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

The following file is part of the Walter E. Heinrichs, Jr. Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

INDUCED POLARIZATION SURVEY
IN THE
SLATE CREEK AREA
YAVAPAI COUNTY, ARIZONA

FOR

KALIUM CHEMICALS LIMITED

JULY, 1973

BY

Heinrichs GEOEXploration Company

GEOEX Job #830

INDUCED POLARIZATION SURVEY
IN THE
SLATE CREEK AREA
YAVAPAI COUNTY, ARIZONA

FOR

KALIUM CHEMICALS LIMITED

JULY, 1973

BY

HEINRICHS GEOEXPLORATION COMPANY
EXPLORATION ENGINEERS AND CONSULTANTS

P.O. BOX 5964 TUCSON, ARIZONA

STRATHMORE ONION SKIN
25% COTTON FIBER U.S.A.

GEOEX Job #830

CONTENTS

INTRODUCTION

At the request of Mr. W. P. Leedy of Kalium Chemical Limited of Prescott, Arizona, Heinrichs GEOEXploration Company of Tucson, Arizona, conducted a brief induced polarization (I.P.) survey over parts of the Slate Creek Area, Yavapai County, Arizona. The purpose of this work was to detect and delineate any significant sulfide mineralization existing at depth related to an altered zone within the Precambrian Yavapai schist showing interesting base and precious metal geochemical values. This field work was done during the interim June 18 to June 22, 1973, with Mr. J. Martin as crew chief. Supervision, interpretation and report were by Mr. C. Ludwig, Chief Geophysicist, assisted by the GEOEX staff.

PROCEDURES

A gradient array I. P. setup was positioned on a grid previously surveyed by Kalium, centered on the zone of geologic interest, and oriented such that the lines would be approximately normal to strike, i.e., the lines run N45°W-S45°E. Four lines were run, each 1400 feet in length and separated 400 feet apart. The readings were obtained with a voltage measuring dipole, 100 feet in length, which was moved on 100 foot station increments along the lines. The data is plotted at the midpoints of the voltage dipole positions and is presented as contour plans of the apparent resistivity,percent frequency effect (PFE) and metallic conduction factor (MCF). Self potential (SP) readings taken in the course of the I.P. readings are shown as a set of stacked profiles.

A five-electrode, collinear dipole-dipole line (Baseline) was also run along O-W/E and centered at O-S/N using 300 foot dipoles. These data are presented on a sectional data sheet showing the resistivity, PFE and MCF contoured in"sectional" form and SP in profile form at the bottom of the sheet.

GEOEX Mark 4 System I.P. equipment was used on the project. The dual frequency I.P. technique was employed on frequency pairs of 0.1 and 1.0 hz for the gradient array coverage and 0.3 and 3.0 hz for the dipole-dipole array coverage.

The gradient array technique utilizes two grounded current electrodes placed far enough apart on either side of the area of interest so that the area is in an approximately uniform electric field. This field is preferably oriented normal to the expected target strike. For this survey, the grounded current electrodes were placed about 2000 feet N45°W and 2000 feet S45°E of the grid origin. Voltage measurements were made over a short enough length (100 feet in this case) relative to the current dipole length (4000 feet in this case), so that they approximated (when divided by 100 feet) the gradient of the voltage in the normal-to-strike direction.

One important item to note in gradient I.P. is that the depth of penetration is determined by the current dipole length and not the voltage measuring dipole length. For a given grid, depth manifests itself by broadness of anomaly shape just as in a magnetic, gravity or SP survey and the resulting I.P. data is interpreted and presented in a very similar fashion to these other geophysical methods. Changing the voltage measuring length (station spacing) only affects the detail of the resultant data and not the depth response.

For additional information on theory, interpretation and specifics on the dipole-dipole I.P. array, please refer to the appended "Basis of the Induced Polarization Method".

CONCLUSIONS AND RECOMMENDATIONS

No anomalous I.P. response was detected with either array used - the PFE shows only minor background variations typical of unmineralized rock. However, the zone of interest does show as a well defined resistivity low on gradient lines 400S, 0-S/N and 400N along the baseline. This resistivity low in turn produces a minor MCF high which is not considered significant due to lack of a corresponding high PFE response. This resistivity low is likely reflecting the more conductive alteration products present in the zone of interest. The general resistivity pattern shows the N45°E schistosity of the Yavapai schist with very elongate contours in that direction.

The dipole-dipole Baseline shows some resistivity variation along strike, perhaps related to variations in width of the altered zone. In general, the resistivity level of the two arrays is quite similar, as is the PFE background level.

Self potentials show some variation, probably mainly caused by the topographic irregularities and rock type changes present. There is a 140 millivolt, one-station low at 700W on Line 400N which could possibly be of sulfide significance but there is no correlating response on the two adjacent lines. There is no significant SP response correlating with the zone of interest implying a lack of any important near surface, actively oxidizing, interconnected sulfide mineralization - in further support of the negative I.P. results.

These uniformly discouraging results do not rule out the possibility of some sulfides at depth - just that, if present, they are likely in very narrow (say less than 10 feet total width), perhaps discontinuous, zones probably of no economic importance, or they are quite deep (say below 400 feet). Considering the normal penetration limits of the arrays and spacings used here, the zone from surface down to about 400 or 500 feet below surface was prospected in fair detail. No additional geophysical work is recommended at this time.

