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INDUCED POLARIZATION SURVEY

PICO CLAIM AREA

CASA GRANDE MINING DISTRICT

PINAL COUNTY, ARIZONA

For

American Exploration and Mining Company

December 1966 - January 1967

By

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

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BASIS OF INDUCED POLARIZATION METHOD	1a

IN MAP POCKET: (4 Pieces Total)

Composite Magnetic and Induced Polarization Plan

Sectional Data Sheets
- Line 1 (8S)
- Line 2 (Baseline)
- Line 3 (8N)

INTRODUCTION

At the request of Mr. Robert Garwood of American Exploration Company, Heinrichs Geoexploration Company conducted and completed a quick preliminary induced polarization test type survey over a portion of the Pico Claims, Casa Grande Mining District, Papago Indian Reservation, Pinal County, Arizona. Field work was done during the interim December 19 to December 28, 1966.

Three-five electrode-four sending dipole induced polarization setups on three lines were laid out and observed. The three lines numbered 1, 2, and 3 correspond respectively to Amex magnetometer survey lines 8S, the base line and 8N (see plan map). A dipole spacing of 800 feet was used which gave a total of 27,200 line feet of surface coverage and approximately 16,000 feet of plotted subsurface information.

Data were taken by the dual frequency induced polarization technique with a conventional, symmetrical, co-linear dipole-dipole electrode configuration. Sending frequencies used were 0.05 and 3.0 cycles per second. For the resistivity levels encountered on this survey, the three cycles per second higher frequency used, was low enough that frequency effects caused by inductive coupling interference were negligible

Objective of the survey was to determine if the magnetic anomalies located by Amex were related to sulfide zones and to define the best possible initial drilling sites as indicated by the combined data available.

Results are displayed on sectional data sheets, one for each line, with resistivity, percent frequency effect (PFE), and metallic conduction factor (MCF) contoured in section, and self potential (SP) in profile form with the magnetic profiles superimposed on the SP profile. An induced polarization location and interpretation plan overlaid upon the magnetic contour and claim location map is included.

Geoex personnel involved in the field work were R. Palmer, geophysical crew chief, W. Hurley and B. Terrill, technical assistants. Report and interpretation are by the Geoex staff

in Tucson under the supervision of Chris S. Ludwig, senior geophysicist.

CONCLUSIONS, RECOMMENDATIONS, AND INTERPRETATION

All three lines show definite I.P. anomalism across their entire length. The strongest and most shallow effects are west of an electrical interface (possible geologic contact) trending N-S and lying between 8W and 12W and are apparently, at least geographically, related to the main magnetic high. Amount of sulfide in this zone is difficult to estimate because of the effects of the interface and lack of sufficient background data to the west, but are likely from 0.75% to 3% by volume (1.5-6% by weight) total sulfide across the zones indicated and could therefore be of economic interest.

It is recommended that at least Lines 1 and 3 be extended further west to determine the extent of the anomaly in that direction, as well as doing more work east, north and south of the present survey. The anomalous zone appears to extend below and east of the exposed block of sediments becoming deeper and somewhat weaker in character than that zone west of the 8W interface. Consequently more I.P. is needed to the east to delineate the anomaly in that direction.

Within the Pico Claim group the present best I.P. target, is at Station 9.5W, Line 1 (8S). This nearly corresponds to the apex of the magnetic high which gives further geophysical incentive for drilling at this site. An alternate site, probably equivalent geologically, would be the NW corner of Pico 1. Sulfides will likely be intersected within 500 feet of the surface at either location.

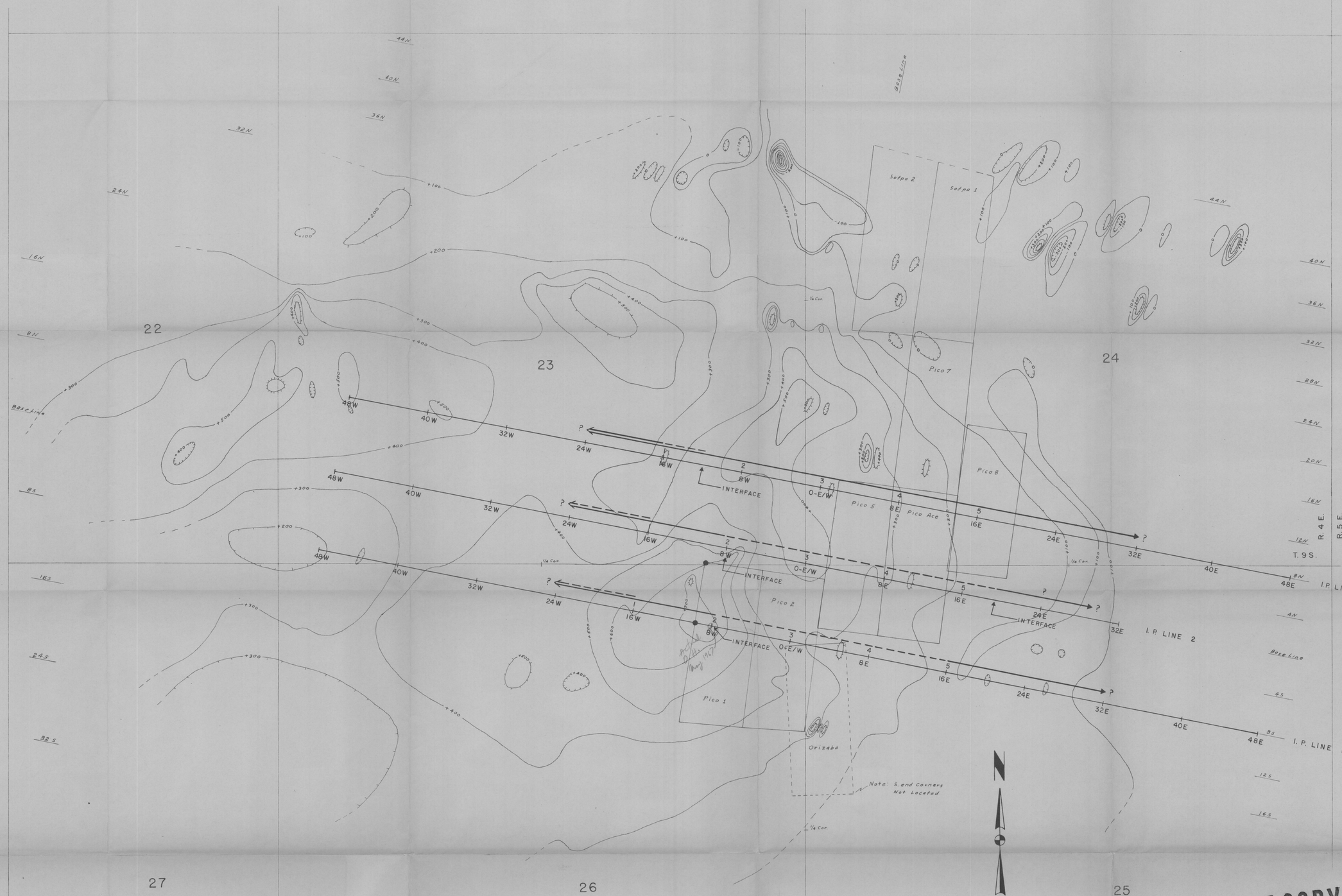
If the ground is available, drilling west of the 8W interface is recommended prior to any on the Pico Claims because of the stronger anomalism and probably greater sulfide content. However, more coverage is needed here before a proper drill site can be selected in this area.

Self potential profiles show a broad low centered between or near 0 E-W and 8E, apparently related to the magnetic high and the exposed block of sediments. These lows suggest oxidizing sulfides within several hundred feet of the surface. The lows correlate with the weakest I.P. effects on the survey suggesting limited depth extent and low total sulfide content (perhaps minor shallow vein-like bodies) in the zone from about 4W to 16E.

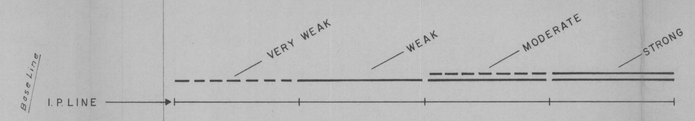
The source of the main magnetic anomaly is not obvious on the surface or from the I.P. data but it is considered possible that it is due to a diabase sill, portions of which are seen north and south of the area. Depth to the top of the magnetic anomaly source could be 200 or 300 feet below surface, based on anomaly shape. Other possible causes could be volcanic material or minor magnetite mineralization including contact metamorphic type. In any case, the magnetic source does not appear to have much induced polarization response; although it is apparently related somehow to the 8W interface which forms the east boundary of the stronger I.P. anomalism.

With an I.P. anomaly of this character it is difficult to be certain of an exact type of sulfide source. Moreover, other minerals can cause polarization effects, for example graphite and some iron and manganese oxides as well as certain clays in isolated cases. Therefore, from the outset of any initial drilling, all core should be saved and closely inspected geophysically for any possible polarizable minerals and simultaneously, representative samples sent to us for laboratory tests and correlation analysis.

In our opinion this part of the Casa Grande Mining District has considerable potential and warrants considerable effort including drilling. However, before too much is done we recommend gaining control of and processing as much ground as feasible in the vicinity before committing too far at only one location, whether the immediate one, another contiguous one, or some other nearby area. The geology is not necessarily simple or well known. There may be such complications as local or regional imbrication involved. Therefore, the possibility of getting too pinned down too soon should be carefully considered.



RELATIVE ANOMALY STRENGTH



● PROPOSED DRILL HOLE

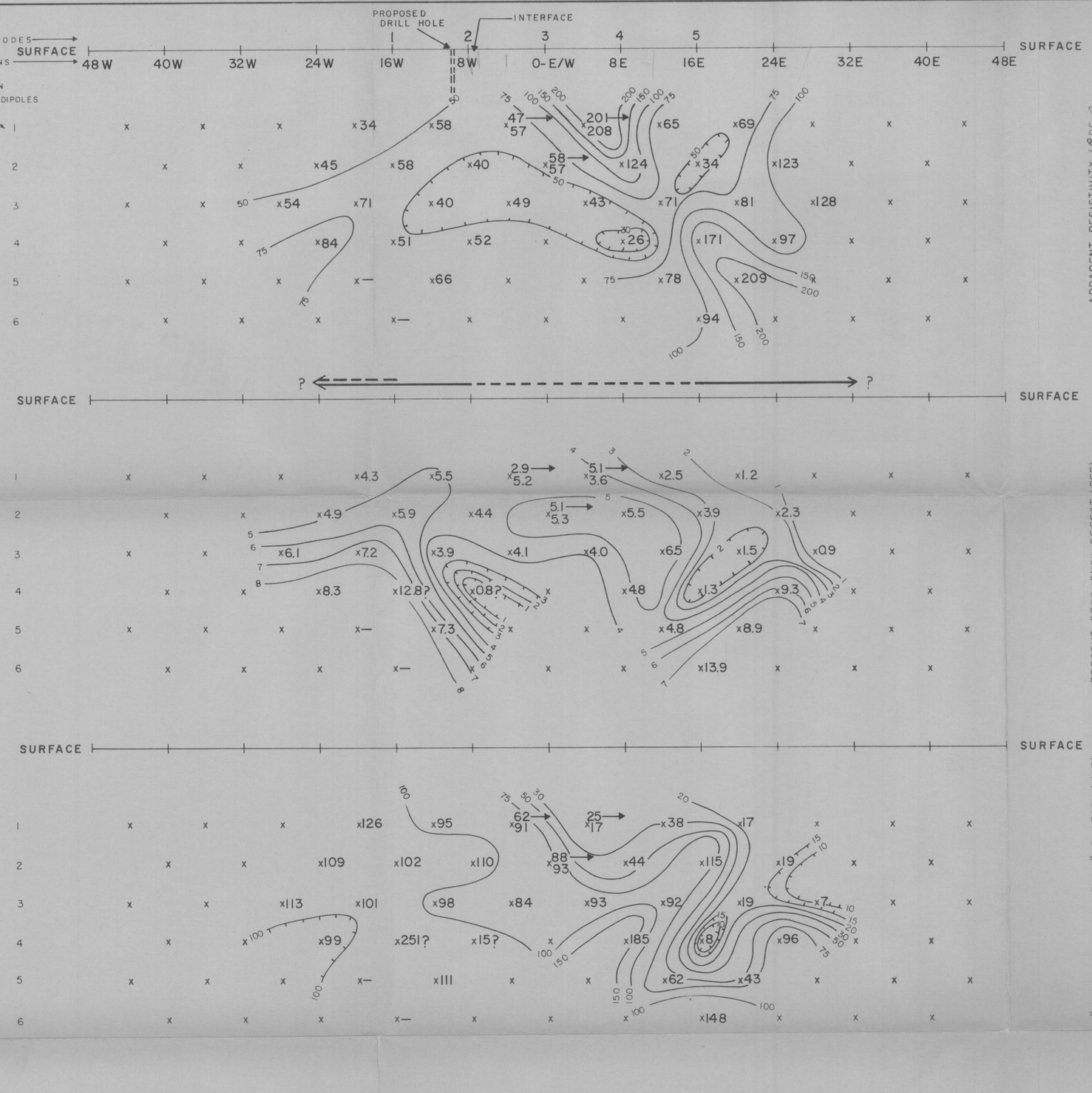
MAGNETIC & CLAIM BASE BY AMEX (DRAWN BY RGG, 12-20-66)

FILE COPY

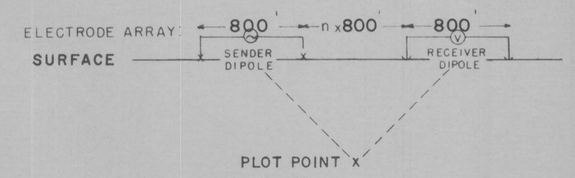
HEINRICHS GEOEXPLORATION COMPANY
P.O. Box 5671 Tucson, Arizona

PICO CLAIM AREA
PINAL COUNTY, ARIZONA
COMPOSITE MAGNETIC & INDUCED POLARIZATION PLAN
for
AMERICAN EXPLORATION & MINING CO.

