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IP Survey

AZCO Project Area

Cochise County, Arizona

for

North American Mining and Mineral Corporation

Casper, Wyoming

April 1977

by

GEOEX

GEOEX Job#1158

HEINRICHS GEOEXPLORATION COMPANY

P.O. BOX 5964, TUCSON, ARIZONA 85703, 806 WEST GRANT ROAD, PHONE: (602) 623-0578

April 5, 1977

Mr. Gene Simons
North American Mining and Mineral Corporation
37 Valley Drive
Casper, Wyoming 82601

Re: IP Survey
AZCO Project
GEOEX Job #1158

Dear Mr. Simons:

This letter is a brief report on the induced polarization (IP) survey recently completed on your behalf by us in the AZCO project area southeast of Tombstone, Cochise County, Arizona. The purpose of this survey was to attempt to locate and define possible subsurface sulfide mineralization in an area of folded and complexly faulted Cretaceous and Paleozoic sediments partly concealed by alluvial cover.

Three lines were completed, all using the multi-frequency IP technique and the collinear dipole-dipole electrode array. Lines 1 and 2 utilizing 500 foot dipole lengths, were oriented N-S and separated 4000 feet apart with Line 2 to the east. Line 3 was oriented about E-W and used 1500 foot dipoles to obtain greater depth penetration. All IP data was taken on a transmitting frequency pair of 0.1 and 1.0 hz.

The data are presented on "sectional" data sheets, one for each line, and show successively from top to bottom: the resistivity, the percent frequency effect (PFE), and the metallic conduction factor (MCF) all contoured in "sectional" form. Self potential (SP) readings taken in conjunction with the IP data are shown at the bottom of the sheets in profile form. An "Induced Polarization Location and Interpretation Plan" at a scale of 1" = 2000' to overlay the appropriate 7 1/2 minute U.S.G.S. topographic maps, is also included to show the line locations and plan projected IP interpretation.

For the most part, Lines 1 and 2 show only very low background IP response. However, a very weak IP anomaly was disclosed between station 20 and 25N on Line 1. This anomaly, due to being indicated from data acquired near the end of the line, is only partially defined, but appears to have a shallow source,

buried less than 150 feet below surface and is considerably less than 500 feet in width. The anomalous IP response correlates with a pronounced resistivity low and a 100 millivolt SP low positioned near 25N.

Considering the indicated surface rock types involved, this anomaly is probably caused by a thin pyritic and/or graphitic limestone or shale unit within the Colina limestone, or perhaps the upper Earp formation, which comprise the sharp ridge in the vicinity of the anomaly. However, it is conceivable that this anomalism may represent polarizable metallic lustered sulfide or oxide mineralization, perhaps replacing a thin bed or along a fracture zone.

Therefore, we recommend brief surface geologic inspection in the vicinity of the anomaly. If an un-economic cause is obvious and is verified by laboratory IP sample testing of typical in-place surface rock samples, then no further work is warranted. However, if the cause is not obvious, or if there are signs of mineralization, additional detailed IP coverage is recommended on 200 to 100 foot dipoles to better delineate the zone and define drill targets. An initial four day survey at a total cost of about $2000.00 is visualized.

There are slightly increased IP values, lower resistivities and an S.P. low on the extreme north end of Line 1 which may be defining a correlating feature with the Line 2 anomaly. If so, a N80W strike is indicated that parallels the geologic strike and trend of the ridge.

Resistivities on Line 1 indicate shallow or outcropping high resistivity bedrock on the north half of the traverse. The south half, however, shows a layered situation with perhaps 250 feet, or so, of low resistivity material, probably alluvial overburden, lying on a high resistivity substratum that is likely bedrock similar to that present on the north half of the line.

Line 2 is somewhat similar to Line 1 except that the zone of low near-surface resistivity is confined mostly between stations 5N to 10S, with shallow or outcropping high resistivity bedrock present north and south thereof on the remainder of the traverse.

Line 3 was run to give considerable more depth penetration in the central portion of the area. Gradually increasing PFEs with depth are present along the length of the traverse. Assuming a simple two-layer model, a depth of roughly 2250 feet to an extended lower medium having an intrinsic IP response of about 2.5 to 4.5 PFE is indicated by type curve matching. An acceptable but less satisfying curve match was also obtained with a lower medium buried about 3000 feet and having an intrinsic response of about 4 to 6.5 PFE.

This response is of borderline interest but could conceivably represent deeply buried disseminated porphyry type sulfide mineralization or a broad IP responsive (or even mineralized) formation likely within the Paleozoic section. The weak response could also simply be caused by an unmineralized rock at depth with a higher background response.

This is a deep target and considerable more 1500 foot or larger IP coverage over the area would be necessary to properly resolve the zone, determine the advisability of drilling and define drilling targets, if any. Of course, with the single existing line of deep data, the apparent deep anomaly could, as an alternate possibility, be the lateral response from a roughly parallel shallower feature offset on the order of 1000 to 1500 feet north or south of the line. However, the 500 foot dipole coverage does not support interpretation for a responsive body shallower than 1000 feet, as no anomalism is present on Line 1 or 2 within 1500 feet of their intersection with Line 3.

There is some indication that the deep anomaly becomes shallower to the east although two grounded fences on the east half of the line could be causing spurious IP interference to the east.

If it is desired to further pursue this possible deep target, it is suggested that Line 3 be extended several dipoles both to the east and west in an attempt to define a stronger or shallower zone at depth. Then, two or three N-S cross traverses spaced about 1/2 mile apart on 1500 or 2000 foot dipoles should be run to further define the zone of interest. A ten day minimum initial survey costing about $6000.00 is indicated.

If you have any comments or questions, please feel free to contact us.

Respectfully submitted,

Heinrichs GEOEXploration Co.

