2 Comp. date Comp by

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	20-25	→	→	→	25-30	→	→	→				
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	53.2	61.5	103	82.5	78.3	83.2	132	99.0	[illegible]			
(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)	3.4	2.4	0	5.4	2.4	3.2	5.1	3.0				
(O) MCF=(M-1)(10^5)/H	64	39	0	66	31	38	39	30				

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project Todd Line 1BE Field date 3-17-65 Data page 1 Comp. date 3-17-65 Comp by EMJ Page 2

(A) Send	45	34	45	23	34	45	12	23	34	45		
(B) Receive	0 5	510		1015			15-20					
(C) n separation												
(D) I	1800											
(E) Vdc (avg)	44.3	78.5	14.2	555	203	6.41	44.5	1.35	7.8	3.09		
(F) DCcal	1.03											
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6.0	15	30		
(H) ρ dc=ExFxGx10^3/D	38.2	67.4	48.7	47.6	69.7	55.1	38.2	38.9	67.0	53		
(I) Vac Σ	1.2	25.8	13.8	54	15.5	6.2	44.	1.0	7.6	3.0		
(J) AC noise x 2	.05	.16		.04			.04					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	6.0	3.5	2.9	2.8	4.0	3.4	1.0	3.2	2.6	3.0		
(O) MCF=(M-1)(10^5)/H	157	52	60	59	57	62	26	82	39	57		
S.P.	-2.2	+19.7	→	-4.2	→		+7.6	→				

Project Line Field date Data page 2 Comp. date Comp by

(A) Send	1 2	2 3	3 4	4 5	1 2	2 3	3 4	4 5				
(B) Receive	20 25				20 30							
(C) n separation	3	10	10	3	10	10	10	3				
(D) I	1800											
(E) Vdc (avg)	10.5	7.17	6.0	2.75	7.12	4.85	4.12	2.06				
(F) DCcal												
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρ dc=ExFxGx10^3/D	53.2	61.5	103	82.5	78.3	83.2	132	~~[illegible]~~	99.0			
(I) Vac Σ	15.0	7.0	6.0	2.61	8.95	1.70	42	2.0				
(J) AC noise x 2	.18				.06							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	3.4	2.4	0	6.4	2.4	3.2	6.1	3.0				
(O) MCF=(M-1)(10^5)/H	64	39	0	66	31	38	39	30				
S.P.	-6.0	→			-3.1	→						

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project Todd Line 1AE Field date 3-16-65 Data page 1 Comp. date 3-17-65 Comp by F.H.J. Page 3

Send	12	23	12	34	23	12	45	34	23	12		
Receive	0-5	5-10		10-15			15-20					
n separation RANGE	100	100	30	100	30	10	100	30	10	10		
I	2000											
Vdc (avg)	64	87.5	27.7	64	23.7	10.8	83.3	20	10.8	6.0		
DCcal	1.0	→										
Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		30.0
ρdc=ExFxGx10^3/D	48.0	65.6	83.0	48.0	71.0	81	62.5	60.0	81.0	90.0		
Vac Σ	62	84.1	[illegible]	61.5	23	10.6	80	19	10.5	5.2		29.1
AC noise x 2	.06	.4		.06			.4					
Vac(corr) = $\sqrt{I^2 - J^2}$												
AC-DC cal.	.990	→										
ρdc/ρac=ExL/K												
PFE=(M-1)(10^2)	3.2	3.0	2.6	4.1	3.0	1.9	4.0	5.1	2.9	3.5		
MCF=(M-1)(10^5)/H	67	46	31	85	42	23	64	85	36	39		
S.P.	+1.8	+24.6	→	-2.4	→		-1.9	→				

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

Send	45	34	23	12	45	34	23	12				
Receive	20-25				25-30							
n separation	30	10	10	3	10	10	3	3				
I	2000											
Vdc (avg)	22.5	8.9	5.5	3.52	9.7	4.7	3.3	2.29				
DCcal	1.0	→										
Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
ρdc=ExFxGx10^3/D	67.5	66.8	82.5	92.3	72.7	70.5	86.6	96.2				
Vac Σ	21.6	8.4	5.2	3.4	7.3	4.4	3.14	2.14				
AC noise x 2	.050				.04							
Vac (corr) = $\sqrt{I^2 - J^2}$												
AC-DC cal.	.990	→										
ρdc/ρac =ExL/K												
PFE=(M-1)(10^2)	4.1	5.8	3.8	3.5	4.2	6.8	5.1	7.0				
MCF=(M-1)(10^5)/H	61	87	46	38	58	97	59	73				
S.P.	-2.6	→			-0.2	→						

Basic Findings
For recording

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project TODD Line 1A-WEST Field date 3-16-65 Data page _____ Comp. date 3-18-65. Comp by J.P.M. Page 4

(A) Send		3-4		2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive		5-10		10-15	→	→	15-20	→	→	→	20-25	→
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D		50.0		43.7	72.5	102	38.2	43.6	66.8	89.1	62.6	49.6
(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)		4.3		2.2	4.1	2.6	1.9	3.8	3.5	.5	1.2	1.0
(O) MCF=(M-1)(10^5)/H		86		50	57	36	50	87	52	6	18	23

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5						
(B) Receive	20-25	→	25-30	→	→	→						
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	96.5	125	74.2	74.3	101	125						
(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)	3.7	2.0	1.5	0.9	4.1	2.6						
(O) MCF=(M-1)(10^5)/H	38	16	20	12	41	21						

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 4

Project Todd Line 1AW Field date 3-16-65 Data page _____ Comp. date 3-18-65 Comp by J.P.M.

(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	0-5	5-10	→	10-15	→	→	15-20	→	→	→	20-25	→
(C) n separation												
(D) I	2000	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	88.0	67.5	28.0	59.0	24.45	13.7	51.5	14.7	9.0	6.00	21.1	9.25
(F) DCcal	.988	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρ dc=ExFxGx10^3/D	65.3	50.0	83.0	43.7	72.5	102	38.2	43.6	66.8	89.1	62.6	68.6
(I) Vac Σ	85	64	27.0	57.0	23.2	13.2	50.0	14.0	8.6	5.9	21.06	9.
(J) AC noise x 2	.23	.04	→	.28	→	→	.24	→	→	→	.04	→
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	→	→	→	→	→	→	→	→	→	→	→	→
(L) AC-DC cal.	.988	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	2.3	4.3	2.6	2.2	4.1	2.6	1.9	3.8	3.5	[illegible]	1.2	1.6
(O) MCF=(M-1)(10^5)/H	35	86	31	50	57	36	50	87	52	6	18	23
S.P.	+12.3	-1.5	→	+3.1	→	→	-8.0	→	→	→	+11.5	→

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5						
(B) Receive												
(C) n separation												
(D) I	2000	→	→	→	→	→						
(E) Vdc (avg)	6.50	4.75	10.0	5.0	3.9	3.01		30.4				
(F) DCcal	.988	→	→	→	→	→		.988				
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	96.5	125	74.2	74.3	101	125						
(I) Vac Σ	6.2	4.6	9.75	4.9	3.7	2.9		30.0				
(J) AC noise x 2	.04	→	.16	→	→	→						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	→	→	→	→	→	→						
(L) AC-DC cal.	.988	→	→	→	→	→		.988				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	3.7	2.0	1.5	0.9	4.1	2.6						
(O) MCF=(M-1)(10^5)/H	38	16	20	12	41	21						
S.P.	+11.5	→	+5.3	→	→	→						

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 5

Project [illegible] Line 2A N Field date 3-18-65 Data page 1 Comp. date 3-19-65 Comp by E.M.

