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

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Bill to cypress
in L. A. office
write attn.
C. C. Goddard
on bill

---

mail bill to
Reg. Skiles for
approval.
(1237 Malibu Dr.
Tempe, Arizona)
He will forward
bill to L. A. office.

September 16, 1966

Mr. Reg Skiles
Cyprus Mines Corporation
1237 Malibu Drive
Tempe, Arizona

Dear Mr. Skiles:

At your request and that of Cyprus Mines Corporation, Heinrichs Geoexploration Company conducted and completed an induced polarization survey in the Mineral Segregation District, Santa Cruz County during the interim August 9 through 12, 1966 inclusive.

Three lines were surveyed, all on 750' dipole separation. Line 1 was oriented N30°E, Line 2 was oriented N15°E, and Line 3 was oriented north-south. This work consisted of 27,000' of surface coverage of which 15,750' is subsurface plotted data.

The dipole spacing of 750' was selected to permit the location of sulfide deposits down to about 850' below surface in the vicinity of the lines.

The data are presented on sectional data sheets, one for each line with apparent resistivity, percent frequency effect (PFE) and metallic conduction factor (MCF) contoured in section and self potential (SP) plotted in profile form. (See Basis of I.P. Method enclosed with this letter report.) A map showing the location of the induced polarization lines is also enclosed.

The field work was completed by John McLean, geophysical crew chief; Mike Fraker, sender operator; and Charles Brackney, technical assistant. Report compilation, and interpretation was prepared by the Tucson staff under the supervision of Paul Head, staff geophysicist.

No induced polarization frequency effects indicative of significant sulfide mineralization were found on this survey. The values shown on the sectional data sheets represent variations in the background levels in the area. We believe, therefore, that there is no significant concentration of sulfides in the vicinity of the I.P. lines down to a depth of about 850'.

The variations in resistivity shown on the sectional data sheets indicate a change in the resistivity of the underlying rock types. Thus a resistivity change may indicate a gradational contact, such as occurs near electrode 5 (1500' north of center) on Line 3 and possibly near electrode 4 (750' north of center) on Line 2. No correlation can be made between the S.P. data and the other three parameters plotted.

Based on the work done thus far, no additional geophysical work is recommended in this area.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