Chris S. Ludwig

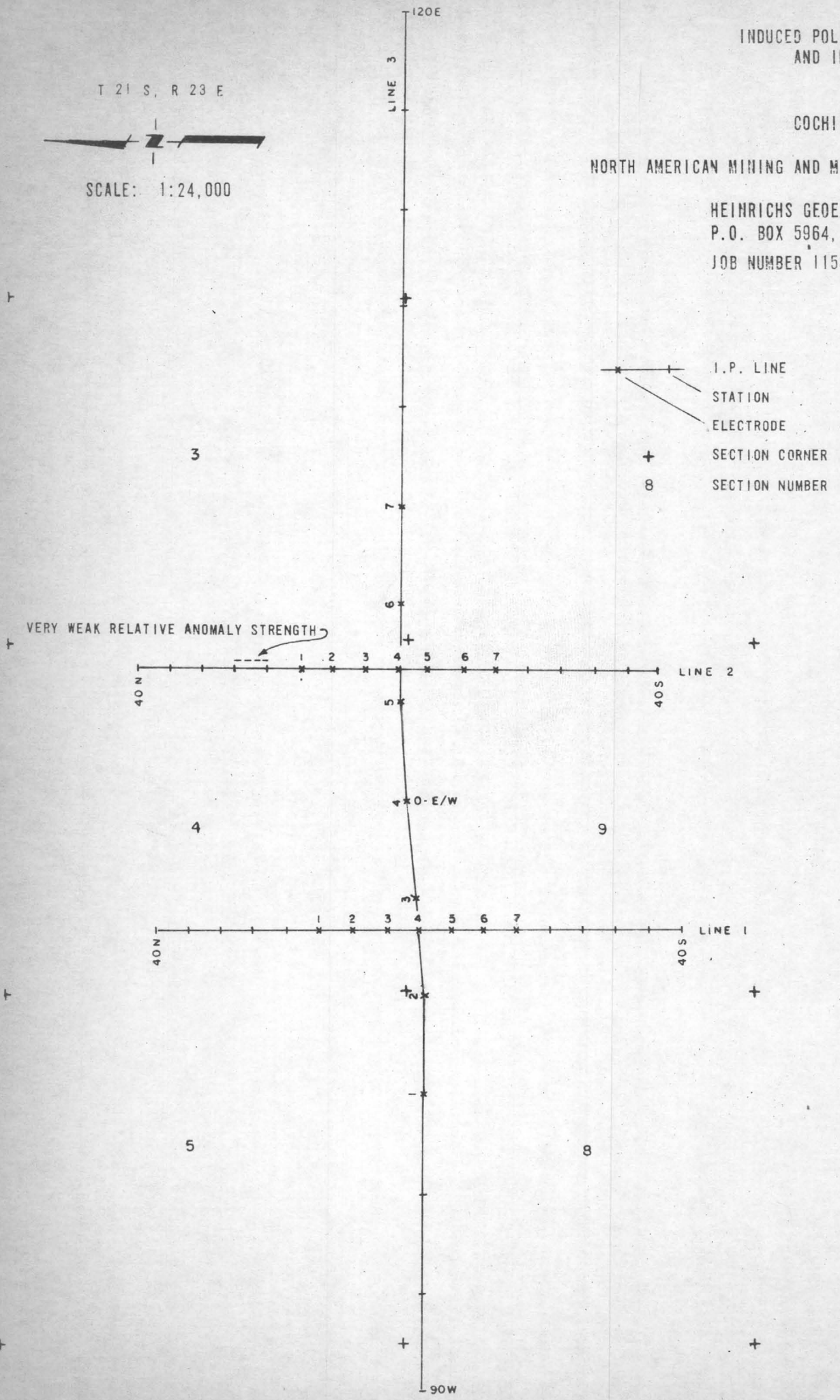
Chris S. Ludwig
Chief Geophysicist

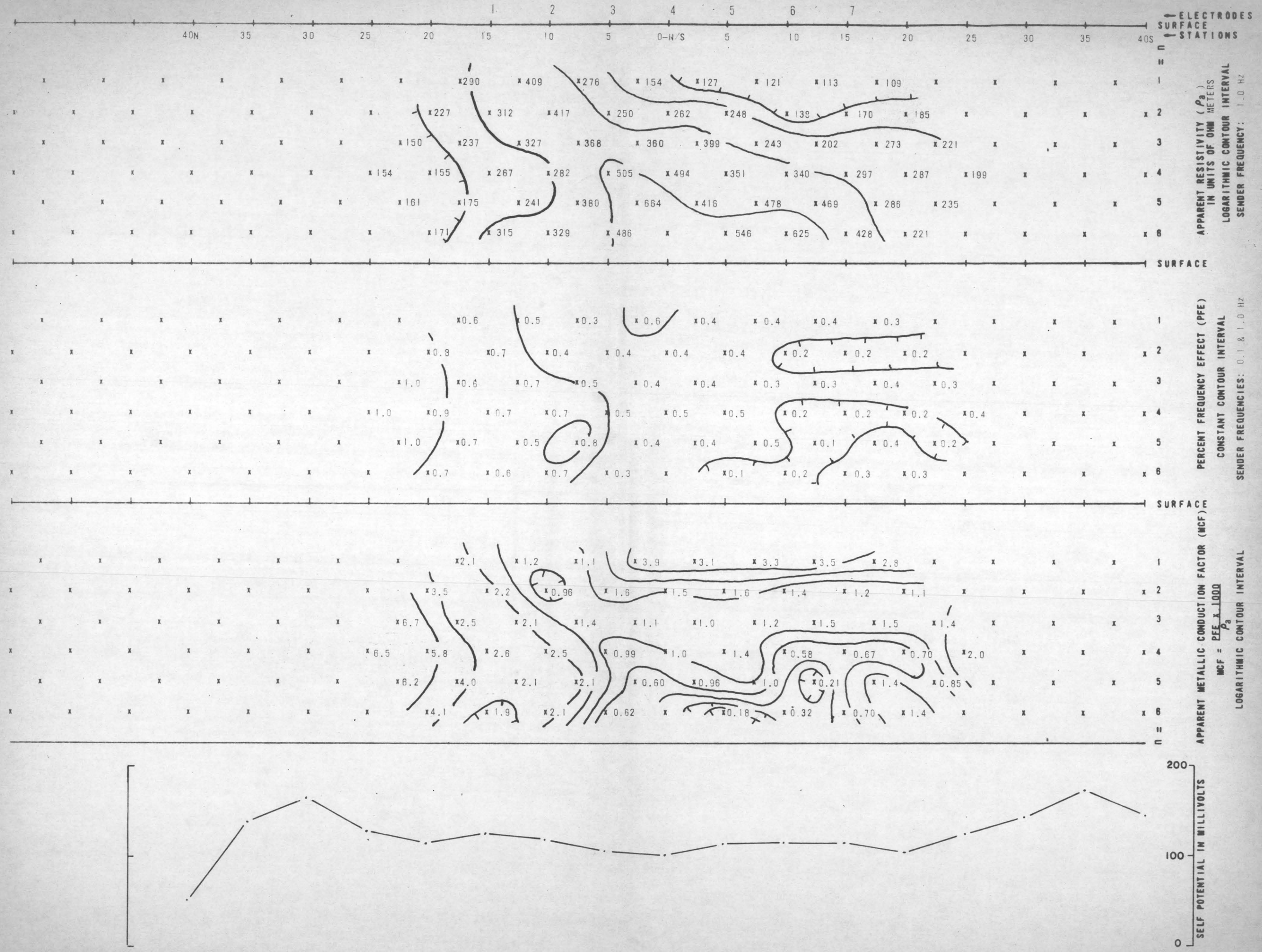
CSL:mt

INDUCED POLARIZATION LOCATION
AND INTERPRETATION PLAN
of
AZCO PROJECT
COCHISE COUNTY, ARIZONA
for
NORTH AMERICAN MINING AND MINERAL CORPORATION
by
HEINRICHS GEOEXPLORATION COMPANY
P.O. BOX 5964, TUCSON, AZ. 85703
JOB NUMBER 1158-77 MARCH 1977