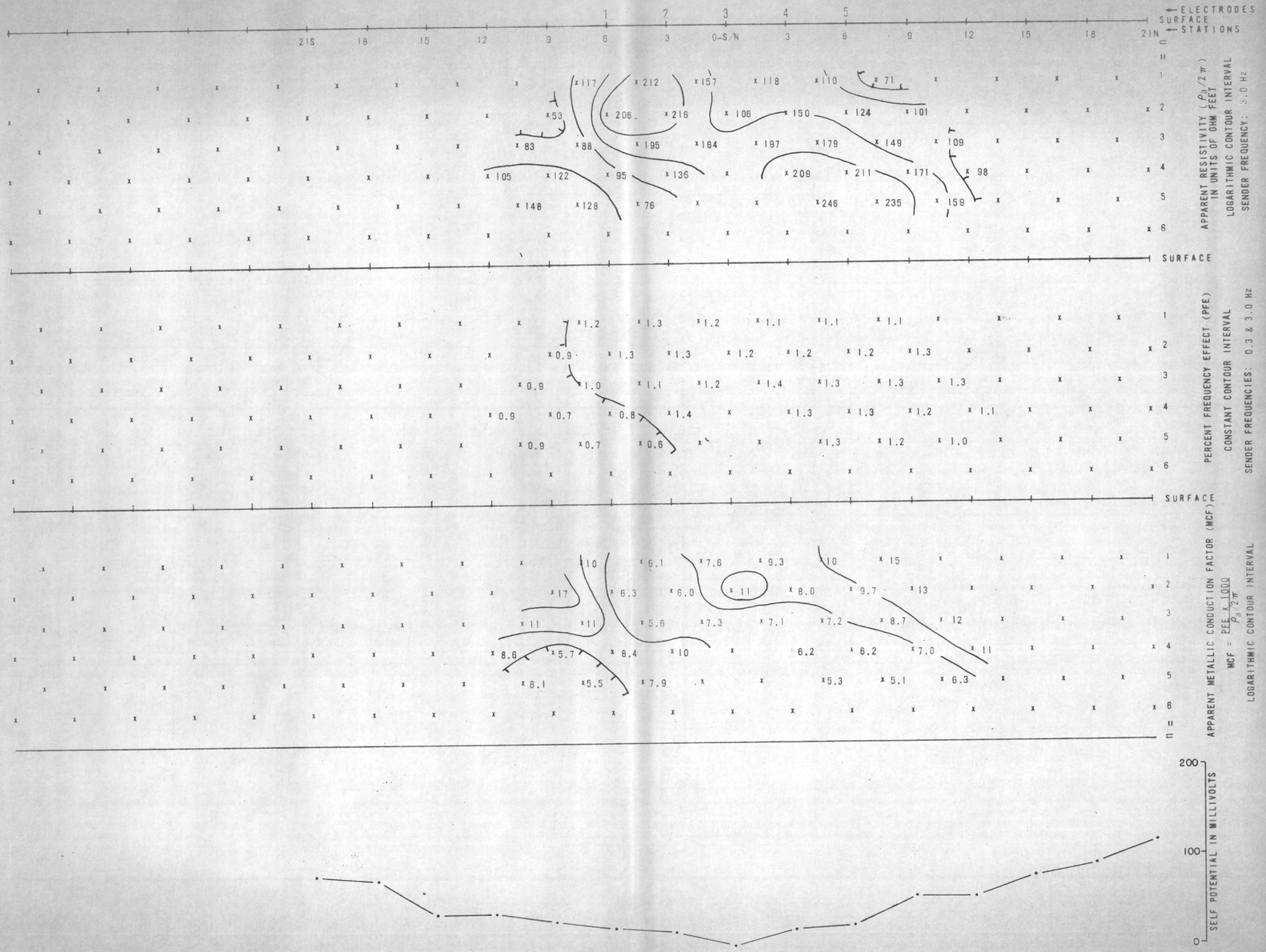
Respectfully submitted,

Heinrichs GEOExploration Company

Chris S. Ludwig

Chris S. Ludwig
Chief Geophysicist

CSL:mt

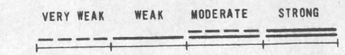


830-73

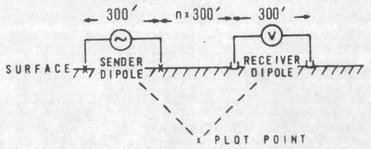
LINE NO.
BASELINE
SPREAD(S)
1
BEARING
N 45° E

INDUCED POLARIZATION TRAVERSE SECTIONAL DATA SHEET of SLATE CREEK AREA for KALIUM CHEMICALS LIMITED

RELATIVE ANOMALY STRENGTH



DIPOLE-DIPOLE ELECTRODE ARRAY



DATE
JUNE 1973

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

I. P. RECEIVER NOTES, JOB No. [redacted] AREA Slate Creek PAGE 1

LINE 0, HALF NW, SR. [redacted], a = 100, BEARING N 45° E / S 45° W

SENDER STA. _____ = ELECTRODE No. _____, DATE 6-20

HEINRICHS GEOEX

SEND		C&L									
RECEIVE			0-100 W	100-200 W	200-300 W	300-400 W	400-500 W	500-600 W	600-700 W		
MULTIPLIER		10	1.0	1.0	1.0	1.0	1.0	1.0			
PFE											
CUR. (AMPS)		3	4 →							← I	
POINT NO.											
SEP. (n) G(X)Y			0.497	0.491	.475	.455	.427	.397	.360		
H. F. MV											
DRIFT											
1.0 PFE	K_n/1000	300	11.1	22.8	23.0	20.7	18.3	39.3	31.2	← ΔV	
0.3 PFE	P_{CAL}							11.2			
0.1 PFE	PFE_C	0.1	1.0	1.0	1.0	0.9	1.0	0.9	0.9		
3.0 MV	P/2π		55	112	109	94	78	156.1	112		
DRIFT	MCF	—	—	—	—	—	—	—	—		
S. P.			+11.35	+21.7	+13.35	+13.85	+30.9	+37.1	+30.1		
NOISE											
POT RES	PFE		0.9	0.9	0.9	0.8	0.9	0.8	0.8		
CULT & CMTS	MCF		16	8.0	8.3	8.5	12	5.1	7.1		

I. P. RECEIVER NOTES, JOB NO. [redacted] AREA Slate Creek PAGE 2

LINE 0, HALF E, SR. [redacted], $\frac{3}{a}$ = 100, BEARING E

SENDER STA. _____ = ELECTRODE NO. _____, DATE 6-20

HEINRICHS GEOEX

SEND						E	E			
RECEIVE	0-100 E	100-200 E	200-300 E	300-400 E	400-500 E	500-600	600-700			
MULTIPLIER	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
PFE										
CUR. (AMPS)	4 →									
POINT NO.										
SEP. (n)	0.497	0.491	.475	.455	.427	.397	.360			
H. F. MV										
DRIFT										
1.0 PFE K_n/1000	14.9	17.9	29.2	39.4	22.5	25.1	40.7			
0.3 PFE P_{CAL}										
0.1 PFE PFE_c	1.1	1.1	1.0	0.8	0.8	1.0	1.2			
3.0 MV $P/2\pi$	74	88	139	179	96	100	147			
DRIFT MCF	—	—	—	—	—	-.1	—			
S. P. +	4.95	+12.0	+ 5.1	+26.1	+26.7	+13.5	+11.1			
NOISE										
POT RES.	1.0	1.0	0.9	0.7	0.7	0.9	1.1			
CULT & CMTS	14	11	6.5	3.9	7.3	9.0	7.5			

