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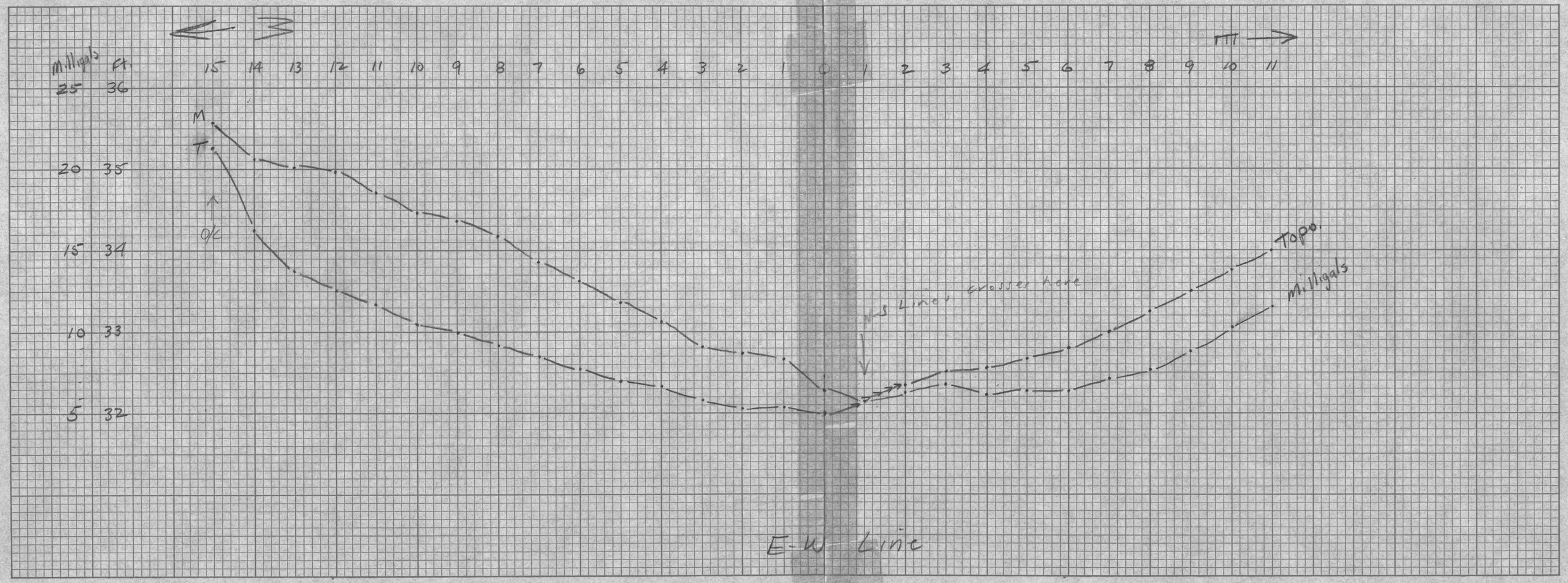