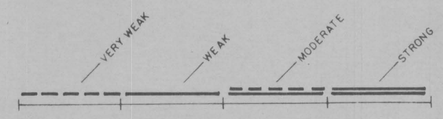
SCALE: 1" = 400'	CONTOUR INTERVAL: 100 γ	REVISIONS
	DATA BY: R.P. & W.H.	
DATE: DEC. '66 - JAN. '67	SHEET 1 OF 1	
DRAWN BY: H.R.M.	DRAWING NO.:	FILE:



EXPLANATION



RELATIVE ANOMALY STRENGTH



LOOKING N 10° E

FILE COPY

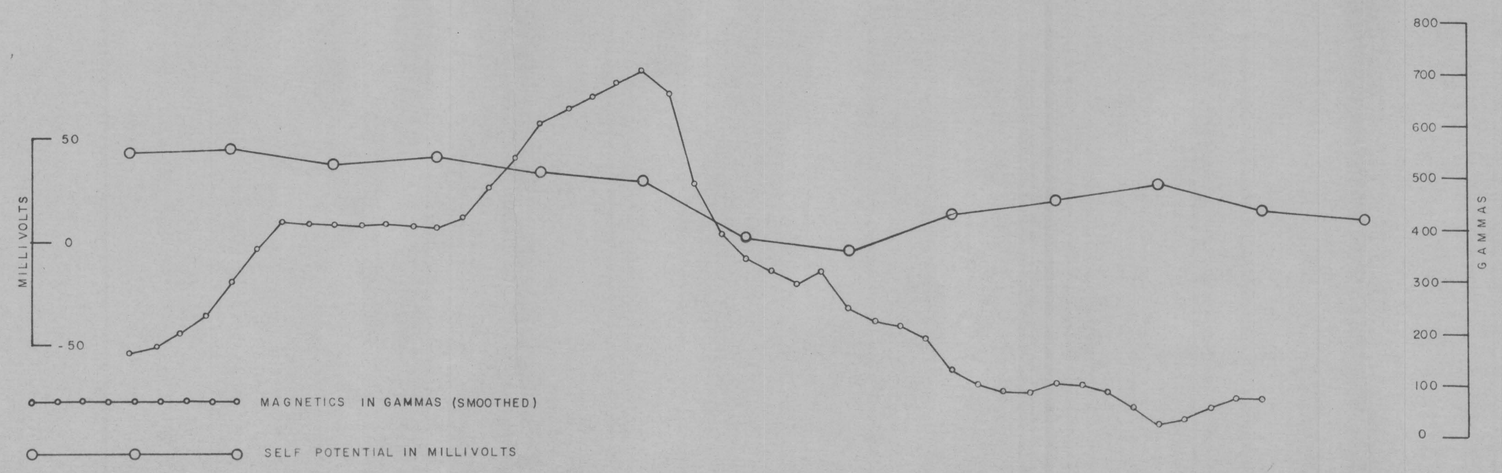
PICO AREA

SECTIONAL DATA SHEET
LINE NO. 1 (800S)
INDUCED POLARIZATION TRAVERSE

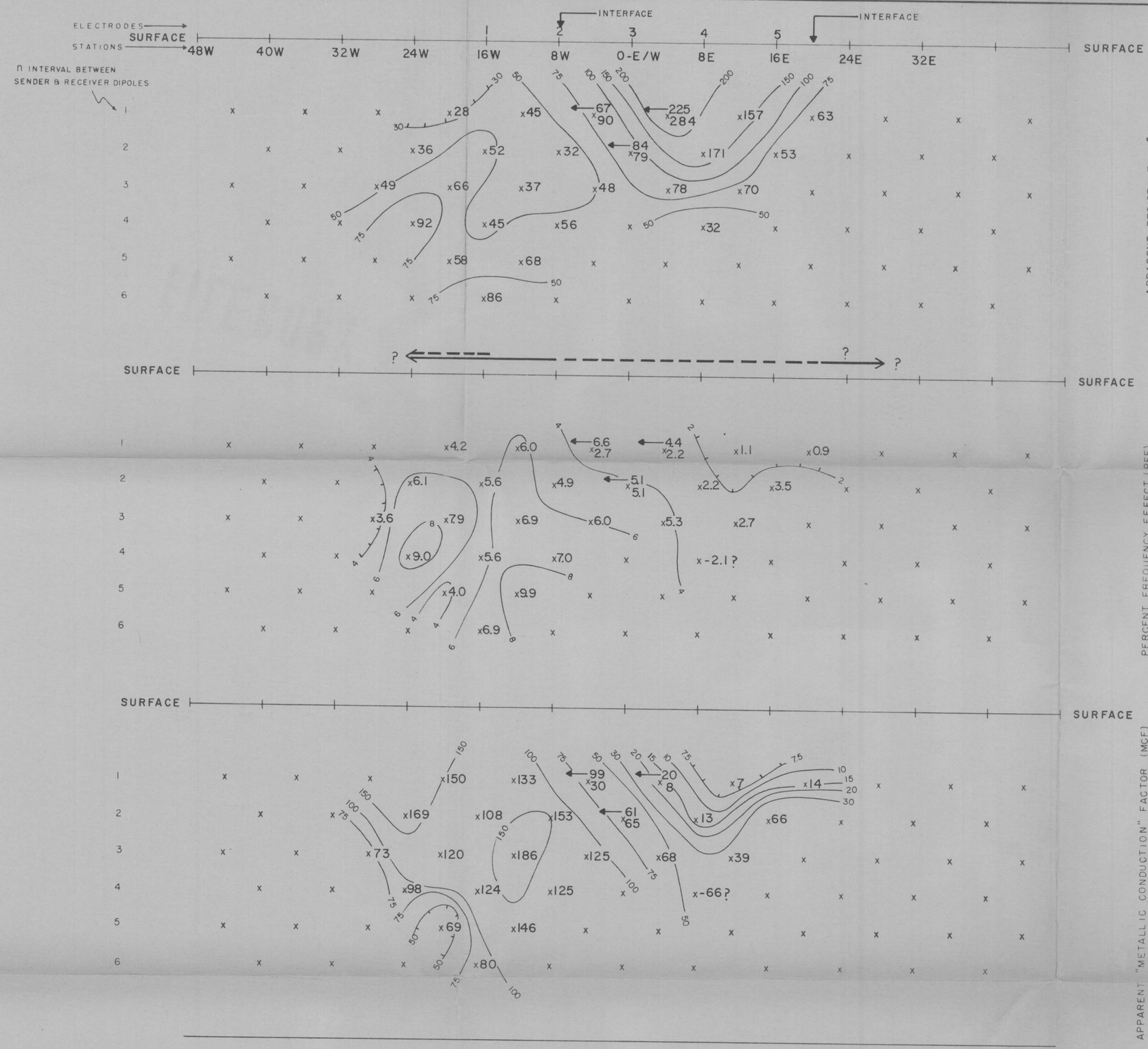
HEINRICHS GEOEXPLORATION COMPANY
SCALE: 1" = 800' DATE: DEC. 1966

FOR

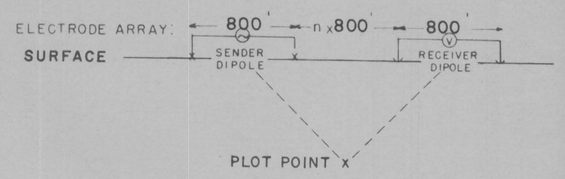
AMERICAN EXPLORATION & MINING CO.



HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA



EXPLANATION



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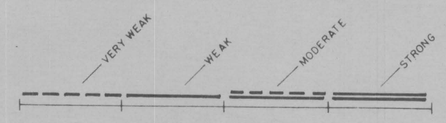


LOOKING N 10° E

FILE COPY

PICO AREA

SECTIONAL DATA SHEET

LINE NO. 2 (BASELINE)

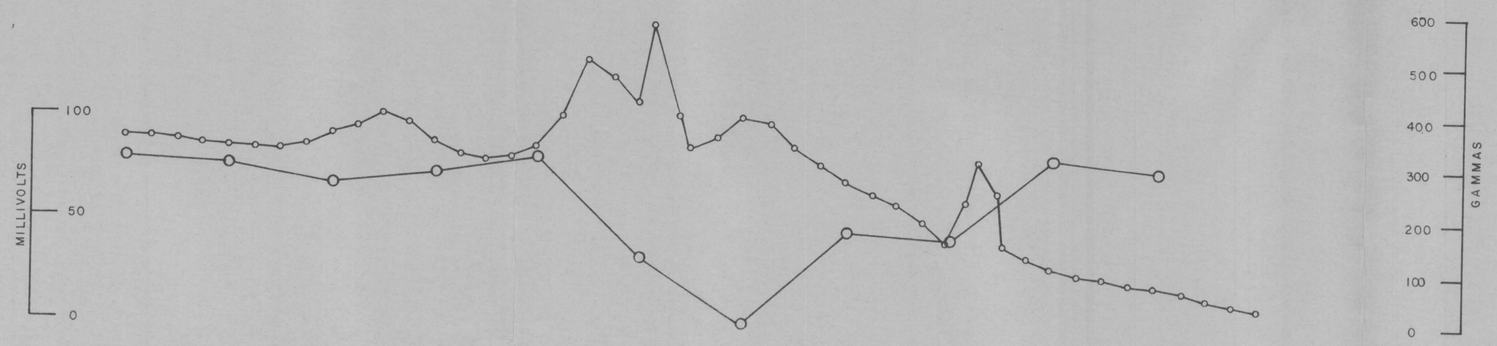
INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 800' DATE: DEC. 1966

FOR

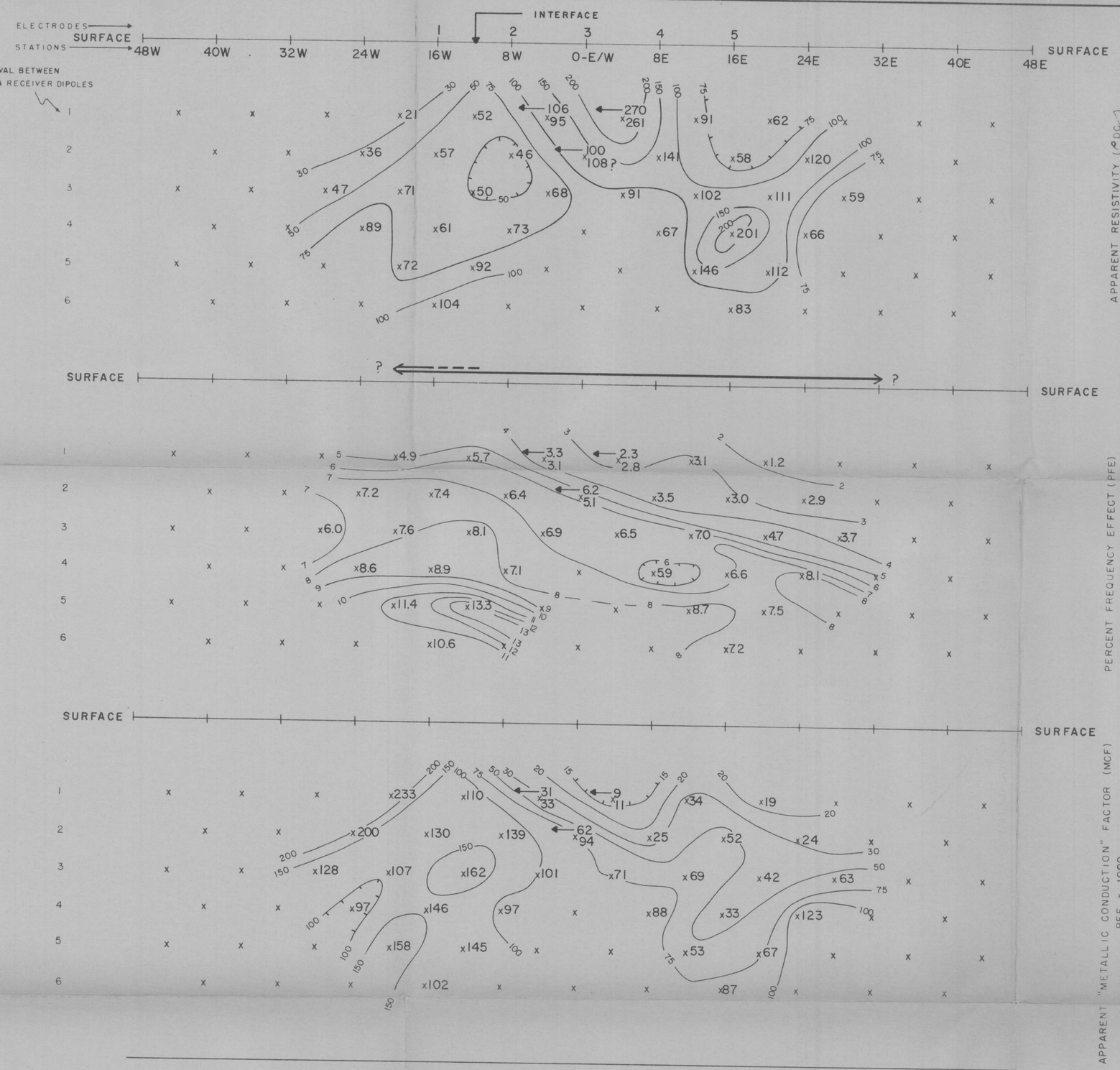
AMERICAN EXPLORATION & MINING CO.