T 21 S, R 23 E

SCALE: 1:24,000





1158-77

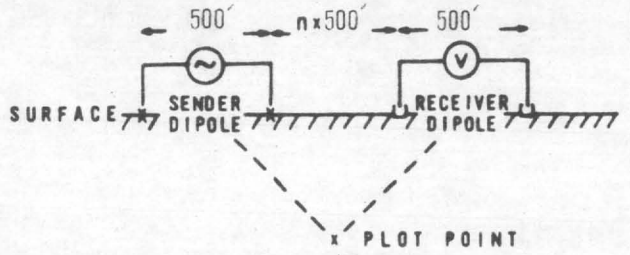
LINE NO. 1
SPREAD(S) 1
BEARING N/S

INDUCED POLARIZATION TRAVERSE SECTIONAL DATA SHEET of AZCO PROJECT for NORTH AMERICAN MINING AND MINERAL CORPORATION

RELATIVE ANOMALY STRENGTH

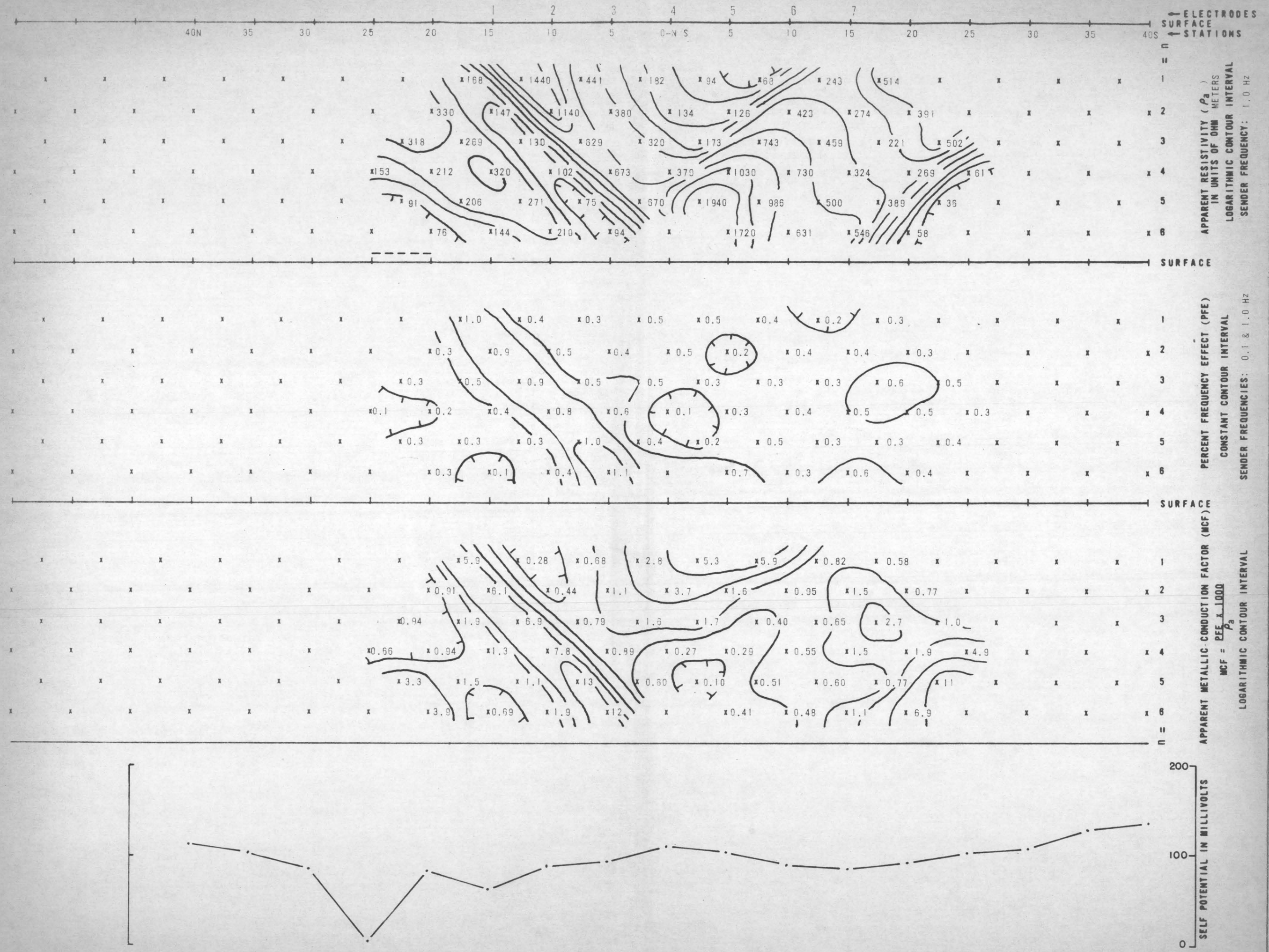
VERY WEAK | WEAK | MODERATE | STRONG

DIPOLE-DIPOLE ELECTRODE ARRAY



DATE
MARCH 1977

HEINRICHS GEOEXPLORATION COMPANY
806 W. GRANT ROAD, POST OFFICE BOX 5964, TUCSON, ARIZ., 85703, PHONE: (602)623-0578



1153-77

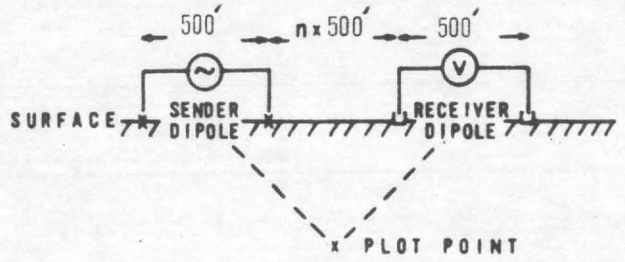
LINE NO.
2
SPREAD(S)
1
BEARING
N/S

INDUCED POLARIZATION TRAVERSE SECTIONAL DATA SHEET of AZCO PROJECT for NORTH AMERICAN MINING AND MINERAL CORPORATION

RELATIVE ANOMALY STRENGTH

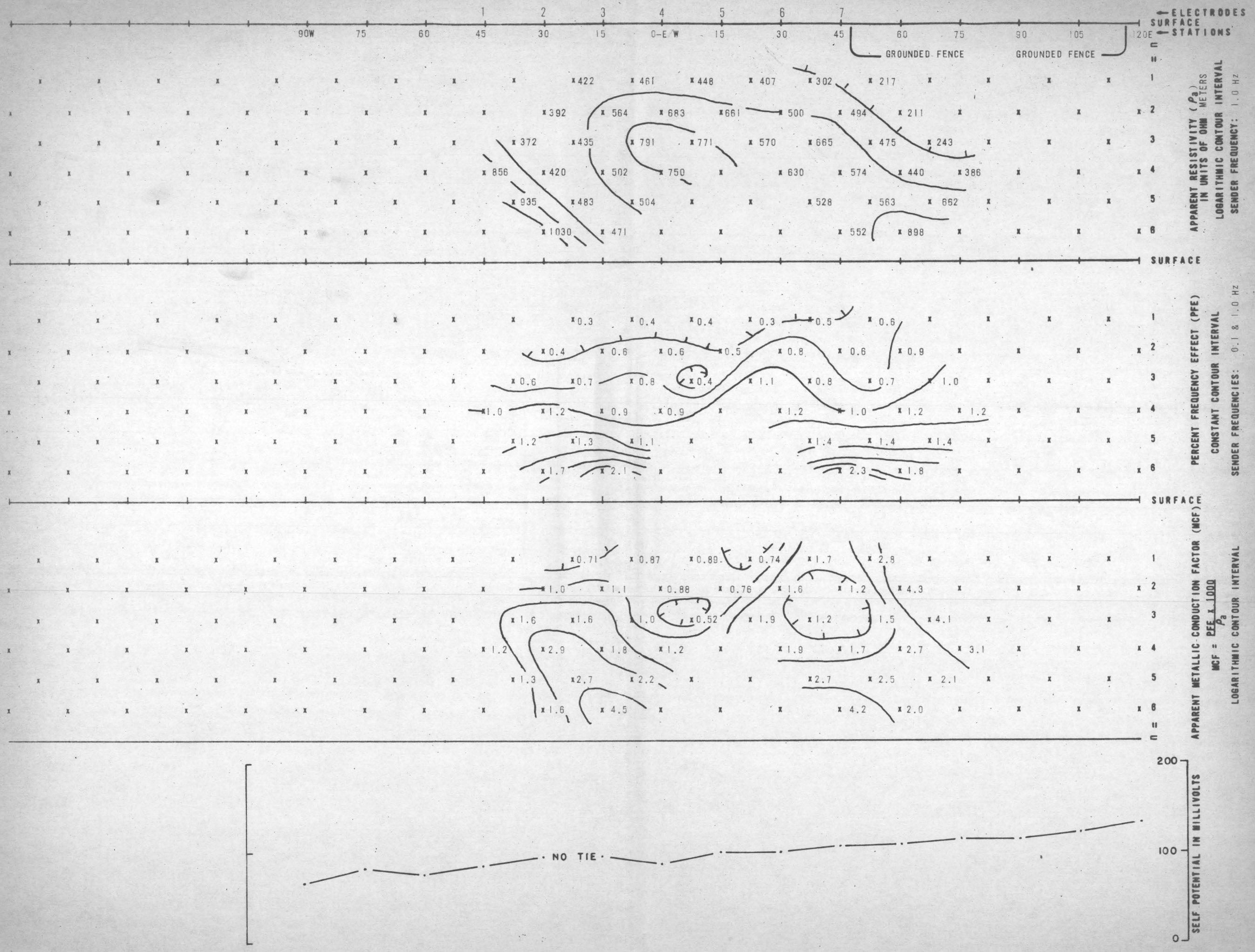
VERY WEAK — WEAK — MODERATE — STRONG

DIPOLE-DIPOLE ELECTRODE ARRAY



DATE
MARCH 1977

HEINRICHS GEOEXPLORATION COMPANY
806 W. GRANT ROAD, POST OFFICE BOX 5964, TUCSON, ARIZ., 85703, PHONE: (602)623-0578



1158-77

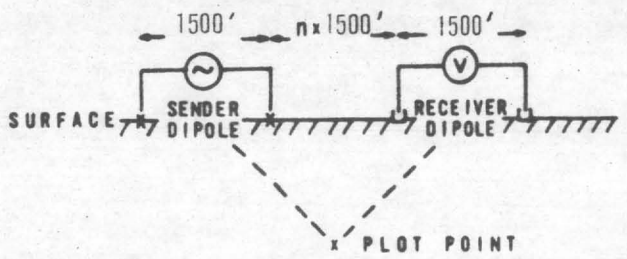
LINE NO.
3
SPREAD(S)
1
BEARING
E/W

INDUCED POLARIZATION TRAVERSE SECTIONAL DATA SHEET
of
AZCO PROJECT
for
NORTH AMERICAN MINING AND MINERAL CORPORATION

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

DIPOLE-DIPOLE ELECTRODE ARRAY



DATE
MARCH 1977

HEINRICHS GEOEXPLORATION COMPANY
806 W. GRANT ROAD, POST OFFICE BOX 5964, TUCSON, ARIZ., 85703, PHONE: (602)623-0578

HEINRICHS GEOEXPLORATION COMPANY

806 W. GRANT RD., P.O. BOX 5964 TUCSON, ARIZ. 85703. PH: (602) 623-0578

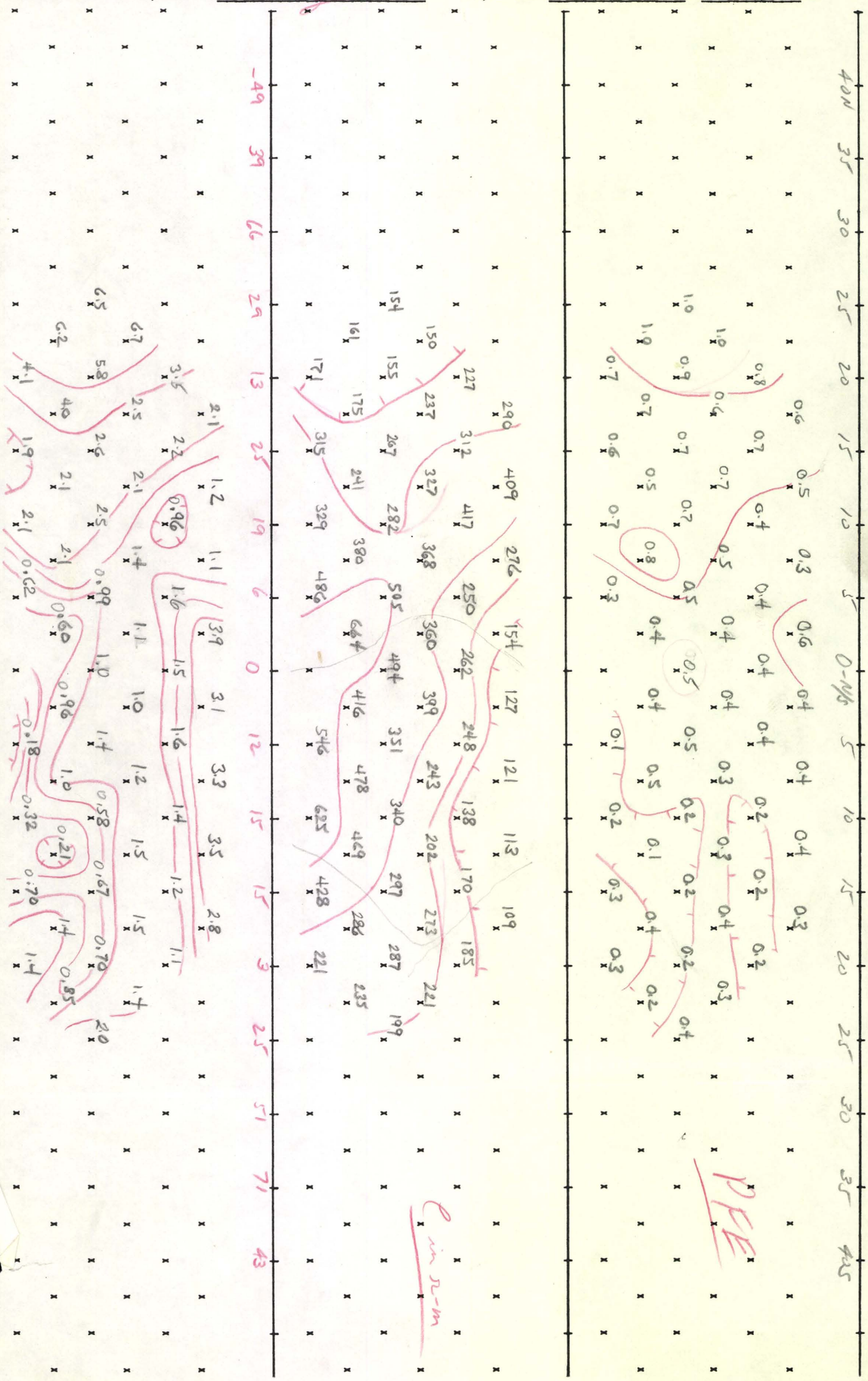
North American Mining and Mineral Corporation

JOB # 1158 CLIENT ~~N.A.M.C.~~

DATE 3-22-77 AREA AZCO PROJECT

LINE# 1 SP 1 a= 500' BEARING N-S

RESISTIVITY FREQUENCIES 1 hz FREQUENCIES 1.0 & 0.1 Hz



HEINRICHS GEOEXPLORATION COMPANY

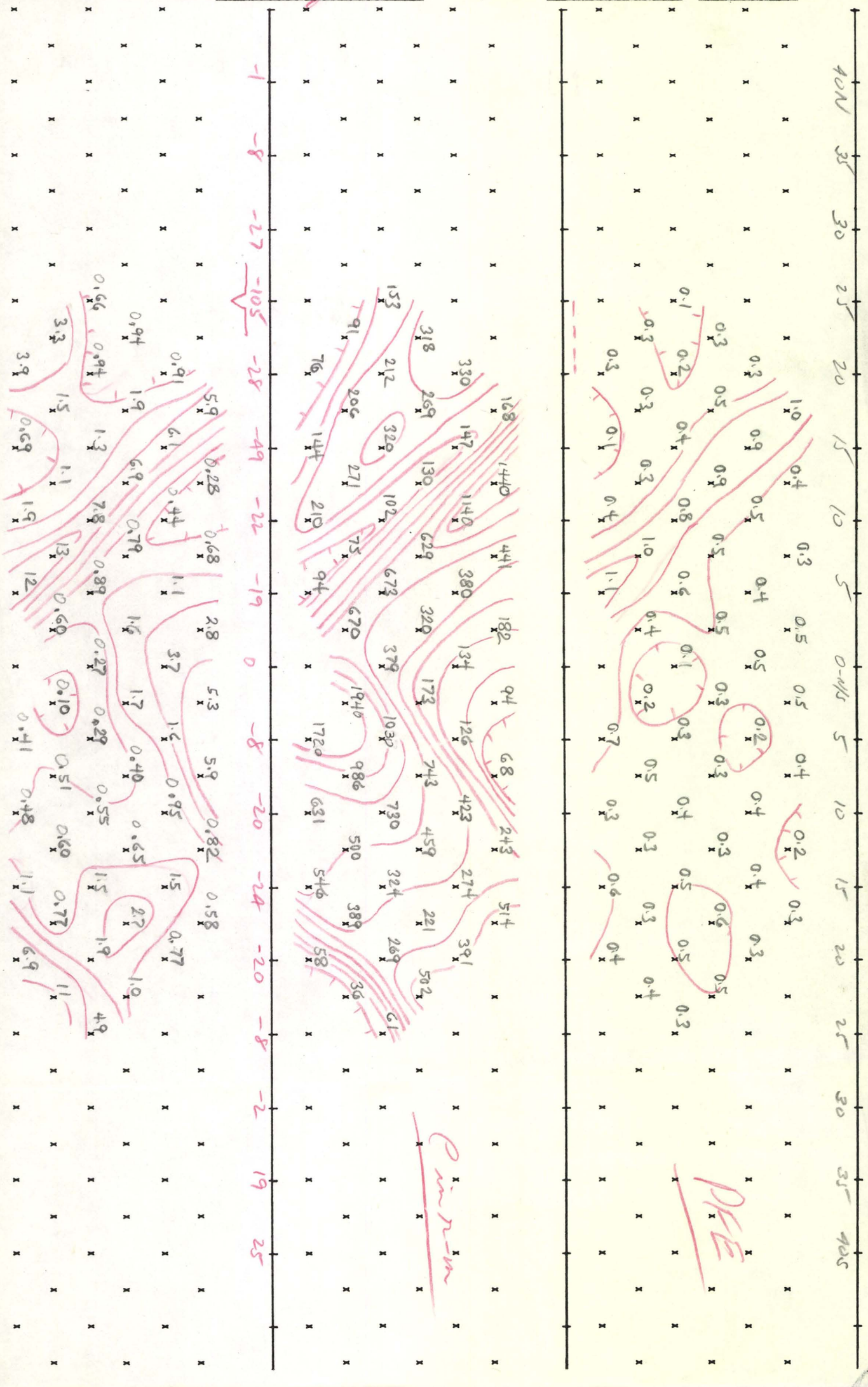
806 W. GRANT RD., P.O. BOX 5964 TUCSON, ARIZ. 85703. PH: (602) 623-0578