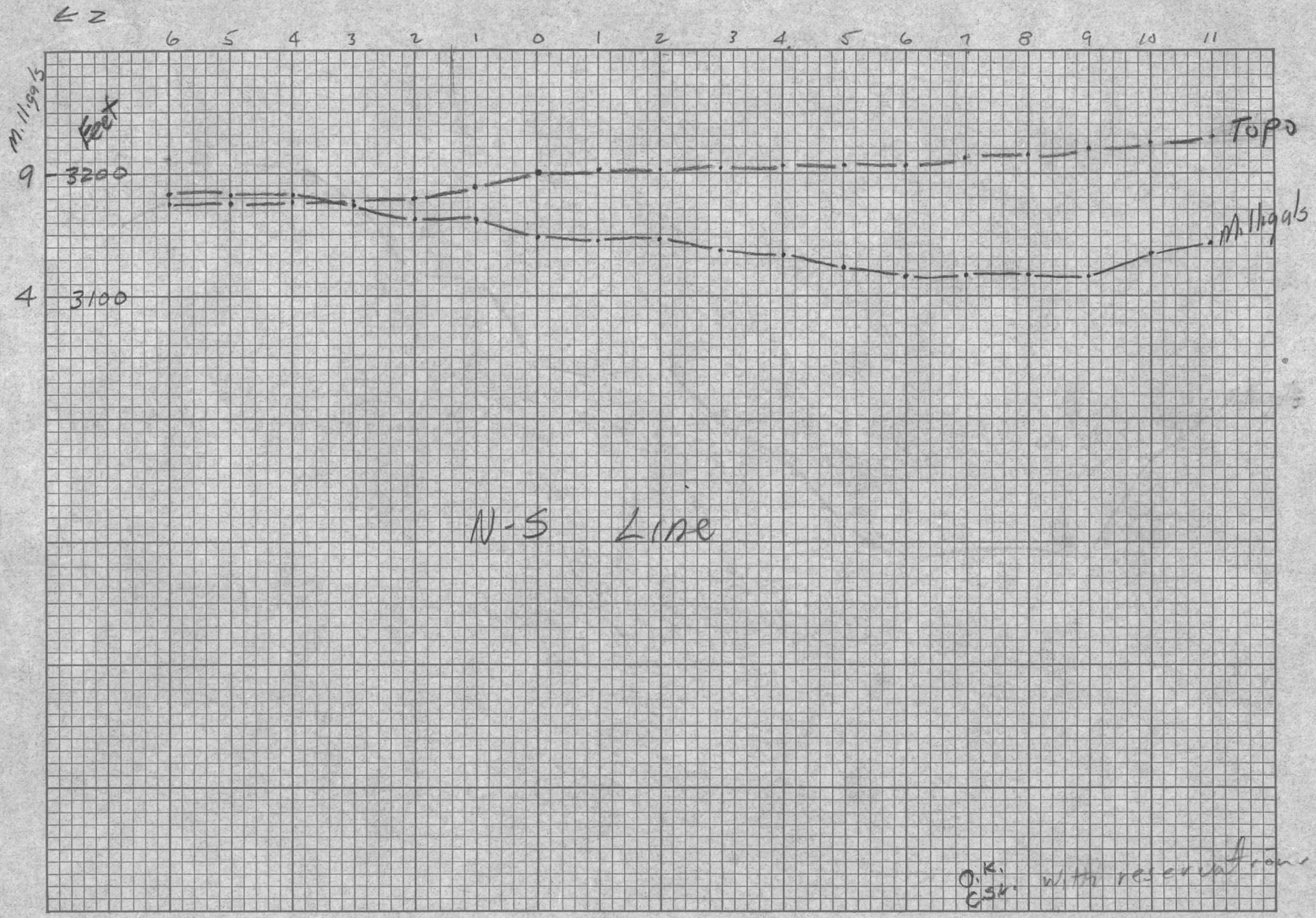
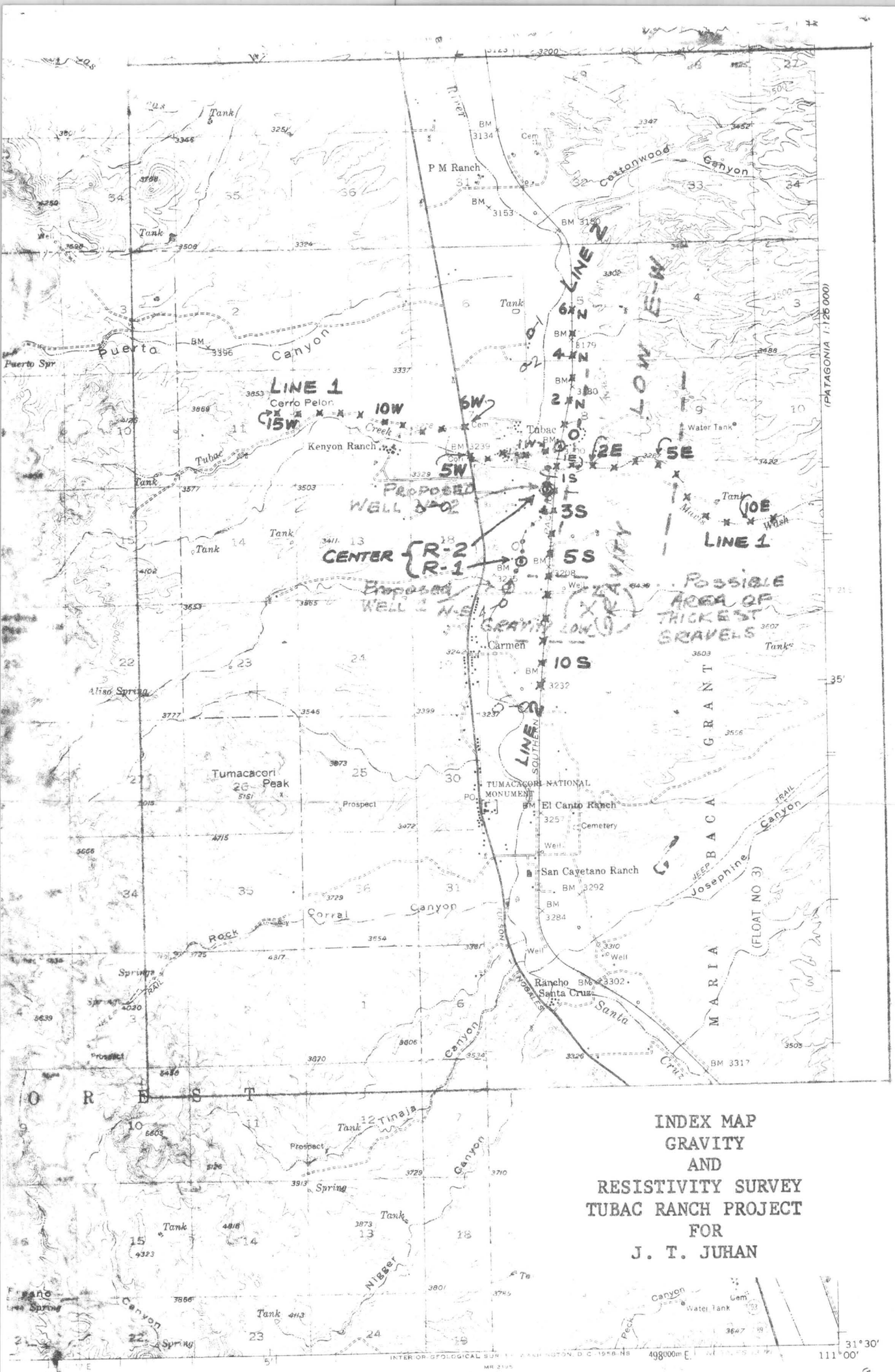