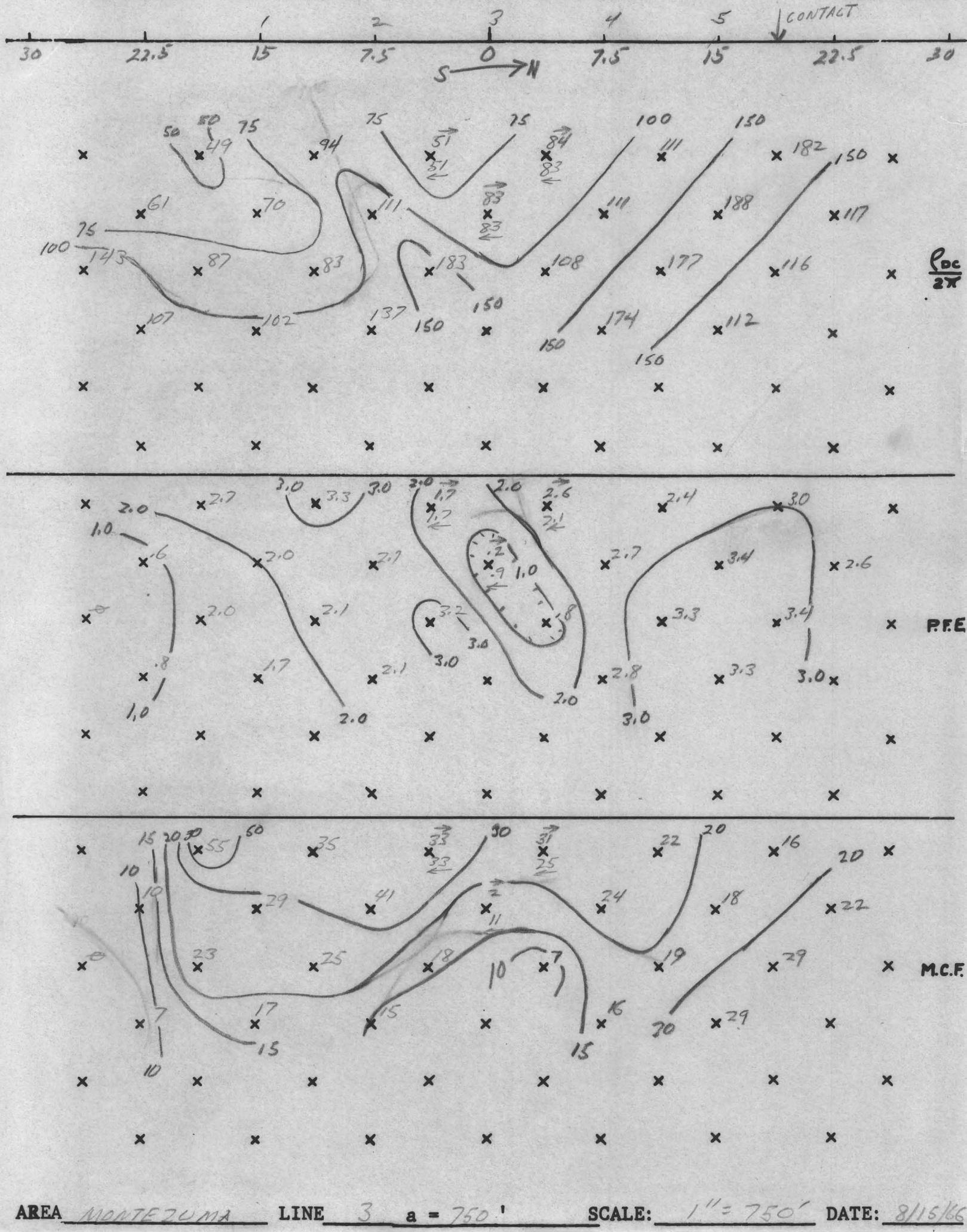
John McLean
Geologist

APPROVED:_____

Paul A. Head
Geophysicist

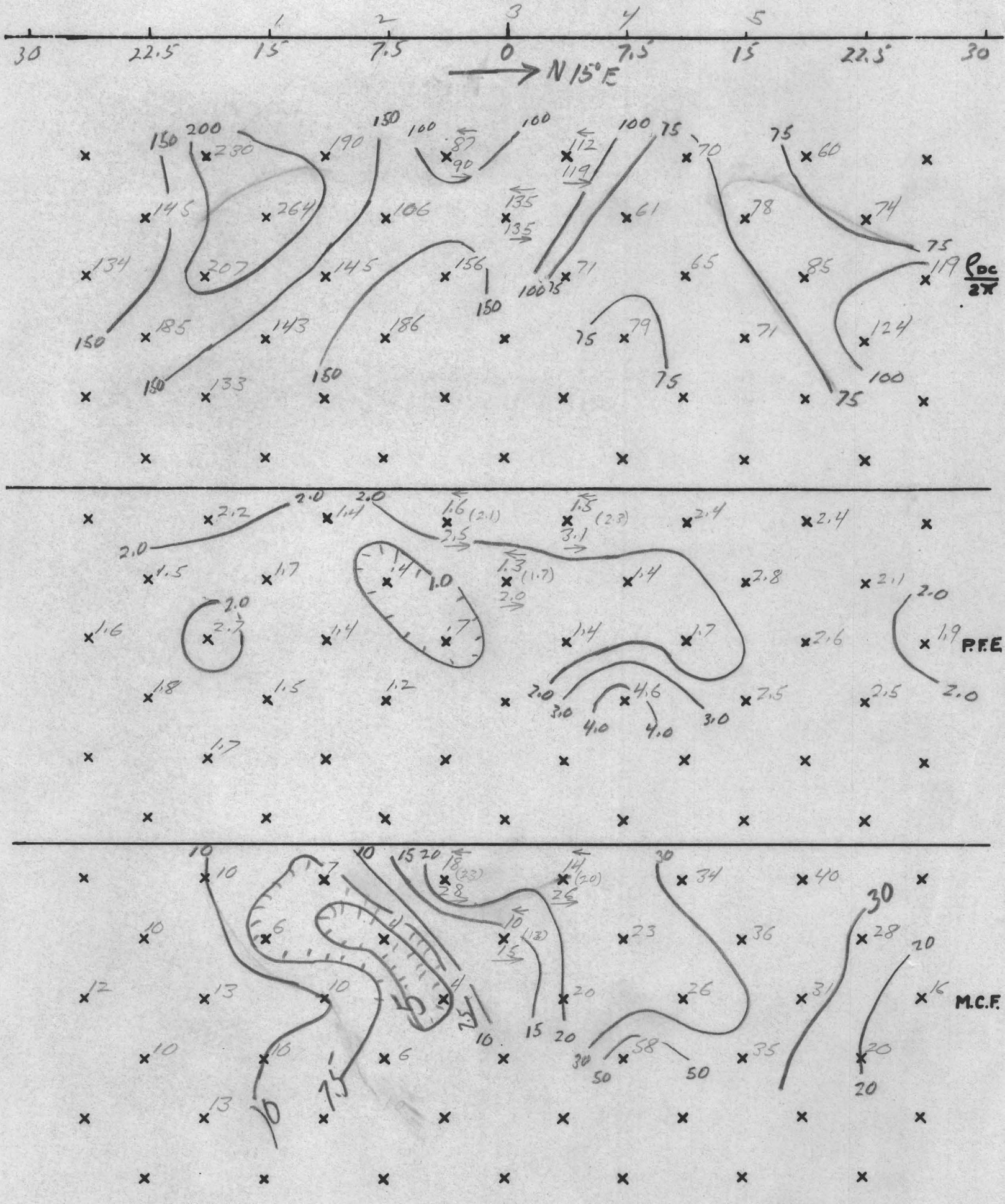
JM:jc
Enclosure: three sectional data sheets each Total (2)
one plan map each Total (2)
one Basis of the I.P. Method each Total (2)
one carbon copy of report

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING WEST



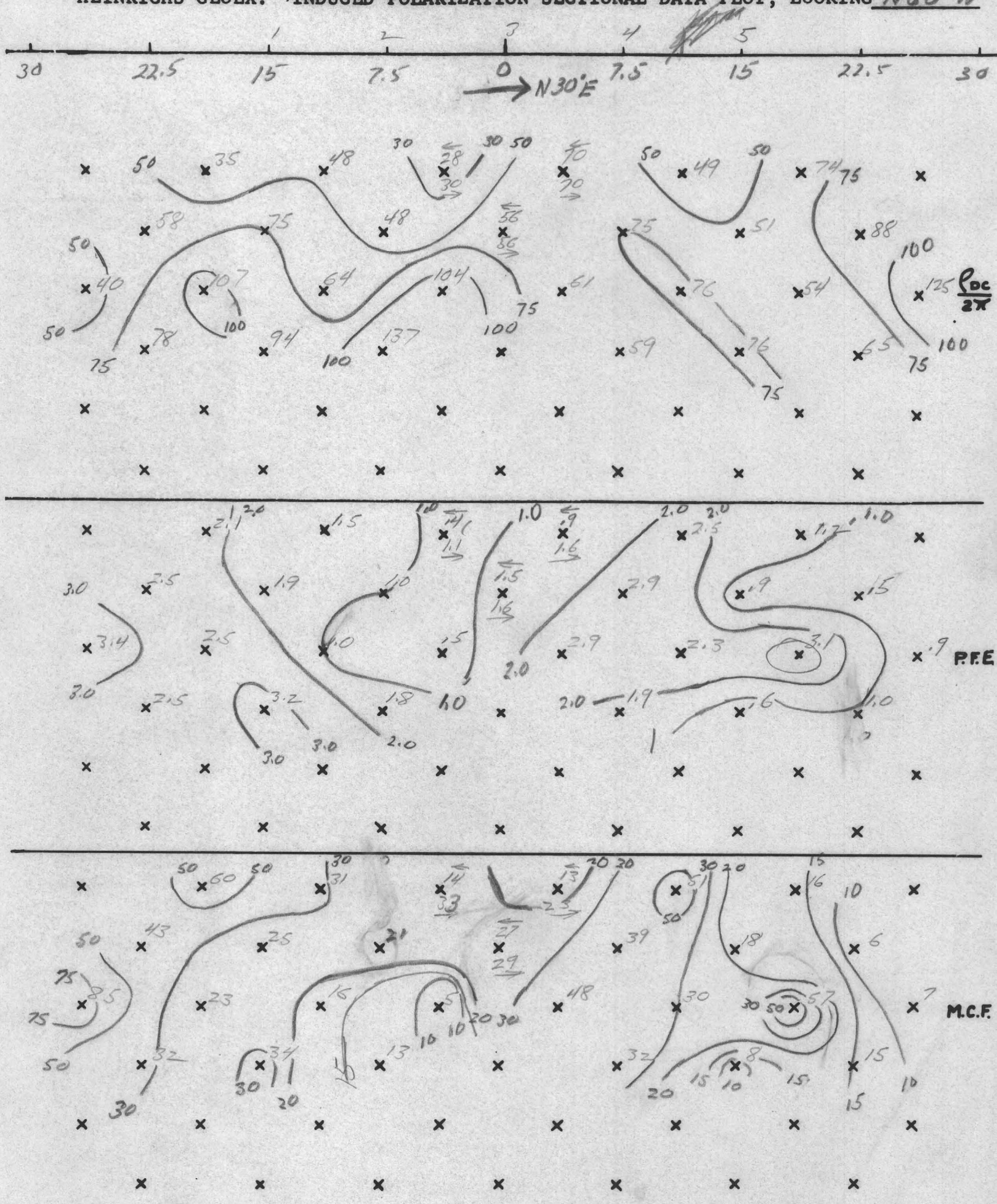
AREA MONTEZUMA LINE 3 a = 750' SCALE: 1" = 750' DATE: 8/15/66

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N 75° W



AREA MONTEZUMA LINE 2 a = 750' SCALE: 1" = 750' DATE: 8/15/66

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N60°W



AREA MONTEZUMA LINE 1 a = 750' SCALE: 1" = 750' DATE: 8/15/66

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: MONTE CRISTO Line: 3-5 Int.Cal Date: 7/16