JOB # 1158 [redacted] CLIENT ~~No. Amer. Mins & Min~~ NAME MC

DATE 3-24-77 AREA AZCO PROJECT TOMBSTONE

LINE# 2 SP 1 a= 500' BEARING N-S

RESISTIVITY FREQUENCIES 1.0 hz FREQUENCIES 1.0 & 0.1 Hz



HEINRICHS GEOEXPLORATION COMPANY

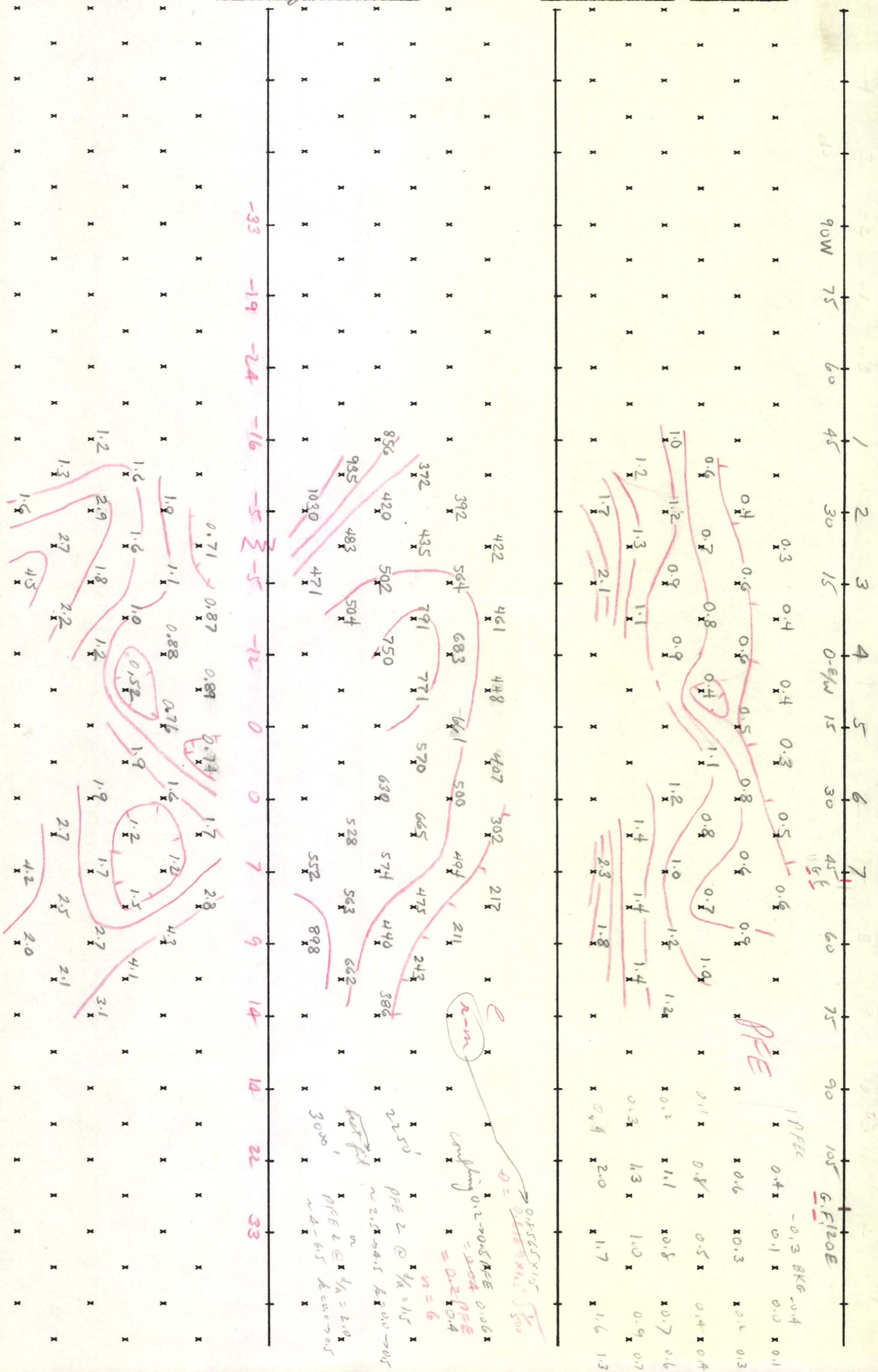
806 W. GRANT RD., P.O. BOX 5964 TUCSON, ARIZ. 85703. PH: (602) 623-0578

JOB # 1158 CLIENT NAMAMC NORTH AMER MINE & MIN.

DATE 3-31-77 AREA AZCO, TOMBSTONE

LINE# 3 SP 1 a= 1500' BEARING E-W

RESISTIVITY FREQUENCIES 1.0 hz FREQUENCIES 1.0 & 0.1 Hz



I. P. RECEIVER NOTES, JOB No. 1158, AREA ARCO, TOMBSTONE

LINE 3, HALF W, SR. 1, a = 1500', BEARING E-W

SENDER STA. 0 = ELECTRODE No. 5, DATE 3-31-78

PAGE 1

HEINRICHS GEOEX

SEND		6-7	5-6	6-7	4-5	5-6	6-7	CAL	3-4	4-5	5-6
RECEIVE		5-4	4-3		3-2			3-4	2-1		
MULTIPLIER		10	10	1	1	1	1	1	10	1	1
PFE		0.1	0.4	0.4	0.3	0.5	0.3	-0.1	0.4	0.7	0.9
CUR. (AMPS)		2.5	2.5	2.5	1.5	2	2.5	.3	3	5	6
POINT No.											
SEP. (n)		1	1	2	1	2	3		1	2	3
H. F. MV		141	159	58.7	84.3	41.6	23.5	31.5	151	84.0	56.6
DRIFT		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0 PFE	K_n/1000	8.61	8.61	34.47	8.61	34.47	86.1		8.61	34.47	86.1
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_c	0.2	0.5	0.5	0.4	0.6	0.4		0.3	0.6	0.8
3.0 MV	$\rho/2\pi$	462	522	771	461	683	771		422	564	791
DRIFT	MCF	1.43	.95	.65	.87	.88	.52		.71	1.1	1.0
S. P.		-20.2	-2.2						-19.3		
NOISE											
POT RES.											
CULT & CMTS											

I. P. RECEIVER NOTES, JOB NO. 1158, AREA ARCO, TOMBSTONE

LINE 3, HALF E, SP. 1, a = 1500', BEARING E-W

SENDER STA. 0 = ELECTRODE NO. 5, DATE 3-31-77

PAGE 2

HEINRICHS GEOEX

SEND		6-7	3-4	4-5	5-6	6-7	3-4	4-5	5-6	6-7	3-4
RECEIVE			1-0				0, -1				-1, -2
MULTIPLIER		1	1	1	1	0.1	1	1	0.1	0.1	1
PFE		1.0	0.5	0.8	1.0	1.2	0.7	1.6	1.7	2.2	1.1
CUR. (AMPS)		6	3	6	5.5	6	3	6	5.5	6	3
POINT NO.											
SEP. (n)		4	2	3	4	5	3	4	5	6	4
H. F. MV		26.8	35.0	31.15	16.45	10.30	13.3	15.0	9.05	6.01	15.3
DRIFT		0.0	0.0	0.0	+0.1	0.0	0.0	+0.3	+0.4	0.0	0.0
1.0 PFE	K_n/1000	172.35	34.47	86.1	172.35	301.62	86.1	172.35	301.62	482.58	172.35
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_c	0.9	0.4	0.7	0.9	1.1	0.6	1.4	1.3	2.1	1.0
3.0 MV	$\rho/2\pi$	750	392	435	502	504	372	420	483	471	856
DRIFT	MCF	1.2	1.0	1.6	1.8	2.2	1.6	3.3	2.7	4.5	1.2
S. P.			-16.8				-3.7				-22.7
NOISE											
POT RES.											
CULT & CMTS											

I. P. RECEIVER NOTES, JOB NO. 1158, AREA ARCO, TOM STONE

LINE 3, HALF E, SR. 1, a = 1500', BEARING E-W

SENDER STA. 0 = ELECTRODE NO. 5, DATE 3-31-77

PAGE 3

HEINRICHS GEOEX

SEND	4-5	5-6	3-4	4-5	3-4	5-6	4-5	3-4	CAL	6-7
RECEIVE			5-6	6-7		7-8			6-7	8-9
MULTIPLIER	1	1	10	10	1	10	1	1	10	10
PFE	1.3	1.8	0.4	0.4	0.5	0.6	0.9	1.2	+0.1	0.7
CUR. (AMPS)	6	5.5	3.5	4	3.5	6	6	4	1	6
POINT NO.										
SEP. (n)	5	6	1	1	2	1	2	3		1
H. F. MV	19.1	12.1	187	194	68.9	216	89.3	27.2	102.65	155
DRIFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0 PFE K_n/1000	301.62	482.58	8.61	8.61	34.47	8.61	34.47	86.1		8.61
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	1.2	1.7	0.3	0.3	0.4	0.5	0.8	1.1		0.6
3.0 MV $\rho/2\pi$	935	1034	448	407	661	302	500	570		217
DRIFT MCF	1.3	1.6	.67	.74	.61	1.7	1.6	1.9		2.8
S. P.			-8.6	-1.5		-6.3				-4.4
NOISE										
POT RES.										
CULT & CMTS								F 7.2		

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO, TOMBSTONE

LINE 3, HALF E, SR. 1, a = 1500', BEARING S-W

SENDER STA. 0 = ELECTRODE No. 5, DATE 3-31-77

PAGE 4

HEINRICHS GEOEX

SEND	5-6	4-5	3-4	6-7	5-6	4-5	3-4	6-7	5-6	4-5
RECEIVE				9-10				10-11		
MULTIPLIER	1	1	1	1	1	1	0.1	1	1	1
PFE	0.7	0.9	1.3	1.0	0.8	1.1	1.5	1.1	1.3	1.5
CUR. (AMPS)	6	6	4	6	6	6	4	6	5.5	6
POINT No.										
SEP. (n)	2	3	4	2	3	4	5	3	4	5
H. F. MV	88.3	47.6	15.0	37.7	34.0	20.5	7.19	17.4	14.4	11.5
DRIFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0 PFE $K_n/1000$	34.47	86.1	172.35	34.47	86.1	172.35	301.62	86.1	172.35	301.62
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	0.6	0.8	1.2	0.9	0.7	1.0	1.4	1.0	1.2	1.4
3.0 MV $\rho/2\pi$	494	665	630	211	475	574	528	243	440	563
DRIFT MCF	1.2	1.2	1.9	4.3	1.5	1.7	2.7	4.1	2.7	2.5
S. P.				-8.8				-0.7		
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZG, TOMBSTONE