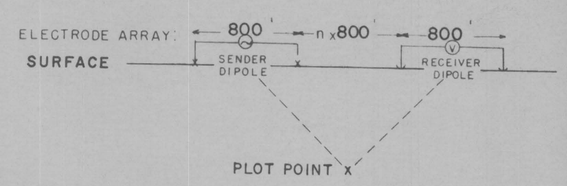
MAGNETICS IN GAMMAS (SMOOTHED)

SELF POTENTIAL IN MILLIVOLTS

HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA



EXPLANATION



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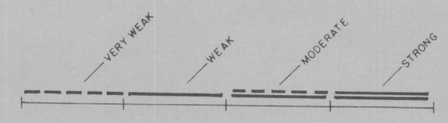


LOOKING N 10° E

FILE COPY

PICO AREA

SECTIONAL DATA SHEET

LINE NO. 3 (800 N)

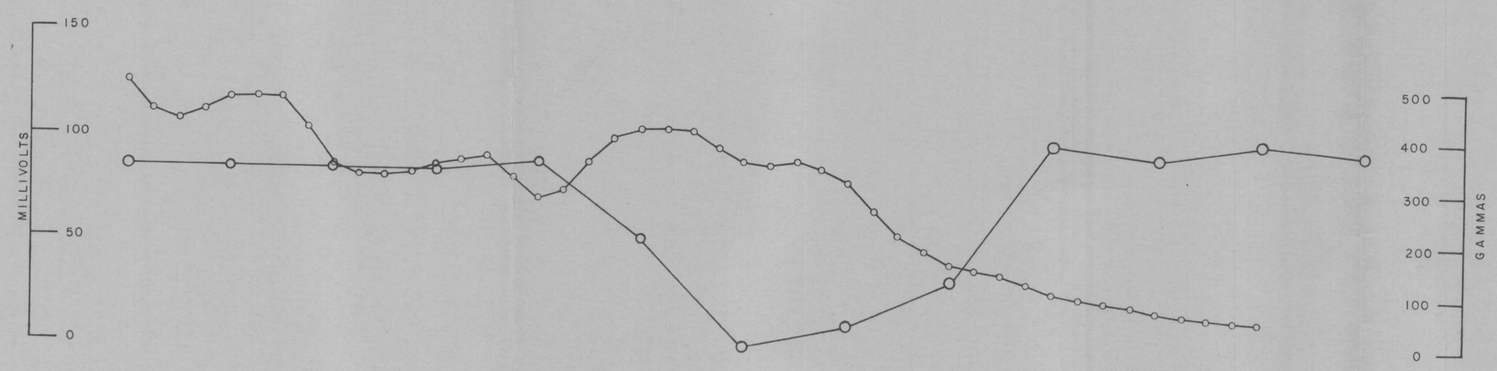
INDUCED POLARIZATION TRAVERSE

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 800' DATE: DEC. 1966

FOR

AMERICAN EXPLORATION & MINING CO.



MAGNETICS IN GAMMAS (SMOOTHED)

SELF POTENTIAL IN MILLIVOLTS

HEINRICHS GEOEX

Any way we can assist will be most welcome. Our experience with the Indians and on the reservation environs has been successful and quite extensive.

Respectfully submitted,

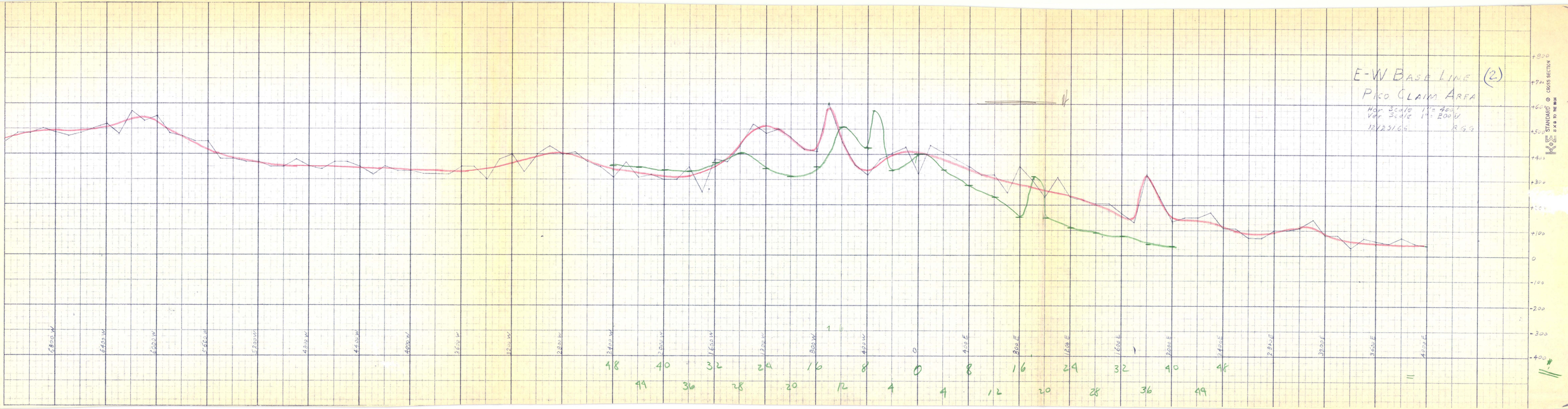
HEINRICHS GEOEXPLORATION COMPANY

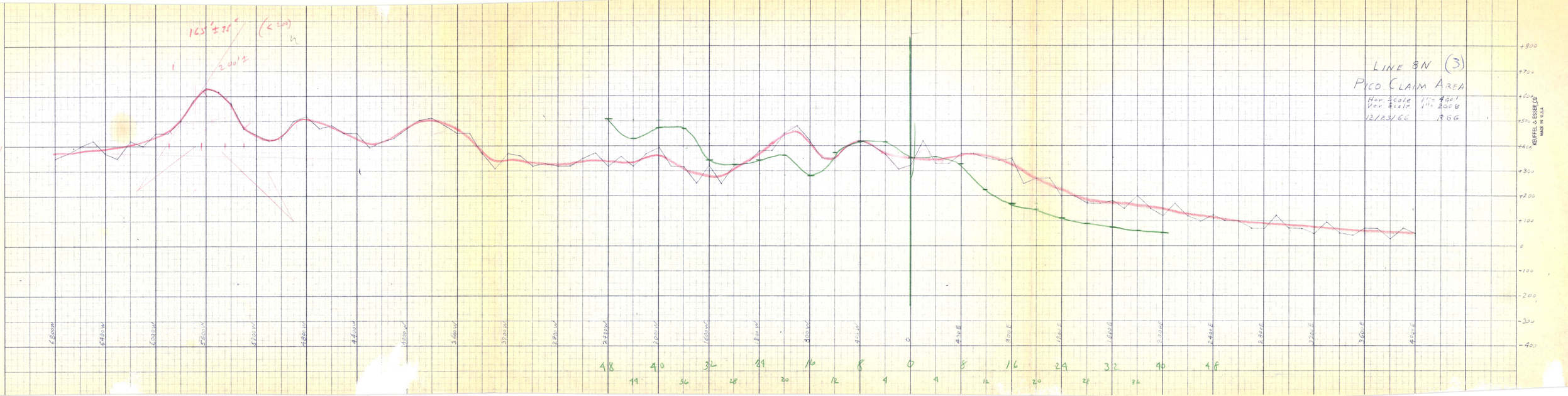
Chris S. Ludwig

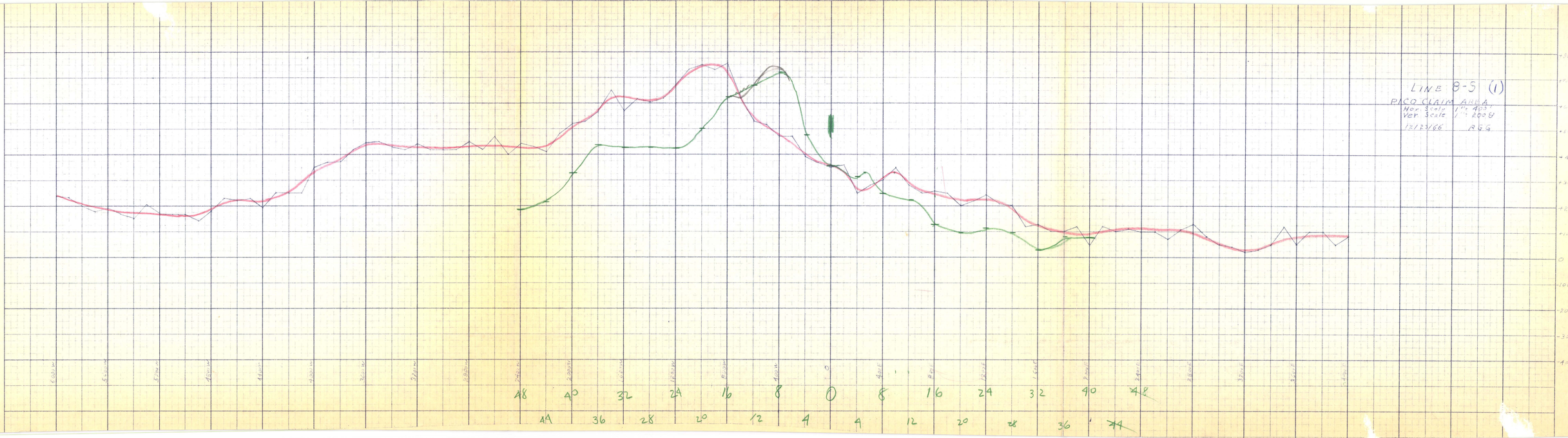
Chris S. Ludwig
Senior Geophysicist

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

Tucson, Arizona
January 5, 1966


E-W BASE LINE (2)
PICO CLAIM AREA
Hor Scale 1" = 40'
Ver Scale 1" = 200'
12/23/66
R.G.G.
STANDARD © CROSS SECTION
K&E 10 X 10 TO THE INCH
+800
+700
+600
+500
+400
+300
+200
+100
0
-100
-200
-300
-400
6800W
6400W
6000W
5600W
5200W
4800W
4400W
4000W
3600W
3200W
2800W
2400W
2000W
1600W
1200W
800W
400W
0
400E
800E
1200E
1600E
2000E
2400E
2800E
3200E
3600E
4000E
48 40 32 24 16 8 0 8 16 24 32 40 48
49 36 28 20 12 4 4 12 20 28 36 49


LINE 8N (3)
PICO CLAIM AREA
Hor. Scale 1" = 400'
Ver. Scale 1" = 200'
12/23/66 RGG
165' ≠ 95'
200' ≠
(c 200)
+800
+700
+600
+500
+400
+300
+200
+100
0
-100
-200
-300
-400
6800W
6400W
6000W
5600W
5200W
4800W
4400W
4000W
3600W
3200W
2800W
2400W
2000W
1600W
1200W
800W
400W
0
400E
800E
1200E
1600E
2000E
2400E
2800E
3200E
3600E
4000E
48 40 32 24 16 8 0 8 16 24 32 40 48
48 40 36 28 20 12 4 4 12 20 28 36
KEUFFEL & ESSER CO.
MADE IN U.S.A.


LINE 8-5 (1)
PISCO CLAIM AREA
Hor Scale 1" = 400'
Ver Scale 1" = 200'
12/23/86 RGG
KEUFFEL & ESSER CO.
MADE IN U.S.A.
48 40 32 24 16 8 0 8 16 24 32 40 48
44 36 28 20 12 4 4 12 20 28 36 44

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

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

	9	6	10	12	11	4	2	7	1	8	5	3
Footage												
Send	455	439	465	470	468	425	416	443.5	364	449	432	420
Rec.												
Time												
DC-1	178 177	151 150	208 215	201 188	236 243	180 163	226 123	208 224	173	150 152	184	142
DC-2	204 208	130 128	206 212	203 187	236 244	183 160	227 125	210 228	171	150 153	168	142
Σ	382 385	281 278							344	300 305	352	
DC-3	204 208	130 128	208 208	205-185 207-183	238 245	185 158	228 127	212 231	171 174	150 153	168 189	142
Dc-4	177 175	150 150	210 211 208 204	209-180 211-178	240 246	187 193 154 147	230 129	214 234	174 170	152 154	187 172	140
Σ	381 383	280 278							345 340	302 307	357 361	
DC-AV	383	279	209	194.75	241	171	176.9	220.1	345	304	357	284
AC-1	187	138	187	177	216	165	174	165	168	138	172	135
AC-2	196	134	185	177	217	164	182	174	167	143	179	136
Σ	383	272	186	177	216.5	164.5	178	169.5	334	281	351	271
S. P.	1.0	2.6	12.4	10.0	11.3	4.0	1.06	29.8	3.3	8.2	1.7	4.8
AC-N												
Pot. Res									7.4	average		

3.4 without 443.5

42
43
44
45
46
47
414 – 471
36
36 – 369
PSE

168 AC

163

178

174

355

356

192

193

172 AC

173

345 179

178

357

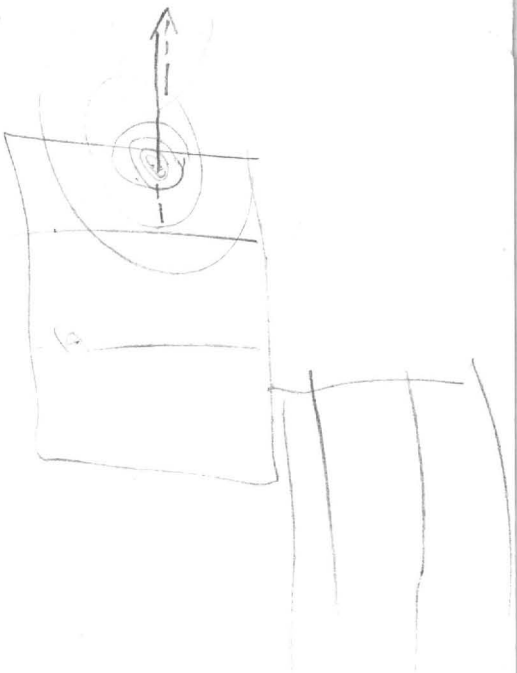
325

288

94.5 AC 95.5

92.5

95.5



PICO DDH#1

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: _____ Int.Cal _____ Date: 5/15/67

Send	516	521	523	528								
Rec.												
Time												
DC-1	173	176	237	182								
DC-2	176	177	235	187								
Σ	349		472	369								
DC-3	176	177 177	235 238	187 183								
Dc-4	173	177 177	238 237	183 189								
Σ	349	354	473 475	370 372								
DC-AV	349	354	473	370								
AC-1	157	162	211	171								
AC-2	159	162	215	176								
Σ	316	324	426	347								
S. P.												
AC-N	10.4	9.5	11.0	6.6								
Pot. Res		374 341										

176
160
16

May 15, 1967

AMEX PICO DRILL HOLE

Approximate Footage	PFE	Sample Description
364	3.3	
416	0.0	
420	4.8	
425	4.0	
432	1.7	
439	2.6	
444	29.8	
449	8.2	
455	1.0	
465	12.4	
468	11.3	
470	10.0	
516	10.4	
521	9.5	
523	11.0	
528	6.6	

Worst case Coupling 3 gao
Amex Pico area C.G.