W
E
Milligals
Ft.
25 36
20 35
15 34
10 33
5 32
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 10 11
M
T
O/C
Topo.
Milligals
Lines crosses here
E-W Line

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



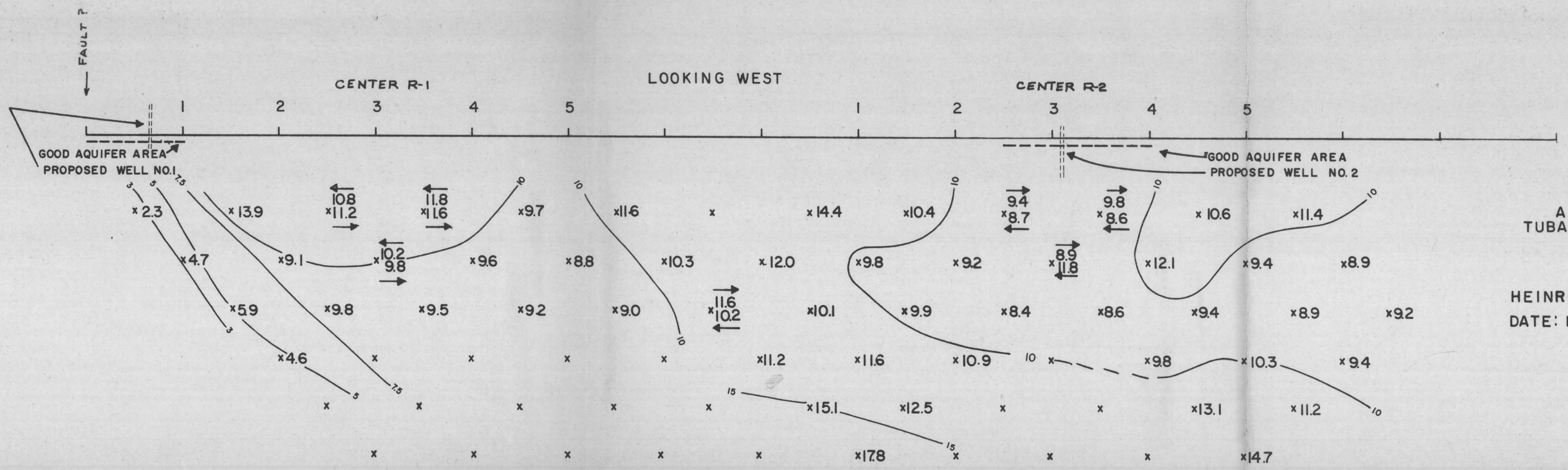


INDEX MAP
GRAVITY
AND
RESISTIVITY SURVEY
