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

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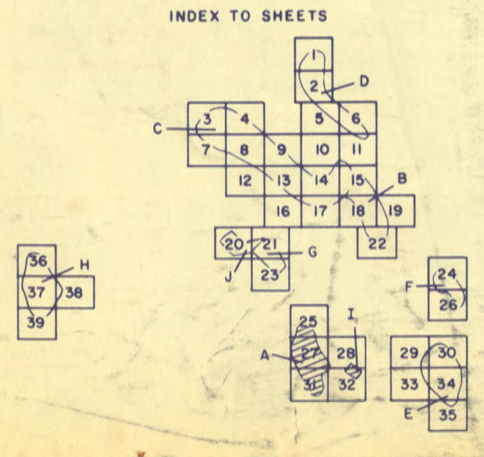
AERO SERVICE CORPORATION
A DIVISION OF FUGRO-NORTHERN INDUSTRIES
210 EAST COURTLAND ST. PHILADELPHIA 20, PA

INDEX TO SHEETS



INDEX TO SHEETS

25	
27	28
31	32

Gravity Work Map

magnetic low

Superior land

Proposed Grav. coverage

AREA A

ARIZONA

THE SUPERIOR OIL CO.

MINERALS DIVISION

SCALE 1 24,000

2000 0 2000 4000 6000 8000 10000 FEET

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

What the Hell is this

Base	464.6	0.0	464.6	
		0.1	443.6	
		0.2	426.6	
		0.3	428.4	
		0.4	423.9	
85.		0.5	423.3	
Base	465.3	-0.7	464.6	
85		-0.9	423.3	
		-1.1	435.8	
		-1.2	448.3	
70		-1.4	438.7	
85		-1.6	422.4	+9
70		-1.7	438.5	
		-1.9	438.9	
		-2.1	440.7	
		-2.2	446.7	
		-2.4	449.3	
		-2.6	454.5	
40		-2.7	460.9	
70		-2.9	437.1	+1.5
40		-3.1	460.4	
		-3.2	450.8	
		-3.4	431.4	
		-3.6	421.0	
		-3.7	412.3	
		-3.9	407.6	
		-4.1	400.1	
		-4.2	396.8	
		-4.4	384.0	
40		-4.5	459.3	+1.3
Base	469.2	-4.6	464.6	

FORM 22 8-63 100M 3305-J&C

THE SUPERIOR OIL COMPANY

INTER-OFFICE CORRESPONDENCE

TO GEOEX LOCATION Tucson DATE 8/6/64

FROM Ralph H. Wilpolt LOCATION Tucson

SUBJECT Proposed Gravity Work
Pima District, Pima County, Arizona

Attached is letter agreement of July 31, 1964, which has been signed by R. C. Ward, vice president of Superior.

Ralph H. Wilpolt

Ralph H. Wilpolt

RHW/jmw
attachment

AUG 1964
GEOEX

HEINRICHS GEOEXPLORATION COMPANY

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

July 31, 1964

The Superior Oil Company
Minerals Division
Post Office Box 12487
Tucson, Arizona

Re: Proposed Gravity Work on Your Property in
Pima District, Pima County, Arizona

Gentlemen:

Per recent conversations with your Mr. Wilpolt and at his request, we are pleased to propose to undertake this job which contemplates three (3) lines from approximately two (2) to three (3) miles long, more or less, as follows:

Line 1: From NW part of 19, T18S, R13E about N45° E to Duval Road near NE corner of Sec. 18 adjoining on the north and continuing NE on Duval Road for about 1½ miles, or less, if a normal even gradient has been established sooner.

Line 2: NE and SW on Twin Buttes Road from at or near BM 3419, as necessary to establish a normal even gradient on either side of the extension of the Senator Morgan fault structure.

Line 3: Diagonally N45E-S45W across Sec. 20, T18S, R13E and into adjoining Sec. 30 to SW as necessary to safely cross the expected feature.

Objective is to investigate cause of the major aerial magnetic low which appears to be a SE extension of the Senator Morgan rocks and fault structure.

The work will be done in accordance with your directions. In order to avoid trespass, we have been given by your local office, confidential

information regarding property boundaries. Nevertheless, you agree to protect us from trespass damage and liability incurred during the normal course of the work in executing your assignment.

Our charges will be based on $317.00 per mile of traverse, or approximately $28.80 per station at 500' intervals along the lines. This will include report and interpretation of results in triplicate.

Elevations will be held to ± 0.2' per station. Estimating a total of 7 traverse miles gives a total job cost of $2219.00, unless later reduced or extended.

We are prepared to start immediately and your approval to do same on the basis of this letter may be so indicated by executing on the attached copy as provided below and returning same to us.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

Walter E. Heinrichs, Jr.
President and General Manager

WEH:vh

Encl. (2 extra c.c.)

COPY

DATE ACCEPTED: Aug 5 1964

THE SUPERIOR OIL COMPANY

BY:

TITLE: Vice Pres.

July 31, 1964

COPY

The Superior Oil Company
Minerals Division
Post Office Box 12487 85710
Tucson, Arizona

Re: Proposed Gravity Work on Your Property in
Pima District, Pima County, Arizona

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BY: _____

TITLE: _____

July 31, 1964

COPY

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Walter E. Heinrichs, Jr.
President and General Manager

WEH:vh

Encl. (2 extra c.c.)

COPY

DATE ACCEPTED: _____

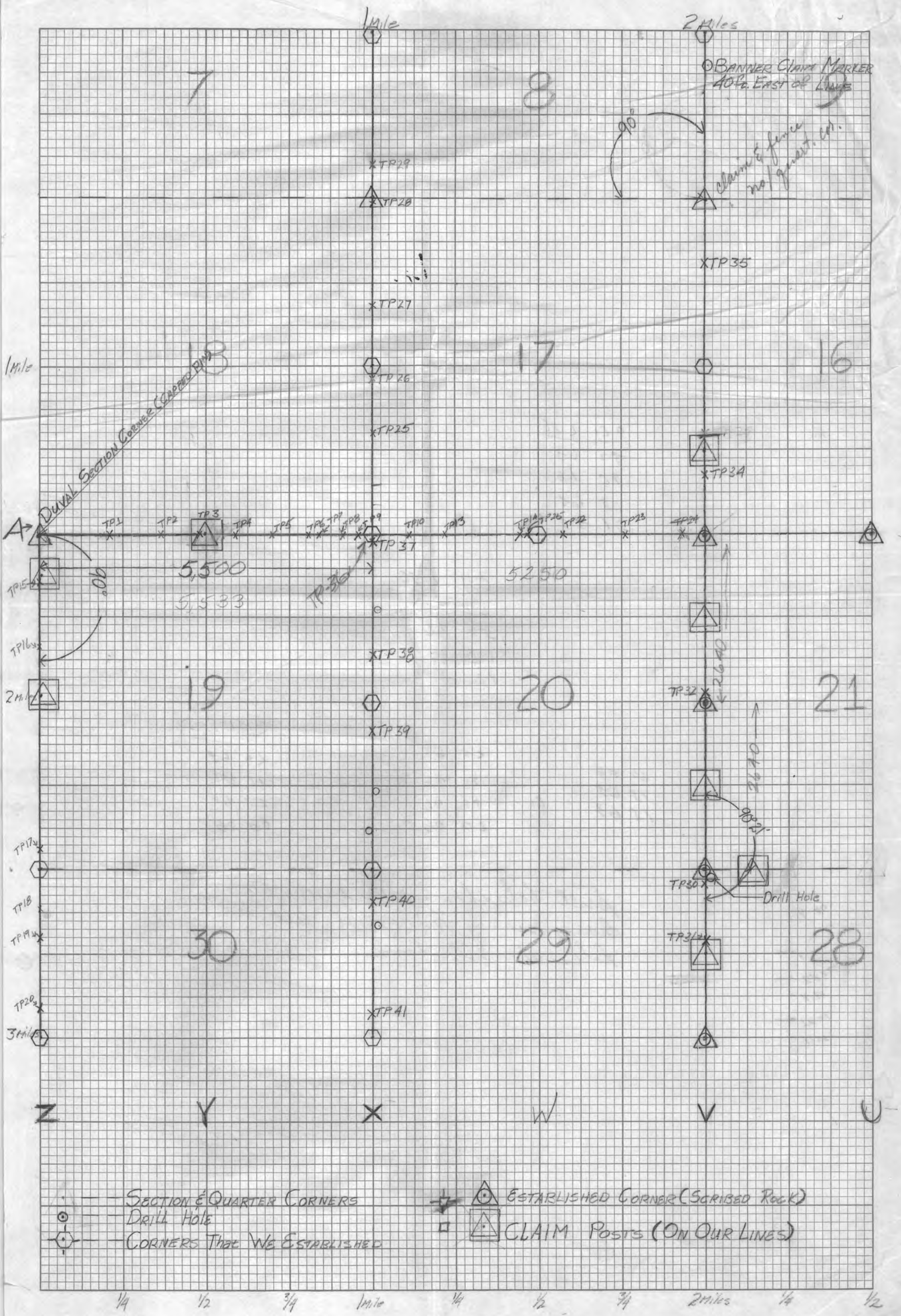
THE SUPERIOR OIL COMPANY

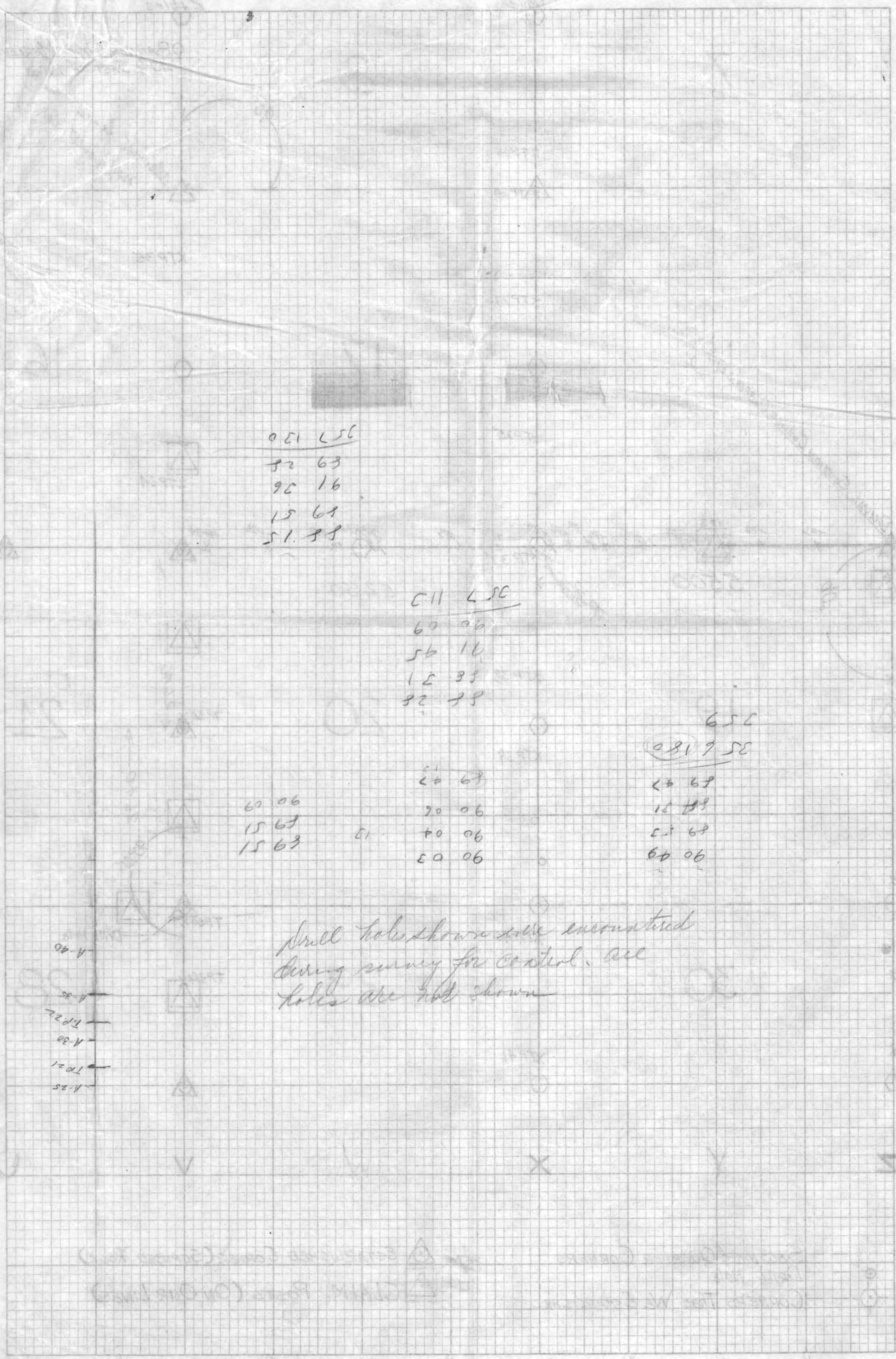
BY: _____

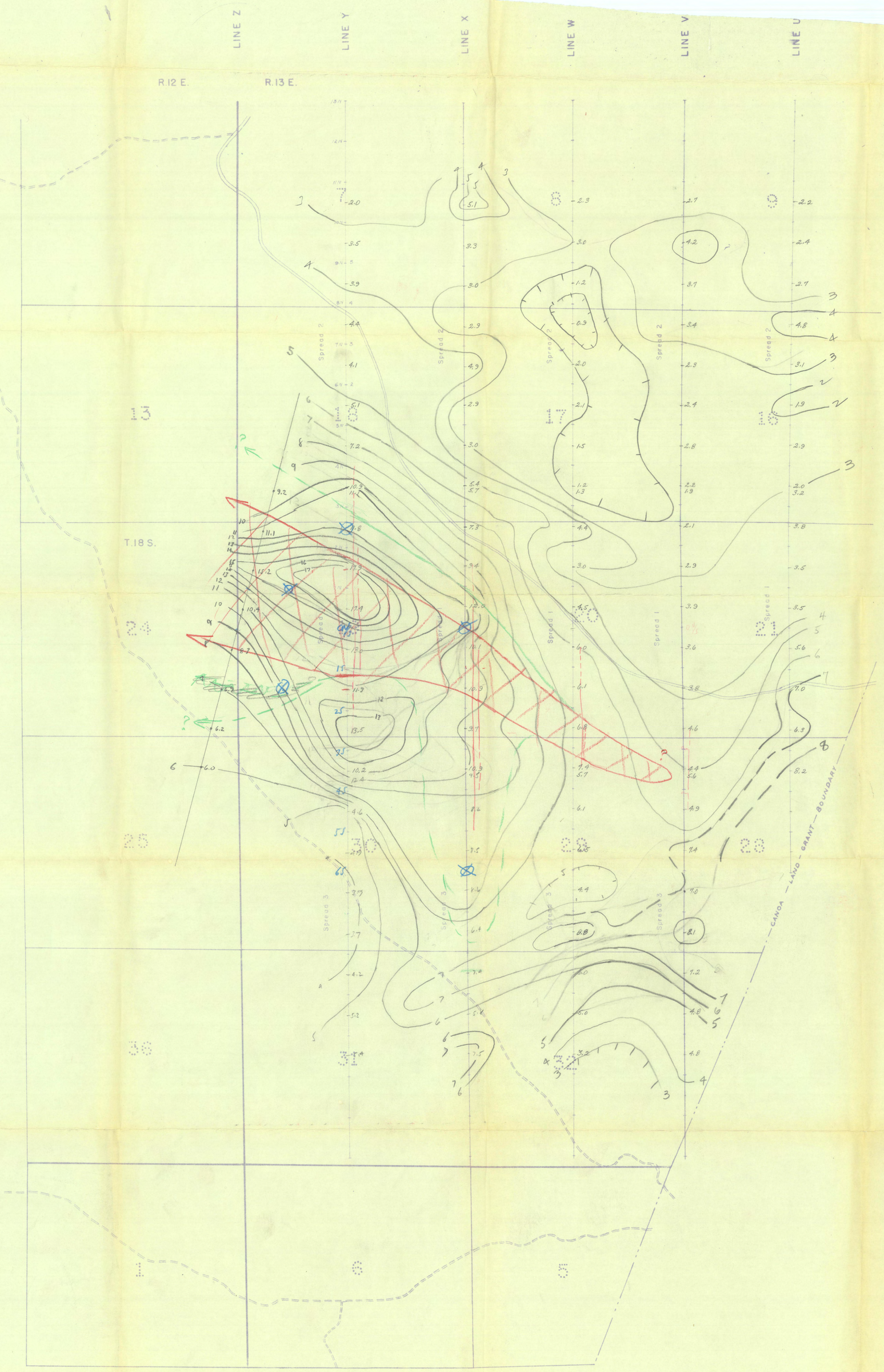
TITLE: _____

K+E 10 X 10 TO THE INCH KEUFFEL & ESSER CO. 359-5DLG MADE IN U.S.A.

DEMETRIE



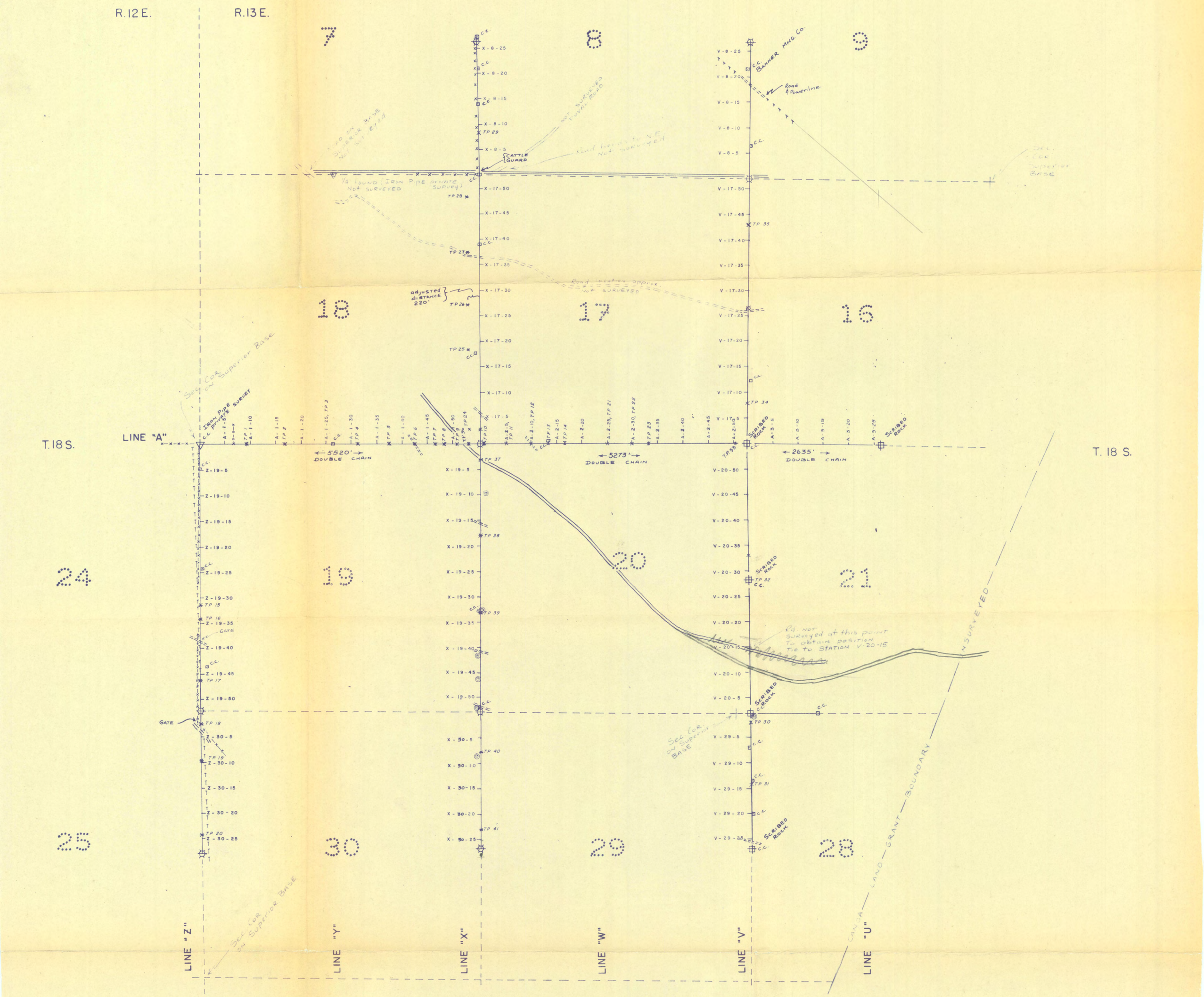

Drill holes shown are encountered during survey for control. All holes are not shown



PFE

3N
WORK MAP
PFE

LINE Z
LINE Y
LINE X
LINE W
LINE V
LINE U
R.12 E.
R.13 E.
T.18 S.
Spread 1
Spread 2
Spread 3
CANDA - LAND - GRANT - BOUNDARY
M.C.F.
20
30
50
100
150
200
300
500
750
3N
WORK MAP
MCF



INFORMATION

—x—x— Fence Line

TTTTT Power Line & Phone Line

=== Unimproved Road

═══ Improved Road

—⊕— Scribed Rock Corner Located

Corner Surveyed - Stake Set

▽ Iron Pipe Corner Private Survey

□ Claim Corner

✱ Turning Point

◎ Drill Hole

←5280'→ Distance Surveyed

Pencil Line indicates unsurveyed position. All Survey Stations identified as shown and are a white tipped 1" x 2" stake set in ground.

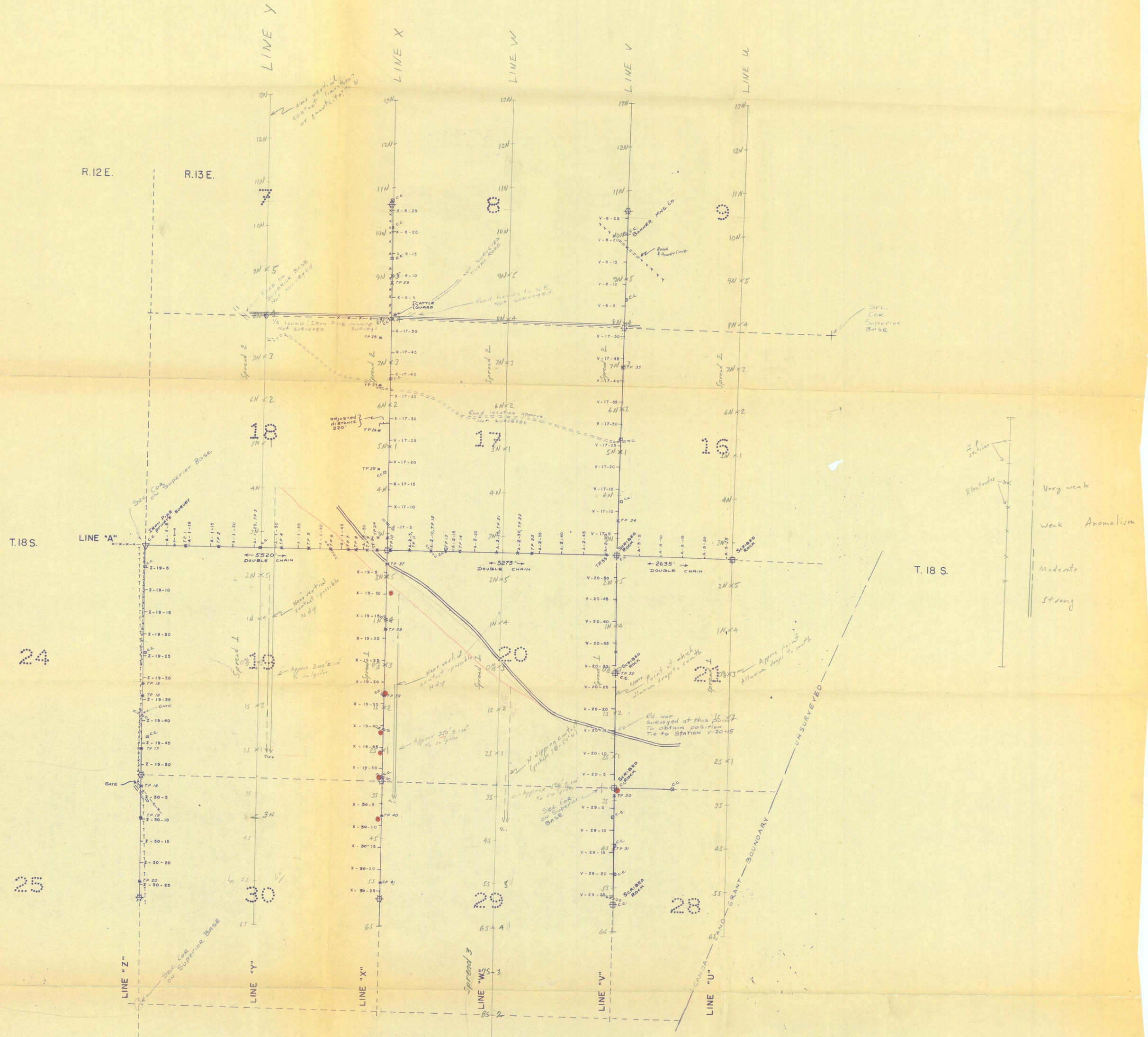
Lines are flagged with white and blue.
Only drill holes encountered on survey line shown.
Sections 7, 18, 19, 30 are wide EAST, WEST. This is common to have larger sections on WEST side of township. This does not agree with plat and was double chained.

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

TRANSIT & STADIA SURVEY
DEMETRIE WASH PROJECT
FOR
THE SUPERIOR OIL COMPANY

TWIN BUTTES MNG. DISTRICT
PIMA COUNTY, ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL:	REVISIONS
	DATA BY: U.S.B.L.M., D.A., E.G.H.	
DATE: 2-24-64	SHEET 1 OF 1	
DRAWN BY: S.I.G., E.G.H.	DRAWING NO.:	FILE:



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Lines are flagged with white and blue.
Only drill holes encountered on survey line shown.
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—x—x— Fence Line
TTTTT Power Line & Phone Line
=== Unimproved Road
═══ Improved Road
—⊕— Scribed Rock Corner Located
Corner Surveyed - Stake Set
▽ Iron Pipe Corner Private Survey
Claim Corner
* Turning Point
Drill Hole
←5280'→ Distance Surveyed

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

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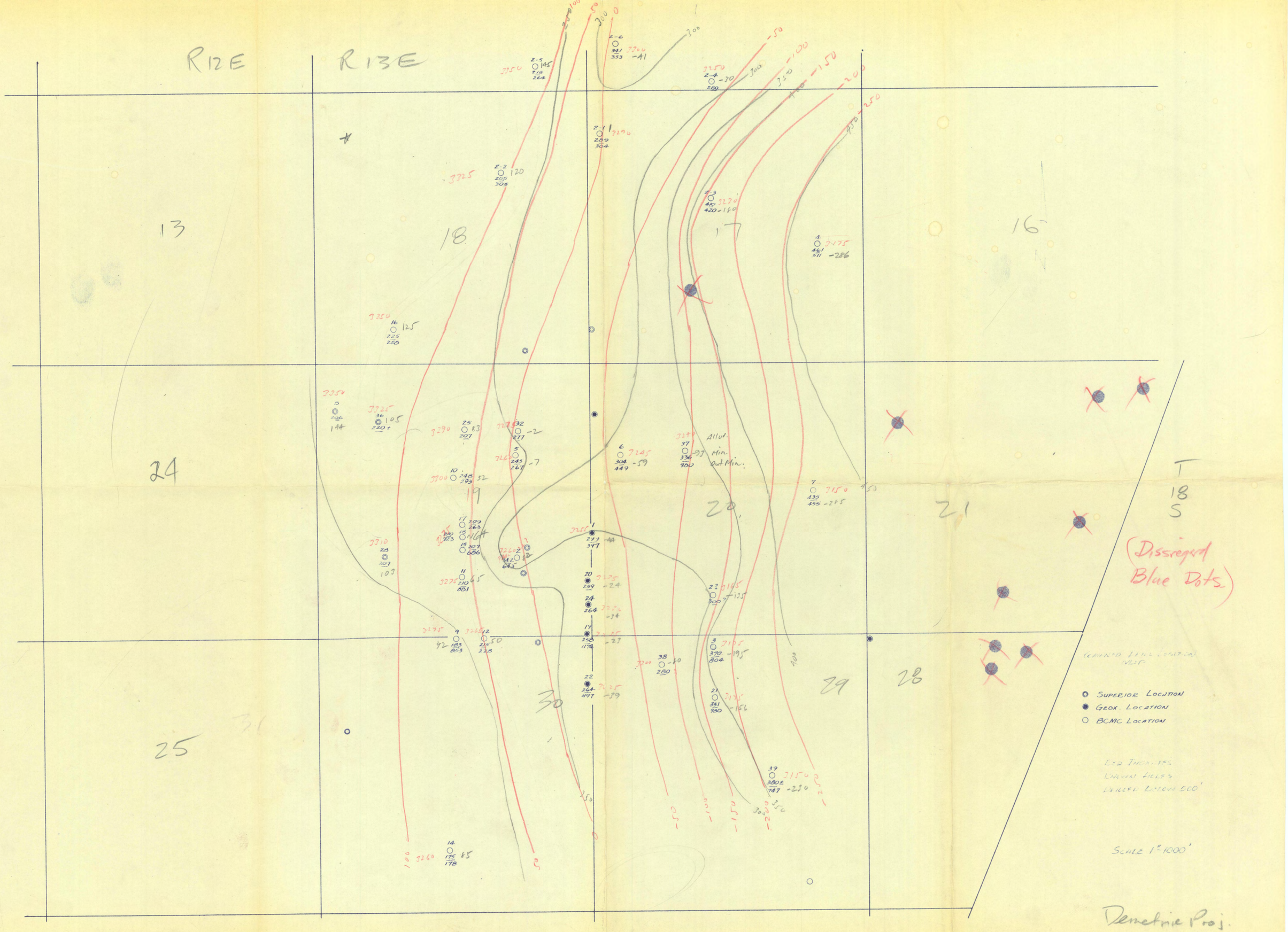
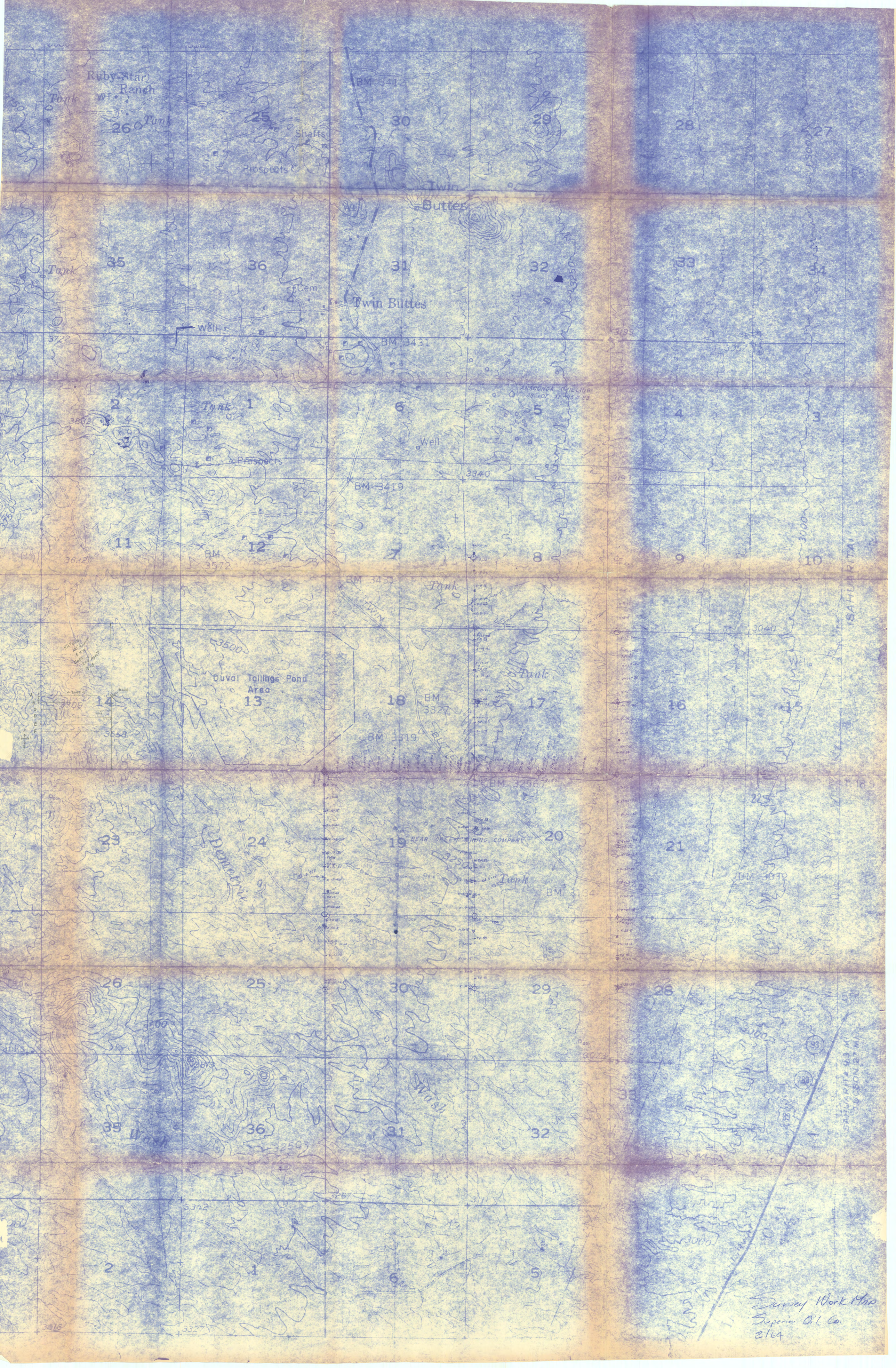
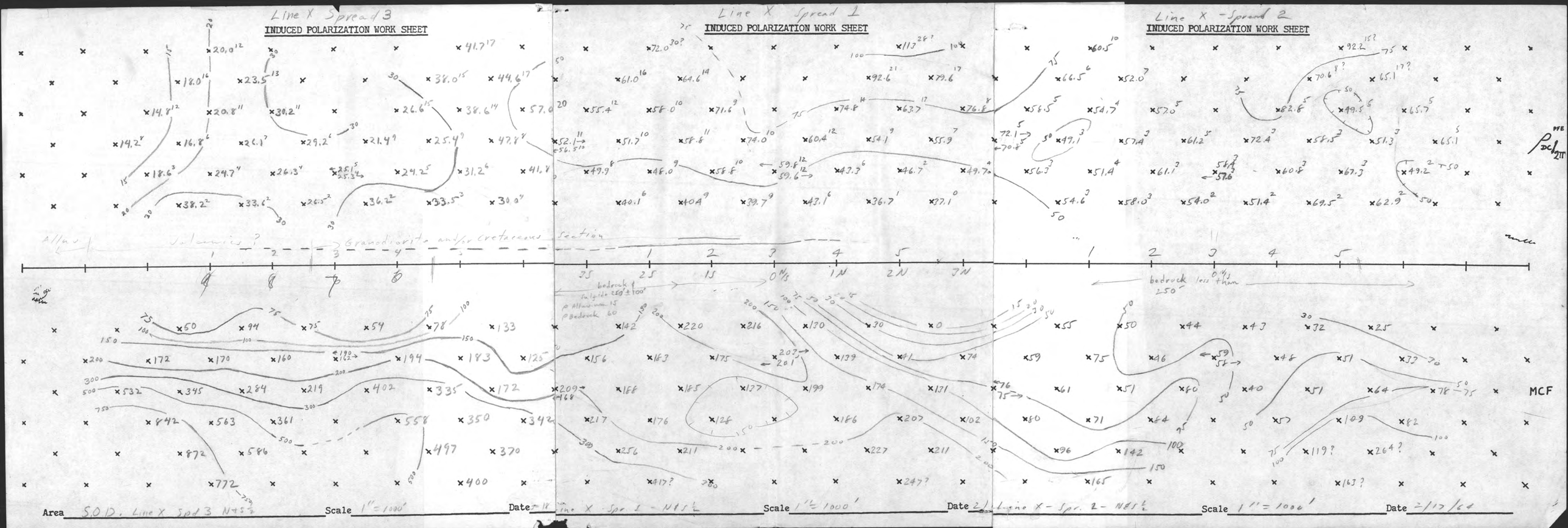
DRAWN BY: S.I.G., E.G.H.	DRAWING NO.:	FILE:



Demetrie Proj.
Superior


Ruby-Star Ranch
Tank
Shafts
Prospects
Twin Buttes
Well
Cem
BM 3431
ANACONDA DRILLING AS OF 11-15-63
BM 3419
BM 3572
BM 3437
Duval Tailings Pond Area
BM 3327
BM 3319
BM 3256
BEAR CREEK MINING COMPANY
BM 3134
Demetric
Wash
SAHUARITA
TUCSON 27 MI
Survey Work Map
Superior Oil Co.
2/64


Line X Spread 3
INDUCED POLARIZATION WORK SHEET
Line X Spread 1
INDUCED POLARIZATION WORK SHEET
Line X - Spread 2
INDUCED POLARIZATION WORK SHEET
Granodiorite and/or Cretaceous Section
bedrock & sulfide 250' ± 100'
bedrock less than 250'
MCF
Area S.O.D. Line X Spd 3 N+S½
Scale 1" = 1000'
Date
Line X - Spr. 1 - N+S½
Scale 1" = 1000'
Date
Line X - Spr. 2 - N+S½
Scale 1" = 1000'
Date 2/17/64

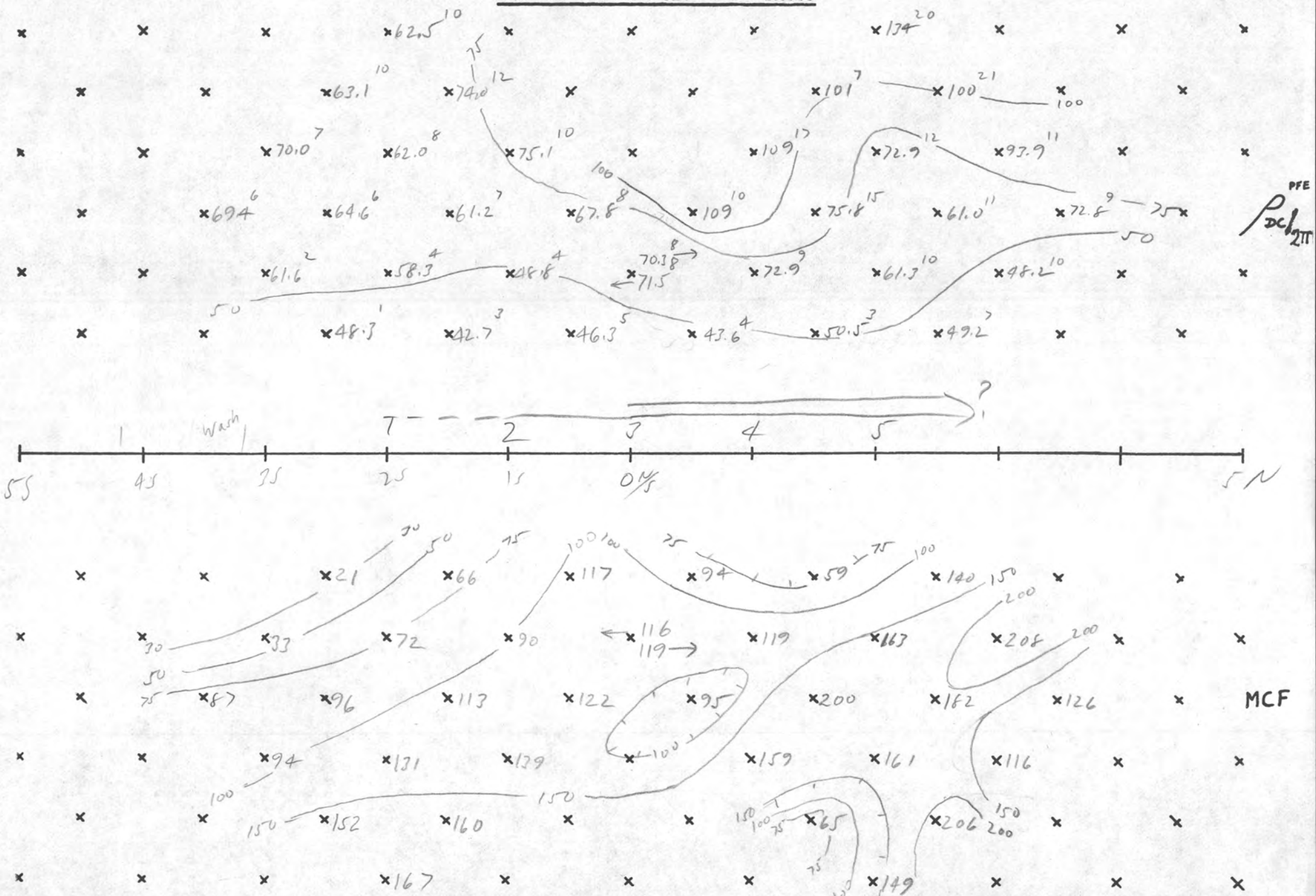
PFE

INDUCED POLARIZATION WORK SHEET

LINE 2

LINE 2

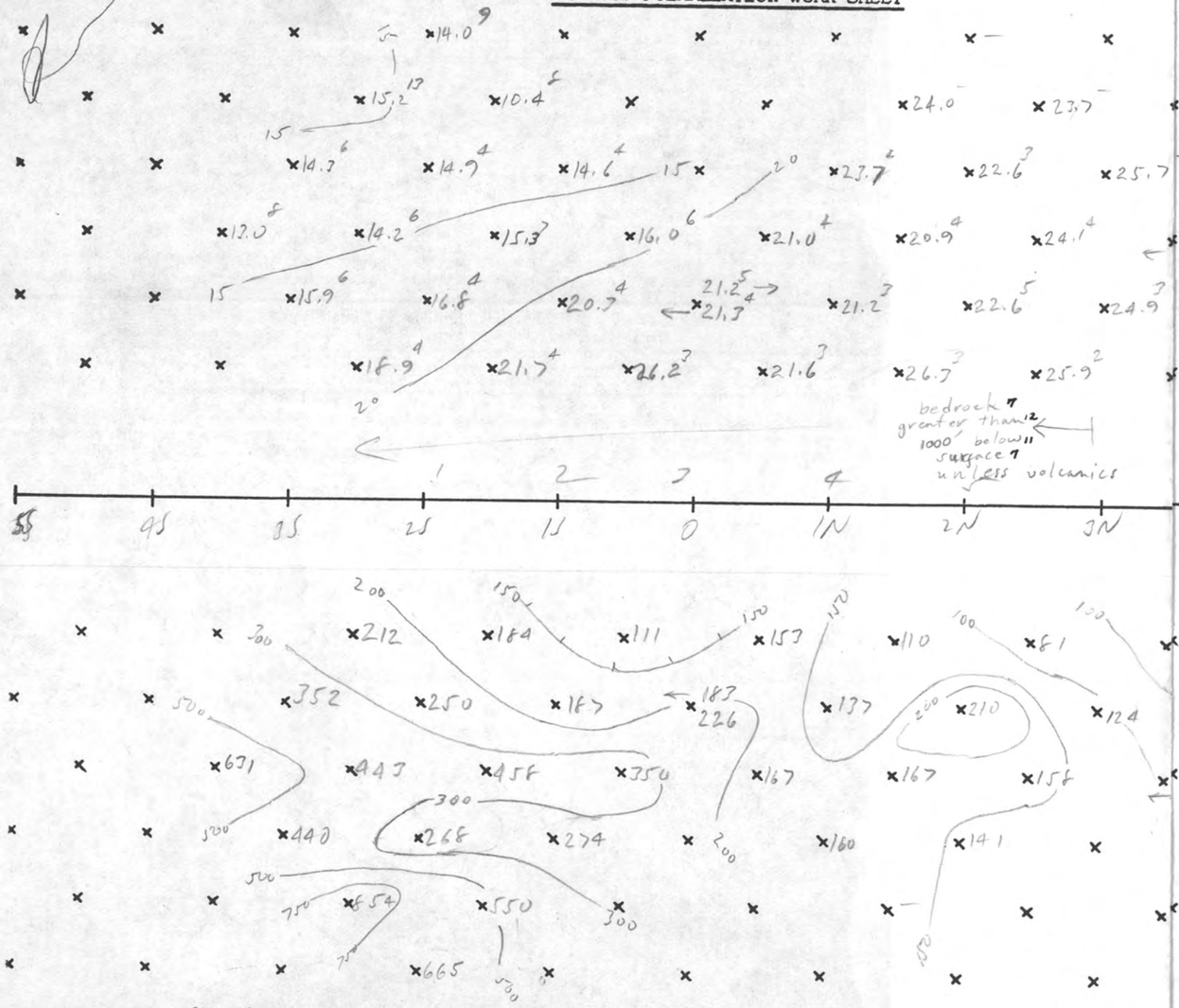
INDUCED POLARIZATION WORK SHEET



Area S.O.O. LINE 2 Spr. 1 Scale 1" = 1000' Date

Line U-Spread 1

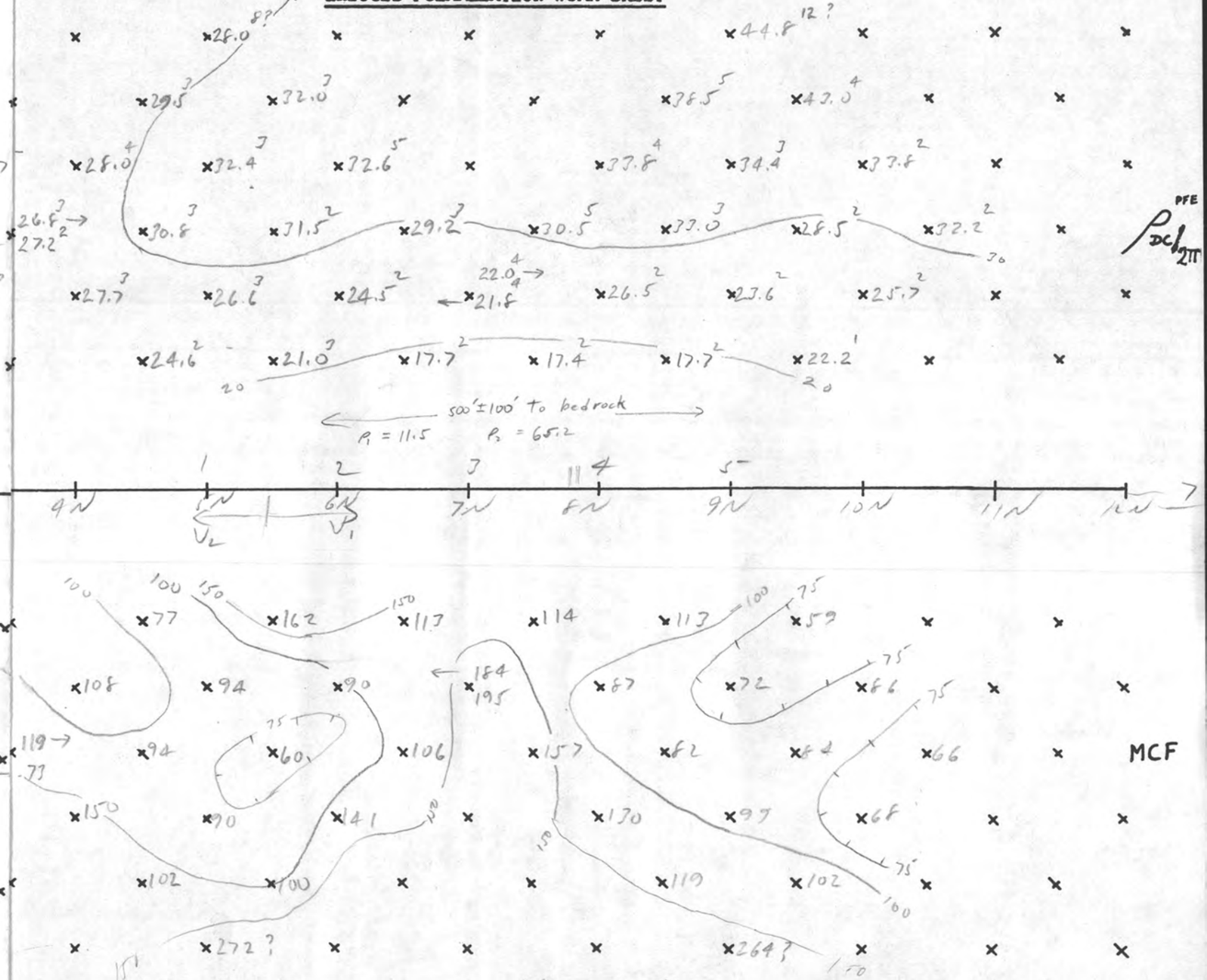
INDUCED POLARIZATION WORK SHEET



Area S.O.O. Scale 1" = 1000' Date

Line U-Spread 2

INDUCED POLARIZATION WORK SHEET



Scale 1" = 1000' Date

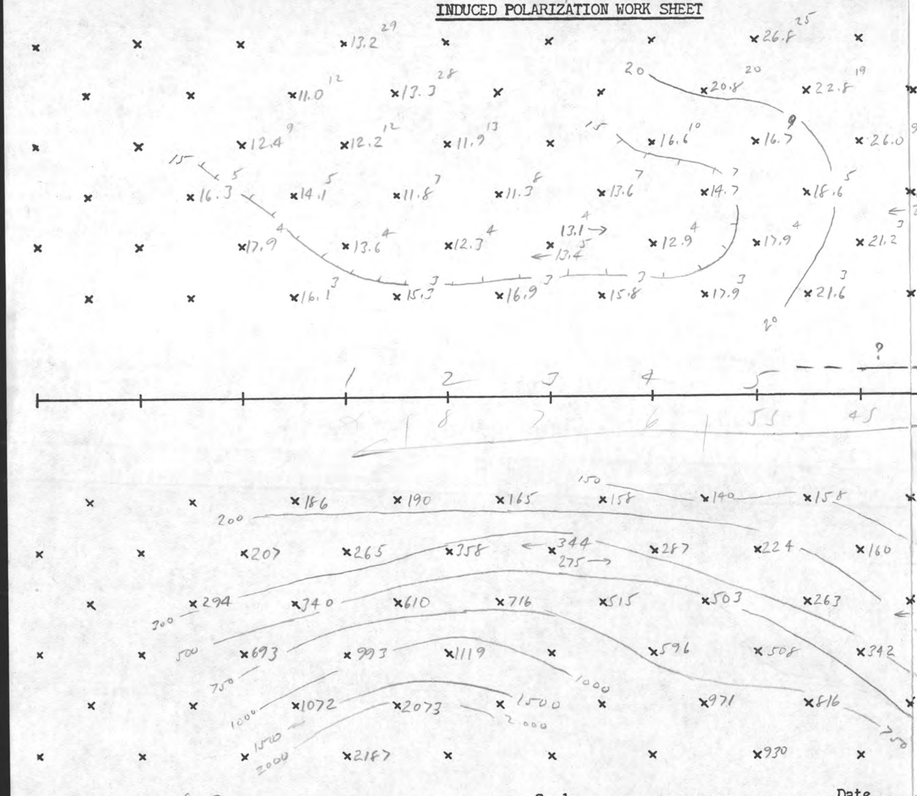
PFE

$\rho_{DC}/2\pi$

MCF

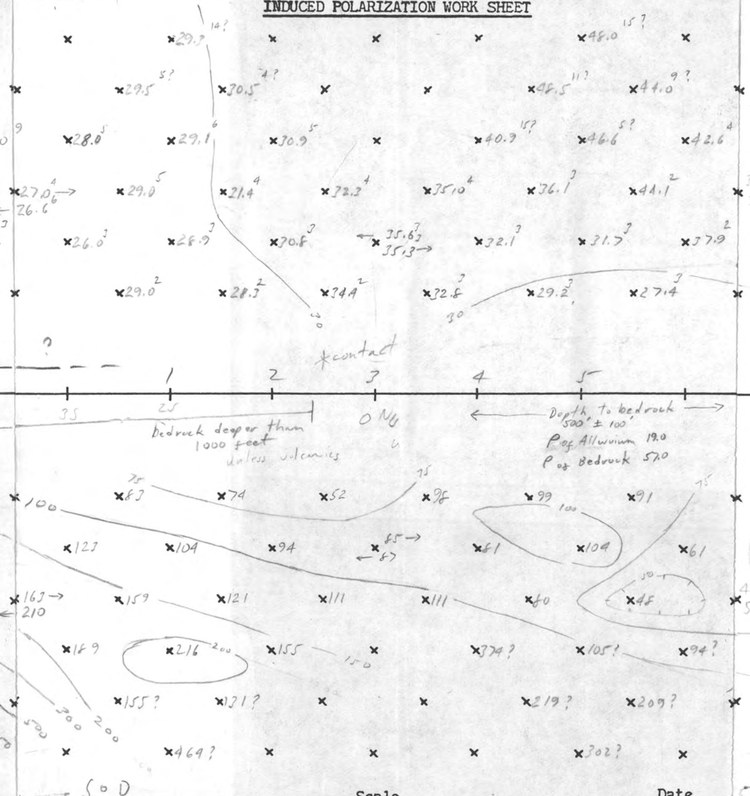
LINE V - Spread 3

INDUCED POLARIZATION WORK SHEET



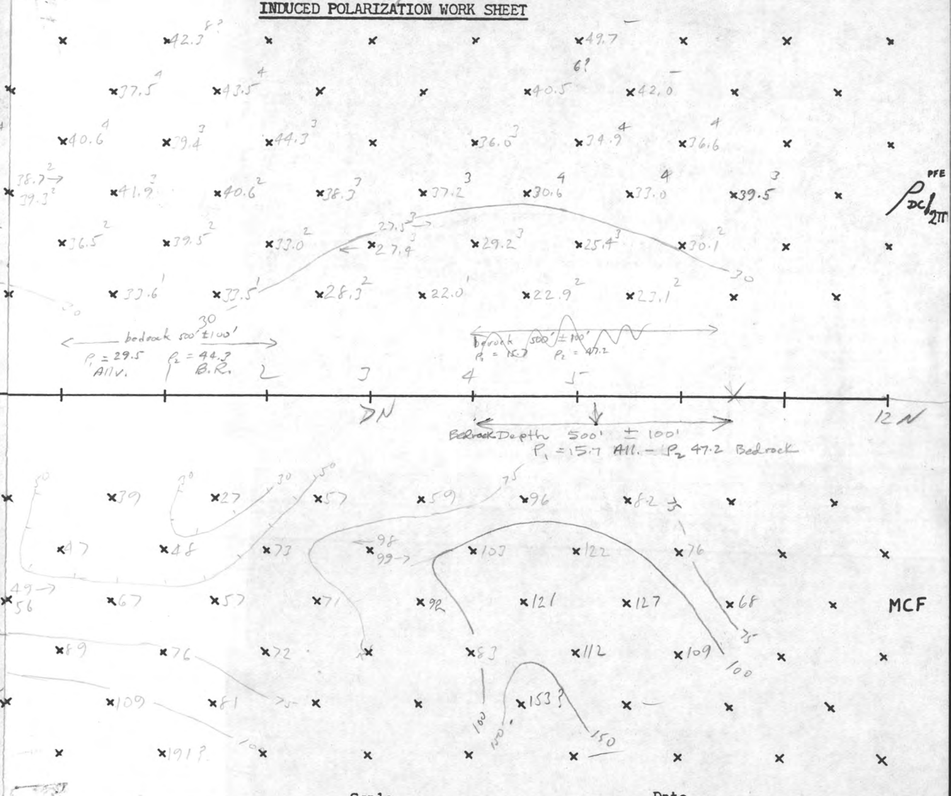
Line V - Spread 1

INDUCED POLARIZATION WORK SHEET



Line V - Spread 2

INDUCED POLARIZATION WORK SHEET



LINE W - Spread 3

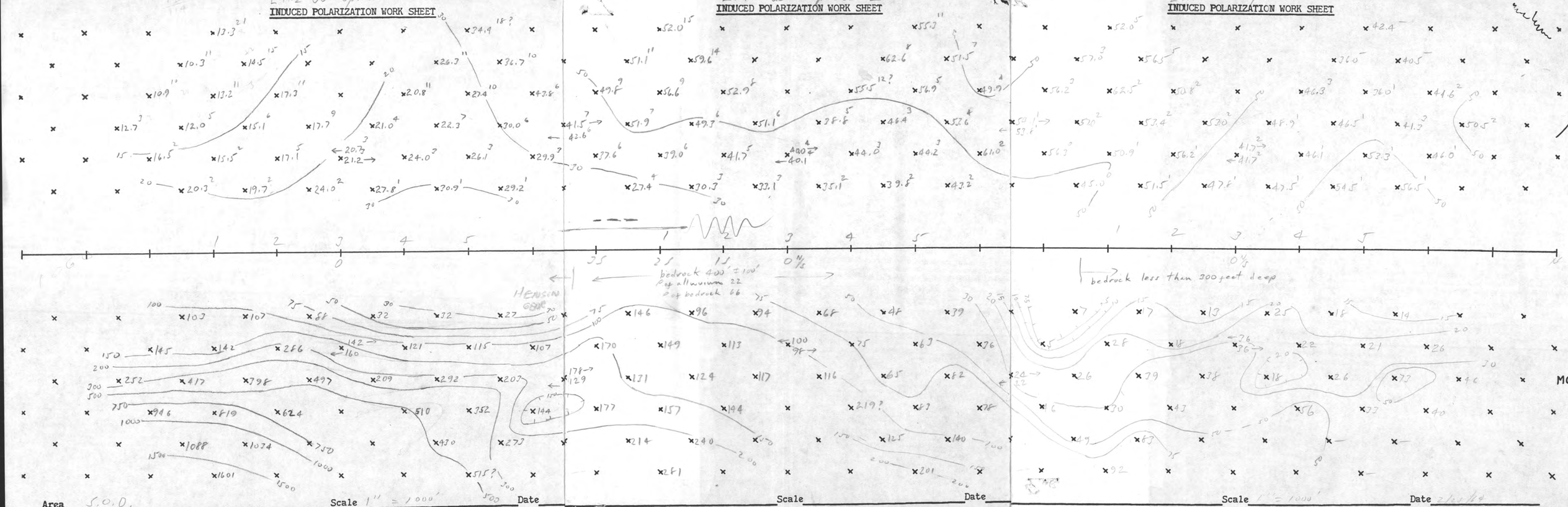
INDUCED POLARIZATION WORK SHEET

Line W - Spread 1

INDUCED POLARIZATION WORK SHEET

Line W - Spread 2

INDUCED POLARIZATION WORK SHEET



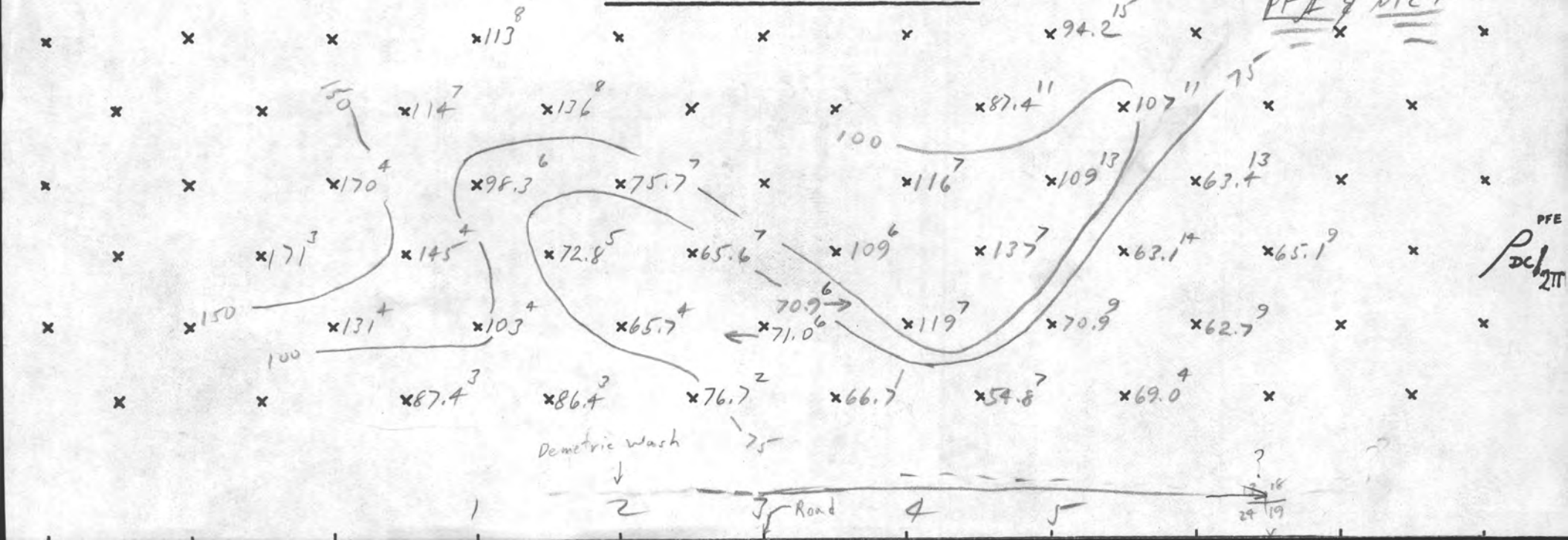
Area S.O.O. Scale 1" = 1000' Date

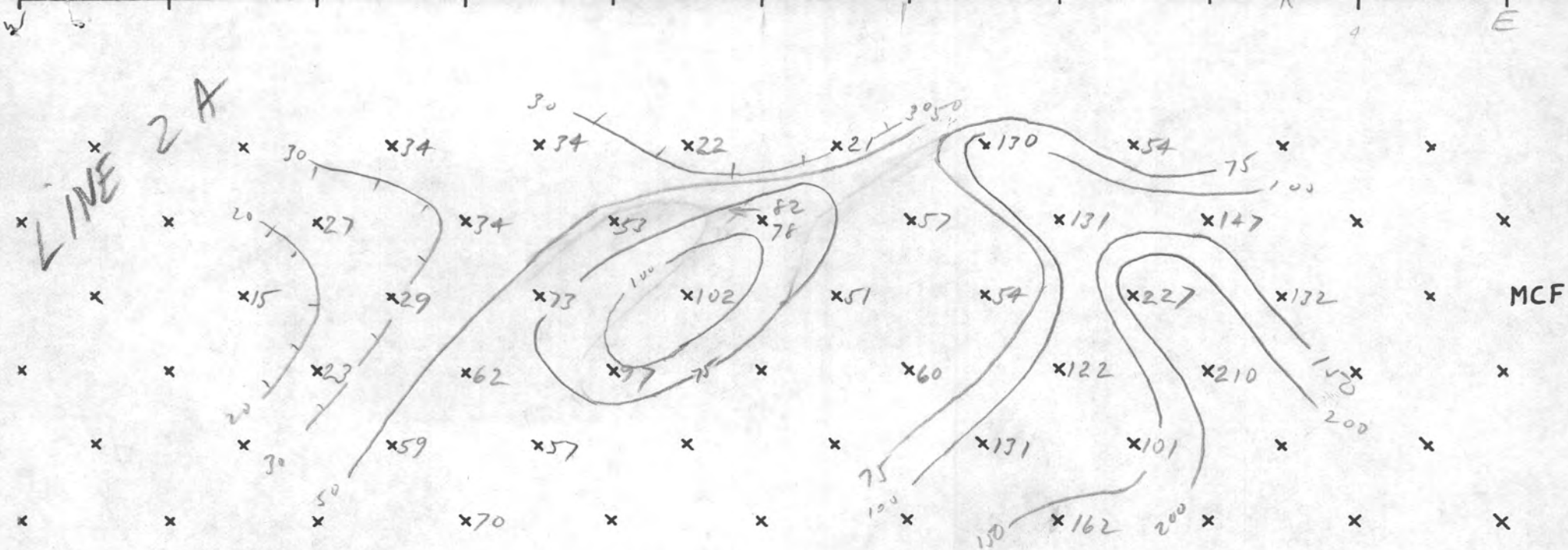
Scale Date

Scale 1" = 1000' Date 2/25/64

← S65°W Line 2A N65°E → Coupling Corrected PFE & MCF

INDUCED POLARIZATION WORK SHEET

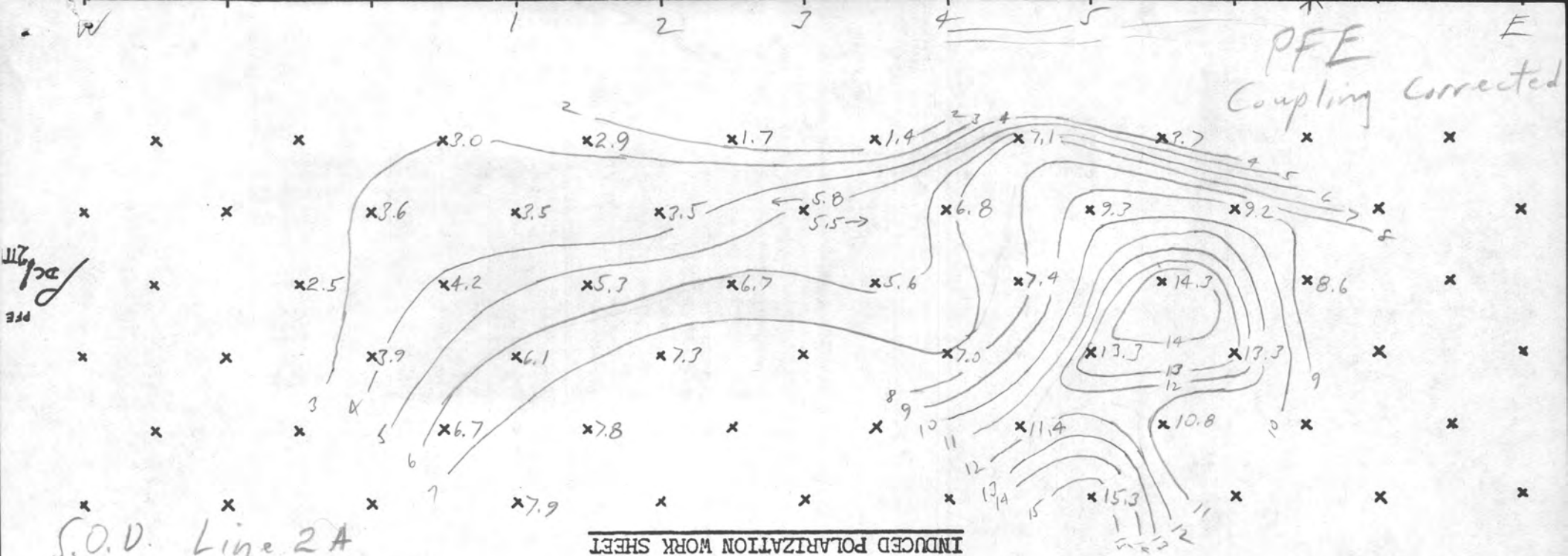


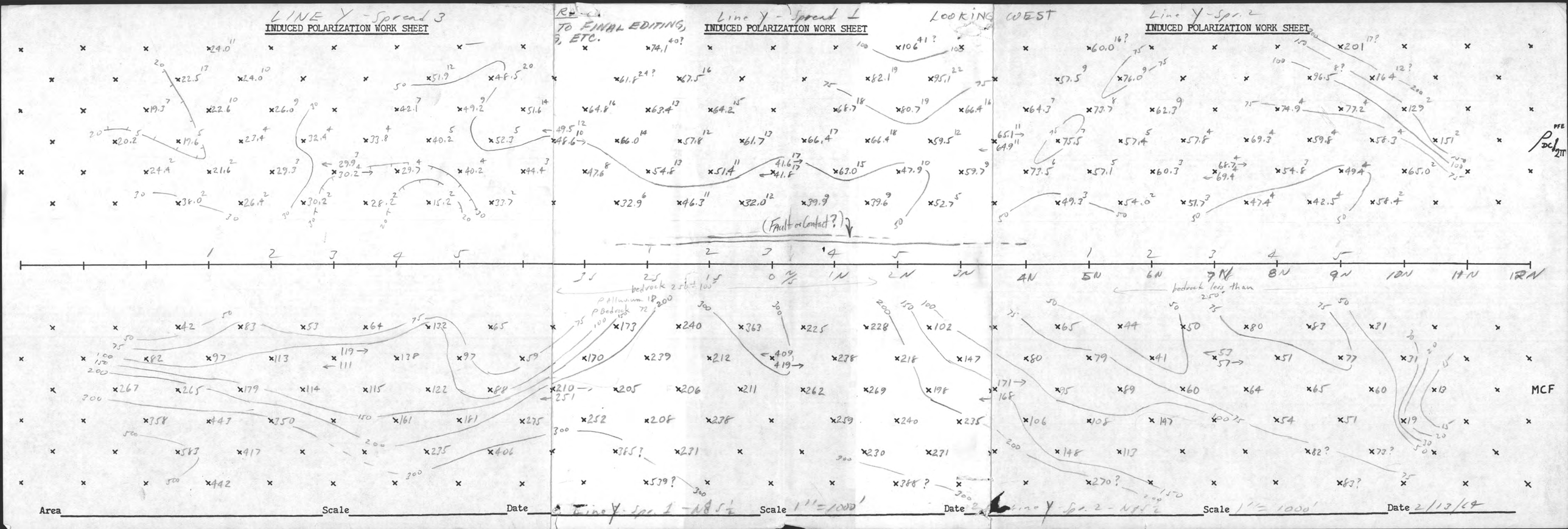


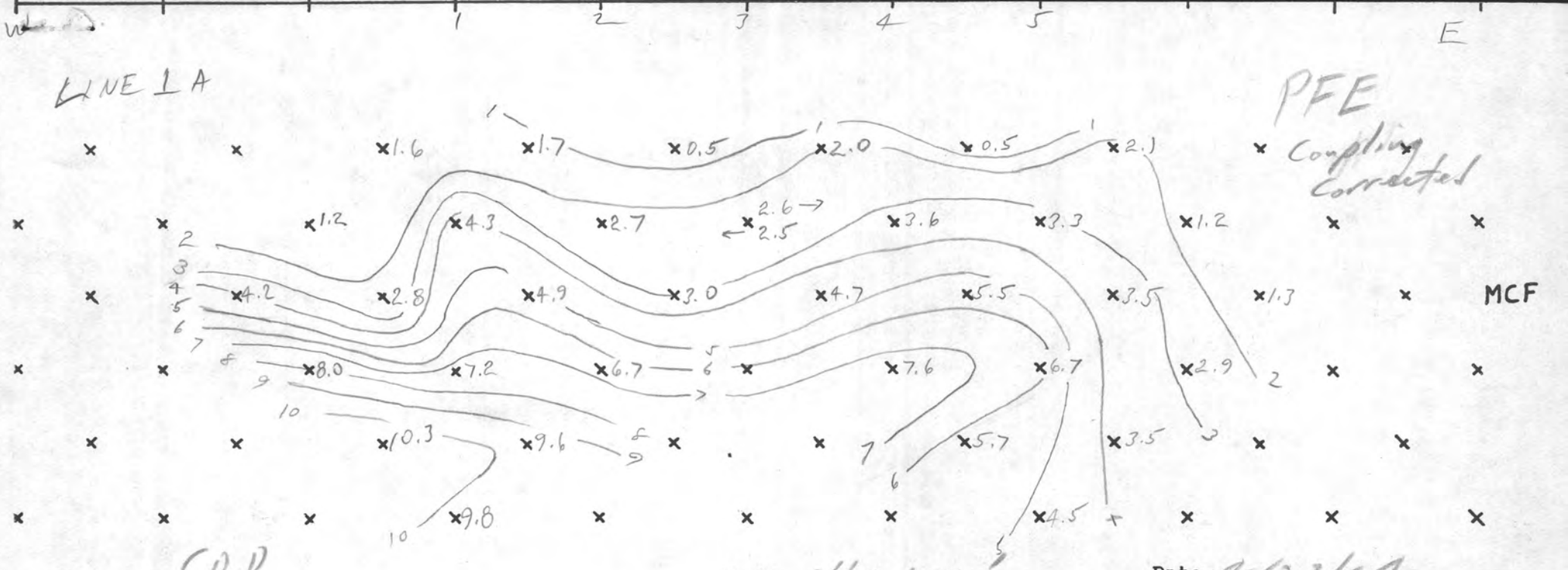
Area S.O.O.