LINE 3, HALF E, SR. 1, a = 1500, BEARING E-W

SENDER STA. 0 = ELECTRODE No. 5, DATE 3-31-77

PAGE 5

HEINRICHS GEOEX

SEND		3-4	6-7	5-6	4-5						
RECEIVE			11-12								
MULTIPLIER		0.1	1	1	0.1						
PFE		2.4	1.3	1.5	1.9						
CUR. (AMPS)		4	6	5.5	4						
POINT No.											
SEP. (n)		6	4	5	6						
H. F. MV		4.70	13.8	12.4	7.64						
DRIFT		0.0	0.0	0.0							
1.0 PFE	K_n/1000	482.58	172.35	301.62	482.58						
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_c	2.3	1.2	1.4	1.8						
3.0 MV	$\rho/2\pi$	552	386	662	898						
DRIFT	MCF	4.2	3.1	2.1	2.0						
S. P.			+2.6								
NOISE											
POT RES.											
CULT & CMTS			GF 11.7								

I.P. SENDER NOTES

JOB No. 1158 AREA AZCO, TombsTone

LINE 3, HALF W, SP. 1', DATE 3-31-77

PAGE 1

HEINRICHS GEOEX

SEND	6,7	5,6	6,7	4,5	5,6	6,7	cal	3,4	4,5	5,6
RECEIVE	5,4	4,3	→	3,2		→	3,4	2,1		
RANGE	10X250	10X250	10X250	10X150	10X200	10X250	3X100	300X10	500X10	300X20
VOLTAGE	400	380	400	380	260	380	280	640	520	400
CURRENT	2.5	2.5	2.5	1.5	2.0	2.5	.3	3.0	5.0	60
SEND	6,7	3,4	4,5	5,6	6,7	3,4	4,5	5,6	6,7	3,4
RECEIVE	→	1,0			→	1,0		→	→	0,-1
RANGE	300X20	300X10	300X20	250X20	300X20	300X10	300X20	250X20	300X20	300X10
VOLTAGE	540	600	620	340	540	600	620	340	540	600
CURRENT	6.0	3.0	6.0	5.5	6.0	3.0	6.0	5.5	6.0	3.0

FREQUENCIES 1.0 + 0.1

SENDER No. 267215 POWER UNIT ID

OPERATOR ROLLINS

RECEIVER No. HOURS RUN

OPERATOR Fisher

COMMENTS:

I.P. SENDER NOTES

JOB No. 1159 AREA AZCO, TOMBSTONE

LINE 3, HALF W, SP. P, DATE 2-31-77

PAGE 2

HEINRICHS GEOEX

SEND	4,5	5,6								
RECEIVE										
RANGE	300x20	250x20								
VOLTAGE	620	340								
CURRENT	6.0	5.5								
SEND										
RECEIVE										
RANGE										
VOLTAGE										
CURRENT										

FREQUENCIES	1.0 90.1		COMMENTS:
SENDER No.	267215	POWER UNIT ID	
OPERATOR	Rollins		
RECEIVER No.		HOURS RUN	
OPERATOR	Fisher		

I. P. SENDER NOTES

JOB No. 1158 AREA AZCO TOMBSTONE

LINE 3, HALF E, SP. 1, DATE 3/31/77

PAGE 3

HEINRICHS GEOEX

SEND	~~4-5~~	~~3-4~~	3-4	3-4	4-5	5-6	4-5	3-4	CAL	6-7
RECEIVE			5-6	6-7	→	7-8	→	→	→	8-9
RANGE			~~X10~~X350	~~X10~~X350	400X10	300X20	300X20	400X10	100X10	300X20
VOLTAGE			640	640	400	380	580	740	100	510
CURRENT			3.5	3.5	4.0	6.0	6.0	4.0	1.0	6.0
SEND	5-6	4-5	3-4	6-7	5-6	4-5	3-4	6-7	5-6	4-5
RECEIVE	→	→	→	9-10	→	→	→	10-11	→	→
RANGE	300X20	300X20	400X10	300X20	300X20	300X20	400X10	300X20	250X20	300X20
VOLTAGE	380	580	740	500	380	580	740	500	320	580
CURRENT	6.0	6.0	4.0	6.0	6.0	6.0	4.0	6.0	5.5	6.0

FREQUENCIES 01 .1

SENDER No. 26721 POWER UNIT ID

OPERATOR ~~T. MERKLE~~ ROLLINS

RECEIVER No. 20693 HOURS RUN

OPERATOR M. FISHER

COMMENTS:

* 4,5 ON 100/15

CAL ON 500/10

OTHERS ON 750/7

I.P. SENDER NOTES

JOB No. 1158 AREA AZ00

LINE 3, HALF E, SP. 1, DATE 3/31/77

PAGE 2

HEINRICHS GEOEX

SEND	3-4	6-7	5-6	4-5						
RECEIVE	→	11-12	→	→						
RANGE	400X10	300X20	250X20	400X10						
VOLTAGE	746	500	520	440						
CURRENT	4.0	6.0	5.5	4.0						
SEND										
RECEIVE										
RANGE										
VOLTAGE										
CURRENT										

FREQUENCIES 01 .1

SENDER No. 26721 POWER UNIT ID

OPERATOR T. HERKLE Rollins

RECEIVER No. 20693 HOURS RUN

OPERATOR FISHER

COMMENTS:

Pseudo to be X3

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO, TOMBSTONE

LINE 3, HALF W, SP. 1, a = 1500', BEARING E-W

SENDER STA. 0 = ELECTRODE No. 5, DATE 3-25-77

PAGE 1

HEINRICHS GEOEX

SEND		6-7	5-6	6-7	4-5	5-6	6-7	CAL	3-4	4-5	5-6
RECEIVE		5-4	4-3		3-2			3-4	2-1		
MULTIPLIER		10	10	1	1	1	1	10	1	1	1
PFE		0.1	0.4	0.4	0.3	0.5	0.3	-0.1	0.5	0.5	0.7
CUR. (AMPS)		2.5	2.5	2.5	1.5	2	2.5	.3	1.5	2.5	2.5
POINT No.											
SEP. (n)		1	1	2	1	2	3		1	2	3
H. F. MV		141	159	58.7	84.3	41.6	23.5	31.5	72.5	40.7	20.25
DRIFT		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1
1.0 PFE	K_n/1000	2.87	2.87	11.49	2.87	11.49	28.7		2.87	11.49	28.7
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_c	0.2	0.5	0.5	0.4	0.6	0.4		0.6	0.6	0.8
3.0 MV	$\rho/2\pi$	154	174	257	154	228	257		132	178	221
DRIFT	MCF	1.3	2.9	1.9	2.6	2.6	1.6		4.5	3.4	3.6
S. P.		-20.2	-2.2		+5.2				-2.1		
NOISE											
POT RES.											
CULT & CMTS											

Redone

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO, TOMBSTONE

LINE 3, HALF W, SP. 1, a = 1500', BEARING E-W

SENDER STA. ⊙ = ELECTRODE No. 5, DATE 3-25-77

PAGE 2

HEINRICHS GEOEX

SEND	6-7	3-4	4-5	5-6	6-7	3-4 (3-26-77)	4-5	5-6	6-7	3-4
RECEIVE		1-0				0 -1				-1, -2
MULTIPLIER	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
PFE	1.0	1.6	1.0	3.0	0.3					
CUR. (AMPS)	2.5	.25	2.5	2.5	2.5					
POINT No.										
SEP. (n)	4	2	3	4	5					
H. F. MV	9.44	7.02	10.38	6.52	3.49	T	5.29	I. ?		
DRIFT	0.0	0.0	0.0	0.0	± 0.0		± 0			
1.0 PFE / K_n/1000	57.45	11.49	28.7	57.45	100.54					
0.3 PFE / ρ_{CAL}										
0.1 PFE / PFE_c	1.1	1.7	1.1	3.1	0.4					
3.0 MV / $\rho/2\pi$	207	118	113	143	134					
DRIFT / MCF	5.3	14	9.7	22	3.0					
S. P.		+13.6				-29.5				
NOISE										
POT RES.										
CULT & CMTS				WINDY-NOISY						

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO

LINE 3, HALF W, SP. 1, a = 1500', BEARING E-W

SENDER STA. 0 = ELECTRODE No. 5, DATE 3-25-77

PAGE 3

HEINRICHS GEOEX

SEND	4-5	5-6	3-4	3-4	4-5	3-4	4-5	5-6	CAL	3-4
RECEIVE			5-6	6-7		7-8				8-9
MULTIPLIER										
PFE										
CUR. (AMPS)										
POINT NO.										
SEP. (n)										
H. F. MV										
DRIFT										
1.0 PFE $K_n/1000$										
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c										
3.0 MV $\rho/2\pi$										
DRIFT MCF										
S. P.										
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. 1158, AREA 1200

LINE 3, HALF E, SP. 1, a = 1500', BEARING E-W

SENDER STA. 0 = ELECTRODE No. 5, DATE 3-25-77

PAGE 1

HEINRICHS GEOEX

SEND		4-5	5-6	6-7	3-4	4-5	5-6	6-7	3-4	4-5	5-6
RECEIVE					9-10				10-11		
MULTIPLIER											
PFE											
CUR. (AMPS)											
POINT No.											
SEP. (n)											
H. F. MV											
DRIFT											
1.0 PFE	$K_n/1000$										
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_c										
3.0 MV	$\rho/2\pi$										
DRIFT	MCF										
S. P.											
NOISE											
POT RES.											
CULT & CMTS											

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO

LINE 3, HALF W, SR. 1, a = 1500', BEARING E-W

SENDER STA. 0 = ELECTRODE No. 5, DATE 3-25-77

HEINRICHS GEOEX

PAGE 5

SEND		6-7	3-4	4-5	5-6						
RECEIVE			11-12								
MULTIPLIER											
PFE											
CUR. (AMPS)											
POINT No.											
SEP. (n)											
H. F. MV											
DRIFT											
1.0 PFE	$K_n/1000$										
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_c										
3.0 MV	$\rho/2\pi$										
DRIFT	MCF										
S. P.											
NOISE											
POT RES.											
CULT & CMTS											

I. P. SENDER NOTES

JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 3, HALF W, SP. 1, DATE 3-25-77