I. P. RECEIVER NOTES, JOB NO. _____ AREA Slate Creek PAGE 3

LINE 400N, HALF W, SR. _____, a = 100, BEARING W

SENDER STA. _____ = ELECTRODE NO. _____, DATE 6-20

HEINRICHS GEOEX

SEND	W	W	W	W	W	W	W			
RECEIVE	0-100	100-200	200-300	300-400	400-500	500-600	600-700			
MULTIPLIER	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
PFE										
CUR. (AMPS)	4 →									
POINT NO.										
SEP. (n)	.529	.523	.509	.488	.462	.436	.403			
H. F. MV										
DRIFT										
1.0 PFE K_n/1000	15.3	18.3	18.5	15.9	25.5	45.7	30.0			
0.3 PFE P_{CAL}										
0.1 PFE PFE_C	1.0	1.0	0.6	0.6	0.8	0.7	1.1			
3.0 MV $P/2\pi$	81	96	94	78	118	199	121			
DRIFT MCF	—	—	—	—	—	—	—			
S. P.	+14.0	+15.1	+16.05	+28.9	+17.2	+14.3	-12.3			
NOISE										
POT RES. PFE	0.9	0.9	0.5	0.5	0.7	0.6	1.0			
CULT & CMTS	11	9.4	5.3	6.4	5.9	3.0	8.3			

I. P. RECEIVER NOTES, JOB NO. ● AREA Slate Creek PAGE 4

LINE 400 N, HALF E, SR. _____, ^2a = 100, BEARING E

SENDER STA. _____ = ELECTRODE NO. _____, DATE 6-20

HEINRICHS GEOEX

SEND	E	E	E	E	E	E	E			
RECEIVE	0-100	100-200	200-300	300-400	400-500	500-600	600-700			
MULTIPLIER	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
PFE										
CUR. (AMPS)	4 →									
POINT NO.										
SEP. (n)	.529	.523	.509	.488	.462	.436	.403			
H. F. MV										
DRIFT										
1.0 PFE K_n/1000	13.3	19.6	23.2	36.6	29.2	33.9	54.8			
0.3 PFE P_{CAL}										
0.1 PFE PFE_C	0.8	1.2	0.6	1.0	0.9	1.1	1.1			
3.0 MV $P/2\pi$	70	103	118	179	135	147	221			
DRIFT MCF	—	—	—	—	—	—	—			
S. P.	-9.6	+6.2	+30.7	+-0	+27.1	+7.1	+22.8			
NOISE										
POT RES. PFE	0.7	1.1	0.5	0.9	0.8	1.0	1.0			
CULT & CMTS	10	11	4.2	5.0	5.9	6.8	4.5			

I. P. RECEIVER NOTES, JOB NO. ● AREA S/o TE Creek PAGE 5

LINE 800 N, HALF E, SR. ____, ^{2}a = 100, BEARING E

SENDER STA. ____ = ELECTRODE No. ____, DATE 6-21-73

HEINRICHS GEOEX

SEND	CBL	E 00-100	E	E	E	E	E	E		
RECEIVE			100-200	200-300	300-400	400-500	500-600	600-700		
MULTIPLIER		1.0	1.0	1.0	1.0	1.0	1.0	1.0		
PFE										
CUR. (AMPS)	3	4	3	→						
POINT NO.										
SEP. (n)		.626	.621	.611	.595	.576	.552	.531		
H. F. MV										
DRIFT										
1.0 PFE K_n/1000	298	22.1	13.45	13.5	18.7	89.7	24.3	26.0		
0.3 PFE P_{CAL}										
0.1 PFE PFE_C	0.2	0.3	0.7	1.0	1.0	0.9	1.0	0.9		
3.0 MV $P/2\pi$		138	111	110	148	228	179	184		
DRIFT MCF	—	—	—	—	—	—	—	—		
S. P.		+26.1	+32.8	+14.0	+12.8	+42.0	+17.4	+21.7		
NOISE										
POT RES. MV		0.1	0.5	0.8	0.8	0.7	0.8	0.7		
CULT & CMTS		↑0.72	↑4.5	7.3	5.4	3.1	4.5	3.8		

4 AMPS | Went to 3 AMPS Here

I. P. RECEIVER NOTES, JOB No. ● AREA Slate Creek PAGE 6

LINE 800 N, HALF W, SP. ____, a = 100, BEARING W

SENDER STA. ____ = ELECTRODE No. ____, DATE 6-21-73

HEINRICHS GEOEX

SEND		W	W	W	W	W	W	W			
RECEIVE		0-100	100-200	200-300	300-400	400-500	500-600	600-700			
MULTIPLIER		1.0	1.0	1.0	1.0	1.0	1.0	1.0			
PFE											
CUR. (AMPS)		3	3	3	3	3	3	3			
POINT NO.											
SEP. (n)		.626	.621	.611	.595	.576	.552	.531			
H. F. MV											
DRIFT				10.2							
1.0 PFE	K_n/1000	11.5	13.2	[illegible]	10.45	17.56	31.05	22.4			
0.3 PFE	P_{CAL}										
0.1 PFE	PFE_c	1.1	0.8	0.8	0.9	1.0	0.7	0.9			
3.0 MV	$P/2\pi$	96	109	83	83	135	228	159			
DRIFT	MCF	—	—	+.1	—	—	—	—			
S. P.		-17.7	+75.6	+28.0	+16.1	+20.4	+5.7	+17.4			
NOISE											
POT RES.		0.9	0.6	0.6	0.7	0.8	0.5	0.7			
CULT & CMTS		9.4	5.5	7.2	8.4	5.9	2.2	4.4			