Scale 1" = 1000'

Date 4/22/64


W
1
2
3
4
5
E
PFE
Coupling Corrected
3.0
2.9
1.7
1.4
7.1
7.7
3.6
3.5
3.5
5.8
5.5
6.8
9.3
9.2
2.5
4.2
5.3
6.7
5.6
7.4
14.3
8.6
3.9
6.1
7.3
7.0
13.3
13.3
6.7
7.8
11.4
10.8
7.9
15.3
INDUCED POLARIZATION WORK SHEET
S.O.D. Line 2A


LINE Y - Spread 3
INDUCED POLARIZATION WORK SHEET
Line Y - Spread 1
INDUCED POLARIZATION WORK SHEET
LOOKING WEST
Line Y - Spr. 2
INDUCED POLARIZATION WORK SHEET
(Fault or Contact?)
bedrock 250' ± 100'
bedrock less than 250'
MCF
Area
Scale
Date
Line Y - Spr. 1 - N85½
Scale 1" = 1000'
Date
Line Y - Spr. 2 - N85½
Scale 1" = 1000'
Date 2/13/64



Area S.O.D Scale 1" = 100' Date 4/23/64

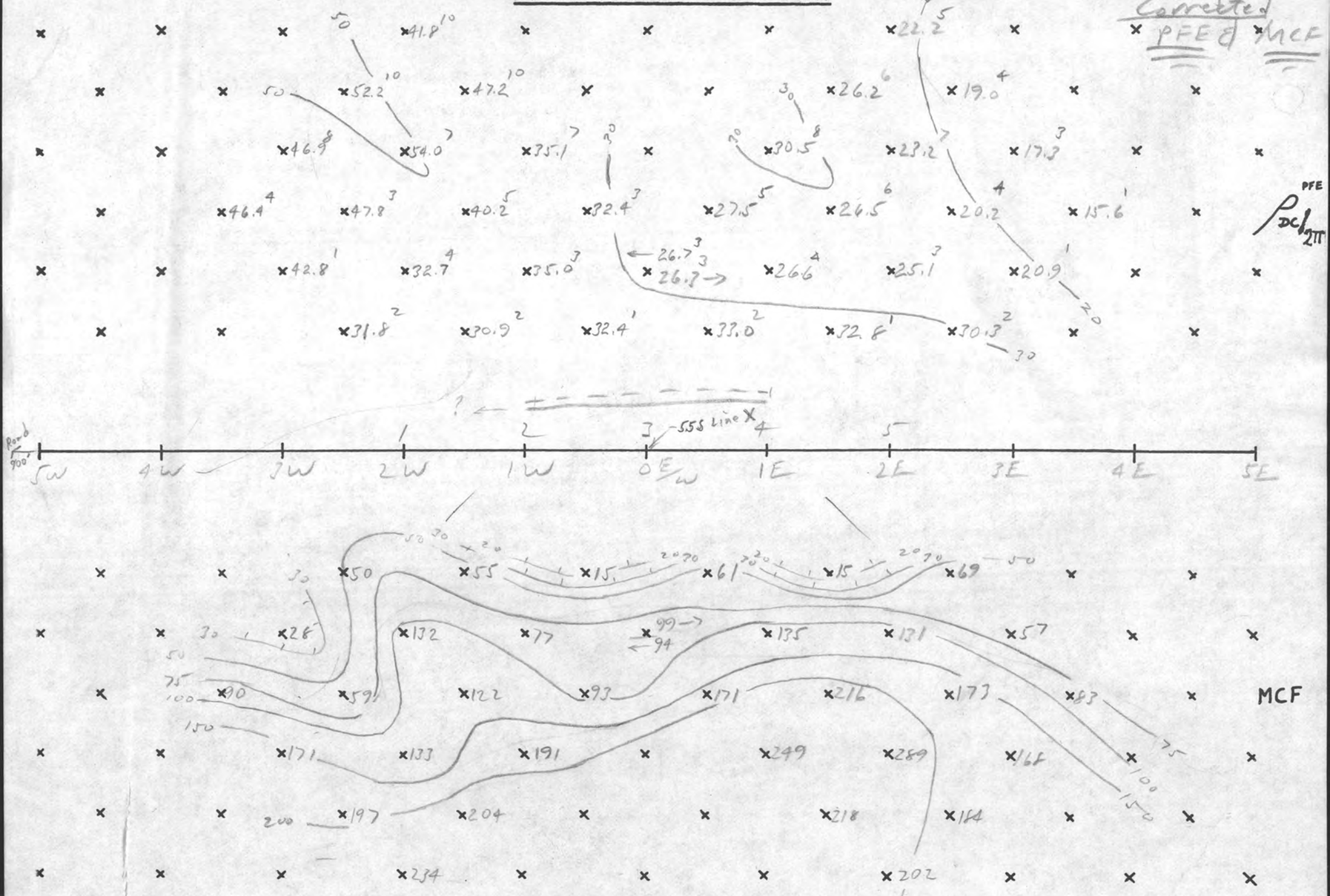
Line 1A

INDUCED POLARIZATION WORK SHEET

← N 70° W

S 70° E →

Coupling Corrected PFE & MCF



Area S.O.D. Scale 1" = 1000' Date 4/20/64

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: 2A W½ Date: 4-20-64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Receive	→		→		→				→			
Time	2x9	2x10	2x10	2x9	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10
Range	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Current	1800	2000	2000	1800	2000	2000	2000	2000	2000	2000	2000	2000
Send	4-5	1-2	2-3	3-4	4-5		CAL	1-2				
Receive	→				→							
Time	2x10	2x10	2x8	2x8	2x10			1x3				
Range	2.0	2.0	1.50	1.50	2.0			.30				
Current	2000	2000	1600	1600	2000			300				

INDUCED POLARIZATION - RECEIVER NOTES PAGE 3

Project: S.O.D. Line: 2A - Spr. S - W½ 565 W Int.Cal _____ Date: 4/21/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-2W	→	2-3W		→	3-4W			→	4-5W		
~~Time~~ Range	100	30	100	10	10	100	30	10	3	30	10	3
DC-1	23.7	5.7 5.[illegible]	27.9	4.78 5.17	2.03 2.38	28.6	8.4 8.0	2.92 2.14 2.22 2.62	1.03 1.49 1.43 1.13	9.6 11.9	4.57 5.02	1.57 1.65 1.68 1.66
DC-2	21.7	6.0 5.9	29.0	5.00 8.70	2.33 2.00	28.9	8.6 9.0	2.85 2.60 2.06 2.17	1.42 .95 1.09 1.24	11.9 9.6	5.00 4.50	1.66 1.57 1.55 1.59
Σ	45.4	11.7	56.9	9.78 9.77	4.36 4.30	57.5	17.0 17.0	4.84 4.74 4.73 4.79	2.45 2.47 2.52 2.47	21.5 21.5	9.57 9.52	3.23 3.23 3.23 3.25
DC-3	21.7	6.0	29.0	4.73 5.00	2.01 2.12	28.9	8.6 9.0 9.1 7.7	2.06 2.77	1.12 1.47 1.05 1.22	9.6 12.0	4.55 4.52 4.97 5.08	1.57 1.62
Dc-4	23.7	5.7	27.9	5.00 4.68	2.30 2.19	28.6	8.1 7.3 7.7 9.8	2.78 2.07	1.32 1.07 1.50 1.12	11.9 9.5	5.00 5.06 4.52 4.42	1.62 1.61
Σ	45.4	11.7	56.9	9.73 9.68	4.31 4.31	57.5	16.7 16.9 16.8 17.0	4.84 4.80	2.49 2.54 2.55 2.44	21.5 21.5	9.55 9.57 9.49 9.50	3.17 3.23
DC-AV	45.4	11.7	56.9	9.73	4.32	57.5	16.9	4.79	2.48	21.5	9.53	3.23
AC-1	22.1	5.3	27.4	4.54	1.94	27.6	7.9	2.18	1.10	10.0	4.40	1.46
AC-2	22.1	5.4	27.4	4.54	1.95	27.7	7.9	2.20	1.11	10.1	4.42	1.46
Σ	44.2	10.7	54.8	9.08	3.89	55.3	15.8	4.38	2.21	20.1	8.82	2.92
S. P.	-17.9	→	-1.7	→	→	-2.3	-2.3	→	→	-14.2		
AC-N	.22+A	→	.21+A	→	→	.03	.21A	→	→	.26+A		
I.C.	50.3	→	50.1	→	→	50.0	→	→	→	50.0		

INDUCED POLARIZATION - RECEIVER NOTES PAGE 4

Project: S.O.D. Line: 2A Spr 1 - W½ Int.Cal _____ Date: 4/21/64

Send	4-5	1-2	2-3	3-4	4-5		CAL	→				
Rec.	→	5-6 W	→	→	→		1-2	→				
Time Range	3	10	10	3	3		30	30				
DC-1	[illegible]	5.45 5.76	2.41 2.02 2.06 2.47	.83 .77 1.02 .77	.76 .64 .94 .58		14.7	14.9				
DC-2	.89 .87 .97 .87	5.60 5.55	2.05 2.50 2.37 2.08	.90 .93 .83 .89	.50 .48 .37 .73		14.8	14.9				
Σ	1.85 1.86 1.87 1.83	11.25 11.31	4.49 4.52 4.43 4.65	1.73 1.70 1.65 1.66	1.26 1.32 1.31 1.31		29.5	29.8				
DC-3	.95 .87 .94 .88	5.75 5.44	2.09 2.22 2.42 2.15	1.02 .75 .82 .63	.93 .65 .77 .68		14.7	14.9				
Dc-4	.90 .92 .84 1.02	5.46 5.50	2.41 2.15 2.11 2.28	.74 1.03 .94 1.10	.50 .65 .54 .65		14.8	14.9				
Σ	1.88 1.79 1.82 1.90	11.21 11.24	4.55 4.37 4.53 4.43	1.76 1.78 1.76 1.77	1.43 1.30 1.31 1.31		29.5	29.8				
DC-AV	1.85	11.25	4.48	1.72	1.32		29.5	29.8				
AC-1	.82	5.30	2.07	.77	.58		14.4	14.9				
AC-2	.82	5.32	2.07	.77	.58		14.5	14.8				
Σ	1.64	10.62	4.14	1.54	1.16		28.9	28.8				
S. P.	→	+4.7	→	→	→							
AC-N	→	0.02	→	→	→							
I.C.	→	50.0	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line 2A - Spoil W Field date 4/21/64 Data page_____ Comp. date 4/22/64. Comp by C.S.L.

(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-2W	→	2-3W	→	→	3-4W	→	→	→	4-5W	→	→
(C) ~~n separation~~ Range	100	30	100	10	10	100	30	10	3	30	10	3
(D) I	1800	2000	2000	1800	2000	→	→	→	→	→	→	→
(E) Vdc (avg)	45.4	11.7	56.9	9.73	4.32	57.5	16.9	4.79	2.48	21.5	9.53	3.23
(F) DCcal USED	1.012	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	76.7	71.0	86.4	65.7	65.6	87.4	103	72.8	75.5	131	145	98.3
(I) Vac Σ	44.2	10.7	54.8	9.08	3.89	55.3	15.8	4.38	2.21	20.1	8.82	2.92
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.994	.974	.994	.974	.974	.994	.974	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.020 .3	1.066 .8	1.031 .2	1.043 .8	1.082 .5	1.032 .2	1.041 .6	1.066 1.3	1.093 2.0	1.041 .5	1.051 .9	1.078 1.7
(N) PFE=(M-1)(10^2)	1.7	5.8	2.9	3.5	6.7	3.0	3.5	5.3	7.3	3.6	4.2	6.1
(O) MCF=(M-1)(10^5)/H	22	82	34	53	125 102	34	34	91 73	97	27	35 29	62

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	1-2	2-3	3-4	4-5		CAL					
(B) Receive	→	5-6W	→	→	→		1-2					
(C) n separation	3	10	10	3	3		30	30				
(D) I	→	→	1600	1600	2000		300	300				
(E) Vdc (avg)	1.85	11.25	4.48	1.72	1.32		29.5	29.8				
(F) DCcal	→	→	→	→	→		1.017	1.007				
(G) Kn x 10^{-3}	105	30	60	105	168		1.012					
(H) ρ dc=ExFxGx10^3/D	136	171	170	114	113							
(I) Vac Σ	1.64	10.62	4.14	1.54	1.16		28.9	28.8				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→		.980	.968				
(M) ρdc/ρac =ExL/K	1.099 2.1	1.032 .7	1.052 1.3	1.088 2.1	1.108 2.9		~ .974					
(N) PFE=(M-1)(10^2)	7.8	2.5	3.9	6.7	7.9							
(O) MCF=(M-1)(10^5)/H	57	19 15	23	59	70							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: 2 A E½ Date: 4-21-69

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time	2x1000	2X 1000	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10
Range	1.50	1.50	1.50	1.50	2.0	2.0	2.0	2.0	2.0	1.50	1.50	1.50
Current	2000	2000	2000	1800	2000	2000	2000	2000	2000	2000	2000	2000

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Receive	→	→	→	→	→		4-5					
Time	2x100	2x100	2x100	2x100			1-3					
Range	1.50	1.50	2.0	2.0			.30					
Current	2000	2000	2000	2000			300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 5

Project: 5.0.0 Line: 2A-Spr.1-F½ Int.Cal Date: [illegible]

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2E	→	2-3E		→	3-4E			→	4-5E		
Time	100	30	30	30	10	100	30	10	3	10	3	3
DC-1	22.6	6.0	17.6	9.3	3.60 3.81	23.4	6.2	4.63 4.64	1.99 1.98	5.28	2.08 2.21	1.87 1.82
DC-2	22.6	6.0	19.5	8.8	3.80 3.57	23.4	5.8	4.64 4.63	1.98 1.97	5.32	2.21 2.06	1.82 1.91
Σ	45.2	12.0	37.1	18.1	7.40 7.44	46.8	12.0	9.27 9.27	3.97 3.95	10.60	4.29 4.27	3.69 3.73
DC-3	22.6	6.0	19.5	8.8	3.80 3.56	23.4	5.8	4.63	1.97 1.99	5.30	2.06 2.24	1.91 1.78
Dc-4	22.6	6.0	17.6	9.3	3.56 3.85	23.4	6.2	4.64	1.96 1.97	5.30	2.20 2.02	1.78 1.95
Σ	45.2	12.0	37.1	18.1	7.36 7.49	46.8	12.0	9.27	3.93 3.92	10.60	4.25 4.26	3.69 3.73
DC-AV	45.2	12.0	37.1	18.1	7.38	46.8	12.0	9.27	3.94	10.60	4.28	3.71
AC-1	21.3	5.5	16.8	8.2	3.37	22.4	5.3	4.17	1.77	4.68	1.79	1.57
AC-2	21.2	5.5	16.8	8.2	3.38	22.3	5.3	4.17	1.76	4.70	1.81	1.58
Σ	42.5	11.0	33.6	16.4	6.75	44.7	10.6	8.34	3.53	9.38	3.60	3.15
S. P.	+9.1	→	+13.4		→	-8.5			→	+7.6		
AC-N	.03	→	.04+A		→	.08+A			→	.11+A		
I.C.	51.7		51.6			51.6			→	51.7		

INDUCED POLARIZATION - RECEIVER NOTES PAGE 6

Project: S.O.D. Line: 2A-Spnf-E½ Int.Cal _____ Date: [illegible]

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6E	→	→	→		4-5					
Time	3	10	3	3	1		30	30				
DC-1	.82 .84	2.18 2.21	1.08 1.07	1.00 1.11	.50 .58 .59 .62		15.2	15.2				
DC-2	.84 .85	2.21 2.20	1.07 1.10	1.09 1.00	.61 .56 .57 .50		15.3	15.3				
Σ	1.66 1.69	4.39 4.41	2.15 2.17	2.09 2.11	1.11 1.14 1.16 1.12		30.5	30.5				
DC-3	.85 .86	2.20 2.21	1.10 1.06	1.00 1.02 1.05 1.09	.57 .58		15.2	15.2				
Dc-4	[illegible] [illegible]	2.21 2.[illegible]	1.05 1.07	1.05 1.06 1.02 1.00	.58 .56		15.3	15.3				
Σ	1.76 1.69	[illegible]	2.15 2.15	2.05 2.08 2.07 2.09	1.13 1.14		30.5	30.5				
DC-AV	1.69	4.41	2.15	2.08	1.14		30.5	30.5				
AC-1	.72	1.95	.90	.89	.495		15.0	14.8				
AC-2	.72	1.95	.91	.90	.500		15.0	14.9				
Σ	1.44	3.90	1.81	1.79	.995		30.0	29.7				
S. P.	→	+24.7	→	→	→							
AC-N	→	.04	.07+4	→	→							
I.C.	→	51.7	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line 2A-Spr.L-E½ Field date 4/22/64 Data page_____ Comp. date 4/22/64 Comp by C.S.L.

(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2E	→	2-3E	→	→	3-4E	→	→	→	4-5E	→	→
(C) ~~n separation~~ Range	100	30	→	→	10	100	30	10	3	10	3	3
(D) I	2000	→	→	1800	2000	→	→	→	→	→	→	→
(E) Vdc (avg)	45.2	12.0	37.1	18.1	7.38	46.8	12.0	9.27	3.94	10.60	4.28	3.71
(F) DCcal USED	.985	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	66.7	70.9	54.8	119	109	69.0	70.9	137	116	62.7	63.1	109
(I) Vac Σ	42.5	11.0	33.6	16.4	6.75	44.7	10.6	8.34	3.53	9.28	3.60	3.15
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.994	.974	→	→	→	.994	.970	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1017 .3	1062 .7	1076 .5	1074 .6	1066 1.0	1040 .3	1101 .8	1082 .8	1088 1.0	1100 .8	1158 1.5	1148 1.5
(N) PFE=(M-1)(10^2)	1.4	5.5	3.1	6.8	5.6	3.7	9.3	7.4	7.0	9.2	14.3	13.7
(O) MCF=(M-1)(10^5)/H	21	78	130	57	61 51	54	131	60 54	60	147	250 227	122

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	4-5	3-4	2-3	1-2		CAL	→				
(B) Receive	→	5-6E	→	→	→		4-5	→				
(C) n separation	3	10	3	3	1		30	30				
(D) I	→	→	→	→	→		300	300				
(E) Vdc (avg)	1.69	4.41	2.15	2.08	1.14		30.5	30.5				
(F) DCcal	→	→	→	→	→		.985					
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	87.4	65.1	63.4	107	94.2							
(I) Vac Σ	1.44	3.90	1.81	1.79	.995		30.0	29.7				
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	1.034		.985	.974				
(M) ρdc/ρac =ExL/K	1142 2.8	1101 1.5	1158 2.5	1131 2.3	1186 [illegible]							
(N) PFE=(M-1)(10^2)	11.4	8.6	13.3	10.8	15.3							
(O) MCF=(M-1)(10^5)/H	131	155 132	210	101	162							

7/2/65

Superior Oil Co.

Ralph Wilport said he found the Sunshine Data on C.G. Area will send it to us

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: U spd 1 S½ Date: 2-26-64

Send	34	45	23	34	45	12	23	34	45	12	23	34
Receive	125 →		235 →			345 →				455 →		
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5
Current	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100

Send	45	12	23	34	45
Receive	→	565 →			
Time					
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5
Current	2/100	2/100	2/100	2/100	2/100

INDUCED POLARIZATION - RECEIVER NOTES PAGE 35

Project: S.O.O. Line: U-Spr. 1-5½ Int.Cal Date: 2/26/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-25	→	2-35	→	→	3-45	→	→	→	4-55	→	→
~~Time~~ Range	30	3	30	3	3	30	3	3	1	3	3	1
DC-1	9.1 9.1	1.80 1.85 1.91 1.88	7.6 7.6	1.71 1.69 1.78 1.90	.57 .57 .60 .53	6.5 6.8	1.47 1.42 1.48 1.51	.56 .63 .49 .44	.27 .27 .125 .21	1.36 1.42	.45 .55 .52 .44	.275 .30 .25 .21
DC-2	9.1 9.2	1.91 1.86 1.89 1.87	7.6 7.6	1.90 1.87 1.75 1.62	.58 .56 .50 .55	6.8 6.3	1.47 1.51 1.45 1.43	.50 .43 .61 .64	.24 .23 .325 .31	1.42 1.36	.53 .44 .46 .58	.255 .32 .28 .31
Σ	18.3 18.3	3.71 3.71 3.80 3.77	15.2 15.2	3.61 3.51 3.53 3.52	1.15 1.02 1.10 1.08	13.3 13.1	2.94 2.93 2.97 2.94	1.06 1.06 1.10 1.08	.51 .50 .50 .52	2.78 2.78	.98 .99 .98 .99	.53 .52 .53 .52
DC-3	9.2 9.1	1.89 1.87 1.90 1.87	7.6 7.3	1.74 1.73 1.82 1.64	.49 .63 .68 .54	6.3 6.3 7.0 6.8	1.46 1.49	.52 .48 .57 .59	.30 .31 .25 .22	1.36 1.42	.44 .57 .38 .43	.28 .32 .21 .22
Dc-4	9.1 9.2	1.90 1.87 1.81 1.85	7.6 7.5	1.82 1.83 1.71 1.67	.66 .50 .46 .52	7.0 6.8 6.2 6.3	1.48 1.43	.57 .57 .50 .47	.22 .20 .285 .29	1.42 1.36	.57 .02 .43 .56	.22 .21 .31 .28
Σ	18.3 18.3	3.79 3.74 3.72 3.72	15.2 15.2	3.56 3.56 3.53 3.51	1.15 1.13 1.14 1.06	13.3 13.1 13.2 13.1	2.94 2.92	1.09 1.05 1.07 1.06	.52 .51 .51 .51	2.78 2.78	1.01 .99 1.01 .99	.50 .53 .52 .53
DC-AV	18.3	3.73	15.2	3.54	1.12	13.2	2.93	1.07	.51	2.78	.99	.52
AC-1	8.9	1.79	7.3	1.71	.53	6.4	1.40	.50	.245	1.31	.46	.25
AC-2	8.9	1.80	7.3	1.70	.53	6.3	1.41	.50	.245	1.32	.47	.25
Σ	17.8	3.59	14.6	3.41	1.06	12.7	2.81	1.00	.49	2.63	.93	.50
S. P.	-3.2	→	-12.0	→	→	+41.7	→	→	→	-0.1	→	→
AC-N	.01	→	.01	→	→	.01	→	→	→	.01	→	→
I.C.	50.2	→	50.2	→	→	50.2	→	→	→	50.1	→	→

SP 0-15 +27.3

INDUCED POLARIZATION - RECEIVER NOTES PAGE 36

Project: S.O.D. Line: U Spr. 1 - 5½ Int.Cal _____ Date: 2/2/64

Send	4-5	1-2	2-3	3-4	4-5		CAL					
Rec.	→	5-6S	→	→	→		1-2					
~~Time~~ Range	1	3	1	1	1		30					
DC-1	.13 .13 .15 .145	.42 .42 .47 .50	.22 .28	.11 .09 .17 .14	.10 .08 .10 .11		15.0					
DC-2	.14 .15 .13 .135	.48 .48 .42 .38	.38 .21	.17 .12 .11 .15	.08 .13 .05 .03		15.0					
Σ	.27 .28 .28 .28	.90 .90 .90 .88	.60 .49	.28 .31 .30 .32	.18 .21 .15 .19		30.0					
DC-3	.125 .11 .16 .145	.38 .38 .55 .50	.20 .21	.15 .15 .15 .22	.07 .08 .11 .06		15.0					
Dc-4	.165 .17 .11 .095	.56 .51 .38 .42	.30 .29	.15 .17 .15 .08	.11 .07 .07 .11		15.0					
Σ	.29 .28 .27 .28	.94 .89 .93 .92	.50 .50	.30 .32 .30 .30	.18 .15 .18 .17		30.0					
DC-AV	.28	.91	.50	.305	.175		30.0					
AC-1	.13	.42	.23	.135	.08		14.9					
AC-2	.13	.42	.24	.135	.08		10.9					
Σ	.26	.84	.47	.270	.160		29.8					
S. P.	→	+8.7	→	→	→							
AC-N	→	.011	→	→	→							
I.G.	→	50.1	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line U spd/S½ Field date 2-26-69 Data page_____ Comp. date 3-2-69. Comp by CSCHKA

(A) Send	34	45	23	34	45	12	23	34	45	12	23	34
(B) Receive	125	→	235	→	→	345	→	→	→	455	→	→
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	14.3	3.73	15.2	3.54	1.12	13.2	2.93	1.07	.51	2.78	.99	.52
(F) DCcal Used 1.000	→	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	26.2	21.3	21.7	20.3	16.0	18.9	16.8	15.3	14.6	15.9	14.2	14.9
(I) Vac Σ	17.8	3.59	14.6	3.41	1.06	12.7	2.81	1.00	.49	2.63	.93	.50
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. Used 1.000	→	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.029	1.039	1.040	1.038	1.056	1.040	1.042	1.070	1.040	1.056	1.063	1.040
(N) PFE=(M-1)(10^2)	3	4	4	4	6	4	4	7	4	6	6	4
(O) MCF=(M-1)(10^5)/H	111	183	184	187	350	212	250	458	274	352	443	268

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	45	12	23	34	45		Cal					
(B) Receive	→	565	→	→	→		12					
(C) n separation												
(D) I	→	→	→	→	→							
(E) Vdc (avg)	.28	.91	.50	.305	.175							
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	14.0	13.0	14.3	15.2	14.0							
(I) Vac Σ	.26	.84	.47	.270	.160							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1077	1082	1063	1130	1093							
(N) PFE=(M-1)(10^2)	8	8	6	13	9							
(O) MCF=(M-1)(10^5)/H	550	631	440	854	665							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: Uspd 1 N½ Date: 2-25-64

Send	23	12	34	23	12	45	34	23	12	45	34	23
Receive	12N →		23N →			34N →				45N		
Time												
Range	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5
Current	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00
Send	12	45	34	23	12		col					
Receive	→	5-6N			→							
Time												
Range	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5	2 X 10.5		3 X 1					
Current	2/00	2/00	2/00	2/00			300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 33

Project: S.O.O. Line: U-Spr. 1-N½ Int.Cal _____ Date: 2/25/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
~~Time~~ Range	30	3	30	3	3	30	10	3	3	10	3	3
DC-1	7.6 / 7.5	1.99 1.77 / 1.76 1.79	1.0 / 9.4	1.73 1.95 / 1.92 1.74	.57 .75 / .71 .80	9.1 / 9.1	1.94 2.02 / 1.90 1.96	.70 .66 / .84 .73	.45 .53 / .36 .70	2.20 / 2.15	.99 1.00 / .66 .67	.38 .00 / .34 .46
DC-2	7.5 / 7.6	1.76 1.83 / 1.95 1.89	9.4 / 9.0	1.93 1.76 / 1.75 1.91	.90 .80 / .55 .74	9.1 / 9.0	1.98 1.98 / 2.04 2.00	.82 .78 / .62 .75	.36 .30 / .44 .53	2.17 / 2.18	.66 .67 / .64 .63	.39 .48 / .47 .43
Σ	15.1 / 15.1	3.75 3.60 / 3.71 3.67	18.4 / 18.4	3.66 3.69 / 3.67 3.67	1.47 1.55 / 1.46 1.54	18.2 / 18.1	3.95 4.00 / 3.94 3.96	1.52 1.44 / 1.46 1.48	.81 .83 / .80 .83	4.37 / 4.33	1.65 1.63 / 1.70 1.70	.77 .81 / .77 .89
DC-3	7.6 / 7.5	1.77 1.98 / 1.96 1.69	9.0 / 9.4	1.77 1.92 / 1.63 1.82	.67 .78 / .77 .64	9.0 / 9.1	2.06 2.00 / 1.84 1.95	.66 .72 / .73 .78	.40 .51 / .40 .25	2.00 / 2.40	1.05 1.04 / .67 .66	.44 .43 / .41 .37
Dc-4	7.5 / 7.6	1.88 1.73 / 1.78 2.17	9.4 / 9.0	2.00 1.79 / 2.07 1.88	.80 .70 / .75 .86	9.1 / 9.0	1.88 1.96 / 2.04 2.02	.78 .76 / .73 .64	.42 .27 / .46 .54	2.35 / 1.95	.66 .66 / .02 .06	.29 .33 / .41 .37
Σ	15.1 / 15.1	3.65 3.71 / 3.70 3.86	18.4 / 18.4	3.77 3.71 / 3.70 3.70	1.47 1.48 / 1.52 1.50	18.1 / 18.1	3.94 3.96 / 3.88 3.97	1.54 1.48 / 1.46 1.46	.82 .78 / .86 .79	4.35 / 4.35	1.69 1.70 / 1.69 1.72	.78 .76 / .82 .79
DC-AV	15.1	3.71	18.4	3.70	1.47	18.1	3.95	1.46	.83	4.35	1.69	.79
AC-1	7.3	1.76	9.0	1.80	.71	8.8	1.88	.70	.41	2.10	.83	.42
AC-2	7.7	1.78	8.9	1.80	.71	8.9	1.89	.71	.40	2.12	.83	.41
Σ	14.6	3.54	17.9	3.60	1.42	17.7	3.77	1.41	.80	4.22	1.66	.83
S. P.	-9.8	→	+16.4	→	→	-8.7	→	→	→	+4.1	→	→
AC-N	.07	→	.12	→	→	.16	→	→	→	.22	→	.21
I.C.	50.1	→	50.0	→	→	50.0	→	→	→	50.0	→	→

SP 0-1N + 23.2

INDUCED POLARIZATION - RECEIVER NOTES PAGE 24

Project: SO.0 Line: U - Spn 1 - N½ Int.Cal _____ Date: 2/25/84

Send	1-2	4-5	3-4	2-3	1-2		1-4					
Rec.	→	5-6N	→	→	→		4-5					
Time	3	3	3	3	3		30					
DC-1	.18	.96 .94	.42 .47 .50 .42	.20 .23			14.9					
DC-2	.14	.98 .98	.50 .42 .38 .48	.24 .23			14.9					
Σ		1.94 1.92	.92 .89 .88 .90	.49 .46			29.8					
DC-3		1.03 1.07 .85 .82	.44 .46 .47 .42	.22 .28 .21 .21			14.9					
Dc-4		1.06 .83 1.05 1.06	.96 .42 .46 .48	.24 .21 .28 .24			14.9					
Σ		1.89 1.90 1.93 1.88	.90 .88 .93 .90	.46 .49 .49 .45			29.8					
DC-AV		1.90	.90	.47			29.8					
AC-1	.31	.98	.54	.49			14.8					
AC-2	.30	.98	.58	.48			14.9					
Σ		1.96					29.7					
S. P.	→	+6.2	→	→	→							
AC-N	.20	.48	.46	.41 .42								
I Ri	→	50.0	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line U-Gr. 1-N½ Field date 2/25/64 Data page_____ Comp. date 2/29/64 Comp by C.S.L.

(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2N	2-3N			3-4N			2	4-5N			
(C) n separation												
(D) I	2100											
(E) Vdc (avg)	15.1	3.71	18.4	3.70	1.47	18.1	3.95	1.46	.83	4.35	1.69	.79
(F) DCcal USED	1.000											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	21.6	21.2	26.3	21.2	21.0	25.9	22.6	20.9	23.7	24.9	24.1	22.6
(I) Vac Σ	14.6	3.54	17.9	3.60	1.42	17.3	3.77	1.41	.80	4.22	1.66	.83
(J) AC noise x 2											.33	.32
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	1.000										1.624	.766
(L) AC-DC cal.	1.037	1.048	1.029	1.029	1.035	1.021	1.048	1.035	1.038	1.031	1.038	1.032
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	3	5	3	3	4	2	5	4	4	3	4	3
(O) MCF=(M-1)(10^5)/H	157	226	110	137	167	81	210	167	160	124	158	141

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	4-5	3-4	2-3	1-2							
(B) Receive		5-6N										
(C) n separation												
(D) I												
(E) Vdc (avg)	.48	1.90	.90	.47								
(F) DCcal												
(G) Kn x 10^{-3}	105	30	60	105								
(H) ρ dc=ExFxGx10^3/D	24.0	27.2	25.7	23.7								
(I) Vac Σ	.61	1.96	1.08 1.16	.97								
(J) AC noise x 2	.40	.67										
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.46		.848									
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K		1.020	1.060									
(N) PFE=(M-1)(10^2)		2										
(O) MCF=(M-1)(10^5)/H		73										

INDUCED POLARIZATION SENDER NOTES

Project: S.O.-D. Line: O sod 2 5 1/2 Date: Feb. 27, 1964

Send	3/4	4/5	2/3	3/4	4/5	1/2	2/3	3/4	4/5	1/2	2/3	3/4
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100

Send	4/5	1/2	2/3	3/4	4/5		cal.	1/2				
Receive	→	→	→	→	→							
Time												
Range												
Current	2100	2100	2100	2100	2100			300				

INDUCED POLARIZATION - RECEIVER NOTES PAGE 39

Project: S.O.D. Line: U-Span 2-5½ Int.Cal _____ Date: 2/12/64

Send	7-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-2	→	2-3.5	→	→	3-4.5	→	→	→	4-5.5	→	→
Time	30	10	30	10	3	30	10	3	3	10	3	3
DC-1	[illegible]	1.97 2.03 1.60 1.64	6.6 7.9	2.13 2.06 2.04 2.15	1.22 1.09 .85 .82	4.0 4.3 4.1 4.0	2.20 2.10 2.56 2.48	1.16 1.08 1.00 1.15	1.20 .57 (2.51)	2.42 2.36 2.47 2.45	.99 .98 1.15 1.19	.51 .57 .67 .67
DC-2	[illegible]	1.18 1.18 2.22 2.06	7.9 6.8	2.48 2.15 2.26 1.99	.89 .94 1.09 1.13	6.1 6.0 9.0 9.5	2.30 2.50 2.06 2.10	1.04 1.02 1.20 1.08	1.22 .56 .36 .62	2.46 2.48 2.40 2.41	1.18 1.17 .99 1.02	.63 .49 .42 .50
Σ	[illegible]	3.18 3.18 3.28 3.24	14.7 14.7	4.61 4.41 4.30 4.17	1.97 2.03 1.97 2.09	10.1 10.3 10.1 10.3	4.70 4.65 4.56 4.58	2.20 2.28 2.20 2.18	1.42 1.17 1.08 1.17	4.89 4.88 4.87 4.86	2.17 2.15 2.14 2.16	1.14 1.15 1.09 1.09
DC-3	6.3 6.8 5.8 5.5	2.30 2.34 2.27 2.46	6.8 7.9	2.25 1.87 2.5 2.5	1.12 1.18 1.1 1.16	9.0 9.1 8.2 8.1	2.03 2.01 2.0 2.77	1.19 1.02 1.15 1.18	1.0 .59 .46 .66	2.50 2.90	1.01 1.05 1.15 1.08	1.45 .84 .64 .67
Dc-4	7.0 5.4 7.0 6.0	2.72 2.77 2.52 2.52	7.9 7.3	2.0 2.00 2.1 2.10	1.04 .98 .91 .93	8.7 8.0 9.1 9.3	2.65 2.77 2.60 2.30	1.19 1.11 1.07 1.06	1.12 .57 .91 .47	2.35 2.36	1.12 1.12 1.01 1.08	.61 .70 .69 .69
Σ	12.7 12.0 12.6 12.6	5.02 5.07 5.02 5.20	14.7 15.2	4.29 4.32 4.61 4.95	2.06 2.06 2.0 2.03	17.2 17.3 17.5 17.5	4.68 4.77 4.90 4.87	2.38 2.12 2.22 2.16	1.12 1.12 1.17 1.13	4.85 4.86	2.16 2.15 2.15 2.16	1.33 1.14
DC-AV	12.4	3.82	14.7	4.29	2.04	17.2	4.65	2.20	1.14	4.84	2.15	1.13
AC-1	6.1	1.85	7.2	2.11	.99	8.5	2.26	1.08	.54	2.35	1.04	.55
AC-2	6.1	1.85	7.2	2.11	.99	8.4	2.27	1.08	.55	2.35	1.05	.55
Σ	12.2	3.70	14.2	4.22	1.98	16.9	4.53	2.16	1.09	4.70	2.09	1.10
S. P.	+0.8	→	+7.9	→	→	+14.8	→	→	→	-6.8	→	→
AC-N	.25	→	.19+A	19+A	No A	A	→	→	.13 A	.18 A	→	→
I.C.	10.0	→	49.9	→	→	49.9	→	→	→	49.9	→	→

SP 0-15 -15.2

INDUCED POLARIZATION - RECEIVER NOTES PAGE 40

Project: 50.0 Line: 4-Spr.2-5½ Int.Cal _____ Date: 2/27/6

Send	4-5	1-2	2-3	3-4	4-5		4-4					
Rec.	→	5-6.5		→			1-2					
Time	1	3	3	1	1		30					
DC-1	.39 .20 .26 .39	1.01 1.09 .42 .76	.51 .61 .45 .32	.54 .81 .32 .16	.18 .24 .12 .12		14.9					
DC-2	.33 .40 .14 .17	.65 .76 1.09 1.14	.14 .36 .58 .66	.34 .15 .15 .08	.14 .12 .25 .23		14.9					
Σ	.66 .60 .60 .56	1.66 1.85 1.90 1.90	.85 .97 ~~.97~~ .95	.48 .56 .47 .60	.32 .35 .35 .35		29.8					
DC-3	.17 .25 .13 .12	.112 .121 .66 .69	.60 .67 .37 .34	.14 .21 .14 .16	.122 .23 .11 .12		14.9					
Dc-4	.16 .24 .16 .33	.37 .46 .106 .112	.38 .32 .62 .66	.17 .20 .60 .63	.17 .17 .20 .23		14.9					
Σ	.25 .22 .29 .23	1.89 1.85 1.25 1.25	.98 .99 ~~1.00~~	.61 .61 .59 .59	.35 .35 .35 .35		29.8					
DC-AV	.64	1.88	.98	.59	.35		29.8					
AC-1	.34	.91	.475	.288	.17		14.8					
AC-2	.39	.91	.465	.292	.17		14.8					
Σ	.68	1.82	.940	.58	.34		29.7					
S. P.	→	+19.6	→	→	→							
AC-N	.14 A	.5 A	→	→	→							
I.C.	→	49	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line U Sp 12 5½ Field date 2-26-64 Data page_____ Comp. date 3-2-64. Comp by CSL+KH

(A) Send	34	45	23	34	45	12	23	34	45	12	23	34
(B) Receive	125 →	→	235 →	→	→	345 →	→	→	→	455 →	→	→
(C) n separation												
(D) I	2100 →	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	12.4	3.82	14.7	9.29	2.04	17.2	4.65	2.20	1.14	4.84	2.15	1.13
(F) DCcal 1000 →	→	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	17.7	21.8	21.0	24.5	29.2	24.6	26.6	31.5	32.6	27.7	30.8	32.4
(I) Vac Σ	12.2	3.70	14.2	4.22	1.98	16.9	4.53	2.16	1.09	4.70	2.09	1.10
(J) AC noise x 2	—	.50		.38	—							
(K) Vac(corr) =$\sqrt{I^2 - J^2}$	12.18	3.67		4.20								
(L) AC-DC cal. 1000 →	→	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.020	1.040	1.034	1.022	1.031	1.019	1.025	1.019	1.046	1.030	1.029	1.029
(N) PFE=(M-1)(10^2)	2	4	3	2	3	2	3	2	5	3	3	3
(O) MCF=(M-1)(10^5)/H	113	184	162	90	106	77	94	60	141	108	94	90

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	45	12	23	34	45							
(B) Receive	→	565 →	→	→	→							
(C) n separation												
(D) I	→	→	→	→	→							
(E) Vdc (avg)	.64	1.88	.980	.59	.35							
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	32.0	26.8	28.0	29.5	28.0							
(I) Vac Σ	.68	1.82	.940	.58	.34							
(J) AC noise x 2	.28			.10	.325							
(K) Vac (corr) =$\sqrt{I^2 - J^2}$	.62			.572								
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.032	1.032	1.042	1.030	1.076							
(N) PFE=(M-1)(10^2)	3	3	4	3	8?							
(O) MCF=(M-1)(10^5)/H	100	119	150	102	272?							

INDUCED POLARIZATION SENDER NOTES

Project: S.O.-D. Line: U - N 1/2 Spd. 2 Date: Feb. 27, 1964

Send	2/3	1/2	3/4	2/3	1/2	4/5	3/4	2/3	1/2	4/5	3/4	2/3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	1/2	4/5	3/4	2/3	1/2		cal	4/5				
Receive	→	→	→	→	→							
Time												
Range												
Current	2100	2100	2100	2100	2100			300				

INDUCED POLARIZATION - RECEIVER NOTES PAGE 22

Project: [illegible] Line: U-Spr. 2 - N½ Int.Cal _____ Date: 2/27/64

Send	2-3	1-2	3-4	2-7	1-7	4-5	3-8	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
Time	30	10	30	10	3	30	10	3	3	10	3	3
DC-1	6.0 6.0 / 6.0 6.1	2.03 2.04 / 1.76 1.78	6.1 6.1 / 6.5 6.3	2.82 2.55 / 2.08 2.10	1.08 1.07 / 1.14 .93	7.5 7.5 / 8.0 8.1	2.16 1.97 / 2.17 2.02	1.19 1.06 / 1.10 1.21	.61 .67 / .57 .58	2.21 2.16 / 2.20 2.24	.99 1.17 / .93 .91	.67 .92 / .47 .50
DC-2	6.3 6.2 / 6.8 6.0	1.77 1.76 / 2.13 1.97	6.4 6.3 / 6.3 6.1	2.12 2.09 / 2.55 2.42	1.08 .99 / 1.00 1.19	8.0 8.0 / 7.5 7.3	2.00 2.11 / 2.00 2.16	1.11 1.22 / 1.22 1.09	.57 .51 / .67 .77	2.26 2.35 / 2.23 2.08	1.00 .83 / 1.06 1.02	.58 .36 / .75 .50
Σ	12.3 12.2 / 12.7 12.1	3.80 3.76 / 3.89 3.75	12.5 12.4 / 12.5 12.4	4.54 4.64 / 4.63 4.62	2.16 2.16 / 2.14 2.12	15.5 15.5 / 15.5 15.4	4.20 4.05 / 4.17 4.18	2.30 2.28 / 2.32 2.30	1.20 1.18 / 1.20 1.18	4.47 4.57 / 4.47 4.46	1.99 2.00 / 1.99 1.97	1.24 1.26 / 1.20 1.20
DC-3	5.8 5.8 / 5.9 6.2	1.84 2.06 / 1.82 1.88	6.0 6.0 / 6.3 6.4	2.11 2.43 / 2.11 2.12	1.01 1.08 / 1.16 1.02	7.5 8.0 / 8.2 7.4	2.00 2.03 / 2.08 2.14	1.22 1.10 / 1.14 1.26	.70 .82 / .48 .82	2.24 2.07 / 2.32 2.30	1.02 1.07 / .98 .83	.74 .53 / .51 .48
Dc-4	6.2 6.3 / 6.4 6.1	1.93 1.88 / 2.07 2.00	6.7 6.5 / 6.3 6.1	2.28 2.10 / 2.33 2.48	1.14 1.02 / 1.00 1.06	8.0 7.4 / 7.4 7.3	2.10 2.0 / 2.03 1.98	1.14 1.15 / 1.14 1.06	.68 .78 / .68 .74	2.28 2.37 / 2.20 2.25	1.00 .81 / 1.06 1.13	.61 .60 / .40 .40
Σ	12.0 12.1 / 12.7 12.7	3.77 3.94 / 3.89 3.88	12.3 12.5 / 12.5 12.5	4.60 4.58 / 4.75 4.60	2.15 2.10 / 2.16 2.08	15.5 15.4 / 15.6 15.3	4.10 4.14 / 4.11 4.12	2.36 2.25 / 2.18 2.32	1.18 1.20 / 1.16 1.18	4.52 4.40 / 4.52 4.55	2.06 1.98 / 2.04 1.97	1.16 1.17 / 1.21 1.26
DC-AV	12.2	3.84	12.4	4.63	2.13	15.5	4.13	2.31	1.18	4.49	1.99	1.20
AC-1	6.0	1.90	6.1	2.30	1.10	7.7	2.03	1.15	.61	2.20	.98	.60
AC-2	6.0	1.90	6.1	2.30	1.11	7.6	2.03	1.15	.61	2.20	.99	.60
Σ	12.0	3.80	12.2	4.60	2.21	15.3	4.06	2.30	1.22	4.40	1.97	1.20
S. P.	+3.5		+25.0	→	→	+0.3	→	→	→	+6.8	→	→
AC-N	.50	→		.53 .44	.42 .37	.23	.23	.24 .25	.25 .23	.17	.16 .15	.15 .15
I.C.	50.1	→	50.0	→	→	50.0	→	→	→	50.0	→	→

SP 0-1N -12.1

INDUCED POLARIZATION - RECEIVER NOTES PAGE 7

Project: C.O.D. Line: U. Spr. 2-N 1/2 Int.Cal Date: 2/27/68

Send	1-2	4-5	3-4	2-3	1-2		2-4					
Rec.	→	5-6	→	→	→		4-5					
Time	1	3	3	1	1		30					
DC-1	.36 .51 .75 .79	1.05 1.02 1.12 1.13	.42 .32 .43 .39	.33 .53	.23 .32 .43 .40		15.0					
DC-2	.41 .55 .44 .48	1.12 1.14 1.11 1.18	.42 .46 .42 .69	.53 .33	.40 .33 .21 .18		14.9					
Σ	.77 .79 .79 .73	2.27 2.26 2.23 2.22	.79 1.10 1.13 1.16	.86 .86	.63 .53 .64 .56		29.9					
DC-3	.45 .53 .30 .39	1.09 1.19 1.17 1.11	.71 .77 .65 .61	.32 .51	.32 .23 .42 .36		14.9					
Dc-4	.32 .21 .51 .48	1.14 1.11 1.07 1.13	.66 .60 .70 .58	.40 .29	.26 .31 .15 .20		15.0					
Σ	.77 .79 .81 .77	2.23 2.30 2.24 2.25	2.19 1.17 2.19 1.16	.86 .86	.58 .54 .57 .56		29.9					
DC-AV	.77	2.25	1.18	.86	.56		29.9					
AC-1	.405	1.11	.59	.43	.29		14.9					
AC-2	.405	1.12	.59	.43	.29		15.0					
Σ	.81	2.23	1.18	.86	.58		29.9					
S. P.	→	+2.2	→	→	→							
AC-N	.18 .16	.16 + Anaconda	.17	.17	.18							
I. C.	→	50.0	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line U Spd 2 Field date 2-27-64 Data page_____ Comp. date 3-2-64. Comp by CSL+KH

(A) Send	23	12	34	23	12	45	34	23	12	45	34	23
(B) Receive	12N	→	23N	→	→	34N	→	→	→	45N	→	
(C) n separation												
(D) I 2101	→	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	12.2	3.84	12.4	4.63	2.13	15.5	4.13	2.31	1.18	4.49	1.99	1.20
(F) DCcal 1000	→	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	17.4	22.0	17.7	26.5	30.5	22.2	23.6	33.0	33.8	25.7	28.5	34.4
(I) Vac Σ	12.0	3.80	12.2	4.60	2.21	15.3	4.06	2.30	1.22	4.40	1.97	1.20
(J) AC noise x 2	1.00	→	1.06	.38	.31		.46	.49	.44	.74	.31	.31
(K) Vac(corr) = $\sqrt{I^2 - J^2}$	11.96	3.68	1.215	4.52	2.03		4.07	2.25	1.13	4.39	1.944	1.160
(L) AC-DC cal. 1000	→	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.020	1.093	1.020	1.023	1.048	1.013	1.017	1.027	1.044	1.022	1.024	1.034
(N) PFE=(M-1)(10^2)	2	4	2	2	5	1	2	3	4	2	2	3
(O) MCF=(M-1)(10^5)/H	114	195	113	87	157	59	72	82	130	86	20	99

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	12	45	34	23	12							
(B) Receive	→	56N	→	→	→							
(C) n separation												
(D) I	→	→	→	→	→							
(E) Vdc (avg)	.77	2.25	1.18	.86	.56							
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	38.5	32.2	33.8	43.0	44.8							
(I) Vac Σ	.81	2.23	1.18	.86	.58							
(J) AC noise x 2	.04	.32	.25	.25	.25							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.776	2.20	1.152	.823	.501							
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.046	1.022	1.023	1.044	1.118							
(N) PFE=(M-1)(10^2)	5	2	2	4	12 ?							
(O) MCF=(M-1)(10^5)/H	119	68	68	102	264?							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: V spd 1 5½ Date: 2-20-64

Send	34	45	23	34	45	12	23	34	45	12	23	34
Receive	125 →		235 →			345 →				455 →		
Time												
Range	2x105	2x105	2x105	2x105	2x105	2x105	2x105	2x105	2x105	2x105	2x105	2x105
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	45	12	23	34	45		cc1					
Receive	→	565 →										
Time												
Range	2x105	2x105					3x1					
Current	2100	2100					300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 23

Project: S.O.D. Line: V-Spr. 1 - S'2 Int.Cal _____ Date: 2/20/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-2.5	→	2-3.5	→	→	3-4.5	→	→	→	4-5.5	→	→
Time	30	10	30	10	3	30	10	3	3	10	3	3
DC-1	12.9 12.7 12.3 12.3	3.19 3.01	9.4 10.5	2.80 2.57	1.16 1.18 1.04 1.07	10.3 10.0	2.57 2.65 2.40 2.63	1.10 1.07 1.19 1.23	.58 .51 .54 .50	2.28 2.26 2.24 2.30	1.00 .99 .99 1.04	.57 .51 .49 .50
DC-2	12.3 12.3 12.0 11.8	3.01 3.20	10.5 9.3	2.57 2.64	1.08 1.07 1.25 1.19	10.0 10.3	2.47 2.39 2.65 2.42	1.11 1.18 1.11 1.12	.58 .51 .53 .58	2.24 2.30 2.30 2.23	1.02 1.04 1.05 .97	.45 .51 .53 .49
Σ	24.2 24.0 24.7 24.4	6.20 6.21	19.9 19.8	5.37 5.41	2.24 2.25 2.29 2.26	20.3 20.3	5.04 5.04 5.05 5.04	2.21 2.25 2.20 2.15	1.08 1.08 1.07 1.08	4.52 4.52 4.54 4.53	2.01 2.03 2.04 2.03	1.02 1.02 1.02 1.02
DC-3	12.2 12.2 12.2 12.2	3.22 2.99	9.3 10.6	2.80 2.75 2.62 2.61	1.18 1.13 1.11 1.08	10.3 10.0	2.29 2.42 2.85 2.62	1.11 1.11	.52 .58	2.32 2.24	1.00 .97 1.03 1.07	.56 .46 .50 .56
Dc-4	11.9 12.1 12.3 12.1	2.99 3.22	10.6 9.2	2.60 2.75 2.75 2.51	.94 1.07 1.38 1.17	10.0 10.3	2.80 2.62 2.15 2.45	1.11 1.08	.57 .48	2.20 2.28	1.03 1.07 .99 .97	.48 .59 .50 .47
Σ	23.9 24.3 24.0 24.3	6.21 6.22	19.9 19.8	5.40 5.37 5.42	2.22 2.30 2.29 2.25	20.3 20.3	5.09 5.04 5.00 5.10	2.19	1.09 1.06	4.52 4.52	2.02 2.02 2.04 2.04	1.00 1.00 1.03 1.03
DC-AV	24.1	6.21	19.8	5.39	2.26	20.3	5.05	2.20	1.08	4.53	2.03	1.02
AC-1	11.9	3.01	9.7	2.62	1.09	9.9	2.44	1.06	.51	2.20	.97	.48
AC-2	11.8	3.01	9.7	2.62	1.09	9.9	2.46	1.06	.52	2.20	.97	.48
Σ	23.7	6.02	19.4	5.24	2.18	19.8	4.90	2.12	1.03	4.40	1.94	.96
S. P.	+5.5	→	-13.8	→	→	+3.3	→	→	→	-1.3	→	→
AC-N	.02	→	.01	→	→	.01	→	→	→	.01	→	→
I.C.	50.3	→	50.2	→	→	50.2	→	→	→	50.2	→	→

SP 0-15 +17.6

INDUCED POLARIZATION - RECEIVER NOTES PAGE 24

Project: C.O.D. Line: V-Gen 1 - 5½ Int.Cal _____ Date: 2/20/84

Send	1-5	1-2	2-3	3-4	4-5		C+L						
Rec.	→	5-65	→	→	→		1-2						
Time	1	3	3	1	1		30						
DC-1	.30 .26	.72 .23 .23	.53 .47 .47 .35	.34 .36 .26 .23	.10 .18 .22 .24		15.0						
DC-2	.16 .30	.97 .13 .79 .63	.41 .37 .55 .42	.24 .23 .39 .39	.20 .24 .16 .14		15.0						
Σ	[illegible]	1.69 1.45 .87 2.46	.79 1.88 .96 .98	.58 .61 .60 .62	.37 .38 .36 .38		30.0						
DC-3	.32 .38 .24 .26	.91 1.07 1.4 .28	.93 .51 .48 .53	.37 .37 .32 .28	.16 .16 .21 .22		15.0						
Dc-4	.24 .21 .24 .24	.97 .57 .18 .25	.47 .57 .50 .57	.23 .20 .35 .34	.21 .21 .15 .17		15.0						
Σ	[illegible]	1.88 1.94 .96 .83	.90 1.02 .98 .98	.60 .57 .57 .58	.37 .37 .36 .38		30.0						
DC-AV	[illegible]	1.89?	.98?	.59	.375		30.0						
AC-1	.293 .38 .25	.90	.46	.261	.165		14.9						
AC-2	.293	.91	.47	.263	.165		15.0						
Σ	.586	1.81	.93	.564	.330		29.9						
S. P.	→	+0.7	→	→	→								
AC-N	→	.02	→	→	→								
I.C.	→	50.2	→	→	→								

L W Spr 2 5½

2/21/64

2-3 3-4 4-5

18.0 4.72
18.0 5.00
18.0 5.00
18.0 6.60
18.0 4.73
36.0 5.17

17.9 4.86
17.8 4.86
35.7 9.72

3-4

4.82 5.02 4.80 5.00
5.02 4.80 5.00 4.82
9.84 9.82 9.80 9.82

9.82 VC
2 9.72 AC

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line VSp2 15½ Field date 2-20-64 Data page_____ Comp. date 2-22-64. Comp by_____

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-2 S	→	2-3 S	→	→	3-4 S	→	→	→	4-5 S	→	→
(C) n separation												
(D) I	2100											
(E) Vdc (avg)	24.1	6.21	19.8	5.39	2.26	20.3	5.05	2.20	1.08	4.53	2.03	1.02
(F) DCcal USED	1000											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	34.4	35.6	28.3	30.8	32.3	29.0	28.9	31.4	30.9	26.0	29.0	29.1
(I) Vac Σ	23.7	6.02	19.4	5.24	2.18	19.8	4.90	2.12	1.03	4.40	1.94	.96
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1000											
(M) ρ dc/ρac=ExL/K	1018	1031	1021	1020	1036	1024	1030	1038	1048	1032	1046	1063
(N) PFE=(M-1)(10^2)	2	3	2	3	4	2	3	4	5	3	5	6
(O) MCF=(M-1)(10^5)/H	52	87	74	94	111	83	104	121	155	123	159	216
	.8	1.5	1.0	1.8	3.0	1.0	2.0	3.0	5.2	2.3	3.2	5.7
	1.0	1.7	1.1	1.3	0.6	[illegible]	1.0	0.8	-0.9	[illegible]	1.4	[illegible]

Project_____ Line 3 Field date 6 Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	1-2	2-3	3-4	4 5		CAL					
(B) Receive	→	5-6 S	→	→	→		1-2					
(C) n separation												
(D) I	2100	→	→	→	→		300					
(E) Vdc (avg)	.61	1.89	.98	.59	.375							
(F) DCcal	1000	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	165							
(H) ρ dc=ExFxGx10^3/D	30.5	27.0	28.0	29.4	29.3							
(I) Vac Σ	.586	1.81	.93	.569	.330							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1000	→	→	→	→							
(M) ρdc/ρac =ExL/K	1040	1044	1053	1045	1136							
(N) PFE=(M-1)(10^2)	4 ?	4	5	5 ?	14 ?							
(O) MCF=(M-1)(10^5)/H	131?	163	189	155?	464?							
	7.8	3.5	5.8	8.7	11.7							
	-3.8?	0.5	-0.8	-3.3?	3.3?							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: V spd 1 N½ Date: 2-19-64

Send	23	12	34	23	12	46	34	23	12	46	34	23
Receive	2N →		23N →			34N →				46N →		
Time												
Range	2X10.6	2X10.6	2X10.6	2X10.6	2X10.6	2X10.6	2X10.6	2X10.6	2X10.6	2X10.6	2X10.6	2X10.6
Current	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00
Send	12	46	34	23	12							
Receive	→	56N →										
Time												
Range	2X10.6	2X10.6	2X10.6	2X10.6	2X10.6							
Current	2/00	2/00	2/00	2/00	2/00							

INDUCED POLARIZATION - RECEIVER NOTES PAGE 21

Project: S.O.D. Line: V-Spr. 1-N 1/2 Int.Cal _____ Date: 2/19/61

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
Time	30	10	30	10	3	30	10	3	3	10	3	3
DC-1	11.9 11.0	3.15 2.97 3.22 3.20	10.0 10.4	2.80 2.83	1.28 1.33	9.3 10.0	3.92 2.83	1.32 1.33	.80 .76 .85 .88	3.27 3.42	1.57 1.56	.85 .90
DC-2	11.0 11.9	3.00 3.20 3.17 3.97	10.4 10.0	2.83 2.79	1.33 1.29	10.0 9.3	2.63 2.70	1.33 1.30	.85 .89 .79 .76	3.42 3.25	1.58 1.57	.90 .85
Σ	22.9 22.9	6.15 6.17 6.19 6.17	20.4 20.4	5.63 5.62	2.61 2.62	19.3 19.3	5.55 5.53	2.65 2.63	1.66 1.65 1.64 1.64	6.69 6.67	3.15 3.15	1.75 1.75
DC-3	11.9 10.9	3.17 3.00	10.0 10.4	2.79 2.83	1.29 1.33	9.3 10.0	2.88 2.85	1.30 1.28 1.36 1.38	.78 .87	3.25 3.42	1.58 1.56	.84 .91
Dc-4	11.0 12.0	3.00 3.19	10.4 10.0	2.83 2.79	1.33 1.29	10.0 9.3	2.65 2.70	1.35 1.38 1.28 1.25	.87 .76	3.42 3.25	1.57 1.59	.91 .84
Σ	22.9 22.9	6.17 6.19	20.4 20.4	5.62 5.62	2.62 2.62	19.3 19.3	5.53 5.55	2.65 2.66 2.64 2.63	1.65 1.63	6.67 6.67	3.15 3.15	1.75 1.75
DC-AV	22.9	6.17	20.4	5.62	2.62	19.3	5.54	2.64	1.64	6.67	3.15	1.75
AC-1	11.1	2.97	10.0	2.72	1.17	9.3	2.65	1.21	.62	3.22	1.50	.77
AC-2	11.1	2.98	9.9	2.72	1.17	9.4	2.67	1.22	.62	3.22	1.50	.77
Σ	22.2	5.95	19.9	5.44	2.34	18.7	5.32	2.43	1.24	6.44	3.00	1.54
S. P.	+3.5 .23	→	+0.3 .46	→	→	-23.8 .40	→	→	→	.32	→	→
AC-N	.03	→	.03	→	→	.06	→	→	→	.07	→	→
I.C.	50.3	→	50.4	→	→	50.3	→	→	→	50.3	→	→