$\rho_{ex} = 40$ ohm-ft $a = 800$ 12/27/66

$f = 3$

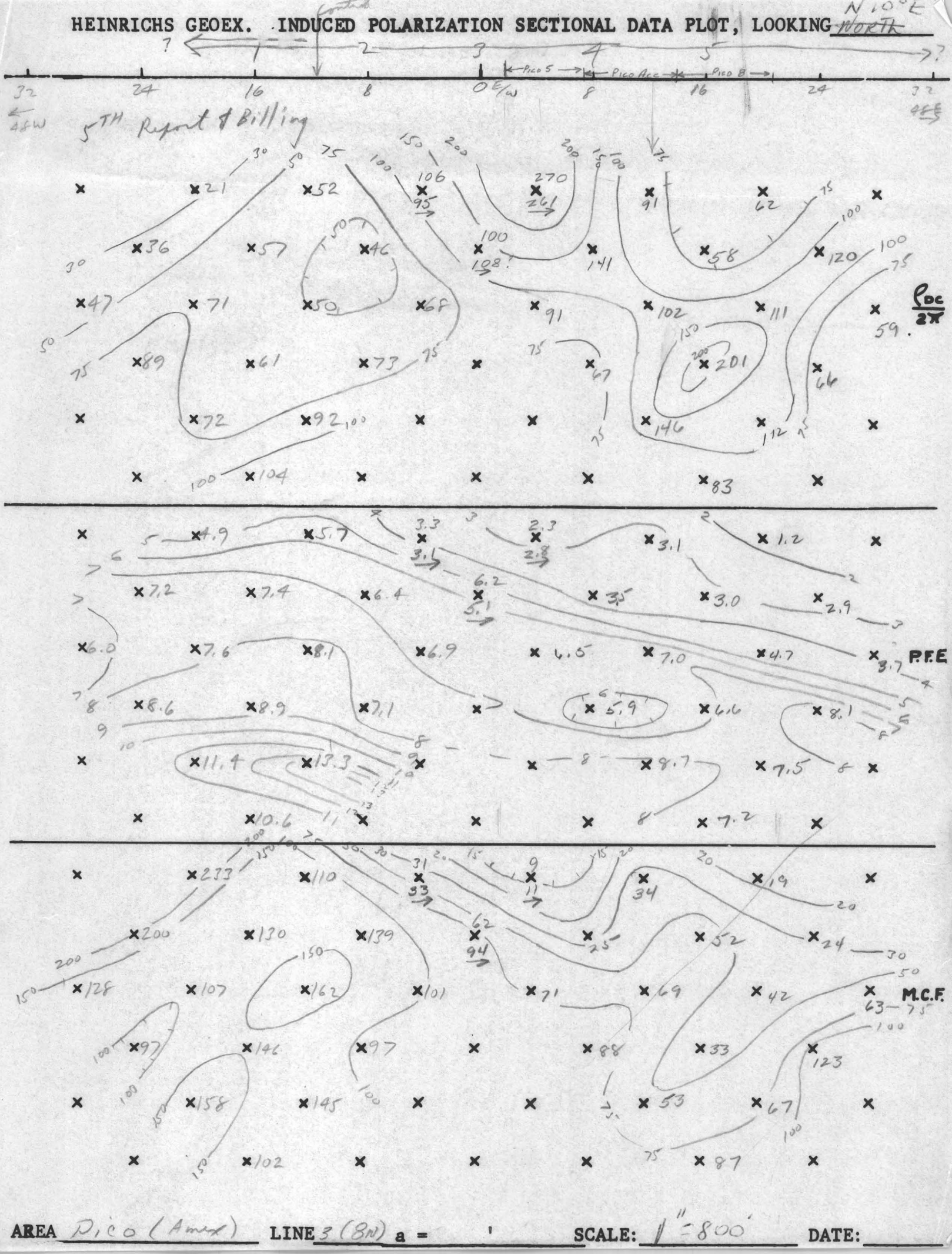
$$.6189 \times .8 \sqrt{\frac{3}{40}}$$

$$\frac{.6189 \times .8 \times 1.732}{6.32} = 0.136$$

	PFEC
n = 1	0.2
2	0.6
3	1.1
4	2.0
5	3.4
6	5.0

N. Sayre
326-3575

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING ~~NORTH~~ N 10° E

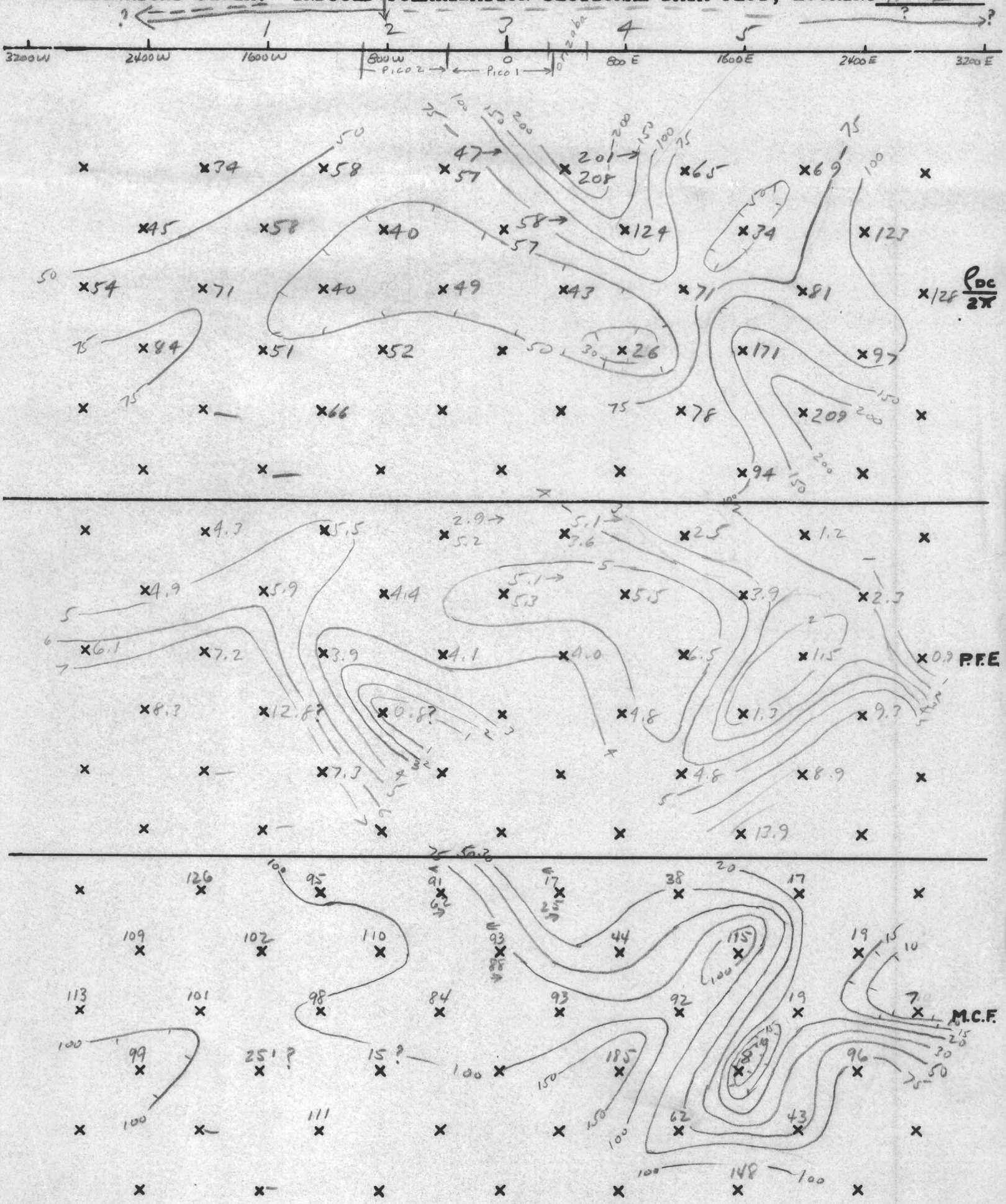


AREA Pico (Amex) LINE 3 (8N) a = ' SCALE: 1" = 800' DATE:

Core 6
Bunker Hill

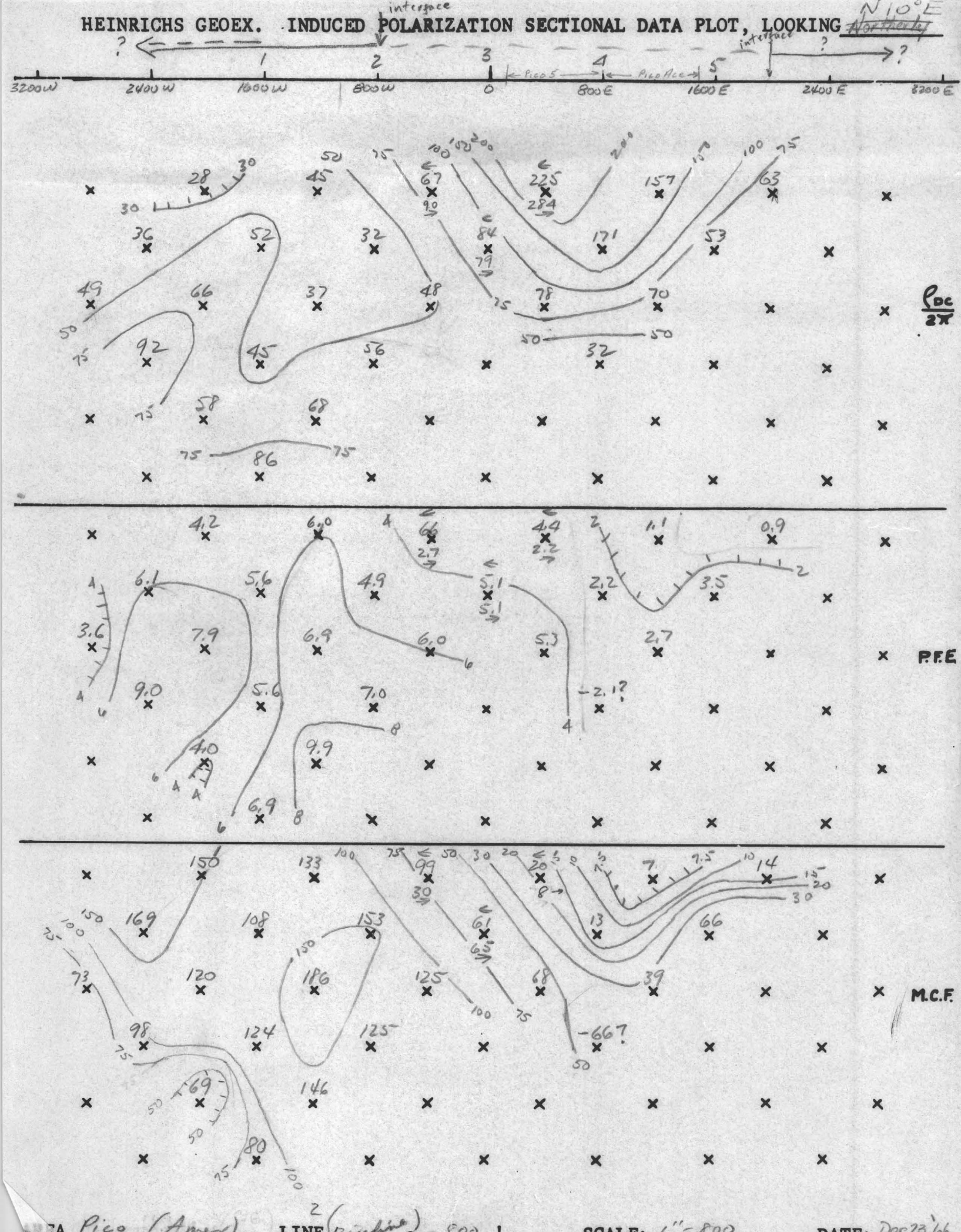
Hz	Pa/27	n	Coupling PFE	
1	27	6	3.8	26.2%
3	27	6	14.5	
1	46	4	0.8	25%
3	46	4	3.2	
1	31	6	3.2	26.9%
3	31	6	11.9	
1	25	3	1.0	26.3%
3	25	3	3.8	
1	38	3	0.5	21.7%
3	38	3	2.3	
1	18	1	0.3	37.5%
3	18	1	0.8	
1	22	2	0.4	20%
3	22	2	2.0	
1	26	5	2.7	26.7
3	26	5	10.1	
1	43	4	0.9	25.7
3	43	4	3.5	
1	33	2	0.6	21.4
3	33	2	2.8	
1	29	3	.7	21.9
3	29	3	3.2	
1	23	4	1.8	25%
3	23	4	7.2	
1	53	3	.8	25
3	53	3	3.2	

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N10°E



AREA Pico (A max) LINE 1 (800S) a = 800' SCALE: 1"=800' DATE:

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING ~~Northerly~~ N 10° E



AREA Pico (Amex) LINE 2 (Baseline) a = 800 ' SCALE: 1" = 800 DATE: Dec 23, '66

800 S BASE LINE

INDUCED POLARIZATION SENDER NOTES

Project: _____ Line: I E ½ Date: 12-20 1966

Send	1-2	2 3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4
Receive	0 800	800	1600	1600	2400	→	2400	3200	→		3200	4000
Time												
Range												
Current	6A	3A	6A	1A	3A	6A	1A	1A	3A	6A	1A	1A
Send	2-3	1-2	4-5	3-4	2-3	1-2		2-3				
Receive	→	→	4000	4800	→			CAL				
Time												
Range												
Current	3A	6A	1A	1A	3A	6A		1A				

1A

800 S BASE LINE

INDUCED POLARIZATION SENDER NOTES

Project: _____ Line: I W1/2 Date: 12-20-66

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	0-800W	800	1600W	1600	-2400W →		2400	3200W	→		3200	4000W
Time												
Range												
Current	1A	1A	1A	3A	1A	1A	6A	3A	1A	1A	6A	3A
Send	3-4	4-5	1-2	2-3	3-4	4-5		3-4				
Receive	→		4000	4800W	→			CAL				
Time												
Range												
Current	~~1A~~	~~1A~~	6A	3A	1A							

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: 1E 1/2 South 900 BASE WNE Int.Cal 93 Date: 12-19-76

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	0-800	800	-1600	1600	- 2400		2400	3200		→		
Time	300	300	100	100	100	30	100	10	10	10		
DC-1	116 114	247 246	36.0 35.5	26.8 26.5	38.5 37.5	10.6 10.6	27.8 28.5	3.52 3.42	8.7 8.72	3.2 3.2		
DC-2	116 114	247 246	36.0 35.5	26.8 26.5	38.5 37.5	10.8 10.2	27.8 28.5	3.52 3.42	8.7 8.72	3.15 3.25		
Σ	230	493	71.5	53.3	76.0	148.6	56.3	6.94	17.42	44.60		
DC-3						10.8 10.2				3.15 3.25		
Dc-4						10.6 10.6				3.0 3.4		
Σ						21.0 21.2				6.38		
DC-AV	115	246.5	35.75	26.65	38.0	21.22	28.15	3.47	8.71	3.19		
AC-1	112	234	34	26	36.2	10.2	27.8	3.32	8.18	3.05		
AC-2	112	234	34	26	36.2	10.2	27.8	3.32	8.18	3.05		
Σ	224	468	68	52	72.4	20.4	55.6	6.64	16.36	6.10		
S. P.	-6	+18		+7			+5					
AC-N	.02	.02		.02			.02					
Pot. Res												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: 1E ½ Int.Cal _____ Date: _____

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		Cal		
Rec.	3200	4000 →			4000	-	4800	→		2-3		
Time	30	10	30	10	10	3	10	10		360		
DC-1	12.2 13.0	3.30 3.28	11.5 10.4	5.50 5.30	5.20 5.25	1.90 2.00	7.2 7.4	3.95 4.00		98 98		
DC-2	12.2 13.0	3.30 3.28	11.5 10.4	5.4 5.6	5.20 5.25	1.95 1.95	7.2 7.4	3.85 4.13		98 98		
Σ	25.2	6.58	21.9	10.86	10.45	3.99	14.6	8.2				
DC-3				5.5 5.3		1.85 2.05		3.95 4.13				
Dc-4						1.90 2.00		8.2				
Σ												
DC-AV	12.6	3.29	10.45	5.43	5.23	1.99	7.3	4.10		196		
AC-1	12.3	3.22	10.2	5.18	5.18	1.82	6.70	3.6		98		
AC-2	12.3	3.22	10.2	5.18	5.18	1.82	6.70	3.6		98		
Σ	24.3	6.44	20.4	10.36	10.36	3.64	13.40	7.2		196		
S. P.	-12				-5							
AC-N	.02				.1							
Pot. Res												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: 1W½ Int.Cal _____ Date: _____

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		Cal		
Rec.										3-4		
Time	30	10	3	3	30	10						
DC-1	28.2 26.5	8.65 8.70	.95 1.15	.80 .78	13.8 12.6	5.2 5.1				98 98		
DC-2	28.2 26.5	8.65 8.70	.9 1.0	.65 .87	13.8 12.6	5.2 5.1				98 98		
Σ	54.7	17.35	2.10 1.9	1.68 1.52	26.4	10.3				196		
DC-3			1.15 .95	.70 .83								
Dc-4			1.15 .95	.74 .60								
Σ	27.3	8.67	2.10 2.10	1.34 1.34								
DC-AV	27.3	8.67	1.05	.77	13.2	5.15				196		
AC-1	25.7	7.99	.92	.71	12.4	4.7				97		
AC-2	25.7	7.99	.92	.71	12.4	4.7				97		
Σ	51.4	15.98	1.84	1.42	24.8	9.4				194		
S. P.	+6				0							
AC-N	.02				.1							
Pot. Res												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: 1 W½ Int.Cal _____ Date: 12-19-65

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.												
Time	100	100	10	100	10	3	100	30	3	3		
DC-1	85 85	23.8 23.0	6.1 6.1	71.0 71.0	4.0 4.2	2.0 2.0	85.0 84.0	18.3 17.6	1.60 1.70	1.1 1.0		
DC-2	85 85	23.8 23.0	6.1 6.1	71.0 71.0	4.0 4.2	2.0 2.0	85.0 84.0	18.3 17.6	1.80 1.50	1.15 1.05		
Σ	170	46.8	12.2	141.0	8.2	4.0	169.0	35.9	3.30	2.20		
DC-3									1.70 1.60	1.07 1.15		
Dc-4									1.75 1.65	1.07 1.15		
Σ	85	23.4	6.1	71.0	4.1	2.0	84.5	17.9	1.65	1.06		
DC-AV												
AC-1	81.0	22	5.72	66.5	3.88	1.90	80.1	16.7	1.57	1.04		
AC-2	81.0	22	5.72	66.5	3.88	1.90	80.1	16.7	1.57	1.04		
Σ	162.0	44	11.44	133.0	7.76	3.80	160.2	33.4	3.14	2.08		
S. P.	+28	+5		+7			-2					
AC-N	.02	.02		.02			.02					
Pot. Res												

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project AMEX Line 1E½ Field date 12-19-66 Data page_____ Comp. date 12-19-66 Comp by W.E.H.

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-800	800-1600		1600-2400			2400-3200			→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	600	300	600	100	300	600	100	100	300	600		
(E) Vdc (avg)	115	246.5	35.75	26.65	38.0	10.6	28.15	3.47	8.71	3.19		
(F) DCcal 1.020	~~1.21~~									→		
(G) Kn x 10^{-3}	2.4	2.4	9.6	2.4	9.6	24.0	2.4	9.6	24.0	48.0		
(H) ρ dc=ExFxGx10^3/D	~~56~~ 47	~~24~~ 201	~~64~~ 58	~~27~~ 65	124	~~87~~ 43	~~23~~ 69	34	71	~~41~~ 26		
(I) Vac Σ	11.2	234	34	26	36.2	10.2	27.8	3.32	8.18	3.05		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000									→		
(M) ρ dc/ρac=ExL/K	1.029	1.051	1.051	1.025	1.055	1.040	1.012	1.039	1.065	1.048		
(N) PFE=(M-1)(10^2)	2.9	5.1	5.1	2.5	5.5	4.0	1.2	3.9	6.5	4.8		
(O) MCF=(M-1)(10^5)/H	62	25	88	38	44	93	17	115	92	185		
S.P.	-6	+18		+7			+5					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		Cal		
(B) Receive	3200-4000		→		4000-4800		→			2-3		
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	100	100	300	600	100	100	300	600				
(E) Vdc (avg)	12.6	3.29	10.45	5.43	5.23	1.99	7.3	4.11		98		
(F) DCcal								→		~~1.21~~		
(G) Kn x 10^{-3}	9.6	24.0	48.0	84.0	24.0	48.0	84.0	134.4		1.020		
(H) ρ dc=ExFxGx10^3/D	~~18~~ 123	~~31~~ 81	~~23~~ 171	~~47~~ 78	~~29~~ 128	~~21~~ 97	~~166~~ 209	~~40~~ 99				
(I) Vac Σ	12.3	3.22	10.2	5.18	5.18	1.82	6.70	3.6		98		
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.								→		1.000		
(M) ρdc/ρac =ExL/K	1.023	1.015	1.013	1.048	1.009	1.093	1.089	1.139				
(N) PFE=(M-1)(10^2)	2.3	1.5	1.3	4.8	0.9	9.3	8.9	13.9				
(O) MCF=(M-1)(10^5)/H	19	19	7.6	62	7.0	96	43	148				
	-12				-5							

85 x 2.4

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project AMEX Line 1W½ Field date 12-19-66 Data page_____ Comp. date 12-19-66 Comp by WEH

(A) Send	4-5	3-4	4-5	2-3.	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-800	800	-1600	1600	-2400		2400	-3200	→			
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	100	100	100	300	100	100	600	300	100	100		
(E) Vdc (avg)	85	23.4	6.1	71.0	2.1	2.0	84.5	17.9	1.65	1.06		
(F) DCcal 1.020 →	~~1.21~~									→		
(G) Kn x 10^{-3}	2.4	2.4	9.6	2.4	9.6	24.0	2.4	9.6	24.0	48.0		
(H) ρ dc=ExFxGx10^3/D	~~24~~ 208	~~17~~ 57	~~7~~ 57	~~19~~ 58	~~48~~ 40	~~8~~ 49	~~4~~ 34	~~6~~ 58	~~4~~ 40	~~6~~ 52		
(I) Vac Σ	81	22	5.72	66.5	3.88	1.90	80.1	16.7	1.57	1.04		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.989									→		
(M) ρ dc/ρac=ExL/K	1.036	1.052	1.053	1.055	1.044	1.041	1.043	1.059	1.039	1.008		
(N) PFE=(M-1)(10^2)	3.6	5.2	5.3	5.5	4.4	4.1	4.3	5.9	3.9	0.8		
(O) MCF=(M-1)(10^5)/H	17	91	93	95	110	84	126	102	98	15		
S.P.	+28	+5		+7			−2					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		Cal		
(B) Receive	3200	-4000	→	→	4000	-4800	→	→		3-4		
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	600	300	100	100	600	300	100	100		1000		
(E) Vdc (avg)	27.3	8.67	1.05	.77	13.2	5.15	—	—		98		
(F) DCcal						→	—	—		~~1.21~~ 1.020		
(G) Kn x 10^{-3}	9.6	24.0	48.0	84.0	24.0	48.0	—	—				
(H) ρ dc=ExFxGx10^3/D	~~52~~ 45	~~84~~ 71	~~51~~ 51	66	~~64~~ 54	~~99~~ 84						
(I) Vac Σ	25.7	7.99	.92	.71	12.4	4.7	—	—		97		
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.								→		.989		
(M) ρdc/ρac =ExL/K	1.049	1.072	1.128	1.073	1.061	1.083						
(N) PFE=(M-1)(10^2)	4.9	7.2	12.8	7.3	6.1	8.3						
(O) MCF=(M-1)(10^5)/H	109	101	251	111	113	99						
	+6				0							

INDUCED POLARIZATION SENDER NOTES

Project: Ampex Line: 2 E½ Date: Dec 22, 66

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1 2	4-5	3-4
Receive	0 800	800	1600	1600	2400	→	2400	3200	→		3200	4000
Time												
Range												
Current	300	600	300	300	300	500	450	300	300	300		
Send	2 3	1-2	4-5	3-4	2-3	1-2		2-3	~~3-4~~			
Receive	→	→	4000	4800	→	→		CAL	~~CAL~~			
Time												
Range												
Current								600	~~600~~			

INDUCED POLARIZATION SENDER NOTES

Project: AMPEX Line: 2 West ½ Date: Dec 23

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive	0 800	800	1600	1600	2400	→	2400	3200	→		3200	4000
Time												
Range												
Current	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A
Send	3-4	4-5	1-2	2-3	3-4	4-5		34				
Receive	→	→	4000	4800	→			CAL				
Time												
Range												
Current	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A		1.0A				

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: II E ½ Int.Cal _____ Date: _____

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	0-8	8-16	→	16-24	→	→	24-32	→	→	→		
Time	30	100	10	100	10	3	30	10	3	1		
DC-1	14.6 14.8	82 83	2.75 2.75	44.0 44.2	6.2 6.2	1.08 1.10	18.2 17.3	3.6 3.62	1.99 2.75			
DC-2	14.6 14.7	82 82.5	2.6 2.9	44.0 44.2	6.1 6.3	1.18 1.13	18.2 17.4	3.6 3.62	1.89 2.25			
Σ												
DC-3	14.4 14.8	82.5 83	2.6 2.75	44.0 44.2	6.1 6.3	1.0 1.1	17.5 18.3	3.6 3.62	2.06 1.93			
Dc-4	14.4 14.6	82.5 83.5	2.75 2.75		6.1 6.3	1.13 1.04	18.4 18.2		2.0 2.04			
Σ		82.5 83.5										
DC-AV												
AC-1	14.1	79.8	2.53	43.0	5.92	1.02	17.4	3.49	1.87			
AC-2	14.1	79.9	2.53	43.0	5.92	1.02	17.4	3.49	1.87			
Σ												
S. P.	+32	+7		+16			+1					
AC-N	.15	.1		.02			.1					
Pot. Res												

Normal Polarity

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: IIE½ Int.Cal 92 Date: _____