3 DMPS

I. P. RECEIVER NOTES, JOB No. ____ AREA Slota Creek PAGE 7

LINE 400S, HALF E, SR. ____, a = 100, BEARING E

SENDER STA. ____ = ELECTRODE No. ____, DATE 6-21

HEINRICHS GEOEX

SEND		E	E	E	E	E	E	E			
RECEIVE		0-100	100-200	200-300	300-400	400-500	500-600	600-700			
MULTIPLIER		0.1	1.0	1.0	1.0	1.0	1.0	1.0			
PFE											
CUR. (AMPS)		3 →									
POINT NO.											
SEP. (n)		.529	.523	.509	.488	.462	.436	.403			
H. F. MV											
DRIFT											
1.0 PFE	K_n/1000	7.97	18.4	16.0	16.5	19.8	22.3	20.6			
0.3 PFE	P_{CAL}										
0.1 PFE	PFE_c	0.8	0.9	0.6	1.0	1.1	0.9	1.0			
3.0 MV	$P/2\pi$	56	128	109	120	122	130	111			
DRIFT	MCF	—	—	—	—	—	—	-.1			
S. P.		+4.7	+20.6	+62.4	+27.7	-24.6	-8.1	+14.3			
NOISE											
POT RES.		0.6	0.7	0.4	0.8	0.9	0.7	0.8			
CULT & CMTS		11	5.5	3.7	6.7	7.4	5.4	7.2			

I. P. Receiver Notes, Job No. _____ Area Slate Creek Page 8

Line 4005, Half W, Sr. _____, a = 100, Bearing W

Sender Sta. _____ = Electrode No. _____, Date 6-21

HEINRICHS GEOEX

Send	O W	W	W	W	W	W	W	W			
Receive	0-100	100-200	200-300	300-400	400-500	500-600	600-700				
Multiplier	0.1	1.0	1.0	1.0	1.0	1.0	1.0				
PFE											
Cur. (amps)	3	→									
Point No.											
Sep. (n)	.529	.523	.509	.488	.462	.436	.403				
H. F. Mv											
Drift											
1.0 PFE K_n/1000	9.98	16.0	18.0	13.8	18.5	18.6	19.45				
0.3 PFE P_{CAL}											
0.1 PFE PFE_c	1.1	0.4	0.7	0.0	1.1	0.6	0.9				
3.0 MV $P/2\pi$	70	112	122	90	114	108	104				
Drift MCF	—	—	—	—	—	—	—				
S. P.	-10.4	+37.8	+35.3	+7.8	+26.1	+17.7	+9.4				
Noise											
Pot Res. PFE	0.9	0.2	0.5	-0.2	0.9	0.4	0.7				
Cult & Cmts	13	1.8	4.1	-2.2	7.9	3.7	6.7				

I.P. RECEIVER NOTES, JOB NO. _____ AREA Slotta Creek PAGE 1

LINE J, HALF N, SR. _____, a = 300, BEARING N 45°W

SENDER STA. _____ = ELECTRODE NO. _____, DATE 6-22

HEINRICHS GEOEX

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-3 00N	3-6N	→	6-9N	→	→	9-12N	→	→	→
MULTIPLIER	10	10	10	10	10	1.0	10	10	1.0	1.0
PFE	1.0	1.1	1.3	1.1	1.2	1.4	1.1	1.2	1.3	1.3
CUR. (AMPS)	4	→	→	→	→	→	→	→	3	4
POINT NO. K_n	0.9	0.9	3.6	0.9	3.6	9	0.9	3.6	9	18
SEP. (n) ρ_{cal}	158	115	104	110	150	197	71	124	179	209
H.F. MV	6.3	9.6	12	10	8.0	7.1	15	9.7	7.2	6.2
DRIFT										
1.0 PFE K_n/1000										
0.3 PFE ρ_{CAL}	0.7	0.8	1.0	0.8	0.9	1.1	0.8	0.9	1.0	1.0
0.1 PFE PFE_c									9.8	
3.0 MV $\rho/2\pi$	200	511	116	490	167	87.4	316	138	~~[illegible]~~	46.5
DRIFT MCF	—	+.1	—	—	—	—	—	—	—	—
S.P.	+15.5	+3.1		+34.6			-2.4			
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB No. ____ AREA Slate Creek PAGE 2

LINE 7, HALF N, SR. 1, a = 300, BEARING N 45° W

SENDER STA. ____ = ELECTRODE No. ____, DATE 6-22

HEINRICHS GEOEX

SEND	4-5	3-4	2-3	1-2	4-5	2-4	2-3	4-5	3-4	CAL.
RECEIVE	12-15	N →	→	→	15-18	N →	→	18-21	N →	
MULTIPLIER	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
PFE	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.0	
CUR. (AMPS)	4	4	3	4	3	—	—	—	→	
POINT NO. K_n	3.6	9	18	31.5	9	18	31.5	18	31.5	
SEP. (n) $\rho_{n\pi}$	101	149	211	246	109	171	235	98	159	
H. F. MV/MCF	13	8.7	6.2	5.3	12	7.0	5.1	11	6.3	
DRIFT										
1.0 PFE $K_n/1000$										
0.3 PFE ρ_{CAL}	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.8	0.7	-.4
0.1 PFE PFE_c										
3.0 MV $\rho/2\pi$	112	66.2	35.2	31.2	36.3	28.5	22.35	16.35	15.1	202
DRIFT MCF	—	—	—	—	—	—	—	—	—	—
S. P.	+25.1				+10.9			+27.1		
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB NO. ____ AREA Slate Creek PAGE 3

LINE 7, HALF 5, SR. 1, a = 300, BEARING South 45° E

SENDER STA. ____ = ELECTRODE NO. ____, DATE 6-22

HEINRICHS GEOEX

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-3 5	3-6 5	→	6-9 5	→	→	9-12 5	→	→	→
MULTIPLIER	10	10	1.0	10	10	1.0	10	10	1.0	1.0
PFE	1.1	1.3	1.2	1.3	1.3	1.2	1.2	1.3	1.1	1.4
CUR. (AMPS)	3	→	→	→	→	→	→	→	→	→
POINT NO. K_n	0.9	0.9	3.6	0.9	3.6	9	0.9	3.6	9	18
SEP. (n) 2π	121	156	108	212	216	164	117	206	195	136
H. F. MV MCF	9.1	8.3	11	6.1	6.0	7.3	10	6.3	5.6	10
DRIFT										
1.0 PFE K_n/1000										
0.3 PFE P_{CAL}	0.8	1.0	0.9	1.0	1.0	0.9	0.9	1.0	0.8	1.1
0.1 PFE PFE_C										
3.0 MV $P/2\pi$	402	520	89.7	702.5	180	54.7	390.	172	65.0	22.7
DRIFT MCF									-.1	
S. P.	+15.5	+4.1		+9.4		+9.6 →				
NOISE										
POT RES.										
CULT & CMTS										