Line 2A N 100+06 W

A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
B) Receive	0-5	5-10	→	10-15	→	→	15-20	→	→	→		
C) n separation	100	100	30	100	30	10	100	30	30	10		
D) I	2000	→	→	→	→	→	→	→	→	→		300
E) Vdc (avg)	59.5	95	18.6	94.5	37.3	10.6	106.5	32.4	17.9	5.9		29.5
F) DCcal	1.016	→	→	→	→	→	→	→	→	→		
G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
H) ρ dc=ExFxGx10^3/D	45.3	72.4	56.7	72	113.6	81.3	81.3	98.8	136.3	89.9		
I) Vac	58	92	18	92	36	10.2	104	31.8	17.2	5.8		29.[illegible]
J) AC noise x 2	.04	.12		.06			.12					
K) Vac(corr) = $\sqrt{I^2 - J^2}$	—	—	—	—	—	—	—	—	—	—		
L) AC-DC cal.	.997	→	→	→	→	→	→	→	→	→		
M) ρ dc/ρac=ExL/K	1.032	1.03	1.03	1.023	1.037	1.037	1.021	1.016	1.038	1.013		
N) PFE=(M-1)(10^2)	2.2	3	3	2.3	3.7	3.7	2.1	1.6	3.8	1.3		
O) MCF=~~(M-1)(10^3)/n~~	42.7	41.4	52.9	31.95	32.6	45.6	25.85	16.2	27.85	14.47		
(N)(10^3)/H S.P.	-7.1	-1.0	→	+4.9	→	→	+2.5	→	→	→		

Project _____ Line _____ Field date _____ Data page 2 Comp. date _____ Comp by _____

A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
B) Receive	20-25	→	→	→	25-30	→	→	→				
C) n separation	30	30	10	3	30	10	10	3				
D) I	2000	→	→	1800	→	→	→	→				
E) Vdc (avg)	5.23	14.7	9.45	3.32	13.6	7.4	5.3	2.15				
F) DCcal	1.016	→	→	→	→	→	→	→				
G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
H) ρ dc=ExFxGx10^3/D	102	112	151.5	98.4	115	125.3	157.1	101.9				
I) Vac	82.4	14.4	9.6	3.2	13.2	7.2	5.15	2.1				
J) AC noise x 2	.16				.14							
K) Vac (corr) = $\sqrt{I^2 - J^2}$	—	—	—	—	—	—	—	—				
L) AC-DC cal.	.997	→	→	→	→	→	→	→				
M) ρdc/ρac =ExL/K	1.024	1.017	1.033	1.033	1.027	1.023	1.027	1.02				
N) PFE=(M-1)(10^2)	2.4	1.7	3.3	3.3	2.7	2.3	2.7	2				
O) MCF=~~(M-1)(10^3)/n~~	23.5	15.17	21.8	33.6	23.45	18.35	17.18	19.62				
(N)(10^3)/H S.P.	+0.7	→	→	→	-5.3	→	→	→				

Basic Findings for recording

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Project TODD Line 2A SOUTH Field date 3-18-65 Data page 1 Comp. date 3-19-65 Comp by EMH

Page 6

(A) Send	1-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
(B) Receive	0-5	5-10	→	10-15	→	→	15-20	→	→	→
(C) n separation										
(D) I										
(E) Vdc (avg)										
(F) DCcal										
(G) Kn x 10^{-3}										
(H) ρ dc=ExFxGx10^3/D	63	47.7	55.5	32.7	44.4	54.7	33.5	66.6	84	94.8
(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)	4.1	1.6	3.4	3.6	2.8	2.9	1.6	3.8	3.8	4.3
(O) MCF=(M-1)(10^2)/H	59.5	33.55	61.3	110.1	63.1	53	47.8	57.1	45.3	45.4

Project Line Field date Data page 2 Comp. date Comp by

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	20-25	→	→	→	25-30	→	→	→				
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	48.3	86.7	96.3	102.4	65	114	125.2	133.8				
(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)	3.6	4.1	4.2	4.1	5.6	2.8	5.7	6.1				
(O) MCF=(M-1)(10^5)/H	74.6	47.3	43.65	40	86.2	24.55	45.5	45.6				

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 6

Project Todd Line 2 A S Field date 3-18-65 Data page 1 Comp. date 3-19-65 Comp by F.M.J.

Send	45	34	45	23	34	45	12	23	34	45		EAb
Receive	0-5	5-10		10-15			15-20					
n separation	100	100	30	100	30	10	30	30	10	10		
I	2000	—	—	—	—	—	1800	2000	—	—		30
Vdc (avg)	89.5	62.0	18.0	42.5	14.4	7.1	39.2	21.6	10.9	6.15		29.2
DCcal	1.027	—	—	—	—	—	—	—	—	→		
Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
ρ dc=ExFxGx10^3/D 2	69	47.7	55.5	32.68	44.4	54.7	33.5	66.6	84	94.8		
Vac Σ	86	61.0	17.4	41.0	14.0	6.90	38.6	21.0	10.50	5.90		29.2
AC noise x 2	.20	.12		.14			.22					
Vac(corr) = $\sqrt{I^2 - J^2}$	—	—	—	—	—	—	—	—	—	—		
AC-DC cal.	1	—	—	—	—	—	—	—	—	→		
ρ dc/ρac=ExL/K	1.041	1.016	1.034	1.036	1.028	1.029	1.016	1.038	1.038	1.043		
PFE=(M-1)(10^2) 1	4.1	1.6	3.4	3.6	2.8	2.9	1.6	3.8	3.8	4.3		
MCF=~~(M-1)(10^3)~~/H	59.5	33.55	61.3	110.1	63.1	53	47.8	57.1	45.3	45.4		
(N)(10^3)/H S.P.	+2.8	+7.2	→	11.7	→		-0.2	→				

Project ____ Line ____ Field date ____ Data page 2 Comp. date ____ Comp by ____

Send	12	23	34	45	12	23	34	45				
Receive	20-25				25-30							
n separation	30	10	10	3	10	10	10	3				
I	1800	2000	—	—	1800	2000	—	—				
Vdc (avg)	14.1	11.25	6.25	3.80	7.60	7.4	4.65	3.10				
DCcal	1.027	—	—	—	—	—	—	→				
Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
ρ dc=ExFxGx10^3/D 2	48.3	86.7	96.3	102.4	65	114	125.2	133.8				
Vac Σ	13.6	10.8	6.0	3.65	7.2	7.2	4.4	2.92				
AC noise x 2	.12				.06							
Vac (corr) = $\sqrt{I^2 - J^2}$	—	—	—	—	—	—	—	—				
AC-DC cal.	1	—	—	—	—	—	—	→				
ρ dc/ρac =ExL/K	1.036	1.041	1.042	1.041	1.056	1.028	1.057	1.061				
PFE=(M-1)(10^2) 1	3.6	4.1	4.2	4.1	5.6	2.8	5.7	6.1				
MCF=~~(M-1)(10^3)~~/H	74.6	47.3	43.65	40	86.2	24.55	45.5	45.6				
(N)(10^3)/H S.P.	4.1	→			-21.3	→						

Basic Findings
For recording

HEINRICHS GEOEXPLORATION COMPANY

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Page 4

Project TODD Line 1A-WEST Field date 3-16-65 Data page _____ Comp. date 3-18-65. Comp by N.P.M

(A) Send	4-5	3-4		2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive		5-10		10-15	→	→	15-20	→	→	→	20-25	→
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	[illegible]	50.0	3.[illegible]	43.7	72.5	102	38.2	43.6	66.8	89.1	62.6	68.6
(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)	[illegible]	4.3		2.2	4.1	2.6	1.9	3.8	3.5	.5	1.2	1.6
(O) MCF=(M-1)(10^5)/H	[illegible]	86		50	57	36	50	87	52	6	18	23