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
Rec.	3+-37.5	→	→	→	37.5-4+	←	←	→				
Time	.1	.1	.03	.01	.03	.03	.01	.01				
DC-1	33.2 33.8	18.8 19.5	6.6 6.6	5.03 5.20	12.2 12.6	8.5 8.6	3.6 3.6 5.5 3.4					
DC-2	33.0 34.0	19.0 19.2	7.1 6.2		12.0 12.8	8.5 8.6	3.2 3.5 3.8 3.6					
SW												
DC-3	33.5 33.5	18.7 19.5	6.6 6.5		12.4 12.4	8.9 8.2	3.7 3.2 5.3 3.8					
Dc-4	34.0 32.8	19.0 19.2	6.6 6.7									
SW												
DC-AV												
AC-1	33.0	18.6	6.5	5.05	12.2	8.4	3.46	2.95				
AC-2	33.0	18.6	6.5		12.2	8.4	3.46					
SW												
S. P.	-11.5											
AC-N	.06											
Pot. Res												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: MONTEZUMA Line: 2-5 Int.Cal 8 Date: 7/1/66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.	0-7.5	7.5-15	→	15-22.5	→	→	22.5-30	→	→	→		
Time	.3	.3	.1	.3	.1	.03	1.0	.3	.03	.03		
DC-1	104 103	81 80	31.0 31.0	175 176	25.0 24.2	14.3 14.3	213 212	61 61	13.2 13.6	8.6 8.6		
DC-2	105 102	81 79	31.2 31.0	176 176	24.6 24.6	14.4 14.2	215 212	61 61	13.0 13.8	8.6 8.6		
Σ												
DC-3	102 103	81 80	31.0 31.2	176 176	24.5 24.7	14.6 14.0	213 212	61 61	13.3 13.6	8.5 8.7		
Dc-4		81 79							13.5 13.5	8.5 8.7		
Σ												
DC-AV												
AC-1	102	79	30.7	174	24.5	14.2	208	60	13.2	8.5		
AC-2	102	79	30.7	173	24.5	14.2	208	60	13.3	8.5		
Σ												
S. P.	-6.5	-4.0		-17.3			-12.9					
AC-N	.08	.04		.04								
Pot.Res												

INDUCED POLARIZATION SENDER NOTES

project: Montezuma Line: #2 South Date: 8-10-66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Receive	0750	750 - 1500		1500 - 2250		→	2250 - 3000			→		
Time												
Range												
Current	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00		
Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CHG WIRE	1-2	2-3	
Receive	3000 - 3700		→		3700 - 4500		→					
Time												
Range												
Current	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00				

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project MONTEZUMA Line 2-5 Field date 8/10/66 Data page 1 Comp. date 8/15/66. Comp by JMS

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-7.5	7.5-15	→	15-22.5	→	→	22.5-30	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2	→	→	→	→	→	→	→	→	→		
(E) Vdc (avg)	103.5	80.3	31.1	176	24.6	14.3	212.5	61	13.44	8.6		
(F) DCcal	.9615	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	2.25	2.25	9	2.25	9	22.5	2.25	9	22.5	45		
(H) ρ dc=ExFxGx10^3/D	112	87	135	190	106	156	230	264	145	186		
(I) Vac Σ	102	79	30.7	173.5	24.5	14.2	208	60	13.25	8.5		
(J) AC noise x 2	—	—										
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—	—										
(L) AC-DC cal.	1.00	→	→	→	→	→	→	→	→	→		
(M) ρ dc/ρac=ExL/K	1.015	1.016	1.015	1.014	1.004	1.007	1.022	1.017	1.014	1.012		
(N) PFE=(M-1)(10^2)	1.5	1.6	1.3	1.4	.4	.7	2.2	1.7	1.4	1.2		
(O) MCF=(M-1)(10^5)/H	14	18	10	7	4	4	10	6	10	6		
	-7	-4		-17			-13					

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					
(B) Receive	30-37.5	→	→	→	37.5-45	→	→					
(C) n separation	2	3	4	5	3	4	5					
(D) I	2	→	→	→	→	→	→					
(E) Vdc (avg)	33.5	19.1	6.6		12.4	8.55	3.52					
(F) DCcal	.9615	→	→	→	→	→	→					
(G) Kn x 10^{-3}	9	22.5	45		22.5	45	78.7					
(H) ρ dc=ExFxGx10^3/D	145	207	143		134	185	133					
(I) Vac Σ	33.0	18.6	6.5		12.2	8.4	3.46					
(J) AC noise x 2	—											
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	1.00	→	→	→	→	→	→					
(M) ρdc/ρac =ExL/K	1.015	1.027	1.015		1.016	1.018	1.017					
(N) PFE=(M-1)(10^2)	1.5	2.7	1.5		1.6	1.8	1.7					
(O) MCF=(M-1)(10^5)/H	10	13	10		12	10	13					
	-12				?							

INDUCED POLARIZATION SENDER NOTES

Project: Montizuma Line: #2 North Date: 8-10-66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive	0-750	750-1500		1500-2250 →			2250-3000		→			
Time												
Range												
Current	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00		
Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL WAIT	3-4	4-5	
Receive	3000-3750	→			3750-4500	→						
Time												
Range												
Current	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00				

INDUCED POLARIZATION - RECEIVER NOTES PAGE ____

Project: MONTEZUMA Line: 2-N Int.Cal ____ Date: 7/11/66

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
Rec.	30-37.5	→	→	→	37.5-45	→	→	→				
Time	.1	.05	.01	.01	.03	.03	.01					
DC-1	16.7 17.5	7.9 7.9	3.27 3.25		11.0 11.0	5.6 5.8	2.63.2 2.82.9					
DC-2	16.7 17.3	7.8 8.0	3.15 3.40		10.9 11.1	5.7 5.8	3.4 3.2					
Σ												
DC-3	17.2 17.0	7.9 7.9	3.25 3.25		11.0 11.0	5.6 5.7						
Dc-4	17.0 17.0		3.40 3.15			5.7 5.8						
Σ												
DC-AV												
AC-1	16.7	7.7	3.18	1.95	10.8	5.6	2.77					
AC-2	16.7	7.7	3.20		10.8	5.6						
Σ												
S. P.	-13.0											
AC-N			↓									
Pot. Res												

CAL

		1-2	2-3
3.20	Ac	104	104
3.27			
3.18		104	104
3.4	pc	104	104
3.30			
3.20			104
3.40			
3.18		104	104

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: [illegible] Line: 7-N Int.Cal Date: 7/11/66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	6-7	25-13		15-226				225-30				
Time	.3	.3	.1	.3	.03	.03	.3	.1	.03	.01		
DC-1	83 83	111 109	31.2 31.2	63 64	13.9 14.1	6.8 6.2	55 56	19.0 17.0	6.0 6.0	3.3 3.8 4.0 4.4		
DC-2	83 83	111 109	31.7 31.0	63 64	14.4 13.8	6.6 6.7	55 55	17.8 18.2	6.5 5.5	3.7 3.9 3.6 3.3		
Σ												
DC-3	83 83	112 109	30.7 31.5	63 64	14.2 14.1	7.1 6.2	54 56	18.7 17.5	6.9 6.1	3.2 3.9 3.8 3.1		
Dc-4		111 110	31.8 30.5		14.3 14.0	6.1 7.0		16.5 18.0	6.3 5.6	3.8 4.7 3.4 3.1		
Σ												
DC-AV												
AC-1	81	107	30.6	63	13.9	6.5	54	17.5	5.9	3.5		
AC-2	81	107	30.6	63	13.9	6.5	54	17.7	5.9	3.5		
Σ												
S. P.	-20.8	-18.2		-7.6			-3.2					
AC-N	.08											
Pot.Res												

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project MONTEZUMA Line 2-N Field date 8/11/66 Data page 1 Comp. date 8/15/66. Comp by JMC