I. P. RECEIVER NOTES, JOB NO. _____ AREA Slate Creek PAGE 4

LINE T, HALF 5, SR. _____, a = 300, BEARING S 45° E

SENDER STA. _____ = ELECTRODE NO. _____, DATE 6-22

HEINRICHS GEOEX

SEND		1-2	2-3	3-4	4-5	1-2	2-3	3-4	1-2	2-3	
RECEIVE		13-13.5	→	→	→	15-18.5	→	→	18-21.5	→	CAL
MULTIPLIER		1.0	1.0	1.0	0.1	1.0	1.0	1.0	1.0	1.0	
PFE		0.9	1.0	0.8	0.6	0.9	0.7	0.7	0.9	0.9	
CUR. (AMPS)		3	—	—	—	—	—	—	—	→	2
POINT NO.	K_n	3.6	9	18	31.5	9	18	31.5	18	31.5	
SEP. (n)	P_{MV}	53	88	95	76	83	122	128	105	148	
H. F. MV	MCF	17	11	8.4	7.9	11	5.7	5.5	8.6	6.1	
DRIFT											
1.0 PFE	K_n/1000										
0.3 PFE	P_{CAL}	0.6	0.7	0.5	0.3	0.6	0.4	0.4	0.6	0.6	-.1
0.1 PFE	PFE_c										
3.0 MV	$P/2\pi$	44.5	29.3	15.9	7.23	27.5	20.35	12.2	17.5	14.1	2.03
DRIFT	MCF	—	—	—	—	—	—	—	←	→	→
S. P.		+0-				+34.2			+6.8		
NOISE											
POT RES.											
CULT & CMTS											

I. P. SENDER NOTES

JOB NO. _____ AREA SIMPLE CREEK

LINE J, HALF N, SP. 1, DATE JUNE 22, 73

HEINRICHS GEOEX

PAGE 1

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-3 00N	3-6 N	→	6-9N	→	→	9-12N	→	→	→
RANGE	3X133	3X133	3X133	3X133	3X133	3X133	3X133	3X133	3X100	3X133
VOLTAGE	400	560	400	640	560	400	680	640	560	400
CURRENT	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	4-5	3-4	
RECEIVE	12-15N	→	→	→	15-18N	→	→	18-21N	→	
RANGE	3X133	3X133	3X100	3X100	3X100	3X100	3X100	3X100	3X100	
VOLTAGE	680	640	400	400	500	500	400	500	500	
CURRENT	4.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0	3.0	

FREQUENCIES 3.0 ±0.3

SENDER NO. 866 / -5

OPERATOR DL

RECEIVER NO.

OPERATOR QM

COMMENTS: 9-12N change AMPS ON 2-3 FROM 4A to 3A

4-5 (15-18N) 3 AMPS

I. P. SENDER NOTES

JOB NO. _____ AREA SLATE CREEK

LINE J, HALF S, SP. 1, DATE JUNE 22, 73

HEINRICHS GEOEX

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-3.5	3-6.5	→	6-9.5	→	→	9-12.5	→	→	→
RANGE	3X100	3X100	3X100	3X100	3X100	3X100	3X100	3X100	3X100	3X100
VOLTAGE	500	460	500	400	460	500	300	400	460	500
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	1-2	2-3	
RECEIVE	12-15	S	→	→	15-18	S	→	18-21	S →	
RANGE	3X100	→	→	→	→	→	→	→	→	
VOLTAGE	300	400	460	500	300	400	460	300	500	
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	30	3.0	

FREQUENCIES	3.0 0.3
SENDER NO.	8661-5
OPERATOR	JZ
RECEIVER NO.	
OPERATOR	JM

COMMENTS:

~~Benson 624-2427~~

Cochise 294-3466

two daily

8:20 – 12:10 through Phx

5:00 P.M → 7:40

5:35 → 7:00

$32.00

ftt 413 8:20 ex Prescott A.M.

Kalispell Phone 445-3299 off.

445-5125 home

$\Delta X = 0.02$ or 0.01

$\therefore \Delta x = 100'$ or $50'$

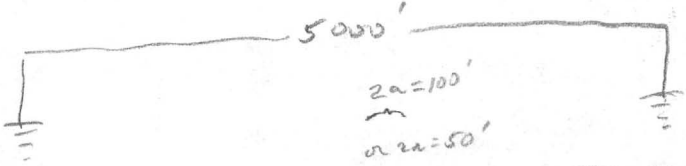
$$\frac{\Delta x}{l} = \Delta X$$

$$\text{or } l = \frac{\Delta x}{\Delta X} = \frac{100'}{0.02}$$

$$= 5000'$$

$$\text{or } \frac{50'}{0.02} = 2500'$$

$$\equiv \frac{100'}{0.04}$$



Grid x & y

$x \leq \frac{l}{3} \leq \frac{2500}{3} = 833$

$y \leq \frac{l}{2} \leq \frac{2500}{2} = 1250$

$\therefore$ grid $1667' \times 2500'$

Kalium / jet

$$\Delta V = \left(\frac{\rho_a}{2\pi}\right)\frac{(2a)I}{\ell G(X,Y)}$$

assume $\rho_a/2\pi \sim 200$ n-ft

$2a = 100$ ft

$I = 5$ amps $\rightarrow 5000$ ma

$G(X,Y) \sim 0.5$

$\ell = 2500'$

$$\Delta V \sim \frac{200 \times 100 \times 5000^2}{2500 \times 2500 \times 0.5} \text{ mv}$$

$$\frac{40000}{1250} = 32 \text{ mv}$$

good — $50' = a \rightarrow 16$ mv

still O.K.