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	0-8	8-16		16-24	→		24-32		→			
Time	30	100	10	30	10	3	30	3	3	1		
DC-1	12.5 12.6	79.0 75.5	2.90 2.90	22.4 21.4	5.90 6.0	1.79 1.82	13.7 12.8	1.75 1.99	.97 .95	.24 .21		
DC-2	13.0 12.3	78.0 80.0	2.90 2.50	22.4 21.2	5.9 6.0	1.73 1.76	13.7 12.8	1.73 1.91	.95 .93	26 20		
Σ		78.2 76.9										
DC-3	12.8 12.2	78.0 80.0	2.80 2.70	22.2 21.2	5.8 6.2	1.75 1.73	13.4 12.7	1.77 1.86	1.05 .95	20 16		
Dc-4	12.9 12.6	79.9 80.0	2.80 2.70	22.3 21.2	5.8 6.2	1.92 1.89	13.7 12.9	1.73 1.84	1.1 .85	22 30		
Σ			3.0	22.4		1.93		1.78	1.1	22		
DC-AV	25.24	155.22	2.37 5.50	21.5 43.62	11.93	3.67	26.4	1.79 3.66	.85 1.85	.44		
AC-1	12.3	77.5	2.62	21.6	5.84	1.72	13.1	1.77	.95	.225		
AC-2	12.3	77.5	2.62	21.6	5.84	1.72	13.1	1.77	.95	.225		
Σ	24.6	155.0	5.24	43.2	11.68	3.44	26.2	3.54	1.90	.450		
S. P.	+44.8	-3.8		+28			-4					
AC-N	.1	.18		.03			.13					
Pot. Res												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: II E 1/2 Int.Cal _____ Date: _____

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		Cal		
Rec.	32-40	→	→	→	40-48	→	→	→		2-3		
Time										100		
DC-1										61.8 61.9		
DC-2										61.8 61.9		
Σ												
DC-3										61.8 61.9		
Dc-4												
Σ												
DC-AV										133.7		
AC-1										61.9		
AC-2										61.9		
Σ										133.8		
S. P.												
AC-N												
Pot. Res												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: MINEX Line: AW½ Int.Cal 89 Date: _____

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.	0-8	8-16	→	16-24	→	→	24-32	→	→	→		
Time	300	100	30	30	10	3	30	10	3	3		
DC-1	93.0 93.0	27.8 27.4	8.7 8.7	18.8 18.3	3.55 2.72 3.42 3.78	2.00 2.70 2.21 1.70	11.1 11.3 11.5 11.4	5.10 4.94 5.76 5.98	1.55 1.81 1.81 1.30	1.26 1.27 1.00 0.61		
DC-2	93.0 93.0	27.8 27.6	9.1 8.3	18.6 18.3	3.18 2.34 2.96 3.78	2.05 2.26 1.83 1.60	11.1 10.8 11.8 11.7	4.90 4.82 5.96 6.20	1.70 1.59 1.57 1.41	1.06 1.60 0.89 1.16		
Σ												
DC-3	93.0 93.0	27.6 27.8	9.0 8.5	18.7 18.1	3.20 3.00 3.66 3.74	2.16 2.46 1.51 1.56	11.4 11.4 11.9 11.9	5.08 4.84 5.66 6.06	1.15 1.70 1.80 1.32	1.25 1.77 1.21 0.86		
Dc-4			9.1 8.6	19.5 17.5	2.88 2.68 3.80 4.26	2.64 2.35 1.26 1.71	11.4 10.7 11.9 12.2	4.90 4.56 5.70 6.04	1.36 1.50 1.71 1.44	1.31 1.26 1.11 0.79		
Σ												
DC-AV	186.0	55.28	17.48	37.04	6.53	4.01	22.91	10.79	3.09	2.31		
AC-1	90.0	26.2	8.4	17.65	3.15	1.91	11.1	5.16	1.46	1.09		
AC-2	90.0	26.2	8.4	17.65	3.15	1.91	11.1	5.16	1.46	1.09		
Σ	180.0	52.4	16.8	35.3	6.3	3.82	22.2	10.32	2.92	2.18		
S. P.	+29.8	+49.0		-9.3			-3.0					
AC-N	.06	.07		.07			.03					
Pot. Res												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: IIW, J Int.Cal _____ Date: _____

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		Cal		
Rec.	32-40	→	→	→	40-48	→	→	→		3-4		
Time	10	10	3	3	3	3	1	1		300		
DC-1	4.06 3.98 3.36 2.92	2.16 2.18 3.30 3.22	.99 1.32 .76 .66	1.14 1.45 .66 .26	2.11 2.20 1.82 2.07	2.10 2.45 1.75 1.45	.54 .15 .67 .73	.70 .35 .47 .82		99.5 99.5		
DC-2	3.84 4.54 3.82 2.78	2.54 2.02 3.52 3.35	1.00 1.13 .98 .28	.61 1.07 .58 .36	2.14 2.48 2.14 2.31	1.98 2.36 1.89 1.40	.96 .84 .68 .33	.89 .82 .80 .67		99.5 99.5		
Σ												
DC-3	4.16 4.26 3.00 2.72	2.12 2.26 2.86 3.24	.85 1.23 .59 1.04	1.13 1.53 .56 .46	2.24 2.01 1.79 1.58	2.33 2.11 1.53 1.85	.83 .70 .47 .72	.49 .71 .33 .59				
Dc-4	4.24 4.74 3.22 3.10	2.08 2.20 3.22 3.42	1.34 1.28 .71 0.41	.86 1.36 .42 .50	1.90 1.81 2.00 2.57	1.87 2.22 1.51 1.43	.60 .98 .29 .81	.71 .51 .64 .55				
Σ												
DC-AV	7.35	5.45	1.85	1.61	4.06	3.80	1.38	1.27		199.0		
AC-1	3.50	2.55	.885	.74	1.98	1.76	0.67	0.60		100.5		
AC-2	3.50	2.55	.885	.74	1.98	1.76	0.67	0.60		100.5		
Σ	7.00	5.10	1.77	1.48	3.96	3.52	1.34	1.20		201.0		
S. P.	+7.8				+0.7							
AC-N	.09				.07							
Pot. Res												

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project AMEX Line # E½ Field date_____ Data page_____ Comp. date_____. Comp by_____

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-8	8-16	→	16-24	→	→	24-32	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	300	600	300	300	300	500	450	300	300	300		
(E) Vdc (avg)	25.24	168.22	5.50	43.62	11.93	3.62	26.4	3.66	1.95	.44		
(F) DCcal	.449											
(G) Kn x 10^{-3}	2.4	2.4	9.6	2.4	9.6	24	2.4	9.6	24	48		
(H) ρ dc=ExFxGx10^3/D	90	284	79	157	171	78	63	53	70	32		
(I) Vac Σ	24.6	165	5.24	43.2	11.68	3.44	26.2	3.54	1.90	.45		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.001	1										
(M) ρ dc/ρac=ExL/K	1.027	1.022	1.051	1.011	1.022	1.053	1.009	1.035	1.027	.979		
(N) PFE=(M-1)(10^2)	2.7	2.2	5.1	1.1	2.2	5.3	0.9	3.5	2.7	-2.1		
(O) MCF=(M-1)(10^5)/H	30	7.7	65	7	13	68	14	66	39	-66		
	S.P. +44.8	-3.8		+28			-4					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send												
(B) Receive												
(C) n separation												
(D) I												
(E) Vdc (avg)											133.7	
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D												
(I) Vac Σ											133.8	
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

Baseline

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project AMEX Line II W½ Field date Dec 23 Data page_____ Comp. date Dec. 27. Comp by_____

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-8	8-16 →		16-24 →		→	24-32 →			→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000		
(E) Vdc (avg)	186	55.28	17.48	37.04	6.53	4.01	22.91	10.79	3.09	2.31		
(F) DCcal	.503									→		
(G) Kn x 10^{-3}	2.4	2.4	9.6	2.4	9.6	24	2.4	9.6	24	48		
(H) ρ dc=ExFxGx10^3/D	225	67	84	45	32	48	28	52	37	56		
(I) Vac Σ	180	52.4	16.8	35.3	6.3	3.82	22.2	10.32	2.92	2.18		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.010									→		
(M) ρ dc/ρac=ExL/K	1.044	1.066	1.051	1.060	1.049	1.060	1.042	1.056	1.069	1.070		
(N) PFE=(M-1)(10^2)	4.4	6.6	5.1	6.0	4.9	6.0	4.2	5.6	6.9	7.0		
(O) MCF=(M-1)(10^5)/H	20	99	61	133	153	125	150	108	186	125		
S.P.	+29.8	+49.0		-9.3			-3.0					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		Cal		
(B) Receive	32-40 →		→		40-48 →		→			3-4		
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	1	1	1	1	1	1	1	1				
(E) Vdc (avg)	7.35	5.45	1.85	1.61	4.06	3.80	1.38	1.27		199.0		
(F) DCcal								→		.503		
(G) Kn x 10^{-3}	9.6	24	48	84	24	48	84	134.4				
(H) ρ dc=ExFxGx10^3/D	36	66	45	68	49	92	58	86				
(I) Vac Σ	7.00	5.10	1.77	1.48	3.96	3.52	1.34	1.20		201.0		
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.								→		1.010		
(M) ρdc/ρac =ExL/K	1.061	1.079	1.056	1.099	1.036	1.090	1.040	1.069				
(N) PFE=(M-1)(10^2)	6.1	7.9	5.6	9.9	3.6	9.0	4.0	6.9				
(O) MCF=(M-1)(10^5)/H	169	120	124	146	73	98	69	80				
S.P.	+7.8			-7	+0.7							

INDUCED POLARIZATION SENDER NOTES

Project: AMEX Line: III E½ Date:

Send	1/2	2/3	1/2	3/4	2/3	1/2	4/5	3/4	2/3	1/2		
Receive	0-8	8-16		16-24			24-32					
Time												
Range												
Current	2A	1A	2A	600MA	1A	2A	600MA	600MA	1A	2A		
Send	4/5	3/4	2/3	1/2	4/5	3/4	2/3	1/2			Cal	
Receive	32-40				40-48						3-4	
Time												
Range												
Current	600MA	600MA	1A	2A	600MA	600MA	1A	2A			600MA	

INDUCED POLARIZATION SENDER NOTES

project: AMEX Line: HW 1/2 Date:

Send	4/5	3/4	4/5	2/3	3/4	4/5	1/2	2/3	3/4	4/5		
Receive	0-8	8-16	→	16-24	→		24-32					
Time									—		—	
Range												
Current	700mA	700mA	700mA	1A	700mA	700mA	2A	1A	700mA	700mA		
Send	1/2	2/3	3/4	4/5	1/2	2/3	3/4	4/5			Cal	
Receive	32-40				40-48						2-3	
Time												
Range												
Current	2A	1A	700mA	700mA	2A	1A	700mA	700mA			1A	

INDUCED POLARIZATION - RECEIVER NOTES

PAGE _____

Project: AMEX Line: 3 W/E 6½ Int.Cal _____ Date: _____

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	0-8	8-16	→	16-24	→	→	24-32	→	→	→		
Time	300	300	30	100	30	30	30	10	10	18		
DC-1	78.0 79.5	109 108.5	11.2 11.4	22.8 23.0	14.7 14.5 14.9 14.4	6.9 8.3	15.7 15.6 14.9 15.7	3.22 3.02 4.08 4.44	4.48 4.28 4.48 5.50	2.32 2.40 3.12 3.00		
DC-2	78.0 79.5	109 108.5	11.3 11.5	23.0 22.6	14.3 14.8 14.8 15.2	7.4 7.6	15.8 15.2 15.5 15.6	3.34 3.18 4.32 4.12	4.10 3.24 3.92 4.56	2.48 2.50 3.18 3.14		
Σ	157.5		22.6 22.8									
DC-3	78.0 79.5	109 108.5	11.0 22.5 11.6 22.6	23.0 22.8	14.6 14.3 15.0 14.6	7.4 7.9	15.2 15.4 15.3 16.0	3.22 3.18 4.08 3.80	3.80 4.04 4.80 4.48	2.48 2.54 3.16 3.32		
Dc-4			11.1 22.7 11.6 22.7	22.6 23.0	14.4 14.5 14.6 15.3	7.2 7.9	15.9 15.0 15.1 15.8	2.84 3.18 4.04 4.26	4.28 3.42 3.76 5.02	2.28 2.66 3.34 2.88		
Σ												
DC-AV	78.75	108.7	11.33									
AC-1	76.5	106.0	10.8	22.2	14.2	7.15	15.3	3.54	3.96	2.66		
AC-2	76.5	106.0	10.8	22.2	14.2	7.15	15.3	3.54	3.96	2.66		
Σ	76.5	106	10.80									
S. P.	+11.1	+20.5		+67.6			-6.5					
AC-N	.02	.07		.06			.05					

2.9 2.7 5.1

INDUCED POLARIZATION - RECEIVER NOTES

PAGE _____

Project: AMEX Line: 3E 1/2 Int.Cal _____ Date: _____

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		cal	Cal
Rec.	32-40			→	40-48			→		3-4	2-3
Time	30	10	10	10	3	3	3	3		100	100
DC-1	7.0 7.2 8.0 7.8	2.90 3.48 3.08 2.12	4.18 3.76 4.38 4.50	3.18 3.56 3.50 3.26	1.41 1.45 1.56 1.46	076 090 058 064	~~1.54~~ 1.35 1.35 1.42	1.29 1.67 1.09 0.64		60.0 60.0	61.4 61.4
DC-2	6.6 6.6 8.6 8.4	2.72 3.26 2.54 2.04	4.18 4.04 4.20 3.96	3.40 3.58 3.28 3.98	1.30 1.30 1.70 1.59	075 088 095 056	1.27 1.07 1.34 1.83	1.30 1.30 1.24 1.46		60.0 60.0	61.4 61.4
Σ											
DC-3	6.4 8.4	2.88 3.36 2.56 1.98	3.88 4.10 4.62 4.04	3.34 3.06 3.26 3.86	1.21 1.36 1.81 1.63	1.05 0.90 071 1.02	1.34 079 1.29 1.90	1.35 1.00 1.17 1.48			
Dc-4	7.1 8.1	2.76 3.46 2.66 2.60	3.74 4.66 4.78 3.82	3.74 3.20 3.44 3.74	1.16 1.26 1.97 1.57	074 0.98 096 0.70	1.35 0.61 1.34 2.10	1.33 1.05 0.97 1.56			
Σ							1.26				
DC-AV											
AC-1	7.3	2.66	3.94	3.20	1.43	0.76	1.24	1.15		60.1	60.3
AC-2	7.3	2.66	3.94	3.20	1.43	0.76	1.24			60.1	60.3
Σ											
S. P.	+4.3				-7.6						
AC-N	.07				.05						