PAGE 1

HEINRICHS GEOEX

SEND	6-7	5-6	6-7	4-5	5-6	6-7	CAL	3-4	4-5	5-6
RECEIVE	5-4	4-3	→	3-2	→	→	3-4	2-1	→	→
RANGE	10X250	10X250	10X250	10X150	10X200	10X250	3X100	10X150	10X250	10X250
VOLTAGE	400	380	400	380	260	380	280	800	460	260
CURRENT	2.5	2.5	2.5	1.5	2.0	2.5	.3	1.5	2.5	2.5
SEND	6-7	5-4	4-5	5-6	6-7	3-4	4-5	5-6	6-7	3-4
RECEIVE	→	1-0	→	→	→	0-1	→	→	→	-1, -2
RANGE	10X250	250X3	10X250	10X250	10X250	3X250	250			
VOLTAGE	300	340	300	260	280	320	380			
CURRENT	2.5	.65	2.5	2.5	2.5	.65	2.5			

FREQUENCIES	1 OP -1		
SENDER No.	187013	POWER UNIT ID	
OPERATOR	Rollins	BLS 6HP	
RECEIVER No.	20693	HOURS RUN	
OPERATOR	FISHER		

COMMENTS: 0-100 ma Dial Sticking at .47

I. P. SENDER NOTES

JOB NO._____ AREA_____

LINE_____, HALF_____, SP._____, DATE_____

PAGE_____

HEINRICHS GEOEX

SEND	4-5	5-6	3-4	3-4	4-5	3-4	4-5	5-6	CAL	3-4
RECEIVE			5-6	6-7		7-8				8-9
RANGE										
VOLTAGE										
CURRENT										
SEND	4-5	5-6	6-7	3-4	4-5	5-6	6-7	3-4	4-5	5-6
RECEIVE				9-10				10-11		
RANGE										
VOLTAGE										
CURRENT										

FREQUENCIES	
SENDER NO.	POWER UNIT ID
OPERATOR	
RECEIVER NO.	HOURS RUN
OPERATOR	

COMMENTS:

I. P. SENDER NOTES

JOB NO._____ AREA_____

LINE_____, HALF_____, SP._____, DATE_____

PAGE_____

HEINRICHS GEOEX

SEND	6-7	3-4	4-5	5-6						
RECEIVE		11-12								
RANGE										
VOLTAGE										
CURRENT										
SEND										
RECEIVE										
RANGE										
VOLTAGE										
CURRENT										

FREQUENCIES	
SENDER NO.	POWER UNIT ID
OPERATOR	
RECEIVER NO.	HOURS RUN
OPERATOR	

COMMENTS:

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO, TOMBSTONE

LINE 2, HALF S, SP. 1, a = 500, BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-23-77 3-24-77

PAGE 1

HEINRICHS GEOEX

SEND	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	5-6
RECEIVE	4-5		5-6			6-7				7-8
MULTIPLIER	10	1	1	1	1	1	1	1	1	10
PFE	0.3	0.2	0.3	0.3	0.3	0.2	0.0	0.1	-0.1	0.0
CUR. (AMPS)	2	2	2	2	2	1	2	2	2	2.5
POINT No.										
SEP. (n)	1	2	1	2	3	1	2	3	4	1
H. F. MV	133	62.8	68.85	24.5	19.5	24.7	23.0	12.65	12.6	222
DRIFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0 PFE K_n/1000	2.87	11.49	2.87	11.49	28.7	2.87	11.49	28.7	57.45	2.87
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	0.5	0.4	0.5	0.5	0.5	0.4	0.2	0.3	0.1	0.2
3.0 MV $\rho/2\pi$	182	344	94	134	266	68	126	173	345	243
DRIFT MCF	2.8	1.2	5.3	3.7	1.9	5.9	1.6	1.7	.29	.82
S. P.	-7.7		-12.3			-4.2				+4.6
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. 1158, AREA ARCO, TOMBSTONE

LINE 2, HALF S, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-24-77

PAGE 2

HEINRICHS GEOEX

SEND	4-5	3-4	2-3	1-2	6-7	6-7	5-6	4-5	3-4	2-3
RECEIVE	7-8				CAL	8-9				
MULTIPLIER	1	1	1	1	10	10	1	1	1	1
PFE	0.2	0.1	0.1	0.0	-0.2	0.1	0.2	0.1	0.2	0.3
CUR. (AMPS)	1.5	1.5	2	2	1	2	2.5	1.5	1.5	2
POINT No.										
SEP. (n)	2	3	4	5		1	2	3	4	5
H. F. MV	58.0	40.8	37.55	40.55	105	37.6	62.6	25.2	20.0	20.6
DRIFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0 PFE K_n/1000	11.49	28.7	57.45	100.54		2.87	11.49	28.7	57.45	100.54
0.3 PFE P_{CAL}										
0.1 PFE PFE_c	0.4	0.3	0.3	0.2	–	0.3	0.4	0.3	0.4	0.5
3.0 MV $P/2\pi$	423	743	1027	1941		514	274	459	730	986
DRIFT MCF	.95	.40	.29	.10		.58	1.5	.65	.55	.51
S. P.						+11.2				
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO, TOMBSTONE

LINE 2, HALF S, SP. 1, a = 500', BEARING NS

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-24-77

PAGE 3

HEINRICHS GEOEX

SEND	1-2	6-7	5-6	4-5	3-4	2-3	6-7	5-6	4-5	3-4
RECEIVE		9-10					10-11			
MULTIPLIER	1	1	1	0.1	0.1	0.1	1	1	0.1	0.1
PFE	0.5	0.1	0.3	0.2	0.1	0.1	0.3	0.3	0.1	0.4
CUR. (AMPS)	2	2	2.5	1.5	1.5	2	2	2.5	1.5	1.5
POINT NO.										
SEP. (n)	6	2	3	4	5	6	3	4	5	6
H. F. MV	22.4	71.4	20.2	8.895	7.84	8.24	36.7	12.3	6.10	5.35
DRIFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0 PFE K_n/1000	160.86	11.49	28.7	57.45	100.54	160.86	28.7	57.45	100.54	160.86
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	0.7	0.3	0.6	0.5	0.3	0.3	0.5	0.5	0.3	0.6
3.0 MV $\rho/2\pi$	1716	391	221	324	500	631	502	269	389	546
DRIFT MCF	.41	.77	2.7	1.5	.60	.48	1.0	1.9	.77	1.1
S. P.		+5.9					+21.0			
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. 1158, AREA ARCO, TOMBSTONE

LINE 2, HALF 5, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-24-77

PAGE 4

HEINRICHS GEOEX

SEND		6-7	5-6	4-5	3-4	SP	3-4	4-5	5-6	6-7	2-3
RECEIVE		11-12			4,3	3,2	2,1				1,0
MULTIPLIER		0.1	.01	.01			10	1	1	1	10
PFE		0.1	0.2	0.2			0.1	0.2	0.2	-0.1	0.2
CUR. (AMPS)		2	2.5	1.5			1.5	2.5	1	2	1
POINT NO.											
SEP. (n)		4	5	6			1	2	3	4	1
H. F. MV		2.23	.927	.571			242	95.35	13.7	15.05	527
DRIFT		0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0
1.0 PFE	K_n/1000	57.45	100.54	160.86			2.87	11.49	28.7	57.45	2.87
0.3 PFE	P_{CAL}										
0.1 PFE	PFE_c	0.3	0.4	0.4			0.3	0.4	0.4	0.1	0.4
3.0 MV	$\rho/2\pi$	61	36	58			441	417	374	412	1440
DRIFT	MCF	4.9	11	6.9			.68	.96	1.1	.24	.28
S. P.		+6.2			-18.7	-3.4	-26.6				+20.7
NOISE											
POT RES.											
CULT & CMTS											

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO, TOMBSTONE

LINE 2, HALF N, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-24-77

PAGE 5

HEINRICHS GEOEX

SEND		3-4	4-5	5-6	6-7	1-2	1-2	2-3	3-4	4-5	5-6
RECEIVE						CAL	0, -1				
MULTIPLIER		10	1	1	1	10	1	1	0.1	0.1	0.1
PFE		0.3	0.3	0.4	0.2	-0.2	0.8	0.7	0.7	0.6	0.8
CUR. (AMPS)		1.5	2.5	1	2	1	1	1	1.5	2.5	1.5
POINT No.											
SEP. (n)		2	3	4	5		1	2	3	4	5
H. F. MV		156.5	79.8	12.3	14.0	105	61.5	13.4	7.14	4.67	1.17
DRIFT		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	+0.1
1.0 PFE	K_n/1000	11.49	28.7	57.45	100.54		2.87	11.49	28.7	57.45	100.54
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_c	0.5	0.5	0.6	0.4	-	1.0	0.9	0.9	0.8	1.0
3.0 MV	$\rho/2\pi$	1142	629	673	670		168	147	130	102	75
DRIFT	MCF	.44	.79	.89	.60		5.9	6.1	6.9	7.8	13
S. P.							-76.7				
NOISE											
POT RES.											
CULT & CMTS											

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO, TOMBSTONE

LINE 2, HALF N, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-24-77

PAGE 6

HEINRICHS GEOEX

SEND	6-7	1-2	2-3	3-4	4-5	5-6	1-2	2-3	3-4	4-5
RECEIVE		-1, -2					-2, -3			
MULTIPLIER	0.01	1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.1
PFE	0.9	0.1	0.3	0.2	0.1	0.2	0.1	0.0	0.1	-0.1
CUR. (AMPS)	1.5	1	1	1.5	2.5	2.5	1	1	1	2
POINT NO.										
SEP. (n)	6	2	3	4	5	6	3	4	5	6
H. F. MV	.916	30.2	9.855	8.77	7.08	3.42	11.65	3.87	2.15	1.88
DRIFT	0.0	0.0	0.0	0.0	0.0	+0.1	0.0	0.0	-0.1	0.0
1.0 PFE K_n/1000	160.86	11.49	28.7	57.45	100.54	160.86	28.7	57.45	100.54	160.86
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	1.1	0.3	0.5	0.4	0.3	0.4	0.3	0.2	0.3	0.1
3.0 MV $\rho/2\pi$	94	330	269	320	271	210	318	212	206	144
DRIFT MCF	12	.91	1.9	1.3	1.1	1.9	.94	.94	1.5	.69
S. P.		+77.2					+19.2			
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. 1158, AREA AZCO, TOMBSTONE

LINE 2, HALF N, SR 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-24-77

PAGE 7

HEINRICHS GEOEX

SEND		1-2	2-3	3-4							
RECEIVE		-3, -4									
MULTIPLIER		0.1	0.01	0.01							
PFE		-0.1	0.1	0.1							
CUR. (AMPS)		1	1	1							
POINT No.											
SEP. (n)		4	5	6							
H. F. Mv		2.79	.953	.499							
DRIFT		0.1	0.0	-0.1							
1.0 PFE	$K_n/1000$	57.45	100.54	160.86							
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_C	0.1	0.3	0.3							
3.0 MV	$\rho/2\pi$	153	91	76							
DRIFT	MCF	.66	3.3	3.9							
S. P.		+7.1									
NOISE											
POT RES.											
CULT & CMTS											