$$\theta = \frac{0.6189\ell}{1000}\sqrt{\frac{f}{\rho_{(a)}}}$$

$0.6189 \times 2.5\sqrt{3a1/200} \rightarrow 0.189$ for 3 hz

0.109 for 1 hz

for 1 hz coupling nil

for 3 hz coupling ~ 0.2 PFE — worth trying

at ρ_a = 100 ohm ft 100, 0.6 PFE

June 20, 73

CURRENT 4A

VOLTAGE 640

June 21, 73

CURRENT 4A

VOLTAGE 680

100-200 E

800 N 3A

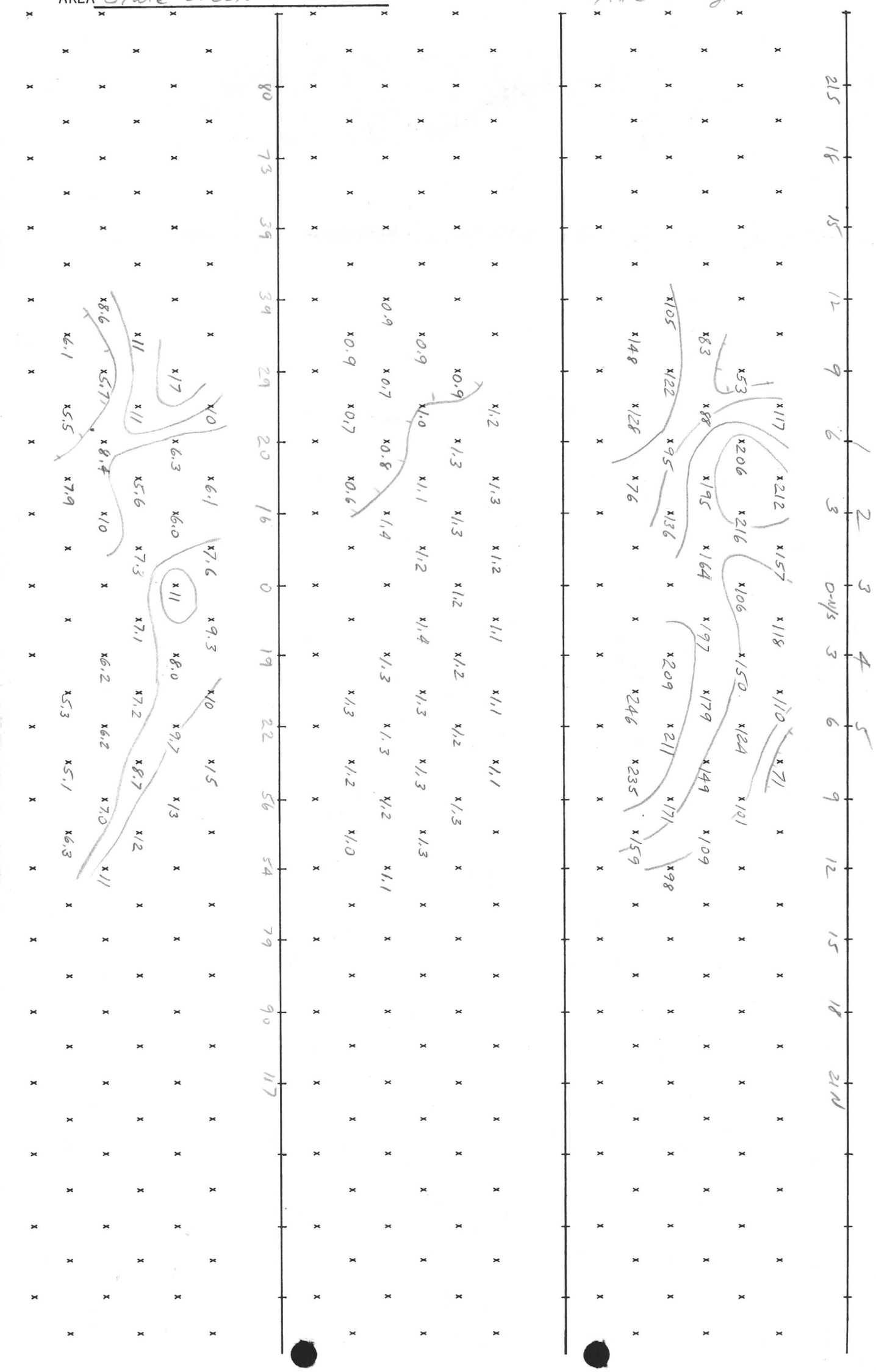
VOLTAGE 500

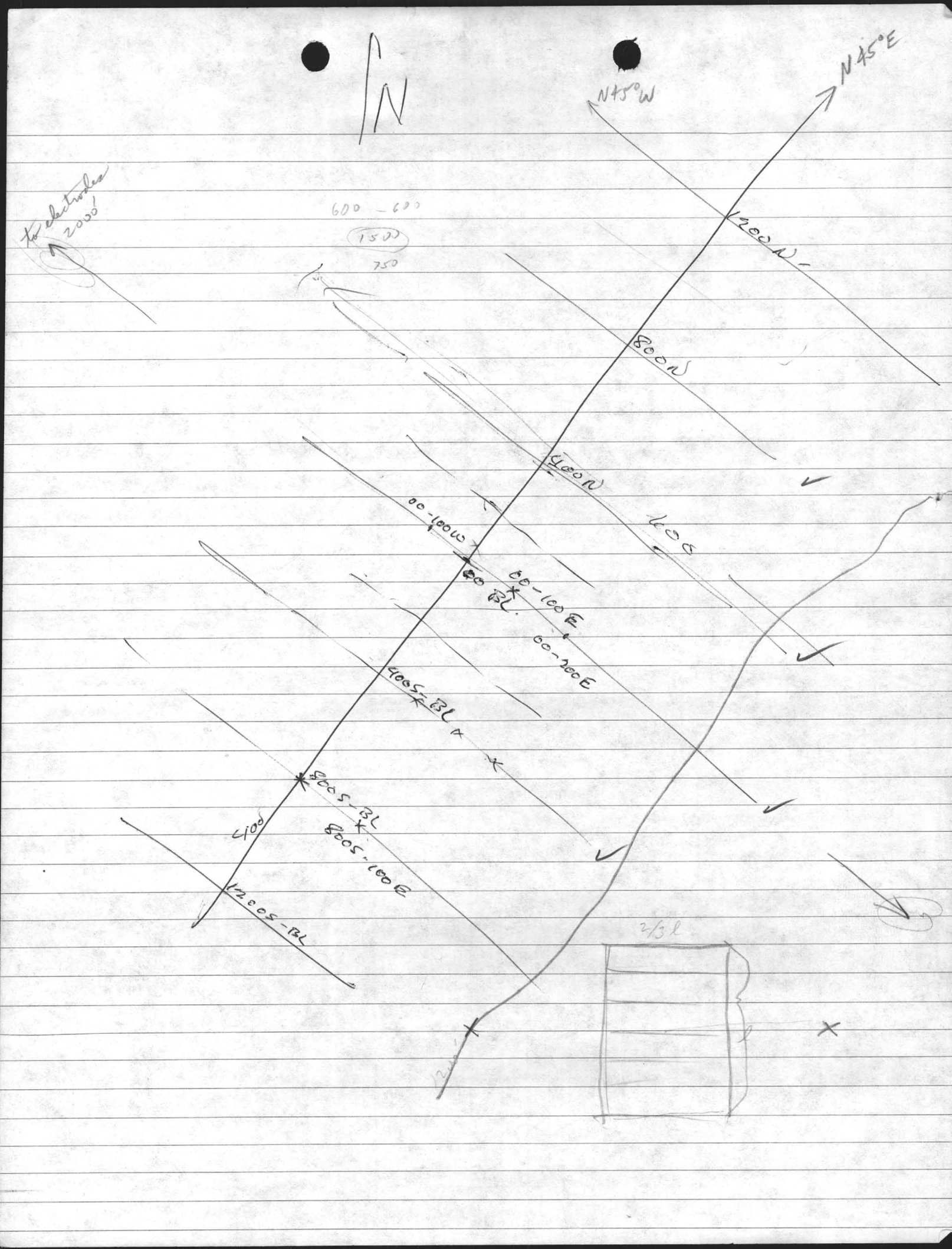
JOB# 830 LINE# 7 (Baseline) SP 1 a = 300' Bearing LOOKING N45E–S45W