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-7.5	7.5-15	→	15-22.5	→	→	22.5-30	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2.0	→	→	→	→	→	→	→	→	→		
(E) Vdc (avg)	83	110.3	31.2	64.5	14.1	6.59	55.3	18.1	6.0	3.66		
(F) DCcal	.9615	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	2.25	2.25	9	2.25	9	22.5	2.25	9	22.5	45		
(H) ρ dc=ExFxGx10^3/D	90	119	135	70	61	71	60	58	65	79		
(I) Vac Σ	81	107	30.6	63	13.9	6.5	54	17.6	5.9	3.5		
(J) AC noise x 2	—											
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	1.00	→	→	→	→	→	→	→	→	→		
(M) ρ dc/ρac=ExL/K	1.025	1.031	1.020	1.024	1.014	1.014	1.024	1.028	1.017	1.046		
(N) PFE=(M-1)(10^2)	2.5	3.1	2.0	2.4	1.4	1.4	2.4	2.8	1.7	4.6		
(O) MCF=(M-1)(10^5)/H	28	26	15	34	23	20	40	36	26	58		
	-21	-18		-8			-3					

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

(A) Send	4-5	3-4	2-3	~~1-2~~	4-5	3-4						
(B) Receive	30-37.5	→	→		37.5-45	→						
(C) n separation	2	3	4		3	4						
(D) I	2.0	→	→		→	→						
(E) Vdc (avg)	17.05	7.9	3.27		11.0	5.74						
(F) DCcal	.9615	→	→		→	→						
(G) Kn x 10^{-3}	9	22.5	45		22.5	45						
(H) ρ dc=ExFxGx10^3/D	74	85	71		119	120						
(I) Vac Σ	16.7	7.7	3.19		10.8	5.6						
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.00	→	→		→	→						
(M) ρdc/ρac =ExL/K	1.021	1.026	1.025		1.019	1.025						
(N) PFE=(M-1)(10^2)	2.1	2.6	2.5		1.9	2.5						
(O) MCF=(M-1)(10^5)/H	28	31	35		16	20						
	-13				?							

INDUCED POLARIZATION SENDER NOTES

Project: Montezuma Line: #1 South Date: 8-9-66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Receive	0-750	750-1500	→	1500-2250	→	→	2250	3000	→	→		
Time												
Range												
Current	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8		
Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL LAMP	1-2	2-3
Receive	3000	3750	→		3750	4500	→					
Time												
Range												
Current	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8				

INDUCED POLARIZATION - RECEIVER NOTES

PAGE _____

Project: MONTEZUMA Line: 1-5 Int.Cal _____ Date: 7/9

Send	0-7.5	7.5-15	→	15-22.5	←	→	22.5-30	←	→		
Rec.	4-5	3-11	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	
Time	.3	.1	.03	.1	.03	.03	.1	.03	.03	.03	
DC-1	57 60	23.5 23.5	11.4 11.6	40.0 40.2	10.0 10.0	8.6 8.7	28.5 30.2	15.8 15.6	5.3 5.3	6.3 5.2	
DC-2	58 59	23.5 23.5	11.5 11.6	39.8 40.2	10.4 9.6	8.6 8.5	29.5 29.3	15.7 15.7	5.6 5.0	5.5 6.0	
Σ											
DC-3	57 60	23.5 23.5	11.5 11.6	40.0 40.2	10.2 9.8	8.7 8.8	29.7 29.0	15.5 15.9	5.4 5.2	5.6 5.7	
Dc-4			11.5 11.7			8.8 8.4	29.5 29.2		5.2 5.3	5.7 5.9	
Σ											
DC-AV											
AC-1	58	23.4	11.4	39.4	9.9	8.6	28.8	15.4	5.2	5.6	
AC-2	58	23.4	11.4	39.5	9.9	8.6	28.8	15.4	5.3	5.6	
Σ											
S. P.	-24.4	-7.6		-13.9			-10.7				
AC-N	.06	.08		.06			.08				
Pot.Res											

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: MONTEZUMA Line: 1-5 Int.Cal 89 Date: 8/9/66

Send	30-33			→	37.5-45			→				
Rec.	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
Time	.03	.03	.01		.01	.01	.003					
DC-1	12.0 12.0	8.7 9.6	3.7 4.2		3.00 3.67	3.36 3.20						
DC-2	12.0 12.1	9.0 8.9	3.7 4.0		3.38 3.40	3.45 3.10						
Σ												
DC-3	11.9 12.2	9.0 8.9	3.7 4.1		3.20 3.45	3.00 3.40						
Dc-4	12.0 12.1	8.8 9.0	3.8 4.0		3.40 3.30	3.42 3.07						
Σ												
DC-AV												
AC-1	11.8	8.7	3.80		3.28	3.17						
AC-2	11.8	8.7	3.77		3.25	3.17						
Σ												
S. P.	-4.6				-4.4							
AC-N					.08							
Pot. Res												

3.50	3.9
3.18	3.9
3.60	3.9
3.00	4.0
3.00	3.8
3.72	3.9
3.82	4.0
3.85	3.8

N 30° E

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project MONTEZUMA Line 1-5 Field date 8/9/66 Data page 1 Comp. date 8/15/66. Comp by JMc

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-7.5	7.5-15	→	15-22.5	→	→	22.5-30	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	1.8	→	→	→	→	→	→	→	→	→		
(E) Vdc (avg)	58.5	23.5	11.57	40.1	10.0	8.64	29.4	15.7	5.3	5.7		
(F) DCcal	.9615	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	2.25	2.25	9	2.25	9	22.5	2.25	9	22.5	45		
(H) ρdc=ExFxGx10^3/D	70	28	56	48	48	104	35	75	64	137		
(I) Vac Σ	58	23.4	11.9	39.5	9.9	8.6	28.8	15.4	5.25	5.6		
(J) AC noise x 2	—											
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	1.00	→	→	→	→	→	→	→	→	→		
(M) ρdc/ρac=ExL/K	1.009	1.004	1.015	1.015	1.010	1.005	1.021	1.019	1.010	1.018		
(N) PFE=(M-1)(10^2)	.9	.4	1.5	1.5	1.0	.5	2.1	1.9	1.0	1.8		
(O) MCF=(M-1)(10^5)/H	13	14	27	31	21	5	60	25	16	15		
	-24	-16		-14			-11					

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					
(B) Receive	30-37.5	→	→	→	37.5-45	→	→					
(C) n separation	2	3	4	5	3	4	5					
(D) I	1.8	→	→	→	→	→	→					
(E) Vdc (avg)	12.1	8.92	3.90		3.35	3.25	→					
(F) DCcal	.9615	→	→	→	→	→	→					
(G) Kn x 10^{-3}	9	22.5	45		22.5	45						
(H) ρdc=ExFxGx10^3/D	58	107	94		40	78						
(I) Vac Σ	11.8	8.7	3.79		3.24	3.17						
(J) AC noise x 2	—											
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	1.00	→	→	→	→	→	→					
(M) ρdc/ρac =ExL/K	1.025	1.025	1.032		1.034	1.025						
(N) PFE=(M-1)(10^2)	2.5	2.5	3.2		3.4	2.5						
(O) MCF=(M-1)(10^5)/H	43	23	34		85	32						
	-5				-4							

INDUCED POLARIZATION SENDER NOTES

Project: Montezuma Line: #3 South Date: 8-11-66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	45		
Receive	0-750	750-1500	1500	—2250		2250	—3000	→				
Time												
Range												
Current	2.5	2.5	2.3	2.5	2.5	2.3	2.5	2.5	2.5	2.3		
Send	1-2	2-3	3-4	1-2	2-3							
Receive	3000	—3750		3750	—4500					CAL AMP	3-4	
Time												
Range												
Current	2.5	2.5	2.5	2.5	2.5							

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: _____ Line: 3-S Int.Cal _____ Date: 7/12/66