Project _____	Line _____		Field date _____		Data page _____		Comp. date _____				Comp by _____	
(A) Send	3-4	4-5	1-2	2-3	3-4	4-5						
(B) Receive	20-25	→	25-30	→	→	→						
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	96.5	125	74.2	74.3	101	125						
(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)	3.7	2.0	1.5	0.9	4.1	2.6						
(O) MCF=(M-1)(10^5)/H	38	16	20	12	41	21						

Basic Findings for recording

HEINRICHS GEOEXPLORATION COMPANY

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Project TODD Line 2A SOUTH Field date 3-18-65 Data page 1 Comp. date 3-19-65 Comp by EAL Page 6

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-5	5-10	→	10-15	→	→	15-20	→	→	→		
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	69	47.7	55.5	32.7	44.4	54.7	33.5	66.6	84	94.8		
(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)	4.1	1.6	3.4	3.6	2.8	2.9	1.6	3.8	3.8	4.3		
(O) MCF=(M-1)(10^5)/H	59.5	33.55	61.3	110.1	63.1	53	47.8	52.1	45.3	45.4		

Project Line Field date Data page 2 Comp. date Comp by

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	20-25	—		→	25-30	—	—	→				
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D	48.3	86.7	96.3	102.4	65	114	125.2	133.8				
(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)	3.6	4.1	4.2	4.1	5.6	2.8	5.7	6.1				
(O) MCF=(M-1)(10^5)/H	74.6	47.3	43.65	40	86.2	24.55	45.5	45.6				

BASIC FINDINGS
FOR RECORDING

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Page 2

Project TODD Line 1B EAST Field date 3-17-65 Data page 1 Comp. date 3-17-65 Comp by FK

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
(B) Receive	0-5	5-10	→	10-15	→	→	15-20	→	→	→
(C) n separation										
(D) I										
(E) Vdc (avg)										
(F) DCcal										
(G) Kn x 10^{-3}										
(H) ρdc=ExFxGx10^{-3}/D	38.2	67.9	49.7	47.6	69.7	55.1	38.2	36.8	67.0	53
(I) Vac ρ										
(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)	6.0	3.5	2.9	2.8	4.0	3.4	1.0	3.2	2.6	3.0
(O) MCF=(M-1)(10^3)/N	157	52	60	59	57	62	26	82	39	57

Project Line Field date Data page 2 Comp. date Comp by

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	20-25	→	→	→	25-30	→	→	→				
(C) n separation												
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρdc=ExFxGx10^3/D	53.2	61.5	103	82.5	78.3	83.2	132	99.0				
(I) Vac ρ												
(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)	3.4	2.4	0	5.9	2.4	3.2	5.1	3.0				
(O) MCF=(M-1)(10^3)/N	64	39	0	66	31	38	39	30				

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Page 1

Project Todd Line 1 RW Field date 3-17-65 Data page 1 Comp. date 3-18-65 Comp by F.M.J.

(A) Send	12	23	12	34	23	12	45	34	23	12		
(B) Receive	05	510		10-15			15-20					
(C) n separation Range	100	100	30	100	30	10	100	30	10	10		
(D) I	1800											
(E) Vdc (avg)	77.5	43.5	14.1	60.5	13.7	7.75	49.0	22.3	7.35	5.0		
(F) DCcal	1.03											
(G) Kn x 10^{-3}	1.500	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρdc=ExFxGx10^3/D	66.5	37.3	48.4	51.9	47.0	66.5	42.0	76.6	63.1	85.8		
(I) Vac Σ	75.0	42	13.4	59.0	13.4	7.50	47.0	21.4	7.10	4.6		
(J) AC noise x 2	.04	.04		.04			.04					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K	.050											
(N) PFE=(M-1)(10^2)	3.3	3.6	5.2	2.5	2.2	3.3	4.3	4.2	3.5	8.7		
(O) MCF=(M-1)(10^5)/H	50	96	108	49	48	50	102	55	56	102		
S.P.	-10.2	-2.9	→	-3.7	→	→	+2.2	→	→	→		

Project Line Field date Data page 2 Comp. date Comp by

(A) Send	45	34	23	12	45	34	23	12				
(B) Receive	20-25				25-30							
(C) n separation												
(D) I	1800											
(E) Vdc (avg)	14.2	9.9	4.03	2.98	8.55	7.45	3.40	2.80				
(F) DCcal												
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρ dc=ExFxGx10^3/D	48.8	85.0	69.3	89.5	73.5	128	102	134				
(I) Vac Σ	13.8	9.45	3.84	2.86	8.2	7.10	3.30	2.65				
(J) AC noise x 2	.14				.18							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	2.9	4.8	5.0	14.1	4.3	5.0	3.0	15.3				
(O) MCF=(M-1)(10^5)/H	59	56	72	46	59	39	29	40				
S.P.	-20.5	→	→	→	+22.1	→	→	→				

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Page 2

Project Todd Line 1BE Field date 3-17-65 Data page 1 Comp. date 3-17-65 Comp by FMJ

(A) Send	45	34	45	23	34	45	12	23	34	45		
(B) Receive	0 5	5 10		10 15			15-20					
(C) n separation												
(D) I	1800											
(E) Vdc (avg)	44.5	78.5	14.2	55.5	20.3	6.41	44.5	11.35	7.8	3.09		
(F) DCcal	1.03											
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6.0	15	30		
(H) ρdc=ExFxGx10^3/D	38.2	67.4	48.7	47.6	69.7	55.1	38.2	38.9	67.0	53		
(I) Vac Σ	42	75.8	13.8	54	19.5	6.2	44.	11.0	7.6	3.0		
(J) AC noise x 2	.04	.16		.04			.04					
(K) Vac(corr) =$\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	6.0	3.5	2.9	2.8	4.0	3.4	1.0	3.2	2.6	3.0		
(O) MCF=(M-1)(10^5)/H	157	52	60	59	57	62	26	82	39	57		
S.P.	-2.2	+19.7	→	-4.2	→		+7.6	→				

Project Line Field date Data page 2 Comp. date Comp by

(A) Send	12	23	34	45	12	23	34	45				
(B) Receive	20 25				25 30							
(C) n separation	30	10	10	3	10	10	10	3				
(D) I	1800											
(E) dc (avg)	15.5	7.17	6.0	2.75	9.12	4.85	4.42	12.06				
(F) DCcal												
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρ dc=ExFxGx10^3/D	53.2	61.5	103	82.5	78.3	83.2	132	~~49.5~~	99.0			
(I) Vac Σ	15.0	7.0	6.0	2.61	8.90	4.70	4.2	2.0				
(J) AC noise x 2	.18				.06							
(K) Vac (corr) =$\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	3.4	2.4	0	5.4	2.4	3.2	5.1	3.0				
(O) MCF=(M-1)(10^5)/H	64	39	0	66	31	38	39	30				
S.P.	-6.0	→			-3.1	→						

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Page 3

Project Todd Line 1AE Field date 3-16-65 Data page 1 Comp. date 3-17-65 Comp by F.M.J.