CLIENT Kalium Chemicals Limited DATE June 1977 FREQUENCIES 0.3 & 3.0 Hz

AREA Slate Creek

0/7 @ 3.0 dg




N
N45°W
N45°E
to electrodes
2000'
600 - 600
1500
750
1200N
800N
400N
00-100W
00 BL.
00-100E
400S BL
800S BL
800S-100E
400
1200S-BL
2/3 l

JOB # 830

Gradient Array Calculations

$2a = 100' = \Delta x$

$2\ell = 4000' \qquad \ell = 2000'$

$\Delta y = 400'$

$$\Delta X = \frac{\Delta x}{\ell} = \frac{100}{2000} = 0.05$$

$y = 0, 400N, 800N), 400(S)$

$Y = 0, {}^{400}/_{2000} = 0.2, 0.4, 0.2$

$\boxed{G(X,Y)}$

x (EW)	X (EW)	Line: 0	400 N $Y = 0.2$	800 N = 0.4
50	0.025	0.497	0.529	0.626
150	0.075	0.491	0.523	0.621
250	0.125	0.475	0.509	0.611
350	0.175	0.455	0.488	0.595
450	0.225	0.427	0.462	0.576
550	0.275	0.397	0.436	0.552
650	0.325	0.360	0.403	0.531

$$\rho_{a/2\pi} = \left[\frac{\ell^2}{2a}\right]\left(\frac{\Delta V}{I}\right) G(X,Y)$$

constant $\dfrac{\ell^2}{2aI} = \dfrac{2000^2}{100 \times 4000} = 10$ for 4 amps

& $\dfrac{2000^2}{100 \times 3000} = 13.33$ for 3 amps

$\therefore \rho_{a/2\pi} = \underline{10}\ \Delta V\ G(X,Y)$ for 4 amps

$= \underline{13.33}\ \Delta V\ G(X,Y)$ for 3 amps

HEINRICHS GEOEXPLORATION COMPANY

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

June 14, 1973

Mr. W. P. Leedy
Kalium Chemicals Limited
P.O. Box 2441
Prescott, Arizona 86301

HEINRICHS GEOEX
Cable: GEOEX

Re: Proposed I.P.
Slate Creek Property
GEOEX Job #830

Dear Mr. Leedy:

Pursuant to your telephone call yesterday, we herewith submit this proposal-contract letter for your approval to conduct an I.P. survey on your Slate Creek Property near Prescott, Arizona.

We understand that gradient array I.P. coverage is desired to prospect a zone of alteration and geochemical anomalism within the Yavapai schist having at least 1500 feet of strike length. The targets are apt to be narrow and fairly detailed gradient array coverage is therefore desirable. Initial coverage would be on lines 400 feet apart and about 1200 feet long with 100 foot stations and using a 100 foot voltage measuring dipole. Fill-in lines half way between the 400 foot spaced lines would be run if any encouragement were obtained. Expected depth of oxidation is at least 100 feet and perhaps as much as 200 or 300 feet.

A three man crew plus necessary equipment to obtain this I.P. coverage would be charged at $250.00 per work day plus expenses. Expenses include $48.00 per day living expenses for the three man crew and $15.00 per day plus $0.15 per mile per vehicle (and one four wheel drive vehicle should suffice). Other direct job related expenses will be billed at our invoice cost plus 15 percent.

Our normal work schedule is based on a five day week and an eight hour work day. Travel time up to one hour per day each way between the job site and crew base will not be charged. Overtime in excess of this schedule will be charged at $37.50 per hour for the three man crew plus expenses as above.

Travel time between Tucson and Prescott and standby time due to inclement weather or client request will be charged at half the daily rate plus expenses as above.

Final data compilation, computation, and drafting will be charged at $10.00 per hour. Final interpretation and report will be charged at $18.75 per hour. Rough field plots and preliminary interpretations will be available during the project as needed.

We estimate that about five or six field days would be involved to lay out the long wire and run 10 or 12 lines. On this basis, we estimate a total billing of about $2500.00 including final drafting, interpretation and report. If considerable encouragement is obtained in the initial work and additional coverage is justified, we estimate about $400.00 per field day increase on the total job billing.

GEOEX will save the client harmless from 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 which are incurred on behalf of the client will be chargeable to the client at GEOEX cost plus 15 percent. All special insurance premiums, bonds, fees, duties, license, taxes, trespass permits, and related special fees, if any, will be billed to the client at GEOEX cost plus 15 percent.

Billings may be submitted periodically with final payment due on presentation of final report.

Our crew availability at this time is such that we can start the field work on Monday, June 18.

Your understanding and approval of the above may be indicated by signing as provided below on the attached copy of this letter and returning it to us, or by submitting a purchase order.

Sincerely yours,

Heinrichs GEOEXploration Co.