1.015 1.027 .982

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX-PICO Line: 3W ½ Int.Cal _____ Date: _____

Send	4-5	3-4	4-5	2-3	34	4-5	1-2	2-3	3-4	4-5		
Rec.	0-8	8-16	→	16-24	→		24-32	→				
Time	300	100	30	100	10	3	100	10	3	3		
DC-1	76.5 78.0	30.2 30.2	7.5 6.8	20.6 21.8	3.38 3.28 3.14 3.20	1.95 2.10 1.94 1.69	23.4 21.8	5.80 5.64 5.76 6.02	1.48 1.20 1.41 1.74	1.21 0.95 0.90 1.10		
DC-2	76.5 78.0	30.2 30.5	7.4 7.0	20.8 21.6	3.34 3.46 3.32 3.00	1.99 2.16 1.96 1.76	23.2 22.0	5.80 5.54 5.88 6.14	1.45 1.16 1.45 1.66	1.16 1.09 0.96 1.02		
Σ	154.5											
DC-3	76.5 78.0	30.1 30.4	7.3 6.7	20.8 21.8	3.42 3.52 3.08 2.96	2.00 2.06 1.77 1.85	22.8 22.2	5.72 5.32 5.94 6.34	1.36 1.19 1.53 1.62	1.02 1.05 1.10 1.11		
Dc-4		30.2 30.6	7.5 6.9		3.48 3.14	2.16 2.16 1.76 1.77	22.8 22.2	5.76 5.96	1.22 1.15 1.61 1.66	1.04 0.93 1.13 1.16		
Σ												
DC-AV	154.5	60.57	14.26	42.48	6.55	3.90	45.03	11.62	2.84	2.10		
AC-1	77.0	29.9	6.85	20.5	3.14	1.86	21.9	5.52	1.34	1.00		
AC-2	77.0	29.9	6.85	20.5	3.14	1.86	21.9	5.52	1.34	1.00		
Σ	154.0	59.8	13.70	41.0	6.28	3.72	43.8	11.04	2.68	2.00		
S. P.	+52.5	+36.7		-3.5			-2.4					
AC-N	.03	.03		.03			.03					

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: AMEX Line: 3 W ½ Int.Cal _____ Date: _____

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5			Cal	
Rec.	32-40	→	→	→	40-48	→	→	→			3-4	
Time	30	10	3	3	10	3	1	1			300	
DC-1	7.3 7.5	2.62 3.18	0.76 0.74 1.05 0.95	064 096 089 060	3.58 4.12	1.96 2.12 1.70 1.51	560 658 528 498	522 508 458 524			98 98	
DC-2	7.2 7.5	2.60 3.22	0.66 0.72 1.00 0.99	055 087 095 065	3.70 3.96	1.86 2.20 1.77 1.45	682 684 474 486	588 490 476 540			98 98	
Σ												
DC-3	7.4 7.3	2.62 3.22	0.74 0.75 1.04 1.01	077 090 066 057	3.68 3.98	1.89 1.67	666 672 550 476	552 522 500 542				
Dc-4	7.5 7.2	2.52 3.28	0.54 0.74 1.19 1.01	074 096 066 057	3.66 4.04	2.05 1.56	624 708 598 518	578 504 554 556				
Σ												
DC-AV	14.71	5.80	1.73	1.51	7.69	3.64	1.18	1.058			✓	
AC-1	7.0	2.75	0.81	0.68	3.70	1.71	.544	.486			105	
AC-2	7.0	2.75	0.81	0.68	3.70	1.71	.540	.490			105	
Σ	14.0	5.5	1.62	1.36	7.4	3.42	1.08	.976			↑	
S. P.	+0.6				-0.5							
AC-N	.03				.02							

Shop cal.

1.220

use

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project AMEX-PICO Line 8N/~~IIIE½~~ Field date 12-28-66 Data page_____ Comp. date_____. Comp by_____

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-8	8-16	→	16-24	→	→	24-32	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	2000	1000	~~2000~~ 1000	600	1000	2000	600	600	1000	2000		
(E) Vdc (avg)	78.75	108.75	11.33	22.84	14.66	7.60	15.46	3.64	4.23	2.81		
(F) DCcal	1.000	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	2.4	2.4	9.6	2.4	9.6	24.0	2.4	9.6	24.0	48.0		
(H) ρ dc=ExFxGx10^3/D	95	261	108	91	141	91	62	58	102	67		
(I) Vac Σ	76.5	106.0	10.8	22.2	14.2	7.15	15.3	3.54	3.96	2.66		
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.002	→	→	→	→	→	→	→	→	→		
(M) ρ dc/ρac=ExL/K	1.031	1.028	1.051	1.031	1.035	1.065	1.012	1.030	1.070	1.059		
(N) PFE=(M-1)(10^2)	3.1	2.8	5.1	3.1	3.5	6.5	1.2	3.0	7.0	5.9		
(O) MCF=(M-1)(10^5)/H	33	11	94	34	25	71	19	52	69	88		
S.P	+11.1	+20.5		+67.6			-6.5					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2			Cal	
(B) Receive	32-40	→	→	→	40-48	→	→	→			34	
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	600	600	1000	2000	600	600	1000	2000			600	
(E) Vdc (avg)	7.5	2.78	4.19	3.47	1.48	0.82	1.33	1.23			60.0 ←	
(F) DCcal	→	→	→	→	→	→	→	→			1.000	
(G) Kn x 10^{-3}	9.6	24	48	84	24	48	84	134.4				
(H) ρ dc=ExFxGx10^3/D	120	111	201	146	59	66	112	83				
(I) Vac Σ	7.3	2.66	3.94	3.20	1.43	0.76	1.24	1.15			60.1	
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.002	→	→	→	→	→	→	→			1.002	
(M) ρdc/ρac =ExL/K	1.029	1.047	1.066	1.087	1.037	1.081	1.075	1.072				
(N) PFE=(M-1)(10^2)	2.9	4.7	6.6	8.7	3.7	8.1	7.5	7.2				
(O) MCF=(M-1)(10^5)/H	24	42	33	53	63	123	67	87				
	+4.3				-7.6							

DC cal $= \frac{I_{DC}}{10\,V_{DC}}$ (cal) →

AC-DC $= \frac{V_{AC}}{V_{DC}}$

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8N INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Pico - Amax Line 3 W/2 Field date 12-28-66 Data page_____ Comp. date_____. Comp by R.A.B.H

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-8	8-16	→	16-24	→	→	24-32	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	700	700	700	1000	700	700	2000	1000	700	700		
(E) Vdc (avg)	154.5	60.57	14.26	42.48	6.55	3.90	45.03	11.62	2.84	2.10		
(F) DCcal	.510	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3}	2.4	2.4	9.6	2.4	9.6	24	2.4	9.6	24	48		
(H) ρ dc=ExFxGx10^3/D	270	106	100	52	46	68	21	57	50	73		
(I) Vac Σ	154.0	59.8	13.70	41.0	6.28	3.72	43.8	11.04	2.68	2.00		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.020	→	→	→	→	→	→	→	→	→		
(M) ρ dc/ρac=ExL/K	1.023	1.033	1.062	1.057	1.064	1.069	1.049	1.074	1.081	1.071		
(N) PFE=(M-1)(10^2)	2.3	3.3	6.2	5.7	6.4	6.9	4.9	7.4	8.1	7.1		
(O) MCF=(M-1)(10^5)/H	9	31	62	110	139	101	233	130	162	97		
S.P.	+52.5	+36.7		-3.5			-2.4					

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		cal.		
(B) Receive	32-40	→	→	→	40-48	→	→	→				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	2000	1000	700	700	2000	1000	700	700				
(E) Vdc (avg)	14.71	5.80	1.73	1.51	7.69	3.64	1.18	1.058		use shop cal		
(F) DCcal	.510	→	→	→	→	→	→	→				
(G) Kn x 10^{-3}	9.6	24	48	84	24	48	84	134.4				
(H) ρ dc=ExFxGx10^3/D	36	71	61	92	47	89	72	104				
(I) Vac Σ	14.0	5.5	1.62	1.36	7.4	3.42	1.08	.976				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.020	→	→	→	→	→	→	→		use 1.020		
(M) ρdc/ρac =ExL/K	1.072	1.076	1.089	1.133	1.060	1.086	1.114	1.106				
(N) PFE=(M-1)(10^2)	7.2	7.6	8.9	13.3	6.0	8.6	11.4	10.6				
(O) MCF=(M-1)(10^5)/H	200	107	146	145	128	97	158	102				
S.P.	+0.6				-0.5							

IM 1-67 BANCO-S.P.

Per Statement May 17, 1967 - 150.00

x13855

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GEOEX

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PLEASE DETACH BEFORE DEPOSITING
NO OTHER RECEIPT NECESSARY

AMERICAN EXPLORATION & MINING CO.

WHEN DETACHED AND PAID THIS CHECK BECOMES A RECEIPT
IN FULL PAYMENT OF THE ITEMIZED ACCOUNT.

1M 1-67 BANCO-S. F.

Per Statement 5/31/67 - 12.50

x13977

Misc Repairs

8002

JUN 1967
GEOEX

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1M 1-67 BANCO-S.F.

Per Statement June 2, 196 - 28.50 - Reproductions

x13999

GUARDIAN SAFETY PAPER

JUN 1967 GEOEX

ETACH BEFORE DEPOSITING
HER RECEIPT NECESSARY

AMERICAN EXPLORATION & MINING CO.

WHEN DETACHED AND PAID THIS CHECK BECOMES A RECEIPT IN FULL PAYMENT OF THE ITEMIZED ACCOUNT.

May 17, 1967

Mr. Robert Garwood
American Exploration Company
2902 North Baxter
Tucson, Arizona

Dear Bob:

Listed below are the results of the laboratory induced polarization tests on the core from your Pico Drill Hole #1, Orizaba Area, Pinal County, Arizona, you requested last week.

This hole was drilled at Station 8W, Line 1 on the east fringe of a stronger induced polarization anomaly west of the claims and on the apex of a 400 gamma magnetic high.

The meta-diorite contains enough magnetite to easily account for the magnetic anomaly and probably accounts for a portion of the induced polarization response.

The I.P. response in the vicinity of the drill hole ranged from about 4 to 5 PFE and the MCF's indicated about 1%.total sulfide by volume. The I.P. laboratory response ranged from 0 to 29.8 PFE although most were from 0 to 12 PFE. The average PFE was 6.2 not counting the one very high sample and is well in accordance with the field results, although only 164 feet were logged. Apparently the last portion of the hole drilled (below our logging) went into a tuff carrying around 5% pyrite visually and should give a strong response.

Perhaps there is an easterly dip to the pyritic tuff and it is actually the material responsible for the stronger field response further west. In any case, if land availability allows at least one more hole to the west in the stronger anomaly is recommended - preferably after extending the I.P. work in that

direction to delineate a target.

I.P. RESPONSE - PICO DRILL HOLE #1

Approximate Footage	PFE	Sample Description
364'	3.3	Meta-diorite; very weakly magnetic (magnetite). Trace Pyrite. Weakly fractured, some quartz filling.
416'	0.0	Rehealed brecciated quartzite. Vugs containing quartz crystals common. Minor iron staining.
420'	4.8	Rehealed brecciated quartzite. Trace pyrite. Strongly iron stained.
425'	4.0	Rehealed brecciated quartzite. Moderately iron stained.
432'	1.7	Same as above
439'	2.6	Meta-diorite (from fault zone?) Strongly fractured
444'	29.8	Meta-diorite; weakly magnetic (magnetite). Moderately fractured.
449'	8.2	Meta-diorite; weakly magnetic. Less than 1% pyrite. Weakly fractured
455'	1.0	Meta-diorite; weakly magnetic. Very weakly fractured.
465'	12.4	Meta-diorite; weakly magnetic. Less than 1% pyrite, primarily along fractures; minor disseminations. Weakly fractured.
468'	11.3	Meta-diorite; weakly magnetic. Weakly fractured.

Approximate Footage	PFE	Sample Description
516'	10.4	Quartzite; less than 1% pyrite disseminated.
521'	9.5	Quartzite; less than 1% pyrite disseminated and along fractures. Weakly fractured.
523'	11.0	Quartzite; less than 1% pyrite disseminated and along fractures. Moderately fractured.
528'	6.6	Quartzite; less than 1% pyrite disseminated and along fractures. Weakly fractured

If you have any questions and if we can be of further assistance, please let us know.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig
Senior Geophysicist

CSL:jc
cc: Mr. J. B. Bush

S T A T E M E N T

May 17, 1967

Mr. Robert Garwood
American Exploration Company
2902 North Baxter
Tucson, Arizona

Re: I. P. Physical Property Testing
of Core, Pico Claims Area
Pinal County, Arizona
Our Job - A99-66

Mr. Chris Ludwig & Mr. Harvey Durand
Professional Services $ 150.00

May 17, 1967

Mr. Robert Garwood
2902 North Baxter
Tucson, Arizona

Re: Core Logging
Pico Claims Area
Pinal County, Arizona
Our Job - A99-66

Mr. Chris Ludwig & Mr. Harvey Durand
Professional Services $ 150.00

BILLING

CLIENT Amex

AREA

BILLING NO. 799-66 Pico Claima Area Pinal Co., Ariz. I.P. Physical Prop. Testing & ~~Logging~~

TYPE OF WORK Core

DATE	CHARGE	AMOUNT
5/13 - Durand - 1½ hrs. Ludwig - 4 hrs.	10 hrs @ 15.00/hr	150.00
5/20 - Durand - 1½ hrs. Ludwig - 4 hrs.		