(A) Send	12	23	12	34	23	12	45	34	23	12		
(B) Receive	0-5	5-10		10-15			15-20					
(C) n separation RANGE	100	100	30	100	30	10	100	30	10	10		
(D) I	2000	→										
(E) Vdc (avg)	64	87.5	27.7	64	23.7	10.8	83.3	20	10.8	6.0		
(F) DCcal	1.0	→										30.0
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρdc=ExFxGx10^3/D	48.0	65.6	83.0	48.0	71.0	81	62.5	60.0	81.0	90.0		
(I) Vac Σ	62	84.1	27	61.5	23	10.6	80	19	10.5	5.8		29.7
(J) AC noise x 2	.06	.4		.06			.4					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.990	→										
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	3.2	3.0	2.6	4.1	3.0	1.9	4.0	5.1	2.9	3.5		
(O) MCF=(M-1)(10^5)/H	67	46	31	85	42	23	64	85	36	39		
S.P.	+1.8	+24.6	→	-2.4	→		-1.9	→				

Project Line Field date Data page Comp. date Comp by

(A) Send	45	34	23	12	45	34	23	12				
(B) Receive	20-25				25-30							
(C) n separation	30	10	10	3	10	10	3	3				
(D) I	2000	→										
(E) Vdc (avg)	22.5	8.9	5.5	3.52	9.7	4.7	3.3	2.29				
(F) DCcal	1.0	→										
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρ dc=ExFxGx10^3/D	67.5	66.8	82.5	92.3	72.7	70.5	86.6	96.2				
(I) Vac Σ	21.6	8.4	5.3	3.4	9.3	4.4	3.14	2.14				
(J) AC noise x 2	.050				.04							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.990	→										
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	4.1	5.8	3.8	3.5	4.2	6.8	5.1	7.0				
(O) MCF=(M-1)(10^5)/H	61	87	46	38	58	97	59	73				
S.P.	-2.6	→			-0.2	→						

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Page 4

Project Todd Line 1AW Field date 3-16-65 Data page _____ Comp. date 3-18-65 Comp by J.P.M.

(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												
(C) n separation												
(D) I	2000	→										
(E) Vdc (avg)	88.0	67.5	28.0	59.0	24.45	13.7	51.5	14.7	9.0	6.00	21.1	9.25
(F) DCcal	.988	→										
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30	6	15
(H) ρdc=ExFxGx10^3/D	65.3	50.0	83.0	43.7	72.5	102	38.2	43.6	66.8	89.1	62.6	68.6
(I) Vac Σ	85	64	27.0	57.0	23.2	13.2	50.0	14.0	8.6	5.9	2.06	9.0
(J) AC noise x 2	.23	.04	→	.28	→	→	.24				.04	→
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	→	→	→	→	→	→	→	→	→	→	→	→
(L) AC-DC cal.	.988	→										
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	2.3	4.3	2.6	2.2	4.1	2.6	1.9	3.8	3.5	5.0	1.2	1.6
(O) MCF=(M-1)(10^5)/H	35	86	31	50	57	36	50	87	52	6	18	23
S.P.	+12.3	-1.5	→	+3.1	→	→	-8.0	→	→	→	+11.5	→

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

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5						
(B) Receive												
(C) n separation												
(D) I	2000	→										
(E) ρdc (avg)	6.50	4.75	10.0	5.0	3.9	3.01		30.4				
(F) DCcal	.988	→						.988				
(G) Kn x 10^{-3}	30	52.5	15	30	52.5	84						
(H) ρ dc=ExFxGx10^3/D	96.5	125	74.2	74.3	101	125						
(I) Vac Σ	6.2	4.6	9.75	4.9	3.7	2.9		30.0				
(J) AC noise x 2	.04	→	.16	→	→	→						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	→	→	→	→	→	→						
(L) AC-DC cal.	.988	→				→		.988				
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	3.7	2.0	1.5	0.9	4.1	2.6						
(O) MCF=(M-1)(10^5)/H	38	16	20	12	41	21						
S.P.	+11.5	→	+5.3	→	→	→						

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Page 5

Project Todd Line 2 A N (LOOKING W) Field date 3-18-65 Data page 1 Comp. date 3-19-65 Comp by F. M.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL
(B) Receive	0-5	5-10	→	10-15	→	→	15-20	→	→	→		
(C) n separation	100	100	30	100	30	10	100	30	30	10		
(D) I	2000	→	→	→	→	→	→	→	→	→		300
(E) Vdc (avg)	59.5	95	18.6	94.5	37.3	10.6	106.5	32.4	17.9	5.9		29.5
(F) DCcal	1.016	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρdc=ExFxGx10^3/D 2	45.3	72.4	56.7	72	113.6	81.3	81.3	98.8	136.3	89.9		
(I) Vac Σ	58	92	18	92	36	10.2	104	31.8	17.2	5.8		29.4
(J) AC noise x 2	.04	.12		.06			.12					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—	—	—	—	—	—	—	—	—	—		
(L) AC-DC cal.	.997	→	→	→	→	→	→	→	→	→		
(M) ρdc/ρac=ExL/K	1.022	1.03	1.03	1.023	1.037	1.037	1.021	1.016	1.038	1.013		
(N) PFE=(M-1)(10^2) 1	2.2	3	3	2.3	3.7	3.7	2.1	1.6	3.8	1.3		
(O) MCF=~~(M-1)(10^5)/H~~	48.7	41.4	52.9	31.95	32.6	45.6	25.85	16.2	27.85	14.47		
$\frac{(N)(10^3)}{H}$ S.P.	-7.1	-1.0	→	+4.9	→	→	+3.5	→	→	→		

Project ____ Line ____ Field date ____ Data page 2 Comp. date ____ Comp by ____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	20-25	→	→	→	25-30	→	→	→				
(C) n separation	30	30	10	3	30	10	10	3				
(D) I	2000	→	→	1800	→	→	→	→				
(E) Vdc (avg)	33.3	14.7	9.95	3.32	13.6	7.4	5.3	2.15				
(F) DCcal	1.016	→	→	→	→	→	→	→				
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρdc=ExFxGx10^3/D 2	102	112	151.5	98.4	115	125.3	157.1	101.9				
(I) Vac Σ	32.4	14.4	9.6	3.2	13.2	7.2	5.15	2.1				
(J) AC noise x 2	.16				.14							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	—	—	—	—	—	—	—	—				
(L) AC-DC cal.	.997	→	→	→	→	→	→	→				
(M) ρdc/ρac =ExL/K	1.024	1.017	1.033	1.033	1.027	1.023	1.027	1.02				
(N) PFE=(M-1)(10^2) 1	2.4	1.7	3.3	3.3	2.7	2.3	2.7	2				
(O) MCF=~~(M-1)(10^5)/H~~	23.5	15.17	21.8	33.6	23.45	18.35	17.18	19.62				
$\frac{(N)(10^3)}{H}$ S.P.	+0.7	→	→	→	-5.3	→	→	→				