TUBAC RANCH PROJECT
FOR
J. T. JUHAN

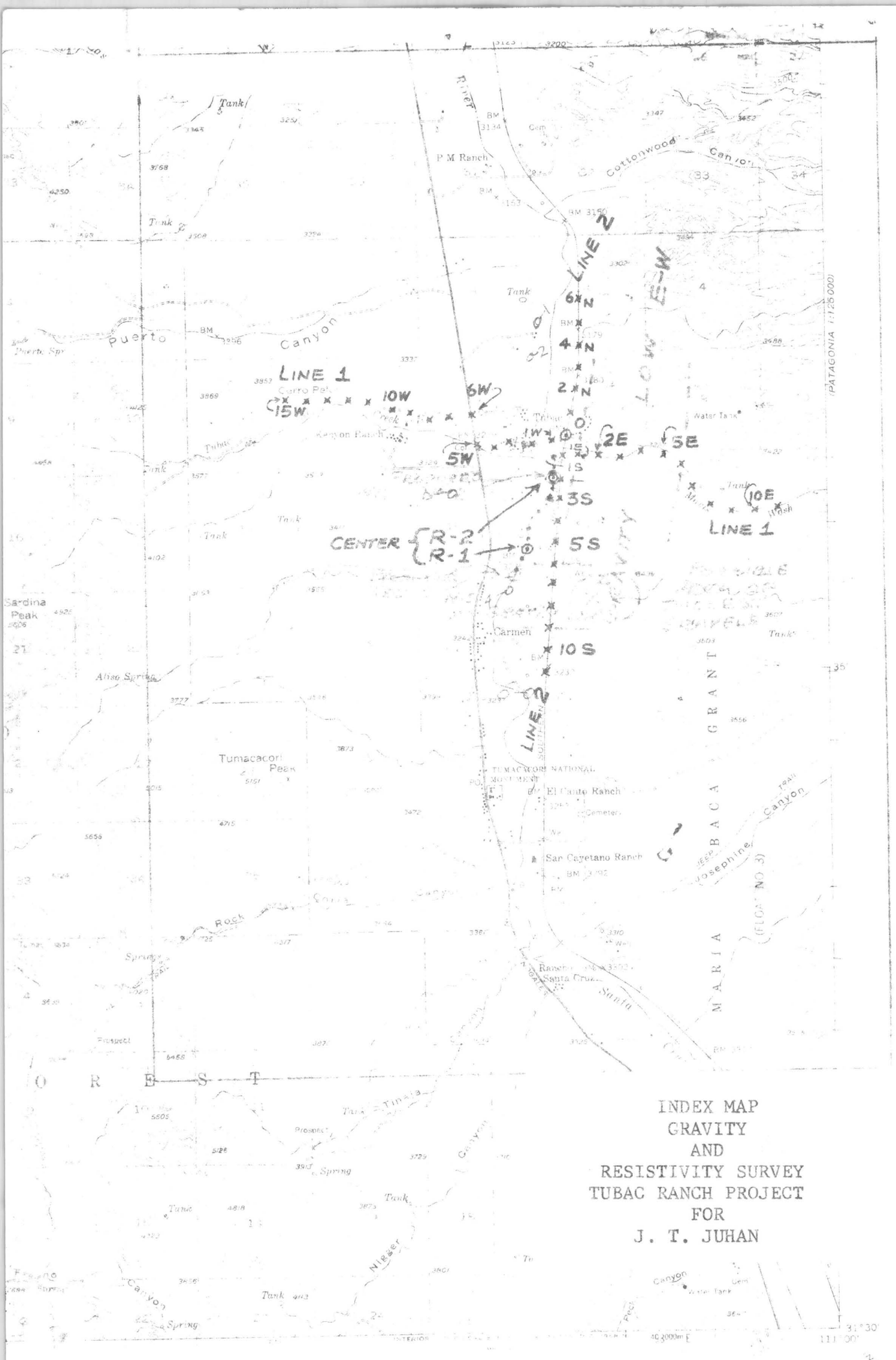
TUBAC, ARIZ.
N3130—W11100/15

1957

COPIES OF WASHINGTON 25, D. C.
SYMBOLS ON REQUEST



APPARENT RESISTIVITY
TUBAC RANCH WATER PROJECT
FOR
J. T. JUHAN
BY
HEINRICHS GEOEXPLORATION CO.
DATE: MAY 1965 SCALE: 1" = 400'