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
Rec.	30-37.5	→	→	→	37.5-45	→	→	→				
Time	.03	.03	.03		.03	.03						
DC-1	12.6 12.8	10.3 9.6	6.6 5.8		16.3 15.1	5.4 5.0						
DC-2	13.4 18.0	10.3 10.0	6.2 5.8		16.7 16.4	6.2 6.2						
Σ												
DC-3	17.2 18.2	10.3 10.0	5.6 6.3		17.2 16.2	6.4 6.1						
Dc-4		10.3 10.3	5.3 6.2		16.0 17.2	6.3 6.2						
Σ												
DC-AV												
AC-1	12.6	10.0	5.9		16.7	6.2						
AC-2	17.6	10.0	5.8		16.7	6.2						
Σ					-3.1							
S. P.	-7.2				.06							
AC-N	.06											
Pot.Res												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: MONTEZUMA Line: 3-5 Int.Cal _____ Date: 7/12/66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
Rec.	0-2.5	2.5-15	→	15-22.5	→	→	22.5-30	→	→	→		
Time	.3	.3	.1	.5	.1	.1	.3	.1	.03	.03		
DC-1	97 97	59 60	22.4 22.4	111 108	32.2 32.5	19.8 19.9	59 56	20.0 20.8	9.4 10.0	7.6 7.1		105 105
DC-2	97 97	59 60	22.4 22.4	111 108	32.0 32.7	19.7 19.5	59 56	20.2 20.6	9.5 9.9	7.7 7.1		105 105
Σ												
DC-3		59 60	22.3 22.5	111 108	31.8 33.0	19.6 19.7	57 58	20.7 20.6	9.5 9.9	7.0 7.7		
Dc-4					32.0 32.7			20.8 20.0	9.5 10.0	7.7 7.0		
Σ												
DC-AV												
AC-1	95	59	22.2	106	31.5	19.0	56	20.0	9.5	7.2		105
AC-2	95	58	22.2	106	31.5	19.0	56	20.0	9.5	7.2		105
Σ												
S. P.	-5.6	-1.5		-7.4			-12.0					
AC-N	.04	.04		.06			.06					
Pot. Res				3+	3							

NORTA - SOUTH

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project MONTEZUMA Line 3-S Field date 8/12/66 Data page_____ Comp. date 8/15/66. Comp by JME

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-7.5	7.5-15	→	15-22.5	→	→	22.5-30	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2.5	2.5	2.3	2.5	2.5	2.3	2.5	2.5	2.5	2.3		
(E) Vdc (avg)	97	59.5	22.4	109.5	32.35	19.6	52.5	20.4	9.7	7.35		
(F) DCcal	.9524	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	2.25	2.25	9	2.25	9	22.5	2.25	9	22.5	4.5		
(H) ρ dc=ExFxGx10^3/D	83	51	83	94	111	183	49	70	83	137		
(I) Vac Σ	95	58.5	22.2	106	31.5	19.0	56	20	9.5	7.2		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.00	→	→	→	→	→	→	→	→	→		
(M) ρ dc/ρac=ExL/K	1.021	1.017	1.009	1.033	1.027	1.032	1.027	1.020	1.021	1.021		
(N) PFE=(M-1)(10^2)	2.1	1.7	.9	3.3	2.7	3.2	2.7	2.0	2.1	2.1		
(O) MCF=(M-1)(10^5)/H	25	33	11	35	41	18	55	29	25	15		
	-6	-2		-7			-12					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3						
(B) Receive	30-37.5	→	→	→	37.5-45	→						
(C) n separation	2	3	4	5	3	4						
(D) I	2.5	2.5	2.5		2.5	2.5						
(E) Vdc (avg)	17.7	10.2	5.95		16.7	6.25						
(F) DCcal	.9524	→	→		→	→						
(G) Kn x 10^{-3}	9	22.5	45		22.5	45						
(H) ρ dc=ExFxGx10^3/D	61	87	102		143	107						
(I) Vac Σ	17.6	10.0	5.85		16.7	6.2						
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.00	→	→		→	→						
(M) ρdc/ρac =ExL/K	1.006	1.020	1.017		1.000	1.008						
(N) PFE=(M-1)(10^2)	.6	2.0	1.7		0	.8						
(O) MCF=(M-1)(10^5)/H	10	23	17		0	7						
	-7				?							

Aug 15 —

Final Report - + Drafting

return Original plan (base) Map

+ Geologic (Drewes) map to

Cyprus.

No hurry but get out as

soon as we can so it won't

get lost.

John McLean

Paul Head.

INDUCED POLARIZATION SENDER NOTES

Project: Montezuma Line: #3 North Date: 8-11-66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive	0750	750 – 1500		1500 – 2250 →			3250 – 3000 →					
Time												
Range												
Current	2.5	2.5	2.5	2.5	2.5	2.5	2.00	2.5	2.5	2.5		
Send	4-5	3-4	2-3	4-5	3-4							
Receive	3000 – 3750 →			3750 – 4500								
Time												
Range												
Current	2.00	2.5	2.5	2.00	2.5							

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: MUSTANG Line: 3-N Int.Cal 89 Date:

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	2-15	2-15	→	15-22.5	→	→	22.5-30	→	→	→		CAL
Time	.3	.3	.1	.3	.1	.03	.3	.3	.1	.03		
DC-1	59 59	100 97	24.5 24.2	130 129	31.3 33.5	12.3 12.9	169 170	54 56	20.7 20.5	9.8 10.1		104 104
DC-2	59 59	99 98	24.3 24.4	130 130	32.5 32.7	12.5 12.7	171 168	54 56	20.3 21.0	10.2 10.0		104 104
Σ												
DC-3	58 60	100 97	24.6 24.2	131 129	32.7 32.6	12.4 12.5	170 169	53 56	20.5 21.0	10.2 10.2		
Dc-4		100 97	24.6 24.0			12.5 12.9		54 55	21.5 20.2	10.5 9.7		
Σ												
DC-AV												
AC-1	58	96	24.3	127	31.5	12.5	164	53	20.0	9.8		
AC-2	58	96	24.3	127	31.5	12.5	164	53	20.0	9.9		104
Σ												104
S. P.	+2.4	-11.8		-2.4			-2.2					
AC-N	08											
Pot.Res												

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: [illegible] Line: 3-N Int.Cal _____ Date: _____

Send	4-	3-4	2-	1-2	4-5	5-6	2-3	1-2				
Rec.	30-32			→	57-58	→	→	→				
Time	.1	.03	.03									
DC-1	23.9 23.2	13.7 13.3	7.1 6.2									
DC-2	21.2 22.0	15.4 13.7	6.2 6.9									
Σ												
DC-3	22.5 23.0	13.7 13.4	6.6 6.5									
Dc-4	22.5 23.0	13.6 13.4	6.6 6.5									
Σ												
DC-AV												
AC-1	26.5	13.1	6.3									
AC-2	26.6	13.1	6.4									
Σ												
S. P.	-5.7											
AC-N												
Pot.Res												

Thunderstorm [illegible] lightning [illegible] etc.