Chris S. Ludwig

Chris S. Ludwig
Chief Geophysicist

CSL:mt

Date: June 16, 1973

Accepted by: W. P. Leedy

Title: Geologist - J

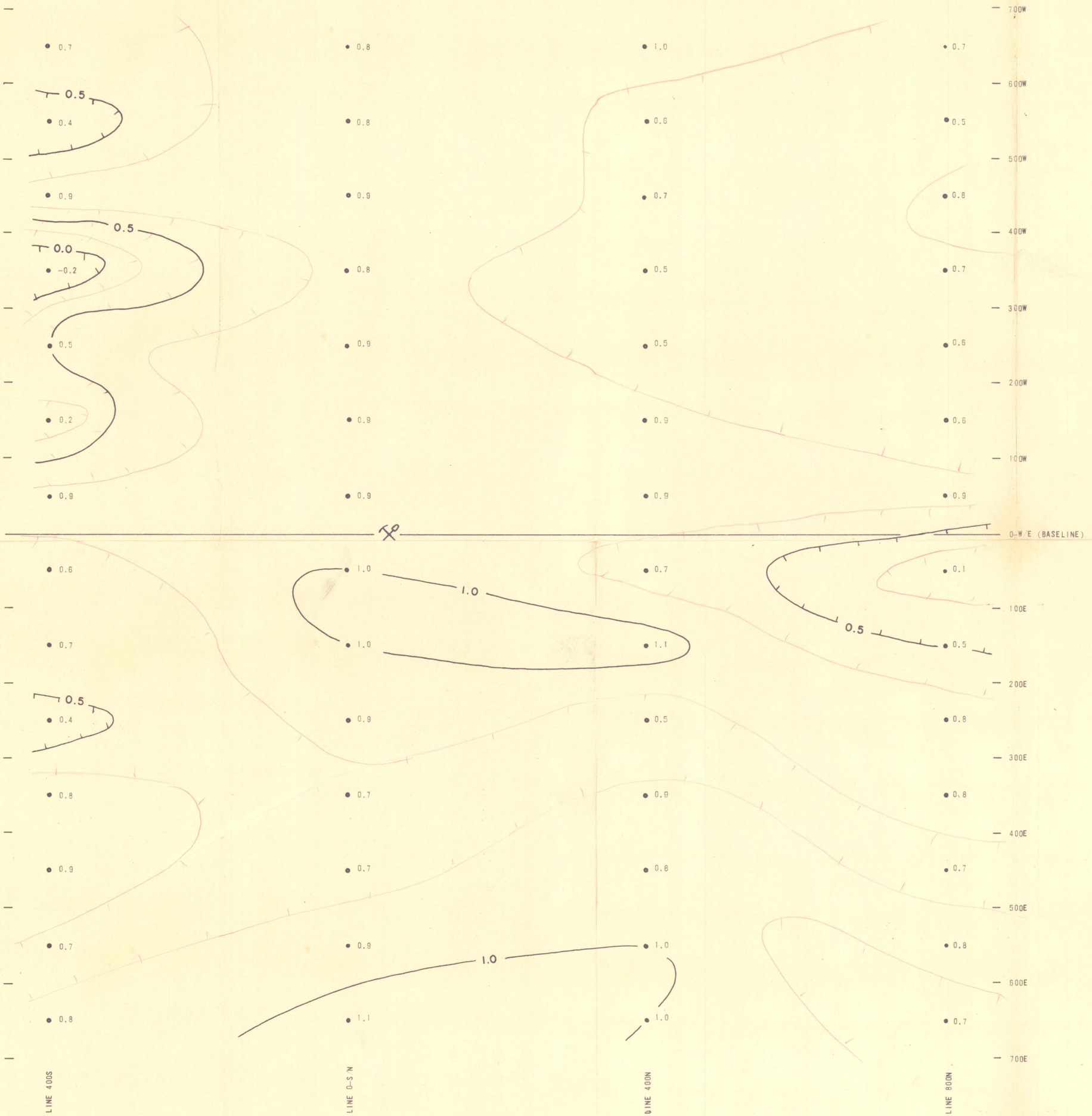
PERCENT FREQUENCY EFFECT CONTOUR PLAN
INDUCED POLARIZATION GRADIENT ARRAY
of
SLATE CREEK AREA
YAVAPAI COUNTY, ARIZONA
for
KALIUM CHEMICALS LIMITED
by
HEINRICHS GEOEXPLORATION COMPANY
Job number 830-73 June 1973

T 12 N, R 2 W
Unsurveyed Township (no land net control)

Grid by Kalium Chemicals Limited

Scale: 1" = 100'

Contour interval: 0.5 P.F.E.
Voltage dipole length: 100'



APPARENT RESISTIVITY CONTOUR PLAN
INDUCED POLARIZATION GRADIENT ARRAY
of
SLATE CREEK AREA
YAVAPAI COUNTY, ARIZONA
for
KALIUM CHEMICALS LIMITED
by
HEINRICHS GEOEXPLORATION COMPANY
Job number 830-73 June 1973

T 12 N, R 2 W
Unsurveyed Township (no land net control)
Grid by Kalium Chemicals Limited

Scale: 1" = 100'

Contour interval: Logarithmic
Voltage dipole length: 100'

700W
600W
500W
400W
300W
200W
100W
0-N E(BASELINE)
100E
200E
300E
400E
500E
600E
700E

LINE 400S
LINE 0-S/N
LINE 400N
LINE 800N

STACKED PROFILES OF SELF POTENTIAL

of

SLATE CREEK AREA
YAVAPAI COUNTY, ARIZONA

for

KALIUM CHEMICALS LIMITED

by

HEINRICHS GEOEXPLORATION COMPANY
Job number 830–73 June 1973

T 12 N, R 2 W
Unsurveyed Township (no land net control)

Grid by Kalium Chemicals Limited

Scale: 1" = 100'

MILLIVOLTS 50 0 -50

MILLIVOLTS 50 0 -50

MILLIVOLTS 50 0 -50 -100

MILLIVOLTS 50 0 -50

700W
600W
500W
400W
300W
200W
100W
0—W/E(BASE LINE)
100E
200E
300E
400E
500E
600E
700E

LINE 400S

LINE 0-S/N

LINE 400N

LINE 800N

METALLIC CONDUCTION FACTOR CONTOUR PLAN
INDUCED POLARIZATION GRADIENT ARRAY
of
SLATE CREEK AREA
YAVAPAI COUNTY, ARIZONA
for
KALIUM CHEMICALS LIMITED
by
HEINRICHS GEOEXPLORATION COMPANY
Job number 830-73 June 1973

T 12 N, R 2 W
Unsurveyed Township (no land net control)
Grid by Kalium Chemicals Limited

Scale: 1" = 100'

Contour interval: Logarithmic
Voltage dipole length: 100'