VEHICLE RENTAL:

MILEAGE:

EXPENSES: LIVING & TRAVEL

MAPS

MISC.

PHONE

REPORT:

TOTAL HOURS:

REMARKS, ETC:

TOTAL

1M 9-66 BANCO-S.F.

Invoice date[illegible]1-6-67
I.P. Survey, [illegible]co Area, Arizona, Job A99-66 $2,106.76

X12901

GUARDIAN SAFETY PAPER

GUARDIAN SAFETY PAPER

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AMERICAN EXPLORATION & MINING CO.

WHEN DETACHED AND PAID THIS CHECK BECOMES A RECEIPT
IN FULL PAYMENT OF THE ITEMIZED ACCOUNT.

TO American Exploration Mining Co.

ATTENTION: Mr. Bob Garwood

HEINRICHS GEOEXPLORATION COMPANY
808 W. GRANT ROAD - P. O. BOX 5671
TUCSON, ARIZONA 85703
Area Code 602 Phone 623-0578
Geophysical Exploration Research Engineering

SUBJECT: reports hand delivered this date DATE: 1/5/66

2ND FOLD

Gentlemen:

Enclosed is an original and two copies of our report on the Induced Polarization Survey, Pico Claim Area, Casa Grande Mining District, Pinal County, Arizona.

Reproducible sepias hand delivered under separate cover.

If we can be of any further assistance,,please let me know.

Very truly yours,
HEINRICHS GEOEXPLORATION CO.

Chris S. Ludwig
Senior Geophysicist

CSL:jc
Enclosures

1ST FOLD

PLEASE REPLY TO → SIGNED

DATE SIGNED

SEND WHITE AND PINK COPIES WITH CARBON INTACT PINK COPY IS RETURNED WITH REPLY.

DETACH THIS COPY-RETAIN FOR ANSWER

American Expl. 12/15/66

Bob Garwood home by
ph. 326-3545 6:00 P.M.
2902 N. Baxter
Tucson, Ariz.

3 E-W lines 800' dipole

3-5 days

250.00 /day $750.00 - 1250.00
1 vehicle day
$10.00 /day + 10¢/mile
$39.00/day
5
195.00

Est. $1700.00

Report

Call tomorrow ph. wife
Orizaba Papago In

INDUCED POLARIZATION SURVEY

PICO CLAIM AREA

CASA GRANDE MINING DISTRICT

PINAL COUNTY, ARIZONA

For

American Exploration and Mining Company

December 1966 - January 1967

By

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

TABLE OF CONTENTS

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INTRODUCTION	1
CONCLUSIONS, RECOMMENDATIONS, AND INTERPRETATION	2
BASIS OF INDUCED POLARIZATION METHOD	1a

IN MAP POCKET: (4 Pieces Total)

Composite Magnetic and Induced Polarization Plan

Sectional Data Sheets
- Line 1 (8S)
- Line 2 (Baseline)
- Line 3 (8N)

INTRODUCTION

At the request of Mr. Robert Garwood of American Exploration Company, Heinrichs Geoexploration Company conducted and completed a quick preliminary induced polarization testytype survey over a portion of the Pico Claims, Casa Grande Mining District, Papago Indian Reservation, Pinal County, Arizona. Field work was done during the interim December 19 to December 28, 1966.

Three-five electrode-four sending dipole induced polarization setups on three lines were laid out and observed. The three lines numbered 1, 2, and 3 correspond respectively to Amex magnetometer survey lines 8S, the base line and 8N (see plan map). A dipole spacing of 800 feet was used which gave a total of 27,200 line feet of surface coverage and approximately 16,000 feet of plotted subsurface information.

Data were taken by the dual frequency induced polarization technique with a conventional, symmetrical, co-linear dipole-dipole electrode configuration. Sending frequencies used were 0.05 and 3.0 cycles per second. For the resistivity levels encountered on this survey, the three cycles per second higher frequency used, was low enough that frequency effects caused by inductive coupling interference were negligible

Objective of the survey was to determine if the magnetic anomalies located by Amex were related to sulfide zones and to define the best possible initial drilling sites as indicated by the combined data available.

Results are displayed on sectional data sheets, one for each line, with resistivity, percent frequency effect (PFE), and metallic conduction factor (MCF) contoured in section, and self potential (SP) in profile form with the magnetic profiles superimposed on the SP profile. An induced polarization location and interpretation plan overlaid upon the magnetic contour and claim location map is included.

Geoex personnel involved in the field work were R. Palmer, geophysical crew chief, W. Hurley and B. Terrill, technical assistants. Report and interpretation are by the Geoex staff

in Tucson under the supervision of Chris S. Ludwig, senior geophysicist.

CONCLUSIONS, RECOMMENDATIONS, AND INTERPRETATION

All three lines show definite I.P. anomalism across their entire length. The strongest and most shallow effects are west of an electrical interface (possible geologic contact) trending N-S and lying between 8W and 12W and are apparently, at least geographically, related to the main magnetic high. Amount of sulfide in this zone is difficult to estimate because of the effects of the interface and lack of sufficient background data to the west, but are likely from 0.75% to 3% by volume (1.5-6% by weight) total sulfide across the zones indicated and could therefore be of economic interest.

It is recommended that at least Lines 1 and 3 be extended further west to determine the extent of the anomaly in that direction, as well as doing more work east, north and south of the present survey. The anomalous zone appears to extend below and east of the exposed block of sediments becoming deeper and somewhat weaker in character than that zone west of the 8W interface. Consequently more I.P. is needed to the east to delineate the anomaly in that direction.

Within the Pico Claim group the present best I.P. target, is at Station 9.5W, Line 1 (8S). This nearly corresponds to the apex of the magnetic high which gives further geophysical incentive for drilling at this site. An alternate site, probably equivalent geologically, would be the NW corner of Pico 1. Sulfides will likely be intersected within 500 feet of the surface at either location.

If the ground is available, drilling west of the 8W interface is recommended prior to any on the Pico Claims because of the stronger anomalism and probably greater sulfide content. However, more coverage is needed here before a proper drill site can be selected in this area.

Self potential profiles show a broad low centered between or near 0 E-W and 8E, apparently related to the magnetic high and the exposed block of sediments. These lows suggest oxidizing sulfides within several hundred feet of the surface. The lows correlate with the weakest I.P. effects on the survey suggesting limited depth extent and low total sulfide content (perhaps minor shallow vein-like bodies) in the zone from about 4W to 16E.

The source of the main magnetic anomaly is not obvious on the surface or from the I.P. data but it is considered possible that it is due to a diabase sill, portions of which are seen north and south of the area. Depth to the top of the magnetic anomaly source could be 200 or 300 feet below surface, based on anomaly shape. Other possible causes could be volcanic material or minor magnetite mineralization including contact metamorphic type. In any case, the magnetic source does not appear to have much induced polarization response; although it is apparently related somehow to the 8W interface which forms the east boundary of the stronger I.P. anomalism.

With an I.P. anomaly of this character it is difficult to be certain of an exact type of sulfide source. Moreover, other minerals can cause polarization effects, for example graphite and some iron and manganese oxides as well as certain clays in isolated cases. Therefore, from the outset of any initial drilling, all core should be saved and closely inspected geophysically for any possible polarizable minerals and simultaneously, representative samples sent to us for laboratory tests and correlation analysis.

In our opinion this part of the Casa Grand Mining District has considerable potential and warrants considerable effort including drilling. However, before too much is done we recommend gaining control of and processing as much ground as feasible in the vicinity before committing too far at only one location, whether the immediate one, another contiguous one, or some other nearby area. The geology is not necessarily simple or well known. There may be such complications as local or regional imbrication involved. Therefore, the possibility of getting too pinned down too soon should be carefully considered.

Any way we can assist will be most welcome. Our experience with the Indians and on the reservation environs has been successful and quite extensive.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig

Chris S. Ludwig
Senior Geophysicist

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

Tucson, Arizona
January 5, 1966

S T A T E M E N T

January 6, 1967

American Exploration & Mining Company
23rd Floor Russ Building
San Francisco, California 94102

ATTENTION: Mr. H. Goudey

RE: I.P. Survey
Pico Area, Arizona
Our job A99-66

Weeks ending Dec. 24 & Dec. 31	
4 field days @ $250.00/day	$1,000.00
1/2 day rerun line	N/C
1/2 day travel	62.50
Vehicle rental (2 vehicles) 6 days	120.00
Mileage - 1211 @ 10¢/mile	121.00
Living expenses	255.00
Computation & compilation	527.50
Reproductions	15.30
Communications	5.46
	$2,106.76

cc: Mr. Robert Garwood

Crowe:

I only charged @ 5.00/hr.
for Hurley's office time.
Is this okay?

Dorothy

We have to get this out today

JOB A99-66

BILLING

CLIENT AMEX

BILLING NO. 1

AREA Pico

TYPE OF WORK I.P.

DATE	CHARGE	AMOUNT
weekend 12/24		750
3 days @ 250/day		~~875.00~~
1/2 day travel @ 125/day		62.50
weekend 12/31		
1 day @ 250/day		250.00
1/2 day rerun line		n/c
Pro. office		
Hurley - 8hrs = 40.00		
Mouliet - 5hrs + 13 = 90.00		
Ludwig - 4 + 2 + 10 = 160.00		527.50
Cooley - 6 + 12 = 180.00		
Palmer - 4 = 40.00		
Jannie - 3½ hrs 175.00		

VEHICLE RENTAL: 6 days (2 veh.) @ 20/day 120.00

MILEAGE: 1211 @ 10¢ mile 121.00

EXPENSES: LIVING & TRAVEL 5 days @ 51/day 255.00

MAPS

MISC. 51 - Sepia, 102 - Blue 15.30

PHONE 1.31, 1.53, 1.29 + 15/15 5.46

REPORT:

TOTAL HOURS:

REMARKS, ETC:

TOTAL 2106.76 ~~2231.76~~

est - 1700.00

HEINRICHS GEOEXPLORATION COMPANY
CREW AND EXPENSE STATEMENT

HEINRICHS GEOEX

WEEK ENDING 12/24 19 66
NAME OF PROJECT AMEX.
CREW CHIEF HURLEY
ADDRESS

TYPE OF WORK I. P.
ENTER ALL TIME AND ALL EXPENSES FOR EACH MAN

	NAME	HOURS GP	TR	C	MNT	GY	SVY	SMP	HE	DRI	DFT	OF	SPV	UN	Wages (do not use)	Vehicle No.	Mi.	Other Expenses Lodging	Meals	Misc.	Description or Remarks	Record of Work Done
	Brt. Fwd. (Do not use)														#6 #1	72 20	806 334			(Row)	GP TR MNT	
SUN.																				Mon	3 3 2	
																				Tues	8	
																				Wed	6 2	
																				Thurs	2½ 4½	
MON.	Bill	3	3		2											1	115			Fri	7 4½	PACK - DRIVE TO CASA GRANDE - SET UP LINE #1
	LOREN	3	3		2											6	115					
	BRYAN	3	3		2																	
	REX	3	3		2																	
TUES.	BILL	4	1½		3											6	—					WORK ON CHEVY #6 - RUN LINE #1
	LOREN				8											61	51					
	BRYAN	4	1½		3																	
	REX	4	1½		3																	
WED	Bill	8	1½													1	50					SET UP LINE #2 RAN ½ LINE #2
	Loren	8	1½													6	50					
	BRYAN	8	1½																			
	Rex	8	1½																			
THURS.	Bill	2½	1½													1	180	—				RAN SAME ½ LINE #2 BRAKE DOWN 130 mi. travel/Geoex
	Loren	2½	1½													6	50					
	BRYAN	2½	1½																			
	Rex	2½	1½																			
FRI.	Bill	7	3													1	115					RAN OTHER ½ LINE #2 SET UP LINE #3 COULDNT RUN DO TO HIGH RES.
	Loren	7	3													6	115					
	BRYAN	7	3																			
SAT.																						
	Cum. Total (Do not use)														#6 #1	731 207	36 59					

GP - Geophysical
TR - Travel Time
C - Computing
MNT - Equip. Maint.
SVY - Survey
SMP - Sampling
HE - Heavy Exploration
DRI - Drilling
OF - Office
SPV - Supervision
UN - Unclassified

Report Compiled by filled 1/6/66
Notes

ROW - MONDAY TUES

GP	TR	MNT
3	3	2 8

HEINRICHS GEOEXPLORATION COMPANY
CREW AND EXPENSE STATEMENT

HEINRICHS GEOEX

WEEK ENDING 12/31/66 19
NAME OF PROJECT Pico (AMEX)
CREW CHIEF
ADDRESS

TYPE OF WORK I.P.
ENTER ALL TIME AND ALL EXPENSES FOR EACH MAN (6) 723054 20776 (3)

	NAME	HOURS GP	TR	C	MNT	GY	SVY	SMP	HE	DRI	DFT	OF	SPV	UN	Wages (do not use)	Vehicle No.	Vehicle Mi.	Other Expenses Lodging	Meals	Misc.	Description or Remarks	Record of Work Done
	Brt. Fwd. (Do not use)																					
SUN.																						
MON.																						
TUES.																						
WED	Ron	8	3½		4											3	185	✓			Rain line 3 Both Ends ✓	
	Tex	8	3½		4											6	185					
	Bill	8	3½		4																	
THURS.																						
FRI.																						
SAT.																						
	Cum. Total (Do not use)																					

GP - Geophysical
TR - Travel Time
C - Computing
MNT - Equip. Maint.
SVY - Survey
SMP - Sampling
HE - Heavy Exploration
DRI - Drilling
OF - Office
SPV - Supervision
UN - Unclassified

(6) 73364

Report Compiled by
Notes

filled 1/6/67