INDUCED POLARIZATION - RECEIVER NOTES PAGE 22

Project: S.O.O. Line: V - Spr. 2 - N½ Int.Cal _____ Date: 2/19/6[illegible]

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6	→	→	→		4-5					
~~Time~~ Range	3	3	3	3	3		30					
DC-1	.62 .62	1.35 1.15 1.46 1.69	.76 .88 .82 .72	.55 1.65 .55 .48	.47 .54 .47 .38		15.0					
DC-2	.62 .61	1.46 1.67 1.30 1.07	.83 .72 .79 .93	.56 .49 .58 .66	.47 .40 .45 .56		15.0					
Σ	1.22 1.22	2.81 2.82 2.76 2.76	1.59 1.60 1.61 1.65	1.11 1.14 1.13 1.14	.94 .94 .92 .94		30.0					
DC-3	.61 .61	1.44 1.54 1.30 1.23	.83 .94 .76 .66	.61 .61 .52 .51	.44 .52		15.0					
Dc-4	.61 .61	1.30 1.23 1.51 1.58	.77 .67 .87 1.00	.52 .52 .63 .65	.50 .42		15.0					
Σ	1.22 1.22	2.74 2.77 2.81 2.81	1.60 1.61 1.63 1.46	1.13 1.14 1.15 1.16	.94 .94		30.0					
DC-AV	1.22	2.79	1.61	1.13	.94		30.0					
AC-1	.93	1.34	.71	.40	.26		14.9					
AC-2	.44	1.33	.71	.40	.26		14.9					
Σ	.87	2.67	1.42	.80	.52		29.8					
S. P.	.32 →	+3.3 .31 →	→	→	→							
AC-N	.09 →	.12 →	→	→	→							
I.C.	→	50.3 →	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line V-Spr 1N½ Field date 2-19-64 Data page_____ Comp. date 2-22-64. Comp by_____

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2N	→	2-3 N	→	→	3-4N	→	→	→	4-5N	→	→
(C) n separation												
(D) I	2100											
(E) Vdc (avg)	22.9	6.17	20.4	5.62	~~2.42~~ 2.45	19.3	5.54	~~2.64~~ 2.52	~~1.64~~ 1.42	~~6.67~~ 6.63	~~2.15~~ 2.08	~~1.75~~ 1.677
(F) DCcal USED	1.000											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	32.8	35.3	29.2	32.1	35.0	27.4	31.7	36.1	4.09	37.9	44.1	46.6
(I) Vac Σ	22.2	5.95	19.9	5.44	2.34	18.7	5.32	2.42	1.24	6.44	2.00	1.54
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	.993											
(M) ρ dc/ρac=ExL/K	1.032	1.030	1.029	1.026	1.029	1.025	1.033	1.029	1.153 ?	1.023	1.021	1.049
(N) PFE=(M-1)(10^2)	3	3	3	3	4	3	3	3	15 ?	2	2	5 ?
(O) MCF=(M-1)(10^5)/H	98	85	99	81	111	91	104	80	374 ?	61	48	105 ?
	.8	1.5	1.0	1.8	2.7	1.0	1.7	2.7	3.8	1.7	2.3	3.3

Project_____ Line 3 Field date 6 Data page_____ Comp. date_____ Comp by_____

	1	2	3	4	5	6	7	8	9	10	11	12
(A) Send	1-2	4-5	3-4	2-3	1-2		C4L					
(B) Receive	→	5-6 N	→	→	→		4-5					
(C) n separation												
(D) I	2100	→	→	→	→		300					
(E) Vdc (avg)	~~1.22~~ .97	~~2.79~~ 2.75	~~1.62~~ 1.488	~~1.15~~ .58	~~.79~~ .60							
(F) DCcal USED	1.000	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	165							
(H) ρ dc=ExFxGx10^3/D	48.5	39.3	42.6	44.0	45.0							
(I) Vac Σ	.87	2.67	1.42	.80	.52							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.106	1.022	1.040	1.092	1.145							
(N) PFE=(M-1)(10^2)	11 ?	2	4 ?	9 ?	15 ?							
(O) MCF=(M-1)(10^5)/H	219 ?	56	94 ?	209 ?	302 ?							
	4.7	2.5	3.7	5.2	6.7							

INDUCED POLARIZATION SENDER NOTES

Project: 50D Line: V Spd 2 S ½ Date: 2-24-64

Send	34	45	23	34	45	12	23	34	45	12	23	34
Receive	125 →		235 →		→	345 →			→	455	→	
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5
Current	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100	2/100
Send	45	12	23	34	45		Cal					
Receive	→	565 →			→							
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5		3x1					
Current	2/100	2/100	2/100	2/100	2/100		300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 29

Project: S.O.D. Line: U-Spr 2-S ½ Int.Cal _____ Date: 2/24/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-2.5	→	2-3.5	→	→	3-4.5	→	→	→	4-5.5	→	→
Time	30	10	30	10	3	30	10	3	3	10	3	3
DC-1	9.9 9.8	2.34 2.47	11.4 12.0	2.97 2.80	1.30 1.42 1.41 1.30	11.6 11.8	3.48 3.43	1.42 1.40 1.40 1.44	.73 .76 .82 .82	3.12 3.01 3.19 3.10	1.97 1.47	.65 .78 .73 .65
DC-2	9.8 10.1	2.37 2.35	12.0 11.4	2.80 2.94	1.36 1.36 1.34 1.35	11.9 11.6	3.43 3.47	1.39 1.43 1.45 1.43	.82 .82 .73 .72	3.20 3.37 3.22 3.20	1.97 1.47	.73 .60 .86 .72
Σ	19.7 19.9	4.77 4.80	23.4 23.4	5.77 5.74	2.66 2.68 2.72 2.65	23.5 23.4	6.91 6.90	2.81 2.83 2.85 2.83	1.55 1.58 1.55 1.60	6.34 6.38 6.40 6.40	2.94 2.94	1.38 1.35 1.39 1.37
DC-3	10.1 9.7	2.33 1.26 2.50 2.53	11.3 12.1	2.84 2.83	1.33 1.41 1.37 1.29	11.7 11.9	3.46 3.45	1.05 1.41 1.37 1.44	.71 .78 .80 .75	3.22 3.08	1.38 1.54	.75 .75 .82 .63
Dc-4	9.7 10.1	2.53 2.53 2.48 2.46	12.1 11.3	2.83 2.95	1.38 1.26 1.32 1.39	11.8 11.6	3.43 3.45	1.38 1.44 1.45 1.39	1.53 .76 .73 .80	3.18 3.16	1.54 1.40	.62 .67 .75 .78
Σ	19.8 19.8	4.81 4.79 4.78 4.79	23.4 23.4	5.77 5.78	2.71 2.67 2.69 2.68	23.5 23.5	6.89 6.90	2.83 2.83 2.82 2.83	1.54 1.54 1.53 1.55	6.38 6.38	2.94 2.94	1.37 1.38 1.37 1.41
DC-AV	19.8	4.79	23.4	5.76	2.68	23.5	6.90	2.84	1.55	6.38	2.93	1.38
AC-1	9.7	2.33N	11.6	2.81	1.30	11.6	3.38	1.38	.75	3.13	1.42	.67
AC-2	9.8	2.33	11.6	2.81	1.31	11.6	3.39	1.39	.75	3.14	1.43	.67
Σ	19.5	4.66	23.2	5.62	2.61	23.2	6.77	2.77	1.50	6.27	2.85	1.34
S. P.	+10.1	→	-23.9	→	→	+23.5	→	→	→	+4.9	→	→
AC-N	.16	→	.06	→	→	.05	→	→	→	.02	→	→
I. C.	50.0	→	49.9	→	→	50.0	→	→	→	49.9	→	→

S.P. 0-15 -9.8

INDUCED POLARIZATION - RECEIVER NOTES PAGE 30

Project: S.O.D. Line: V-Spv. 2-S½ Int.Cal _____ Date: 2/24/64

Send	4-5	1-2	2-3	3-4	4-5		CAL					
Rec.	→	1-6	→	→	→		1-2					
Time	3	3	3	3	3		30					
DC-1	.51 .58 .34 .46	1.45 1.42 1.24 1.32	.79 .82 .62 .59	.44 .34	.22 .18 .33 .33		14.8					
DC-2	.34 .28 .32 .3	1.25 1.30 1.03 1.02	.63 .60 .77 .87	.34 .41	.33 .30 .16 .41		14.7					
Σ	.85 .86 .86 .89	2.70 2.72 2.67 2.75	1.42 1.42 1.39 1.46	.75 .75	.55 .52 .52 .54		29.5					
DC-3	.51 .58 .32 .33	1.22 1.22 1.30 1.27	.76 .90 .66 .59	.90 .35	.19 .36		14.7					
Dc-4	.34 .32 .58 .58	1.22 1.27 1.40 1.43	.69 .54 .80 .79	.34 .39	.36 .17		14.8					
Σ	.83 .90 .90 .89	2.75 2.69 2.70 2.70	1.45 1.44 1.46 1.38	.74 .74	.53 .53		29.5					
DC-AV	.87	2.71	1.42	.75	.53		29.5					
AC-1	.42	1.33	.68	.36	.24		14.7					
AC-2	.42	1.33	.69	.36	.25		14.8					
Σ	.84	2.66	1.37	.72	.49		29.5					
S. P.	→	+4.7	→	→	→							
AC-N	→	.01	→	→	→							
I.C.	→	49.9	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line V-Spr. 2-5 Field date 2/24/80 Data page_____ Comp. date 2/28/80. Comp by C.S.L

(A) Send	3-4	4-5	1-2	2-3	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-2.5	→	1-2.5	→	→	3-4.5	→	→	→	1-2.5	→	→
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	19.8	4.79	23.4	5.76	2.68	23.5	6.90	2.84	1.55	6.38	2.92	1.38
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	28.3	27.4	33.5	33.0	38.3	33.6	39.5	40.6	44.3	36.5	41.9	39.4
(I) Vac Σ	19.5	4.66	23.2	5.62	2.61	23.2	6.72	2.77	1.50	6.22	2.85	1.34
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.016	1.027	1.009	1.024	1.027	1.012	1.019	1.024	1.032	1.017	1.028	1.030
(N) PFE=(M-1)(10^2)	2	3	1	2	3	1	2	2	3	2	3	3
(O) MCF=(M-1)(10^5)/H	57	98	27	73	71	39	48	59	72	47	67	76

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	1-2	2-3	3-4	4-5							
(B) Receive	→	5-6.5	→	→	→							
(C) n separation												
(D) I	→	→	→	→	→							
(E) Vdc (avg)	.87	2.71	1.42	.75	.553							
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	43.5	38.7	40.6	37.5	42.3							
(I) Vac Σ	.84	2.66	1.37	.72	.49							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.035	1.019	1.036	1.041	1.031							
(N) PFE=(M-1)(10^2)	4	2	4	4	8 ?							
(O) MCF=(M-1)(10^5)/H	81	49	89	109	191 ?							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: V spd 2 N ½ Date: 2-25-64

Send	23	12	34	23	12	45	34	23	12	45	34	23
Receive	12N →		23N →			34N →				45N →		
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5
Current	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00
Send	12	45	34	23	12		cal					
Receive	→	68N →			→							
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5		3x4					
Current	2/00	2/00	2/00	2/00	2/00		300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 31

Project: S.O.D. Line: V-Spr. 2-N/2 Int.Cal _____ Date: 7/25/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
Time	30	10	30	10	10	30	10	3	3	10	3	3
DC-1	7.3 8.2 7.6 7.2	2.39	6.1 7.9 7.8 8.1	2.86 2.14	1.41 1.34	7.8 8.4	2.19 2.24	1.09 1.06	.77 .79 .56 .75	2.58 2.60 2.63 2.25	1.11 1.16 1.11 1.14	.66 .57
DC-2	7.6 7.2 8.0 8.7	2.44	7.7 8.1 7.9 8.2	2.32 2.87	1.36 1.37	8.4 7.8	2.26 2.20	1.06 1.07	.54 .77 .70 .53	2.63 2.65 2.60 2.60	1.21 1.12 1.15 1.16	.56 .41
Σ	15.6 15.9		15.6 16.0 15.7 16.7	5.06 5.11		16.2 16.2	4.05 4.44	2.15 2.13	1.26 1.26 1.26 1.26	5.21 5.25 5.26 5.25	2.32 2.28 2.37 2.34	1.22 1.18
DC-3	6.4 7.3		7.9 8.2 7.9 7.8	2.92 2.12	1.27 1.41 1.37 1.24	7.8 8.4 8.4	2.20 2.22	1.06 1.10	.60 .55 .73 .72	2.65 2.57	1.14 1.23	.59 .63
Dc-4	7.2 8.1		7.9 7.8 8.1 8.2	2.18 2.90	1.23 1.19 1.27 1.40	8.4 7.8	2.27 2.22	1.09 1.13	.70 .72 .57 .51	2.67 2.67	1.13 1.07	.64 .61
Σ	15.2 15.4		15.8 16.0 15.8 16.0	5.10 5.12	2.60 2.60 2.60 2.60	16.2 16.2	4.44 4.44	2.15 2.13	1.26 1.27 1.26 1.27	5.24 5.24	2.27 2.30	1.23 1.24
DC-AV	15.4	[illegible]	16.0	5.10	2.60	16.2	4.44	2.14	1.26	5.24	2.31	1.22
AC-1	7.6	2.33	8.0	3.00	2.07	8.0	2.28	1.24	.93	2.60	1.18	.71
AC-2	7.6	2.33	7.9	3.00	1.70	8.0	2.26	1.23	.95	2.60	1.18	.71
Σ	15.2	4.66	15.9	6.00		16.0				5.20	2.36	1.42
S. P.	+138.5	→	+8.4	→	→	-4.4	→	→	→	+6.8	→	→
AC-N	.48	→	1.72	→	1.19	.87 .68	.80 .70	.74 .72	.70 .75	.48	.47	.42
T.C.	50.1	→	50.1	→	→	50.1	→	→	→	50.1	→	→

SP O-IN -121 J ?

INDUCED POLARIZATION - RECEIVER NOTES PAGE 72

Project: 50.0 Line: V-fan 2-N½ Int.Cal _____ Date: 1/25/64

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6N	→	→	→		4-5					
Time	30	3	3	3	3		30					
DC-1	.32 .32	1.26 1.76	.67 .65	.42 .46 .44 .30	.32 .39		14.9					
DC-2	.48 .51	1.51 1.40	.70 .64	.36 .30 .41 .54	.30 .28		15.0					
Σ	.80 .83	2.77 2.76	1.37 1.29	.78 .76 .85 .82	.61 .62		29.9					
DC-3	.70 .70	1.40 1.34	.70 .58 .66 .77	.40 .50 .48 .40	.15 .25		14.9					
Dc-4	.51 .51	1.36 1.42	.52 .73 .60 .48	.52 .37 .38 .48	.39 .28		15.0					
Σ	.81 .82	2.76 2.76	1.22 1.31 1.24 1.25	.88 .87 .86 .88	.62		29.9					
DC-AV	.81	2.76	1.28	.84	.62		29.9					
AC-1	.53	1.41	.75	.545	.44		14.9					
AC-2	.53	1.41	.75	.545	.44		14.9					
Σ	1.06	2.82	1.50	1.09	.88		29.8					
S. P.	→	-10.8	→	→	→							
AC-N	.39 .43	.46 .32	.46	.44	.55							
I.C.	→	50.1	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project [illegible] Line V-pr 2-N½ Field date 2/25/64 Data page_____ Comp. date 2/28/64. Comp by [illegible]

(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	15.4	4.50	16.0	5.10	2.60	16.2	4.44	2.14	1.26	5.24	2.31	1.22
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	22.0	27.5	22.9	29.2	37.2	23.1	25.4	30.6	36.0	30.1	33.0	34.9
(I) Vac Σ	15.2	4.66	16.0	6.20	[illegible]	16.[illegible]	4.56 4.53	2.48 2.46	1.86 1.9[illegible]	5.20	2.3[illegible]	1.42
(J) AC noise x 2			[illegible]	3.94	3.44 2.38		[illegible]	1.48 1.44	1.40 1.[illegible]	.96	.84	[illegible]
(K) Vac(corr) = $\sqrt{I^2 - J^2}$			15.62	4.95	[illegible]	15.9	[illegible]	[illegible]	1.224	5.12	2.21	[illegible]
(L) AC-DC cal. USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.013	.027	1.022	1.030	1.014	1.019	1.031	1.037	1.030	1.023	1.042	1.039
(N) PFE=(M-1)(10^2)	1	3	2	3	3	2	3	4	3	2	4	4
(O) MCF=(M-1)(10^5)/H	57	99	86	103	92	82	122	121	83	76	127	112

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	4-5	3-4	2-3	1-2							
(B) Receive	→	5-6N	→	→	→							
(C) n separation												
(D) I	→	→	→	→	→							
(E) Vdc (avg)	.81	2.76	1.28	.84	.62							
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	40.5	39.5	36.6	42.0	49.7							
(I) Vac Σ	1.06	2.82	1.50	1.09	.88							
(J) AC noise x 2	.78	.86	→	→	→							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.718	2.69	1.23									
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.062 ?	1.027	1.040	X	X							
(N) PFE=(M-1)(10^2)	6?	3	4	—	—							
(O) MCF=(M-1)(10^5)/H	153?	68	109									

6.50
.10
6.40

6.00
.58
5.48
5.42

20.40
.64
19.76

22.20
.64
21.56

24.10
.64
23.46

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: V Spd 3 St Date: 3-5-64

Send	34	45	23	34	45	12	23	34	45	12	23	34
Receive	125	→	235		→	345			→	45		
Time												
Range	2X10											
Current	2x10											
Send	45	12	23	34	45		cal					
Receive	→	325			→							
Time												
Range					→		1X3					
Current					→		35					

$$\begin{array}{r} 25 \\ 25 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 25 \\ 32 \\ \hline 50 \\ 75 \\ \hline 800 \end{array}$$

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: S.O.O. Line: U-Spr. 3-5½ Int.Cal _____ Date: 3/5/64

Send	2-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-25	→	2-35		→	3-45			→	4-55		
Time	30	3	10	3	1	10	3	1	1	3	1	1
DC-1	5.8 5.7	1.16 1.19 1.14 1.29	5.01 5.12 5.26 5.26	1.13 1.03 1.03 1.08	.44 .43 .32 .31	5.64 5.35	1.13 1.07 1.18 1.27	.40 .42 .39 .37	.20 .21 .22 .19	1.47 1.65 1.58 1.42	.43 .39 .30 .60	.23 .15 .27 .20
DC-2	5.7 5.8	1.13 1.30 1.16 1.12	5.34 5.44 5.26 5.20	.98 1.07 1.06 .98	.31 .35 .44 .47	5.35 5.64	1.17 1.27 1.12 1.06	.41 .39 .42 .44	.21 .23 .18 .23	1.55 1.42 1.49 1.67	.55 .59 .67 .37	.20 .25 .11 .25
Σ	11.5 11.5	2.28 2.29 2.30 2.31	10.35 10.36 10.42 10.46	2.11 2.10 2.09 2.06	.75 .78 .78 .78	10.99 10.99	2.30 2.34 2.30 2.33	.81 .81 .81 .81	.41 .42 .40 .42	3.02 3.07 3.07 3.09	.98 .95 .97 .97	.43 .40 .38 .45
DC-3	5.8 5.7	1.16 1.03 1.13 1.14	5.31 5.15 5.16 5.37	1.02 .93 1.12 1.08	.44 .33 .34 .45	5.64 5.32	1.12 1.07 1.23 1.26	.42 .34 .38 .48	.24 .24 .17 .21	1.48 1.40 1.59 1.62	.52 .48 .45 .49	.10 .25 .27 .19
Dc-4	5.7 5.8	1.12 1.24 1.15 1.05	5.13 5.33 5.20 5.12	1.12 1.13 1.02 1.04	.33 .45 .43 .33	5.33 5.64	1.22 1.24 1.09 1.07	.37 .46 .43 .32	.19 .16 .14 .19	1.38 1.63 1.44 1.40	.46 .49 .49 .43	.32 .16 .15 .21
Σ	11.5 11.5	2.28 2.29 2.28 2.29	10.46 10.48 10.46 10.49	2.14 2.06 2.14 2.12	.77 .78 .77 .78	10.97 10.96	2.34 2.36 2.32 2.33	.79 .80 .81 .80	.38 .42 .41 .40	3.06 3.02 3.03 3.02	.98 .97 .94 .92	.42 .41 .42 .40
DC-AV	11.5	2.29	10.42	2.10	.775	10.98	2.32	.805	.406	3.05	.965	.415
AC-1	5.6	1.09	5.06	1.00	.372	5.33	1.12	.390	.185	1.47	.477	.195
AC-2	5.6	1.10	5.07	1.01	.374	5.32	1.12	.390	.187	1.47	.480	.190
Σ	11.2	2.19	10.13	2.01	.746	10.65	2.24	.780	.372	2.94	.957	.385
S. P.	-5.1	→	+3.7	→	→	-1.4	→	→	→	+4.3	→	→
AC-N	.02	→	.02	→	→	.02	→	→	→	.01	→	→
I.C.	50.0	→	49.9	→	→	49.8	→	→	→	+99	→	→

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: S.O.D. Line: V - Spr. 3 - S 1/2 Int.Cal _____ Date: 3/5/64

Send	4-5	1-2	2-3	3-4	4-5		C+1					
Rec.	→	5-6.5	→	→	→		1-2					
Time	1	7	1	1	1		30					
DC-1	.15 .13	.55 .60 .59 .53	.19 .23 .16 .22	.10 .10 .11 .09	.11 .11 .07 .15		14.6					
DC-2	.11 .13	.57 .51 .49 .58	.25 .20 .16 .19	.10 .11 .11 .13	.05 .05 .07 .11		14.6					
Σ	.26 .26	1.12 1.11 1.08 1.11	.44 .43 .42 .43	.20 .21 .21 .22	.16 .16 .14 .16		29.2					
DC-3	.11 .15	.63 .58 .65 .46	.17 .18 .19 .21	.10 .14 .09 .09	.06 .11 .10 .06		14.6					
Dc-4	.15 .11	.47 .50 .68 .67	.23 .23 .24 .23	.13 .07 .14 .17	.10 .06 .07 .11		14.6					
Σ	.26 .26	1.10 1.08 1.13 1.13	.44 .41 .43 .44	.23 .21 .22	.16 .17 .17 .17		29.2					
DC-AV	.260	1.11	.422	.214	.161		29.2					
AC-1	.104	.53	.202	.099	.065		14.5					
AC-2	.108	.53	.202	.100	.065		14.6					
Σ	.212	1.06	.404	.199	.130		29.1					
S. P.	→	-12.9	→	→	→							
AC-N	→	.03	→	→	→							
F.C.	→	49.8	→	→	→							

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line U-Spr. 3-5½ Field date 3/5/64 Data page_____ Comp. date 3/16/64. Comp by C.S.L.

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-25	→	2-35	→	→	3-45	→	→	→	4-51	→	→
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	11.5	2.29	10.42	2.10	.775	10.98	2.32	.805	.406	3.05	.965	.415
(F) DCcal USED	1.028	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	16.9	13.4	15.3	12.3	11.3	16.1	13.6	11.8	11.9	17.9	14.1	12.2
(I) Vac Σ	11.2	2.19	10.13	2.01	.746	10.65	2.24	.780	.372	2.94	.957	.385
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000	→	→	→	1.040	1.000	→	1.040	→	1.000	1.040	→
(M) ρ dc/ρac=ExL/K	1.028	1.046	1.029	1.044	1.081	1.030	1.036	1.072	1.133	1.037	1.048	1.121
(N) PFE=(M-1)(10^2)	3	5	3	4	8	3	4	7	13	4	5	12
(O) MCF=(M-1)(10^5)/H	165	344	190	358	716	186	265	610	1119	207	340	993
	1.6	4.6	1.8	5.0	9.8	1.7	4.5	9.3	14.7	3.3	7.7	14.3
	1.2	0.0	1.1	-0.6	-1.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Project_____ Line 5 3 Field date 5 6 Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	1-2	2-3	3-4	4-5		CAL					
(B) Receive	→	5-65	→	→	→		1-2					
(C) n separation												
(D) I	→	→	→	→	→		300					
(E) Vdc (avg)	.260	1.11	.422	.214	.161		29.2					
(F) DCcal	→	→	→	→	→		1.028					
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	13.3	16.3	12.4	11.0	13.2							
(I) Vac Σ	.212	1.06	.404	.199	.130							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.040	1.000	1.040	→	→							
(M) ρdc/ρac =ExL/K	1.276	1.048	1.086	1.118	1.289							
(N) PFE=(M-1)(10^2)	28	5	9	12	29							
(O) MCF=(M-1)(10^5)/H	2073	294	693	1072	2187							
	19.0	6.5	14.0	23.0	25.3							
	[illegible]	-1.7	[illegible]	[illegible]	[illegible]							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: V. spd 3 N½ Date: 3-5-64

Send	23	12	34	23	12	45	34	23	12	45	34	23
Receive												
Time												
Range	2x10.5											
Current	100											
Send	12	45	34	23	12		Cal					
Receive												
Time												
Range					>		1x3	1x1.2				
Current					>		300	120				

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: S.O.D. Line: U - Spur 3 N Int.Cal _____ Date: 3/5/84

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	2-3N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
Time	10	7	30	3	1	30	3	3 1	1	3	3	1
DC-1	5.59 5.02 5.19 5.82	1.24 1.01 .94 1.29	6.3 6.2	1.12 1.26 1.11 1.14	.52 .58 .63 .46	7.7 7.5	1.58 1.62 1.53 1.56	.67 .48 .71 .49	.32 .28 .30 .28	1.92 1.67 1.88 1.90	.74 .36 .54 .38	.29 .30 .26 .30
DC-2	5.25 5.90 5.86 5.30	.96 1.27 1.34 .96	6.2 6.3	1.10 1.03 1.17 1.22	.42 .39 .36 .51	7.4 7.6	1.52 1.53 1.65 1.56	.37 .53 .34 .54	.30 .29 .33 .29	1.80 2.02 1.72 1.84	.58 .41 .72 .95	.28 .31 .36 .31
Σ	10.84 10.92 11.05 11.12	2.20 2.28 2.28 2.25	12.5 12.5	2.22 2.29 2.28 2.26	.92 .93 .99 .97	15.1 15.1	3.14 3.15 3.18 3.12	1.00 1.03 1.06 1.03	.62 .57 .63 .57	3.72 3.69 3.60 3.74	1.32 1.37 1.26 1.33	.57 .61 .62 .61
DC-3	5.17 5.20 5.08 5.85	1.36 1.17 1.06 1.15	6.3 6.2	1.21 1.24 1.09 1.02	.53 .45 .49 .43	7.6 7.5	1.65 1.58 1.46 1.52	.61 .48 .46 .44	.33 .32 .22 .29	1.72 1.92 2.07 1.83	.70 .87 .15 .31	.29 .31 .22 .24
Dc-4	5.79 5.85 5.95 5.31	.98 1.10 1.22 1.22	6.2 6.3	1.08 1.00 1.20 1.15	.47 .48 .42 .53	7.5 7.6	1.45 1.51 1.64 1.59	.41 .52 .53 .61	.25 .26 .37 .30	2.00 1.82 1.65 1.70	.84 .34 .78 .94	.22 .25 .39 .36
Σ	10.96 11.05 11.03 11.16	2.24 2.29 2.28 2.25	12.5 12.5	2.29 2.24 2.29 2.26	1.00 .93 .91 .98	15.1 15.1	3.10 3.09 3.10 3.11	1.02 1.00 .99 1.05	.58 .60 .59 .59	3.72 3.74 3.69 3.77	1.34 1.21 1.03 1.26	.61 .58 .56 .60
DC-AV	11.01	2.28	12.5	2.26	.953	15.1	3.12	1.02 1.03	.580	3.70	1.30	.585
AC-1	5.36	1.10	6.1	1.09	.463	7.3	1.50	.46 .51	.272	1.79	.62	.281
AC-2	5.38	1.10	6.1	1.09	.463	7.3	1.50	.46 .52	.277	1.79	.62	.281
Σ	10.74	2.20	12.2	2.18	.926	14.6	3.00	.92 1.03	.549	3.58	1.24	.562
S. P.	-8.6 →	→	+7.4	→	→	-9.3	→	→	→	+17.8	→	→
AC-N	.01 →	→	.03	→	→	.025	→	→	→	.07	→	→
I.C.	50.0 →	→	49.9	→	→	50.0	→	→	→	50.0	→	→

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: S.O.D. Line: V-Spr-3-N½ Int.Cal _____ Date: 3/5/64

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6N	→	→	→		4-3					
Time	1	3	1	1	1		30	10				
DC-1	.155 .15 .28 .21	.83 .96 .96 .80	.36 .59 .52 .30	.24 .20	.18 .13 .14 .11		14.6	5.88				
DC-2	.275 .25 .15 .21	1.10 .70 .97 .79	.83 .27 .47 .61	.21 .26	.16 .16 .20 .24		14.7	5.85				
Σ	.43 .36 .43 .42	1.83 1.86 1.87 1.89	.69 .88 .99 .91	.45 .46	.34 .29 .34 .35		29.3	11.73				
DC-3	.16 .17 .25 .29	.95 .11 .92 .88	.47 .61 .35 .40	.33 .12	.16 .20 .15 .20		14.6	5.88				
Dc-4	.26 .24 .17 .13	.97 .79 .97 .86	.41 .19 .57 .55	.08 .78	.19 .17 .16 .13		14.7	5.85				
Σ	.42 .41 .42 .42	1.92 1.90 1.85 1.84	.88 .90 .92 .95	.41 .50	.35 .37 .37 .33		29.3	11.73				
DC-AV	.416	1.86	.91	.455	.335		29.3	11.73				
AC-1	.180	.88	.43	.20	.14		14.6	5.86				
AC-2	.181	.88	.44	.20	.14		14.7	5.86				
Σ	.361	1.76	.87	.400	.28		29.3	11.72				
S. P.	→	+54.0	→	→	→							
AC-N	→	.02	→	→	→							
I.C.	→	49.9	→	→	→							

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.O. Line U-Spr. I Field date_____ Data page_____ Comp. date_____. Comp by_____

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
(C) n separation								3 1				
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg) 1	11.01	2.28	12.5	2.26	.953	15.1	3.12	1.02 1.03	.580	3.70	1.30	.585
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	15.8	13.1	17.9	12.9	13.6	21.6	17.9	14.7	16.6	21.2	18.6	16.7
(I) Vac Σ 2	10.34	2.20	12.2	2.18	.926	14.6	3.00	.92 1.03	.549	3.58	1.24	.562
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000				1.040			1.040	1.040			1.040
(M) ρ dc/ρac=ExL/K	1025	1036	1025	1037	1.070	1034	1040	1.109 1.060	1.099	1034	1049	1.085
(N) PFE=(M-1)(10^2)	3	4	3	4	7	3	4	7	10	3	5	9
(O) MCF=(M-1)(10^5)/H	158	275	140	287	515	158	224	503	596	160	263	508
	1.7	4.7	1.5	4.7	8.0	1.3	3.4	7.3	10.4	2.8	5.6	10.3

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

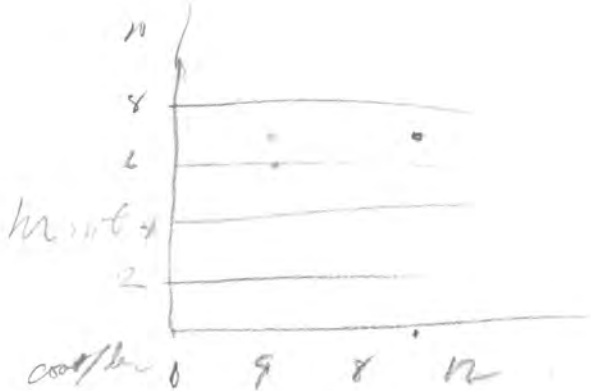
	5	3	4	5	6							
(A) Send	1-2	4-5	3-4	2-3	1-2							
(B) Receive	→	5-6N	→	→	→							
(C) n separation												
(D) I	→	→	→	→	→							
(E) Vdc (avg)	.416	1.86	.91	.455	.235							
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	20.8	26.6	26.0	22.8	26.8							
(I) Vac Σ	.361	1.76	.87	.400	.280							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.040		1.040	1.040	1.040							
(M) ρdc/ρac =ExL/K	1.202	1056	1.089	1.186	1.249							
(N) PFE=(M-1)(10^2)	20	6	9	19	25							
(O) MCF=(M-1)(10^5)/H	971	210	392	816	970							
	12.3	3.6	6.4	11.2	12.8							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: W spel / 5½ Date: 2-18-6[illegible]

Send	34	45	23	34	45	12	23	34	45	12	23	34
Receive	125	→	235	→	→	345	→	→	→	455	→	→
Time												
Range	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100

Send	45	12	23	34	45		0-1					
Receive	→	565	→	→	→							
Time												
Range	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]	2x10[illegible]		3x1					
Current	2100	2100	2100	2100	2100		300					



$6\frac{1}{2}$ 1

8 1.3

$\frac{6\frac{1}{2}}{8}$ $\frac{8}{13}$

$\frac{8}{6\frac{1}{2}}$ $\frac{13}{8}$ $\frac{10}{7}$

1.23/hr 1.62

INDUCED POLARIZATION - RECEIVER NOTES PAGE 17

Project: C.O.D. Line: W-Spr. 1 - 5½ Int.Cal _____ Date: 2/18/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-25	→	2-35		→	3-45			→	4-55		
Time Range	30	10	30	10	3	30	10	3	3	10	3	3
DC-1	11.7 11.3	3.45 3.45 3.60 3.46	11.5 11.8	3.57 3.70 3.70 3.58	1.72 1.61 1.87 1.93	9.5 9.7	3.37 3.35	1.68 1.77 1.70 1.69	.93 .92 .92 .93	3.40 3.57 3.40 3.40	1.82 1.82	1.03 .96 .96 1.02
DC-2	11.3 11.8	3.60 3.56 3.40 3.56	9.8 10.4	3.70 3.57 3.62 3.73	1.87 1.97 1.68 1.59	9.7 9.5	3.48 3.47	1.75 1.69 1.76 1.78	.92 .93 .93 .93	3.10 3.06 3.17 3.59	1.81 1.81	.98 1.02 .98 .98
Σ	23.0 23.1	7.05 7.07 7.00 7.02	21.3 21.2	7.27 7.27 7.32 7.31	3.59 3.58 3.55 3.56	19.2 19.2	6.85 6.82	3.43 3.46 3.46 3.47	1.85 1.85 1.85 1.86	6.50 6.57 6.55 6.59	3.63 3.63	2.01 2.00 1.96 2.00
DC-3	11.8 11.3	3.40 3.45 3.60 3.56	10.4 10.9	3.62 3.53 3.63 3.83	1.68 1.73 1.92 1.96	9.4 9.7	3.47 3.37	1.78 1.68	.91 .94	3.18 3.47	1.82 1.81	1.44 1.02 .96 .98
Dc-4	11.3 11.8	3.60 3.56 3.45 3.45	10.9 10.3	3.63 3.81 3.70 3.45	1.92 1.96 1.63 1.61	9.7 9.4	3.37 3.46	1.68 1.77	.92 .92	3.42 3.17	1.81 1.82	.92 .92 1.18 .90
Σ	23.1 23.1	7.05 7.01 7.05 7.01	21.3 21.2	7.25 7.34 7.33 7.28	3.60 3.59 3.55 3.57	19.1 19.1	6.84 6.83	3.46 3.45	1.85 1.85	6.60 6.64	3.63 3.63	1.96 2.00 1.97
DC-AV	23.1	7.02	21.2	7.30	3.57	19.15	6.83	3.45	1.85	6.58	3.63	1.98
AC-1	11.2	3.37	10.3	3.48	1.69	9.2	3.23	1.63	.86	3.08	1.70	.91
AC-2	11.2	3.37	10.3	3.49	1.68	9.2	3.23	1.62	.86	3.10	1.70	.91
Σ	22.4	6.74	20.6	6.97	3.37	18.40	6.46	3.25	1.72	6.18	3.40	1.82
S. P.	+30.3	→	+1.4		→	-16.5			→	+6.3		
AC-N	.03	→	.02		→	.02			→	.03		
I.C.	50.6	→	50.5		→	50.5			→	50.5		

INDUCED POLARIZATION - RECEIVER NOTES PAGE 18

Project: S.O.D. Line: W-Sp.1-S2 Int.Cal _____ Date: 4/18/84

Send	4-5	1-2	2-3	3-4	4-5		C-A2					
Rec.	→	1-65	→	→	→		1-2					
~~Time~~	3	3	3	3	3		30					
DC-1	.39 .82 .28 .52	1.41 1.86 1.41 1.04	.45 .89	.50 .52	.27 .792 .21 .710		15.0					
DC-2	.52 .83 .24 .71	1.81 1.84 1.50 1.46	.89 .85	.52 .50	.24 .710 .26 .798		15.0					
Σ	1.15 1.16 .80 1.14	2.69 2.90 2.81 2.90	1.34 1.79	1.02 1.02	.65 .695 .66 .700		30.0					
DC-3	.60 .71 .52 .65	1.97 1.41	.45 .64	.69 .55	.26 .298 .39 .345		15.0					
Dc-4	.55 .79 .64 .73	1.22 1.46	.90 .90	.53 .49	.39 .345 .26 .265		15.0					
Σ	1.16 1.19 1.20 1.19	2.93 2.87	1.34 1.34	1.02 1.02	.65 .695 .65 .700		30.0					
DC-AV	1.19	2.90	1.74	1.02	.65 .704		30.0					
AC-1	.52	1.35	.80	.46	.27 .315		14.8					
AC-2	.52	1.35	.80	.46	.24 .315		14.9					
Σ	1.04	2.70	1.60	.92	.55 .63		29.7					
S. P.	→	+9.2	→	→	→							
AC-N	→	.02	→	→	→							
~~I.C.~~	→	50.5	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line W. Spur 1-5 Field date 2/18/64 Data page_____ Comp. date 2/20/64. Comp by C.S.C.

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-2 5	→	2-3 5	→	→	3-4 5	→	→	→	4-5 5	→	→
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	23.1	7.02	21.2	7.30	3.57	19.15	6.83	3.45	1.85	6.58	3.63	1.98
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D →	33.1	40.1	30.3	41.7	51.1	27.4	39.0	49.3	52.9	37.6	51.9	56.6
(I) Vac Σ	22.4	6.74	20.6	6.97	3.37	18.40	6.46	3.25	1.72	6.18	3.40	1.82
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.031	1.040	1.029	1.047	1.060	1.040	1.058	1.061	1.076	1.064	1.068	1.089
(N) PFE=(M-1)(10^2)	3	4	3	5	6	4	6	6	8	6	7	9
(O) MCF=(M-1)(10^5)/H	94	100	96	113	117	146	149	124	144	170	131	157
	.8	1.3	1.0	1.3	2.0	1.0	1.3	2.1	3.0	1.4	2.0	2.7

Project_____ Line 5 Field date 4 Data page_____ Comp. date_____ Comp by_____

	1	2	3	4	5							
(A) Send	4-5	1-2	2-3	3-4	4-5							
(B) Receive	→	5-6 5	→	→	→							
(C) n separation												
(D) I	→	→	→	→	→							
(E) Vdc (avg)	1.19	2.90	1.74	1.02	.65 .700							
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	59.6	41.5	49.8	51.1	52.0							
(I) Vac Σ	1.04	2.70	1.60	.92	.55 .63							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.143	1.074	1.088	1.109	1.131							
(N) PFE=(M-1)(10^2)	14	7	9	11	15							
(O) MCF=(M-1)(10^5)/H	240	178	177	214	281							
	3.8	2.4	3.2	4.4	6.1							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: W Spd N½ Date: 2-15-64

Send	23	12	34	23	12	45	34	23	12	45	34	23
Receive	12N →		23N →			34N →				45N →		
Time												
Range	2X10⁶	2X10⁶	2X10⁶	2X10⁶	2X10⁶	2X10⁶	2X10⁶	2X10⁶	2X10⁶	2X10⁶	2X10⁶	2X10⁶
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	12	45	34	23	12		Cal					
Receive	→	5.2N →										
Time												
Range	2X10⁶	2X10⁶	2X10⁶	2X10⁶	2X10⁶		1X3	1X1.2				
Current	2100	2100	2100	2100	2100		300	120				

INDUCED POLARIZATION - RECEIVER NOTES PAGE 19

Project: S.O.O. Line: W-Spur 1-N2 Int.Cal _____ Date: 2/19/6

Send	2-3	1-2	3-4	2-3	1-2	2-3	3-4	2-3	1-2	2-3	3-4	2-3
Rec.	2N	→	2 3N		→	3-4N			→	2-3N		
~~Time~~	30	10	30	10	3	30	10	3	3	10	10	3
DC-1	12.4 12.3	3.43 7.47	14.0 12.9	2.80 2.98	1.90 1.87 1.85 1.82	15.0 15.4	2.86 2.03 2.80 2.64	1.66 1.62 1.76 1.79	1.05 1.22 1.02 1.02	5.23 5.35	1.94 1.84	1.08 1.09
DC-2	12.2 12.3	7.56 7.53	12.9 14.0	2.94 3.37	1.85 1.90 1.86 1.90	15.4 16.9	2.80 3.60 2.92 2.10	1.76 1.78 1.62 1.62	1.05 1.00 1.15 1.18	5.35 5.23	1.84 .94	1.03 1.04
Σ	24.6 24.6	15.00 15.00	27.9 27.9	7.74 7.71	3.75 3.77 3.71 3.71	30.6 30.3	7.76 7.67 7.76 7.74	3.42 3.40 3.34 3.41	2.20 2.22 2.24 2.18	10.68 10.68	3.78 3.78	2.14 2.13
DC-3	12.3 12.3	7.53 7.43	14.0 13.8	3.74 4.01 3.97 3.71	1.86 1.88 1.86 1.83	14.9 15.5	3.25 4.10 3.99 3.62	1.62 1.78	1.18 1.18 1.00 1.03	5.35 5.23	1.94 1.84	1.08 1.11
Dc-4	12.3 12.3	7.43 7.58	12.9 14.1	3.97 3.71 3.71 3.99	1.88 1.83 1.88 1.86	15.5 16.8	3.99 3.62 3.74 4.16	1.78 1.62	1.00 1.03 1.21 1.17	5.23 5.35	1.84 1.90	1.10 1.03
Σ	24.6 24.6	15.00 15.01	27.9 27.9	7.76 7.72 7.68 7.70	3.72 3.71 3.79 3.69	30.3 30.3	7.74 7.77 7.79 7.76	3.40 3.40	2.18 2.19 2.21 2.20	10.68 10.68	3.78 3.78	2.14 2.14
DC-AV	24.6	7.00	27.9	7.71	3.72	30.3	7.74	3.40	2.20	10.68	3.78	2.14
AC-1	12.0	3.37	13.7	3.72	1.78	14.9	3.77	1.58	.86	5.23	1.80	.95
AC-2	12.0	3.37	13.7	3.74	1.78	14.9	3.76	1.58	.87	5.23	1.80	.95
Σ	24.0	6.74	27.4	7.46	3.56	29.8	7.53	3.16	1.73	10.46	3.60	1.90
S. P.	+31	→	-125	→	+50 5.7		→		.50 Mode	.34 -1.1	.39	.34
AC-N	10.5	→	.03	→	.08			→		.04		
I. C.	50.3	→	50.2	→	50.3			→		50.2		

SP 0-1N +25.6

INDUCED POLARIZATION - RECEIVER NOTES PAGE 20

Project: S.O.D. Line: W-for. 1-N½ Int.Cal _____ Date: 2/19/6

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6N	→	→	→		4-3					
Time Range	3	10	3	3	3		30	10				
DC-1	.79 .74	1.99 2.03 1.91 1.96	1.00 .94 1.05 1.09	.70 .67 .77 .80	.64 .62		15.0	6.03				
DC-2	.74 .78	1.91 1.80 1.96 1.87	1.05 1.00 .97 .92	.77 .79 .69 .66	.62 .63		15.0	6.04				
Σ	1.53 1.52	3.90 3.83 3.87 3.85	2.05 2.03 2.02 2.01	1.47 1.46 1.46 1.46	1.26 1.25		30.0	12.07				
DC-3	.76 .76	1.97 1.88 2.00 2.00	.96 .92 1.08 1.10	.68 .66 .78 .82	.62 .63		15.0	6.04				
Dc-4	.76 .77	1.89 1.90 .84 .84	1.07 1.10 .95 .90	.78 .81 .67 .65	.63 .62		15.0	6.07				
Σ	1.53 1.53	3.88 3.87 3.84 3.84	2.03 2.02 2.03 2.00	1.46 1.49 1.45 1.47	1.25 1.25		30.0	12.07				
DC-AV	1.53	3.86	2.02	1.46	1.25		30.0	12.07				
AC-1	.58	1.85	.84	.47	.31		15.0	6.01				
AC-2	.58	1.86	.84	.47	.31		15.0	6.07				
Σ	1.16	3.71	1.68	.94	.62		30.0	12.02				
S. P.	.38	.43	.43	.43	.43							
AC-N	→	.05 15.5	→	→	→							
I.C.	→	50.2	→	→	→							

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line W-Spr. L-N½ Field date 2/19/64 Data page_____ Comp. date 2/20/64. Comp by C.S.L.

(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	24.6	7.00	27.9	7.71	3.72	30.3	7.74	~~3.40~~ 2.25	~~2.20~~ 1.94	10.68	~~3.78~~ 2.76	~~2.14~~ 1.93
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	35.1	40.0	39.8	44.0	38.8	43.2	44.2	46.4	55.5	61.0	53.6	56.9
(I) Vac Σ	24.0	6.74	27.4	7.46	3.56	29.8	7.53	3.16	1.73	10.46	3.60	1.90
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.024	1.039	1.019	1.033	1.045	1.017	1.028	1.030	1.121	1.022	1.044	1.047
(N) PFE=(M-1)(10^2)	2	4	2	3	5	2	3	3	12?	2	4	5
(O) MCF=(M-1)(10^5)/H	68	98	48	75	116	39	63	65	219?	36	82	83
	.8	1.3	.7	1.2	2.5	.6	1.2	2.2	2.8	.8	2.0	2.7

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	4-5	3-4	2-3	1-2							
(B) Receive	→	5-6N	→	→	→							
(C) n separation												
(D) I	→	→	→	→	→							
(E) Vdc (avg)	~~1.53~~ 1.25	~~3.86~~ 1.76	~~2.02~~ 1.45	1.46 .00	~~1.25~~ .69							
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	62.6	53.8	49.9	51.5	55.3							
(I) Vac Σ	1.16	3.71	1.68	.94	.62							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.078	1.012	1.039	1.072	1.111							
(N) PFE=(M-1)(10^2)	8	1	4	7	11							
(O) MCF=(M-1)(10^5)/H	125	22	78	140	201							
	3.7	2.0	3.2	4.5	5.7							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: W 5½ Spx2 Date: 2-21-64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Receive	→		→		→	→			→			
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	4-5	1-2	2-3	3-4	4-5		CAL					
Receive	→	→			→		1-2					
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5		1x3					
Current	2100	2100	2100	2100	2100		300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 25

Project: S.O.D. Line: W-Spur 2-5½ Int.Cal Date: 2/20/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-2	3	2-3		3	2-45			3	2-55		
Time	30	10	30	10	3	30	10	10	3	10	10	3
DC-1	1.69 1.65	3.67 3.72	17.6 18.1	4.94 4.85 4.85 4.81	1.78 1.77 1.86 1.83	16.1 15.9 15.6 15.1	4.60 4.18 4.30 4.25	1.65 1.96 1.90 1.77	.93 .88 1.02 .87	2.97 4.91 3.15 4.99	2.05 1.40 2.00 2.07	1.17 .68 1.07 1.97
DC-2	1.65 1.69	3.72 3.59	18.1 17.6	4.83 4.81 5.00 4.81	1.81 1.96 1.96 1.92	15.6 15.5 15.9 15.9	4.30 4.77 4.62 4.24	1.87 1.74 1.60 2.08	.97 .78 1.74 .85	3.02 4.96 4.77 4.88	1.97 2.05 1.96 1.92	1.05 .86 1.07 1.24
Σ	33.4 33	7.39 7.31	35.7 35.5	9.77 9.62 9.65 9.67	3.69 3.73 3.80 3.79	31.7 31.8 31.5 31.8	8.90 8.95 8.92 8.95	3.72 3.70 3.50 3.81	1.90 1.66 1.76 1.74	6.99 9.87 9.62 9.85	4.02 3.95 3.99 3.99	2.20 2.19 2.22 2.17
DC-3	1.69	3.59 3.68 3.72 3.60	17.9 18.1	4.86 4.78 4.74 4.80	2.00 1.97 2.08 1.77	15.8 16.1 15.5 15.3	4.85 4.30 4.87 4.43	2.32 1.45 2.22 2.15	.75 .89 .91 1.02	4.77 4.85 5.07 4.77	1.69 2.15 2.20 1.81	1.95 1.73 1.71 1.77
Dc-4	1.86 1.69	3.72 3.64 3.52 3.66	18.1 17.4	4.80 4.85 4.83 4.88	1.64 1.73 2.21 1.83	15.8 15.9 16.1 15.9	4.65 4.53 4.19 4.49	2.13 2.14 2.42 1.70	1.00 .97 .90 .78	5.04 3.01 5.86 5.12	1.88 1.40 1.78 2.19	1.77 1.78 1.82 1.87
Σ	3.3 3.2	7.31 7.32 7.24 7.26	35.3 35.5	9.63 9.60 9.61 9.64	3.84 3.70 3.89 3.60	31.9 31.9 31.8 31.6	8.90 8.85 8.82 8.89	3.95 3.95 3.64 3.55	1.90 1.66 1.81 1.60	9.91 9.86 9.48 9.39	3.97 3.95 3.98 2.08	3.15 2.20 3.19 2.20
DC-AV	33.4	7.29	35.5	9.62	3.71	31.5	8.90	3.74	1.78	9.85	3.99	2.19
AC-1	16.6	3.59	17.6	4.80	1.82	15.7	4.38	1.83	.87	4.91	1.97	1.08
AC-2	16.6	7.59	17.6	4.80	1.82	15.7	4.38	1.83	.87	4.90	1.96	1.07
Σ	33.2	7.18	35.2	9.60	3.64	31.4	8.78	3.66	1.74	9.81	3.93	2.15
S. P.	+17.2	→	0.0		→	-51.7			→	+17.2		
AC-N	.03	→	.03		→	.03			→	.04		
I.C.	50.1	→	50.3		→	50.2			→	50.2		

SP 0-15 — 6.0

INDUCED POLARIZATION - RECEIVER NOTES PAGE 26

Project: S.O.B. Line: W-Spr. 2 - S2 Int.Cal _____ Date: 2/20/64

Send	4-5	1-2	2-3	3-4	4-5		CAL					
Rec.	→	5-6.5			→		1-2					
Time	3	10	3	3	3		30		30			
DC-1	.75 .65 .50 .47	1.80 1.76 2.06 2.15	.90 .71 1.18 1.23	.67 .56 .47 .40	.31 .39 .18 .33		14.9		15.1			
DC-2	.40 .42 .64 .73	3.02 3.8 1.72 1.60	1.12 1.26 .73 .74	.47 .54 .40 .42	.31 .28 .54 .35		14.9		15.1			
Σ	1.15 1.13 1.14 1.10	3.82 3.89 3.78 3.75	2.02 1.97 1.91 1.97	1.14 1.10 1.22 1.12	.62 .67 .75 .72		29.8		30.2			
DC-3	.67 .75 .41 .44	1.60 1.63 2.22 2.03	.77 .89 1.15 1.03	.88 .87 .16 .73	.20 .44 .40 .19		14.9		15.1			
Dc-4	.44 .42 .75 .66	2.18 2.05 1.61 1.78	.19 1.06 .87 .94	.23 .30 .14 .12	.47 .18 .71 .83		14.9		15.1			
Σ	1.11 1.17 1.16 1.14	3.62 3.68 3.83 3.81	1.96 1.95 2.02 1.97	1.17 1.17 1.20 1.15	.67 .62 .71 .62		29.8		30.2			
DC-AV	1.13	3.78	1.97	1.14	.65		29.8		30.2			
AC-1	.54	1.86	.96	.56	.31		14.9		15.1			
AC-2	.54	1.87	.96	.55	.31		14.8		15.1			
Σ	1.08	3.73	1.92	1.11	.62		29.7		30.2			
S. P.	→	-6.1	→	→	→							
AC-N	→	.04	→	→	→							
I.C.	→	50.2	→	→	→							

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project 50 D Line W Spr 25½ Field date 2-20-64 Data page_____ Comp. date 2-22-64. Comp by_____

	1	2										
(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-2 S →		2-3 S →			3-4 S			→	4-5 S		
(C) n separation												
(D) I	2100											
(E) Vdc (avg)	33.4	7.29	360	9.82	3.71	31.5	8.90	3.74	1.78	9.85	3.99	2.19
(F) DCcal USED	1.000											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	47.8	41.7	51.5	56.2	53.0	45.0	50.9	53.4	50.8	56.3	57.0	62.5
(I) Vac Σ	33.2	7.18	35.7	9.72	3.64	31.4	8.78	3.66	1.74	9.81	3.93	2.15
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K	1.006	1.015	1.009	1.010	1.020	1.002	1.014	1.021	1.022	1.003	1.015	1.019
(N) PFE=(M-1)(10^2)	1	2	1	1	2	0	1	2	2	0	2	2
(O) MCF=(M-1)(10^5)/H	13	36	17	18	38	7	28	39	43	5	26	30

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	1-2	2-3	3-4	4-5		CAL					
(B) Receive	→	5-6 S			→		1-2					
(C) n separation												
(D) I	2100				→		300					
(E) Vdc (avg)	1.13	3.78	1.97	1.14	.65							
(F) DCcal	1000				→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	56.5	54.1	56.2	57.0	52.0							
(I) Vac Σ	1.08	3.73	1.92	1.11	.62							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1000				→							
(M) ρdc/ρac =ExL/K	1.047	1.013	1.026	1.028	1.048							
(N) PFE=(M-1)(10^2)	5	1	3	3	5							
(O) MCF=(M-1)(10^5)/H	83	24	46	49	92							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: W N½ sp×2 Date: 2-21-64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	1-2	4-5	3-4	2-3	1-2		CAL					
Receive	→	→	→	→	→		4-5					
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5		1X3					
Current	2100	2100	2100	2100	2100		300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 27

Project: [illegible] Line: W-Jan 2 - N½ Int.Cal _____ Date: 2/21/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N	→	→	3-4N			→	4-5N		
Time	30	10	30	10	3	30	10	3	3	10	3	3
DC-1	16.7 1.62	3.71 3.58	19.6 18.6	4.00 4.05	1.73 1.74	19.7 19.8	4.52 4.77	1.68 1.57	.55 .78	4.00 4.04	1.37 1.54	.57 .66
DC-2	16.5 16.4	3.58 3.70	18.6 19.5	4.05 4.00	1.68 1.68	19.8 19.7	4.77 4.59	1.57 1.69	.78 .84	4.04 4.02	1.54 1.38	.66 .61
Σ	33.2 33.2	7.29 7.28	38.2 38.1	8.05 8.05	3.41 3.42	39.5 39.5	9.29 9.31	3.25 3.26	1.62 1.62	8.04 8.06	2.91 2.88	1.23 1.27
DC-3	16.5 16.7	3.70 3.59	19.5 19.5	4.00 4.05	1.69 1.77	19.6 19.8	4.54 4.79	1.68 1.57	.84 .78	4.02 4.02	1.34 1.31 1.56 1.58	.62 .66 .67 .58
Dc-4	16.7 16.5	3.59 3.71	18.6 18.6	4.05 4.00	1.73 1.69	19.8 19.6	4.79 4.51	1.57 1.68	.78 .84	4.02 4.02	1.56 1.59 1.31 1.62	.63 .60 .64 .68
Σ	33.2	7.29 7.30	38.1 38.1	8.05 8.04	3.42 3.42	39.4 39.4	9.33 9.30	3.25 3.25	1.62 1.62	8.04 8.04	2.90 2.90 2.87 2.90	1.25 1.29 1.27 1.26
DC-AV	33.2	7.29	38.1	8.05	3.42	39.5	9.31	3.25	1.62	8.04	2.89	1.26
AC-1	16.4	3.58	18.9	4.00	1.69	19.6	4.60	1.68	1.11	4.00	1.57	.98
AC-2	16.4	3.60	18.8	3.98	1.70	19.6	4.60	1.74	1.06	4.00	1.58	1.05
Σ	32.8	7.18	37.7	7.98	3.39	39.2	9.20			8.00	3.15	
S. P.	+13.3	→	-3.5	→	→	-10.4	[illegible]	R/L	N→	+3.0		
AC-N	.09	→	.28?	→	→	.40	→	.78	.75	.70	.72	.75 .83 .87
I.C.	50.2	→	50.2	→	→	50.2			→	50.2 [illegible]		

S.P. 0-1W +4.0

INDUCED POLARIZATION - RECEIVER NOTES PAGE 25

Project: S.O.D. Line: W-Spoil-N½ Int.Cal _____ Date: 2/21/64

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6 N	→	→	→		45					
Time	3	3	3	3	3		30					
DC-1	.37 .35	1.84 1.70	.76 .80	.44 .36	.30 .23		14.9					
DC-2	.35 .37	1.70 1.83	.80 .75	.37 .46	.27 .29		14.9					
Σ	1.72 1.72	3.50 3.53	1.56 1.55	.81 .82	.53 .52		29.8					
DC-3	.37 .37	1.85 1.79	.74 .83	.46 .35	.29 .24		14.9					
Dc-4	.35 .35	1.68 1.70	.83 .72	.35 .46	.24 .29		14.9					
Σ	.72 .72	3.53 3.51	1.57 1.55	.81 .81	.53 .53		29.8					
DC-AV	.72	3.53	1.56	.81	.53		29.8					
AC-1	.85	1.87	1.31	1.26	1.23		14.9					
AC-2	.90	1.85	1.40	1.22	1.15		14.9					
Σ		1.98					29.8					
S. P.	→		+1.6	→	→							
AC-N	.80 .82	.98	1.10 1.17	1.17 1.18	1.18 1.13							
[illegible]	→	50.1	→	→	→							

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line Wspr2N½ Field date 2-21-64 Data page 2-21-64 Comp. date 2-22-64. Comp by_____

(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2-N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	33.2	7.29	38.1	8.05	3.42	39.5	9.31	3.25	1.62	8.04	2.89	1.26
(F) DCcal USED	1000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	66
(H) ρ dc=ExFxGx10^3/D	47.5	41.7	54.5	46.1	48.9	56.5	53.3	46.5	46.3	46.0	41.3	36.0
(I) Vac Σ	32.8	7.18	37.7	7.98	3.39	39.2	9.20	3.36 2.48	2.22 2.12	8.00	3.15	1.96 2.10
(J) AC noise x 2					.5			1.00 1.56	1.56 1.50	1.40	1.44	1.50 1.46
(K) Vac(corr) = $\sqrt{I^2 - J^2}$					3.35			[illegible]	1.58 1.60	7.94	2.80	1.26 [illegible]
(L) AC-DC cal. USED	1000	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.012	1.015	1.010	1.010	1.009	1.008	1.011	1.012	1.026	1.012	1.030	1.012
(N) PFE=(M-1)(10^2)	1	2	1	1	1	1	1	1	3	1	3	1
(O) MCF=(M-1)(10^5)/H	25	36	18	22	18	14	21	26	56	26	73	33

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	4-5	3-4	2-3	1-2		CAL					
(B) Receive	→	5-6N	→	→	→		4-5					
(C) n separation												
(D) I	2100	→	→	→	→		300					
(E) Vdc (avg)	.72	3.53	1.56	.81	.53							
(F) DCcal	1000	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	36.0	50.5	44.6	40.5	42.4							
(I) Vac Σ	1.70 1.80	3.72	2.62 2.80	2.52 2.44	2.46 2.30							
(J) AC noise x 2	1.60 1.64	1.45	2.20 2.34	2.34 2.36	2.26 2.26							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	~~.574 .742~~	3.45	~~1.537~~	~~.983 .686~~	~~.643 .424~~							
(L) AC-DC cal.	1000	→	→	→	→							
(M) ρdc/ρac =ExL/K	—	1.023	1.016	—	—							
(N) PFE=(M-1)(10^2)	—	2	2	—	—							
(O) MCF=(M-1)(10^5)/H	—	46	40	—	—							

INDUCED POLARIZATION SENDER NOTES

Project: 500 Line: W Spx 3 5½ Date: 3-9-64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Receive	→		→						→			
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	4-5	1-2	2-3	3-4	4-5		CAL					
Receive	→				→		2-3					
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5		1x3					
Current	2100	2100	2100	2100	2100		300					

@ 2.80 from Ron's last spc electrode

crossed a Blue flag ~ 50' from D.H.