DUE NORTH

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project MONTEZUMA Line 3-N Field date 8/12/66 Data page_____ Comp. date 8/15/66. Comp by JMc

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-7.5	7.5-15	→	15-22.5	→	→	22.5-30	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2.5	→	→	→	→	→	2.0	2.5	→	→		
(E) Vdc (avg)	59	98.5	24.35	130	32.35	12.6	169.5	54.8	20.65	10.13		
(F) DCcal	.9529	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	2.25	2.25	9	2.25	9	22.5	2.25	9	22.5	45		
(H) ρdc=ExFxGx10^3/D	51	84	83	111	111	108	182	188	177	174		
(I) Vac Σ	58	96	24.3	127	31.5	12.5	164	53	20.0	9.85		
(J) AC noise x 2	—											
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	1.00	→	→	→	→	→	→	→	→	→		
(M) ρ dc/ρac=ExL/K	1.017	1.026	1.002	1.024	1.027	1.008	1.030	1.034	1.033	1.028		
(N) PFE=(M-1)(10^2)	1.7	2.6	.2	2.4	2.7	.8	3.0	3.4	3.3	2.8		
(O) MCF=(M-1)(10^5)/H	33	31	2	22	24	7	16	18	19	16		
	+2	-12		-3			-2					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3									
(B) Receive	30-37.5	→	→									
(C) n separation	2	3	4									
(D) I	2.00	2.5	2.5									
(E) Vdc (avg)	27.2	13.55	6.56									
(F) DCcal	.9524	→	→									
(G) Kn x 10^{-3}	9	22.5	45									
(H) ρ dc=ExFxGx10^3/D	117	116	112									
(I) Vac Σ	26.5	13.1	6.35									
(J) AC noise x 2	—											
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	1.00	→	→									
(M) ρdc/ρac =ExL/K	1.026	1.034	1.033									
(N) PFE=(M-1)(10^2)	2.6	3.4	3.3									
(O) MCF=(M-1)(10^5)/H	22	29	29									
	-5.7											

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: MONTEZUMA Line: 1-A Int.Cal _____ Date: 7/30/66

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	(3-4)			
Rec.	30-37.5	→	→	→	37.5-45	→	→	→				
Time	.1	.01	.01	.003	.03	.01	.01					
DC-1	20.4 20.6	5.05 5.02	3.4 3.8 3.6 3.3		11.0 12.0	2.85 3.05			2.98 3.20			
DC-2	20.0 21.3	5.10 4.95	3.7 3.6 3.2 3.45		11.7 11.5	2.82 3.30			3.20 2.80			
Σ												
DC-3	20.5 20.4	5.20 4.90	3.7 3.3		11.4 11.8	3.05 2.95						
Dc-4	20.8 20.2	5.08 5.00			11.7 11.8	3.49 3.48						
Σ												
DC-AV												
AC-1	20.4	4.90	3.50		11.5	2.96	2.28					
AC-2	20.4	4.88	3.48		11.5	2.97						
Σ												
S. P.	-19.7				+4.2							
AC-N	.06											
Pot.Res												

CAL

	3-4	4-5
A-C	104.5	104.5
DC	104.5	104.5
	104.5	104.5
	104.5	104.5
	104.5	104.5
		104.5
AC	104.5	104.5

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: MONTEZUMA Line: 1-N Int.Cal 90 Date: 7/10/66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	0-7.5	7.5-15	———	15-22.5	———	———	20.5-30	———	———	———		
Time	.1	.3	.03	.1	.1	.03	.3	.03	.03	.01		
DC-1	28.5 26.7	64 66	15.5 12.8	45.5 45.7	17.0 17.2	6.3 5.4 5.0 6.3	69 68	12.0 11.6	7.4 6.6	2.70 2.85	2.70 2.65	
DC-2	27.3 28.0	64 66	12.7 13.5	45.5 46.0	17.0 18.0	5.4 5.7 6.1 5.5	69 68	11.8 11.7	7.0 7.1	2.80 2.65	2.45 3.00	
M												
DC-3	27.5 27.5	65 65	12.5 13.7	46.5 45.0	17.2 17.7	6.5 5.5 4.8 6.0	70 68	12.0 11.5	7.0 7.2	2.55 2.95	2.65 2.75	
Dc-4	27.5 27.7		12.1 14.0	46.3 45.0	18.2 16.7	5.4 5.6 5.4 5.7		11.6 11.9	7.2 7.0 7.0 7.1	2.70 2.60	2.70 2.85	
M					(16.5) (18.5)							
DC-AV												
AC-1	27.3	64	12.9	44.6	17.0	5.5	68	11.7	6.9	2.65		
AC-2	27.3	64	12.9	44.6	17.0	5.5	68	11.7	6.9	2.68		
M												
S. P.	-20.0	-10.0		-10.2			-10.1					
AC-N							.08					
Pot. Res												

INDUCED POLARIZATION SENDER NOTES

Project: _____ Line: #1 No+Th Date: 8-10-66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive	0-750	750-1500		1500-2250	→		2250-3000	→		→		
Time												
Range												
Current	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00		
Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CHG. TAPE	4-5	3-4	
Receive	3000-3750	→		→	3750-4500	→						
Time												
Range												
Current	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00				

N30°E

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project MONTEZUMA Line 1-N Field date 8/10/66 Data page 1 Comp. date 7/15/66. Comp by JME

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-7.5	7.5-15	→	15-22.5	→	→	22.5-30	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2	→	→	→	→	→	→	→	→	→		
(E) Vdc (avg)	27.6	65	13.1	45.7	17.5	5.66	68.8	11.8	7.06	2.72		
(F) DCcal	.9569	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	2.25	2.25	9	2.25	9	22.5	2.25	9	22.5	45		
(H) ρdc=ExFxGx10^3/D	30	70	56	49	75	61	74	51	76	59		
(I) Vac Σ	27.3	64	12.9	44.6	17.0	5.5	68	11.7	6.7	2.67		
(J) AC noise x 2	—											
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	—											
(L) AC-DC cal.	1.00	→	→	→	→	→	→	→	→	→		
(M) ρ dc/ρac=ExL/K	1.011	1.016	1.016	1.025	1.029	1.029	1.012	1.009	1.023	1.019		
(N) PFE=(M-1)(10^2)	1.1	1.6	1.6	2.5	2.9	2.9	1.2	.9	2.3	1.9		
(O) MCF=(M-1)(10^5)/H	37	23	29	51	39	48	16	18	30	32		
	-20	-10		-10			-10					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4						
(B) Receive	30-37.5	→	→	→	37.5-45	→						
(C) n separation	2	3	4	5	3	4						
(D) I	2	→	→	→	→	→						
(E) Vdc (avg)	20.5	5.04	3.51		11.6	3.00						
(F) DCcal	.9569	→	→	→	→	→						
(G) Kn x 10^{-3}	9	22.5	45		22.5	45						
(H) ρ dc=ExFxGx10^3/D	88	54	76		125	65						
(I) Vac Σ	20.4	4.89	3.49		11.5	2.97						
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.00	→	→	→	→	→						
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K	1.005	1.031	1.006		1.009	1.010						
(N) PFE=(M-1)(10^2)	.5	3.1	.6		.9	1.0						
(O) MCF=(M-1)(10^5)/H	6	57	8		7	15						
	-20				+4							

SCALE 1" = 50'

MONTEZUMA (6 YARDS)