I. P. SENDER NOTES

JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 2, HALF S, SP. 1, DATE 3-24-77

PAGE 1

HEINRICHS GEOEX

SEND	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	5-6
RECEIVE	4-5	→	5-6	→	→	6-7	→	→	→	7-8
RANGE	X10X200	X10X200	X10X200	X10X200	X10X200	X10X100	X10X200	X10X200	X10X200	X10X250
VOLTAGE	620	690	480	620	690	190	480	620	690	260
CURRENT	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.5
SEND	4-5	3-4	2-3	1-2	6-7	6-7	5-6	4-5	3-4	2-3
RECEIVE	7-8	→	→	→		8-9	→	→	→	→
RANGE	X10X150	X10X150	X10X200	X10X200	X10X100	X10X200	X10X125	X10X150	X10X150	X10X200
VOLTAGE	200	360	600	690	270	320	240	200	370	650
CURRENT	1.5	1.5	2.0	2.0	1.0	2.0	2.5	1.5	1.5	2.0

FREQUENCIES 1.0 0.1

SENDER No. | POWER UNIT ID

OPERATOR T. MERIKLE M-7 187015

RECEIVER No. | HOURS RUN

OPERATOR M. FISHER

COMMENTS:

I. P. SENDER NOTES

JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 2, HALF 5, SP. 1, DATE 3-24-77

PAGE 2

HEINRICHS GEOEX

SEND	1-2	6-7	5-6	4-5	3-4	2-3	6-7	5-6	4-5	3-4
RECEIVE	→	9-10	→	→	→	→	10-11	→	→	→
RANGE	X10X200	X10X200	X10X250	X10X150	X10X150	X10X200	X10X200	X10X250	X10X150	X10X150
VOLTAGE	700	320	260	210	380	620	320	300	240	440
CURRENT	2.0	2.0	2.5	1.5	1.5	2.0	2.0	2.5	1.5	1.5
SEND	6-7	5-6	4-5							
RECEIVE	11-12	→	→							
RANGE	X10X200	X10X250	X10X150							
VOLTAGE	360	300	240							
CURRENT	2.0	2.5	1.5							

FREQUENCIES

SENDER No.	POWER UNIT ID
OPERATOR T. MERIKLE	M-7 187015
RECEIVER No.	HOURS RUN
OPERATOR M. FISHER	3

COMMENTS:

I. P. SENDER NOTES

JOB No. 1158 AREA A2CO, TOMBSTONE

LINE 2, HALF N, SP. 1, DATE 3-24-77

PAGE 3

HEINRICHS GEOEX

SEND	3,4	4,5	5,6	6,7	2,3	3,4	4,5	5,6	6,7	1,2
RECEIVE	1,2	→	→	→	0,1	→	→	→	→	cal
RANGE	10X150	10X250	10X100	10X200	10X100	10X150	10X250	10X100	10X200	10X100
VOLTAGE	440	380	140	280	400	440	380	140	260	270
CURRENT	1.5	2.5	1.0	2.0	1.0	1.5	2.5	1.0	2.0	1.0
SEND	1,2	2,3	3,4	4,5	5,6	6,7	1,2	2,3	3,4	4,5
RECEIVE	-1,0	→	→	→	→	→	-2,-1	→	→	→
RANGE	10X100	10X100	10X150	10X250	10X150	10X150	10X100	10X100	10X150	10X250
VOLTAGE	460	400	440	360	200	300	440	400	440	380
CURRENT	1.0	1.0	1.5	2.5	1.5	1.5	1.0	1.0	1.5	2.5

FREQUENCIES 1.0 & 0.1

SENDER No. 197015

POWER UNIT ID

OPERATOR RR

B&S 6HP

RECEIVER No.

HOURS RUN

OPERATOR ME

COMMENTS: 5,6 = 4 B

Ampere gauge reading .5 off (1.5=2.0)

I. P. SENDER NOTES

JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 2, HALF N, SP. 1, DATE 3-24-78

PAGE 4

HEINRICHS GEOEX

SEND	5,6	1,2	2,3	3,4	4,5	1,2	2,3	3,4		
RECEIVE	-2,-1	-3,-2	→	→	→	-4,-3	→	→		
RANGE	10X250	10X100	10X100	10X100	10X200	10X100	10X100	10X100		
VOLTAGE	300	460	400	320	300	460	400	320		
CURRENT	2.5	1.0	1.0	1.0	2.0	1.0	1.0	1.0		
SEND										
RECEIVE										
RANGE										
VOLTAGE										
CURRENT										

FREQUENCIES 1.0 4011

SENDER No. 187015 POWER UNIT ID

OPERATOR RR

RECEIVER No. HOURS RUN

OPERATOR MF

COMMENTS: 5,6 ON 4B

I. P. RECEIVER NOTES, JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 1, HALF S, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-22-77

PAGE 1

HEINRICHS GEOEX

SEND	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	5-6
RECEIVE	4-5 →		5-6 →			6-7 →				7-8
MULTIPLIER	1	1	1	1	1	1	1	1	1	1
PFE	0.3	0.3	0.1	0.1	0.3	0.1	0.1	0.1	0.3	0.1
CUR. (AMPS)	1.0	1.5	1.25	1.0	1.50	2.0	1.25	1.0	1.5	2.0
POINT No.										
SEP. (n)	1	2	1	2	3	1	2	3	4	1
H. F. MV	56.5	34.4	58.2	23.9	20.0	88.4	28.3	14.6	13.7	82.6
DRIFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0 PFE K_n/1000	2.87	11.49	2.87	11.49	28.7	2.87	11.49	28.7	57.45	2.87
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	0.6	0.6	0.4	0.4	0.6	0.4	0.4	0.4	0.6	0.4
3.0 MV $\rho/2\pi$	154	251	127	262	364	121	248	399	500	113
DRIFT MCF	3.9	2.4	3.1	1.5	1.6	3.3	1.6	1.0	1.2	3.5
S. P.	+12.1		+2.4			+0.15				-12.4
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 1, HALF S, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-22-77

PAGE 2

HEINRICHS GEOEX

SEND	4-5	3-4	2-3	1-2	6-7	6-7	5-6	4-5	3-4	2-3
RECEIVE	7-8	→	→	→	CAL	8-9	→	→	→	
MULTIPLIER	1	1	0.1	0.1	10	1	1	1	0.1	0.1
PFE	-0.1	0.0	0.2	0.1	-0.3	0.0	-0.1	0.0	-0.1	0.2
CUR. (AMPS)	2.0	1.25	1.0	1.5	1.0	1.25	2.0	2.0	1.25	1.0
POINT NO.										
SEP. (n)	2	3	4	5		1	2	3	4	5
H. F. MV	25.3	11.1	6.42	6.51	105	49.8	31.1	14.8	7.77	4.99
DRIFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
1.0 PFE K_n/1000	11.49	28.7	57.45	100.54		2.87	11.49	28.7	57.45	100.54
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	0.2	0.3	0.5	0.4	0.0	0.3	0.2	0.3	0.2	0.5
3.0 MV $\rho/2\pi$	138	243	351	416		109	170	202	340	478
DRIFT MCF	1.4	1.2	1.4	.96		28	1.2	1.5	.58	1.0
S. P.						+22.7				
NOISE										
POT RES.										
CULT & CMTS										

I.P. RECEIVER NOTES, JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 1, HALF S, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-22-77

PAGE 3

HEINRICHS GEOEX

SEND		1-2	6-7	5-6	4-5	3-4	2-3	6-7	5-6	4-5	3-4
RECEIVE			9-10	→	→	→	→	10-11	→	→	→
MULTIPLIER		0.1	1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PFE		-0.2	-0.1	0.1	-0.1	-0.2	-0.1	0.0	-0.1	0.1	0.0
CUR. (AMPS)		1.5	1.0	2.0	1.5	1.25	1.0	1.0	2.0	1.0	1.25
POINT No.											
SEP. (n)		6	2	3	4	5	6	3	4	5	6
H. F. MV		5.35	16.9	20.0	8.13	6.12	4.08	8.08	10.48	2.99	3.49
DRIFT		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1.0 PFE	K_n/1000	160.86	11.49	28.7	57.45	100.54	160.86	28.7	57.45	100.54	160.86
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_c	0.1	0.2	0.4	0.2	0.1	0.2	0.3	0.2	0.4	0.3
3.0 MV	$\rho/2\pi$	546	185	273	297	469	625	221	287	286	428
DRIFT	MCF	.18	1.1	1.5	.67	.21	.32	1.4	.70	1.4	.70
S. P.			+26.1					+19.3			
NOISE											
POT RES.											
CULT & CMTS											

I. P. RECEIVER NOTES, JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 1, HALF S-N, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-22-77

PAGE 4

HEINRICHS GEOEX

SEND	6-7	5-6	4-5	SP	SP	3-4	4-5	5-6	6-7	2-3
RECEIVE	11-12	→		4-3	3-2	2-1	→			1-0
MULTIPLIER	0.1	0.1	0.1			1	1	1	0.1	10
PFE	0.1	-0.1	0.0			0.1	0.1	0.1	0.3	0.3
CUR. (AMPS)	1.0	2.0	1.0			1.0	1.0	2.0	1.0	1.0
POINT NO.										
SEP. (n)	4	5	6			1	2	3	4	1
H. F. MV	3.63	4.90	1.44			101.1	22.9	26.0	8.91	150
DRIFT	0.0	0.0	0.0			0.0	0.0	-0.1	0.0	0.0
1.0 PFE K_n/1000	57.45	100.54	160.86			2.87	11.49	28.7	57.45	2.87
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	0.4	0.2	0.3			0.2	0.3	0.3	0.5	0.5
3.0 MV $\rho/2\pi$	199	235	221			276	250	355	487	409
DRIFT MCF	2.0	.85	1.4			1.1	1.2	.85	1.0	1.2
S. P.	-28.2			+5.8	+13.3	+6.0				-12.5
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. 1158 EA AZCO, TOMBSTONE

LINE 1, HALF N, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-22-77 3-23-77

PAGE 5

HEINRICHS GEOEX

SEND	3-4	4-5	5-6	6-7	CAL	1-2	2-3	3-4	4-5	5-6
RECEIVE	1-0	→	→	→	1-2	0,-1				
MULTIPLIER	1	1	1	0.1	1	1	1	1	0.1	0.1
PFE	0.2	0.3	0.3	0.2	-0.2	0.4	0.5	0.5	0.5	0.6
CUR. (AMPS)	1.0	1.0	2.0	1.0	.6	1.0	1.0	1.0	2.0	2.0
POINT No.										
SEP. (n)	2	3	4	5		1	2	3	4	5
H. F. MV	38.2	13.5	18.5	6.95	6.31	106.4	28.6	12.0	10.31	7.96
DRIFT	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
1.0 PFE K_n/1000	11.49	28.7	57.45	100.54		2.87	11.49	28.7	57.45	100.54
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	0.4	0.5	0.5	0.4	0.0	0.6	0.7	0.7	0.7	0.8
3.0 MV $\rho/2\pi$	417	368	505	664		290	312	327	282	380
DRIFT MCF	.96	1.4	.99	.60		2.1	2.2	2.1	2.5	2.1
S. P.						+16.7				
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 1, HALF N, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-23-77