45.7
68.4
56.4
42.3

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: S.O.D. Line: W-Spr.3-S½ Int.Cal _____ Date: 3/9/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-25	→	2-35	→	→	3-45	→	→	→	4-55	→	→
Time	30	3	30	3	3	30	3	3	1	3	3	1
DC-1	8.2 8.3 8.8 8.4	1.54 1.72 2.02 1.95	6.3 6.2	1.50 1.56 1.43 1.48	.62 .55 .59 .66	7.0 7.1	1.38 1.41 1.39 1.30	.53 .60 .57 .62	.27 .27 .31 .28	1.07 1.57 1.41 1.30	.39 .41 .55 .47	.25 .27 .21 .15
DC-2	8.8 8.4 8.0 8.2	2.06 1.90 1.66 1.54	7.6 7.6	1.48 1.47 1.57 1.55	.63 .63 .65 .57	7.2 7.1	1.37 1.28 1.31 1.43	.53 .63 .54 .62	.32 .31 .29 .35	1.40 1.29 1.48 1.58	.51 .44 .28 .36	.21 .18 .26 .31
Σ	17.0 16.7 16.8 16.6	3.64 3.62 3.66 3.42	13.9 13.8	2.98 3.01 3.00 3.03	1.25 1.18 1.24 1.23	14.2 14.2	2.75 2.69 2.70 2.73	1.06 1.03 1.11 1.04	.59 .58 .60 .59	2.87 2.88 2.89 2.88	.80 .85 .83 .83	.46 .45 .47 .48
DC-3	8.0 8.2 8.0 8.7	1.73 1.42 1.87 2.19	7.6 7.7 6.2 6.2	1.52 1.56 1.41 1.45	.63 .64 .70 .62	7.1 7.1	1.32 1.47 1.20 1.18	.50 .58 .46 .53	.29 .31 .30 .34	1.49 1.57 1.34 1.35	.31 .40 .43 .46	.20 .29 .19 .17
Dc-4	8.6 8.7 8.9 7.9	1.88 2.15 1.72 1.45	6.2 6.1 7.0 7.6	1.46 1.46 1.53 1.48	.67 .60 .50 .68	7.1 7.1	1.35 1.19 1.52 1.56	.48 .52 .60 .57	.35 .35 .21 .21	1.36 1.01 1.56 1.53	.50 .46 .42 .39	.27 .17 .28 .29
Σ	16.6 16.9 16.9 16.6	3.61 3.57 3.59 3.64	13.8 13.8 13.8 13.8	2.98 3.02 2.99 2.97	1.30 1.24 1.20 1.30	14.2 14.2	2.67 2.66 2.72 2.69	.98 1.20 .96 1.10	.64 .66 .60 .59	2.85 2.88 2.90 2.88	.81 .86 .85 .85	.47 .46 .47 .46
DC-AV	16.76	3.61	13.8	2.99	1.24	14.2	2.70	1.06	.606	2.88	.84	.462
AC-1	8.2	1.74	6.75	1.42	.57	7.0	1.32	.50	.29	1.41	.40	.221
AC-2	8.2	1.75	6.75	1.43	.57	6.9	1.32	.50	.29	1.40	.40	.221
Σ	16.40	3.49	13.5	2.85	1.14	13.9	2.64	1.00	.580	2.81	.80	.442
S. P.	-1.2	→	+10.9	→	→	-23.8	→	→	→	+2.4	→	→
AC-N	.01	→	.01	→	→	.02	→	→	→	.01	→	→
F.C.	50.5	→	50.5	→	→	50.5	→	→	→	50.4	→	→

S.P. 0-15 +4.7

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: S.O.D. Line: W-Spr. 3-5½ Int.Cal _____ Date: 3/9/64

Send	4-5	1-2	2-3	3-4	4-5		C+2					
Rec.	→	5-65	→	→	→		1-2					
~~Time~~ Range	1	3	1	1	1		30					
DC-1	.12 .22 .23 .07	.49 .60 .46 .33	.20 .26 .15 .15	.13 .10 .07 .17	.05 .03 .06 .14		15.0					
DC-2	.19 .05 .04 .26	.43 .31 .44 .54	.17 .13 .23 .24	.08 .14 .17 .06	.09 .13 .11 .03		15.0					
Σ	.30 .27 .27 .29	.92 .91 .90 .87	.37 .39 .38 .39	.21 .24 .24 .23	.14 .16 .17 .17		30.0					
DC-3	.11 .24 .13 .09	.45 .55 .34 .33	.28 .24 .09 .11	.17 .07 .08 .09	.09 .03 .13 .12		15.0					
Dc-4	.15 .07 .17 .20	.40 .33 .60 .58	.09 .19 .29 .28	.06 .14 .13 .16	.09 .13 .07 .05		15.0					
Σ	.30 .31 .30 .29	.85 .88 .94 .91	.37 .38 .38 .39	.23 .21 .22 .25	.14 .16 .16 .17		30.0					
DC-AV	.291	.889	.381	.227	.166		30.0					
AC-1	.134	.43	.183	.109	.073		15.0					
AC-2	.134	.43	.183	.107	.072		15.0					
Σ	.268	.860	.366	.216	.145		30.0					
S. P.	→	+17.7	→	→	→							
AC-N	→	.01	→	→	→							
I.C.	→	50.4	→	→	→							

$$K_n = \frac{a\,(n+1)(n+2)}{2} \qquad \frac{a \times 2 \times 3 \times 4}{2} = 12a$$

125
12
250
125
1500

	K_n	$\times 10^{-3}$	
$a = 125$	1500	1.5	1
250	3000	3	2
500	6000	6	3
750	9000	9	4
1000	12000	12	5
1500	18000	18	6
2000	24000	24	7
2500	30000	30	8
3000	36000	36	9

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line W-Spr 3-5 Field date 3/9/64 Data page_____ Comp. date 3/9/64. Comp by [illegible]

(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-15	→	2-35	→	→	3-45			→	4-55		
(C) n separation												
(D) I	2100											
(E) Vdc (avg)	16.76	3.61	13.8	2.99	1.24	14.2	2.70	1.06	.606	2.88	.84	.462
(F) DCcal	1.000											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	24.0	20.7	19.7	17.1	17.7	20.3	15.5	15.1	17.3	16.5	12.0	13.2
(I) Vac Σ	16.40	3.49	13.5	2.85	1.14	13.9	2.64	1.00	.580	2.81	.80	.442
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000								1.060	1.000	1.000	1.060
(M) ρ dc/ρac=ExL/K	1.021	1.033	1.021	1.049	1.088	1.021	1.022	1.060	1.108	1.024	1.050	1.108
(N) PFE=(M-1)(10^2)	2	3	2	5	9	2	2	6	11	2	5	11
(O) MCF=(M-1)(10^5)/H	88	160	107	286	497	103	142	398	624	145	417	819
	1.2	2.9	1.4	4.1	5.8	1.3	4.0	7.0	10.0	3.7	9.0	13.4

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	1-2	2-3	3-4	4-5							
(B) Receive	→	5-65			→							
(C) n separation												
(D) I	→				→							
(E) Vdc (avg)	.291	.889	.381	.227	.166							
(F) DCcal	→				→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	14.5	12.7	10.9	10.3	13.3							
(I) Vac Σ	.268	.860	.366	.216	.145							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.060	1.000	1.060	→	→							
(M) ρdc/ρac =ExL/K	1.150	1.032	1.103	1.112	1.213							
(N) PFE=(M-1)(10^2)	15	3	10	11	21							
(O) MCF=(M-1)(10^5)/H	1034	252	946	1088	1601							
	17.9	8.7	16.0	23.5	25.3							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: W spd 3 N2 Date: 3-5-69

Send	23	12	34	23	12	45	34	23	12	45	34	23
Receive	12N →		23N	→		34N →				45N →		
Time M	2000	2000		2000	2500							
Range						10x45	10x40	10x45	10x40	10x4.5	10x4.5	10x4.5
Current	4500	4000	4000	3500		4500	4500	4500	4000	4500	4500	4500
Send	12	45	34	23	12							
Receive	→	32N	→									
Time				M	2100							
Range	10x4.0											
Current	4000	45	45	45	4000							

INDUC'D POLARIZATION - RECEIVER NOTES

PAGE _____

Project: S.O.D. Line: W-Spn 3-N Int.Cal _____ Date: 3/6/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
Time	100 H	10 H	100 H	3 M	3 M	100 H	10 H	3 H	3 H	10 H	10 H	3 H
DC-1	20.5 20.5	3.28 3.37 3.44	20.2 20.3	2.03 1.94 1.97 2.12	.65 .58 .77 .87	21.5 21.5	4.72 4.77 4.71 4.65	1.66 1.70 1.59 1.56	.72 .72 .63 .63	5.37 5.05 5.25 5.03	2.26 2.05 2.42 2.00	.98 .82 .88 .71
DC-2	20.2 20.2	3.62 3.50 3.46 3.30	20.0 20.2	1.96 2.03 1.75 1.85	.78 .80 .62 .75	21.5 21.3	4.92 4.88 4.85	1.59 1.58 1.69 1.67	.63 .63 .72 .72	5.62 5.70 5.80 5.80	2.03 2.78 1.87 2.40	1.02 1.18 1.20 1.33
Σ	40.7 40.7	6.85 6.87 6.92	40.2 40.2	3.99 3.97 3.92 3.97	1.43 1.38 1.39 1.32	43.0 42.8	9.64 9.61 9.56	3.25 3.28 3.28 3.23	1.35 1.37 1.35 1.35	10.99 10.85 11.05 10.83	4.29 4.43 4.29 4.40	2.00 2.00 2.08 2.04
DC-3	20.2 20.5	3.46 3.43	20.2 20.0	2.07 1.87 2.7 2.08	.54 .63 .82 .74	21.4 21.3	4.83 4.70	1.63 1.67 1.62 1.63	.71 .67 .72 .68	5.00 5.27 5.00 5.01	2.24 2.12 2.10 2.06	1.04 1.30 .92 .68
Dc-4	20.5 20.2	3.47 3.40	20.0 20.2	1.93 2.11 1.85 1.97	.82 .73 .60 .70	21.4 21.5	4.10 4.88	1.66 1.67 1.61 1.58	.66 .69 .66 .69	5.95 5.90 5.93 5.92	2.10 2.33 2.33 2.38	1.00 1.28 1.03 1.32
Σ	40.7 40.7	6.87 6.83	40.2 40.2	3.96 4.08 4.02 4.05	1.36 1.36 1.42 1.46	42.8 42.8	9.53 9.58	3.29 3.30 3.23 3.21	1.37 1.36 1.37 1.37	10.95 10.92 10.91 10.93	4.34 4.45 4.45 4.44	2.04 2.07 1.95 1.98
DC-AV	40.7	6.88	40.2	4.00	1.40	42.8	9.58	3.26	1.36	10.95	4.40	2.01
AC-1	20.6	3.33	20.3	1.94	.66	21.7	4.65	1.53	.61	5.30	2.06	.91
AC-2	20.6	3.35	20.3	1.95	.67	21.6	4.65	1.53	.62	5.30	2.08	.92
Σ	41.2	6.68	40.6	3.89	1.34	43.3	9.30	3.06	1.23	10.60	4.14	1.83
S. P.	-24.3	→	+12.9	→	→	+28.7	→	→	→	-15.9	→	→
AC-N	.01	→	.02	→	→	.01	→	→	→	.03	→	→
F.C.	51.2	→	50.9	→	→	50.8	→	→	→	50.9	→	→

SP 0-1N

+27.6

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: C.O.D. Line: W - Pr. 3 - N½ Int.Cal _____ Date: 3/6/64

Send	1-2	4-5	3-4	2-3	1-2	4-5	C42					
Rec.	→	5-6N	→	→	→	5-6N	4-5					
Time	3 H	10 H	3 H	3 H	3 H	10 (M)	H 100	M 100				
DC-1	.44 .42 .38 .62	3.03 3.07 3.15 3.07	1.71 1.56 1.69	.79 .76 .81 .65	.80 .82	1.53 1.57 1.57 1.46	50.1	50.0	48.0	14.6		
DC-2	.53 .60 .60 .30	3.17 3.12 3.08 3.17	1.56 1.53 1.56 3.	.74 .86 .75 .88	.38 .43	1.51 1.50 1.44 1.55	50.2	50.0	48.2	14.5		
Σ	.97 1.02 .98 .92	6.20 6.21 6.23 6.20	3.07 3.25	1.53 1.56 1.56 1.53	.76 .85	3.04 3.07 2.97 3.01	100.3	100.0				
DC-3	.72 .56 .33 .54	3.08 3.15 3.15 3.18	1.59 1.70 1.73 1.66	.72 .82 .88 .67	.39 .40	1.47 1.59 1.46 1.50	50.1	50.0				
Dc-4	.65 .46 .67 .46	3.14 3.03 3.00 3.02	1.64 1.52 1.50 1.52	.80 .72 .68 .87	.40 .40	1.50 1.45 1.49 1.47	50.2	50.0				
Σ	1.37 1.02 1.00 .98	6.22 6.22 6.15 6.21	3.23 3.22 3.23 3.18	1.52 1.54 1.52 1.54	.79 .80	2.97 3.04 2.95 3.07	100.3	100.0				
DC-AV	.98	6.21	3.21	1.54	.80	3.00	100.3	100.0				
AC-1	.42	2.95	1.51	.70	.34	1.42	44.0	53.3	51.4	15.2		
AC-2	.44	2.95	1.51	.70	.34	1.42	44.4	53.3				
Σ	.88	5.90	3.02	1.40	.68	2.84	88.4	106.6				
S. P.	→	524.6	→	→	→	16			10.00	8 FT LATE		
AC-N	→	.03	→	→	→							
I.C.	→	50.8	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page _____

Project S.O.O. Line W-Spr.3-N Field date 3/6/64 Data page _____ Comp. date 3/7/64 Comp by C.S.L.

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2N →		2-3N	→		3-4N	→			4-5N	→	
(C) n separation	H M	H M	H	M	M	H	H	H	H	H	H	H
(D) I	4500 2000	4000 2000	4000	2000	2000	4500	4500	4500	4000	4500	4500	4500
(E) Vdc (avg)	40.7 18.5	6.68 3.53	40.2	4.00	1.40	42.8	9.58	3.26	1.36	10.95	4.40	2.01
(F) DCcal	1.022 1.000	1.022 1.000	1.022	1.000	1.000	1.022	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	27.8 27.8	21.1 21.2	30.9	24.0	21.0	29.2	26.1	22.3	20.8	29.9	30.0	27.4
(I) Vac Σ	41.2 18.3	6.68 3.43	40.6	3.89	1.34	42.3	9.30	3.06	1.23	10.60	4.14	1.83
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.020 1.000	→	1.020	1.000	→	1.020	1.000	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.008 1.010	1.030 1.029	1.010	1.029	1.044	1.008	1.030	1.065	1.106	1.032	1.061	1.095
(N) PFE=(M-1)(10^2)	1	3	1	3	4	1	3	7	11	3	6	10
(O) MCF=(M-1)(10^5)/H	32	142	32	121	209	27	115	292	510	107	203	352
	1.0	2.8	1.8	2.5	4.8	1.3	2.2	4.3	8.2	1.8	3.2	6.0

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

(A) Send	1-2	4-5	3-4	2-3	1-2							
(B) Receive	→	5-6N	→	→	→							
(C) n separation	H	H M	H	H	H							
(D) I	4000	4500 2100	4500	4500	4200							
(E) Vdc (avg)	.98	6.21 3.00	3.21	1.54	.80							
(F) DCcal	1.022	1.022 1.000	1.022	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	26.3	42.8 42.8	43.8	26.7	34.4							
(I) Vac Σ	.88	5.90 2.94	3.02	1.40	.68							
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.113	1.052 1.057	1.063	1.100	1.177							
(N) PFE=(M-1)(10^2)	11	6	6	10	18 ?							
(O) MCF=(M-1)(10^5)/H	430	129	144	273	515 ?							
	9.4	2.3	3.7	6.3	9.7							

INDUCED POLARIZATION SENDER NOTES

Project: S.O.D. Line: X Spd 1 5½ Date: 2-14-63

Send	34	45	23	34	45	12	23	34	45	12	23	34
Receive	1-25 →		2-35 →			345 →				45 5		
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	45	12	23	34	45		Cal					
Receive	→	563 →										
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5		1X3	1X1				
Current	2100	2100	2100	2100	2100		300	100				

INDUCED POLARIZATION - RECEIVER NOTES PAGE 9

Project: S.O.D. Line: X - Spr. 1, 5½ Int.Cal Date: 2/14/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-2.5	→	2-3.5	→	→	3-4.5	→	→	→	4-5.5	→	→
~~Time~~ Range	30	10	30	10	10	30	10	10	3	10	3	3
DC-1	14.2 13.5	5.08 5.30 5.40 5.14	14.0 14.3	5.00 5.25 5.32 5.04	2.58 2.60 2.60 2.60	14.4 13.6	4.20 4.20	2.18 1.99 1.95 2.15	1.31 1.17 1.14 1.27	4.40 4.33	1.68 1.74 1.92 1.86	1.01 .95 1.05 1.08
DC-2	13.5 14.2	5.40 5.18 5.10 5.22	14.3 14.0	5.32 5.04 5.07 5.15	2.47 2.60 2.65 2.58	13.6 14.6	4.20 4.18	1.95 2.16 2.08 1.99	1.14 1.27 1.39 1.19	4.33 4.40	1.92 1.86 1.72 1.76	1.04 1.08 .98 .94
Σ	27.7 27.7	10.08 10.48 10.50 10.46	28.3 28.3	10.32 10.29 10.39 10.19	5.05 5.18 5.25 5.18	28.0 28.2	8.40 8.38	4.13 4.15 4.03 4.15	2.45 2.44 2.53 2.56	8.73 8.73	3.60 3.60 3.64 3.62	2.05 2.03 2.03 2.02
DC-3	14.2 13.6	5.38 5.37 5.20 5.10	14.3 14.4	5.07 5.15 5.32 5.00	2.71 2.58 2.60 2.58	14.6 13.5	4.18 4.20	2.05 1.97 2.00 2.10	1.39 1.21 1.22 1.20	4.40 4.46 4.36 4.30	1.76 1.77 1.90 1.82	.98 1.08
Dc-4	13.6 14.2	5.12 5.10 5.15 5.30	14.0 13.9	5.32 5.05 4.92 5.30	2.53 2.63 2.53 2.60	13.5 13.7	4.20 4.22	2.00 2.10 2.20 1.99	1.18 1.23 1.17 1.24	4.36 4.30 4.40 4.40	1.90 1.82 1.73 1.76	1.07 .95
Σ	27.8 27.8	10.38 10.47 10.35 10.40	28.3 28.3	10.29 10.20 10.24 10.30	5.24 5.41 5.23 5.18	28.1 28.2	8.38 8.42	4.03 4.07 4.20 4.09	2.57 2.40 2.59 2.54	8.76 8.76 8.76 8.70	3.66 3.59 3.67 3.62	2.05 2.03
DC-AV	27.8	10.47	28.3	10.29	5.18	28.1	8.40	4.12	2.51	8.74	3.62	2.03
AC-1	12.8	4.67	13.0	4.67	2.35	13.3	3.86	1.86	1.15	4.05	1.65	.92
AC-2	12.8	4.68	13.0	4.66	2.35	13.3	3.86	1.86	1.15	4.06	1.65	.92
Σ	25.6	9.35	26.0	9.33	4.70	26.6	7.72	3.72	2.30	8.11	3.30	1.84
S. P.	+5.9 .17	→	-2.1	→	→	+0.3 .17	→	→	→	.11	→	→
AC-N	.11	→	.10	→	→	.07	→	→	→	.05	→	→
I.C.	50.7		50.7	→	→	50.7	→	→	→	50.6	→	→

S.P. 0-15 — 11.3

INDUCED POLARIZATION - RECEIVER NOTES PAGE 10

Project: S.O.O. Line: X-Spr-1 5½ Int.Cal _____ Date: 2/14/64

Send	4-5	1-2	2-3	3-4	4-5		CAL					
Rec.	→	5-6.5	→	→	→		1-2					
Time	3	10	3	3	3		30	10				
DC-1	.67 .66 .61 .61	2.19 1.86	.98 .96	.63 .63 .59 .59	.43 .43 .45 .47		15.1 15.2	5.00				
DC-2	.62 .61 .66 .69	1.86 2.19	.96 .97	.59 .59 .63 .62	.45 .47 .45 .42		15.2 15.1	5.00				
Σ	1.29 1.27 1.28 1.30	4.05 4.05	1.94 1.93	1.22 1.22 1.22 1.21	.88 .90 .90 .89		30.3 30.3	10.00				
DC-3	.66 .64	2.19 1.92	.97 .97	.63 .62 .58 .63	.45 .42 .45 .48		15.1	5.00				
Dc-4	.63 .65	1.86 2.19	.97 .98	.58 .63 .62 .63	.45 .48 .45 .42		15.2	5.00				
Σ	1.29 1.29	4.05 4.07	1.94 1.95	1.21 1.25 1.20 1.26	.90 .90 .90 .90		30.3	10.00				
DC-AV	1.29	4.05	1.94	1.22	.90		30.3	10.00				
AC-1	.57	1.82	.86	.53	.35		15.0	5.00				
AC-2	.57	1.83	.87	.53	.35		15.1	5.00				
Σ	1.14	3.65	1.73	1.06	.70		30.1	10.00				
S. P.	→	+3.0 .16	→	→	→							
AC-N	→	.05	→	→	→							
T.C.	→	50.5	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 5

Project S.O.D. Line X-Spr.1-5½ Field date 2/14/64 Data page _____ Comp. date 2/15/64. Comp by C.S.L.

(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-2S	→	2-3S	→	→	3-4S	→	→	→	2-5S	→	→
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	27.8	10.47	28.3	10.29	5.18	28.1	8.40	4.12	2.51	8.74	3.62	2.03
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	39.7	59.8	40.4	58.8	74.0	40.1	48.0	58.8	71.6	49.9	51.7	58.0
(I) Vac Σ	25.6	9.35	26.0	9.33	4.70	26.6	7.72	3.72	2.30	8.11	3.30	1.84
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.086	1.120	1.089	1.103	1.101	1.057	1.088	1.109	1.092	1.078	1.097	1.102
(N) PFE=(M-1)(10^2)	9	12	9	10	10	6	9	11	9	8	10	10
(O) MCF=(M-1)(10^5)/H	216	201	220	175	137	142	183	185	128	156	188	176
	0.7	0.8	0.7	0.8	1.5	0.7	1.0	1.9	2.3	1.0	2.0	2.7

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

(A) Send	4-5	1-2	2-3	3-4	4-5		CAL	→				
(B) Receive	→	5-6S	→	→	→		1-2	→				
(C) n separation												
(D) I	→	→	→	→	→		300	1000				
(E) Vdc (avg)	1.29	4.05	1.94	1.22	.90		30.3	10.00				
(F) DCcal	→	→	→	→	→		.990	1.000				
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	64.6	52.1	55.4	61.0	72.0							
(I) Vac Σ	1.14	3.65	1.73	1.06	.70		30.1	10.00				
(J) AC noise x 2	.10			.10	.10							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.136			1.056	.693							
(L) AC-DC cal.	→	→	→	→	→		.994	1.000				
(M) ρdc/ρac =ExL/K	1.136	1.109	1.120	1.156	1.300							
(N) PFE=(M-1)(10^2)	14	11	12	16	30?							
(O) MCF=(M-1)(10^5)/H	211	209	217	256	417?							
	3.5	2.0	2.8	3.3	4.5							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: X spd 1 N½ Date: 2-11-64

Send	23	12	34	22	12	45	34	23	12	45	34	23
Receive	12N →		23N →			34N →				45N →		
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5
Current	2100	2101	2101	2101	2100	2101	2100	2101	2100	2101	2100	2100
Send	12	45	34	23	12		Cal					
Receive	→	56N →			→							
Time							3 00					
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5		1X3					
Current	2101	2100	2100	2100	2101		300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 11

Project: S.O.D. Line: X - Sp 1 - N½ Int.Cal _____ Date: 21/4/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
~~Time~~ Range	30	10	30	10	10	30	10	3	3	10	10	3
DC-1	15.2 15.10	5.20 5.22	14.0 11.7	4.06 3.81	2.17 2.07	13.0 13.0	4.27 3.82	1.93 2.04 1.88 1.80	1.32 1.30	4.28 4.43	1.95 1.98	1.11 1.02 1.16 1.20
DC-2	15.10 15.2	5.22 5.20	11.7 14.1	3.48 3.78	2.07 2.15	13.0 13.1	3.82 4.33	1.88 1.78 1.86 2.02	1.30 1.33	4.42 4.27	1.96 1.95	1.16 1.20 1.06 1.01
Σ	30.2 30.2	10.42 10.42	25.7 25.8	7.54 7.59	4.24 4.22	26.0 26.1	8.09 8.15	3.81 3.78 3.74 3.82	2.62 2.63	8.70 8.70	3.91 3.91	2.27 2.22 2.22 2.21
DC-3	15.2 15.1	5.20 5.22	14.1 11.6	3.78 3.79	2.15 2.11	13.1 12.9	4.33 4.38 3.80 3.77	1.86 1.83 1.98 1.96	1.34 1.29	4.27 4.43	1.91 1.91	1.06 1.21
Dc-4	15.0 15.1	5.22 5.20	11.6 14.2	1.79 3.79	2.08 2.11	12.9 13.1	3.80 3.77 4.38 4.38	1.98 1.96 1.83 1.78	1.28 1.33	4.43 4.27	1.91 2.00	1.21 1.02
Σ	30.2 30.2	10.42 10.42	25.7 25.8	7.57 7.58	4.23 4.22	26.0 26.0	8.19 8.15 8.18 8.15	3.80 3.79 3.81 3.74	2.62 2.62	8.70 8.70	3.92 3.91	2.27 2.27
DC-AV	30.2	10.42	25.7	7.57	4.23	26.0	8.16	3.79	2.62	8.70	3.91	2.23
AC-1	14.3	4.66	12.7	3.57	1.89	13.0	4.00	1.73	1.17	4.19	1.82	.99
AC-2	14.3	4.65	12.7	3.57	1.89	13.0	4.00	1.73	1.17	4.20	1.82	.99
Σ	28.6	9.31	25.4	7.14	3.78	26.0	8.00	3.46	2.34	8.39	3.64	1.98
S. P.	+22.6 .21	→	+2.9 .25	→	→	-0.1 .26	→	→	→	.02	→	→
AC-N	.09	→	.08	→	→	.13	→	→	→	.10	→	→
I.C.	50.6	→	50.3	→	→	50.4	→	→	→	50.4	→	→

1.12- N.1-0 dS

INDUCED POLARIZATION - RECEIVER NOTES PAGE 12

Project: S.O.D. Line: X-Spr. 1-N½ Int.Cal _____ Date: 2/14/64

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6N			→		4-5					
Time	3	10	3	3	3		30					
DC-1	.95 .89 .96 .93	2.60 2.35	1.33 1.36	.83 .78 .78 .81	.75 .66		15.1					
DC-2	.90 .96 .93 .85	2.35 2.63	1.36 1.33	.78 .79 .78 .78	.66 .75		15.0					
Σ	1.85 1.85 1.83 1.82	4.95 4.98	2.69 2.69	1.61 1.57 1.56 1.59	1.41 1.41		30.1					
DC-3	.93 .91 .92 .96	2.63 2.66 2.31 2.27	1.33 1.36	.78 .80 .82 .81	.75 .65		15.1					
Dc-4	.93 .96 .91 .89	2.31 2.27 2.66 2.70	1.36 1.33	.82 .78 .80 .77	.65 .77		15.0					
Σ	1.90 1.82 1.83 1.85	4.94 4.93 4.97 4.97	2.69 2.69	1.60 1.57 1.62 1.58	1.40 1.42		30.1					
DC-AV	1.85	4.96	2.69	1.59	1.41		30.1					
AC-1	.77	2.35	1.26	.70	.56		14.9					
AC-2	.77	2.35	1.26	.70	.59		15.0					
Σ	1.54	4.70	2.52	1.40	1.15		29.9					
S. P.	→	-2.8	.26		→							
AC-N	→	.16?	meter	sticks								
I.C.	→	50.3			→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 6

Project S.O.O. Line X-Spr.1-N½ Field date 2/14/64 Data page _____ Comp. date 2/15/64 Comp by C.S.L.

(A) Send	1-2	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	30.2	10.42	25.7	7.57	4.23	26.0	8.16	3.79	2.62	8.70	3.91	2.23
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	43.1	59.6	36.7	43.3	60.4	37.1	46.7	54.1	74.8	49.7	55.9	63.7
(I) Vac Σ	28.6	9.31	25.4	7.14	3.78	26.0	8.00	3.46	2.34	8.39	3.64	1.98
(J) AC noise x 2									.26			.20
(K) Vac(corr) = $\sqrt{I^2 - J^2}$									2.30			1.97
(L) AC-DC cal. USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.056	1.121	1.011	1.060	1.120	1.000	1.019	1.094	1.139	1.077	1.077	1.132
(N) PFE=(M-1)(10^2)	6	12	1	6	12	0	2	9	14	4	7	13
(O) MCF=(M-1)(10^5)/H	130	203	30	139	199	0	41	174	186	74	131	207
	0.6	0.8	0.8	1.2	1.8	0.8	1.0	2.0	2.1	1.0	2.0	2.4

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

(A) Send	1-2	4-5	3-4	2-3	1-2		C4L					
(B) Receive	→	5-6N	→	→	→		4-5					
(C) n separation												
(D) I	→	→	→	→	→		200					
(E) Vdc (avg)	1.85	4.96	2.69	1.59	1.41		30.1					
(F) DCcal	→	→	→	→	→		.998					
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	92.6	70.8	76.8	79.6	113							
(I) Vac Σ	1.54	4.70	2.52	1.40	1.15		29.9					
(J) AC noise x 2	.20		.32	.32	.32							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.527		2.50	1.362	1.104							
(L) AC-DC cal.	→	→	→	→	→		.998					
(M) ρdc/ρac =ExL/K	1.210	1.054	1.078	1.168	1.279							
(N) PFE=(M-1)(10^2)	21	5	8	17	28?							
(O) MCF=(M-1)(10^5)/H	227	76	102	211	247?							
	2.6	1.6	2.0	3.0	2.5?							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: ~~X~~ spd 2 5½ Date: 2-17-64

Send	34	45	23	34	45	12	23	34	45	12	23	34
Receive	12S →		23S →			34S →				45S →		
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	45	12	23	34	45		CAL					
Receive	→	56S →					1-2					
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5		1X3					
Current	2100	2100	2100	2100	2100		300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 15

Project: S.O.D. Line: X-Spr. 2-5½ Int.Cal _____ Date: 2/17/84

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-25	→	2-35	→	→	3-45	→	→	→	4-55	→	→
Time	30	10	30	10	10	30	10	3	3	10	3	3
DC-1	19.0 18.5	5.15 5.17 4.86 4.83	19.6 20.7	5.19 5.45	2.15 2.22 2.10 2.02	19.7 18.2	4.35 4.59	2.02 1.97	.97 1.08 1.03 .90	4.83 4.97	1.68 1.73	.94 .94
DC-2	18.5 19.0	4.86 4.83 5.07 5.18	20.7 19.6	5.45 5.17	2.10 2.02 2.17 2.23	18.2 19.7	4.59 4.33	1.97 2.02	1.03 .90 .95 1.10	4.97 4.82	1.73 1.68	.96 .95
Σ	37.5 37.5	10.08 10.00 9.99 10.01	40.3 40.3	10.62 10.62	4.25 4.20 4.27 4.25	37.9 37.9	8.94 8.92	3.99 3.99	[illegible]	9.80 9.79	3.41 3.41	1.90 1.89
DC-3	18.5 19.0	5.07 5.18 4.87 4.82	20.7 19.5	5.17 5.45	2.17 2.05	19.7 18.2	4.33 4.59	2.02 1.97	.95 1.10 1.05 .88	4.82 5.02	1.68 1.73	.95 .95
Dc-4	19.0 18.5	4.87 4.82 5.18 5.17	19.6 20.8	5.45 5.15	2.05 2.22	18.2 19.7	4.59 4.34	1.97 2.02	1.05 .88 .95 1.10	4.99 4.80	1.73 1.68	.95 .95
Σ	37.5 37.5	9.94 10.00 10.05 9.99	40.3 40.3	10.62 10.62	4.22 4.27	37.9 37.9	8.92 8.93	3.99 3.99	[illegible]	9.81 9.82	3.41 3.41	1.90 1.90
DC-AV	37.5	9.99	40.3	10.62	4.25	37.9	8.93	3.99	1.91	9.80	3.41	1.90
AC-1	18.3	4.99 4.66 9.65	19.6	5.18	2.02	18.4	4.30	3.89	.94	4.73	1.65	.92
AC-2	18.3	4.99 4.66 9.65	19.6	5.18	2.03	18.4	4.30	3.87	.95	4.74	1.66	.92
Σ	36.6	9.65	39.2	10.36	4.05	36.8	8.60	7.88	1.89	9.47	3.31	1.84
S. P.	-3.1	→	+8.2	→	→	-9.3	→	→	→	+1.3	→	→
AC-N	.19	→	.11	→	→	.13	→	→	→	.09	→	→
I.C.	50.6	→	50.6	→	→	50.6	→	→	→	50.6	→	→

S.P 0-15 +24.5

INDUCED POLARIZATION - RECEIVER NOTES PAGE 16

Project: S.O.D. Line: X-1 pr. 2-5½ Int.Cal _____ Date: 2/17/64

Send	4-5	1-2	2-3	3-4	4-5		CAL					
Rec.	→	5.65	→	→	→		12					
~~Time~~ Range	7	10	3	3	3		30					
DC-1	.51 .48	2.63 2.53 2.40 2.44	1.10 1.20 1.03 .82	.88 .67 .72 .70	.40 .34 .40 .40		14.9					
DC-2	.53 .55	2.40 2.44 2.61 2.62	.88 .82 .97 1.21	.72 .70 .62 .63	.40 .40 .30 .32		14.9					
Σ	1.04 1.03	5.03 4.97 5.01 5.06	1.98 2.02 2.04 2.07	1.40 1.37 1.34 1.33	.80 .70 .76 .72		29.8					
DC-3	.55 .49 .48 .53	2.58 2.62 2.52 2.37	.91 1.21 1.18 .82	.62 .63 .69 .67	.32 .29 .48 .52		14.9					
Dc-4	.48 .53 .55 .50	2.42 2.37 2.48 2.63	1.18 .82 .85 1.24	.69 .67 .63 .62	.48 .47 .32 .22		14.9					
Σ	1.03 1.02 1.03 1.03	5.00 4.99 5.0 5.00	2.09 2.03 2.03 2.06	1.31 1.30 1.32 1.29	.76 .76 .76 .74		29.8					
DC-AV	1.03	5.01	2.03	1.32	.75		29.8					
AC-1	.48	2.38	.97	.62	.35		14.8					
AC-2	.48	2.37	.97	.62	.35		14.9					
Σ	.96	4.75	1.94	1.24	.70		29.7					
S. P.	→	-20.7	→	→	→							
AC-N	→	.08	→	→	→							
I/G	→	50.5	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.O. Line X-Spr. 2-5½ Field date 2/17/64 Data page_____ Comp. date 2/17/64. Comp by C.S.L.

(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-2.5	→	2-3.5	→	→	3-4.5	→	→	→	4-5.5		
(C) n separation												
(D) I	2100											
(E) Vdc (avg)	37.5	9.99	40.3	10.62	4.25	37.9	8.93	3.99	1.98	9.80	3.41	1.90
(F) DCcal USED	1.007											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	54.0	57.6	58.0	61.1	61.2	54.6	51.4	57.4	57.0	56.3	49.1	54.7
(I) Vac Σ	36.6	9.65	39.2	10.36	4.05	36.8	8.60	3.88	1.89	9.47	3.31	1.84
(J) AC noise x 2												.18
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												1.83
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K	1.024	1.034	1.029	1.028	1.049	1.030	1.039	1.029	1.048	1.033	1.030	1.039
(N) PFE=(M-1)(10^2)	2	3	3	3	5	3	4	3	5	3	3	4
(O) MCF=(M-1)(10^5)/H	44	59	50	46	80	55	75	51	84	59	61	71

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	1-2	2-3	3-4	4-5		CAL					
(B) Receive	→	5-6.5	→	→	→		1-2					
(C) n separation												
(D) I	→	→	→	→	→		300					
(E) Vdc (avg)	1.03	5.01	2.03	1.32	.75		29.8					
(F) DCcal	→	→	→	→	→		1.007					
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	52.0	72.1	55.5	66.5	60.5							
(I) Vac Σ	.96	4.75	1.94	1.24	.70		29.7					
(J) AC noise x 2	.18			.16	.16							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	.94			1.23	.681							
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.072	1.054	1.047	1.064	1.100							
(N) PFE=(M-1)(10^2)	7	5	5	6	10							
(O) MCF=(M-1)(10^5)/H	142	75	80	96	165							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: 3 and 2 N½ Date: 2-17-69

Send	23	12	34	23	12	45	34	23	12	45	34	23
Receive	12N →		23N →			34N →				45N →		
Time												
Range	10.5X2	10.5X2	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5
Current	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00
Send	12	45	34	23	12		CC1	45				
Receive	→	45N →			→							
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5		1X3					
Current	2/00	2/00	2/00	2/00	2/00		300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 13

Project: S.O.D. Line: X-Spur 2-N½ Int.Cal _____ Date: 2/17/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N		→	3-4N	→		→	4-5N		
~~Time~~	20	10	100	10	10	20	10	10	3	10	10	3
DC-1	17.3 18.3	5.21 5.03	24.2 24.5	5.27 5.37	2.44 2.58	22.1 22.0	5.95 5.84	2.00 1.79 2.12 2.05	1.57 1.71 1.77 1.86	4.18 4.05 4.06 4.59	1.43 1.70 1.74 1.90	1.57 1.96
DC-2	18.2 17.6	5.01 5.22	24.5 24.2	5.37 5.25	2.58 2.49	22.0 22.1	5.84 5.90	2.12 2.17 2.17 2.03	1.77 1.71 1.52 1.12	4.06 4.18 4.07 4.00	1.74 1.90 1.68 1.70	1.96 1.57
Σ	35.9 35.9	10.22 10.23	48.7 48.7	10.64 10.62	5.07 5.07	44.1 44.1	11.79 11.77	4.12 4.16 4.15 4.08	2.90 2.69	8.08 8.60 8.09 8.57	3.57 3.60 3.62 3.60	1.83
DC-3	17.6 17.4	5.22 5.08	24.2 24.5	5.25 5.39	2.49 2.50	22.1 22.0	5.93 5.87	2.03 2.06 2.02 2.04	1.52 1.76 1.48	4.12 4.00 4.57 4.67	1.70 1.92	1.57 1.96
Dc-4	18.4 17.6	5.00 5.22	24.5 24.2	5.39 5.22	2.60 2.57	22.0 22.1	5.87 5.90	2.02 2.08 2.00 1.99	1.60 1.65 1.67	4.57 4.68 4.05 3.94	1.92 1.68	1.96 1.57
Σ	36.0 36.0	10.22 10.22	48.7 48.7	10.68 10.63	5.07 5.07	44.1 44.1	11.80 11.77	4.05 4.14 4.05 4.07	2.92 2.92	8.62 8.60 8.62 8.57	3.62 3.60	1.83 1.83
DC-AV	36.0	10.22	48.7	10.63	5.07	44.1	11.78	4.10	2.90	8.61	7.60	1.83
AC-1	17.6	5.02 2.87	24.3	5.17	2.69 2.79 4.93	21.7	5.68	2.28 1.77 3.96	1.63 1.65 1.12 1.12	5.08 2.40 8.48	1.74	1.82 1.57 1.91
AC-2	17.6	4.98 4.02 9.89	24.2	5.15	2.26 2.55 4.93	21.7	5.63 5.91 5.91 5.97	4.75 3.96 4.00	1.64 1.65 1.12 1.12	3.40 8.48	1.74	1.57 1.84
Σ	35.2	9.89	48.5	10.34	4.93	43.4	11.38	3.98	2.77	8.48	2.48	
S. P.	-6.0	→	-1.8	→		+0.5 -.52	→		→	+3.7		
AC-N	.17	→	.13	→		.26			→			
I.C.	50.8	→	50.7	→		50.7	→		→			

S.P. 0-1N +24.0

INDUCED POLARIZATION - RECEIVER NOTES PAGE 14

Project: S.O.D. Line: X-Spr. 2-N½ Int.Cal _____ Date: 2/17/64

Send	1-2	4-5	3-4	2-3	1-2		CAL	→	→			
Rec.	→	5-6N	→	→	→		4-5	→	→			
~~Time~~ Range							30					
DC-1	.22						15.1					
DC-2	.44						15.0					
Σ							30.1					
DC-3							15.1					
Dc-4							15.0					
Σ							30.1					
DC-AV							30.1					
AC-1	.67						15.0					
AC-2							15.0					
Σ							30.0					
S. P.												
AC-N												
I.C.												

1.53
1.07
1.66

2.17 2.1
1.72
2.09

2.18
1.72

1.93
1.93

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project S.O.D. Line X - Spr. 2 - N Field date 2/17/64 Data page _____ Comp. date 2/17/64. Comp by C.S.L.

(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	36.0	10.22	48.7	10.63	5.07	44.1	11.38	4.10	2.90	8.61	3.60	1.83
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	51.4	58.4	69.5	60.8	72.4	62.9	67.3	58.5	82.8	49.2	51.3	52.2
(I) Vac Σ	35.2	9.89	48.5	10.34	4.93	43.4	11.38	3.98	2.77	8.48	3.48	1.68?
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1.000	→	1.017	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.022	1.034	1.022	1.029	1.029	1.016	1.034	1.030	1.047	1.016	1.033	
(N) PFE=(M-1)(10^2)	2	3	2	3	3	2	3	3	5	2	3	
(O) MCF=(M-1)(10^5)/H	43	58	32	48	40	25	51	51	57	33	64	

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

(A) Send	1-2	4-5	3-4	2-3	1-2		CAL					
(B) Receive	→	5-6N	→	→	→		4-5					
(C) n separation												
(D) I	→	→	→	→	→		300					
(E) Vdc (avg)												
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D												
(I) Vac Σ												
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line X - Spr.2-N Field date 2/18/69 Data page_____ Comp. date 2/20/69. Comp by C.S.L.

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	4-5N	→	→	→	5-6N	→	→	→				
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→				
(E) Vdc (avg)	8.64	3.63	1.73	1.41	4.55	2.30	1.30	1.15				
(F) DCcal USED	1.000	→	→	→	→	→	→	→				
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	49.3	51.9	49.5	70.6	65.1	65.7	65.1	92.2				
(I) Vac Σ	8.48	3.55	1.64	1.30	5.34	3.85 3.72	3.20 2.60	2.58 2.16				
(J) AC noise x 2					3.14	3.14 3.00	3.00 2.38	2.38 1.94				
(K) Vac(corr) = $\sqrt{I^2 - J^2}$					4.32	2.18 2.20	1.109 1.047	1.00 .95				
(L) AC-DC cal. USED	1.000	→	→	→	→	→	→	→				
(M) ρ dc/ρac=ExL/K	1.019	1.022	1.054	1.084	1.051	1.054	1.172	1.150				
(N) PFE=(M-1)(10^2)	2	2	5?	8?	5	5?	17?	15?				
(O) MCF=(M-1)(10^5)/H	39	42	109?	119?	78	82?	264?	163?				

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

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

INDUCED POLARIZATION - RECEIVER NOTES PAGE 12

Project: S.O.D. Line: X - Spur 2 - N½ Int.Cal _____ Date: 2/18/64

Send	2-3	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
Rec.	4-5N	→	→	→	5-6N	→	→	→				
~~Time~~ Range	10	3	3	3	10	3	3	3				
DC-1	4.23 4.29	1.80 1.78 1.90 1.88	.84 .82 .89 .81	.77 .78 .67 .78	2.40 2.15	1.11 1.19	.67 .67	.56 .60				
DC-2	4.48 4.45	1.87 1.88 1.76 1.78	.90 .92 .84 .92	.63 .64 .78 .67	2.15 2.40	1.19 1.17	.63 .67	.60 .50				
Σ	8.64 8.64	3.67 3.62 3.66 3.66	1.74 1.74 1.73 1.77	1.40 1.42 1.41 1.42	4.55 4.55	2.30 2.32	1.30 1.30	1.16 1.19				
DC-3	4.23 4.39	1.75 1.89	.84 .89	.78 .64	2.40 2.15	1.14 1.17	.67 .60	.59 .52 .63 .63				
Dc-4	4.39 4.25	1.88 1.74	.89 .82	.63 .78	2.15 2.40	1.17 1.16	.63 .70	.63 .63 .52 .59				
Σ	8.64 8.64	3.63 3.63	1.73 1.71	1.41 1.42	4.55 4.55	2.33 2.28	1.30 1.20	1.15 1.15 1.15 1.15				
DC-AV	8.64	3.63	1.73	1.41	4.55	2.30	1.30	1.15				
AC-1	4.24	1.78	.82	.66	2.68	1.19 1.16	1.60	1.27				
AC-2	4.24	1.77	.82	.64	2.66	1.20 1.19	1.50	1.08				
Σ	8.48	3.55	1.64	1.30	5.34							
S. P.	-1.9	→	→	→	-1.2	→	→	→				
AC-N	.28	→	→	→	1.58	1.50	1.19	.97				
I.C.	50.8	→	→	→	50.8	→	→	→				

S.P. 0-15 -22

INDUCED POLARIZATION SENDER NOTES

Project: SO D Line: Y 50 X 3 5½ Date: 3-15-84

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Receive	→		→			→						
Time	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5
Range	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Current												

Send	4-5	1-2	2-3	3-4	4-5		CAL					
Receive	→				→		1-2					
Time	2x10.5						1+3					
Range	2100						300					
Current												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: SOD Line: X spd 3 5½ Int.Cal _____ Date: _____

Send	34	45	23	34	45	12	23	34	45	12	23	34
Rec.	125 →		235 →			345 →				455		
Time	30	10	30	10	3	30	10	3	1	3	3 ①	1
DC-1	9.3 9.2 9.3 9.3	219 220 220 219	11.9 12.0 11.6 11.45	2.34 234 226 228	.96 11.1 1.12 9.5	13.7 137 13.0 130	248 200 192 233	950 955 870 870	560 533 505 520	155 152 172 172	.63 .64 .55 .54	.39 .33 .40 .40
DC-2	9.3 9.3 9.25 9.25	220 219 221 222	11.6 11.45 11.9 12.2	226 228 232 236	1.12 9.4 .95 1.14	13.0 13.0 13.7 137	232 233 208 198	870 870 955 950	505 520 455 545	172 172 146 155	.55 .54 .62 .64	.40 .40 .39 .33
Σ	18.6 18.5 18.55 18.55	439 437 441 441	23.5 23.4 23.5 23.5	460 462 458 464	208 206 207 208	26.7 26.7 26.7 26.7	440 433 430 431	1820 1825 1825 1820	1065 1053 9.58 1065	327 334 318 327	118 118 117 118	74 73 74 73
DC-3	9.25 9.25 9.3 9.35	221 222 220 213	11.9 12.2 11.5 11.4	232 236 228 224	.95 1.14 1.1 .95	13.7 137 13.0 130	250 195 234 238	955 950 875 860	453 545 522 521	146 155 176 174	.62 .64 .54 .54	.39 .33 .40 .40
Dc-4	9.3 9.35 9.2 9.20	220 219 219 221	11.5 11.4 12.0 12.1	224 225 234 236	.95 1.14 1.0 9.5	13.4 130 13.7 137	234 238 208 195	875 860 955 970	522 521 533 530	176 174 152 155	.54 .54 .64 .63	.40 .40 .33 .34
Σ	18.35 18.60 18.50 18.55	441 439 439 440	23.4 23.6 23.5 23.5	460 460 458 460	207 207 208 204	26.7 26.7 26.7 26.7	434 433 434 433	1830 1810 1830 1830	975 1066 1055 1051	322 329 328 329	116 118 118 117	74 73 73 74
DC-AV	18.55	4.40	23.5	460	2.07	26.7	4.335	11.825	10.58	3.26	1.175	.730
AC-1	9.1	2.10	11.5	2.20	.965	13.1	2.08	.85	.50	1.58	.55	.350
AC-2	9.1	2.10	11.5	2.22	.970	13.1	2.08	.85	.50	1.58	.56	.350
Σ	18.2	4.20	23.0	4.42	1.935	26.2	4.16	1.70	10.00	3.16	1.11	.700
S. P.	3-4-19	+6.3	+7.8			+3.7				-25.6		
AC-N	.02 →		.03 →			.03 →				.01 →		

INDUCED POLARIZATION - RECEIVER NOTES

PAGE _____

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

Send	45	12	23	34	45		Cal	34	45	23	—	
Rec.	→	565	→	→	→		12	545	→	45	—	
Time	1	1	1	1	1			1	3	1	1	
DC-1	.22 .21 .22 .27	.51 .45 .48 .50	.23 .22 .29 .30	.14 .21 .22 .14	.12 .10 .14 .16		15.0 15.0	960 960 940 940	45 45 56 55	564 634	580 658	
DC-2	.29 .27 .22 .21	.48 50 .51 48	.29 31 .22 .21	.22 .19 .14 .22	.14 .16 .11 .09			940 940 950 550	56 100 45	634 564	658 644	
Σ	44 48 46 .48	99 99 55 54	52 52 51 51	.36 .35 .36 .34	26 26 25 25			1900 1900 1890 1890	101 101	198 1194	1308 1302	
DC-3	.22 .21 .26 .26	.51 48 .48 52	.22 21 .30 .32	.14 .22 .22 .19	.11 .09 .15 .16		15.0 15.0	950 950 950 950	45 55	560 640	644 570	
Dc-4	.26 .26 .21 .22	.48 52 .45 47	.30 32 .22 .26	.22 .14 .14 .22	.15 .16 .10 .09			950 960 960 950	55 45	640 562	12.14	
Σ	.48 .47 .47 .48	99 100 99 99	52 53 52 52	.36 .36 .36 .36	25 28 25 25			1900 1930 1910 1900	100 100	1200 1202		
DC-AV	.47	.99	.52	.36	.25		30.0	1,900	1,005	—	1,23	
AC-1	.22	.486	.247	.165	.118		14.85	.93	.455	.61		
AC-2	.22	.490	.247	.165	.118		14.85	.935	.460	.61		
Σ	.44	.976	.494	.330	.236		29.70	18.65	.915	1.22		
S. P.	→	-11.4	→	→	→							
AC-N	→	.01	→	→	→							

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

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

Send	45	34 →		23	34		23					
Rec.	34	34 →		45	45		45					
Time	1	3	3	3	3		1					
DC-1	530 508 542 572	950 955 870 870	970 980 860 850	168 157	.34 .38	.22 .24						
DC-2	542 572 538 470	870 870 955 950	860 850 975 980	157 168	.38 .34	.24 .23						
Σ	1072 1080 1080 1042	1820 1820 1825 1820	1830 1830 1835 1830	325 325	72 72	46 47						
DC-3	538 534	955 950 875 860	975 950	168 155	.34 .38							
Dc-4	534 508	875 860 555 870	850 980	323	72							
Σ	1072 1072	1830 1810 1830 1820	1825 1830									
DC-AV												
AC-1							.61					
AC-2							.61					
Σ												
S. P.												
AC-N												

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line Xspd 35½ Field date 3-18-63 Data page_____ Comp. date 3-18-63. Comp by HKH

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	34	45	23	34	45	12	23	34	45	12	23	34
(B) Receive	125 →	→	235 →	→	→	345 →	→	→	→	455 →	→	→
(C) ~~n separation~~ Range	30	10	30	10	3	30	10	3	1	3	3	1
(D) I	2100											
(E) Vdc (avg)	18.55	4.40	23.5	4.60	2.04	26.7	4.335	1.825	1.058	3.26	1.175	.730
(F) DCcal 1.000	→	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	26.5	25.1	33.6	26.3	29.2	38.2	24.7	26.1	30.2	18.6	16.8	20.8
(I) Vac Σ	18.2	4.20	23.0	4.42	1.935	26.2	4.16	1.70	1.000	3.16	1.11	.700
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000 →	→	→	→	→	→	→	→	1.060	1001	→	1.060
(M) ρ dc/ρac=ExL/K	1.020	1.048	1022	1.042	1.064	1.019	1.042	1.074	1.112	1.032	1058	1.107
(N) PFE=(M-1)(10^2)	2	5	2	4	6	2	4	7	11	3	6	11
(O) MCF=(M-1)(10^5)/H	75	190	94	160	219	50	170	284	361	172	345	563
	1.0 1.0	2.3 2.5	0.7 1.5	2.2 2.0	4.7 2.1	0.7 1.2	2.7 1.8	3.7 3.7	5.5 5.6	3.2 0	6.0 -0.2	7.7 3.0

Project_____ Line 3 Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	45	12	23	34	45	Cal	34	45	23			
(B) Receive	→	565 →	→	→	→	12	R 34 →	→	45			
(C) n separation	1	1	1	1	1	30	1	3	1			
(D) I	→	→	→	→	→	300						
(E) Vdc (avg)	.47	.99	.52	.36	.25	30.0	1.900	1.005	1.23			
(F) DCcal	→	→	→	→	→	1.000 →	→					
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	23.5	14.2	14.8	18.0	20.0							
(I) Vac Σ	.44	.976	494	330	236		1.865	.915	1.22			
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.060 →	→	→	→	→	.998	1.000	1.000	1.000			
(M) ρdc/ρac =ExL/K	1.132	1.075	1.118	1.157	1121		1.020	1.148	1.008			
(N) PFE=(M-1)(10^2)	13	8	12	16	12		1062	1082	1050			
(O) MCF=(M-1)(10^5)/H	586	532	842	872	772							
	10.8 2.4	7.7 -0.2	11.7 0.1	14.5 1.2	16.7 -4.2							

TO low for accuracy

x(1R pfe • x = 3R pfe)

1R Cal factor 1.060

INDUCED POLARIZATION SENDER NOTES

Project: SO-D Line: X Spr 3 N½ Date: 3-17-64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→											
Time	2X10.5											
Range	2100											
Current												
Send	1-2	4-5	3-4	2-3	1-2		CAL					
Receive	→						4-5					
Time	2X10.5						1X3					
Range	2100						300					
Current												

INDUCED POLARIZATION - RECEIVER NOTES

PAGE _____

Project: SOD Line: X spd 3 N½ Int.Cal 50.1 Date: 3-17-64

Send	23	12	34	23	12	45	34	23	12	45	34	23
Rec.	12N →		23N →			34N →				45N →		
Time	30	10	30	3	3	30	10	3	1	10	3	1
DC-1	12.7 12.6	2.10 2.30	11.8 11.8 11.5 11.6	2.07 2.06 2.12 2.13	.72 .78 .73 .77	10.5 10.5 10.5 10.5	2.80 2.86 2.69 2.59	.87 .86 .92 .94	.47 .48 .46 .44	370 370 364 365	159 162 175 171	.63 .64 .71 .71
DC-2	12.7 12.6	2.30 2.10	11.5 11.6 11.9 11.9	2.12 2.13 2.08 2.10	.73 .77 .75 .74	10.5 10.5 10.5 10.5	2.64 2.59 2.82 2.86	.92 .94 .86 .83	.46 .44 .47 .49	364 365 370 368	175 171 161 162	.71 .71 .64 .63
Σ	25.4 25.2	4.40 4.40	23.3 23.4 23.4 23.5	4.19 4.19 4.20 4.23	1.45 1.51 1.48 1.51	21.0 21.0 21.0 21.0	5.44 5.45 5.46 5.45	1.79 1.86 1.76 1.77	.93 .92 .93 .93	734 735 734 733	334 333 336 333	1.34 1.35 1.35 1.34
DC-3	12.6 12.7	2.12 2.02	11.9 11.9 11.6 11.5	2.08 2.10 2.20 2.24	.75 .74 .74 .74	10.5 10.5 10.5 10.5	2.72 2.86 2.60 2.54	.82 .83 .93 .95	.47 .45 .45 .44	370 368 364 364	161 162 173 172	.64 .63 .70 .72
Dc-4	12.7 12.8	2.28 2.38	11.6 11.8	2.20 2.24 2.06 2.06	.78 .78 .74 .68	10.5 10.5 10.5 10.5	2.60 2.58 2.76 2.87	.93 .95 .86 .82	.45 .44 .44 .45	364 364 370 369	173 172 162 163	.70 .72 .64 .62
Σ	25.3 25.5	4.40 4.40	23.5 23.4 23.4	4.28 4.34 4.26 4.24	1.53 1.52 1.52 1.46	21.0 21.0 21.0 21.0	5.42 5.44 5.46 5.45	1.79 1.74 1.79 1.77	.92 .93 .93 .93	734 732 734 728	334 334 335 335	1.34 1.35 1.34 1.34
DC-AV	25.35	4.40	23.4	4.24	1.50	21.0	5.46	1.78	.93	7.335	3.34	1.35
AC-1	12.4	2.10	11.4	2.02	.68	10.1	2.58	.82	.43	3.50	154	.63
AC-2	12.45	2.12	11.4	2.03	.69	10.1	2.59	.82	.43	3.46	155	.63
Σ	24.85	4.22	22.8	4.05	1.37	20.2	5.17	1.64	.86	6.96	309	1.26
S. P.	-3.1 →		+.4 →			-8.5 →				+.4 →		
AC-N	.04 →		.04 →			.03 →				.13 →		

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: SOD Line: X spd 3 N½ Int.Cal 50.1 Date: 3-17-84

Send	12	45	34	23	12		Cal					
Rec.	→	56N	→	→	→		45					
Time	1	3	3	1	1							
DC-1	.41 .36 .39 .41	206 204 190 193	.98 97 102 103	.45 .41 .43 .43	25 27 27 28		15.0 15.0		.49 .50 .39 .38	23 23 29 27	27 23 25 29	26 28
DC-2	.39 .41 .35 .35	190 193 205 213	102 103 97 98	.43 .43 .48 .46	27 28 25 24		15.0 15.0		.39 .38 .50 .51	29 27 26 25	29 29 24 24	28 22
Σ	80 77 74 76	396 396 395 397	200 200 199 201	.88 .89 .91 .89	52 55 52 52		30.1 30.1		.89 .88 .89 .89	52 50 55 52	57 52 53 53	54 50
DC-3	.35 .35 .40 .42	205 213 192 198	.97 98 103 103	.48 .46 .42 .44	25 24 26 27				.50 .38	26 25 28 25	24 24 24 28	22 30
Dc-4	.40 .42 .36 .32	192 198 204 205	103 103 97 92	.42 .44 .46 .48	21 27 27 23				.39 .50	27 25 23 28	24 27 23 26	52
Σ	75 77 76 74	397 393 396 395	200 201 201 199	.90 .90 .88 .92	51 51 52 50				.44 .88	54 50 51 53	53 52 52 54	
DC-AV	.76	3.96	1.996	.892	.521		30.00					
AC-1	.35	1.81	.88	405	237							
AC-2	.35	1.81	.89	406	237		14.8					
Σ	.70	3.62	1.77	.811	474		14.75					
S. P.	→	-2.0	→	→	→		29.55					
AC-N	→	.02	→	→	→							

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

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

Send	23											
Rec.	Z-3N											
Time												
DC-1	206 204 214 208	.68 .67 .80 .80	2.87 2.56	.82 .95	49 42 42 43	364 376	163 169	.62 .56 .72 .63	.32 .44 .44 .32	205 193	96 102	.48 .49 .41 .42
DC-2	214 208 214 215	.80 .80 .72 .74	2.56 2.98	.95 .82	42 43 50 43	376 364	169 169	.72 .63 .66 .71	.48 .32 .33 .43	193 203	102 97	.41 .42 .46 .49
Σ	420 417 428 423	1.48 1.47 1.52 1.54	4.43 4.46	1.77 1.77	91 85 92 86	734 739	332 333	1.34 1.39 1.34 1.39	76 76 77 75	398 396	198 199	.89 .91 .87 .91
DC-3	214 215 222 202	.72 .82	2.90 2.52	.82 .95	50 42	364 372	164 169	.62 .76	.33 .44	203 194	97 102	.46 .49 .42 .40
Dc-4	222 204	.82 .67	4.52	1.77	92	736	333	1.38	77	397	199	.42 .40 .49 .49
Σ	436 417 426	1.54 1.49										.88 .89 .91 .89
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

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

Send												
Rec.												
Time	3	1	1	1								
DC-1	.48 .64	.315 .315	.31 .405	.165 .200								
DC-2	.60 .68	.375 .375	.400 .305	.200 .165								
Σ	1.32 1.38	1.39 1.39	.71 .71	.365 .365								
DC-3	.64											
Dc-4	.68											
Σ	1.32											
DC-AV	1.32	1.39	.71	.365								
AC-1	.67	.738	.375	.192								
AC-2	.67	.734	.375	.192								
Σ	1.34	1.47	.75	.384								
S. P.												
AC-N	.01											
	1.015	1.058	1.056	1.052								

SP 0.0 to 25 +25.2 mv

Read -25.2

-13
-20
-22
-25
30
-22
-20
-25

.32
45R .47
34S
.29
.50
.30
.50
.30
.50
.31

.71 .55
.72 .83
23S .62 .53
45R .80 .85
.56 .50
.80

.45
.45
.48 45S
.43 34R
.45
.45

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line Xspd 3N½ Field date 3-17-64 Data page_____ Comp. date 3-17-64 . Comp by H.K.H

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	23	12	34	23	12	45	34	23	12	45	34	23
(B) Receive	1-2N →		23N		→	34N			→	45N		
(C) n separation	30	10	30	3	3	30	10	3	1	10	3	1
(D) I	2100											
(E) Vdc (avg)	25.35	4.40	23.4	4.24	1.50	21.0	5.46	1.78	.93	7.335	3.34	1.35
(F) DCcal 1.100												
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	36.2	25.3	33.5	24.2	21.4	30.0	31.2	25.4	26.6	41.8	47.8	38.6
(I) Vac Σ	24.85	4.22	22.8	4.05	1.37	20.2	5.12	1.64	.86	6.56	3.09	1.26
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000							→	1.060	1.000		
(M) ρ dc/ρac=ExL/K	1.019	1.042	1.026	1.047	1.086	1.040	1.057	1.085	1.145	1.052	1.082	1.135
(N) PFE=(M-1)(10^2)	2	4	3	5	9	4	6	9	15	5	8	14
(O) MCF=(M-1)(10^5)/H	54	162	78	194	402	133	183	335	554	125	172	350
	0.7	2.3	0.8	2.3	4.7	1.0	1.8	3.8	6.3	1.3	2.2	4.2

Project_____ Line 3 Field date 6 Data page_____ Comp. date_____ Comp by_____

(A) Send	12	45	34	23	18		Cal					
(B) Receive	→	56N			→		45					
(C) n separation	1	3	3	1	1		30					
(D) I					→		300					
(E) Vdc (avg)	.76	3.56	1.996	.892	.521		30.0					
(F) DCcal					→		1.000					
(G) Kn x 10^{-3}	105	31	60	105	168							
(H) ρ dc=ExFxGx10^3/D	38.0	56.5	57.0	44.6	41.7							
(I) Vac Σ	.70	3.62	1.77	.811	.474		2955					
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.060	1.000	1.080	1.060	→		.997 ~	1.000				
(M) ρdc/ρac =ExL/K	1.151	1.095	1.128	1.165	1.167							
(N) PFE=(M-1)(10^2)	15	10	13	17	17							
(O) MCF=(M-1)(10^5)/H	497	164	225	370	400							
	6.1	1.9	2.7	5.2	7.8							

INDUCED POLARIZATION SENDER NOTES

Project: S.O.D. Line: Y Spr. 1-5E Date: 2/16/62

Send	34	45	23	34	45	1-2	23	34	45	1-2	23	34
Receive	1-25	→	2-35	→	→	3-15	→	→	→	4-55	→	→
Time												
Range	10.5x2	→	→	→	→	→	→	→	→	→	→	→
Current	2100	→	→	→	→	→	→	→	→	→	→	→
Send	45	12	23	34	45	Cal						
Receive	→	5-6	→	→	→	1000	1000	300				
Time												
Range	→	→	→	→	→	245	249	341				
Current	→	→	→	→	→							

ED POLARIZATION - RECEIVER NOTES PAGE 1

Project: S.O.D. Line: 2-Spn. 1-S½ Int.Cal Date: 2/10/64

Send	2-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-2.5	→	2-3.5	→	→	3-4.5	→	→	→	4-5.5	→	
Time	30	10	30	10	10	30	10	3	3	10	10	3
DC-1	11.7 11.4	3.90 3.96 3.69 3.62	17.1 16.6	4.65 4.67 4.78 4.53	2.31 2.16 2.23 2.22	12.9 11.0	4.66 5.25	2.12 2.12 2.11 2.05	1.15 1.15	4.43 4.22	2.32 2.60 2.47 2.20	1.14 1.12 1.16 1.18
DC-2	11.4 11.9	3.69 3.62 3.98 3.93	16.6 17.0	4.63 4.46 4.57 4.46	2.23 2.26 2.28 2.24	11.0 12.0	5.25 9.70	2.11 2.05 2.08 2.14	1.15 1.20	4.22 4.48	2.49 2.20 2.33 2.58	1.16 1.18 1.14 1.17
Σ	23.1 23.3	7.50 7.55 7.62 7.55	33.7 33.6	9.28 9.33 9.35 9.37	4.54 4.42 4.51 4.46	23.9 24.2	9.91 9.95	4.23 4.17 4.19 4.19	2.30 2.35	8.65 8.62	4.81 4.82 4.62 4.78	2.30 2.30 2.30 2.29
DC-3	11.9 11.3	3.98 3.93 3.65 3.69	17.0 16.7	4.70 4.60	2.24 2.18	13.0 10.9	4.70 4.78	2.08 2.10	1.20 1.14	4.60 4.28	2.54 2.20	1.14 1.12
Dc-4	11.3 11.8	3.83 3.69 3.96 3.92	16.7 16.9	4.60 4.73	2.18 2.27	10.9 13.1	5.22 5.17	2.10 2.07	1.13 1.20	4.23 4.55	2.20 2.58	1.12 1.22
Σ	23.1 23.1	7.67 7.57 7.57 7.56	33.7 33.6	9.30 9.33	4.46 4.45	23.9 24.0	9.93 9.95	4.16 4.17	2.33 2.32	8.63 8.67	4.74 4.76	2.32 2.34
DC-AV	23.2	7.58	33.6	9.32	4.48	23.9	9.93	4.19	2.33	8.67	4.79	2.30
AC-1	10.4	3.23	15.1	4.20	2.00	11.3	4.39	1.88	1.03	3.99	2.11	1.03
AC-2	10.4	3.24	15.1	4.21	1.99	11.3	4.39	1.88	1.03	3.99	2.11	1.03
Σ	20.8	6.47	30.2	8.41	3.99	22.6	8.78	3.76	2.06	7.98	4.22	2.06
S. P.	-9.2	→	+9.4	→	→	+16.4	→	→	→	-0.9		
AC-N	0.2	0.21	.262	→	→	.20	→	→	→	.18	→	
I.C.	51.8	→	51.8	→	→	51.8	→	→	→	51.8	→	

S.P. 0-15 + 9.7

Electrode #5 ~ 2.0N to 600's of
Claimpost ~ A 26.40E

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 2

Project: S. O. D. Line: 2-Spr. 1-5½ Int.Cal _____ Date: 2/10/64

Send	4-5	1-2	2-3	3-4	4-5		CHL	→	→	→	→	
Rec.	→	5-6.5	→	→	→		1-2	→	→	→	→	
Time	3	3	3	3	3		100	300	300	30		
DC-1	.71 .70	1.70 1.84	1.26 1.26 1.08 1.07	.68 .68 .60 .61	.94 .93 .56 .59		50.0	49.5	89	15.5		
DC-2	.69 .70	1.64 1.67	1.08 1.07 1.26 1.27	.60 .61 .65 .66	.50 .49 .45 .46		50.0	49.5	89	15.5		
Σ	1.40 1.40	3.34 3.51	2.34 2.33 2.34 2.34	1.28 1.29 1.28 1.27	.94 .92 .96 .99		100.0	99.0	178	31.0		
DC-3	.70 .71	1.66 1.67	1.26 1.10	.66 .62	.43 .52		50.0	49.5	89	15.5		
Dc-4	.70 .69	1.67 1.67	1.00 1.26	.60 .67	.52 .44		50.0	49.5	89	15.5		
Σ	1.40 1.40	3.33 3.34	2.26 2.26	1.28 1.29	.95 .96		100.0	99.0	178	31.0		
DC-AV	1.40	3.53	2.35	1.28	.96		100.0	99.0	178	31.0		
AC-1	.63	1.61	1.03	.55	.38		50.7	48.5	88	15.4		
AC-2	.63	1.61	1.03	.56	.39		50.7	49.0	88	15.5		
Σ	1.26	3.22	2.06	1.11	.77		101.4	97.5	176	30.9		
S. P.	→	+6.7	→	→	→							
AC-N	.18 →	.20	→	→	.173 S.P. .240							
I.C.	→	52.0	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.P.D. Line 2 Spd 1 5½ Field date 2-10-64 Data page_____ Comp. date 2-13-63. Comp by CSL+KH

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	34	45	23	34	45	12	23	34	45	12	23	34
(B) Receive	335	378	229	193	182	149	224	173	203	149	174	169
(C) n separation DC Noise												
(D) I 2100 for all	2100											
(E) Vdc (avg)	23.2	7.58	33.6	9.32	4.48	23.7	9.93	4.19	2.33	8.63	4.79	2.30
(F) DCcal USED	.965											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	32.0	41.8	46.3	51.4	61.7	32.9	57.8	57.8	64.2	47.6	66.0	63.4
(I) Vac Σ	20.8	6.47	30.2	8.41	3.99	22.6	8.78	3.76	2.06	7.98	4.22	2.06
(J) AC noise x 2	.4	.42	.52	.52	.52	.40	.40	.40	.40	.36	.36	.36
(K) Vac(corr) = $\sqrt{I^2 - J^2}$					3.96			3.75	2.02			2.03
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K	1.116	1.171	1.111	1.109	1.130	1.057	1.131	1.119	1.153	1.081	1.135	1.132
(N) PFE=(M-1)(10^2)	12	17	11	11	13	6	13	12	15	8	14	13
(O) MCF=(M-1)(10^5)/H	363	409	240	212	211	173	239	206	238	170	205	208
	1.8	1.3	.5	1.0	1.8	.8	.8	1.9	2.3	1.0	1.7	2.5