S.P. LOOKING WEST

C_1

+100 MV
+50
LINE #1
-50 MV
-100 MV

C_2

+100 MV.
0
-100 MV

C_3

+100 MV
0
-100 MV

APPROX. BOUNDARY MINERAL SEGREGATION

MINERAL SEGREGATION

LINE 1

LINE 2

LINE 3

N

S

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

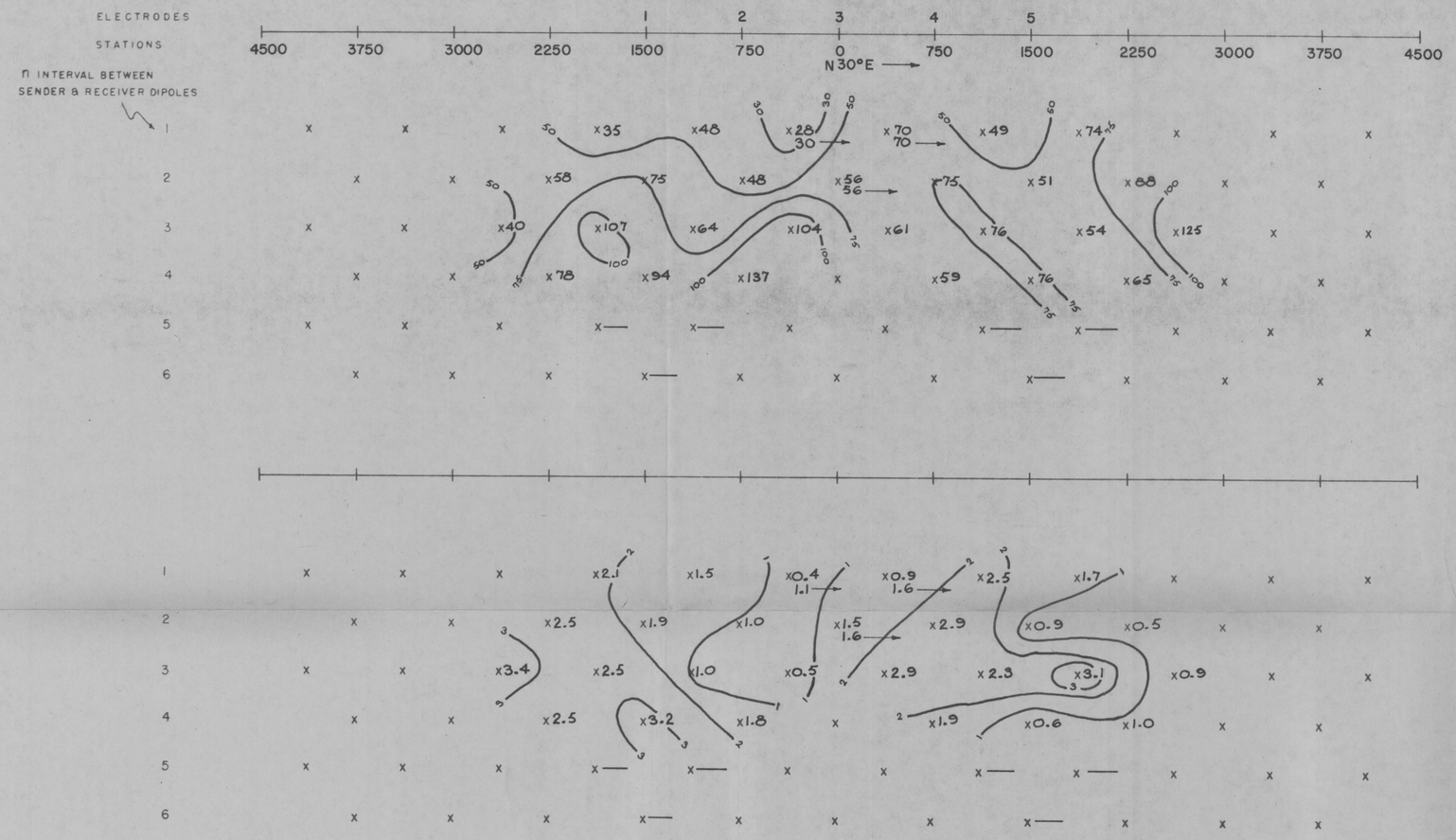
MONTEZUMA PROJECT

FOR
CYPRUS MINES CORPORATION

MINERAL SEGREGATION DISTRICT
SANTA CRUZ COUNTY, ARIZONA

SCALE: 1" = 385' APPROX.	CONTOUR INTERVAL: ——	REVISIONS
FROM R. SKILES	DATA BY: J.M.	
DATE: AUGUST 1966	SHEET 1 OF 4	
DRAWN BY: W.D.S.	DRAWING NO.: 1	FILE:

HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS TUCSON, ARIZONA



APPARENT RESISTIVITY ($\rho_a = \frac{2\pi}{D}$) 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)
$(MCF = \frac{PFE \times 1000}{\rho DC/2\pi})$
CONTOUR INTERVAL LOGARITHMIC

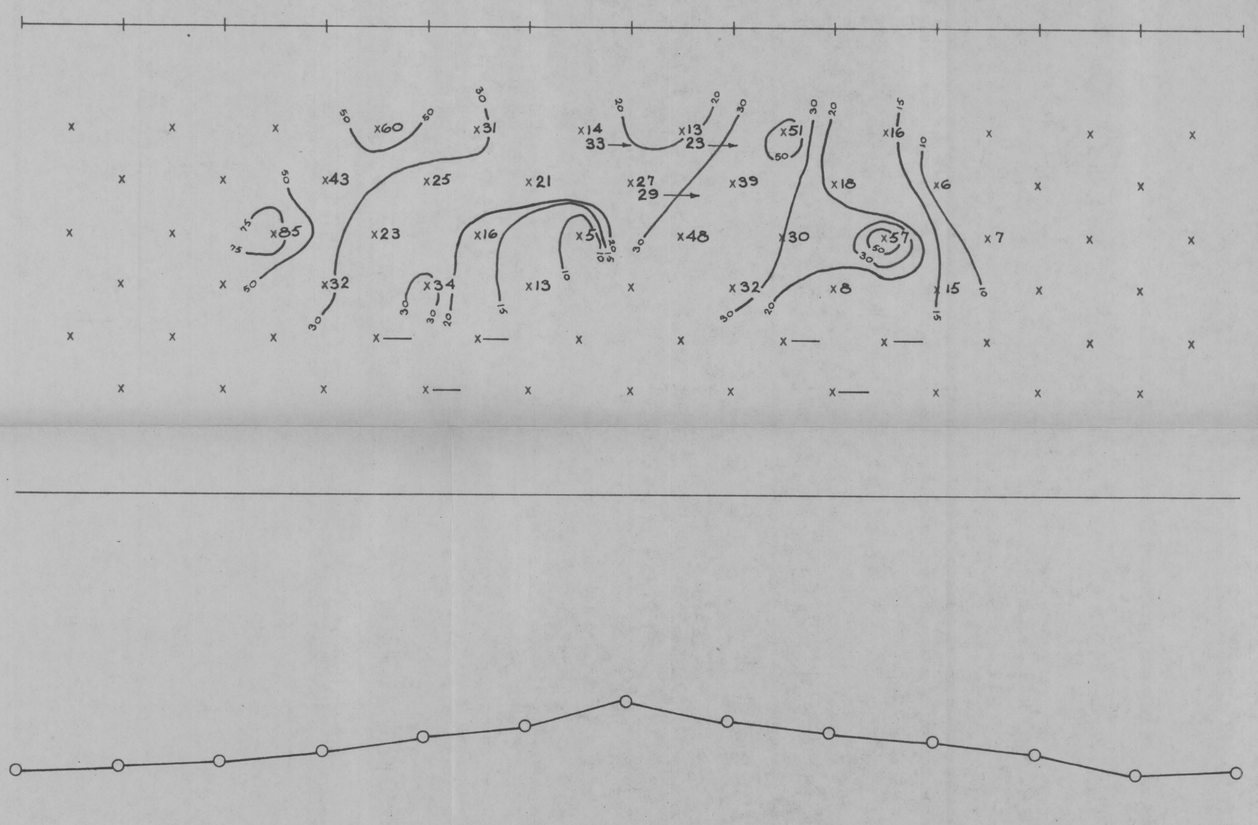
EXPLANATION

ELECTRODE ARRAY: 750' — n x 750' — 750'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING N60°W