PAGE 6

HEINRICHS GEOEX

SEND	6-7	1-2	2-3	3-4	4-5	5-6	1-2	2-3	3-4	4-5
RECEIVE		-1, -2					-2-3			
MULTIPLIER	0.1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PFE	0.1	0.6	0.4	0.5	0.3	0.5	0.8	0.7	0.5	0.4
CUR. (AMPS)	1.0	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	2.0
POINT No.										
SEP. (n)	6	2	3	4	5	6	3	4	5	6
H. F. MV	3.18	20.8	8.70	4.88	5.04	4.30	5.51	2.83	1.83	2.06
DRIFT	-0.1	+0.2	0.0	0.0	+0.1	0.0	0.0	0.0	0.0	0.0
1.0 PFE K_n/1000	160.86	11.49	28.7	57.45	100.54	160.86	28.7	57.45	100.54	160.86
0.3 PFE ρ_{CAL}										
0.1 PFE PFE_c	0.3	0.8	0.6	0.7	0.5	0.7	1.0	0.9	0.7	0.6
3.0 MV $\rho/2\pi$	486	227	237	267	241	329	150	155	175	315
DRIFT MCF	.62	3.1	2.5	2.6	2.1	2.1	6.7	5.8	4.0	1.9
S. P.		+36.8					-27.4			
NOISE										
POT RES.										
CULT & CMTS							NOISEY →			

I.P. RECEIVER NOTES, JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 1, HALF N, SP. 1, a = 500', BEARING N-S

SENDER STA. 0 = ELECTRODE No. 4, DATE 3-23-77

PAGE 7

HEINRICHS GEOEX

SEND		1-2	2-3	3-4							
RECEIVE		-4-3									
MULTIPLIER		0.1	0.1	0.1							
PFE		0.8	0.8	0.5							
CUR. (AMPS)		1.0	1.0	1.0							
POINT No.											
SEP. (n)		4	5	6							
H. F. MV		2.82	1.68	1.12							
DRIFT		+0.1	0.0	0.0							
1.0 PFE	K_n/1000	57.45	100.54	160.86							
0.3 PFE	ρ_{CAL}										
0.1 PFE	PFE_c	1.0	1.0	0.7							
3.0 MV	$\rho/2\pi$	154	161	171							
DRIFT	MCF	6.5	6.2	4.1							
S. P.		-87.4									
NOISE											
POT RES.											
CULT & CMTS		NOISEY									

I.P. SENDER NOTES

JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 1, HALF N, SP. 1500' NS DATE 3-22-77

PAGE 1

HEINRICHS GEOEX

SEND	2-3	1,2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	5-6
RECEIVE	4-5	→	5-6	→	→	6-7	→	→	→	7-8
RANGE	X10X100	X10X150	X10X125	X10X100	X10X150	X10X200	X10X125	X10X100	X10X150	X10X200
VOLTAGE	780	820	750	760	820	330	740	760	800	540
CURRENT	1.0	1.5	1.25	1.0	1.50	2.0	1.25	1.0	1.5	2.0
SEND	4-5	3-4	2-3	1-2	6-7	6-7	5-6	4-5	3-4	2-3
RECEIVE	→	→	→	→	CAL	8-9	—	—	—	—
RANGE	X10X200	X10X125	X10X100	X10X150	X10X100	X10X125	X10X200	X10X100	X10X125	X10X100
VOLTAGE	320	740	750	800	800	710	540	320	720	740
CURRENT	2.0	1.25	1.0	1.5	1.0	1.25	2.0	2.0	1.25	1.0

FREQUENCIES	
SENDER No.	POWER UNIT ID
OPERATOR T. MERIKLE	M.7 187015
RECEIVER No. 20643R	HOURS RUN
OPERATOR M Fischer	

COMMENTS:

I.P. SENDER NOTES

JOB No. 1159 AREA AZCO, TOMBSTONE

LINE 1, HALF 8, SP. 1500 N/S, DATE 3-22-77

PAGE 2

HEINRICHS GEOEX

SEND	1-2	6-9	5-6	4-5	3-4	2-3	6-7	5-6	4-5	3-4
RECEIVE	8-9	9-10	→	→	→	→	10-11	→	→	→
RANGE	X10X150	X10X100	X10X200	X10X150	X10X125	X10X100	X10X100	X10X200	X10X100	X10X125
VOLTAGE	790	560	540	240	720	730	560	520	160	700
CURRENT	1.5	1.0	2.0	1.5	1.25	1.0	1.0	2.0	1.0	1.25
SEND	6-7	5-6	4-5							
RECEIVE	11-12	→	→							
RANGE	X10X100	X10X200	X10X100							
VOLTAGE	550	520	160							
CURRENT	1.0	2.0	1.0							

FREQUENCIES	
SENDER No.	POWER UNIT ID
OPERATOR T. MERIKLE	M-7 18701S
RECEIVER No. 20603R	HOURS RUN
OPERATOR M.F.	2½

COMMENTS: 1-2

I.P. SENDER NOTES

JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 1, HALF N, SP. 1500' N-S, DATE 3-22-77

PAGE 3

HEINRICHS GEOEX

SEND	3-4	4-5	5-6	6-7	2-3	3-4	4-5	5-6	6-7	1-2
RECEIVE	1-2	→	→	→	0,1	→	→	→	→	CAL
RANGE	100X10	100X10	200X10	100X10	100X10	100X10	100X10	200X10	100X10	200X3
VOLTAGE	520	140	500	540	680	520	140	500	520	420
CURRENT	1.2	1.2	2.2	1.2	1.2	1.2	1.2	2.2	1.2	0.6
SEND	1,2	2,3	3,4	4,5	5,6	6,7	1,2	2,3	3,4	4,5
RECEIVE	-1,0	→	→	→	→	→	-2,-1	→	→	→
RANGE	100X10	100X10	100X10	200X10	200X10	100X10	100X10	100X10	100X10	200X10
VOLTAGE	480	680	500	260	500	540	480	680	500	260
CURRENT	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	2.0

FREQUENCIES	1.0 + 0.1		COMMENTS: All 2B SAVE 4,5-2C ~~4-5-6~~
SENDER No.	18701.5	POWER UNIT ID	
OPERATOR	RR	B&S	
RECEIVER No.	20693R	HOURS RUN	
OPERATOR	M.F		

I.P. SENDER NOTES

JOB No. 1158 AREA AZCO, TOMBSTONE

LINE 1, HALF N, SP. 1, DATE 3-23-77

PAGE 4

HEINRICHS GEOEX

SEND	5,6	1,2	2,3	3,4	4,5	1,2	2,3	3,4		
RECEIVE	-2,-1	-3,-2	→	→	→	-4,-3	→	→		
RANGE	10X200	10X100	10X100	10X100	10X200	10X100	10X100	10X100		
VOLTAGE	480	480	680	500	240	480	680	500		
CURRENT	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0		
SEND										
RECEIVE										
RANGE										
VOLTAGE										
CURRENT										

FREQUENCIES	1.0 to 0.1		COMMENTS: 4,5 & 5,6 ON 2-C Mode
SENDER No.	18701 S	POWER UNIT ID	OTHERS ON 2-B
OPERATOR	RR	BTS 8hp	
RECEIVER No.	206936	HOURS RUN	
OPERATOR	M.F.		

GEOEX
Cable: GEOEX
MAR 23 1977
BOX 5964 TUCSON, ARIZONA 85703
Phone: (AREA 602) 623-0578

HEINRICHS GEOEXPLORATION COMPANY

P.O. BOX 5964, TUCSON, ARIZONA 85703, 806 WEST GRANT ROAD, PHONE: (602) 623-0578

March 18, 1977

North American Mining and Mineral Corporation
P.O. Box 1706
Casper, Wyoming 82601

Re: GEOEX Proposal #1158
Tombstone, Cochise County, AZ
Geophysical Reconnaissance
Induced Polarization, Resistivity
and Self Potential Survey

Attention: Mr. Stan Spaulding

Gentlemen:

This letter will serve to confirm phone conversations with Mr. Gene Simons and Mr. Stan Spaulding today.

Pursuant to several recent discussions held with Mr. Simons, our Chris Ludwig and myself, GEOEX agrees to act as an independent contractor and as professional consultants in your behalf, to conduct, interpret and report on the results, in writing, a survey, for mineral exploration purposes, on an area designated by Mr. Simons on property which you control or have access permission, south easterly of Tombstone. The objective is to test potentially favorable geologic structures according to maps in Mr. Simons' possession.

It is agreed, unless subsequent extensions are granted, to initially limit expenditures to a maximum of $3000.00, including report, based on standard present GEOEX charge rates (see sheet enclosed herewith) and estimates of production, coverage and accessibility factors involved.

Work will start on or about 21 March 1977 utilizing a three man crew, one 4X4 vehicle and complete equipment required. The crew will motel base in Tombstone.

GEOEX will assume all Workmen's Compensation liability, public liability, and property damage liability incurred by GEOEX employees. All property permits, brushing and trespass liability and related costs incurred by GEOEX on your behalf will be charged at 115% of GEOEX cost.

A customary advance of 50% of the anticipated total job cost is hereby requested to defray our mobilization, start up and initial operating expenses for this kind of work. Receipt of this, together with your executed extra copy of this letter as provided below, will serve as our authorization to proceed in your behalf. Our statement for $1500 advance on account, to be balanced against subsequent detailed billings which will be submitted, is enclosed.

Sincerely,

Heinrichs GEOEXploration Company

Walter E. Heinrichs, Jr.
President & General Manager

Date: 3-21-77

Approved by: W C Kirkham

Title: Managing Partner

WEH:mt

Enclosures: Statement, Extra Carbon Copy, GEOEX Trifold, Rates, History

cc: Mr. Gene Simons w/enclosures

HEINRICHS GEOEXPLORATION COMPANY

P.O. BOX 5964, TUCSON, ARIZONA 85703, 806 WEST GRANT ROAD, PHONE: (602) 623-0578

March 18, 1977

STATEMENT

North American Mining and Minerals Corporation
P.O. Box 1706
Casper, Wyoming 82601

Re : GEOEX Proposal #1158
Tombstone, Cochise County, AZ
Geophysical Reconnaissance
Induced Polarization, Resistivity,
and Self Potential Survey

Attention: Mr. Stan Spaulding

PROFESSIONAL FEES AND SERVICES

Advance on account to be allocated against future
itemized billings ----------$1500.00

GEOEX
Cable: GEOEX
MAR 23 1977
BOX 5964 TUCSON, ARIZONA 85703
Phone: (AREA 602) 623-0578

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