Project_____ Line 5 3 Field date 5 6 Data page_____ Comp. date_____ Comp by_____

(A) Send	45	12	23	34	45							
(B) Receive	179	164	215	325	480							
(C) n separation DC Noise		.35	.35	.35	.35							
(D) I	→							1000	1000	1800	800	
(E) Vdc (avg)	1.40	3.53	2.35	1.28	.96			100.0	99.0	178	31.0	
(F) DCcal	→							1.000	1.010	1.011	.968	
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	67.5	48.6	69.8	61.8	74.1							
(I) Vac Σ	1.26	3.22	2.06	1.11	.77							
(J) AC noise x 2	.36	.4	.4	.4	.35							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.21	3.20	2.02	1.035	.686							
(L) AC-DC cal.	→											
(M) ρdc/ρac =ExL/K	1.156	1.102	1163	1238	1399							
(N) PFE=(M-1)(10^2)	16	10	16	24 ?	40 ?							
(O) MCF=(M-1)(10^5)/H	231	210	252	385?	539?							
	3.5	2.2	2.4	3.7	4.3							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: Y SM 1 N½ Date: 2-11-69

Send	2-3	12	34	23	12	45	34	23	12	45	34	23
Receive	12N →		23N →			34N →				45N →		
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	1-2	45	34	23	12							
Receive	→	56N →										
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X5	1X3					
Current	2100	2100	2100	2100	2100	1000	300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE 3

Project: S.O.D. Line: 2 - Spr 1 - N½ Int.Cal Date: 2/11/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N		
Time	30	10	30	10	10	30	10	10	3	10	3	3
DC-1	13.2 14.7	3.95 3.40 3.35 3.52	13.9 14.2 12.9 13.5	5.78 5.38 5.20 5.30	2.47 2.17 2.18 2.40	18.2 18.7	4.21 4.25	2.39 2.25	1.19 1 1.22	5.16 4.28 5.71 5.48	2.05 2.17 2.12 1.97	1.51 1.56 1.28 1.25
DC-2	14.7 13.2	3.35 3.52 3.47 3.62	13.6 13.5 14.1 14.1	5.17 5.25 5.63 5.67	2.20 2.33 2.40 2.24	18.7 18.2	4.25 4.02	2.25 2.38	1.22 1.18	5.28 5.47 5.11 4.95	2.12 1.97 2.02 2.27	1.28 1.25 1.54 1.57
Σ	27.9 27.9	7.70 7.82 7.22 7.30	27.5 27.7 28.0 27.6	10.95 11.02 10.83 10.97	4.67 4.60 4.58 4.64	36.9 36.9	8.56 8.37	4.64 4.63	2.41 2.40	10.46 10.45 10.21 10.43	4.17 4.16 4.14 4.20	2.79 2.81 2.82 2.82
DC-3	13.2 14.7	3.87 3.82 3.47 3.37	14.1 13.5	5.83 5.55 5.20 5.65	2.28 2.14 2.40 2.33	18.2 18.8	4.03 4.25	2.38 2.26	1.18 1.23	5.25 5.06	2.02 1.92 2.15 2.26	1.14 1.28
Dc-4	14.7 13.2	3.47 3.37 3.80 3.92	13.5 14.1	5.40 5.70 5.78 5.37	2.28 2.33 2.35 2.26	18.8 18.1	4.25 4.03	2.26 2.38	1.23 1.17	5.06 5.40	2.15 2.26 1.99 1.87	1.28 1.56
Σ	27.9 27.9	7.30 7.19 7.22 7.29	27.6 27.6	11.23 11.10 10.98 11.02	4.62 4.61 4.75 4.59	37.0 36.9	8.28 8.38	4.64 4.64	2.41 2.40	10.41 10.46	4.17 4.16 4.13 4.17	2.82 2.82
DC-AV	27.9	7.27	27.7	11.01	4.64	36.9	8.37	4.64	2.40	10.43	4.16	2.82
AC-1	12.8	3.09	12.7	4.78	2.00	17.5	3.81	2.01	1.11	4.82	1.95	1.32
AC-2	12.8	3.10	12.7	4.79	2.00	17.5	3.81	2.03	1.11	4.81	1.94	1.35
Σ	25.6	6.19	25.4	9.57	4.00	35.0	7.62	4.04	2.22	9.63	3.89	2.67
S. P.	+4.9 →	→	.20 +6.9	→	→	+12.5	→	→	→	-16.3	→	
AC-N	.29 →	→	.43	→	→	.38	→	.44	→	.59	→	.49
I. C.	50.7	→	50.5	→	→	5.04	→	→	→	50.4		

S. P. 0-1N is -7.3

INDUCED POLARIZATION - RECEIVER NOTES PAGE 4

Project: S.O.D. Line: 2-Spr 1 - N½ Int.Cal _____ Date: 2/11/64

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6N	→	→	→		4-5					
Time	3	10	3	3	3		100	30				
DC-1	.81 .83	4.05 2.77 2.49 1.77	1.12 1.23	1.07 .87	.90 .63		49.7	15.0				
DC-2	.83 .81	2.49 1.77 2.00 2.81	1.22 1.07	.87 1.07	.63 .68		49.5	15.0				
Σ	1.64 1.64	4.54 4.54 4.49 4.58	2.34 2.30	1.88 1.90	1.93 1.31		99.2	30.0				
DC-3	.81 .86	2.58 2.62 1.92 1.83	1.07 1.27	1.07 .86	.68 .66		49.7	15.0				
Dc-4	.83 .78	1.92 1.83 2.62 2.77	1.26 1.05	.86 1.05	.66 .68		49.5	15.0				
Σ	1.64 1.64	4.50 4.45 4.58 4.60	2.33 2.32	1.89 1.91	1.34 1.34		99.2	30.0				
DC-AV	1.64	4.54	2.32	1.90	1.33		99.2	30.0				
AC-1	.96	2.15	1.18	.98	.78		50.0	14.9				
AC-2	.98	2.15	1.20	1.02	.76		50.0	14.9				
Σ	1.94	4.30	2.38	2.00	1.54		100.0	29.8				
S. P.	.26 noise →	.40 → +9.2 →	→	.33 →	→							
AC-N	.68 →	.64 →	→	.63 →	.61							
I.C.	→	50.5	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.D. Line 2 Sp.1 1N½ Field date 2-11-63 Data page_____ Comp. date 2-13-63. Comp by CSL + KH

(A) Send	23	12	34	23	12	45	34	23	12	45	34	23
(B) Receive												
(C) n separation												
(D) I	2100											
(E) Vdc (avg)	27.9	7.27	27.7	11.01	4.64	36.9	8.37	4.64	2.40	10.43	4.16	2.82
(F) DCcal USED	1.000											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρdc=ExFxGx10^3/D	39.9	41.6	39.6	63.0	66.4	52.7	42.9	66.4	68.7	59.7	59.5	80.7
(I) Vac Σ	25.6	6.19	25.4	9.57	4.00	35.0	7.62	4.04	2.22	9.67	3.89	2.67
(J) AC noise x 2	.58	→	.86	→	→	.70	→	.88	→	1.18	→	1.34
(K) Vac(corr) = $\sqrt{I^2 - J^2}$					3.95		7.58	3.94	2.04	9.60	3.72	2.36
(L) AC-DC cal. 1.000												
(M) ρdc/ρac=ExL/K	1.090	1.174	1.090	1.150	1.174	1.054	1.104	1.179	1.178	1.088	1.118	1.194
(N) PFE=(M-1)(10^2)	9	17	9	15	17	5	10	18	18	9	12	19
(O) MCF=(M-1)(10^5)/H	225	415	228	238	262	102	218	269	259	147	198	240

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	45	34	23	12							
(B) Receive												
(C) n separation												
(D) I	→	→	→	→	→			900				
(E) Vdc (avg)	1.64	4.54	2.32	1.90	1.33		99.2	30.0				
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρdc=ExFxGx10^3/D	82.1	64.9	66.4	95.1	106							
(I) Vac Σ	1.94	4.30	2.38	2.00	1.54							
(J) AC noise x 2	1.38	1.28	→	1.26	1.22							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.38	4.10	2.005	1.555	.943							
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.189	1.109	1156	1220	1.411							
(N) PFE=(M-1)(10^2)	15	11	16	22	41							
(O) MCF=(M-1)(10^5)/H	230	168	235	231	388							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: Y Spd 2 S½ Date: 2-11-64

Send	34	45	23	34	45	12	23	34	45	12	23	34
Receive	123 →		223		→	345			→			
Time												
Range	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5	2x10.5
Current	2100	2100	2101	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	46											
Receive												
Time												
Range	2x10.5											
Current	2100											

INDUCED POLARIZATION - RECEIVER NOTES PAGE 7

Project: S.O.D. Line: 2-Spr. 2-S½ Int.Cal _____ Date: 2/12/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-25	→	2-35	→	→	3-45	→	→	→	4-55	→	→
Time	30	10	30	10	10	30	10	3	3	10	10	3
DC-1	18.5 17.8	5.9 5.97	11.2 18.7	5.20 5.34	2.40 2.40	17.2 17.4	4.98 4.99	1.97 2.00 2.07 2.04	1.09 1.06 1.11 1.14	6.20 6.62	2.70 2.60	1.28 1.31
DC-2	17.7 18.4	5.96 5.97	18.7 19.2	5.34 5.21	2.40 2.38	17.4 17.1	4.99 4.99	2.07 2.04 1.97 1.98	1.11 1.14 1.08 1.07	6.62 6.22	2.60 2.68	1.31 1.27
Σ	36.2 36.2	11.95 11.94	37.9 37.9	10.54 10.55	4.80 4.78	34.6 34.5	9.95 9.95	4.03 4.04 4.04 4.02	2.20 2.20 2.19 2.17	12.84 12.84	5.70 5.28	2.59 2.58
DC-3	18.4 17.7	5.97 5.99	19.2 18.6	5.28 5.25 5.24 5.27	2.24 2.22 2.52 2.47	17.0 17.4	4.99 4.99	1.97 1.93 2.06 2.05	1.08 1.07 1.11 1.15	6.22 6.64	2.68 2.70	1.27 1.33 1.32 1.31
Dc-4	17.7 18.5	5.99 5.96	18.6 19.2	5.25 5.27 5.26 5.22	2.52 2.47 2.22 2.21	17.4 17.1	4.99 4.99	2.06 2.05 1.93 2.00	1.10 1.13 1.06 1.02	6.64 6.21	2.58 2.59	1.32 1.33 1.26 1.36
Σ	36.2 36.2	11.95 11.95	37.8 37.8	10.52 10.52 10.55 10.49	4.74 4.69 4.74 4.68	34.5 34.5	9.97 9.97	4.03 4.04 4.04 4.05	2.18 2.18 2.17 2.17	12.84 12.85	5.28 5.29	2.59 2.59 2.58 2.58
DC-AV	36.2	11.95	37.8	10.52	4.74	34.5	9.97	4.02	2.18	12.84	5.28	2.58
AC-1	17.6	5.77	18.4	5.14	2.33	16.7	4.77	1.96	1.08	6.07	2.47	1.27
AC-2	17.7	5.75	18.5	5.16	2.35	16.7	4.77	1.95	1.09	6.06	2.48	1.25
Σ	35.3	11.52	36.9	10.30	4.68	33.4	9.54	3.91	2.17	12.13	4.95	2.52
S. P.	-7.4	→	+17.9	→	→	-11.7	→	→	→	-5.3 .06	→	→
AC-N	.55	→	.55	→	→	.43	→	→	→	.39	→	→
I.C.	50.6	→	50.6	→	→	50.5	→	→	→	-5.05	→	→

S. P. 0-15 + 0.6

INDUCED POLARIZATION - RECEIVER NOTES PAGE 8

Project: S.O.D. Line: 2 Sp. 2-5½ Int.Cal _____ Date: 2/12/[illegible]

Send	4-5	1-2	2-3	3-4	4-5		C A2					
Rec.	→	5-6.5			→		1-2					
~~Time~~ Range	3	10	3	3	3							
DC-1	.78 .77	2.13 2.43	1.18 1.06 1.07 1.58	.54 .57 .61 .67	.35 .64 .46 .38							
DC-2	.73 .79	2.43 2.13	1.06 1.18 1.21 1.13	.65 .62 .62 .53	.43 .35 .33 .40							
Σ	1.51 1.52	4.56 4.56	2.34 2.24 2.28 2.16	1.19 1.15 1.23 1.16	.78 .74 .79 .78							
DC-3	.79 .87	2.13 2.58	1.21 1.22 1.00 1.32	.65 .53 .62 .37	.34 .32 .42 .39							
Dc-4	.75 .79	1.43 2.04	.98 1.02 1.22 .95	.53 .51 .50 .57	.43 .37 .33 .33							
Σ	1.54 1.51	4.56 4.56	2.19 2.24 2.22 2.25	1.18 1.10 1.15 1.10	.71 .69 .75 .72							
DC-AV	1.52	4.56	2.25	1.15	.75							
AC-1	.78	2.07	1.08	.57	.40							
AC-2	.79	2.07	1.08	.58	.41							
Σ	1.57	4.14	2.16	1.15	.81							
S. P.	.06 →	+2.6	→	→	→							
AC-N	.36 →	.28	.23	.22	.24							
I.C	→	5.04	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line 2 spd 25½ Field date 2-12-64 Data page_____ Comp. date 2-13-64. Comp by CSL+KH

(A) Send	34	45	23	34	45	12	23	34	45	12	23	34
(B) Receive												
(C) n separation												
(D) I 2100												
(E) Vdc (avg)	36.2	11.95	37.8	10.52	4.74	34.5	9.97	4.02	2.18	12.84	5.28	2.58
(F) DCcal USED	1.000											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	51.7	69.4	54.0	60.3	67.8	49.3	57.1	57.4	62.3	73.5	75.5	73.7
(I) Vac Σ	35.3	11.52	36.9	10.30	4.68	33.4	9.54	3.91	2.17	12.13	4.95	2.52
(J) AC noise x 2				1.10 →				.86 →			.78	
(K) Vac(corr) = $\sqrt{I^2 - J^2}$				10.28	4.55			3.82	1.992		4.92	2.39
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K	1.026	1.037	1024	1025	1041	1032	1045	1051	1.092	1059	1.072	1080
(N) PFE=(M-1)(10^2)	3	4	2	3	4	3	5	5	9	6	7	8
(O) MCF=(M-1)(10^5)/H	50	53	44	41	60	65	79	89	147	80	95	108

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	45	12	23	34	45							
(B) Receive												
(C) n separation												
(D) I												
(E) Vdc (avg)	1.52	4.56	2.25	1.15	.75							
(F) DCcal	→											
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	76.0	65.1	64.3	57.5	60.0							
(I) Vac Σ	1.57	4.14	2.16	1.15	.81							
(J) AC noise x 2	.72	.56	46	44	48							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.40	4.10	2.11	1.06	.645							
(L) AC-DC cal.	→											
(M) ρdc/ρac =ExL/K	1086	1.111	1.068	1.085	1.162?							
(N) PFE=(M-1)(10^2)	9	11	7	9	16?							
(O) MCF=(M-1)(10^5)/H	113	171	106	148	270?							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: Y spd 2 N3 Date: 3-12-64

Send	23	12	34	23	12	45	34	23	12	45	34	23
Receive	1LN →		23N		→	34N			→	4GN		
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5
Current	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00	2/00

Send	12	45	34	23	12	C4						
Receive	→	5GN			→	45	→					
Time												
Range	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X5	1X3					
Current	2/00	2/00	2/00	2/00	2/00	500	300					

$$\frac{300 - 30}{300 + 30}$$

$$\frac{270}{330}$$

INDUCED POLARIZATION - RECEIVER NOTES PAGE 5

Project: S.O.D. Line: 2 - Sec. 2 - N½ Int.Cal 180 Date: 2/12/84

Send	1-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2N	→	2-3N	→	→	3-4N	→	→	→	4-5N	→	→
Time	30	10	30	10	10	30	10	10	3	10	10	3
DC-1	16.9 19.1	5.74 5.95	15.9 16.8	4.82 4.97	2.54 2.58	21.0 20.1	4.22 4.40	2.17 2.02	1.17 1.16	5.75 5.72	2.05 2.08	1.37 1.60 1.39 1.4
DC-2	17.1 16.3	5.98 5.85 5.97 5.64	15.4 15.4	4.78 4.75	2.32 2.32	20.1 21.0	4.39 4.24	2.02 2.02	1.16 1.16	5.60 5.61	2.05 2.07	1.41 1.49 1.39 1.48
Σ	33.4 35.4	11.96 11.80 11.96 11.80	31.3 31.8	9.60 9.72	4.86 4.86	41.1 41.1	8.61 8.64	4.19 4.19	2.65 2.60	11.35 11.33	4.10 4.16	2.91 2.65 2.85 2.97
DC-3	16.3 16.2 16.8 16.7	5.46 5.46	15.0 16.4	4.34 4.35	2.28 2.30	21.2 19.8	4.33 4.23	2.17 2.02	1.23 1.20	5.67 5.73	2.00 2.06	1.34 1.45 1.34 1.45
Dc-4	16.8 16.9 16.2 16.7	5.42 5.47	15.0 15.4	4.60 4.60	2.54 2.56	19.8 21.0	4.32 4.42	2.02 2.17	1.19 1.22	5.73 5.61	2.06 2.00	1.32 1.45 1.34 1.45
Σ	33.0 33.6	10.92 10.93	29.9 31.8	9.19 9.20	4.83 4.87	40.8 40.8	8.65 8.67	4.19 4.19	2.42 2.46	11.39 11.34	4.06 4.06	2.66 2.90 2.77 2.90
DC-AV	33.2	12.00	29.8	9.58	4.85	40.9	8.64	4.19	2.62	11.34	4.08	2.70
AC-1	16.0	5.77	14.4	4.65	2.32	20.1	4.17	2.02	1.27	5.56	1.97	1.30
AC-2	16.0	5.77	14.6	4.67	2.32	20.1	4.16	2.02	1.28	5.56	1.97	1.30
Σ	32.0	11.54	28.8	9.32	4.64	40.2	8.33	4.05	2.55	11.12	3.94	2.60
S. P.	-1.2	→	-1.6	→	→	+0.9 -.71	→	→	→	+2.6 -.37		
AC-N	.24	→	.24	→	→	.22	→	→	.21	.27	→	.34
±.C.	50.7	→				50.4			→	50.5	→	

S.P. 0-1N +2.0

INDUCED POLARIZATION - RECEIVER NOTES PAGE 6

Project: S.O.D. Line: 2-Spec 2-N½ Int.Cal _____ Date: 2/12/64

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6N	→	→	→		4-5	→				
~~Time~~ Range	3	10	10	3	3		100	30				
DC-1	.92 1.04 1.00 .86	5.40 5.17	2.37 2.30	1.32 1.18 1.56 1.63	1.24 1.28		49.5	14.9				
DC-2	.98 .88 .95 1.07	5.17 5.35	2.30 2.23	1.57 1.64 1.39 1.64	1.29 1.24		49.7	15.0				
Σ	1.90 1.92 1.95 1.93	10.57 10.52	4.53 4.53	3.29 3.32 3.35 3.27	2.52 2.52		99.2	29.9				
DC-3	.95 .96 .97 .92	5.19 5.52	2.26 2.13 2.24 2.37	1.51 1.29 1.76 1.55	1.32 1.18		49.5	14.9				
Dc-4	.97 .98 .97 1.03	5.39 5.05	2.22 2.37 2.26 2.20	1.75 1.56 1.54 1.30	1.18 1.32		49.7	15.0				
Σ	1.92 1.94 1.94 1.95	10.54 10.57	4.48 4.50 4.50 4.57	3.26 3.25 3.30 3.25	2.50 2.50		99.2	29.9				
DC-AV	1.93	10.56	4.51	3.29	2.51		99.2	29.9				
AC-1	.89	5.17	2.21	1.64	1.24 .64		50.0	14.9				
AC-2	.90	5.18	2.21	1.63	1.36 .66		50.0	14.9				
Σ	1.79	10.35	4.42	3.27			100.0	29.8				
S. P.	→	+6.1 .37	→	→	→							
AC-N	.32 →	.21	→	.61	.64							
I.C.	→	50.3	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line 2 spd 2 N½ Field date 2-12-64 Data page_____ Comp. date 2-13-64. Comp by CSL+KH

(A) Send	23	12	34	23	12	45	34	23	12	45	34	23
(B) Receive												
(C) n separation												
(D) I	2100											
(E) Vdc (avg)	33.2	12.00	29.8	9.58	4.85	40.9	8.64	4.19	2.62	11.34	4.07	2.70
(F) DCcal USED	1.000											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	47.4	68.7	42.5	54.4	69.3	58.4	49.4	59.8	74.9	65.0	58.3	77.2
(I) Vac Σ	32.0	11.54	28.8	9.32	4.64	40.2	8.33	4.05	2.55	11.12	3.94	2.60
(J) AC noise x 2					.48			.44	.42		.54	.68
(K) Vac(corr) = $\sqrt{I^2 - J^2}$					4.62			4.03	2.52		3.90	2.51
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K	1,038	1039	1035	1028	1044	1018	1038	1039	1040	1020	~~1046~~ 1035	~~1075~~ 1079
(N) PFE=(M-1)(10^2)	4	4	4	3	4	2	4	4	4	2	4	4
(O) MCF=(M-1)(10^5)/H	80	57	83	51	64	31	77	65	54	31	60	51

Project SAA Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	45	34	23	12							
(B) Receive												
(C) n separation												
(D) I												
(E) Vdc (avg)	1.93	10.56	4.51	3.29	2.51							
(F) DCcal												
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	96.5	151	129	164	201							
(I) Vac Σ	1.79	10.35	4.42	3.27	2.48	2.72						
(J) AC noise x 2	.64	—	.42	1.21	1.28	1.72						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.68		4.40	2.94	2.15	2.11						
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K	~~1149~~ 1079	1020	1024	1119	1168	1189						
(N) PFE=(M-1)(10^2)	8?	2	2	12?	17	15?						
(O) MCF=(M-1)(10^5)/H	82	13	19	73	83							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: Y spr 3 S½ Date: 3-19-64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Receive	→		→			→			→			
Time	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5
Range												
Current	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Send	4-5	1-2	2-3	3-4	4-5		CA<					
Receive	→		→				1-2					
Time	2X10.5	2X10.5	2X10.5	2X10.5	2X10.5		1X3					
Range	2100	2100	2100	2100	2100		300					
Current												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: SOD Line: y spd 3 5½ Int.Cal 51.0 Date: 3-19-64

Send	34	45	23	34	45	12	23	34	45	12	23	34
Rec.	12S →		23S		→	34S →			→	45S		
Time	30	10	30	10	3	30	3	3	1(X)	3	1(X)	1(X)
DC-1	10.8 10.8 10.3 10.3	2.23 2.22 2.90 3.00	9.5 9.3 9.2 9.2	2.25 2.85 2.80 2.20	1.20 1.5 1.05 1.20	13.8 12.7 12.8 14.0	1.90 1.95 1.87 1.84	.88 .83 .82 .80	.44 .44 .46 .47	2.45 2.52 1.78 1.75	.76 .68 .67 .81	.32 .35 .47 .42
DC-2	10.8 10.3 10.3 10.8	2.90 3.10 2.30 2.25	9.2 9.2 9.3 9.3	2.80 2.85 2.30 2.25	1.05 1.20 1.15 1.10	12.8 12.8 13.8 13.8	1.87 1.84 1.54 1.90	.82 .80 .82 .85	.46 .47 .45 .44	1.78 1.76 2.48 2.54	.67 .80 .65 .56	.47 .42 .37 .30
Σ	21.1 21.1 21.1 21.1	5.13 5.22 5.20 5.25	18.7 18.5 18.5 18.5	5.05 5.05 5.10 5.10	2.25 2.35 2.20 2.30	26.6 26.7 26.6 26.6	3.77 3.79 3.81 3.74	1.67 1.63 1.64 1.65	.90 .91 .91 .91	4.23 4.27 4.26 4.27	1.42 1.40 1.32 1.36	.79 .77 .84 .72
DC-3	10.3 10.8 10.8 10.3	2.30 2.25 3.00 2.95	9.3 9.3 9.25 9.2	2.30 2.25 2.90 2.90	1.15 1.10 1.15 1.15	13.8 13.8 12.8 12.6	1.94 1.90 1.85 1.82	.82 .85 .83 .76	.45 .44 .47 .47	2.48 2.54 1.76 1.72	.65 .56 .75 .83	.37 .30 .41 .50
Dc-4	10.8 10.3 10.3 10.8	3.50 2.95 2.22 2.30	9.0 9.2 9.5 9.4	2.90 2.90 2.20 2.30	1.15 1.15 1.15 1.10	12.8 12.6 14.0 14.0	1.85 1.82 1.95 1.98	.83 .75 .82 .87	.47 .47 .44 .46	1.76 1.72 2.52 2.54	.75 .83 .60 .52	.41 .50 .35 .32
Σ	21.1 21.1 21.1 21.1	5.30 5.20 5.22 5.25	18.5 18.5 18.5 18.6	5.20 5.15 5.10 5.20	2.30 2.25 2.20 2.25	26.6 26.4 26.8 26.6	3.79 3.72 3.80 3.80	1.65 1.62 1.65 1.62	.92 .91 .91 .93	4.24 4.26 4.28 4.26	1.40 1.33 1.35 1.35	.79 .82 .76 .82
DC-AV	21.1	5.22	18.5	5.12	2.27	26.6	3.78	1.64	.91	4.26	1.37	.79
AC-1	10.1	2.47	8.80	.240	1.06	12.7	1.80	.76	.43	2.03	.67	.37
AC-2	10.1	2.47	8.80	2.42	1.07	12.8	1.80	.77	.43	2.03	.67	.37
Σ	20.2	4.94	17.60	4.82	2.13	25.5	3.60	1.53	.86	4.06	1.34	.74
S. P.	+13.2 →		-29.7			+6.7 →				+2.4 →		
AC-N	.02 →		.03 →			.03 →				.03		

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: SDD Line: y spd 3 S½ Int.Cal 51.0 Date: 3-19-64

Send	45	12	23	34	45		Cal					
Rec.	→	56s	→	→	→		12					
Time	1	3	1	1	1		30					
DC-1	.29 .21 .18 .27	.78 .77 .60 .66	.34 .34 .33 .30	.24 .17 .21 .27	.14 .11 .16 .18		14.9					
DC-2	.18 .27 .30 .23	.10 .66 .75 .84	.33 .30 .36 .38	.21 .27 .23 .17	.16 .18 .12 .16		14.9					
Σ	.47 .48 .48 .50	1.38 1.43 1.35 1.50	.67 .64 .69 .68	.46 .46 .44 .44	.30 .29 .28 .33		29.8					
DC-3	.30 .23 .19 .27	.76 .84 .67 .53	.36 .38 .33 .30	.23 .17 .19 .29	.12 .16 .18 .16		14.9 14.9					
Dc-4	.19 .27 .30 .23	.69 .53 .77 .85	.33 .36 .34 .38	.19 .29 .27 .17	.14 .18 .11 .16							
Σ	.49 .48 .49 .48	1.42 1.37 1.49 1.38	.69 .68 .67 .68	.42 .46 .46 .48	.30 .30 .29 .31		29.8					
DC-AV	.48	1.41	.675	.45	.30		29.8					
AC-1	.22	.65	.32	.21	.14		14.5					
AC-2	.23	.65	.33	.21	.14		14.5					
Σ	.45	1.30	.65	.41	.28		29.0					
S. P.	→	-6.0	→	→	→							
AC-N	→	.03	.03	.03	.03							

T16 2 SP 0 - 2N

130
157
235 125
34R 155
126
165
122
157
127
162
115

170
177
168
184
165
176
125 174
34R
172
174
185
160
173

152
174
154
345 178
45R 152
175
155

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line y spd 3 s½ Field date 3-19-64 Data page_____ Comp. date 3-20-64. Comp by HKH

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	34	45	23	34	45	12	23	34	45	12	23	34
(B) Receive	1-25	→	235	→	→	345	→	→	→	455	→	→
(C) n separation Range	20	50	42	48	6	24	-	0	108	–	0	111
(D) I	2100	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	211	5.22	18.5	5.12	2.27	26.6	37.8	1.64	.91	4.26	1.37	.79
(F) DCcal 1,000	→	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	30.2	29.9	26.4	29.3	32.4	38.0	21.6	23.4	26.0	24.4	19.6	22.6
(I) Vac Σ	20.2	4.92	17.6	4.82	2.13	25.5	3.60	15.3	.86	4.06	1.34	.74
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	0.973	→	→	→	→	→	→	→	1.031	→	1.030	1.030
(M) ρ dc/ρac=ExL/K	1.016	1.033	1.022	1.033	1.037	1.016	1.021	1.042	1.091	1.020	1.052	1.100
(N) PFE=(M-1)(10^2)	2	3	2	3	4	2	2	4	9	2	5	10
(O) MCF=(M-1)(10^5)/H	53	111	87	113	114	42	97	179	350	82	265	443
	1.0 0.6	1.8 1.5	1.1 1.4	1.9 1.4	3.5 0.2	1.7 0.9	2.7 -0.6	4.2 0.0	6.3 2.8	2.3 -0.3	5.2 0.0	7.5 2.5

Project_____ Line 5 3 Field date 5 6 Data page_____ Comp. date_____ Comp by_____

(A) Send	45	12	23	34	45		64					
(B) Receive	→	565	→	→	→							
(C) n separation Range	–	20	–	67	–							
(D) I	→	→	→	→	→							
(E) Vdc (avg)	.48	1.41	.675	.45	.30		29.8					
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	24.0	20.2	19.3	22.5	24.0							
(I) Vac Σ	.45	1.30	.65	.41	.28		29.0					
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.031	.972	1.031	→	→		.973					
(M) ρdc/ρac =ExL/K	1.100	1.054	1.069	1.171	1.106							
(N) PFE=(M-1)(10^2)	10	5	7	17	11							
(O) MCF=(M-1)(10^5)/H	417	267	358	583	442							
	10.5 -0.5	5.0 0.2	8.8 -1.7	11.7 1.5	14.5 -0.5							

INDUCED POLARIZATION SENDER NOTES

Project: S.O.D. Line: Y-Spr. 3-N2 Date: 7-20-64

Send	2-3	1-2	2-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	2-4	2-3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	2100	→	→	→	→	→	→	→	→	→	→	→
Send	1-2	4-5	2-4	2-3	1-2		6-4					
Receive	→	→	→	→	→		4-5					
Time												
Range												
Current	→	→	→	→	→		700					

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: SOD Line: Y spl 3 N½ Int.Cal 51.8 Date: 3-20-64

Send	23	12	34	23	12	45	34	23	12	45	34	23
Rec.	12N →		23N →			34 →				45 →		
Time	30	10	10	11	3	30	10	3	3	10	3	3
DC-1	9.9 9.8 9.8 9.8	2.60 2.64 2.77 2.62	5.4 5.18 5.2 5.4	268 262 248 260	143 115 190 126	11.8 11.8 11.8 11.7	2.9 4.1 4.0 2.9	1.35 1.37 1.01 1.55	.52 .62 .92 .57	3.50 3.50 4.40 4.20	1.90 1.82 1.77 1.78	.86 .78 .86 .95
DC-2	9.8 9.80 9.9 9.9	2.77 2.70 2.62 2.62	5.2 5.4 5.28 5.24	258 260 252 278	130 126 106 119	11.8 11.7 11.8 11.8	4.0 3.1 3.1 4.1	1.58 1.55 1.22 1.16	.67 .67 .80 .80	4.40 3.36 3.45 3.44	1.97 1.82 1.90 1.82	.86 .95 .84 .75
Σ	19.7 19.6 19.7 19.7	5.37 5.26 5.39 5.32	10.60 10.58 10.48 10.64	5.16 5.22 5.10 5.38	2.33 2.41 2.36 2.41	23.5 23.5 23.5 23.5	6.9 7.0 7.1 7.1	2.42 2.38 2.30 2.71	1.44 1.29 1.47 1.47	7.90 7.70 7.85 7.80	3.67 3.60 3.67 3.64	1.72 1.73 1.70 1.70
DC-3	9.9 9.9 9.8 9.8	2.62 2.62 2.58 2.65	5.2 5.24 5.44 5.40	282 278 241 242	106 119 130 120	11.8 11.8	3.1 4.0 3.9 2.9	1.22 1.16 1.58 1.58	.80 .80 .92 .68	3.45 3.44 4.20 3.38	1.90 1.82 1.78 1.86	.84 .75 .92 .96
Dc-4	9.8 9.8 9.8 9.8	2.55 2.65 2.72 2.62	5.44 5.40 5.18 5.20	241 242 262 278	130 120 115 115	11.8 11.6	3.9 2.9 2.9 4.0	1.58 1.58 1.33 1.33	.92 .68 .62 .78	4.20 3.38 3.50 4.40	1.78 1.86 1.87 1.82	.92 .96 .78 .75
Σ	19.7 19.7 19.7 19.6	5.20 5.27 5.27 5.27	10.64 10.64 10.58 10.60	5.23 5.20 5.03 5.20	2.36 2.39 2.45 2.35	23.6 23.4	7.0 6.9 6.8 6.9	2.90 2.72 2.91 2.91	1.72 1.48 1.54 1.46	7.65 7.82 7.70 7.78	3.68 3.68 3.65 3.65	1.76 1.71 1.70 1.71
DC-AV	19.7	5.25	10.60	5.19	2.365	23.55	7.04	2.81	1.473	7.775	3.66	1.72
AC-1	9.70	2.55	5.2	2.48	1.14	11.5	3.38	1.34	.70	3.80	1.75	.79
AC-2	9.65	2.55	5.2	2.50	1.14	11.5	3.40	1.34	.68	3.78	1.76	.79
Σ	19.35	5.10	10.4	4.98	2.28	23.0	6.78	2.68	1.38	7.58	3.50	1.58
S. P.	+10.3	+10.2	-11.3 →			-.66 →				+2.7 →		
AC-N	.04 →		.03 →			.03 →				.03 →		

		S 45	34	23	
	,53	R 56	,82	,45	,44
S 12	,49	170	1,05	,44	,56
R 45	,54	172	,85	,40	,43
	,53	165	,98	,67	,58
	,56	180	,76	,49	,38
	,48	175	,95	,50	,52
	,55	165	,85	,43	,43
	,49	170	1,03	,51	,51
	,52	178	,86	,42	
	,50	164	1,04	,52	
	,56	172	,75	,49	
	,51	178	1,15	,50	
	,60	177	,70	,20	
	,42	163	,95	,68	
		174	,88		
			1,15		
			,65		

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: SOD Line: X 5D/3 N-2 Int.Cal 5.1 Date: 3-20-69

Send	12 #	45 #	34 #	23 #	12		cd						
Rec.	→	56			→								
Time	1	3	3	1									
DC-1	.43 .39 .60 .66	1.45 1.70 1.95 1.68	1.96 .98 1.85 .92	1.50 .49 .45 1.52			16.0 16.1						
DC-2	.66 .66 .41 .33	1.75 1.70 1.70 1.80	1.98 .92 1.68 1.95	1.45 .52 .52 .52			15.1 15.0						
Σ	1.03 1.05 1.07 .99	3.40 3.38 3.95 3.50	1.92 1.90 1.96 1.87	.95 1.01 .97 1.04			30.1 30.1						
DC-3	.41 .33 .65 .70	1.70 1.80 1.74 1.76	.98 .95 .75 1.78	.52 .52 .44 .41			15.0 16.0						
Dc-4	.65 .70 .39 .35	1.79 1.70 1.68 1.60	.75 .78 .98 1.00	.44 .41 .49 .56			15.0 15.0						
Σ	1.05 1.03 1.04 1.05	3.44 3.85 3.42 3.35	1.83 1.83 1.83 1.79	.96 .93 .93 .97			30.05						
DC-AV	1.038	3.46	1.83 1.72 1.805	.97			14.9						
AC-1	.49	1.53	.78	.43			15.0						
AC-2	.49	1.54	.80	.43			29.9						
Σ	.98	3.07	1.58	.86									
S. P.	→	30			→								
AC-N	.03												

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INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line y spd 3N½ Field date 3-20-64 Data page_____ Comp. date 3-20-64. Comp by UKH

	1	2	1	2	3	1	2	3	4	2	3	4
(A) Send	23	12	34	23	12	45	34	23	12	45	34	23
(B) Receive	12N →		23N →			34N →				45N →		
(C) n separation	28	60	20	71	33	42	65	60	71	29	50	114
(D) I	2100											
(E) Vdc (avg) 1.000												
(F) DCcal	19.7	5.29	10.60	5.19	2.365	23.55	7.04	2.81	1.473	7.775	3.66	1.72
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	28.2	30.2	15.2	29.7	33.8	33.7	40.2	40.2	42.1	44.4	52.7	49.2
(I) Vac Σ	19.35	5.10	10.40	4.98	2.28	23.0	6.78	2.68	1.38	7.58	3.50	1.58
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1.000											
(M) ρ dc/ρac=ExL/K	1.018	1.036	1.020	1.041	1.039	1.022	1.039	1.049	1.068	1.026	1.046	1.089
(N) PFE=(M-1)(10^2)	2	4	2	4	4	2	4	5	7	3	5	9
(O) MCF=(M-1)(10^5)/H	64	119	132	138	115	65	97	122	161	59	88	181
	1.0	1.8	1.7	2.0	2.8	.8	1.3	2.5	3.8	1.3	2.0	3.3
	0.8	1.8	0.3	2.1	1.1	1.4	2.6	2.4	2.0	1.2	2.6	5.6

Project_____ Line 3 Field date 5 6 Data page_____ Comp. date_____ Comp by_____

(A) Send	12	45	34	23	12							
(B) Receive		56N →										
(C) n separation	152	210	219	310								
(D) I							700					
(E) Vdc (avg)	1.038	3.46	1.805	.97			70.05					
(F) DCcal												
(G) Kn x 10^{-3}	105	30	60	105	128							
(H) ρ dc=ExFxGx10^3/D	51.9	49.5	51.6	48.5								
(I) Vac Σ	.98	3.07	1.58	.86			29.9					
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.060	1.000	1.000	1.060								
(M) ρdc/ρac =ExL/K	1.122	1.124	1.142	1.197								
(N) PFE=(M-1)(10^2)	12	12	14	20								
(O) MCF=(M-1)(10^5)/H	235	251	275	406								
	4.3	2.0	3.0	4.7								
	7.0	11.8	11.2	15.0								

INDUCED POLARIZATION SENDER NOTES

Project: S.O.D. Line: 1A - Spr. 1 - E½ Date: 4/20/69

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→		→		→				→			
Time	2x1000	2x1000	2x1000	2x1000	2x1000	2x1000	2x1000	2x1000	2x1000	2x1000	2x1000	2x1000
Range	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Current	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Send	1-2	4-5	3-4	2-3	1-2	CAL						
Receive	→	→			→	4-5						
Time	2x1000	2x1000	2x1000	2x1000	2x1000	1 x 3						
Range	2.0	2.0	2.0	2.0	2.0	30						
Current	2000	2000	2000	2000	2000	300						

S.O.D. LINE 2-A SPR / WEST END

3-4 - 1800
4-5 - 2000

2-3 - 2000
3-4 - 1800
4-5 2000

1-2 2000
2-3 2000
3-4 2000
4-5 2000

1-2 2000
2-3
3-4
4-5

1-2 2000
2-3 1600
3-4 1600
4-5 2000

CAL 300 1-2

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: S.O.D. Line: 1A - Gr. 1 - E½ Int.Cal _____ Date: 9/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	1-2E	→	2-3E		→	3-4E	→		→	4-5E		
Time	30	10	30	10	3	30	10	3	1	3	3	1
DC-1	10.7	2.17 2.27	11.0	2.20 2.16	1.07 .87 1.05 1.06	10.6	1.94 2.36	.81 .57 .88 .95	.519 .29 .578 .59	1.60 1.83 1.61 1.96	.65 .58 .93 .72	.42 .41 .53 .61
DC-2	11.7	2.35 2.22	11.3	2.33 2.39	.85 1.05 .87 .89	10.0	2.33 1.93	.95 .91 .92 .87	.585 .61 .645 .63	1.79 1.83 1.74 1.70	.73 .75 .95 .72	.71 .79 .57 .39
Σ	22.4	4.52 4.49	22.3	4.53 4.55	1.88 1.88 1.92 1.90	20.6	4.31 4.29	1.76 1.75 1.76 1.62	1.105 1.07 1.100 1.02	3.39 3.46 3.39 3.42	1.41 1.36 1.77 1.46	1.13 1.20 .94 .80
DC-3	11.7	2.38 2.41 2.19 2.02	11.3	2.33 2.23 2.37 2.36	.93 .92 .97 1.00	10.0	2.06 2.09 2.22 2.27	.88 .87 1.04 1.05	.585 .64 .630 .60	1.95 1.89 1.9 1.86	.92 .57 .63 .60	.67 .79 .69 .71
Dc-4	10.7	2.25 2.00 2.23 2.42	11.0	2.16 2.33 2.19 2.12	.88 .97 .88 .87	10.6	2.33 2.33 1.99 1.87	.96 .99 .77 .76	.600 .60 .670 .67	1.56 1.77 1.95 1.81	.84 .75 .88 .50	.117 .097 .07 .05
Σ	22.4	4.53 4.41 4.46 4.40	22.3	4.49 4.56 4.54 4.48	1.81 1.89 1.85 1.87	20.6	4.42 4.26 4.26 4.20	1.54 1.86 1.81 1.79	1.205 1.03 1.00 1.03	3.54 3.51 3.59 3.5	1.76 1.29 1.65 1.25	1.80 1.32 1.39 1.39
DC-AV	22.4	4.48	22.3	4.52	1.87	20.6	4.27	1.80	1.039	3.58	1.40	.79
AC-1	10.8	2.11	10.9	2.11	0.85	9.9	2.00	0.81	.882	1.70	.64	.362
AC-2	10.8	2.12	10.9	2.12	0.86	9.9	2.01	0.82	.884	1.71	.64	.363
Σ	21.6	4.23	21.8	4.23	1.71	19.8	4.01	1.63	.966	3.41	1.28	.725
S. P.	+9.8	→	+4.1	→		+8.3			→	-6.3		
C-N	.09		3 cpe	→		.05	3 cpe		→	.07 2 cpe		
C	50.9	→	50.8	→		50.8			→	50.8		

INDUCED POLARIZATION - RECEIVER NOTES PAGE 2

Project: S.O.D. Line: 1-A - Spec. 1-E ½ Int.Cal _____ Date: 4-20-84

Send	1-2	4-5	3-4	2-3	1-2		CAL					
Rec.	→	5-6E	→	→	→		4-5					
Time	1	3	1	1	1		30					
DC-1	.23 .19 .29 .24	.43 .58 .37 .47	.17 .34 .20 .42	.24 .14 .17 .12	.12 .10 .12 .16		15.3					
DC-2	.29 .32 .23 .24	.67 .47 .68 .62	.41 .22 .39 .18	.16 .22 .21 .25	.15 .08 .16 .10		15.3					
Σ	.52 .51 .57 .48	1.10 1.05 1.05 1.09	.56 .56 .59 .60	.40 .36 .36 .37	.27 .32 .28 .26		30.6					
DC-3	.23 .25 .31 .27	.43 .62 .58 .42	.22 .32 .29 .29	.19 .22 .21 .25	.13 .09 .09 .18		15.3					
Dc-4	.30 .27 .19 .23	.58 .42 .49 .65	.39 .27 .19 .31	.27 .14 .20 .11	.09 .17 .17 .09		15.3					
Σ	.53 .51 .50 .50	1.01 1.04 1.07 1.07	.61 .59 .58 .60	.41 .36 .41 .36	.26 .26 .26 .27		30.6					
DC-AV	.51	1.06	.59	.370	.270		30.6					
AC-1	.233	.48	.275	.165	.118		15.1					
AC-2	.232	.49	.275	.166	.118		15.2					
Σ	.465	.97	.550	.331	.236		30.3					
S. P.	→	+6.2	→	→	→							
AC-N	.07-A	.01-A	→	→	→							
I.G.	→	50.7	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Line 1-A-Sp.1-E½ Field date 4/20/64 Data page_____ Comp. date 4/20/64. Comp by C.S.L.

(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	1-2E	→	2-3E	→	→	3-4E	→	→	→	4-5E	→	→
(C) n separation Range	30	10	30	10	3	30	10	3	1	3	3	1
(D) I	2000	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	22.4	4.48	22.3	4.52	1.87	20.6	4.27	1.80	1.039	3.58	1.40	.790
(F) DCcal USED	.980	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	33.0	26.3	32.8	26.6	27.5	30.3	25.1	26.5	30.5	20.9	20.2	23.2
(I) Vac Σ	21.6	4.23	21.8	4.23	1.71	19.8	4.01	1.63	.966	3.41	1.28	.725
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.990	→	→	→	→	→	→	→	1.050	.990	→	1.050
(M) ρ dc/ρac=ExL/K	1.028 .8	1.048 2.4	1.013 .4	1.058 2.4	1.058 2.5	1.030 .9	1.055 2.3	1.092 3.7	1.130 6.4	1.040 2.8	1.065 5.0	1.140 7.3
(N) PFE=(M-1)(10^2)	2.8 2.0	4.8 2.6	1.3 .5	5.8 3.6	8.2 4.7	3.0 2.1	5.5 3.3	9.2 5.5	13.0 7.6	3.0 1.2	6.0 3.5	14.0 6.7
(O) MCF=(M-1)(10^5)/H	85 61	182 99	40 15	218 135	298 171	99 69	219 131	347 216	427 249	144 57	297 173	603 269

— Coupling corrected

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

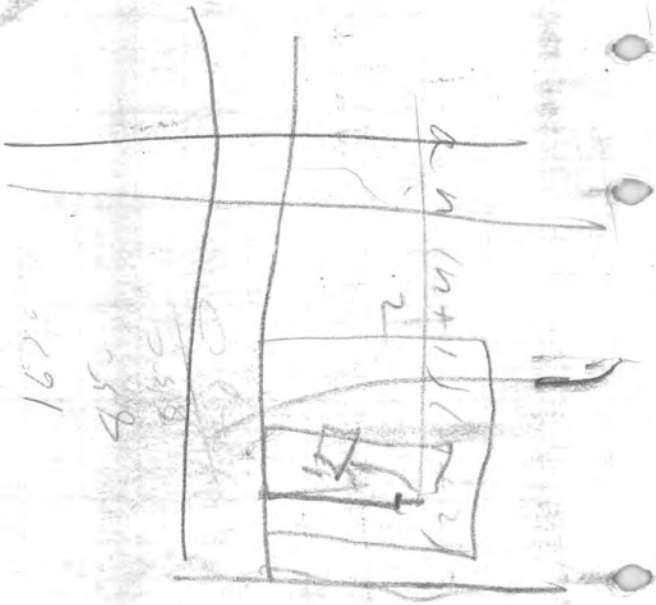
(A) Send	1-2	4-5	3-4	2-3	1-2		6+2	→				
(B) Receive	→	5-6E	→	→	→		4-5	→				
(C) n separation Range	1	3	1	→	→		30					
(D) I	→	→	→	→	→		300					
(E) Vdc (avg)	.510	1.06	.590	.320	.270		30.6					
(F) DCcal	→	→	→	→	→		.980					
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	26.2	15.6	17.3	19.0	22.2							
(I) Vac Σ	.465	.970	.550	.331	.236		30.3					
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.050	.990	1.050	→	→		.990					
(M) ρdc/ρac =ExL/K	1.151 9.4	1.081 6.8	1.127 9.8	1.172 13.7	1.200 16.5							
(N) PFE=(M-1)(10^2)	15.1 5.7	8.1 1.3	12.7 2.9	17.2 3.5	200 4.5							
(O) MCF=(M-1)(10^5)/H	576 218	519 83	735 165	906 184	902 202							

INDUCED POLARIZATION SENDER NOTES

Project: 500 Line: 1A Spr 1 W 1/2 Date: 4-10-64

Send	CAL 1-2	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Receive		→	→	→	→	→	→	→	→	→	→	→
Time	1x3	2x1000	2x1000	2-1000	2-1000	2-1000	2-1000	2-1000	2-1000	2-1000	2-1000	2-1000
Range	30	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Current	300	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Send	3-4	4-5	1-2	2-3	3-4	4-5						
Receive	→	→	→	→	→	→						
Time	2-1000	2-1000	2-1000	2-1000	2-1000	2-1000						
Range	2.0	2.0	2.0	2.0	2.0	2.0						
Current	2000	2000	2000	2000	2000	2000						

Brown - 1
Red - 2
Orange 3
White - 4
Dun - 5



INDUCED POLARIZATION - RECEIVER NOTES PAGE 3

Project: S.O.D Line: 1A Spr. 1 W½ Int.Cal _____ Date: 4/20/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	1-2W	→	2-3W	→	→	3-4W	→	→	→	4-5W	→	→
Time	30	10	30	10	3	30	10	3	3	10	3	3
DC-1	10.7	2.40 2.52 2.03 1.67	10.2 9.8	2.81 2.95 2.15 2.70	1.13 1.26 1.19 1.10	10.2	2.42 2.98	1.35 1.33	.53 .57 .65 .61	3.20 3.99	1.63 1.48	.92 .88
DC-2	10.6	2.05 2.78 2.42 2.75	10.1 10.6	2.97 3.70 3.05 3.20	1.08 .93 .94 1.02	10.7	2.95 2.40	1.30 1.32	.61 .61 .51 .52	3.93 3.02	1.49 1.68	.86 .87
Σ	21.3	4.45 4.30 4.45 4.40	20.3 20.4	5.78 5.65 5.90 5.90	2.13 2.19 2.13 2.12	20.9	5.37 5.38	2.65 2.65	1.14 1.14 1.16 1.13	7.13 7.01	3.12 3.10	1.78 1.75
DC-3	10.6	2.48 1.96	10.2 10.6	2.18 3.48 2.77 2.62	1.22 1.18 1.27 1.22	10.7	2.40 2.99	1.31 1.31 1.33 1.33	.57 .62	3.13 3.19 3.87 3.91	1.67 1.51	.89 .87 .89 .98
Dc-4	10.7	1.92 2.40	9.9 9.8	2.63 2.32 2.82 2.99	.90 .90 .83 .96	10.2	2.95 2.39	1.33 1.32 1.30 1.30	.62 .57	3.88 3.86 3.17 3.02	1.98 1.61	.87 .95 .89 .80
Σ	21.3	4.40 4.36	20.1 20.4	5.81 5.80 5.59 5.61	2.12 2.08 2.10 2.18	20.9	5.38 5.38	2.64 2.67 2.64 2.67	1.15 1.15	7.01 7.05 7.04 7.03	3.15 3.12	1.76 1.78 1.73 1.76
DC-AV	21.3	4.39	20.3	5.75	2.13	20.9	5.38	2.64	1.15	7.03	3.14	1.77
AC-1	10.2	2.09	9.6	2.67	0.97	9.9	2.46	1.19	0.50	3.32	1.45	.78
AC-2	10.2	2.04	9.6	2.67	0.98	9.9	2.47	1.19	0.50	3.34	1.45	.78
Σ	20.4	4.07	19.2	5.34	1.95	19.8	4.93	2.38	1.00	6.66	2.90	1.56
S. P.	+16.9	→	+4.1	→	→	-2.4	→	→	→	+11.3	→	→
AC-N	.06	→	.02	→	→	.015	→	→	→	.015	→	→
I.C.	49.7	→	49.5	→	→	49.4	→	→	→	49.4	→	→

INDUCED POLARIZATION - RECEIVER NOTES PAGE 4

Project: S.O.D. Line: 14 spr. 1 - W½ Int.Cal Date: 9/20/[illegible]

Send	4-5	1-2	2-3	3-4	4-5		CAL					
Rec.	→	5-6 W	→	→	→		1-2					
Time	1	3	3	1	1		30	200 300 30	100			
DC-1	.49 .53 .41 .50	1.49 1.43 1.68 1.59	.75 .72 .79 .77	.54 .52 .45 .51	.26 .24 .25 .24		15.0	14.8	49.2			
DC-2	.39 .41 .49 .41	1.62 1.62 1.33 1.43	.79 .79 .77 .78	.43 .45 .55 .47	.23 .24 .24 .25		14.9	14.7	49.2			
Σ	.88 .94 .90 .91	3.11 3.05 3.01 3.02	1.54 1.51 1.56 1.55	.97 .97 1.00 .98	.49 .45 .49 .49		29.9	29.3	98.4			
DC-3	.40 .36 .42 .50	1.26 1.52 1.89 1.53	.81 .77	.54 .51 .57 .53	.25 .23 .24 .25		14.9	14.6	49.2			
Dc-4	.47 .52 .39 .40	1.02 1.53 1.13 1.50	.72 .77	.45 .48 .44 .43	.25 .27 .25 .22		15.0	14.7	49.2			
Σ	.87 .88 .91 .90	2.08 3.05 3.02 3.03	1.53 1.54	.99 .99 .97 .96	.50 .50 .49 .50		29.9	29.3	98.4			
DC-AV	.885	3.05	1.54	0.98	.491		29.9	29.3	98.4			
AC-1	.398	1.39	0.67	0.440	0.215		14.8	14.2	48.3			
AC-2	.398	1.39	0.67	0.440	0.215		14.8	14.2	48.3			
Σ	.796	2.78	1.34	0.88	.430		29.6	28.4	96.6			
S. P.	→	-0.5	→	→	→							
AC-N	→	0.03	→	→	→							
I.C.	→	49.4	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D Line 1-A pr. 1 W½ Field date 4/20/64 Data page_____ Comp. date 4/21/64. Comp by C.S.L.

(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	1-2W →		2-3W			→ 3-4W			→	4-5W		
(C) ~~n separation~~ Range	30	10	30	10	3	30	10	3	3	10	3	3
(D) I	2000											
(E) Vdc (avg)	21.3	4.39	20.3	5.75	2.13	20.9	5.38	2.64	1.15	7.03	3.14	1.77
(F) DCcal USED	1.014											
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	32.4	26.7	30.9	35.0	32.4	31.8	32.7	40.2	35.1	42.8	47.8	54.0
(I) Vac Σ	20.4	4.07	19.2	5.35	1.95	19.8	4.93	2.38	1.00	6.66	2.90	1.56
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.970											
(M) ρ dc/ρac=ExL/K	1.013 .8	1.047 2.2	1.026 .9	1.042 1.5	1.060 3.0	1.024 .8	1.060 1.7	1.074 2.5	1.114 4.7	1.024 1.2	1.050 2.2	1.100 2.8
(N) PFE=(M-1)(10^2)	0.5	2.5	1.7	2.7	3.0	1.6	4.3	4.9	6.7	1.2	2.8	7.2
(O) MCF=(M-1)(10^5)/H	15	94	55	77	185 93	50	132	184 122	191	28	105 59	133

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	1-2	2-3	3-4	4-5		CAL					
(B) Receive	→	5-6W			→		1-2					
(C) n separation	1	3	3	1	1		30	30	100			
(D) I					→		300	300	1000			
(E) Vdc (avg)	.885	3.05	1.54	0.98	.491		29.9	29.3	98.9			
(F) DCcal					→		1.003	1.023	1.015			
(G) Kn x 10^{-3}	105	30	60	105	168	~	1.014	→				
(H) ρ dc=ExFxGx10^3/D	47.2	46.4	46.9	52.2	41.8							
(I) Vac Σ	.796	2.78	1.34	0.88	.430		29.6	28.4	96.6			
(J) AC noise x 2					.06							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$					.426							
(L) AC-DC cal.	1.030	.970	.970	1.030	→		.990	.969	.982			
(M) ρdc/ρac =ExL/K	1.144 4.8	1.064 2.2	1.114 3.4	1.147 4.4	1.176 3.8							
(N) PFE=(M-1)(10^2)	9.6	4.2	8.0	10.3	9.8							
(O) MCF=(M-1)(10^5)/H	204	138 90	171	197	234							

.185
.004
.184

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: 2-Spur 1-S½ Date: 3/23/64

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	2100	→	→	→	→	→	→	→	→	→	→	→
Send	4-5	1-2	2-3	3-4	4-5		CAL					
Receive	→	→	→	→	→		1-2					
Time												
Range												
Current	→	→	→	→	→		300					

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: SOD Line: Z spd 18½ Int.Cal _____ Date: 3-23-64

Send	34	45	23	34	45	12	23	34	45	12	23	34
Rec.	125 →		235 →			395 →				403 →		
Time	30	10	30	10	10	30	10	3	3	10	10	3
DC-1	16.1 16.1 16.2 15.8	5.7 5.6 6.8 7.2	15.2 15.3 14.7 14.6	4.3 4.35 4.05 4.28	216 180 268 286	17.2 16.9 16.8 16.8	5.0 5.2 5.3 5.1	2.0 205 2.4 232	1.60 1.40 1.30 1.30	5.20 5.24 5.62 5.76	2.22 2.18 2.36 2.18	1.00 1.04 1.26 1.00
DC-2	16.3 16.6 16.2 16.0	5.4 5.6 6.9 6.8	15.3 15.9 14.7 14.6	4.26 4.20 4.40 4.42	205 186 278 278	17.2 16.9 16.8 16.9	5.1 4.9 5.1 5.1	195 165 235 215	1.60 1.25 1.30 1.25	5.36 4.80 5.40 5.60	2.20 2.10 2.35 2.32	1.20 1.94 1.00 1.20
Σ	32.3 32.5 32.5 32.6	12.5 12.8 12.3 12.4	35.9 35.9 35.0 35.0	8.35 8.63 8.66 8.62	484 466 483 464	34.0 33.7 34.0 33.7	10.3 10.3 10.2 10.0	4.4 437 4.4 380	2.90 2.70 2.90 2.50	10.84 11.00 10.76 10.40	4.58 7.32 4.56 4.82	2.20 2.14 2.20 2.14
DC-3	16.4 16.6 16.0 15.9	6.9 5.4 7.0 7.0	15.3 15.4 14.6 14.5	4.08 4.18 4.37 4.30	200 190 279 272	16.9 16.9 16.8 16.8	5.0 5.2 5.1 5.0	190 180 240 250	1.25 1.35 1.40 1.30	5.18 5.37 5.50 5.60	2.20 2.14 2.38 2.40	1.05 1.86 1.18 1.25
Dc-4	16.6 16.6 15.7 15.7	5.6 5.5 6.8 7.1	15.3 15.4 14.7 14.8	4.40 4.22 4.28 4.40	180 195 250 186	16.9 16.8 16.8 17.0	5.0 5.1 5.2 5.1	201 200 250 205	1.45 1.50 1.30 1.10	5.08 5.37 5.60 5.68	2.24 2.18 2.28 2.40	1.04 1.07 1.24 1.10
Σ	32.4 32.4 32.3 32.3	12.4 12.4 12.4 12.6	35.5 35.5 35.0 35.0	8.46 8.48 8.60 8.62	479 462 470 481	33.7 33.7 33.7 33.8	10.1 10.2 10.2 10.2	430 431 451 405	2.05 2.05 2.75 2.50	10.88 10.97 10.88 10.97	4.58 4.58 4.54 4.56	2.23 2.11 2.28 2.17
DC-AV	32.4	12.5	299	8.55	4.74	33.8	10.2	4.285	2.63	10.79	4.52	2.17
AC-1	15.1	5.67	14.3	4.02	2.15	16.45	4.80	1.97	1.17	5.18	2.08	.99
AC-2	15.1	5.65	14.3	4.02	2.15	16.45	4.82	1.97	1.17	5.18	2.10	.98
Σ	30.2	11.32	28.6	8.04	4.30	32.90	9.62	3.94	2.34	10.39	4.18	1.97
S. P.	+26.3 →		-4.8 →			+.6 →						
AC-N	.15 →		.10 →			1.0 →						

345	45
34R	
1.85	1.60
260	1.15
185	1.78
235	.90
280	
235	1.50
195	.95
215	1.65
210	1.05
240	1.55
200	.85
225	1.70
190	.95
240	1.70
210	
220	
195	1.75

— 15 + 150 mU (58)

45	34
45R	56R
.62	.48
1.00	.70
.86	.34
.68	.55
.70	.39
.65	.84
.81	.46
.75	.75
.75	
.84	.40
.63	1.00
.90	.30
.50	.70
.44	.65

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: S&9 Line: 2 small 1 S½ Int.Cal _____ Date: 3-23-6

Send	45	12	23	29	45		cal					
Rec.	→	525	→	→	→							
Time	1	10	3	1	1							
DC-1	.57 .90	2.23 2.20 2.30 2.45	1.15 1.10 1.35 1.35	.57 .46 .84 .86	.43 .40 .47 .32		15.0					
DC-2	.56 .82	2.40 2.35 2.50 2.40	1.05 1.15 1.40 1.40	.46 .41 .80 .53	.30 .45 .42		15.0					
Σ	1.47 1.38	4.53 4.65 4.70 4.75	2.50 2.45 2.45 2.45	1.91 1.32 1.26 1.34	.90 1.00 .84 .72 .79 .77		30.0					
DC-3	.58 .90	2.20 2.37 2.42 2.45	1.05 1.10 1.40 1.35	.48 .30 .79 .90	.40 .40		15.0					
Dc-4	.62 1.00	2.38 2.25 2.40 2.35	1.05 1.10 1.35 1.35	.50 .64 .84 .64	.55 .60		15.0					
Σ	1.48 1.62	4.62 4.82 4.78 4.60	2.45 2.45 2.40 2.45	1.27 1.20 1.34 1.2[illegible]	.82 .115 .80 .95		30.0					
DC-AV	1.48	4.68	2.45	1.262	.87							
AC-1	.68	2.23	1.13	.60	.41		14.8					
AC-2	.70	2.20	1.13	.60	.41		14.7					
Σ	1.38	4.43	2.26	1.20	.82		29.5					
S. P.	.07	-3.9	→	→	→							
AC-N		0.9 →	.08	→	→							

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line Z spl 1 S½ Field date 2-23-64 Data page_____ Comp. date 2-24-64. Comp by HKH

(A) Send	34	45	23	34	45	12	23	34	45	12	23	34
(B) Receive	125 →		235 →			345 →				455 →		
(C) n separation												
(D) I	2101 →											
(E) Vdc (avg)	32.4	12.5	29.9	8.55	4.74	33.8	10.2	4.255	2.63	10.79	4.52	2.17
(F) DCcal 1.000												
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	30	60
(H) ρ dc=ExFxGx10^3/D	46.3	71.5	42.7	48.8	67.8	48.3	58.3	61.2	75.1	61.6	64.6	62.0
(I) Vac Σ	30.2	11.32	28.6	8.04	4.30	32.9	9.62	3.94	2.34	10.39	4.18	1.97
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.983 →											
(M) ρ dc/ρac=ExL/K	1.054	1083	1.028	1044	1.083	1010	1042	1069	1104	1020	1062	1081
(N) PFE=(M-1)(10^2)	5	8	3	4	8	1	4	7	10	2	6	8
(O) MCF=(M-1)(10^5)/H	117	116	66	90	122	21	72	113	139	33	96	131

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	45	12	23	34	45		Cal					
(B) Receive	→	565 →					300					
(C) n separation	1			1	1							
(D) I	→											
(E) Vdc (avg)	1.48	4.68	2.45	1.262	.87		30.0					
(F) DCcal	→											
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρ dc=ExFxGx10^3/D	74.0	69.4	70.0	63.1	62.5							
(I) Vac Σ	1.38	4.43	2.26	1.20	.82		29.5					
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1041	.983 →		1041 →			.983					
(M) ρdc/ρac =ExL/K	1118	1060	1066	1096	1104							
(N) PFE=(M-1)(10^2)	12	6	7	10	10							
(O) MCF=(M-1)(10^5)/H	160	87	94	152	167							

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: Z - Spri 1 - N½ Date: 3/25/64

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range												
Current	2100	→	→	→	→	→	→	→	→	→	→	→
Send	-2	4-5	3-4	2-3	1-2		<42	→				
Receive	→	→	→	→	→		4-5	→				
Time												
Range												
Current	→	→	→	→	→		300	→				

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: S.O.D. Line: Z spd 1 N½ Int.Cal 50 3 Date: 3-25-64

Send	23	12	34	23	12	45	39	23	12	45	34	23
Rec.	12N →		23N →			34N →				45N →		
Time	30	10	30	10	10	30	10	10	3	10	3	
DC-1	15.7 14.8	5.95 5.91 6.35 6.40	17.0 17.0 18.3 18.4	6.33 6.41	4.04 4.03 3.58 3.57	16.3 16.2 18.1 18.2	4.94 5.03 5.64 5.61	2.68 2.70 2.67 2.59	1.76 1.63 2.23 2.13	4.36 4.28 4.06 4.00	2.23 2.30 2.05 1.94	1.03 1.15 1.48 1.50
DC-2	15.7 14.7	5.90 5.92 6.45 6.38	17.0 16.9 18.35 18.4	6.33 6.43	4.00 4.08 3.58 3.48	16.5 16.3 18.0 18.1	5.18 5.12 5.58 5.60	2.70 2.78 2.58 2.59	1.52 1.65 2.34 2.35	4.40 4.88 3.95 3.93	2.35 2.32 1.98 1.92	1.22 1.15 1.44 1.47
Σ	30.5 30.4	12.30 12.30 12.35 12.30	35.3 35.4 35.35 35.3	12.74 12.76	7.62 7.60 7.58 7.56	34.4 34.4 34.5 34.4	10.58 10.64 10.76 10.72	5.26 5.24 5.25 5.32	3.99 3.94 3.95 3.98	8.42 8.28 8.35 8.35	4.28 4.24 4.23 4.24	2.51 2.55 2.56 2.62
DC-3	15.7 14.8	5.52 6.40	17.0 18.4	6.28 6.46	4.08 4.12 3.50 3.46	16.4 16.4 18.1 18.0	5.05 5.01 5.71 5.80	2.72 2.76 2.60 2.58	1.67 1.35 2.06 2.30	4.59 4.42 3.92 3.96	2.33 2.32 2.03 1.92	1.10 1.16 1.62 1.47
Dc-4	15.7 14.8	5.85 6.38	16.8 18.5	6.22 6.56	4.05 4.08 3.57 3.50	16.3 16.3 18.1 18.1	5.00 4.95 5.70 5.80	2.68 2.77 2.60 2.49	1.64 1.70 2.25 2.15	4.39 4.56 4.14 3.94	2.34 2.33 1.96 1.93	1.03 1.15 1.55 1.48
Σ	30.5 30.4	12.32 12.23	35.4 35.3	12.72 12.78	7.58 7.58 7.62 7.56	34.5 34.4 34.4 34.4	10.82 10.81 10.70 10.75	5.32 5.32 5.28 5.28	3.91 3.78 3.83 3.85	8.81 8.38 8.53 8.50	4.30 4.29 4.30 4.26	2.72 2.63 2.58 2.62
DC-AV	30.5	12.30	35.34	12.75	7.59	34.4	10.72	5.30	3.83	8.42	4.27	2.55
AC-1	14.5	5.61	17.0	5.80	3.40	15.9	4.82	2.29	1.63	3.79	1.90	1.14
AC-2	14.5	5.62	16.95	5.82	3.40	15.55	4.83	2.27	1.63	3.79	1.90	1.14
Σ	29.0	11.23	33.95	11.62	6.80	31.85	9.65	4.55	3.26	7.58	3.80	2.28
S. P.	-4.6 →		-2.7 →			+2.7 →				-6.7 →		
AC-N	.1 →		.1			.11 →				.15 →		