MONTEZUMA PROJECT

SECTIONAL DATA SHEET

LINE NO. 1

INDUCED POLARIZATION TRAVERSE

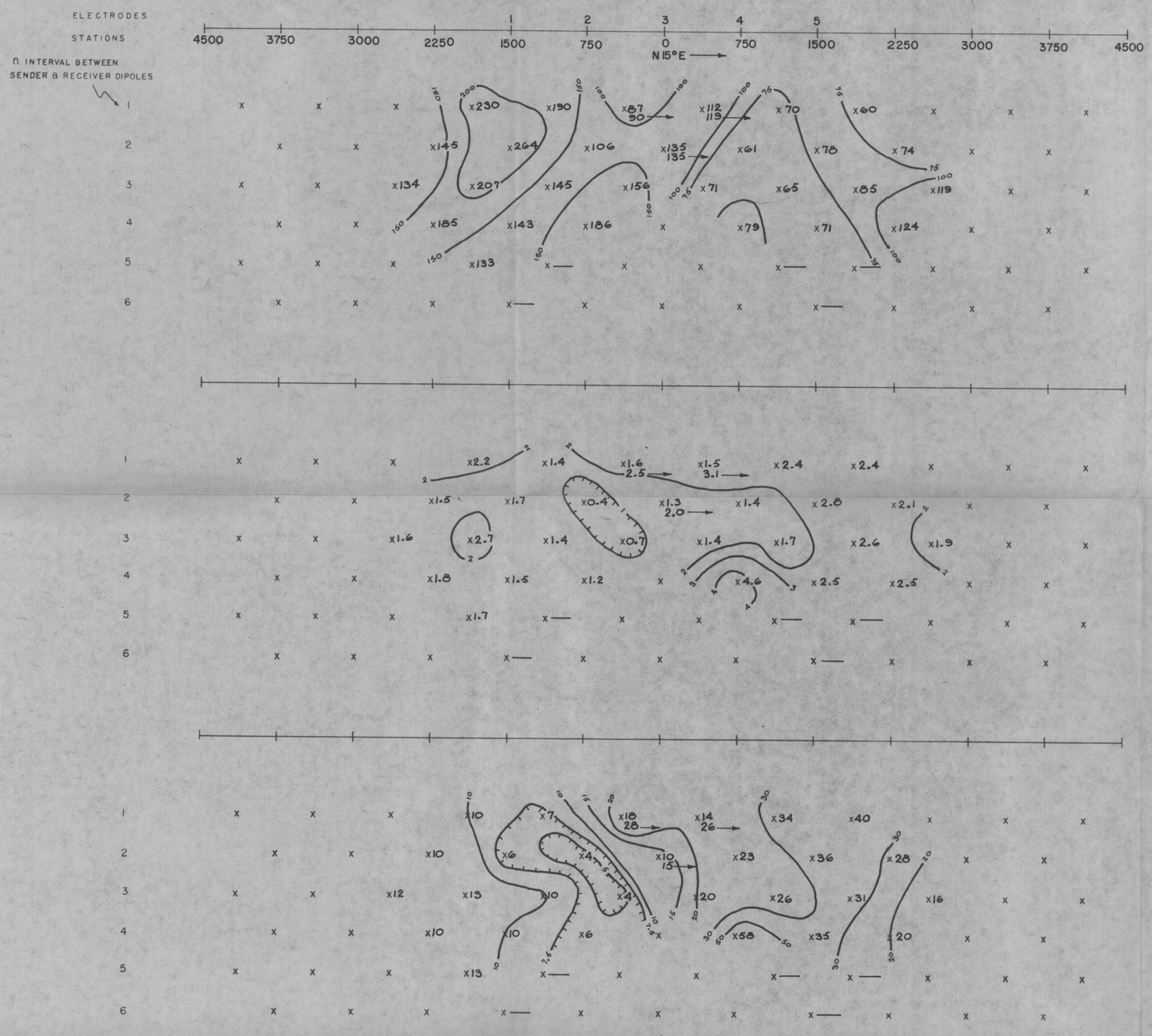
HEINRICHS GEOEXPLORATION COMPANY

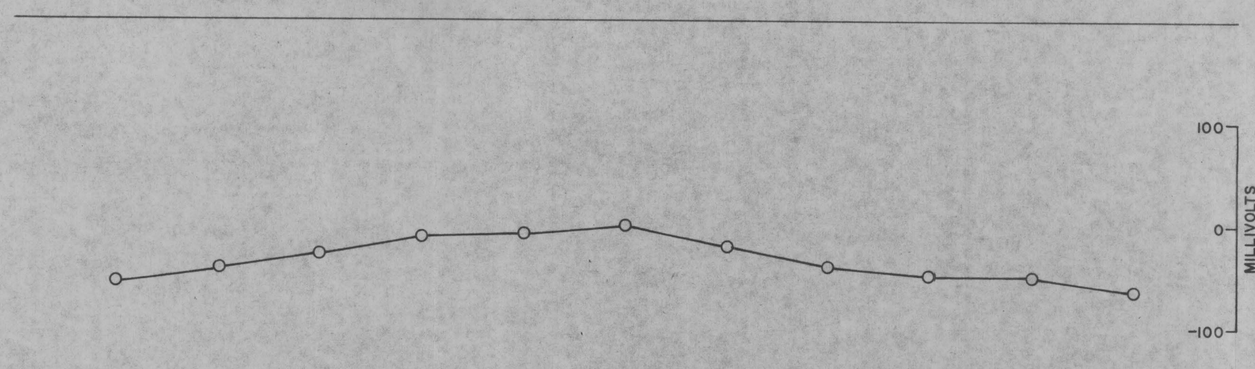
SCALE: 1" = 750' DATE: AUGUST 1966

FOR

CYPRUS MINES CORPORATION
MINERAL SEGREGATION DISTRICT
SANTA CRUZ COUNTY, ARIZONA

HEINRICHS GEOEX
GEOPHYSICAL CONSULTANTS TUCSON, ARIZONA





SELF POTENTIAL

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)

$$(MCF = \frac{PFE \times 1000}{\rho_{DC}})$$

CONTOUR INTERVAL LOGARITHMIC

EXPLANATION

ELECTRODE ARRAY: 750' — n x 750' — 750'
x SENDER DIPOLE x — V RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING N75°W

MONTEZUMA PROJECT

SECTIONAL DATA SHEET

LINE NO. 2

INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 750' DATE: AUGUST 1966

FOR

CYPRUS MINES CORPORATION
MINERAL SEGREGATION DISTRICT
SANTA CRUZ COUNTY, ARIZONA

HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA

SELF POTENTIAL

EXPLANATION

ELECTRODE ARRAY: 750' — n x 750' — 750' (X) SENDER DIPOLE (V) RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

LOOKING WEST

APPARENT RESISTIVITY ($\rho_a = 2\pi \frac{PDC}{PFE}$) 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)
$(MCF = \frac{PFE \times 1000}{\rho DC 2\pi})$
CONTOUR INTERVAL LOGARITHMIC

MONTEZUMA PROJECT

SECTIONAL DATA SHEET
LINE NO. 3
INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 750' DATE: AUGUST 1966

FOR

CYPRUS MINES CORPORATION
MINERAL SEGREGATION DISTRICT
SANTA CRUZ COUNTY, ARIZONA

HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS TUCSON ARIZONA

N

Mineral Segregation

Coronado Nat. Forest

SRHE Pat. D/C All Min.

Approx. Bndary Mineral Segregation

CYPRUS MINES CORP.

MINERAL SEGREGATION PROJECT

PHOTOGEOLOGY OF THE MONTEZUMA STRUCTURE

SCALE 1" = 385' (Approx.)

R. Skiles June 1966