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

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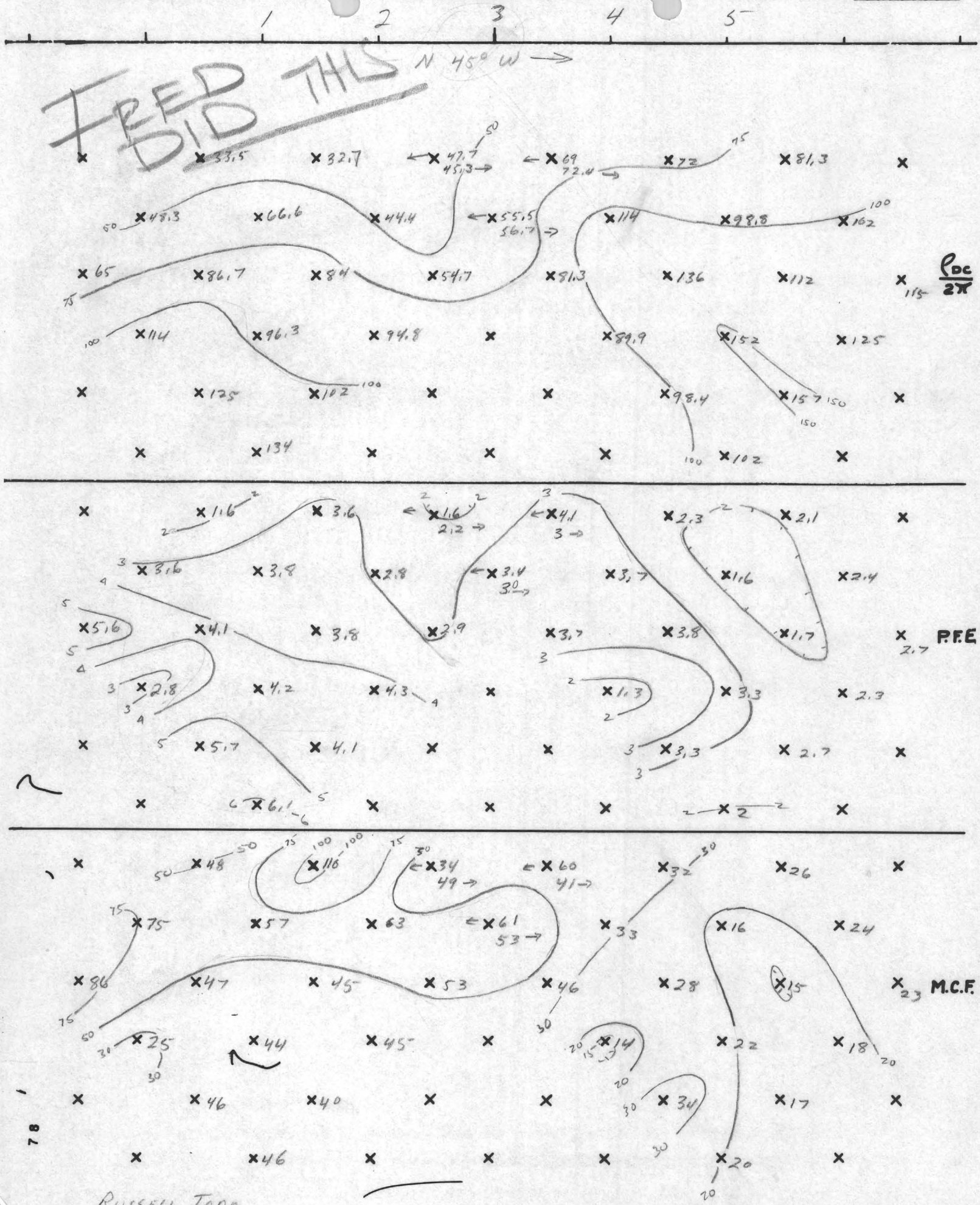
Project Todd Line 2 A S Field date 3-18-65 Data page 1 Comp. date 3-19-65 Comp by F.M.J.

(A) Send	45	34	45	23	34	45	12	23	34	45		CAL
(B) Receive	0-5	5-10		10-15			15-20					
(C) n separation	100	100	30	100	30	10	30	30	10	10		
(D) I	2000	—					1800	2000	—	—		30
(E) Vdc (avg)	89.5	62.0	18.0	42.5	14.4	7.1	39.2	21.6	10.8	6.15		29.2
(F) DCcal	1.027	→										
(G) Kn x 10^{-3}	1.5	1.5	6	1.5	6	15	1.5	6	15	30		
(H) ρdc=ExFxGx10^3/D 2	69	47.7	55.5	32.68	44.4	54.7	33.5	66.6	84	94.8		
(I) Vac Σ	8.6	6.0	17.4	41.0	14.0	6.90	38.6	21.0	10.50	5.90		29.2
(J) AC noise x 2	.20	.12		.14			.22					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—	—	—	—	—	—	—	—	—	—		
(L) AC-DC cal.	1	→										
(M) ρdc/ρac=ExL/K	1.041	1.016	1.034	1.036	1.028	1.029	1.016	1.038	1.038	1.043		
(N) PFE=(M-1)(10^2) 1	4.1	1.6	3.4	3.6	2.8	2.9	1.6	3.8	3.8	4.3		
(O) MCF=~~(M-1)(10^5)/H~~	59.5	33.55	61.3	110.1	63.1	53	47.8	57.1	45.3	45.4		
$\frac{(N)(10^3)}{H}$ S.P.	+2.8	+7.2	→	11.7	→		-0.2	→				

Project Line Field date Data page 2 Comp. date Comp by

(A) Send	12	23	34	45	12	23	34	45				
(B) Receive	20-25				25-30							
(C) n separation	30	10	10	3	10	10	10	3				
(D) I	1800	2000	—	—	1800	2000	—	—				
(E) Vdc (avg)	14.1	11.25	6.25	3.80	7.60	7.4	4.65	3.10				
(F) DCcal	1.027	→										
(G) Kn x 10^{-3}	6	15	30	52.5	15	30	52.5	84				
(H) ρdc=ExFxGx10^3/D 2	48.3	86.7	96.3	102.4	65	114	125.2	133.8				
(I) Vac Σ	13.6	10.8	6.0	3.65	7.2	7.2	4.4	2.92				
(J) AC noise x 2	.12				.06							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	—	—	—	—	—	—	—	—				
(L) AC-DC cal.	1	→										
(M) ρdc/ρac =ExL/K	1.036	1.041	1.042	1.041	1.056	1.028	1.057	1.061				
(N) PFE=(M-1)(10^2) 1	3.6	4.1	4.2	4.1	5.6	2.8	5.7	6.1				
(O) MCF=~~(M-1)(10^5)/H~~	74.6	47.3	43.65	40	86.2	24.55	45.5	45.6				
$\frac{(N)(10^3)}{H}$ S.P.	4.1	→			-21.3	→						

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING W



RUSSELL TODD

AREA PIMA CO. ARIZ LINE 2A a = 500' SCALE: 1" = 500' DATE: 3-19-65

CREW & EXPENSE STATEMENT

WEEK ENDING MAR 20 19 65
PROJECT NAME TODD
CREW CHIEF FRED JOHNSON
ADDRESS TUCSON

ENTER ALL TIME & ALL EXPENSES FOR EACH MAN

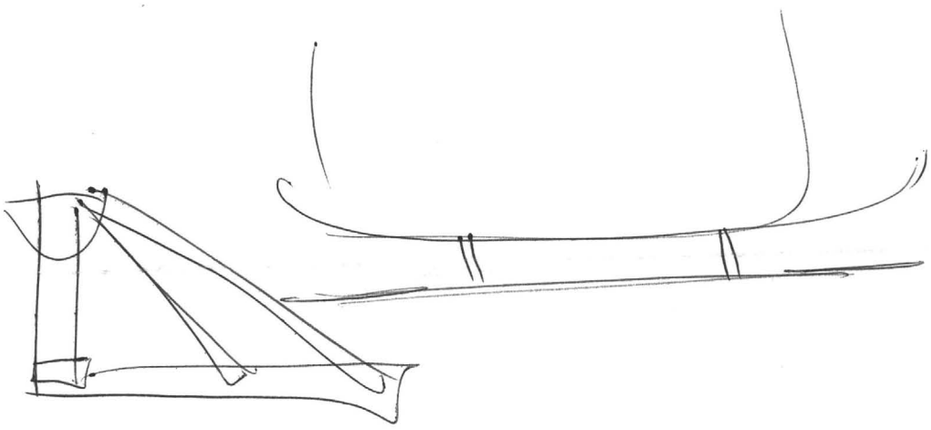
DATE	NAME	HOURS I.P. ETC.	HOURS TR.	HOURS C.	HOURS E-M	HOURS O	HOURS TOTAL	VEHICLES #	VEHICLES MILES	CLIENT EXPENSES MOTEL	CLIENT EXPENSES MEALS	CLIENT EXPENSES OTHER	WORK ACCOMPLISHED	PHONE	GEOEX EXPENSES
SUN. 14															
MON. 15															
TUES. 16	F.M.J.	5	2		1		8	3	60	—	—	—	1 SPREAD 500'		—
	J.B.	5	2		1		8			—	—	—			—
	R.P.	5	2		1		8			—	—	—			—
	G.J.	5	2		1		8			—	—	—			—
WED. 17	F.M.J.	6	2		1		9	3	60	—	—	—	1 SPREAD 500'		—
	J.B.	6	2		1		9			—	—	—			—
	R.P.	6	2		1		9			—	—	—			—
	G.J.	6	2		1		9			—	—	—			—
THURS. 18	F.M.J.	5	1		1		8	3	60	—	—	—	1 SPREAD 500'		
	J.B.	5	1		1		8			—	—	—			
	R.P.	5	1		1		8			—	—	—			
	G.J.	5	1		1		8			—	—	—			
FRI. 19															
SAT. 20															