SP 0 IN

+127

145	.92	.92
173	1.06	.73
148	.93	.96
168	1.05	.72
155	1.00	.86
165	.96	.79
144		.97
180		1.60
140		1.00
176		.78
140		.90
		.80
		.86

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: SOD Line: 2 spd 1N½ Int.Cal 50.8 Date: 3.25.69

Send	12	45	34	22	12		Cal I	Cal II				
Rec.	→	52N	→	→	→		30					
Time	3	10	3	3	3							
DC-1	1.05 1.02 .98 1.03	2.84 2.62 2.26 2.40	1.67 1.56 1.87 1.79	1.00 .92 1.04 1.06	.93 .92 .76 .73		14.8 14.8	14.9 14.8				
DC-2	1.03 1.01 .97 .97	2.78 2.72 2.80 2.41	1.50 1.42 1.54 1.65	.95 .95 1.10 1.15	.85 .94 .86 .72		14.8 14.8	14.9 14.9				
Σ	2.03 2.06 2.10 1.98	5.09 5.02 5.18 5.12	3.54 3.35 3.44 3.27	2.04 2.98 2.05 2.10	1.69 1.65 1.71 1.66		29.6	29.7 29.8				
DC-3	1.05 1.02 .92 1.02	2.62 2.66 2.80 2.80	1.56 1.50 1.87 1.70	.95 .87 1.07 1.13	.80 .84 .80 .82		14.8 14.8	15.0 14.7				
Dc-4	1.06 1.00 .96 1.01	2.62 2.68 2.45 2.38	1.50 1.47 2.04 1.66	.96 .97 1.08 1.15	.87 .84 .84 .83		14.8 14.8	14.9 14.8				
Σ	1.97 2.04 2.02 2.01	5.10 5.06 5.07 5.06	3.53 3.40 3.54 3.13	2.02 2.00 2.02 2.02	1.60 1.70 1.71 1.67		29.6	29.7 29.6				
DC-AV	2.02	5.09	3.28	2.005	1.67		29.6	29.7				
AC-1	.950	2.30	1.48	.84	.72		14.65	14.65				
AC-2	.950	2.31	1.47	.84	.72		14.7	14.70				
Σ	1.90	4.61	2.95	1.68	1.42		29.35	29.35				
S. P.	→	4.17	→	→	→							
AC-N	→	.18	→	→	→							

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project SOD Line 25pd1N½ Field date 3-25-83 Data page_____ Comp. date 3-25-83 Comp by BKH

(A) Send	23	12	34	23	12	45	34	23	12	45	34	23
(B) Receive	12N	→	23N	→	→	34N	→	→	→	45N	→	→
(C) n separation												
(D) I 2100												
(E) Vdc (avg)	30.5	12.30	35.34	12.75	7.59	34.4	10.72	5.30	3.83	8.42	4.27	2.55
(F) DCcal 1000												
(G) Kn x 10^{-3}	3	12	3	12	30	3	12	30	60	12	50	61
(H) ρdc=ExFxGx10^3/D	43.6	70.3	50.5	72.9	109	49.2	61.3	75.8	109	49.2	61.0	72.9
(I) Vac Σ	29.0	11.27	33.95	11.62	6.80	33.85	9.65	4.55	3.26	7.58	3.80	2.28
(J) AC noise x 2												.30
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												2.26
(L) AC-DC cal. .998												
(M) ρdc/ρac=ExL/K	1.041	1.087	1.030	1.087	1.104	1.069	1.100	1.152	1.173	1.100	1.111	1.117
(N) PFE=(M-1)(10^2)	4	8	3	9	10	7	10	15	17	10	11	12
(O) MCF=(M-1)(10^5)/H	94	119	59	119	95	140	163	200	159	208	182	161

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	12	45	34	23	12							
(B) Receive	→	52N	→	→	→							
(C) n separation												
(D) I	→	→	→	→	→							
(E) Vdc (avg)	2.02	5.09	3.28	2.005	1.67							
(F) DCcal	→	→	→	→	→							
(G) Kn x 10^{-3}	105	30	60	105	168							
(H) ρdc=ExFxGx10^3/D	101	72.8	93.9	104.0	134							
(I) Vac Σ	1.90	4.61	2.95	1.68	1.42							
(J) AC noise x 2	.30		.34	.34	.34							
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	1.877		2.93	1.647	1.377							
(L) AC-DC cal.	→	→	→	→	→							
(M) ρdc/ρac =ExL/K	1.066	1.092	1.109	1.206	1.200							
(N) PFE=(M-1)(10^2)	7	9	11	21	20							
(O) MCF=(M-1)(10^5)/H	65	126	116	206	149							

Surface line W
Alluvium
1000
OH_2O Table $\rho \cong 23$
$\rho \cong 10$
$\rho \cong 22$
Volcanics
1.5 to 3.0 %
Sulfide
$\rho \cong 55$
$\rho \cong 40 \rightarrow 60$
probably same rock type
Volcanics and/or cretaceous

LUCERO 144 | LUCERO 145 | LUCERO 146 | LUCERO 147 | LUCERO 148 | LUCERO 149 | LUCERO 150 | LUCERO 151 | LUCERO 152

LUCERO 137 | LUCERO 138 | LUCERO 139 | LUCERO 140 | LUCERO 141 | LUCERO 142 | LUCERO 143

LUCERO 136 | LUCERO 135

Federal BETTY 7

Federal BETTY 2 | BETTY 1

BETTY 8 Federal

~~ANN 29~~ | ~~ANN 30~~ | ~~ANN 31~~

ANN 27 #M-1144 | ANN 28 #M-1144 | ANN 32 #M-1144

ANN 26 #M-1144 | ANN 33 #M-1144

ANN #M-971 | ANN 4 #M-1033 | ANN 18 | ANN 34 #M-1144

LUCERO 6 | LUCERO 17 | LUCERO 38

LUCERO 5 | LUCERO 18 | LUCERO 37

LUCERO 4 | LUCERO 19 | LUCERO 36

LUCERO 16 | LUCERO 39

LUCERO 102 | ANN 17 #M-1143 | ANN 3 #M-971 | ANN 5 #M-1033 | ANN 6 #M-1033 | ANN 7 #M-1033 | ANN 10 #M-1033 | ANN 12 #M-1033 | LUCERO 3 | LUCERO 20 | LUCERO 35

LUCERO 101 | ANN 25 #M-1143 | ANN 1 #M-971

LUCERO 100 | ANN 19 #M-1143 | ANN 21 #M-1143 | ANN 16 #M-1143 | ANN 8 #M-1033 | ANN 9 #M-1033 | ANN 11 #M-1033 | ANN 13 #M-1033 | ANN 14 #M-1033 | LUCERO 22 | LUCERO 33

LUCERO 99 | ANN 20 #M-1143 | ANN 22 #M-1143 | LUCERO 23 | LUCERO 32

LUCERO 98 | LUCERO 94 | LUCERO 89 | ANN 23 #M-1143 | ANN 24 #M-1143 | ANN 15 #M-1143 | LUCERO 76 | LUCERO 24 | LUCERO 31

LUCERO 97 | LUCERO 93 | LUCERO 88 | LUCERO 83 | LUCERO 82 | LUCERO 77 | LUCERO 25 | LUCERO 30

LUCERO 96 | LUCERO 92 | LUCERO 90 | LUCERO 87 | LUCERO 84 | LUCERO 81 | LUCERO 78 | LUCERO 26 | LUCERO 29

LUCERO 95 | LUCERO 91 | LUCERO 86 | LUCERO 85 | LUCERO 80 | LUCERO 79 | LUCERO 27 | LUCERO 28

— MoMAG
10 Line Miles — 500.00

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: Ex #1 Date: 3-10-64

Send	1	2	3	4	5	6	7	8				
Receive												
Time												
Range	1X1	1.5X1	1.5X1									
Current	1000	1500	1500	3500	3,500	3,500	3500	3500				
Send												
Receive												
Time												
Range												
Current												

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: Exy #2 Date: 3-1-04

Send	1	2	3	4	5	6	7	8	9			
Receive												
Time												
Range	2X10	2X10	2X10	4X10	4X10	4X10	3.5X10	3X10	3.3X10			
Current	2000	2000	2000	4000	4000	4000	3500	3000	3300			
Send												
Receive												
Time												
Range												
Current												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

n=2 Project: Expander 500 Line: #1 N55°E I 555°W V Int.Cal _____ Date: 3/10/64

Send	1	2	3	4	5	6	7	8				
Rec.	125	25	500						3000			
Time	30	30	30	30	30	10	10	3				
DC-1	14.2 14.1 14.4 14.3	17.5 17.5	7.2 7.0	8.2 8.4 8.4 8.0	7.7 8.1	4.00 4.06 4.32 4.18	2.37 2.60 2.42 2.38	1.98 2.07 1.94 1.90				
DC-2	16.3 16.3 14.3 14.1	16.8 16.9	7.0 7.0	8.0 8.0 8.1 8.4	8.1 7.7	4.28 4.20 3.92 4.04	2.50 2.38 2.67 2.61	1.93 1.93 2.06 2.07				
Σ	30.5 30.4 30.7 30.4	34.3 34.4	14.2 14.2	16.4 16.4 16.5 16.4	15.8 15.8	8.28 8.26 8.24 8.22	5.00 5.02 5.05 5.03	3.91 3.96 4.00 3.97				
DC-3	14.2 16.3	17.4 16.5	7.1 7.1 7.0 7.0	8.1 8.4	7.7 8.1	4.90 4.06 4.38 4.16	2.66 2.52 2.55 2.48	2.00 2.05 2.03				
Dc-4	16.3 14.1	16.4 17.5	7.0 7.0 7.1 7.1	8.4 8.1	8.1 7.7	4.37 4.18 3.88 4.0	2.33 2.53 2.63 2.60	1.98 1.86 1.83				
Σ	30.5 30.4	34.3 34.3	14.1 14.1 14.1 14.1	16.5 16.5	15.8 15.8	8.27 8.20 8.26 8.26	4.99 5.05 4.98 5.08	3.98 3.91 3.86 3.86				
DC-AV	30.5	34.3	14.1	16.45	15.8	8.25	5.02	3.94				
AC-1	15.1	17.1	7.0	8.2	7.8	4.01	2.37	1.82	15			
AC-2	15.1	17.1	7.0	8.1	7.8	4.01	2.36	1.82				
Σ	30.2	34.2	14.0	16.70	15.6	8.02	4.73	3.64				
S. P.	+7.8	+4.1	+9.9	+12.4	+4.3	+5.4	+8.7	+7.2				
AC-N	.05	.08	.20	.23	.31	.22	.31	.31				
I.L.	50.1	50.2	50.1	50.0	50.0	50.1	50.1	50.3				

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Expander Line: 2 N 35° W I S 35° E V Int.Cal _____ Date: 3/11/64

Send	1	2	3	4	5	6	7	8	9			
Rec.	2000	2000	2000	4000		--						
Time	100	100	30	30	30	10	10	10	10			
DC-1	[illegible]	21.6 21.8	11.8 12.1	13.9 12.6	8.5 8.8	[illegible] 4.84	3.49 3.43 3.63 3.6	[illegible] 3.20 [illegible]	3.04 3.08 2.75 3.18			
DC-2	[illegible]	[illegible]	12.1 11.8	12.6 14.0	8.7 8.5	4.82 5.04	3.63 3.61 3.49 3.45	3.14 [illegible] 3.25 3.01	[illegible] 3.05 2.88			
Σ	[illegible]	[illegible]	23.9 23.9	26.5 26.6	17.2 17.3	[illegible]	7.12 7.11 7.12 7.15	6.18 6.20 6.15 6.19	5.94 5.98 5.83 6.01			
DC-3	31.6 30.4	31.6 31.7	11.8 13.1	12.6 13.7 13.0 12.0	8.5 8.8	[illegible] 4.83	3.47 3.64 3.32	3.05 3.00 3.11 3.20	3.16 2.98 2.73 3.18			
Dc-4	30.4 31.6	31.8 31.7	12.1 11.8	14.0 12.9 13.7 13.7	8.8 8.5	[illegible] 5.05	[illegible] 3.42	3.17 3.00 3.03 3.05	2.84 3.03 3.17 3.00			
Σ	[illegible] 62.0	[illegible] 43.4	23.9 23.9	26.6 26.6 26.7 26.6	17.3 17.3	9.88 9.88	[illegible] 7.12	[illegible] 6.16 6.16	[illegible] 6.01 5.90			
DC-AV	62.0	43.4	23.9	26.6	17.3	9.88	7.1[illegible]	6.16	5.95			
AC-1	31.7	22.1	11.9	13.3	8.6	4.90	3.46	2.97	2.72			
AC-2	31.6	22.0	11.9	13.2	8.5	4.92	3.46	2.96	2.72			
Σ	63.3	44.1	23.8	26.5	17.1	9.82	6.92	5.93	5.44			
S. P.	+9.1	+9.3	+8.9	+10.7	-11.9	+4.0	+5.0	+20.1	+14.4			
AC-N	.01	.06	.10	.12	.09	.10	.13	.27	.20			
I.C.	50.7	50.6	50.6	50.7	50.7	50.1	49.9	49.9	49.9			

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.O. Line 1-EXPANDER Field date 3/10/64 Data page_____ Comp. date_____. Comp by C.S.L.

N55°E

(A) Send	1	2	3	4	5	6	7	8				
(B) Receive												
(C) n separation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
(D) I	1000	1500	1500	3500	3500	→	→	→				
(E) Vdc (avg)	30.5	34.3	14.1	16.45	15.8	8.25	5.02	3.94				
(F) DCcal USED	1.000	→	→	→	→	→	→	→				
(G) Kn x 10^{-3}	1.5	3	6	9	12	18	24	30				
(H) ρ dc=ExFxGx10^3/D	45.7	68.0	56.3	42.3	54.2	42.5	34.4	33.8				
(I) Vac Σ	30.2	34.2	14.0	16.30	15.6	8.02	4.73	3.64				
(J) AC noise x 2							.62	.62				
(K) Vac(corr) = $\sqrt{I^2 - J^2}$							4.68	3.58				
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K	1.010	1.003	1.007	1.009	1.012	1.028	1.073	1.100				
(N) PFE=(M-1)(10^2)	1	0	1	1	1	3	7	10				
(O) MCF=(M-1)(10^5)/H	22	4	12	21	22	66	212	296				
	10 22	0.2 3	0.3 6	0.0 0.00	1.5 -0.3 6	2.3 -0.5 12	1.3 1.0 29	10.0 0.0	← Coupling corr ρ=40			

Project N35°W Line 2 EXPANDER Field date 3/11/64 Data page_____ Comp. date_____ Comp by C.S.L.

(A) Send	1	2	3	4	5	6	7	8	9			
(B) Receive												
(C) n separation												
(D) I	2000	2000	2000	4000	4000	4000	3500	3000	3300			
(E) Vdc (avg)	62.0	43.4	23.9	26.6	17.3	9.88	7.13	6.16	5.95			
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→			
(G) Kn x 10^{-3}	1.5	3	6	9	12	18	24	30	36			
(H) ρ dc=ExFxGx10^3/D	46.5	65.0	71.7	59.8	51.9	44.4	48.9	61.6	64.9			
(I) Vac Σ	63.3	44.1	23.8	26.5	17.1	9.82	6.92	5.93	5.44			
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1020	1.020	1000	→	→	→	→	→	→			
(M) ρdc/ρac =ExL/K	1.000	1004	1.004	1.003	1011	1006	1030	1.040	1093			
(N) PFE=(M-1)(10^2)	0	0	0	0	1	1	3	4	9			
(O) MCF=(M-1)(10^5)/H	0	6	6	5	21	14	61	62	143			
			0.0	0.6	1.3	2.1	3.9	6.5	9.3			
	0.0	0.4	0.2	-0.3	0.1	-1.5	-0.9	-2.5	0.0	← Coupling corr ρ=62		
	0	6	3	-5	2	-34	-18	-41	0			

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: 3/12/64 #3 Date:

Send	1	2	3	4	5	6	7	8	9			
Receive												
Time												
Range												
Current	3500	3500	4000	→				3600	3600			
Send												
Receive												
Time												
Range												
Current												

INDUCED POLARIZATION SENDER NOTES

Project: SOD Line: #4 Date: 2/12/62

Send	1	2	3	4	5	6	7	8	9			
Receive												
Time												
Range												
Current	2100	2100	2100	2100	→							
Send												
Receive												
Time												
Range												
Current												

INDUCED POLARIZATION - RECEIVER NOTES PAGE

Project: S.O.O. Expander Line: 3 - N50°W I Int.Cal Date: 7/12/84

Send	1	2	3	4	5	6	7	8	9			
Rec.												
Time	100	100	30	30	30	30	30	10	10			
DC-1	80.0 79.7	26.0 24.8	13.2 10.0	11.6 11.5	9.7 9.6	8.5 8.5	7.5 7.5 6.6 6.6	5.25 5.47 5.53 5.44	4.05 4.28 4.67 0.96			
DC-2	79.7 80.0	24.8 26.0	13.0 13.3	11.4 11.5	9.6 9.8	8.5 8.5	6.6 7.0 7.5 7.3	5.46 5.70 5.23 5.28	4.65 4.68 4.05 3.97			
Σ	79.7 79.7	50.8 50.8	26.2 26.3	22.9 22.8	19.3 19.6	17.0 17.0	14.1 14.5 14.1 13.1	10.71 10.77 10.76 10.68	8.70 8.72 8.71 5.37			
DC-3	80.0 79.7	26.0 24.8	13.3 13.0	11.5 11.8	9.8 9.8	8.4 8.6	7.3 7.4 6.8 6.8	5.37 5.30 5.03 5.45	4.15 3.98 4.63 4.83			
Dc-4	79.7 80.0	24.8 26.0	13.1 13.3	11.4 11.5	9.8 9.8	8.6 8.5	6.8 6.8 7.3 7.4	5.37 5.42 5.38 5.35	4.50 4.66 4.03 3.80			
Σ	79.3 79.3	50.8 50.8	26.4 26.3	22.9 22.9	19.6 19.6	17.0 17.0	14.1 14.2 14.1 14.2	10.70 10.72 10.75 10.72	8.65 8.69 8.66 8.80			
DC-AV	79.7	50.8	26.3	22.9	19.6	17.0	14.15	10.73	8.70			
AC-1	40.5	26.0	13.1	11.3	9.7	8.3	6.8	5.01	3.97			
AC-2	40.5	25.9	13.1	11.3	9.7	8.3	6.8	5.03	3.98			
Σ	81.0	51.9	26.2	22.6	19.4	16.6	13.60	10.04	7.95			
S. P.	+10.8	-6.1	+1.1	+8.5	+2.0	-7.6	+3.6	+10.2	+9.8			
AC-N	.07	.02	.04	.06	.05	.04	.08	.04	.09			
I.G.	51.2	51.0	50.9	51.0	50.9	50.5	50.7	50.4	50.5			

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: S.O.O. Eyard Line: 4 N 60° E I Int.Cal _____ Date: 3/13/64

Send	1	2	3	4	5	6	7	8				
Rec.												
Time Range	100	30	30	30	10	10	10	10				
DC-1	27.7 27.6	14.0 13.1	6.3 6.2	[illegible]	5.00 4.84 4.80 4.72	3.66 3.68 3.62 3.60	3.18 3.16 2.95 3.06	2.57 2.56 2.95 3.54				
DC-2	27.6 27.7	13.2 13.8	6.3 6.3	6.3 6.3	4.80 4.90 5.00 4.90	3.60 3.60 3.64 3.72	2.90 2.94 3.15 3.17	2.75 2.57 2.63 2.62				
Σ	55.3 55.3	27.2 27.1	12.5 12.5	12.4 12.4	9.80 9.74 9.80	7.26 7.28 7.26 7.32	6.08 6.10 6.10 6.13	5.32 5.43 5.45 5.46				
DC-3	27.7 27.6	14.0 13.2	6.3 6.3	6.1 6.1	4.95 4.86 4.92 5.00	3.64 3.74 3.60 3.56	3.14 3.18 3.00 2.91	2.63 2.61 2.95 2.86				
Dc-4	27.6 27.7	13.2 13.0	6.1 6.0	6.3 6.1	4.88 5.00 4.97 4.77	3.60 3.46 3.68 3.70	3.00 2.86 3.14 3.13	2.14 2.83 2.56 2.61				
Σ	55.3 55.3	27.2 27.2	12.5 12.5	12.4 12.4	9.83 9.86 9.89 9.77	7.24 7.26 7.28 7.26	6.08 6.09 6.10 6.10	5.37 5.44 5.37 5.47				
DC-AV	55.3	27.2	12.1	12.4	9.81	7.27	6.10	5.46				
AC-1	28.0	13.6	6.0	6.1	4.84	3.57	2.94	2.63 .90				
AC-2	28.0	13.5	6.0	6.2	4.84	3.57	2.94	2.59 .83				
Σ	56.0	27.1	12.0	12.3	9.68	7.14	5.88	4.90?				
S. P.	+3.9	+8.7	-1.0	+6.4	+16.1	+2.0	+6.4	+9.1				
AC-N	.01	.05	.10	.15	.25	.34	.59	.83				
I.C.	50.7	50.7	50.6	50.7	50.6	50.6	50.7	50.3				

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project S.O.D. Expander Line 3 Field date 3/12/64 Data page_____ Comp. date 3/12/64. Comp by [illegible]

N50°W

(A) Send	1	2	3	4	5	6	7	8	9			
(B) Receive	125	250	500	750	1000	1500	2000	2500	3000			
(C) n separation												
(D) I	3500	3500	4000	4000	4000	4000	4000	3600	3600			
(E) Vdc (avg)	79.7	50.8	26.3	22.9	19.6	17.0	14.15	10.77	8.70			
(F) DCcal USED	1.000	→	→	→	→	→	→	→	→			
(G) Kn x 10^{-3}	1.5	3	6	9	12	18	24	30	36		3	
(H) ρ dc=ExFxGx10^3/D	34.2	43.6	37.4	51.5	58.8	76.5	85.0	89.4	87.0			
(I) Vac Σ	81.0	51.9	26.2	22.6	19.4	16.6	13.60	10.04	7.95			
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.020	1.020	1.000	→	→	→	→	→	→			
(M) ρ dc/ρac=ExL/K	1.003	1.000	1.003	1.012	1.010	1.024	1.040	1.070	1.094			
(N) PFE=(M-1)(10^2)	0	0	0	1	1	2	4	7	9			
(O) MCF=(M-1)(10^5)/H	9	0	8	23	17	31	47	78	108			
	0.0		0.2	0.6	1.0	2.2	4.0	6.6	9.4			
	0.3	0.0	0.1	0.6	0.0	0.2	0.0	0.4	0.0			
	9	0	13	12	0	3	0	4	0			

← coupling corr data
ρ = 60

Project_____ Line 9 Field date 12 Data page 0 Comp. date_____ Comp by_____

N 90° E

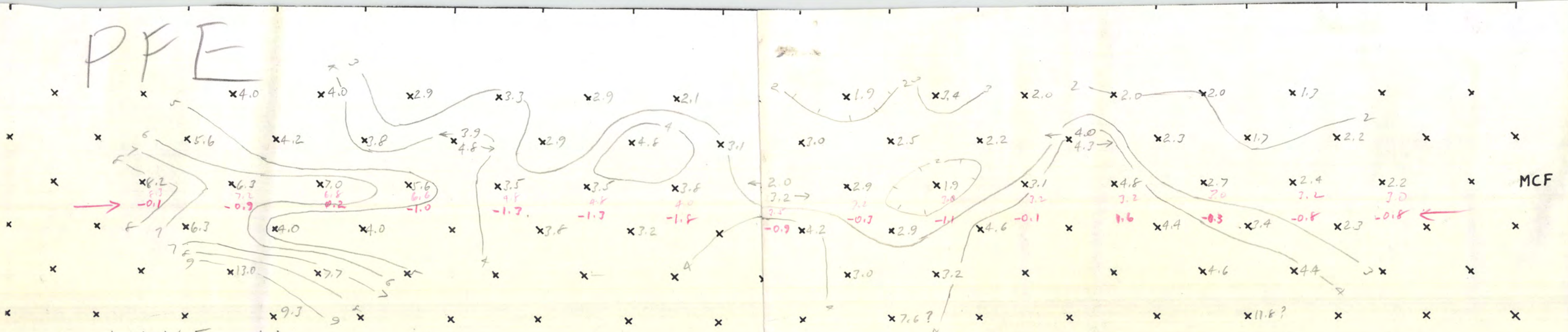
(A) Send	1	2	3	4	5	6	7	8				
(B) Receive						1500	2000	2500				
(C) n separation												
(D) I	2100	→	→	→	→	→	→	→				
(E) Vdc (avg)	55.3	27.2	12.1	12.4	9.81	7.27	6.10	5.46				
(F) DCcal												
(G) Kn x 10^{-3}	1.5	3	6	9	12	18	24	36			4	
(H) ρ dc=ExFxGx10^3/D	39.5	38.9	34.6	53.1	56.1	62.3	69.8	77.9				
(I) Vac Σ	56.0	27.1	12.0	12.3	9.68	7.14	5.88	2.63 2.59				
(J) AC noise x 2						.72	1.18	[illegible]				
(K) Vac (corr) = $\sqrt{I^2 - J^2}$						7.10	5.76	2.47 2.46 4.94				
(L) AC-DC cal.	1.020	1.000	→	→	→	→	→	→				
(M) ρdc/ρac =ExL/K	1.006	1.003	1.008	1.008	1.013	1.023	1.059	1.103				
(N) PFE=(M-1)(10^2)	1	0	1	1	1	2	6	11				
(O) MCF=(M-1)(10^5)/H	15	8	23	15	23	37	84	142				
	0.1	0.0	3	0.8	1.3	2.8	5.5	9.0				
	0.6	0.2	0.5	0.0	0.0	-0.5	0.4	1.3				
	15	5	14	0	0	-8	6	17				

← coupling corr data
ρ = 46

LINE Z
LINE Y
LINE X
LINE W
LINE V
LINE U
R.12 E.
R.13 E.
T. 18 S.
T. 19 S.
CANADA — LAND — GRANT — BOUNDARY
Spread 1
Spread 2
DDH
Proposed Additional I.P. spreads
Interpreted Surface projection of zone of major sulfide mineralization
PFE
Inductive Coupling Corrected in part
Interpreted surface projection possible of sulfide fringe
Sulfide outside sulfide zones
PFF 3N
Coupling Corrected

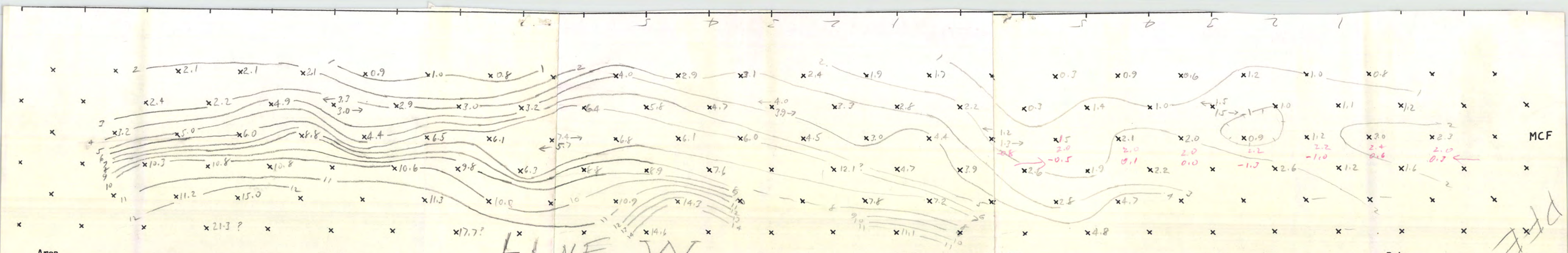
INDUCED POLARIZATION WORK SHEET

PFE

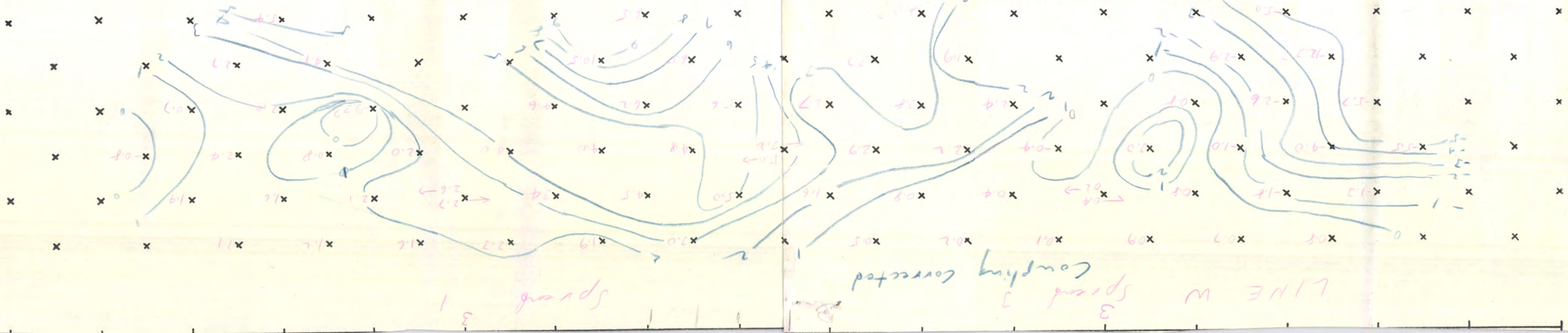


Area LINE U Scale Date

Scale Date


MCF
LINE W
Area
Scale
Date
Scale
Date
Scale
Date

INDUCED POLARIZATION WORK SHEET



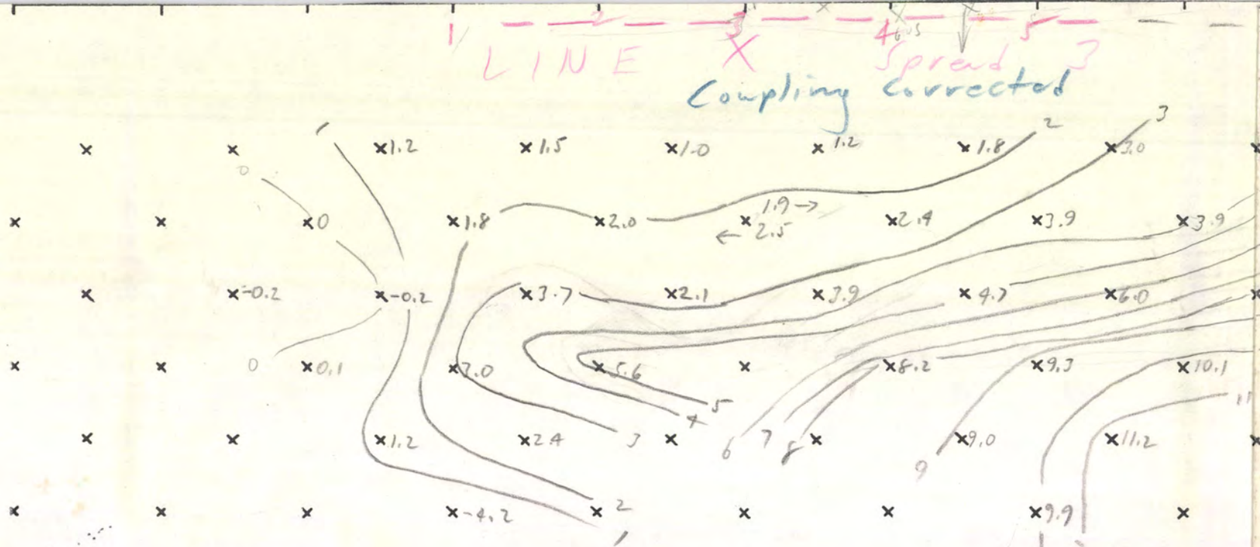
INDUCED POLARIZATION WORK SHEET

INDUCED POLARIZATION WORK SHEET

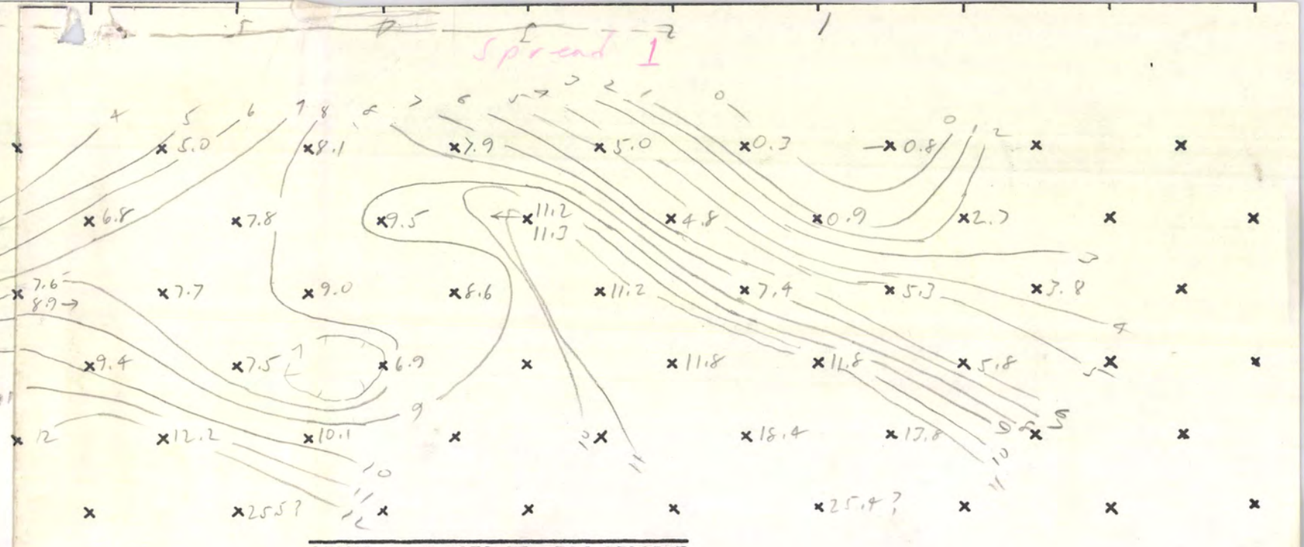
INDUCED POLARIZATION WORK SHEET

LINE X Spread 3

Coupling Corrected



Spread 1



Area _____ Scale _____ Date _____

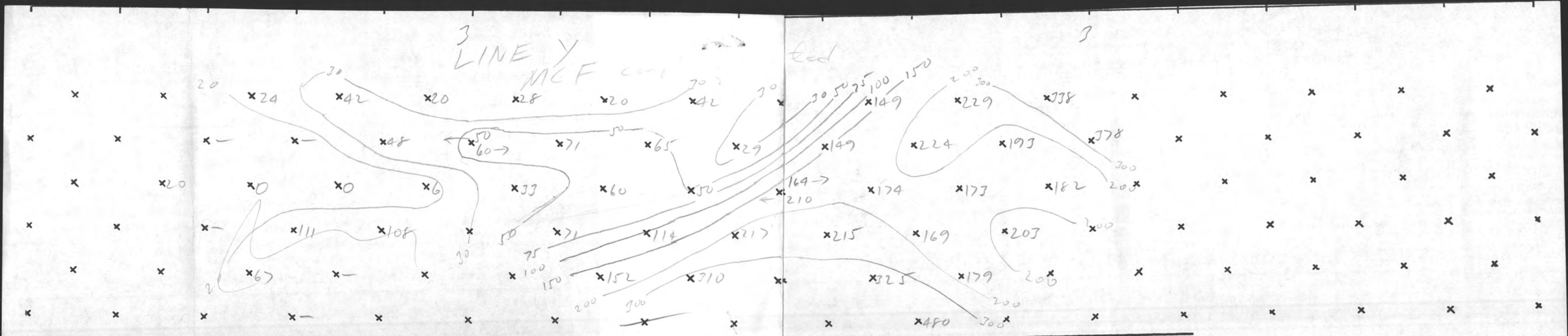
INDUCED POLARIZATION WORK SHEET

PFE

INDUCED POLARIZATION WORK SHEET

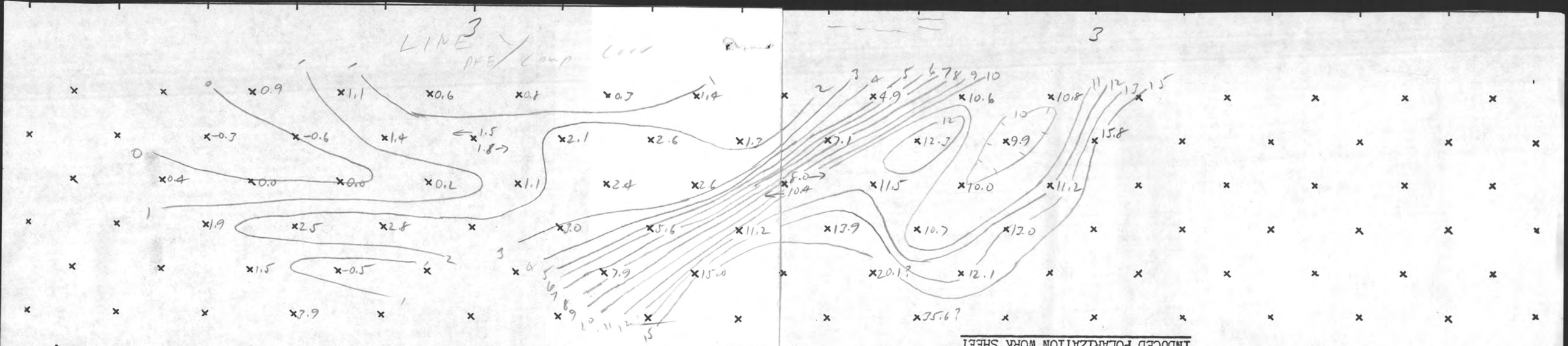
INDUCED POLARIZATION WORK SHEET

INDUCED POLARIZATION WORK SHEET



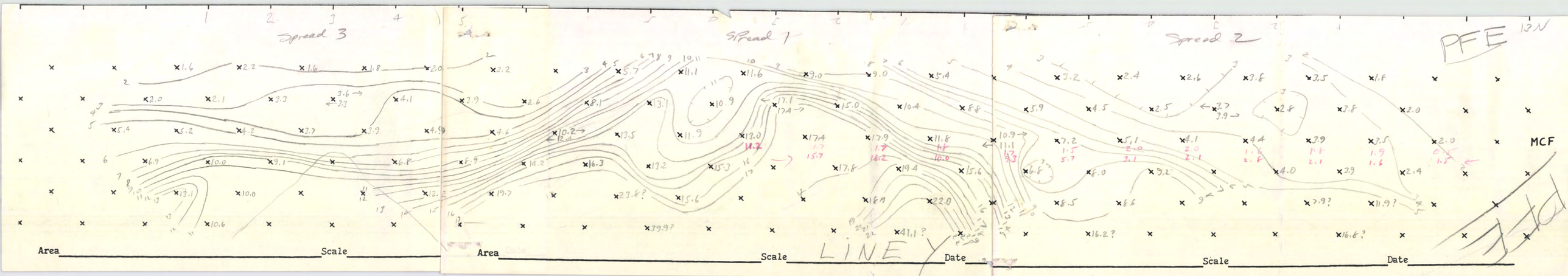
Area _____ Scale _____ Date _____

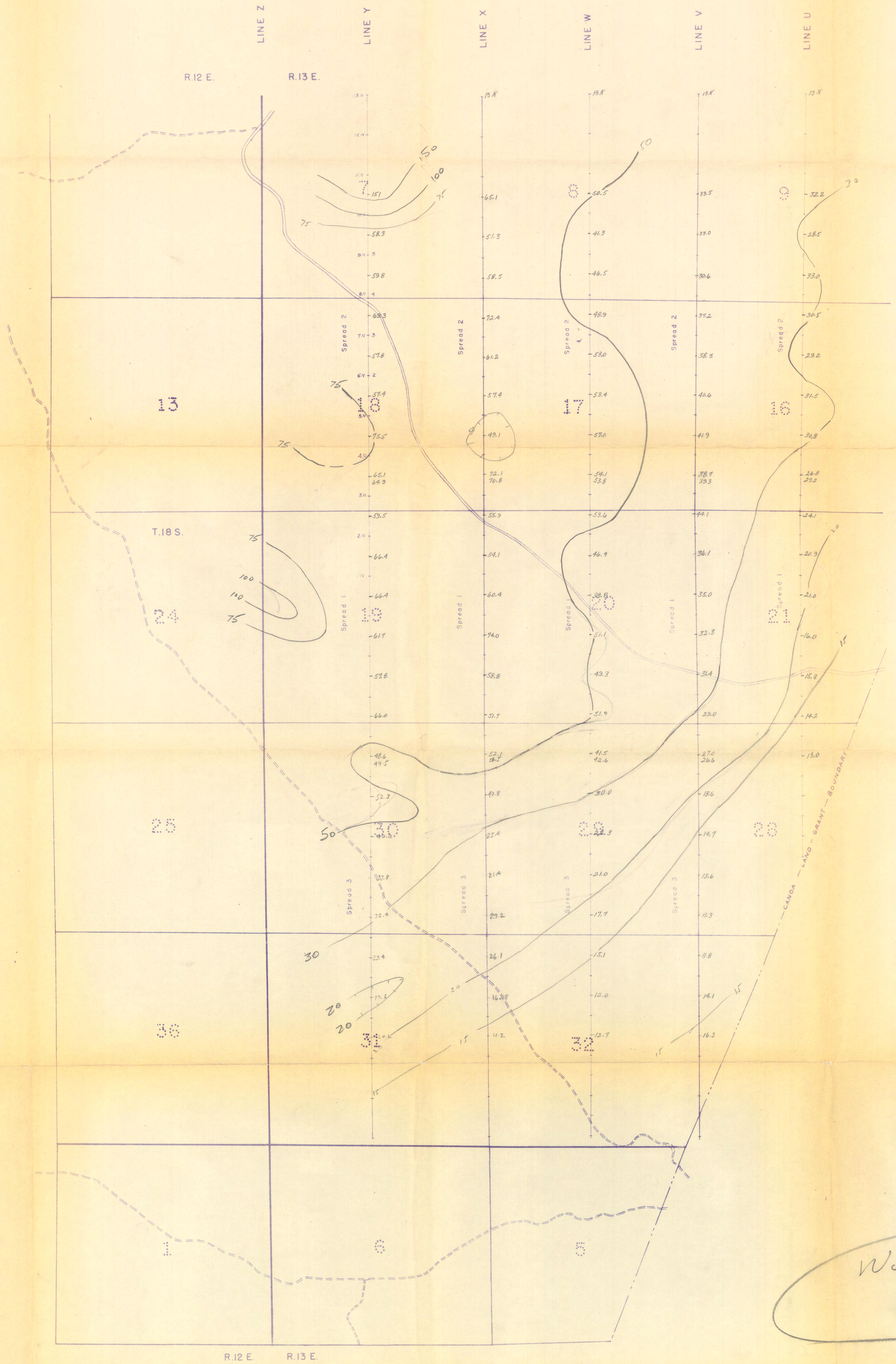
INDUCED POLARIZATION WORK SHEET



Area _____ Scale _____ Date _____

INDUCED POLARIZATION WORK SHEET


Spread 3
Spread 1
Spread 2
PFE
MCF
LINE Y
Area
Scale
Date



20 —
30 —
50 —
75 —
100 —
150 —
200 —

3N

WORK MAP
Resistivity

SUPPLEMENTAL
INDUCED POLARIZATION COVERAGE
Demetrie Wash Area
Pima Mining District

Pima County, Arizona

April 1964

for
THE SUPERIOR OIL COMPANY
Minerals Division
Tucson, Arizona

by

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

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Conclusions & Recommendations	2
Interpretations	3

Appended;-------Basis of the Induced Polarization Method (Revised)

In Map Pocket:

1) Percent Frequency Effect Inductive Coupling Corrected Contour Plan

2) Apparent Resistivity Contour Plan

3) Metallic Conduction Factor Contour Plan

4) Percent Frequency Effect Uncorrected Contour Plan

5) Sectional Data Sheet Line 1A

6) Sectional Data Sheet Line 2A

INTRODUCTION

At the request of The Superior Oil Company, Heinrichs Geoexploration Company conducted and completed supplemental induced polarization work to the February-March 1964 Demetrie Wash Area job from April 20 to April 23.

This work consisted of two spreads of dual frequency, dipole-dipole electrode configuration induced polarization traverses with 1,000 ft. dipoles. The total ground covered was 24,000 ft. of which 14,000 ft. was plotted data points.

Line 1A was centered at 5.5S, Line X and oriented N 70° W - S 70° E as per recommendation "4" of the initial report. The purpose of this spread was to better resolve the southern fringe anomaly on Line X.

Line 2A was oriented N 65° E - S 65° W and centered 3,500 ft. S 65° W from section corner $\frac{13/18}{24/19}$, changed slightly from recommendation "6" of the previous report. This spread was run to test the western extension of the anomalous trend in section 24.

The data are presented on our standard sectional data sheets and the four contour plan maps have been revised to show the new data. Appended is a revised I. P. theory, technique and interpretation synopsis.

CONCLUSIONS AND RECOMMENDATIONS

1.) Line 1A shows moderate anomalism reflecting sulfides of about 1 to 5% by volume at a depth of around 750 +/- 250 ft. below surface from 1W to 1E.

2.) The above zone should be checked out by at least one 2,000 ft. drill hole in the near vicinity of 5.5S on Line X.

3.) Line 2A shows moderate anomalism from 1E to 2E indicative of sulfides from 1 - 5% by volume starting at a depth within 200 ft. of the surface. Also, there is a fringe of sulfide for around 1,000 ft. on either side of the stronger zone.

4.) Because of (3.), the northeast half of section 24 should be tested in several places, say at 1.5E and 3.0E on Line 2A and about 1,000 ft. west of 0.5S on Line Z.

5.) Additional geophysics may be useful after the results of an initial drilling program have been studied in that if any interesting mineralized trends are encountered, detailed geophysics may be able to map them and provide additional and more refined targets. In addition, if the land situation permits, further work to the northwest would be useful as the sulfides are still not cut off in that direction.

6.) Since the I. P. method tends to focus attention on magnitude and location of sulfides without regard to kind, we feel obliged to remind all concerned, that the better ore values <u>may</u>

lie along the margin or edges of higher sulfide zones--with the high-sulfide acting as a sort of halo effect.

INTERPRETATION

Line 1A: After correcting for inductive coupling interference, anomalous frequency effects and metallic conduction factors remained, indicative of a zone of sulfides from 1 to 5% by volume from 1W to 1E at a depth of 750 +/- 250 ft. The eastern contact of this sulfide zone is quite sharp, indicating a near vertical boundary; however, the zone may continue, at depth, to the east. The western boundary is not very apparent and may extend past 1W particularly at depth. If the drill hole at 5.5 Line X proves at all of interest, then it may be advisable to continue Line 1A both east and west and perhaps run several lines parallel to it. The north-south lines surveyed originally are quite far spaced and not ideally suited to detect a northerly-southerly striking feature as this sulfide tongue.

Resistivities add nothing to the interpretation on the initial report.

Line 2A: Anomalous metal factors and frequency effects were noticed on the eastern half of this spread. The strongest effects occur between 1E and 2E, fringing out to weaker effects. This anomalism is due to sulfide of from 1 to 5% by volume at a depth less than 200 ft. below surface. Neither the eastern nor western

contacts are very sharp, in fact, the eastern contact has not been definitely established.

Resistivities indicate a more electrically resistant material at perhaps 300 feet below surface in the vicinity of 1E, probably a granitic rock and likely the same material noticed on Line Z.

Demetrie Wash is perhaps reflecting the structure that discontinues the sulfides to the west, but resistivity-wise, there is no sharp discontinuity. However, west of the wash, it is possible that a non-mineralized granitic rock underlies the outcropping andesites for there is a marked increase in resistivity with depth.

Apparently the strongly anomalous sulfide zone is narrowing to the northwest with the fringe zone proportionately increasing.

Respectfully submitted,

HEINRICHS GEOEXPLORATION CO.

Chris S. Ludwig

Chris. S. Ludwig
Geophysicist

April 28, 1964
P. O. Box 5671
Tucson, Arizona

SUPPLEMENTAL
INDUCED POLARIZATION COVERAGE
Demetrie Wash Area
Pima Mining District

Pima County, Arizona

April 1964

COPY

for
THE SUPERIOR OIL COMPANY
Minerals Division
Tucson, Arizona

by

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

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Respectfully submitted,

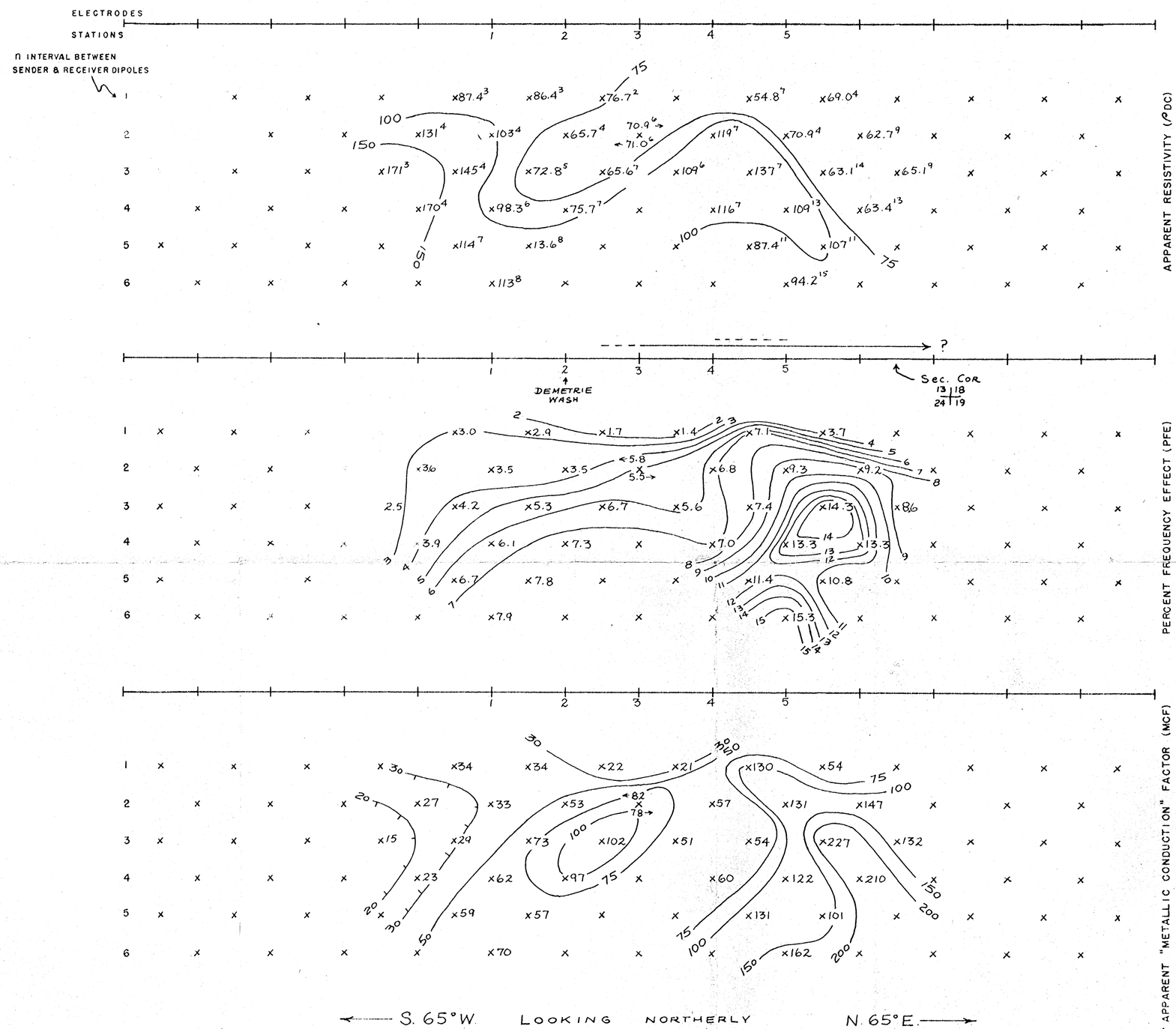
HEINRICHS GEOEXPLORATION CO.

Chris S. Ludwig

Chris. S. Ludwig
Geophysicist

COPY

April 28, 1964
P. O. Box 5671
Tucson, Arizona



EXPLANATION

ELECTRODE ARRAY: 1000' — n × 1000' — 1000'; SENDER DIPOLE; RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

SECTIONAL DATA SHEET

LINE No. 2-A

INDUCED POLARIZATION TRAVERSE

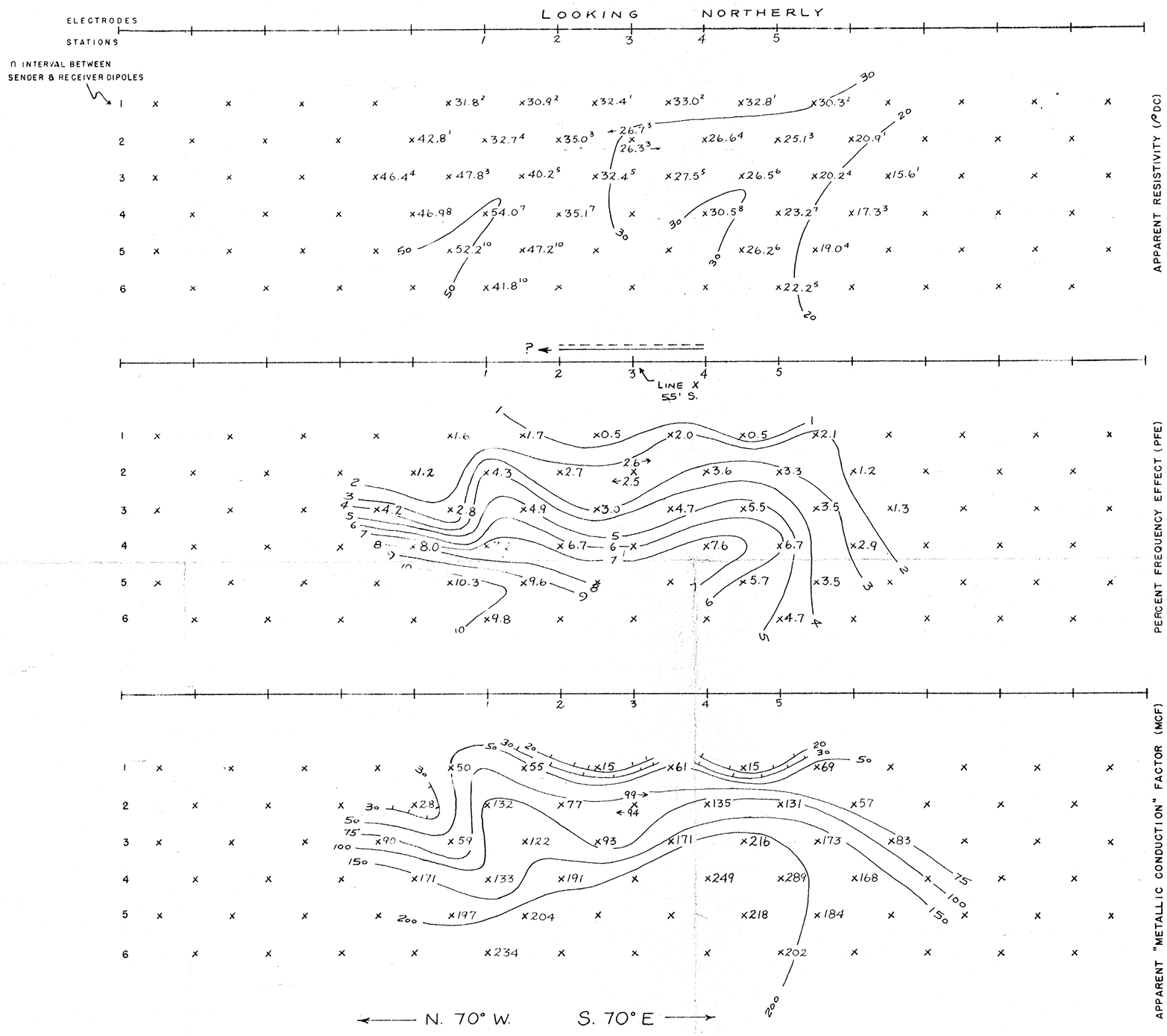
DEMETRIE WASH PROJECT

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: APRIL 1964

FOR

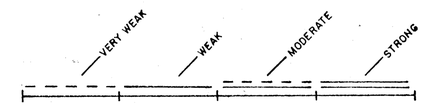
THE SUPERIOR OIL COMPANY
MINERALS DIVISION



EXPLANATION

ELECTRODE ARRAY: 1000' — n × 1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH



SECTIONAL DATA SHEET

LINE No. 1-A

INDUCED POLARIZATION TRAVERSE

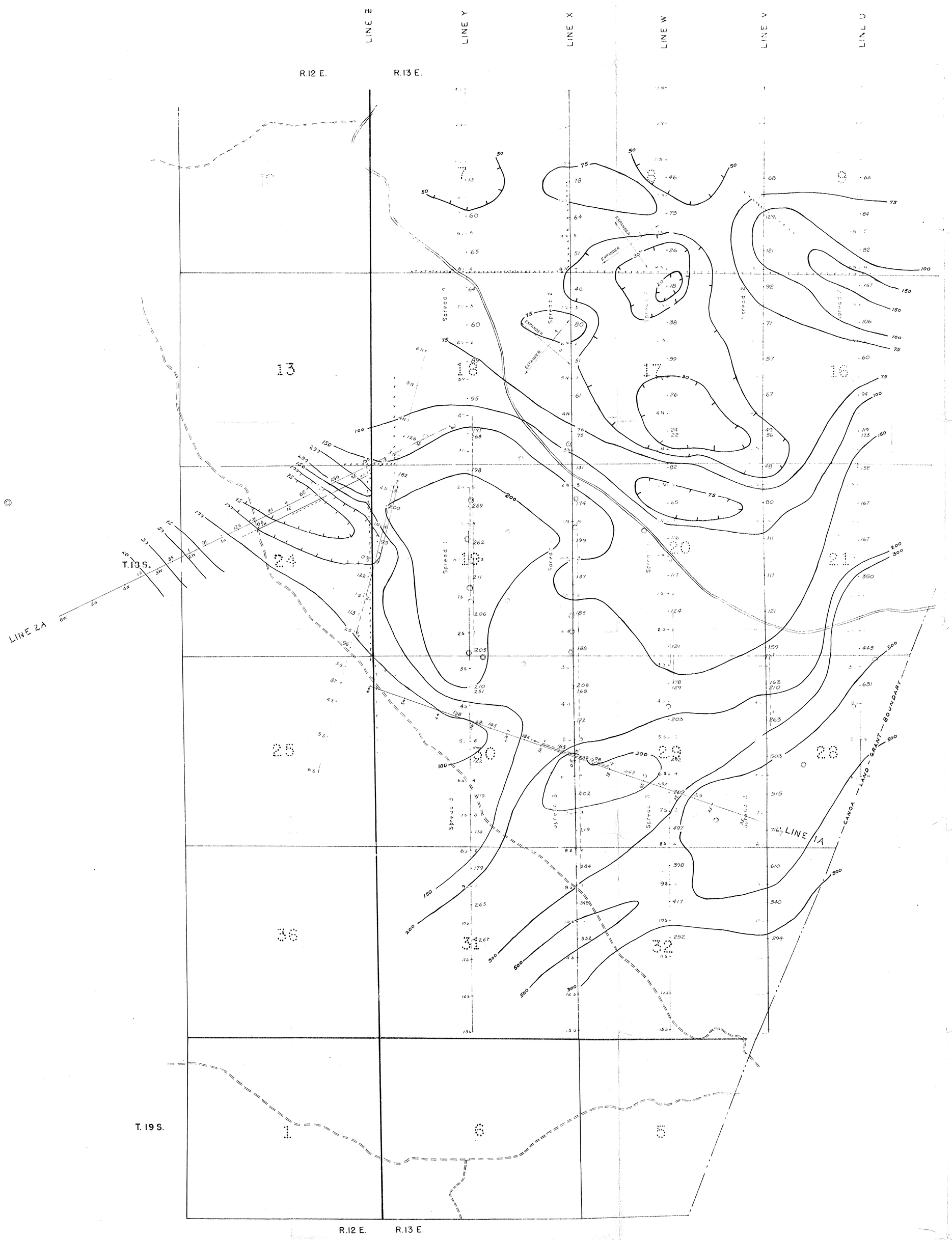
DEMETRIE WASH PROJECT

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: APRIL 1964

FOR

THE SUPERIOR OIL COMPANY
MINERALS DIVISION



Fence Line
Power & Phone Line
Unimproved Road
Improved Road
Scribed Rock Corner Located
Drill Hole

NOTE: True spacial significance of data is interpretational, also see sectional data sheets and basis of I. P. method.

RELATIVE ANOMALY STRENGTH

N

METALLIC CONDUCTION FACTOR
CONTOUR PLAN

3n INTERVAL SEPARATION
(BETWEEN SENDER & RECEIVING DIPOLES)

ELECTRODE ARRAY:

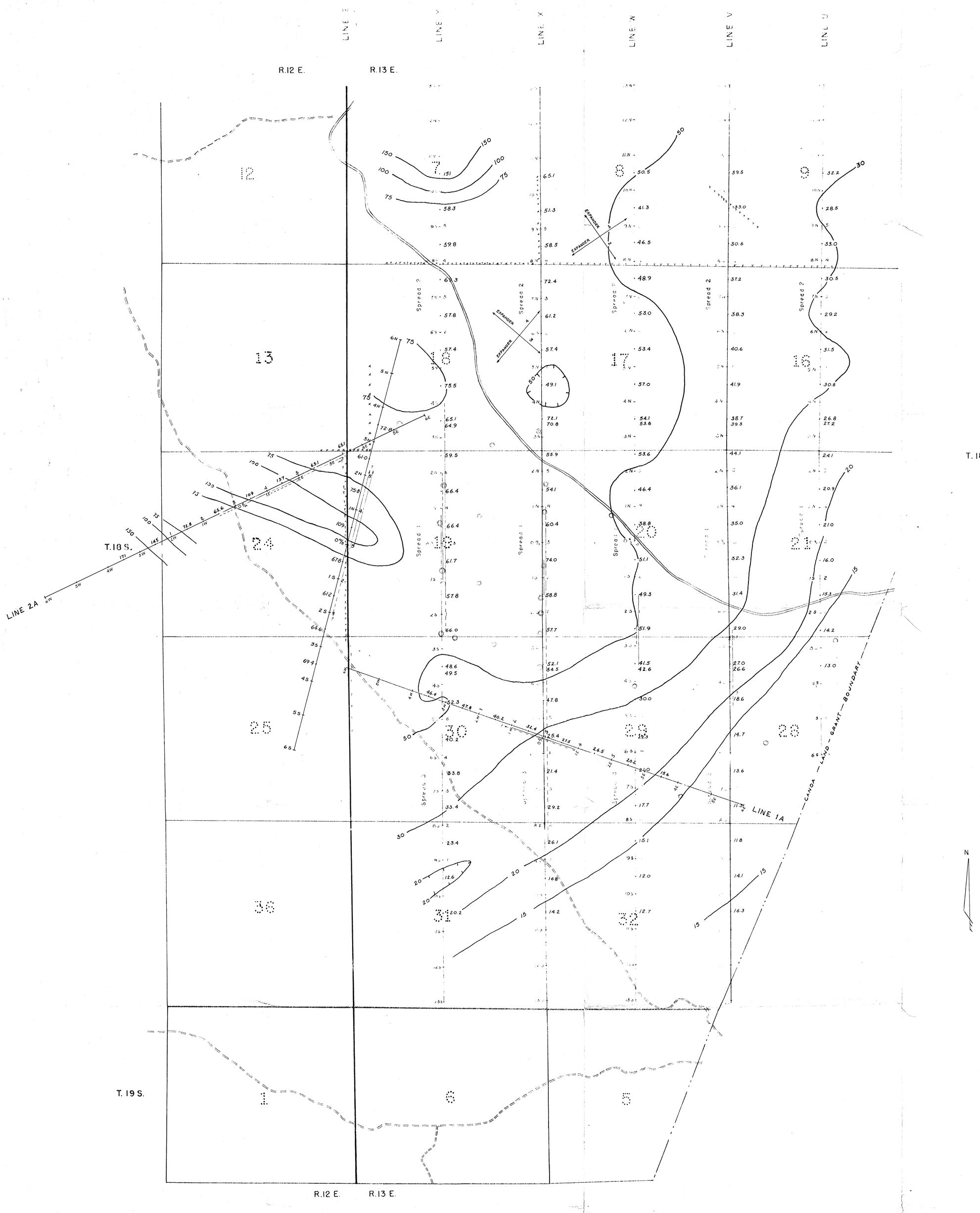
1000' — 3n = 3000' — 1000'

sender dipole — receiver dipole

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

INDUCED POLARIZATION SURVEY
DEMETRIE WASH PROJECT
FOR
THE SUPERIOR OIL COMPANY - MINERALS DIVISION
TWIN BUTTES MNG. DISTRICT
PIMA COUNTY, ARIZONA

SCALE 1" = 1000'	CONTOUR INTERVAL: LOG.	REVISIONS
	DATA BY: C.S., & K.H.	4/64
DATE: MARCH, 1964	SHEET 2 OF 4	
DRAWN BY: D.C.B.	DRAWING NO.:	FILE:



Fence Line
Power & Phone Line
Unimproved Road
Improved Road
Scribed Rock Corner Located
Drill Hole

NOTE: True special significance of data is interpretational, also see sectional data sheets and basis of I. P. method.