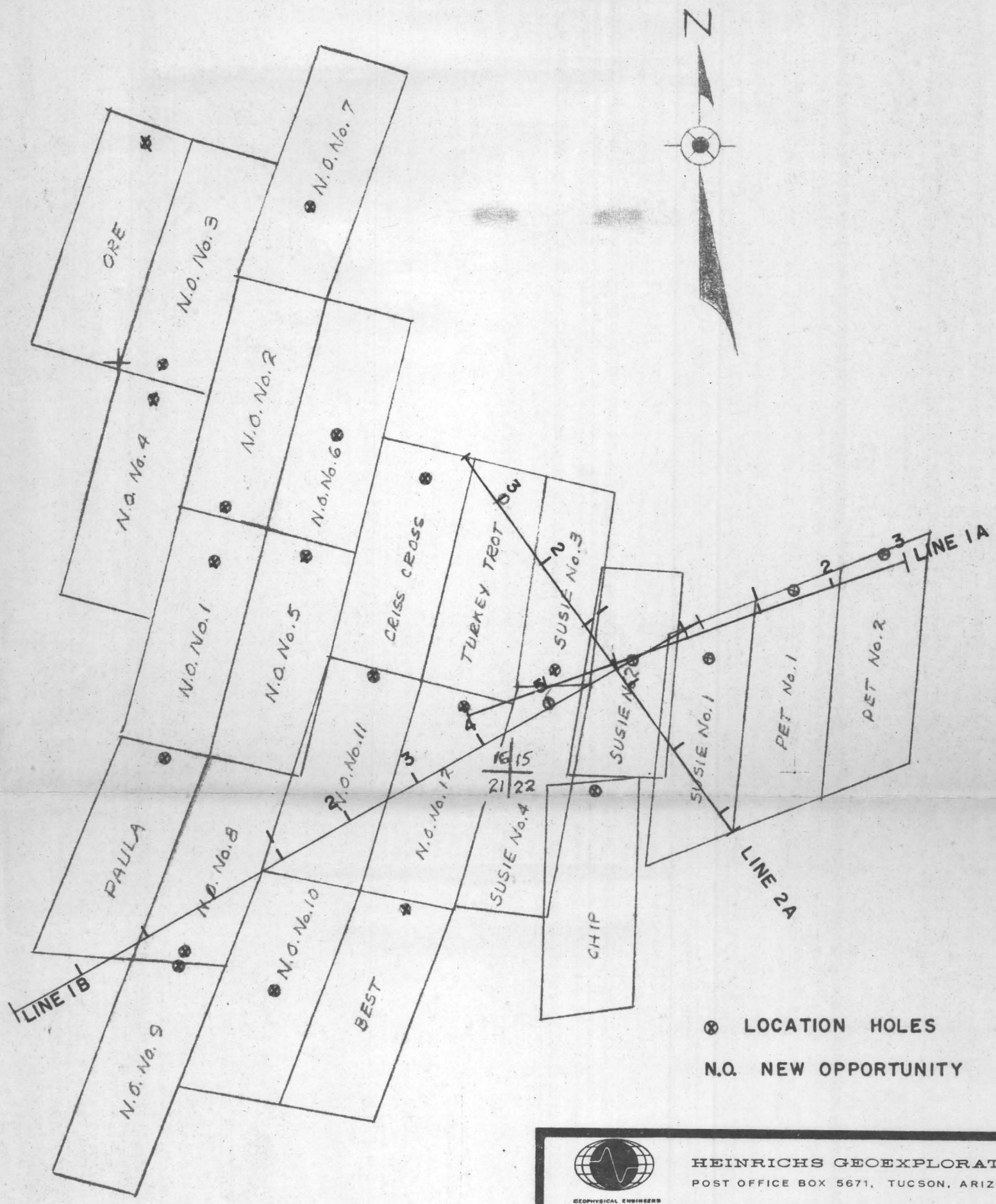
Off Few

Off Few

IT IS THE RESPONSIBILITY OF THE CREW CHIEF TO MAINTAIN THIS RECORD AND SEE THAT IT IS SENT TO THE OFFICE AT LEAST ONCE EACH WEEK. EACH INDIVIDUAL CREW MEMBER IS RESPONSIBLE FOR TURNING IN ALL INFORMATION REQUIRED TO THE PARTY CHIEF EACH DAY.

UNDER "HOURS" TR. = TRAVEL, C = COMPUTING TIME, E-M = EQUIPMENT MAINTENANCE, O = OTHER AND/OR MISC.