RELATIVE ANOMALY STRENGTH

APPARENT RESISTIVITY
CONTOUR PLAN

3n INTERVAL SEPARATION
(BETWEEN SENDER & RECEIVING DIPOLES)

ELECTRODE ARRAY:

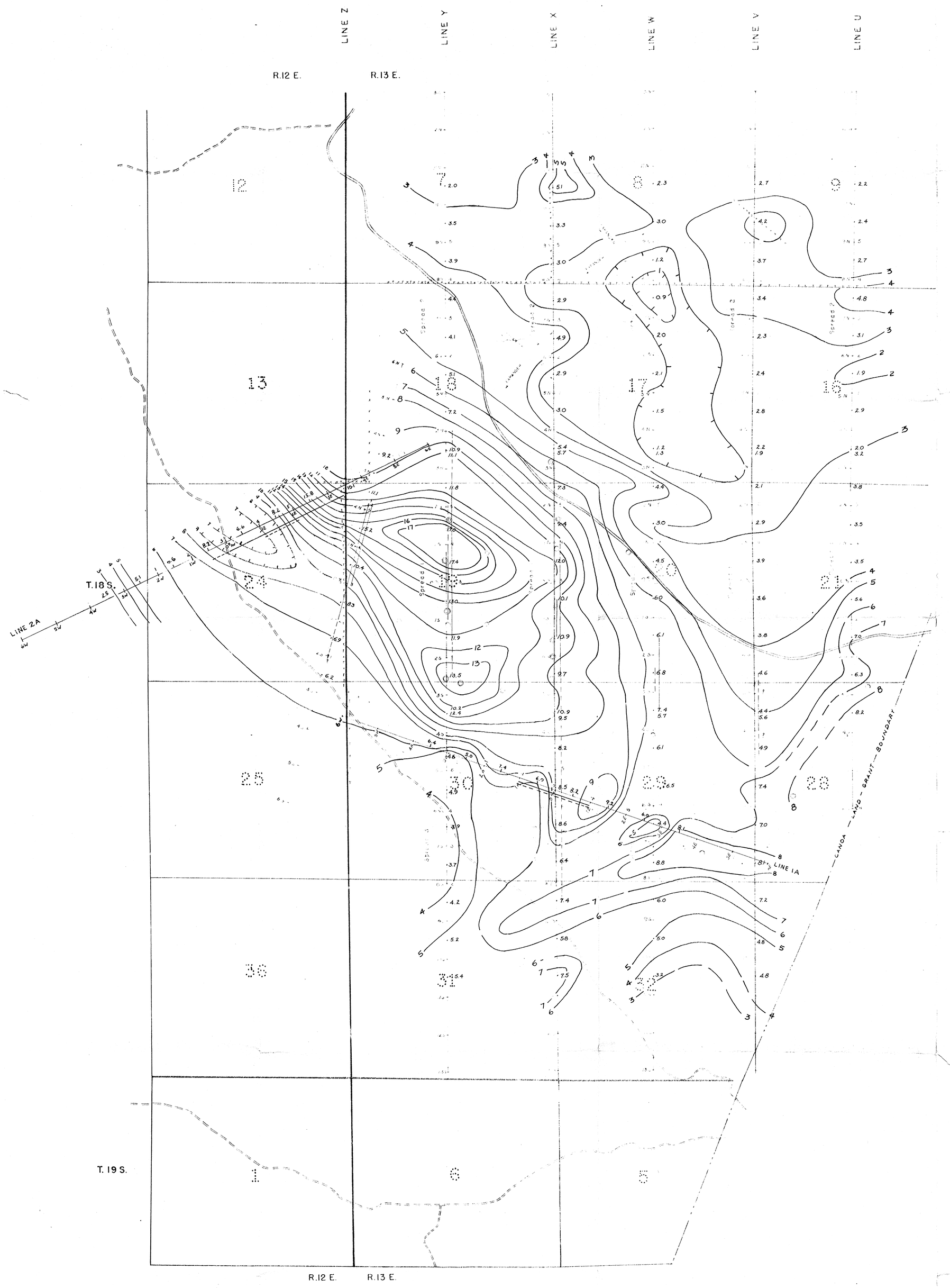
1000' — 3n = 3000' — 1000'

sender dipole — receiver dipole

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

INDUCED POLARIZATION SURVEY
DEMETRIE WASH PROJECT
FOR
THE SUPERIOR OIL COMPANY - MINERALS DIVISION
TWIN BUTTES MNG. DISTRICT
PIMA COUNTY, ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL: LOG	REVISIONS	
	DATA BY: C.S.L. & K.H.		4/64
DATE: MARCH, 1964	SHEET 3 OF 4		
DRAWN BY: D.C.B.	DRAWING NO.	FILE:	



- x - x - Fence Line
- Power & Phone Line
- Unimproved Road
- Improved Road
- Scribed Rock Corner Located
- Drill Hole

NOTE: True spacial significance of data is interpretational, also see sectional data sheets and basis of I. P. method.

RELATIVE ANOMALY STRENGTH

N

UNCORRECTED
PERCENT FREQUENCY EFFECT
CONTOUR PLAN

3n INTERVAL SEPARATION
(BETWEEN SENDER & RECEIVING DIPOLES)

ELECTRODE ARRAY:

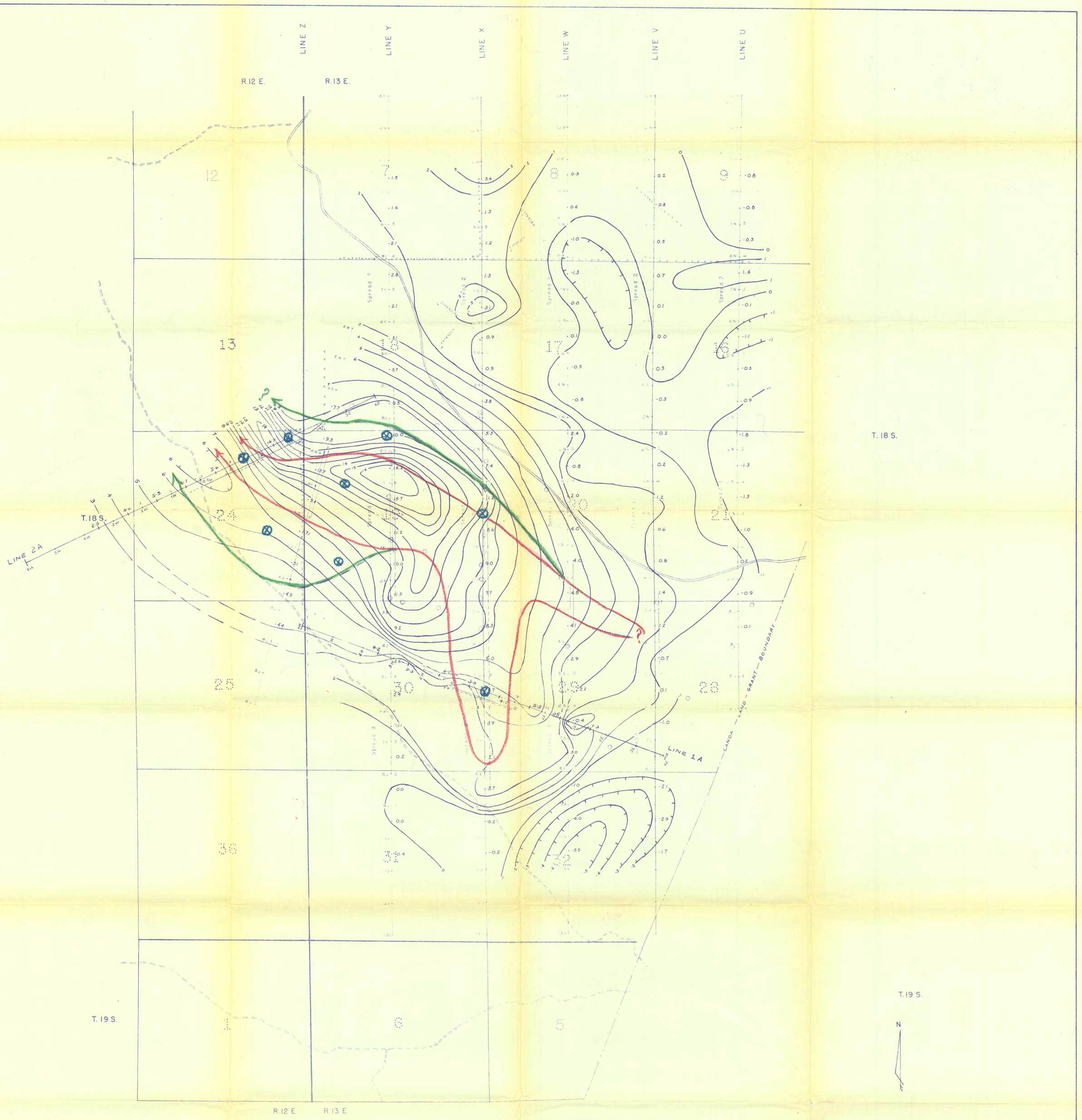
1000' — 3n = 3000' — 1000'

sender dipole — receiver dipole

HEINRICHS GEOEXPLORATION COMPANY
P.O Box 5671 Tucson, Arizona

INDUCED POLARIZATION SURVEY
DEMETRIE WASH PROJECT
FOR
THE SUPERIOR OIL COMPANY - MINERALS DIVISION
TWIN BUTTES MNG. DISTRICT
PIMA COUNTY, ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL: 1 PFE	REVISIONS
	DATA BY C.S.L. & K.H.	4-64
DATE: MARCH, 1964	SHEET 4 OF 4	
DRAWN BY: D.C.B.	DRAWING NO.:	FILE:



PERCENT FREQUENCY EFFECT
INDUCTIVE COUPLING CORRECTED
CONTOUR PLAN

3n INTERVAL SEPARATION
(BETWEEN SENDER & RECEIVING DIPOLES)

ELECTRODE ARRAY:

1000' — 3n = 3000' — 1000'

sender dipole — receiver dipole

Fence Line
Power & Phone Line
Unimproved Road
Improved Road
Scribed Rock Corner Located
Drill Hole

NOTE: True special significance of data is interpretational, also see sectional data sheets and basis of I.P. method.

RELATIVE ANOMALY STRENGTH

Interpreted surface projection of zone of major sulfide mineralization

Interpreted surface projection of possible sulfide fringe.

Proposed additional I.P. spreads.

Proposed drill holes

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

INDUCED POLARIZATION SURVEY
DEMETRIE WASH PROJECT
FOR
THE SUPERIOR OIL COMPANY - MINERALS DIVISION
TWIN BUTTES MNG. DISTRICT
PIMA COUNTY, ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL: 1 PFE	REVISIONS
	DATA BY: C.S.L. & K.H.	4-64
DATE: MARCH, 1964	SHEET 1 OF 4	
DRAWN BY: D.C.B.	DRAWING NO.:	FILE:

April 29, 1964

The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Gentlemen:

Attached herewith are the following reproducable maps which accompany the "Supplemental I. P. Coverage" report which was delivered to your office today.

The maps are:

(MYLAR) 1-----P. F. E.
1-----M. C. F
1-----Resistivity
1-----Coupling Corrected P.F.E.

(Sepia) Sectional Data Sheets (2)
Line 1a
Line 2a.

Sincerely yours,

EGH:jh

E. Grover Heinrichs

Enclosures:6

COPY

April 29, 1964

The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Gentlemen:

Enclosed herewith find one original and two copies of our report "Supplemental Induced Polarization Coverage, Demetrie Wash Area, Pima Mining District, Pima County Arizona"

Should you have any questions regarding this report, please contact us.

Sincerely yours,

E. Grover Heinrichs
Vice President

EGH:jh

Enclosures: 3

COPY

HEINRICHS
GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA

INDUCED POLARIZATION SURVEY

Demetrie Wash Area
Pima Mining District
Pima County, Arizona

February - March 1964

for
THE SUPERIOR OIL COMPANY
Minerals Division

by

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

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Interpretation - - - - - - - - - - - - - - - - -	4
Basis of I. P. Method - - - - - - - -	Appendix

In Red Tab Map Pocket

6 Sectional Data Sheets - Lines U, V, W, X, Y, and Z

In Zipper Map Pocket

4 Contour Plans:

Percent Frequency Effect Coupling Corrected

Metallic Conduction Factor

Apparent Resistivity

PFE Uncorrected

INTRODUCTION

At the request of The Superior Oil Company, Minerals Division, Heinrichs Geoexploration Company has conducted and completed induced polarization field work during the interval of February 10 to March 25, 1964 in the Demetrie Wash Area, Pima Mining District, Pima County, Arizona.

A total of fifteen spreads, making up six lines on a 1000 foot dipole spacing were run, giving 135,000 feet or 25.6 miles of line surveyed and 105,000 feet or 19.9 miles of subsurface data plot points. The data were taken on a dipole-dipole electrode configuration using the dual frequency technique.

In addition to the above spreads, four expanding dipole-dipole spreads were completed as a separate project; however, the results will be mentioned in this report.

The data are presented on sectional data sheets, one for each of the six lines. A plan map is included to show the line and spread locations and the surface projection of the interpretation. Plan overlays giving the third separation contoured results of resistivity, PFE, MCF and inductive coupling corrected PFE's are also included.

Personnel involved in this job were Mr. C. S. Ludwig, geophysicist in charge, F. F. Hanly, K. Hensen, R. Palmer, D. Anderson, M. Padilla technical field assistants. Mr. W. E. Heinrichs, Jr. and Mr. E. G. Heinrichs assisted in the final interpretation of results.

CONCLUSIONS AND RECOMMENDATIONS

1. A definite zone of perhaps 1% to 5% average total sulfide by volume, was encountered. It trends N 65° W - S 65° E for at least 12,000 feet, is about 5,000 feet wide at the known western limit, narrowing to about 1,000 feet or less at the eastern end. The sulfide source width is of course less than the anomalous zone being about 3,000 feet wide to the west, narrowing to less than 1,000 feet to the east.

2. These sulfides appear right at or very near the bedrock-alluvium interface which is about 200 feet below surface on the western most line deepening to around 500 feet to the east. The north and south interfaces generally are fairly sharp and dip steeply away from the zone.

3. The grade of the sulfides appears quite uniform throughout the entire anomalous zone and does not show any marked improvement in depth or any significant enriched zone.

4. An interesting minor anomaly appears from about 2.5S to 8.5S on Line X that may indicate a concentration of sulfides at depth,(750 ft. +/- 250 feet below surface) not on the main anomalous trend. We therefore recommend an I. P. spread on 1,000 foot spacing be centered at 5.5S Line X and oriented N 70° W - S 70° E in order to better resolve a potential drilling target in this area. This particular orientation was chosen so as to keep the effects of the

main anomaly at a minimum to better isolate this minor anomaly.

5. If it is not chosen to run the I. P. line mentioned above in No. 4, a vertical drill hole based on the existing data should be placed at or near 6.0S Line X and be drilled to around 2,000 ft. in order to fully evaluate the economic potential.

6. As the western extremity of the main anomaly is completely open to west--apparently continuing in full strength--additional I. P. work in this area would be of considerable value in further delimiting this sulfide zone. Therefore, we recommend a north-south 1,000 foot dipole spread be centered at ¼ cor. Sec. 13/24 (about ½ mile west of Line Z) if it is feasible to cross the Duval tailings pond in this area. If this is impractical, an alternate spread on the same spacing could be centered 800 feet south and 1,400 feet west of Sec. Cor. $\frac{13/18}{24/19}$, oriented N 70° E - S 70° W to avoid the tailings pond. Pending results, additional spreads even further west may be deemed important.

7. Drilling on the main anomalous trend and fringes should be limited to areas where the Bear Creek drilling was shallow and/or sparce. This gives several possibilities especially near Lines Y and Z. One would be 1,000 feet east of 1N, Line Z and another at 1,500 feet east of 1.5S, Line Z. Both holes should be drilled to around 2,000 feet.

8. The northern fringe noted on Lines X and Y would make good drilling targets. On Line X, a hole at 0 N/S drilled to

2,000 feet is recommended. On Line Y, the fringe could be tested at 2.5N by drilling to 2,000 feet.

9. The four expanders run in Section 8 and 18 north of the main anomaly were probably testing this area down to 2,500 feet below surface to which no sulfide mineralization above background was encountered.

10. Considering the large size and possible depth extent of this sulfide zone, and neglecting the areas already drilled, there is room for fifty or more 50,000,000 ton low grade ore bodies; therefore, to completely eliminate this occurrence as to economic significance would certainly require extensive drilling, or, at least some type of statistical approach short of saturation.

INTERPRETATION

Line U: No anomalism was encountered on this line except for effects that were due solely to inductive coupling interference resulting from the rather low resistivities especially on Spread 1.

Resistivities indicate a depth to bedrock of about 500 +/- 100 feet from 5.5N to the north end of the line. From 5.5N to the south, resistivity decrease indicates that either the alluvium deepens considerably or the rock type changes to one having little contrast with the alluvium--in which case no depth estimate can be made. At 3.5S to the south end of the line, another character change is present; the resistivities drop even further to a value most likely

due to a thick section of water saturated alluvium.

Line V: Strong metal factors and frequency effects appear especially on Spread 3. These effects are undoubtedly due to inductive coupling resulting from the quite low resistivities in what appears to be an alluvial trough from about 5.5S to 8.5S. Similar effects likely account for interest in the area nearby to the east, reportedly drilled by American Metal Climax. Upon correcting for these interfering effects, a minor anomaly remained apparently reflecting a sulfide source around 3S to 4S perhaps 500 Ft. +/- 100 ft. below surface. This zone is probably the easternmost extension of the large anomaly noted on the lines to the west and may actually only be a lateral effect due to the eastern nose of the main anomaly being several hundred feet west of this line.

From 0.5S to the north end of the line, resistivities indicate bedrock to be 500 ft. +/- 100 ft. below the surface. South of 0.5S the rock type changes or the alluvium deepens as was noticed on Line U. The probable alluvial basin from 5.5S to 8.5S was already mentioned in connection with the inductive coupling effects noted on this line. This basin is likely 750 to 1,000 feet deep with volcanics as the probable basement material.

Line W: Anomalous frequency effects and metallic conduction factors were found on this line from about 1.5S to 3.5S definitely due to sulfide mineralization. These effects are interpreted as due to a nearly vertical dipping dike-like zone of around 1,000 feet

in width and having a sub-outcrop 400 ft. +/- 100 feet below surface. The sulfide content is from 1.5 to 3 percent by volume showing no noticeable improvement with depth nor any significantly enriched zones.

Again, as on Lines U and V, inductive coupling effects were noticed, especially south of the anomaly because of reduced resistivities. The same rock types, structures and alluvial basin were encountered as on Line V but displaced 2,500 feet to the south indicating a northeast strike as opposed to the anomalie's northwesterly trend. Bedrock gradually rises to the north from the anomaly, being probably from 200 to 300 feet deep over most of Spread 2.

Line X: Again, anomalous frequency effects and metal factors were encountered. The strongest effects are from about 0.5 to 1.5S and moderate response 1,000 feet north and south of the strong zone. A weakly anomalous zone extends from 2.5S to 8.5S. The moderate to strongly anomalous zone is assuredly due to sulfides perhaps 2 to 3 percent by volume. This sulfide body is from 1,500 to 2,000 feet in width and buried 250 ft. +/- 100 ft. below surface. Again, as on Line W the zone is dike-like and has fairly steep dipping flanks; however, the sulfide mineralization may fringe out past the boundaries mentioned above. To the north, this fringe may be quite extensive--say out to 8.5S but more than likely, these fringing effects are due to a zone, perhaps discrete from the main

anomaly, several thousand feet in width and buried from 500 to 1,000 feet below surface somewhere between 3S and 8S. This lack of definite position is due to interfering effects from the main anomaly, greater depth of burial and inductive coupling complications.

Resistivities show the same rock types as on Lines U, V and W but again displaced about 2,500 feet south (relative to Line W). This line got only far enough south, however, to detect the very northern edge of the alluvial basin. To the north of the anomaly, bedrock rises to less than 250 feet below surface on Spread 2.

Line Y: Anomalous frequency effects and metallic conduction factors were again encountered reflecting definite sulfide concentration of from 2 to 3 percent average by volume, in a zone about 3,000 feet in width and buried 250 ft. +/- 100 ft. The south boundary of this zone is quite steep and sharp. No extension of the minor anomaly on Line X was detected. The north flank does have a fringe which may extend out to 3N.

Resisitivity shows the depth to bedrock to be quite uniform north of the anomaly--staying less than 250 feet below surface. To the south, the same features as were noted on the lines to the east were found except the alluvial trough, probably because the line didn't get far enough south.

At 12N, a high resistivity material was noted; perhaps due to a limestone or quartzite. This material was not encountered elsewhere on this survey.

Line Z: This line, being only one spread, was not long enough to definitely define the limits of the anomalous zone. However, the strongest effects are from 0 N/S to at least 2.5N and are due to sulfides of 2 to 3 percent by volume. The south flank has a sulfide fringe perhaps 1,000 or 1,500 feet south of 0 N/S. The resistivities show a rock with high resistivity at about 750 feet below surface from about 0 N/S out, to the north end of the spread. This rock is probably granitic and is mineralized to the same degree as the more typical prevalent volcanic (?) host rock encountered on the other lines. The depth to top of sulfides and bedrock is from 150 to 250 feet below surface.

Respectfully submitted,

Chris S. Ludwig

Chris S. Ludwig
Geophysicist

Approved:

Walter E. Heinrichs, Jr.
President & General Manager

March 30, 1964
P. O. Box 5671
Tucson, Arizona

BASIS OF I. P. METHOD

The induced polarization method is based on several related electrical properties such as overvoltage, etc., of sulfide or similar metallic lustred particles, especially those of iron, copper, lead, etc. Such particles react to electrical currents somewhat in the manner of miniature electrical capacitors. Thus a relatively non-conducting rock mass containing sulfide particles will "polarize" and offer a lower "impedence" to an alternating current than its equivalent resistance to a direct current. Hence when a so called "direct current" pulse is applied across a pair of current electrodes in the vicinity of a disseminated sulfide body a certain type of polarization will occur and the potential drop between two potential electrodes some given distance from the current electrodes will be greater than when a relatively faster pulse or "alternating current" is applied to the first two electrodes. These effects may be measured by relating to time, frequency or by actually observing or recording the pulse decay character.

This property of Induced Polarization is not entirely unique to sulfide particles, but with sufficient geological knowledge and/or type and amount of data, anomalism due to sulfides can be normally interpreted apart from that possibly due to graphite, magnetite, clay particles, etc.

PROCEDURE AND INTERPRETATION USED

For routine reconnaissance work, we prefer and use the frequency system and most commonly compare 0.05 and 3.0 cycles per second respectively, our so called "D. C." and "A. C." modes. However, other frequencies are available and are occassionally used when needed.

In our standard field practice, five equally spaced co-linear current electrodes are set and observations are made in accordance with a symetrical dipole-dipole or Eltran electrode configuration procedure. Distance between the receiver or potential electrodes is kept equal to the distance between each pair of current electrodes and the separation between the center of each potential electrode set-up from the center of each pair of current electrodes is at least one or some greater multiple of the electrode spacing.

Selection of a given electrode spacing is determined by the objectives to be reached in a given survey. This spacing will range from very small (50 ft. or less) for very detailed surveys, up to 1,000 ft., or occasionally more, for broad reconnaissance work. Other factors involved in the selection are concerned with the anticipated physical geometry of any possibly existing mineral occurrence which must include consideration of such factors as expected depth of burial to the top of the source, the dimensions of the source itself as well as of its electrical and other

physical properties. In general the greater the spacing the greater the maximum penetration and the less the lateral definition. With this dipole-dipole (Eltran) electrode configuration, the maximum possible effective penetration is from 1.0 times the electrode spacing in the first separation to 3.5 times the spacing on the 6th separation. In other words, with theoretically IDEAL conditions of completely isotropic-homogeneous resistivity in every direction both lateral and vertical, (a situation we never have), using 1,000 ft. dipoles, the Information obtained in the first dipole separation represents the average electrical composition of the materials from 0 to 1,000 ft, in the third separation from 0 to 2,000 ft; in the 6th separation from 0 to 3,500 ft. Actually, penetration is a function of the absolute resistivity distribution and magnitude which are most often rather complex, In practice, empirical results have shown that under average conditions the depth of penetration may vary from 0.2 to 2.0 times the electrode spacing from first to sixth dipole separation. The I. P. data obtained is plotted at a point that represents the geometric "bottom" of a hemisphere which has a radius equal to 1/2 the dipole separation, however, it must be emphasized that this value does not necessarily represent the electrical properties at that point, but actually the average of the properties of all the materials within the hemisphere. Furthermore, in the vicinity of sharply contrasting resistivity contacts the hemisphere

will be greatly distorted often providing for lateral translation of maximums and minimums. Therefore, it is unrealistic to attempt interpretation to a degree of accuracy greater than a minimum of about half the distance between any two adjacent depth points. Fortunately geological (and therefore physical property) contacts are often sharp enough to create a pattern within the data that lends itself to more or less define analysis within the limitations above described.

Since we usually only effectively collect data from the surface with essentially two dimensional coverage, the exact vertical aspects are often the most difficult to analyze. For example, it is very hard to detect the presence of a relatively poor conductor, or non-polarizing horizon, lying below a good conductor, or polarizing layer, and if the upper horizon were an especially good conductor there would be no indication whatsoever of the lower zone.

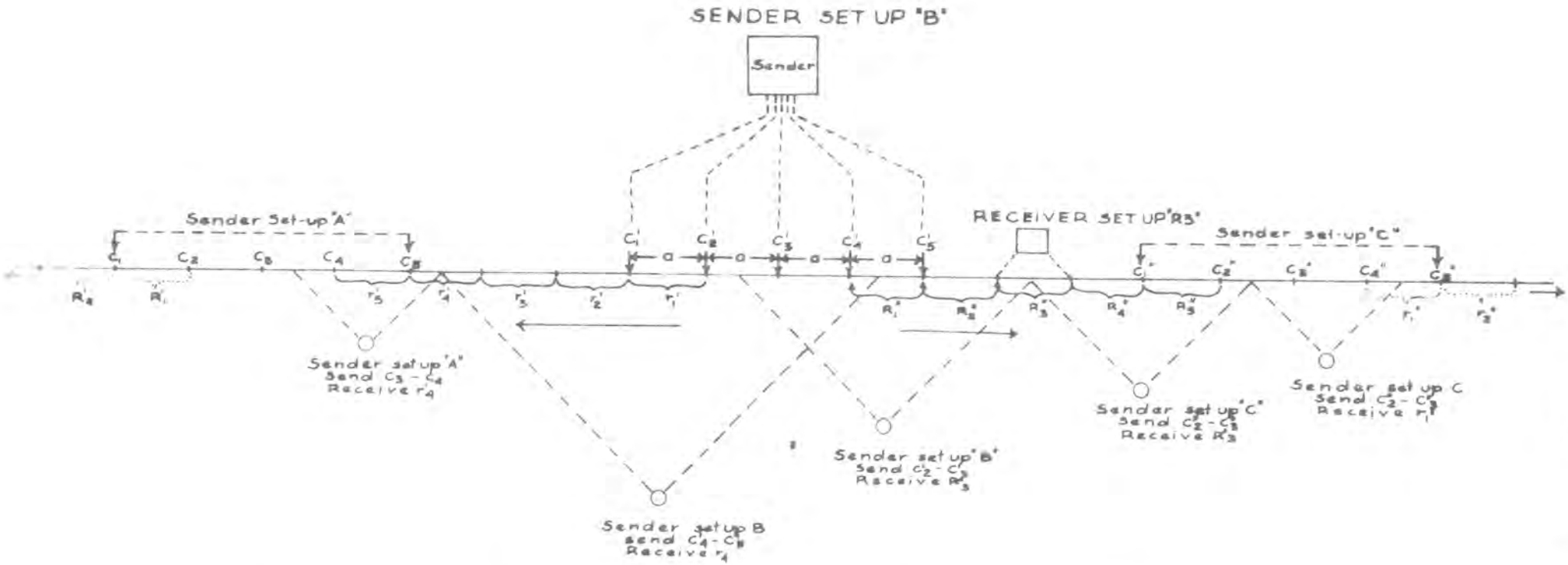
In the case of an alternating series of conducting and insulating horizons the affect is to average the electrical properties of the entire section with a somewhat more attenuated result than if the whole section were a uniform equivalent of the same averaged conditions from surface to the point of maximum penetration. In the more usual case of non-sulfides, less conducting material, overlying a conducting (sulfides) zone that extends beyond the depth of maximum penetration, the data will

show no more than background polarization effects in separations that are smaller than the thickness of the overburden, with polarization uniformly increasing with depth until certain lateral and vertical limits related to the size, shape and position of the conducting horizon are exceeded. Normally PFE's of 0 +/- 5% are considered to be background, 5% to 10% plus as marginal, and 10% plus as definitely anomalous. However, this scaling of values will vary to some degree conditional upon areas and regions and variable geological (earth electrical) conditions. Occasionally negative PFE's are encountered and these may be explained by various rather technical situations, but generally they are not of serious consequence.

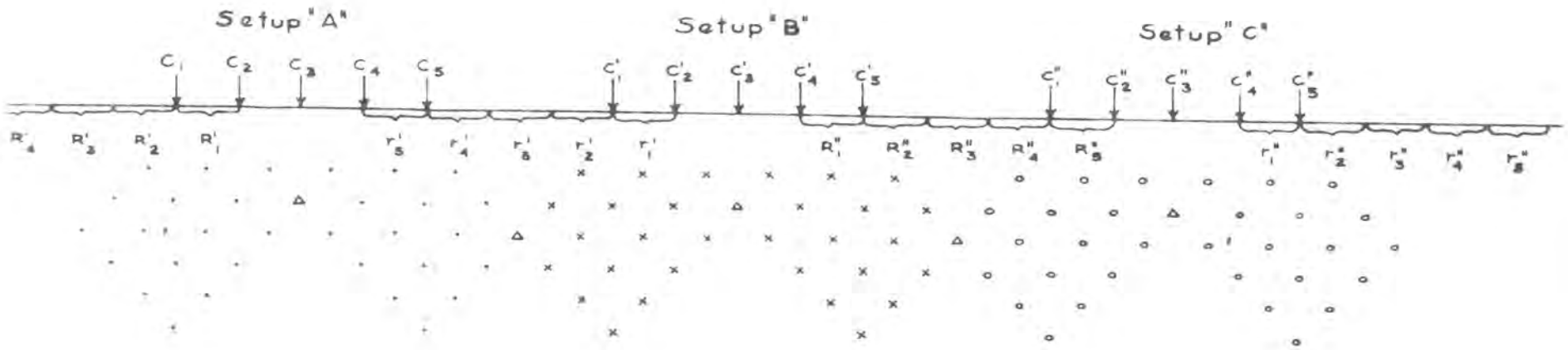
PRESENTATION OF DATA

Four separate quantities are measured or computed from the data acquired in the field. The first is the D. C. resistivity. The second is the percent frequency effect. The third quantity is the so called "metallic conduction factor" which is simply the frequency effect divided by the D. C. resistivity times 1,000, and the fourth is self potential.

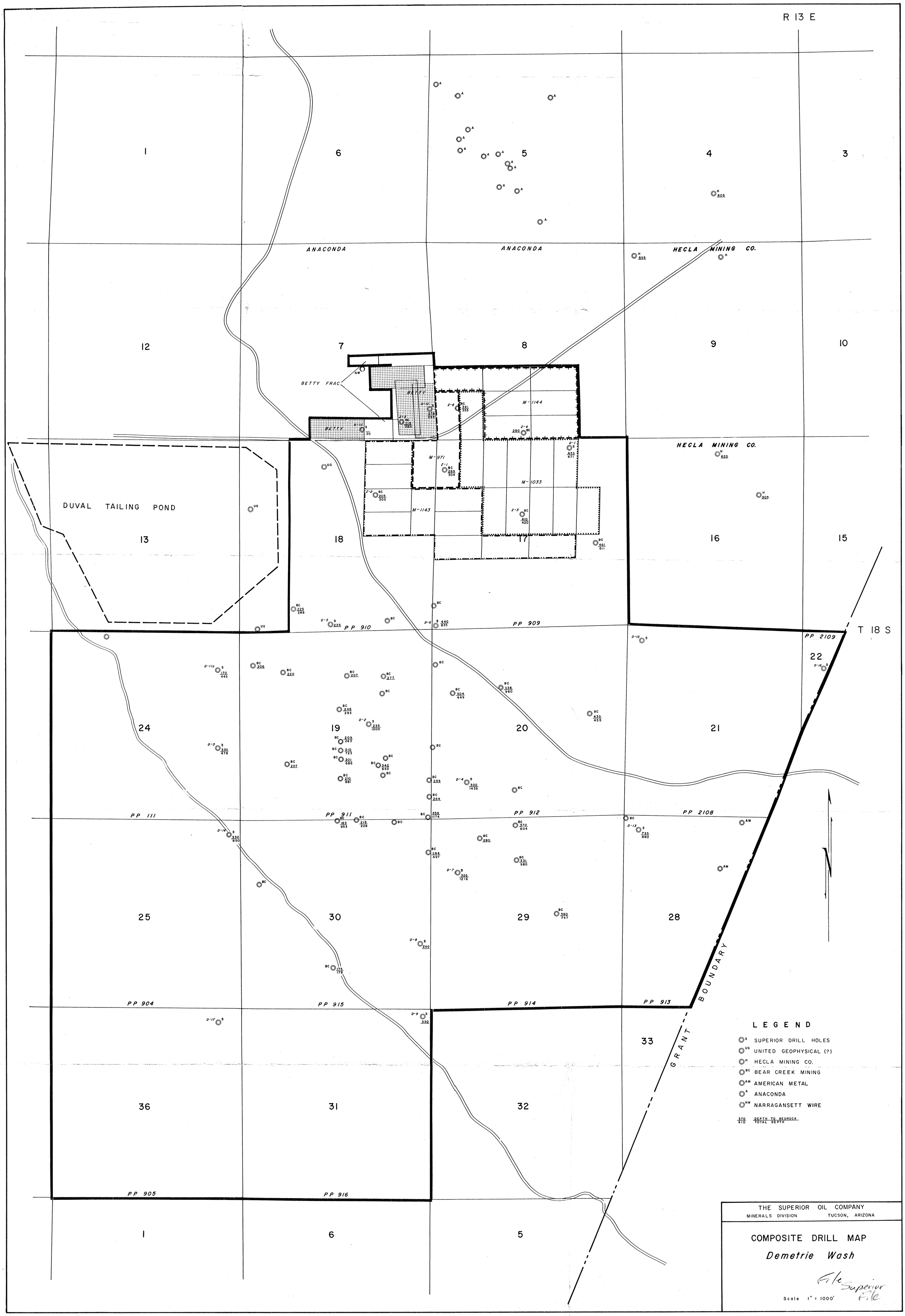
Sectional data sheets are usually the best composite method for plotting, presenting and interpreting results. The D. C. resistivity is plotted uppermost on the sheet, the percent frequency effect (PFE) is plotted directly below the resistivities and the metallic conduction factor (MCF) is plotted next below, leaving a space on the bottom of the sheet for self potential, topography and geology profiles. The sectional contouring is arbitrary and is either done somewhat schematically or on a semi-logarithmic basis. The above three I. P. parameters may also be presented in contour plan, profile form, or both for each "n" or separation level along with the S. P. data if the results and the situation encountered warrants.

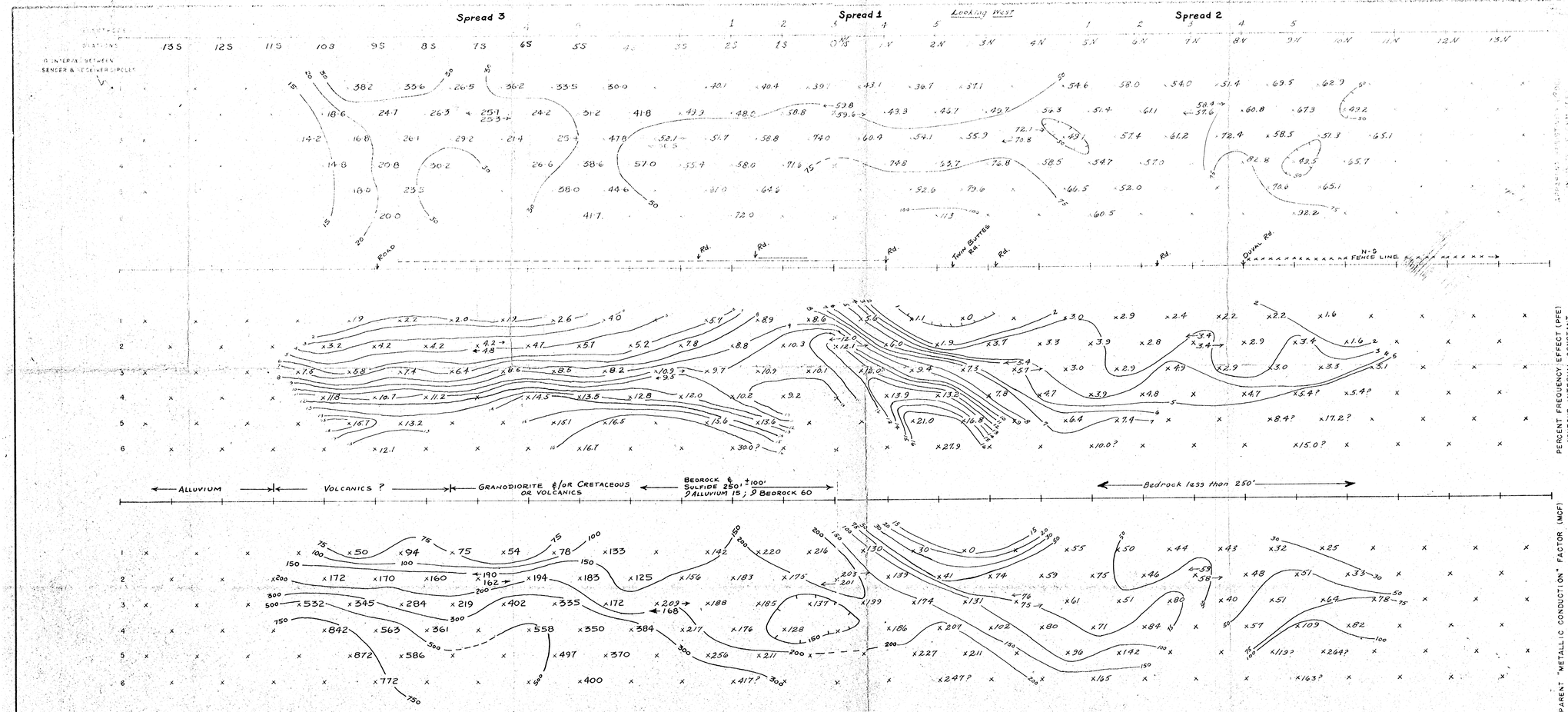


Schematic diagram illustrating the method of obtaining and plotting Eltran resistivity data. Diagram shows three separate current electrode spreads along a traverse line. In normal procedure, there are three dipole separations between current electrode spreads. The receiver setups are moved outwards from the ends of each current electrode spread usually until three dipole spacings separate the potential electrode setup from the near end of the spread. Current is "sent" to each possible pair of electrodes for each receiver setup. For instance, in Sender setup "B" when the receiver is receiving at R_1 only C_3' -C_2' and C_2'-C_1' can be "sent" so that data at 1 and 2 dipole separations is obtained respectively. When the receiver is at R_5'; C_5'-C_4', C_4'-C_3', C_3'-C_2', and C_1'-C_2' are sent and data is obtained for 3, 4, 5 and 6 dipole separations respectively. Each sender setup provides 33 data points.

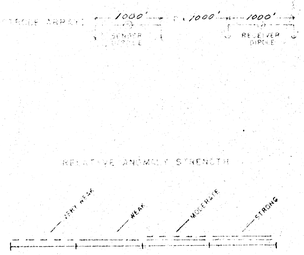


• Setup "A"
× Setup "B"
○ Setup "C"
△ Reciprocal values


R 13 E
T 18 S
ANACONDA
ANACONDA
HECLA MINING CO.
HECLA MINING CO.
BETTY FRAC.
BETTY
M-1144
M-971
M-1033
M-1143
DUVAL TAILING POND
PP 910
PP 909
PP 2109
PP 111
PP 911
PP 912
PP 2108
PP 904
PP 915
PP 914
PP 913
PP 905
PP 916
BOUNDARY
GRANT
LEGEND
SUPERIOR DRILL HOLES
UNITED GEOPHYSICAL (?)
HECLA MINING CO.
BEAR CREEK MINING
AMERICAN METAL
ANACONDA
NARRAGANSETT WIRE
370 DEPTH TO BEDROCK
410 TOTAL DEPTH
THE SUPERIOR OIL COMPANY
MINERALS DIVISION TUCSON, ARIZONA
COMPOSITE DRILL MAP
Demetrie Wash
File Superior File
Scale 1" = 1000'



EXPLANATION



SECTIONAL DATA SHEET

LINE No. X -- Spreads 1, 2, & 3

INDUCED POLARIZATION TRAVERSE

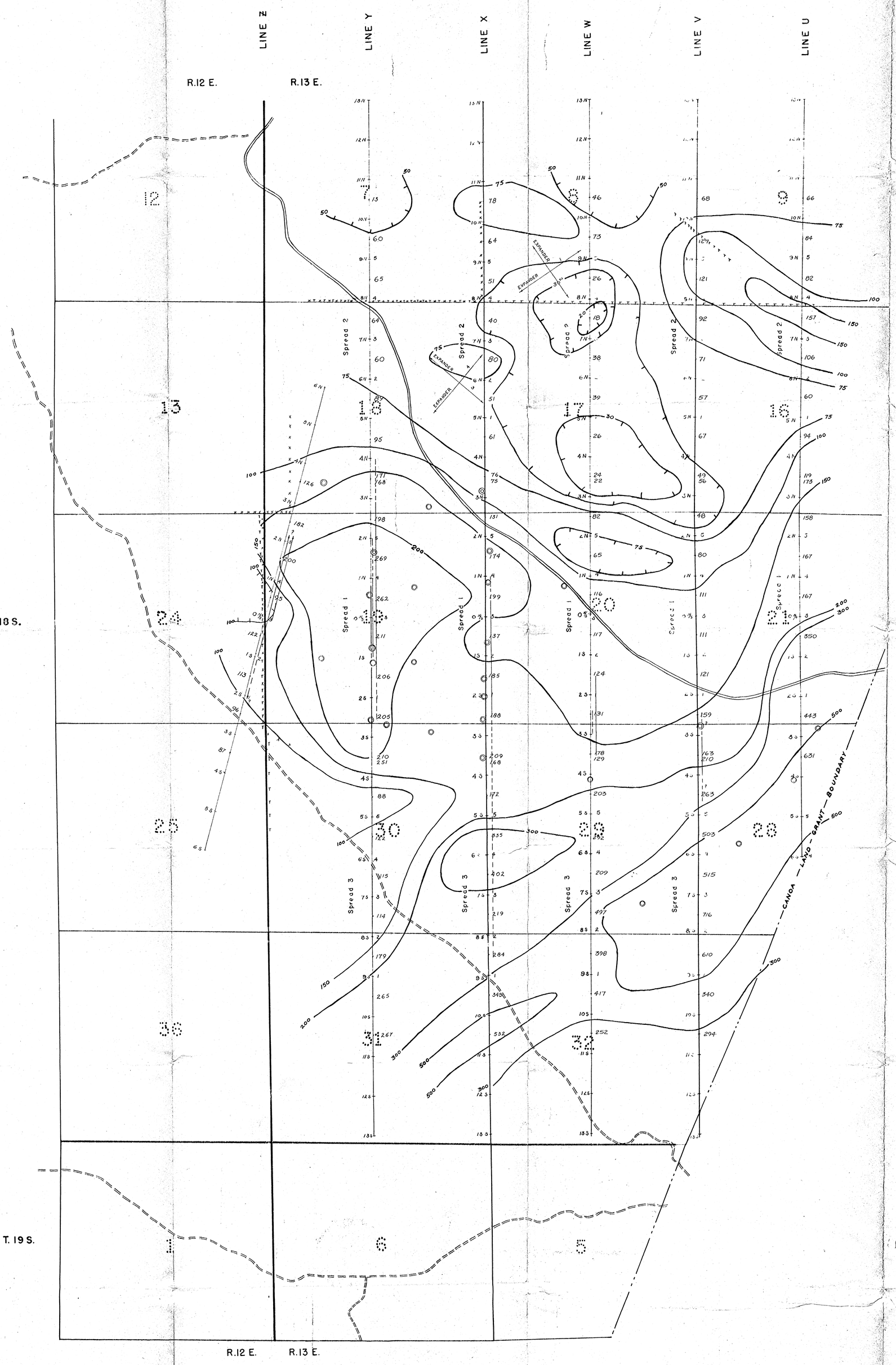
DEMETRIE WASH PROJECT

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: March 1964

FOR

THE SUPERIOR OIL COMPANY
MINERALS DIVISION
TUCSON, ARIZONA



T. 18 S.

T. 19 S.

R.12 E. R.13 E.

T. 19 S.

N

METALLIC CONDUCTION FACTOR
CONTOUR PLAN

3n INTERVAL SEPARATION
(BETWEEN SENDER & RECEIVING DIPOLES)

ELECTRODE ARRAY:

1000' — 3n = 3000' — 1000'

sender dipole — receiver dipole

-x-x- Fence Line
T T T T Power & Phone Line
= = = Unimproved Road
═══ Improved Road
-⊕- Scribed Rock Corner Located
⊙ Drill Hole

NOTE: True spacial significance of data is interpretational, also see sectional data sheets and basis of I. P. method.

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

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

INDUCED POLARIZATION SURVEY

DEMETRIE WASH PROJECT

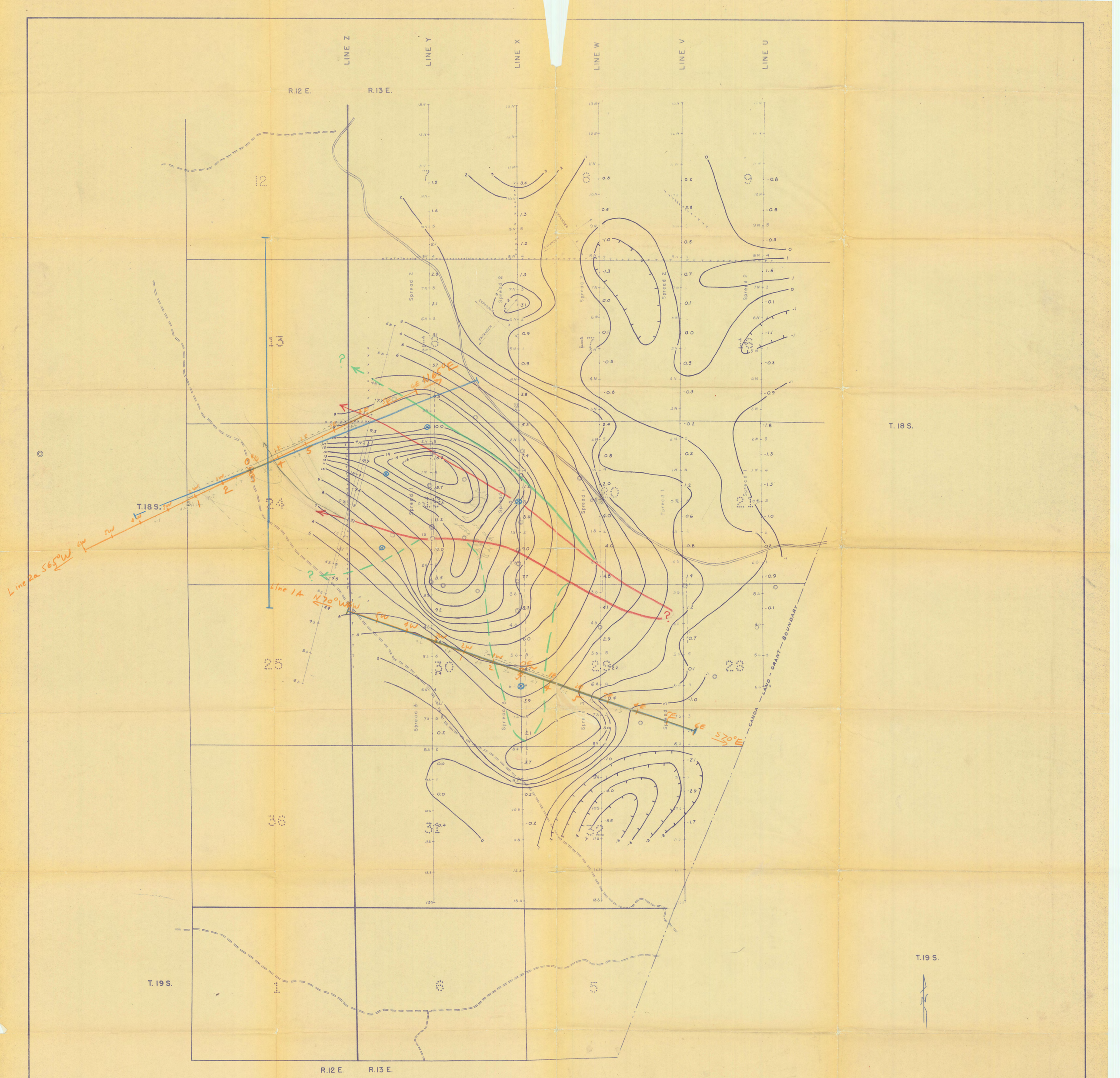
FOR

THE SUPERIOR OIL COMPANY - MINERALS DIVISION

TWIN BUTTES MNG. DISTRICT

PIMA COUNTY, ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL: LOG.	REVISIONS
	DATA BY: C.S.L. & K.H.	
DATE: MARCH, 1964	SHEET 2 OF 4	
DRAWN BY: D.C.B.	DRAWING NO.:	FILE:



PERCENT FREQUENCY EFFECT
INDUCTIVE COUPLING CORRECTED
CONTOUR PLAN

3n INTERVAL SEPARATION
(BETWEEN SENDER & RECEIVING DIPOLES)

ELECTRODE ARRAY:

1000' — 3n = 3000' — 1000'

sender dipole — receiver dipole

-x-x- Fence Line
T T T T Power & Phone Line
= = = Unimproved Road
═══ Improved Road
-⊕- Scribed Rock Corner Located
O Drill Hole

NOTE: True spacial significance of data is interpretational, also see sectional data sheets and basis of I. P. method.

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

Interpreted surface projection of zone of major sulfide mineralization.

Interpreted surface projection of possible sulfide fringe.

Proposed additional I.P. spreads.

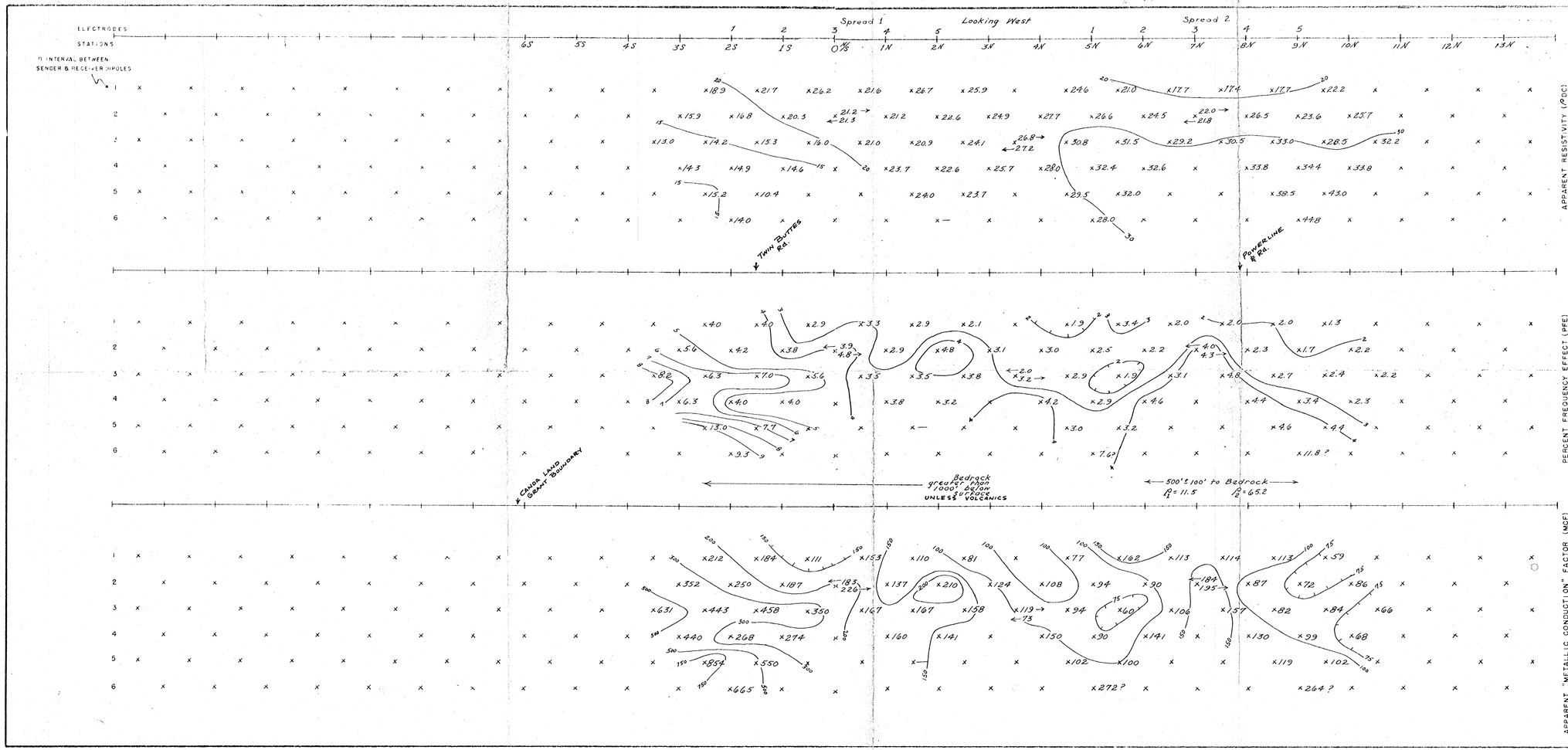
Proposed drill holes

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

INDUCED POLARIZATION SURVEY
DEMETRIE WASH PROJECT
FOR
THE SUPERIOR OIL COMPANY - MINERALS DIVISION

TWIN BUTTES MNG. DISTRICT
PIMA COUNTY, ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL: 1 PFE	REVISIONS
	DATA BY: C.S.L. & K.H.	
DATE: MARCH, 1964	SHEET 1 OF 4	
DRAWN BY: D.C.B.	DRAWING NO.:	FILE:



EXPLANATION

ELECTRODE ARRAY: 1000' — n · 1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

SECTIONAL DATA SHEET

LINE No. U -- Spreads 1 & 2

INDUCED POLARIZATION TRAVERSE

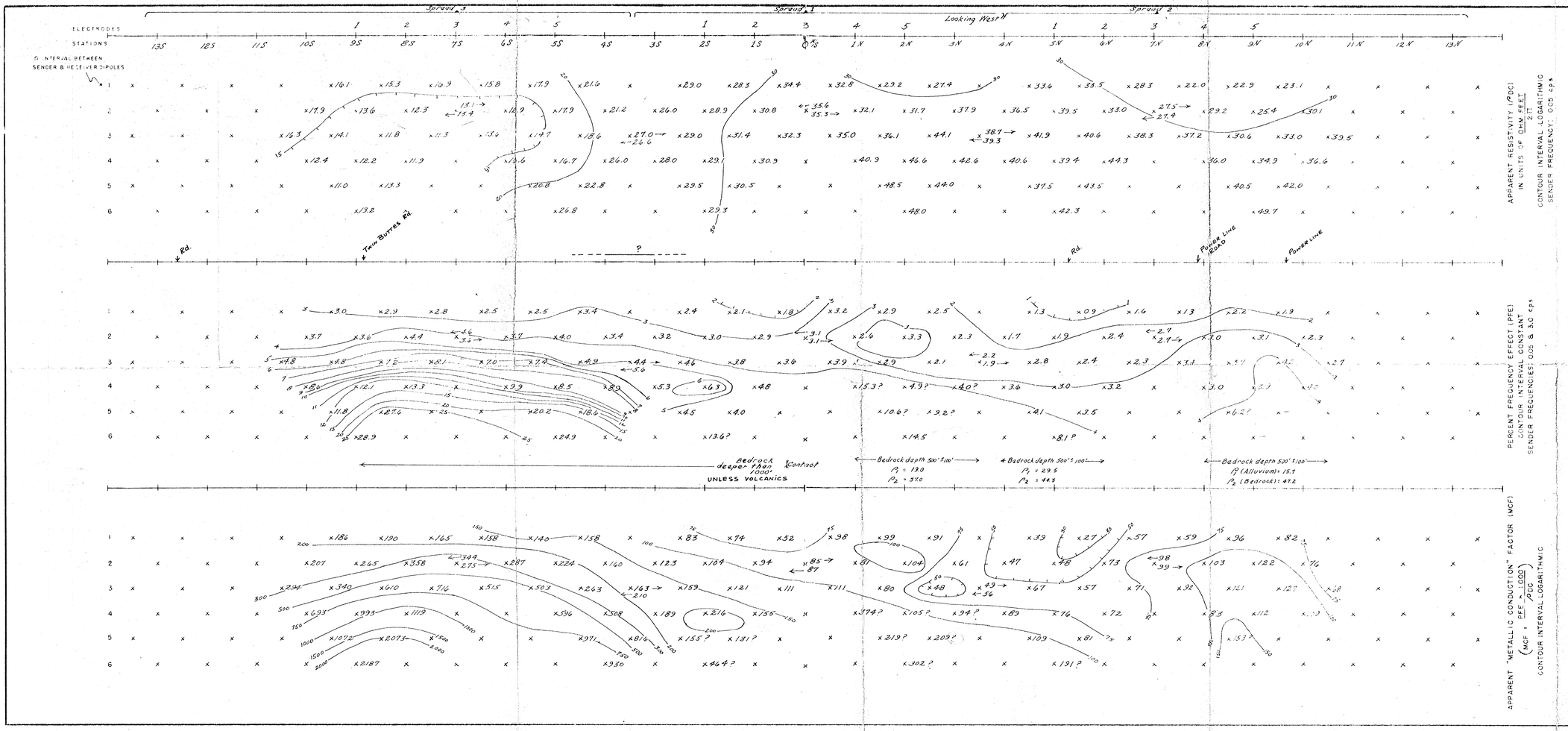
DEMETRIE WASH PROJECT

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: March 1964

FOR

THE SUPERIOR OIL COMPANY
MINERALS DIVISION
TUCSON, ARIZONA



EXPLANATION

ELECTRODE ARRAY: 1000' — G = 1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

SECTIONAL DATA SHEET

LINE No. V -- Spreads 1, 2, & 3

INDUCED POLARIZATION TRAVERSE

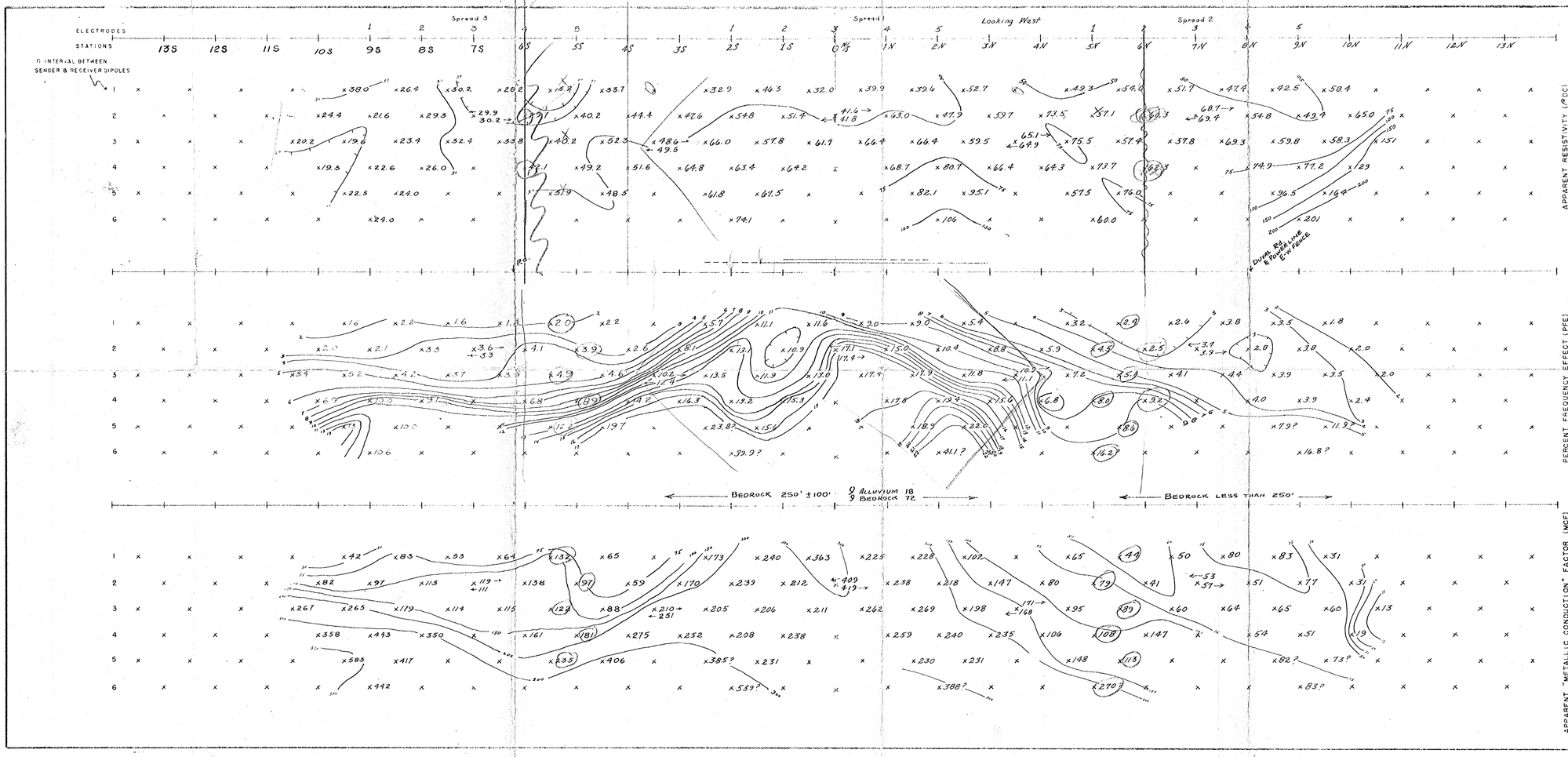
DEMETRIE WASH PROJECT

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: March 1964

FOR

THE SUPERIOR OIL COMPANY
MINERALS DIVISION
TUCSON, ARIZONA



EXPLANATION

ELECTRODE ARRAY: 1000' — n·1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