⊗ LOCATION HOLES

N.O. NEW OPPORTUNITY

GRAPHIC SCALE: 0 1 2 3 4 5 10 HUNDRED FEET

NOTE CLAIM LOCATION BEARINGS & DISTANCES FURNISHED BY R. TODD –

HEINRICHS GEOEXPLORATION CO.
GEOPHYSICAL ENGINEERS
POST OFFICE BOX 5671, TUCSON, ARIZONA, 85703

INDUCED POLARIZATION
& CLAIM LOCATION

FOR

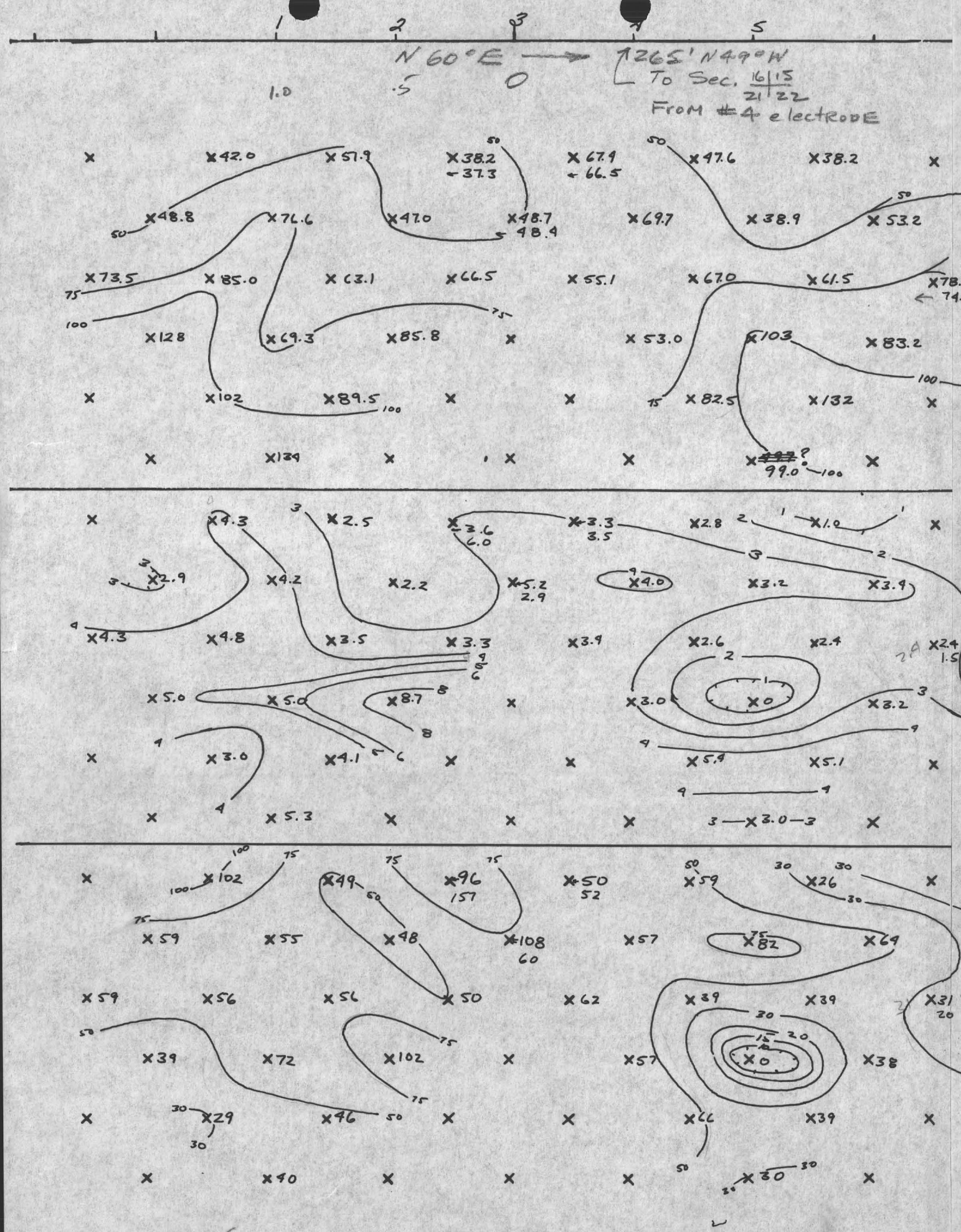
RUSSELL TODD

Aug. 1965

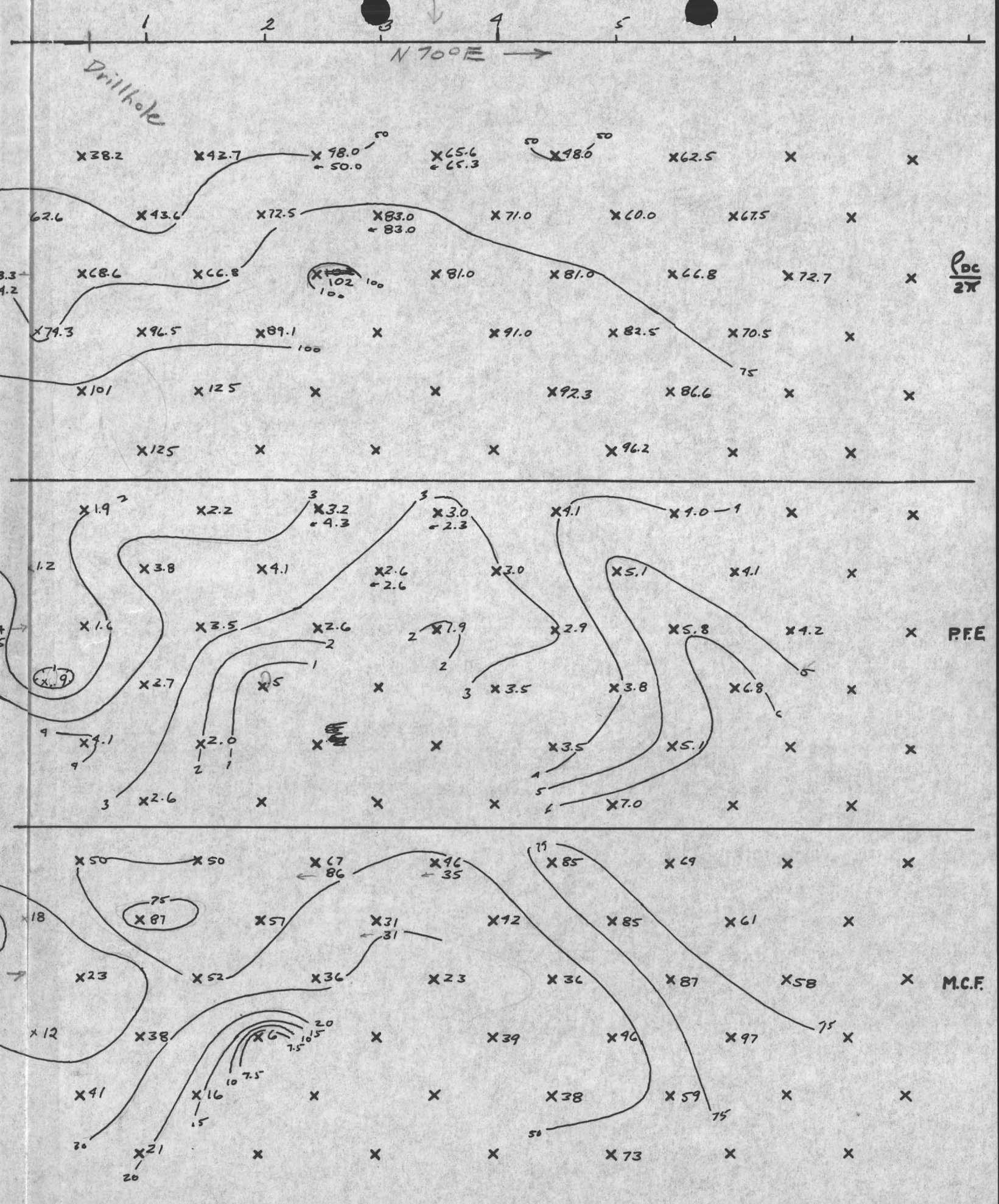
Scale | Date 1965

Revised map Aug. 1965

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N



HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING



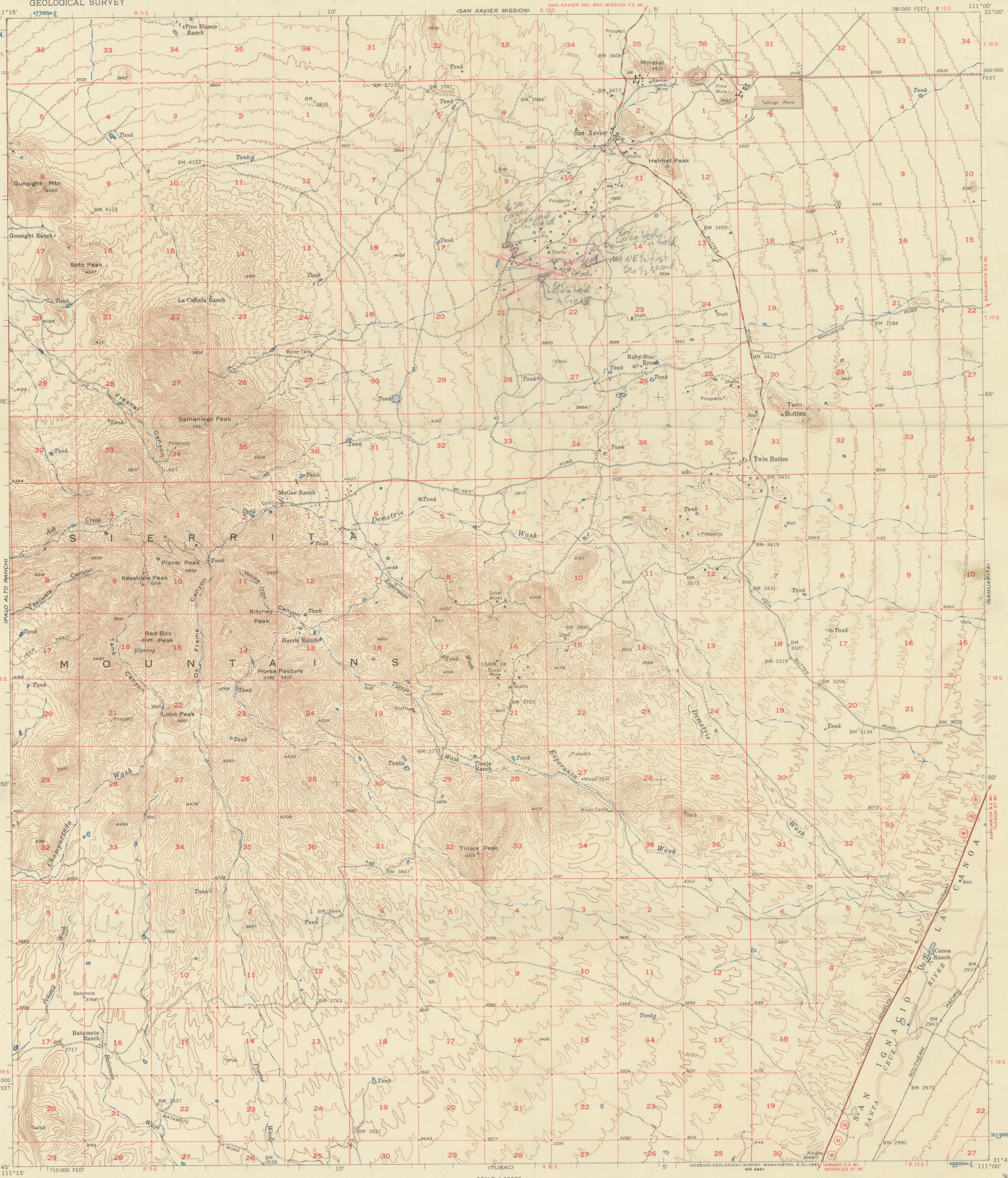
AREA Todd Pima Co. Ariz. LINE 1B a = 500' SCALE: 1"=500' DATE: 3-

AREA Todd LINE 1A a = 500' SCALE: 1"=500 DATE: 3-18-65

Russell Todd

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TWIN BUTTES QUADRANGLE
ARIZONA—PIMA CO.
15 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and USCE

Topography by planetable surveys 1938–39
Culture revision and field check 1957

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