SECTIONAL DATA SHEET

LINE No. Y-- Spreads 1, 2, & 3

INDUCED POLARIZATION TRAVERSE

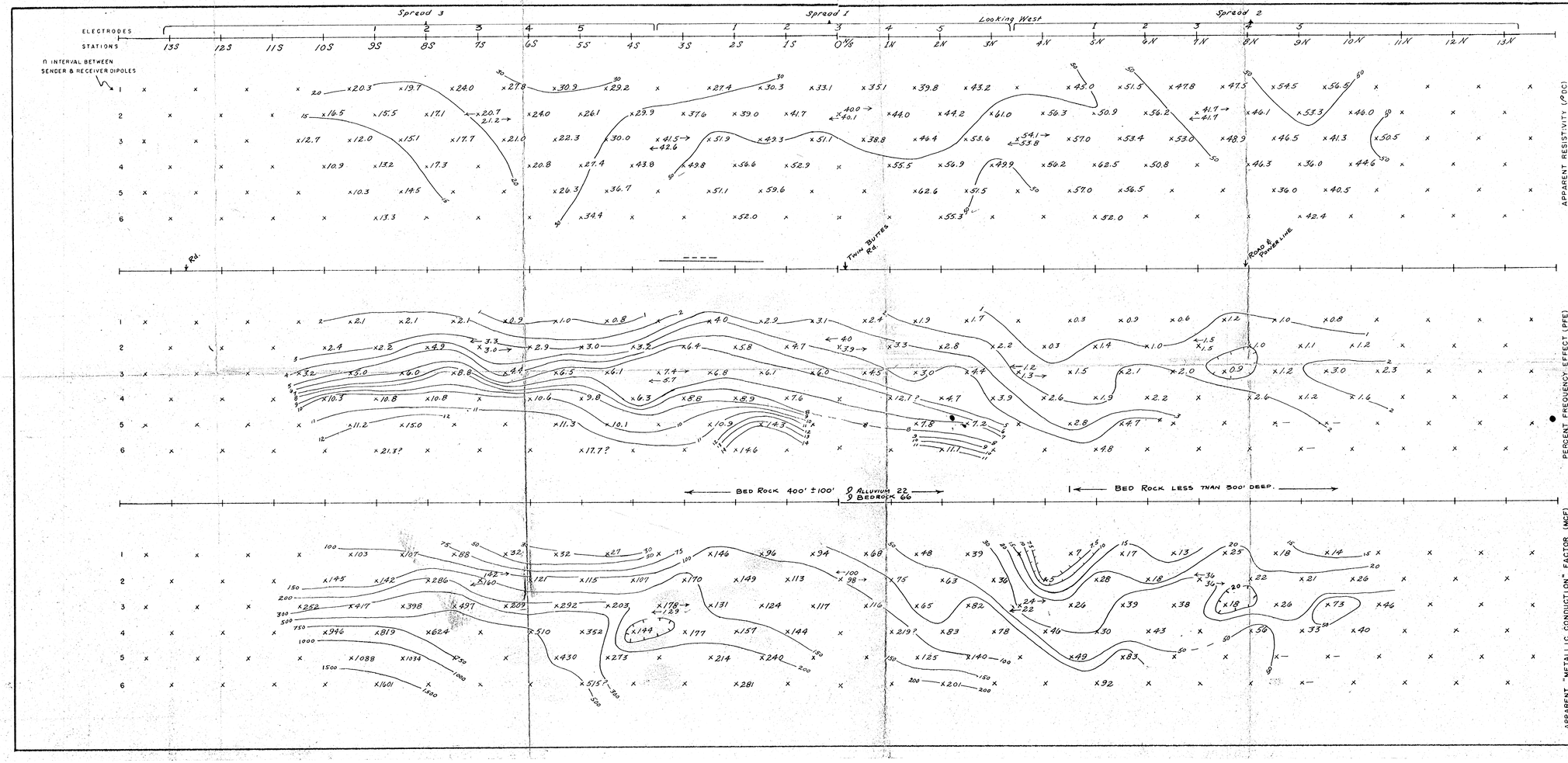
DEMETRIE WASH PROJECT

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: March 1964

FOR

THE SUPERIOR OIL COMPANY
MINERALS DIVISION
TUCSON, ARIZONA



EXPLANATION

ELECTRODE ARRAY: 1000' SENDER DIPOLE, n = 1000', 1000' RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

SECTIONAL DATA SHEET

LINE No. W -- Spreads 1, 2, & 3

INDUCED POLARIZATION TRAVERSE

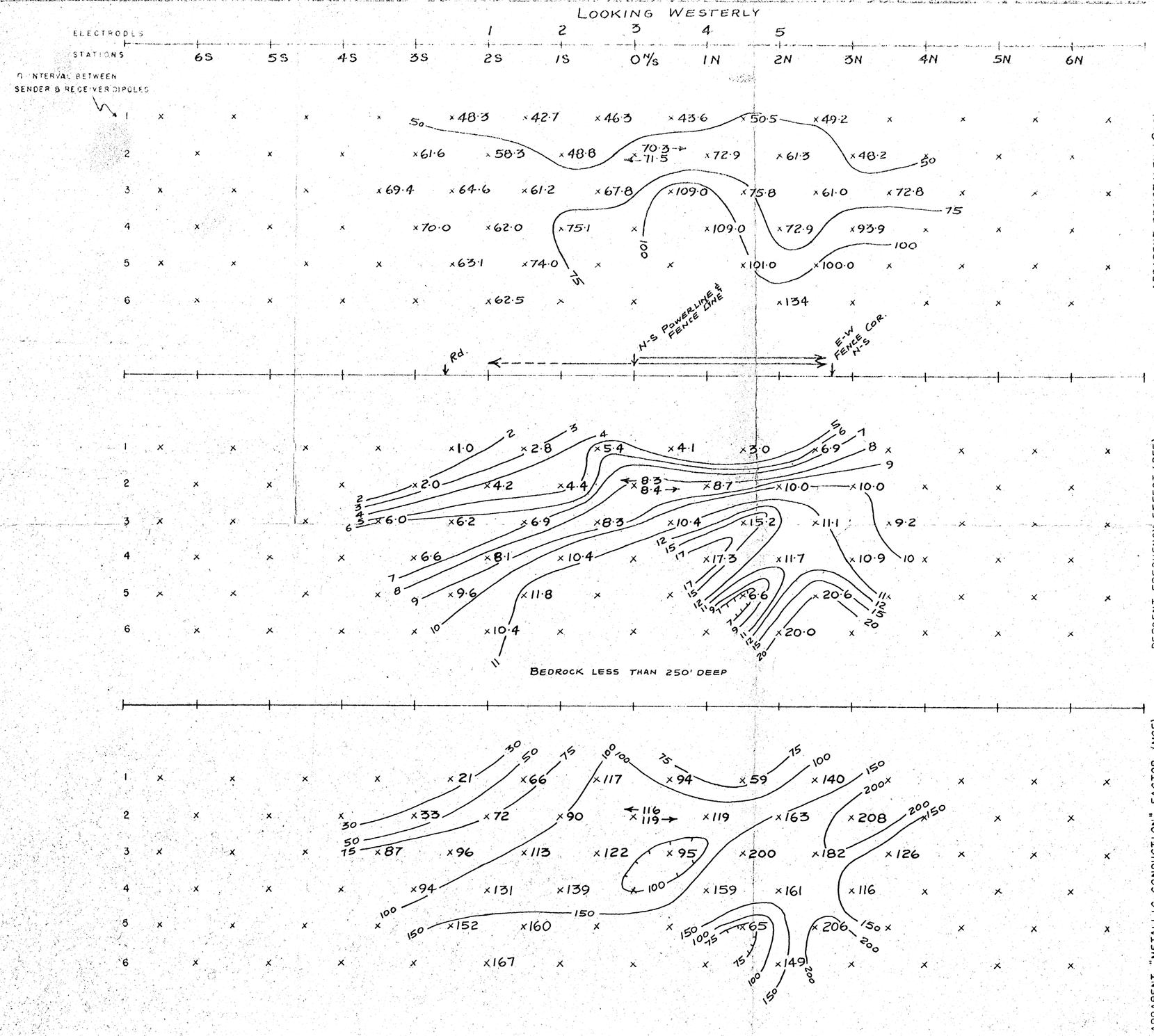
DEMETRIE WASH PROJECT

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: March 1964

FOR

THE SUPERIOR OIL COMPANY
MINERALS DIVISION
TUCSON, ARIZONA



EXPLANATION

ELECTRODE ARRAY: 1000' — n × 1000' — 1000'
SENDER DIPOLE — RECEIVER DIPOLE

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

SECTIONAL DATA SHEET

LINE No. Z -- Spread I

INDUCED POLARIZATION TRAVERSE

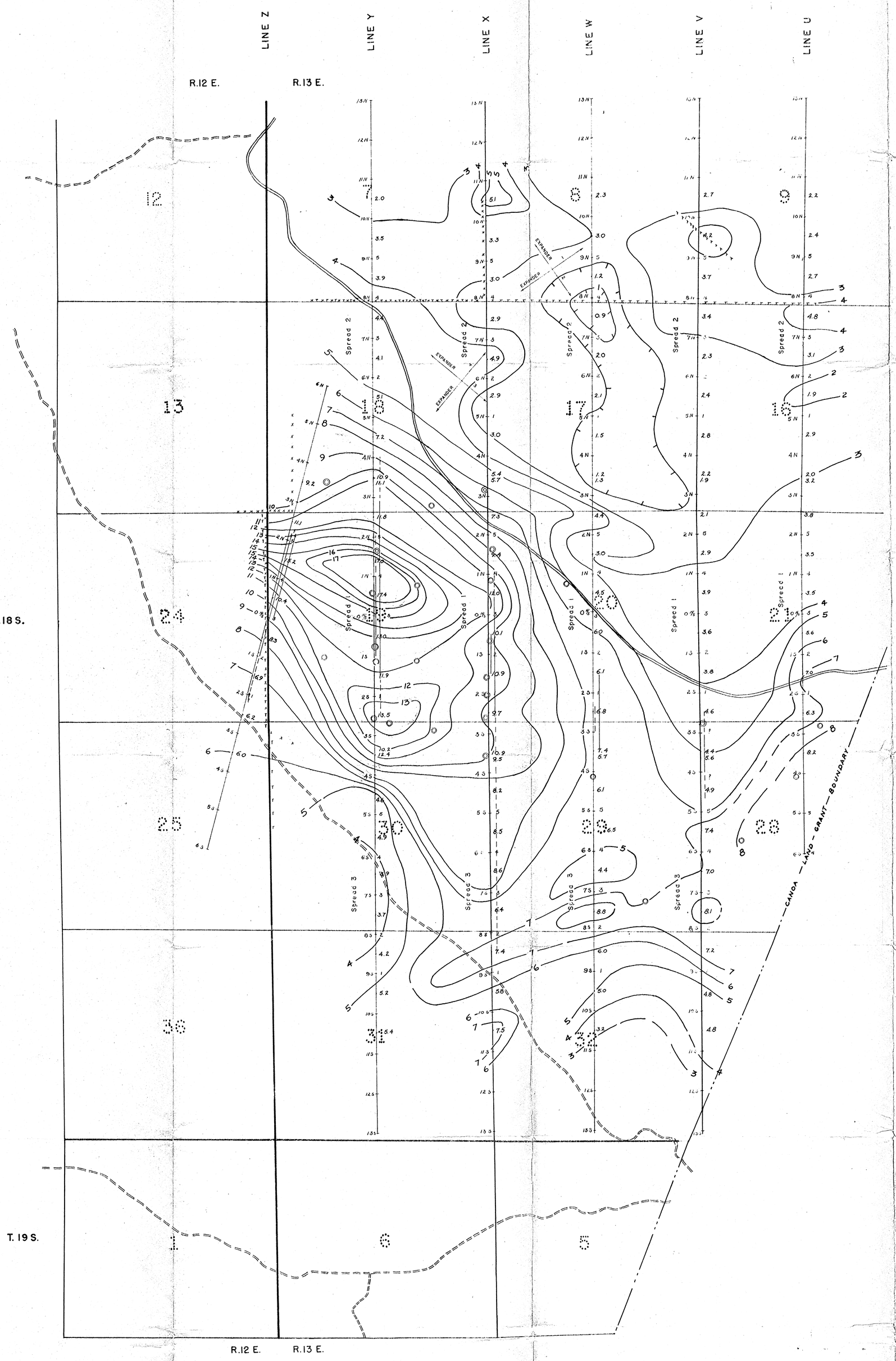
DEMETRIE WASH PROJECT

HEINRICHS GEOEXPLORATION COMPANY

SCALE: 1" = 1000' DATE: March 1964

FOR

THE SUPERIOR OIL COMPANY
MINERALS DIVISION
TUCSON, ARIZONA



T.18 S.

T.19 S.

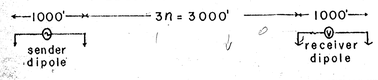
R.12 E. R.13 E.

T.19 S.

UNCORRECTED
PERCENT FREQUENCY EFFECT
CONTOUR PLAN

3n INTERVAL SEPARATION
(BETWEEN SENDER & RECEIVING DIPOLES)

ELECTRODE ARRAY:



-x-x- Fence Line
Power & Phone Line
Unimproved Road
Improved Road
Scribed Rock Corner Located
Drill Hole

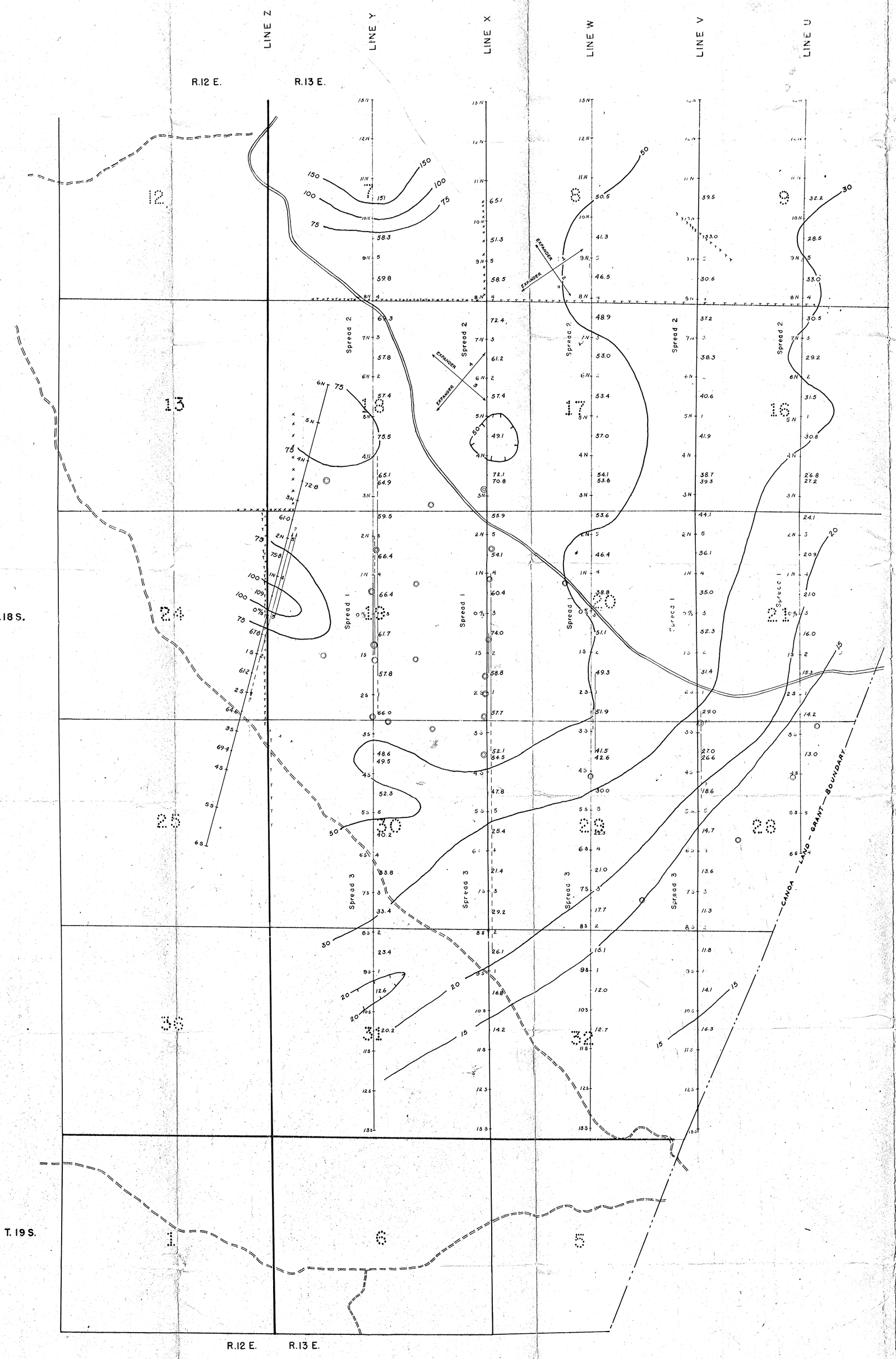
NOTE: True spacial significance of data is interpretational; also see sectional data sheets and basis of I.P. method.

RELATIVE ANOMALY STRENGTH

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

INDUCED POLARIZATION SURVEY
DEMETRIE WASH PROJECT
FOR
THE SUPERIOR OIL COMPANY - MINERALS DIVISION
TWIN BUTTES MNG. DISTRICT
PIMA COUNTY, ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL: 1 PFE	REVISIONS	
	DATA BY: C.S.L. & K.H.		
DATE: MARCH, 1964	SHEET 4 OF 4		
DRAWN BY: D.C.B.	DRAWING NO.:	FILE:	



T. 18 S.

T. 19 S.

APPARENT RESISTIVITY
CONTOUR PLAN

3n INTERVAL SEPARATION
(BETWEEN SENDER & RECEIVING DIPOLES)

ELECTRODE ARRAY:

1000' — 3n = 3000' — 1000'

sender dipole — receiver dipole

-x-x- Fence Line
T T T T Power & Phone Line
= = = Unimproved Road
═══ Improved Road
-⊕- Scribed Rock Corner Located
⊙ Drill Hole

NOTE: True spacial significance of data is interpretational, also see sectional data sheets and basis of I.P. method.

RELATIVE ANOMALY STRENGTH

VERY WEAK — WEAK — MODERATE — STRONG

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

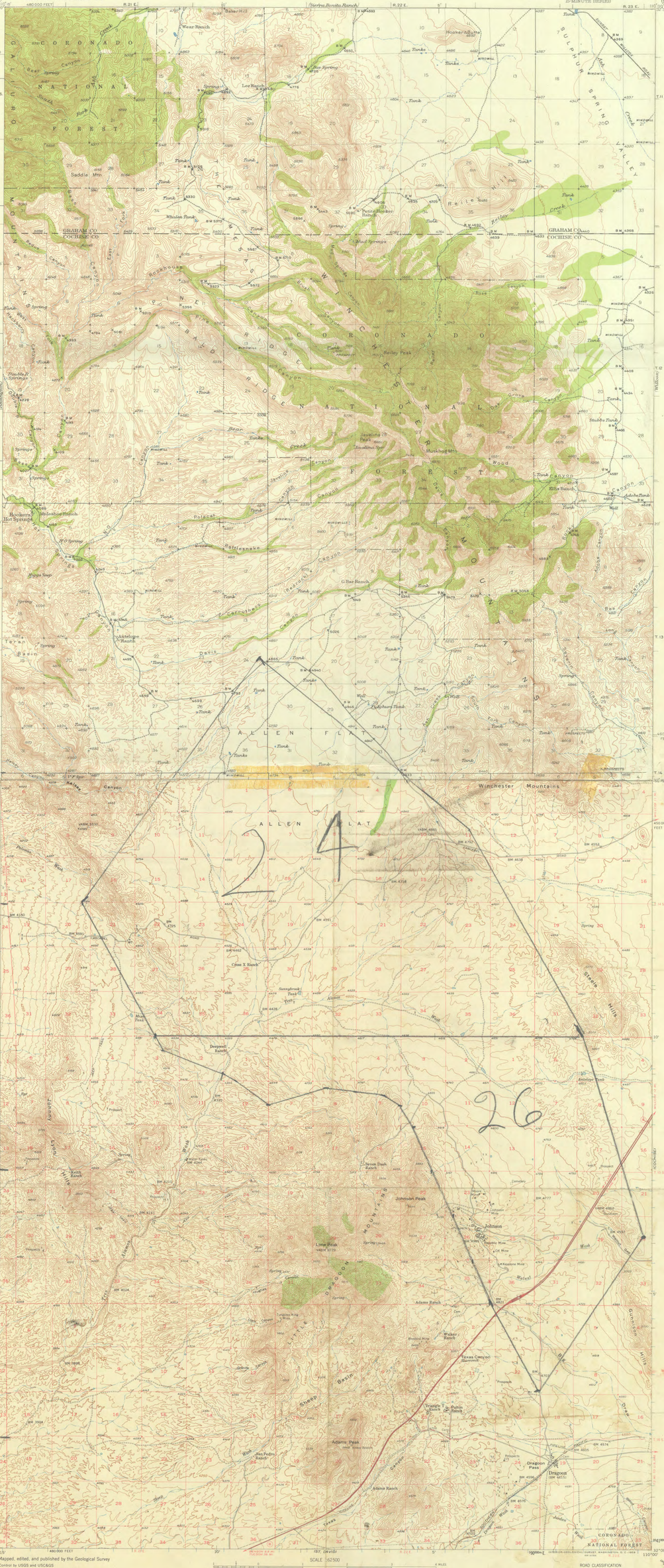
INDUCED POLARIZATION SURVEY
DEMETRIE WASH PROJECT
FOR
THE SUPERIOR OIL COMPANY - MINERALS DIVISION

TWIN BUTTES MNG. DISTRICT
PIMA COUNTY, ARIZONA

SCALE: 1" = 1000'	CONTOUR INTERVAL: LOG ARITHMETIC	REVISIONS
	DATA BY: C.S.L. & K.H.	
DATE: MARCH, 1964	SHEET 3 OF 4	
DRAWN BY: D.C.B.	DRAWING NO.:	FILE:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ARIZONA
WINCHESTER MOUNTAINS QUADRANGLE
15-MINUTE SERIES



Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Topography by planetable surveys 1940–1941
Culture revised 1958
Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, east zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

SCALE 1:62500
CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION
Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
State Route

APPROXIMATE MEAN DECLINATION, 1958

QUADRANGLE LOCATION

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 2, COLORADO OR WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

DRAGOON, ARIZ.
N3200—W11000/15
1958

Superior 24 & 26

April 29, 1964

The Superior Oil Company
Minerals Division
P. O. Box 5671
Tucson, Arizona

Gentlemen:

For the record (yours as well as ours), this is to serve as a cover letter regarding delivery to your office of one original and two copies of our report on "Four Induced Polarization Depth Probes" which was hand-carried to your office by Mr. Walter E. Heinrichs, Jr. on April 9, 1964.

Sincerely yours,

j

(Mrs. W. E. Heinrichs, Jr.)

COPY

FOUR INDUCED POLARIZATION DEPTH PROBES

Demetrie Wash Area
Twin Buttes Mining District
Pima County, Arizona

COPY

for
THE SUPERIOR OIL COMPANY
Minerals Division
Tucson, Arizona

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

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INTRODUCTION

At the request of The Superior Oil Company, Minerals Division, Heinrichs Geoexploration Company conducted and completed an induced polarization depth probing or "expander" survey in The Demetrie Wash Area of the Twin Buttes Mining District, Pima County, Arizona. Expanders 1 and 2 were centered 400 feet N 50 E from the SW corner of Ann 26 in Section 8, T 18 S, R 13 E. Expander 1 was oriented N 55 E - S 55 W and expander 2 normal thereto. Expanders 3 and 4 were centered at the NE corner of Ann 20 in Section 18, T 18 S, R 13 E. Expander 3 was oriented N 50 W - S 50 E and expander 4 normal thereto.

This work was done by using an expanding dipole-dipole array on the second separation always keeping the center of the spread at the same point. In other words, the receiver dipole and the sending dipole, both of the same length, are always kept separated from each other by twice the dipole length. The dipole spacing was increased from 125 feet out to 2,500 or 3,000 feet in 8 or 9 jumps. This expansion gives, in effect, increasing depth penetration; however, there isn't a direct relationship between dipole spacing and depth because the technique gives a complexly weighted electrical average of the resistivity distribution in the nearby vicinity.

The data are plotted on semi-log paper with the electrical

COPY

values plotted on the linear scale and the dipole spacing ("a" spacing) along the logarithmic scale. Four plots are given, one for each expander showing the resistivity, percent frequency effect (uncorrected and inductive coupling corrected) and the metallic conduction factor (uncorrected and inductive coupling corrected). In addition, a plan location map is included.

COPY

RESULTS AND CONCLUSIONS

No induced polarization anomalism reflecting sulfide mineralization was encountered on these four expanders. Anomalous effects resulting from inductive coupling interference was noticed especially on dipole spacings greater than 1,500 feet. Upon correcting for these effects no frequency effects remained that were above background variations.

It is to be remembered, however, that in this extremely deep electrical probing (perhaps an effective depth penetration of 2,500 feet) that a very large volume of ground is being looked at. Unless a sulfide body is of the same average dimension or larger than the dipole spacing used, it likely will not be detected. Therefore, we can say fairly safely, that no sulfide body of about one percent or more sulfides by volume and having an average dimension of about 2,500 feet was found down to 2,500 feet below surface. Actually smaller bodies nearer the surface could have been located since the spacing varied from 125 to 3,000 feet.

The resistivity picture was complicated by the many lateral variations in this area. The worst problem was perhaps the high resistivity Paleozoic section to the north of the expanders. Discounting these lateral variations, no pronounced rock type changes were noted with depth. This indicates a thick section of similar material underlies most, if not all, of the area.

COPY

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

C. S. Ludwig

C. S. Ludwig
Geophysicist

Approved:

Walter E. Heinrichs, Jr.
President & General Manager

FOUR INDUCED POLARIZATION DEPTH PROBES

Demetrie Wash Area
Twin Buttes Mining District
Pima County, Arizona

COPY

for
THE SUPERIOR OIL COMPANY
Minerals Division
Tucson, Arizona

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

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Geophysicist

Approved:

Walter E. Heinrichs, Jr.
President & General Manager

HEINRICHS GEOEXPLORATION CO.
N 40° E - S 40° W
Bearing Beads
02 via 1A CONTI ON G
Exploring the
MINERALS DIVISION
THE SUPERIOR OIL COMPANY
DEMETRIE WASH AREA
Impaged Platinum Survey
EXPANDER ARRAY
SENDER
RECEIVER
a
2a
a
RESISTIVITY
i ohm feet.
a Spacing in Feet
P.F.E. UNCORRECTED
RESISTIVITY
M.C.F. UNCORRECTED
P.F.E. CORRECTED
M.C.F. CORRECTED
M.C.F. coupling corrected & uncorrected
P.F.E. coupling corrected & uncorrected.

DEMETRIE WASH AREA
Induced Polarization Survey
for
THE SUPERIOR OIL COMPANY
Mineral Division
20 Amp Cut. NE G
Expander #3
N 20° W - S 20° E
Spread Bearing
HEINRICHS GEOEXPLORATION CO.
EXPANDER ARRAY
Sender
Receiver
RESISTIVITY
in ohm feet
PFE
UNCORRECTED
RESISTIVITY
M.C.F. UNCORRECTED
PFE CORRECTED
M.C.F. CORRECTED
M.C.F. Coupling corrected & uncorrected
PFE Coupling corrected & uncorrected
Feet in Spacing B

GEOEXPLORATION CO.
THE SUPERIOR OIL COMPANY
DEMETRIE WASH AREA
EXPANDER ARRAY
RECEIVER
SENDER
PFE UNCORRECTED
M.C.F. UNCORRECTED
RESISTIVITY
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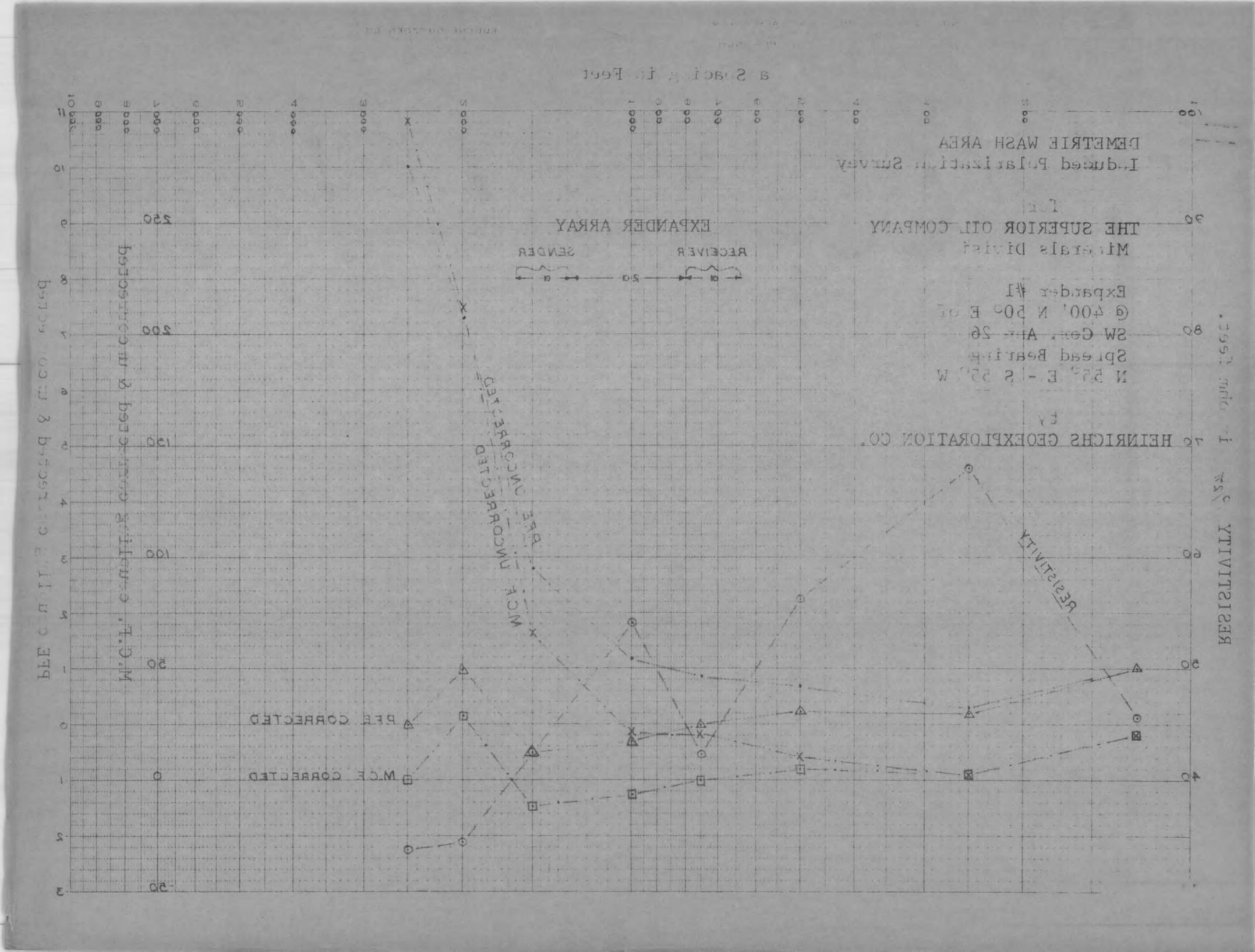
DEMETRIE WASH AREA
Induced Polarization Survey
for
THE SUPERIOR OIL COMPANY
Minerals Divisi
Expander #1
@ 400' N 50° E of
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Spread Bearing
N 55° E - S 55° W
by
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EXPANDER ARRAY
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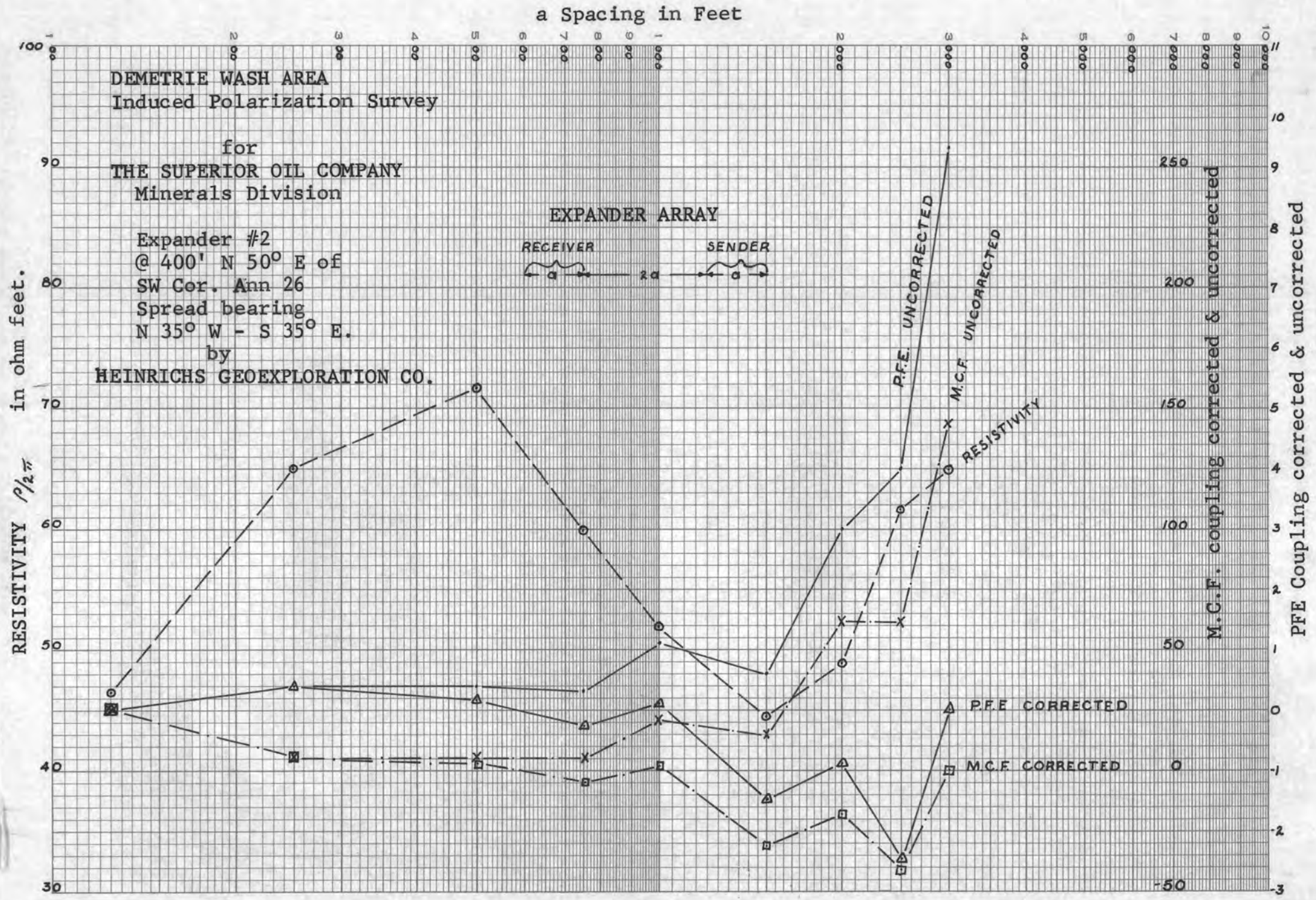
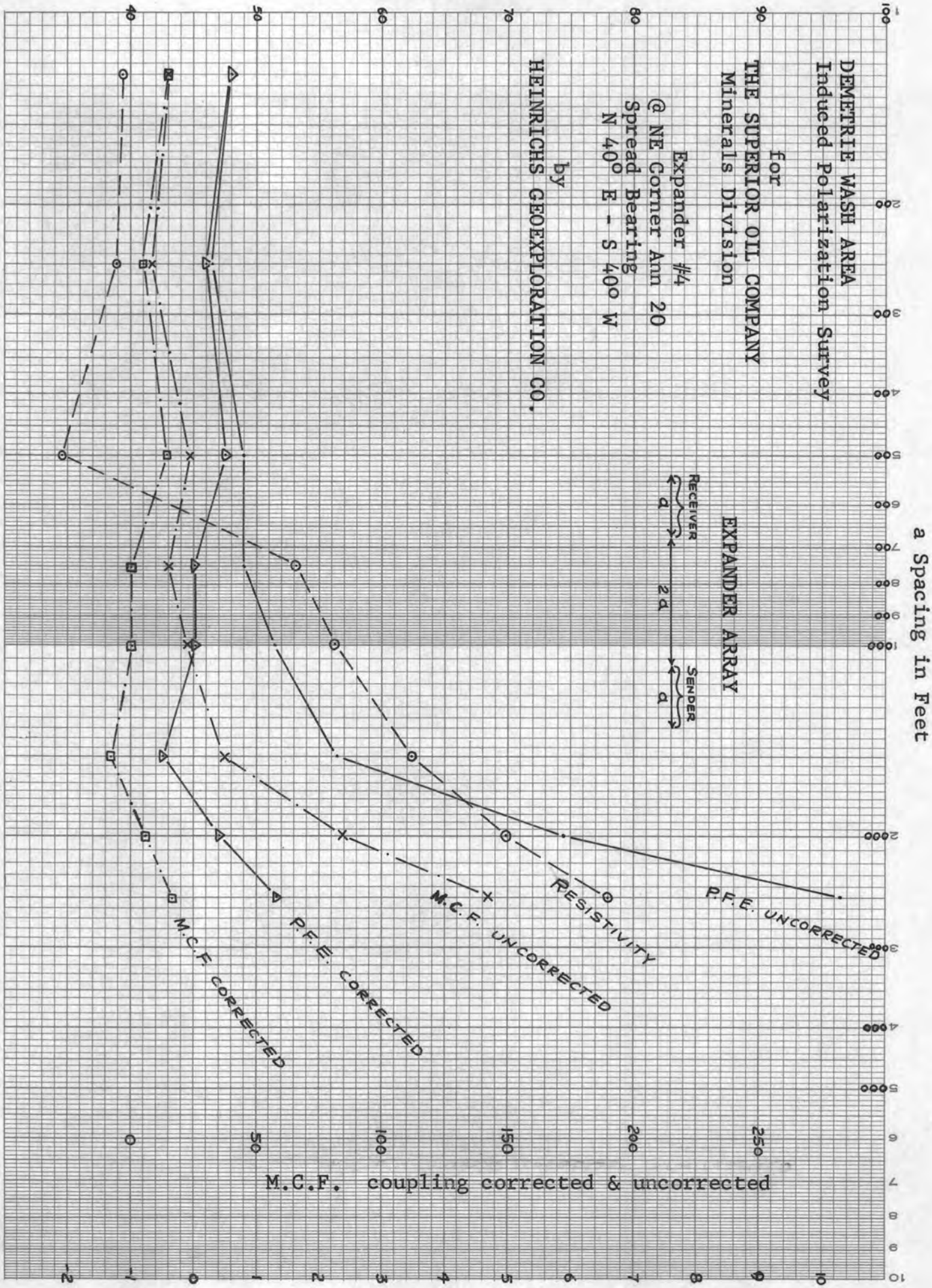
SENDER
PFE CORRECTED
M.C.F. CORRECTED
RESISTIVITY
a Spacing in Feet
RESISTIVITY
PFE CORRECTED
M.C.F. CORRECTED

NO. 340R-L210 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
2 CYCLES X 10 DIVISIONS PER INCH

EUGENE DIETZGEN CO.
MADE IN U. S. A.



RESISTIVITY $\rho/2\pi$ in ohm feet.



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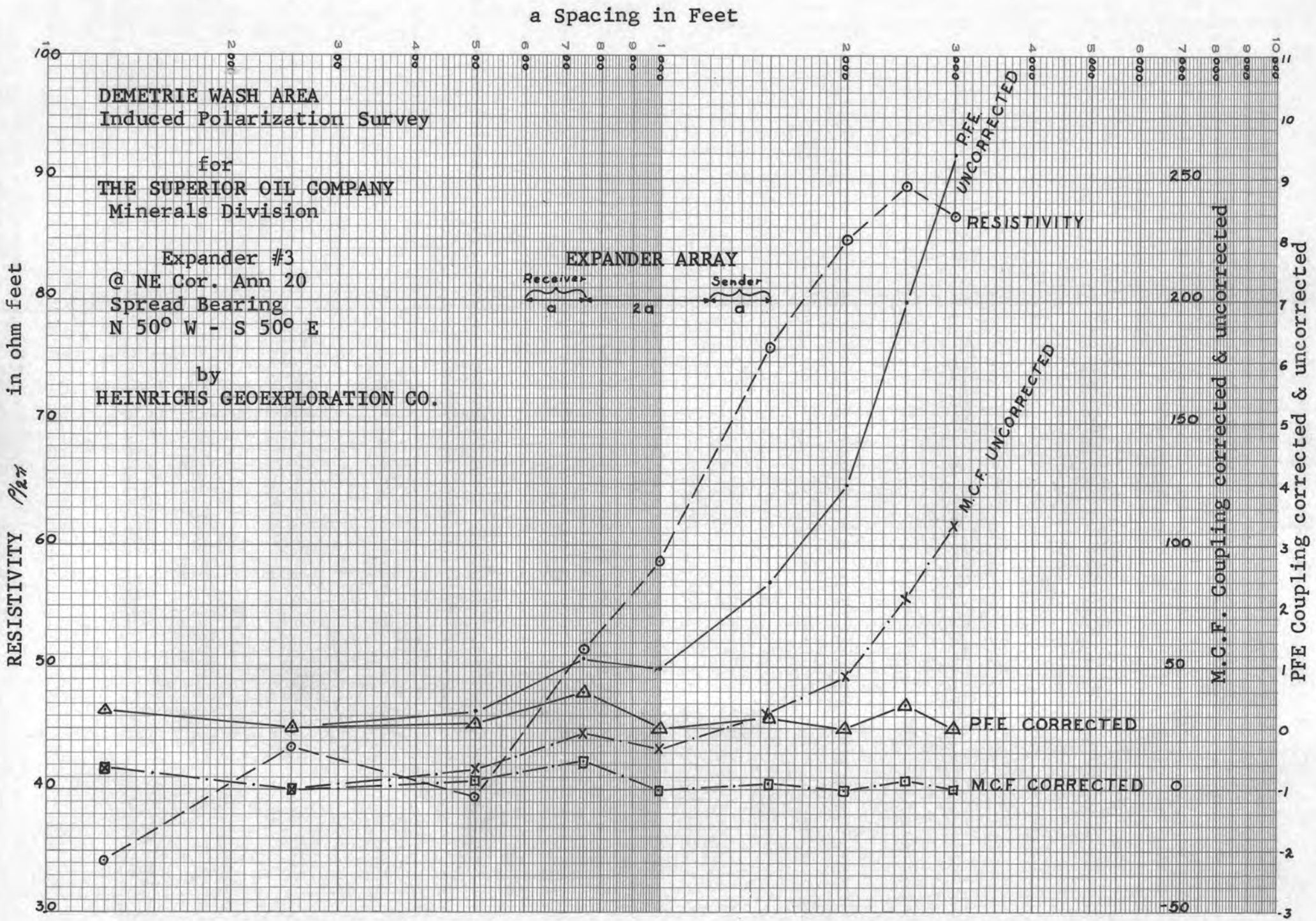

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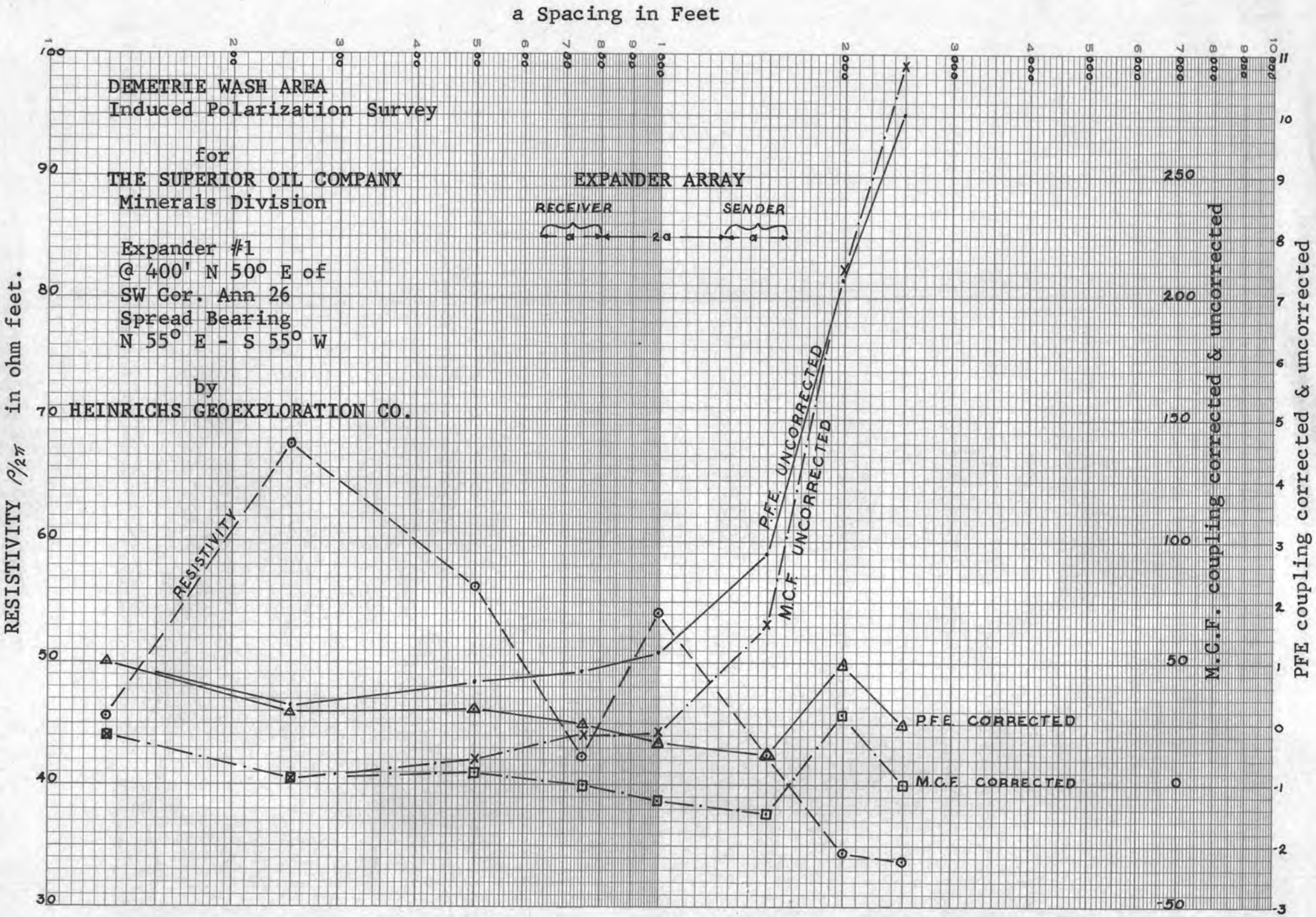

FOUR INDUCED POLARIZATION DEPTH PROBES

Demetrie Wash Area
Twin Buttes Mining District
Pima County, Arizona

for
THE SUPERIOR OIL COMPANY
Minerals Division
Tucson, Arizona

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

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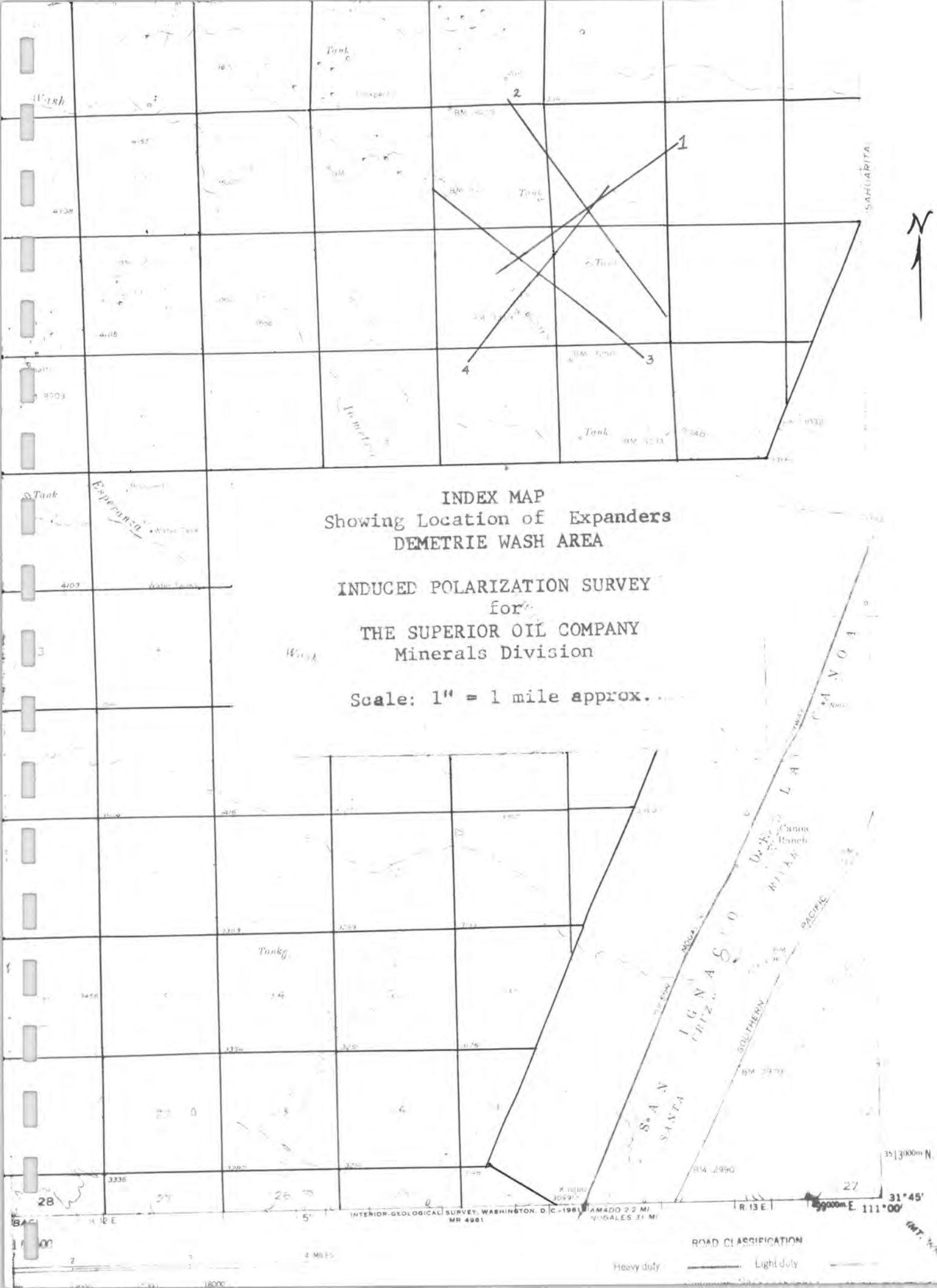
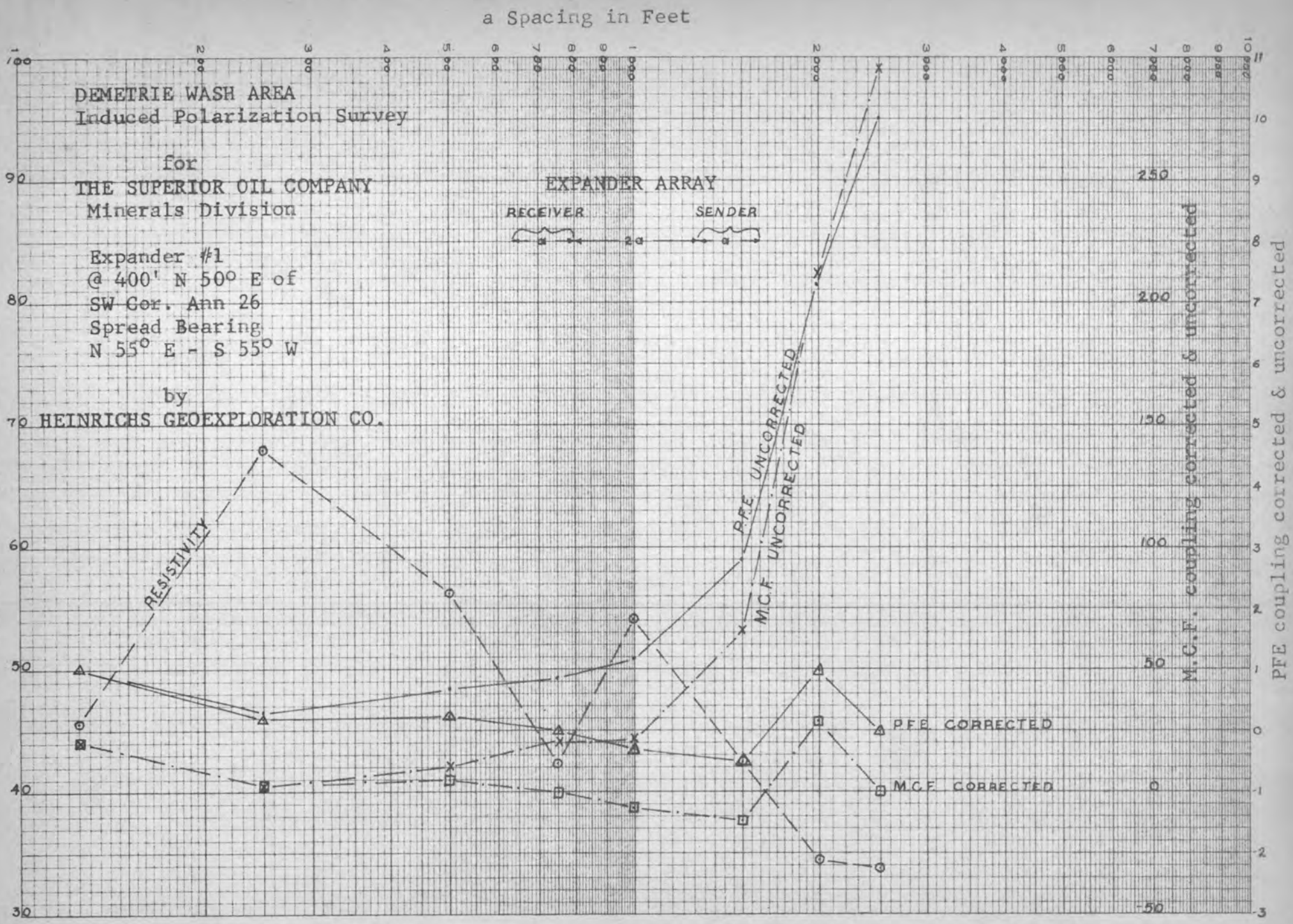


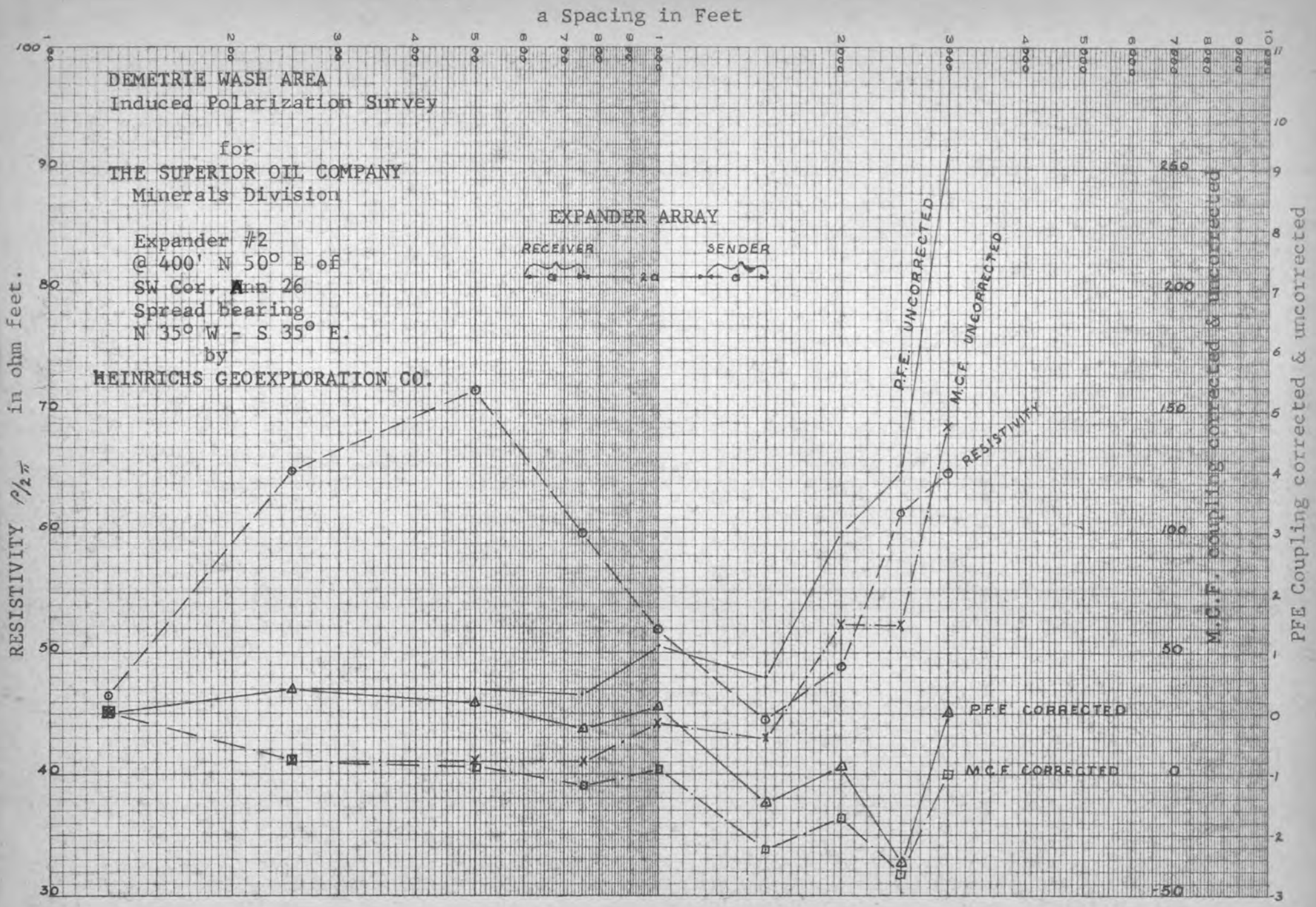
INDEX MAP
Showing Location of Expanders
DEMETRIE WASH AREA

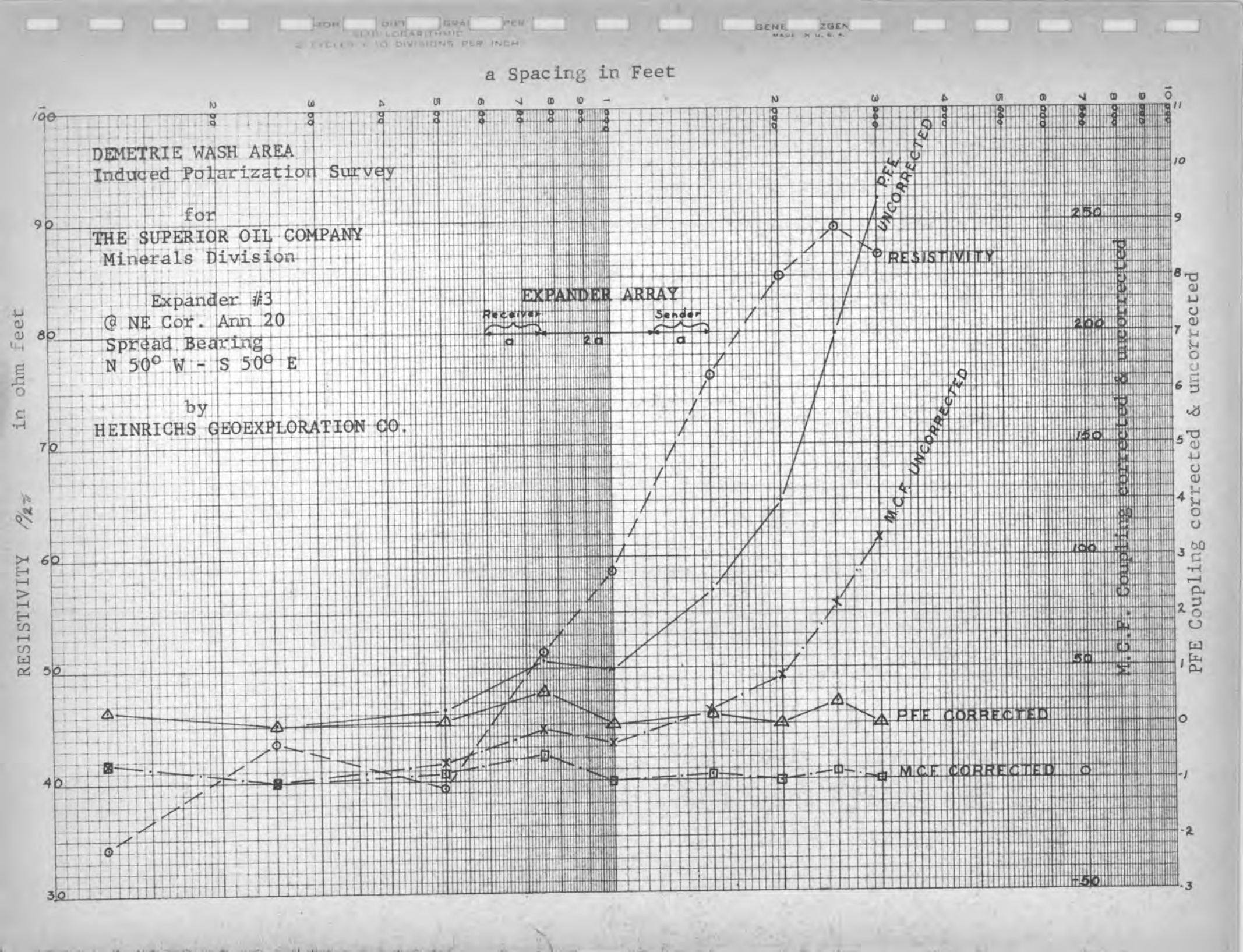
INDUCED POLARIZATION SURVEY
for
THE SUPERIOR OIL COMPANY
Minerals Division

Scale: 1" = 1 mile approx.


a Spacing in Feet
DEMETRIE WASH AREA
Induced Polarization Survey
for
THE SUPERIOR OIL COMPANY
Minerals Division
Expander #1
@ 400' N 50° E of
SW Cor. Ann 26
Spread Bearing
N 55° E - S 55° W
by
HEINRICHS GEOEXPLORATION CO.
EXPANDER ARRAY
RECEIVER
SENDER
a
2a
a
RESISTIVITY
P.F.E. UNCORRECTED
M.C.F. UNCORRECTED
P.F.E. CORRECTED
M.C.F. CORRECTED
RESISTIVITY ρ/2π in ohm feet.
PFE coupling corrected & uncorrected
M.C.F. coupling corrected & uncorrected

SEMI-LOGARITHMIC
2 CYCLES X 10 DIVISIONS PER INCH
EUGENE DIETZGEN CO.

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by
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Receiver
Sender
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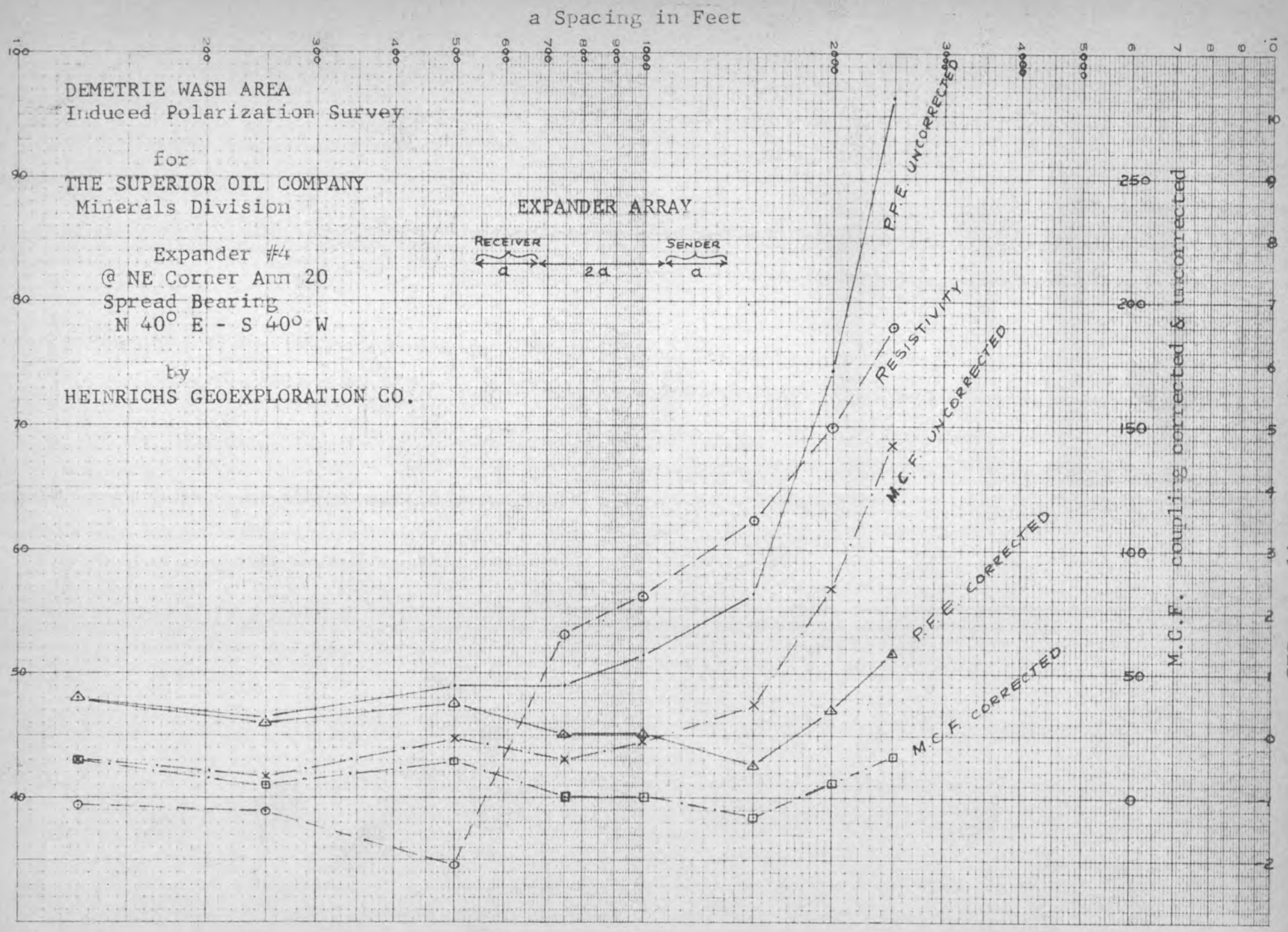
a Spacing in Feet
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Induced Polarization Survey
for
THE SUPERIOR OIL COMPANY
Minerals Division
Expander #4
@ NE Corner Ann 20
Spread Bearing
N 40° E - S 40° W
by
HEINRICHS GEOEXPLORATION CO.
EXPANDER ARRAY
RECEIVER
SENDER
a
2a
a
P.F.E. UNCORRECTED
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