TRUE NORTH
MAGNETIC NORTH
13°
APPROXIMATE MEAN DECLINATION, 1957

SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

ARIZONA
QUADRANGLE LOCATION

ROAD CLASSIFICATION

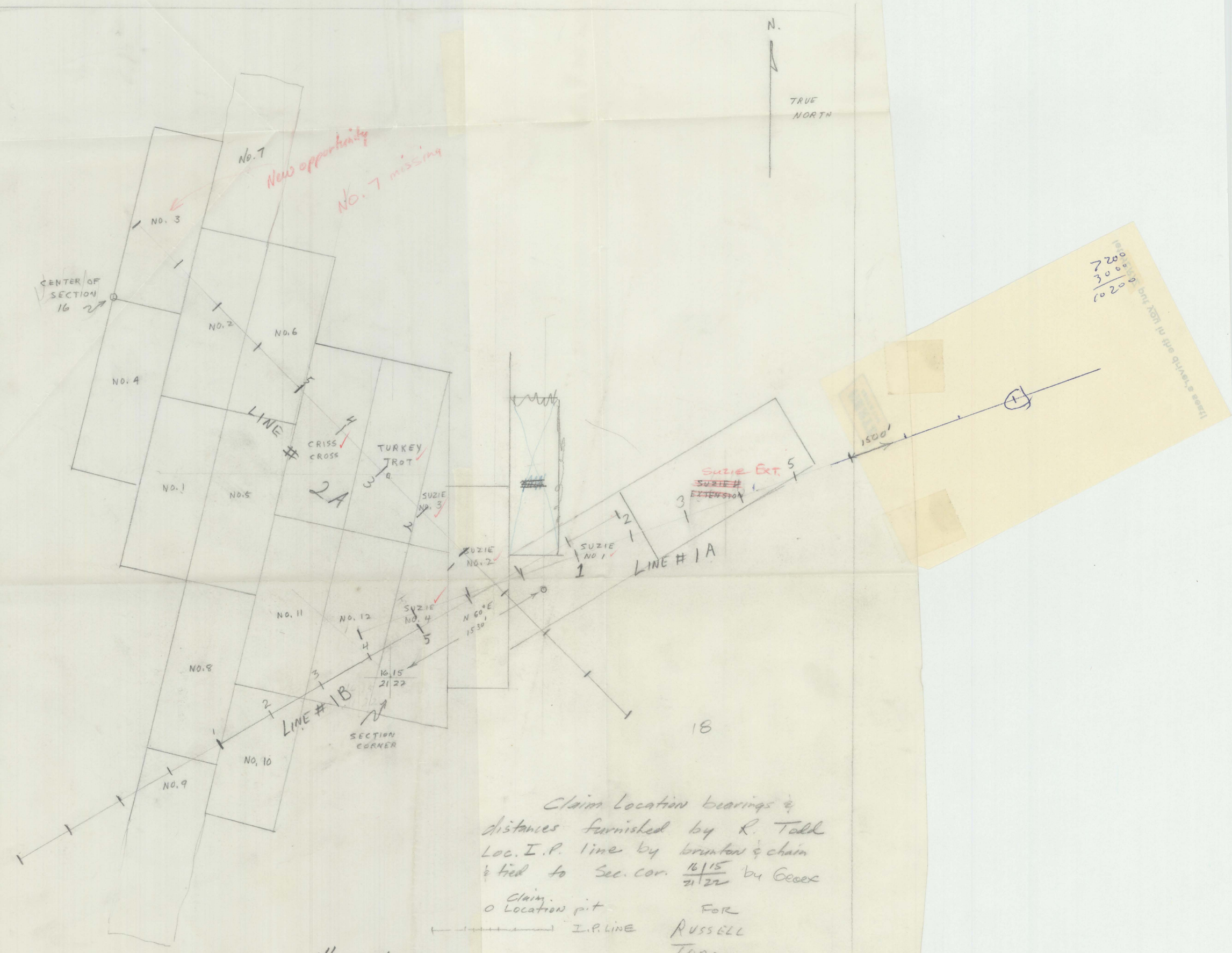
Heavy-duty — Light-duty
Unimproved dirt
U. S. Route — State Route

TWIN BUTTES, ARIZ.
N3145—W11100/15

1957

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 25, COLORADO OR WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1961
MR 4961


N.
TRUE NORTH
No. 7
New opportunity
No. 7 missing
No. 3
CENTER OF SECTION 16
No. 2
No. 6
No. 4
LINE # 2A
CRISS CROSS
TURKEY TROT
No. 1
No. 5
SUZIE No. 3
SUZIE No. 2
SUZIE No. 1
SUZIE EXT.
~~SUZIE #~~
~~EXTENSION~~
LINE # 1A
1500'
No. 11
No. 12
SUZIE No. 4
N 60° E
1530'
No. 8
16 15
21 22
LINE # 1B
SECTION CORNER
No. 10
No. 9
18
7200
3000
10200
Claim Location bearings & distances furnished by R. Todd
Loc. I.P. line by brunton & chain & tied to Sec. cor. 16/15 21/22 by Geoex
Claim Location pit
I.P. LINE
FOR RUSSELL TODD
1" = 600'