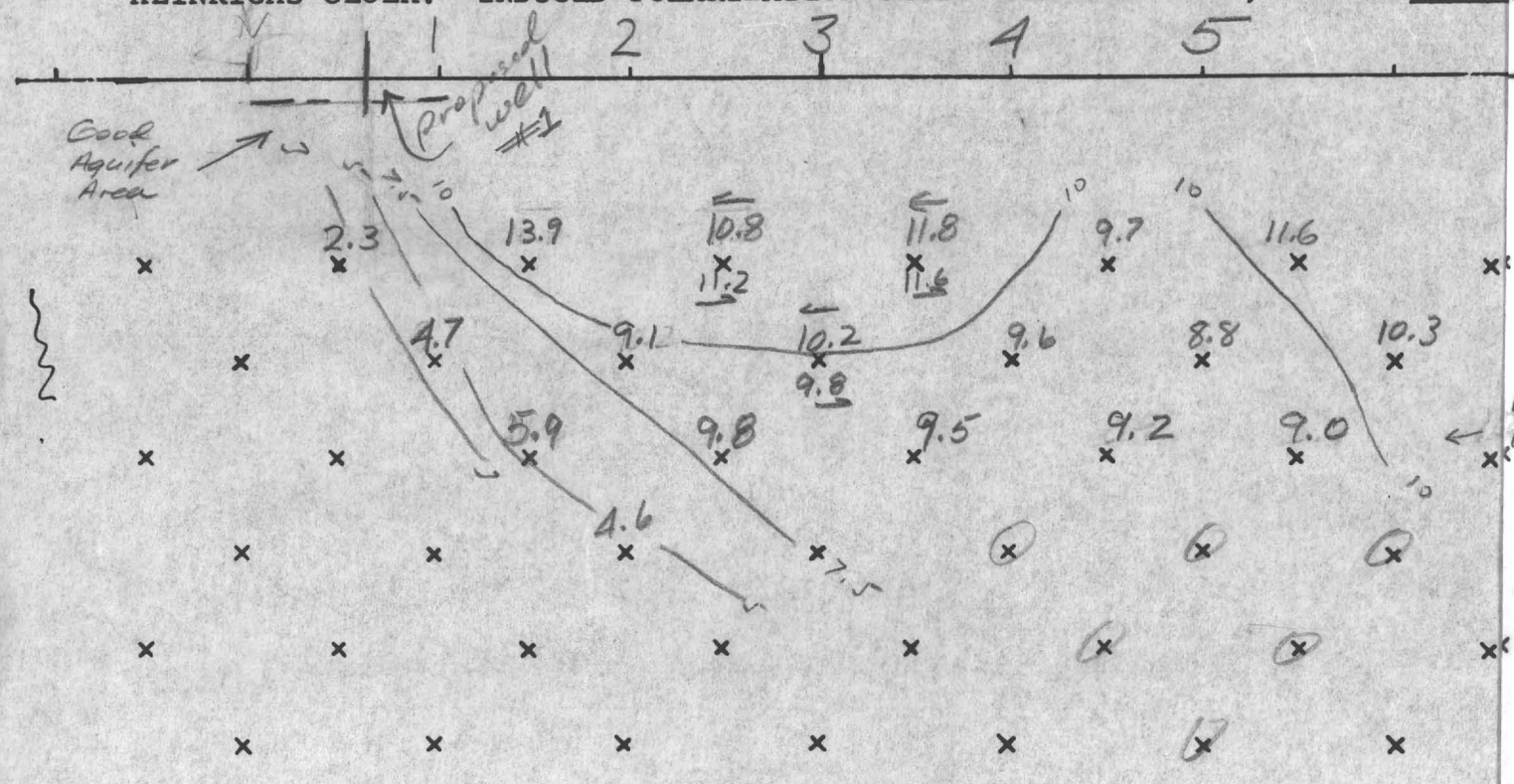
INDEX MAP
GRAVITY
AND
RESISTIVITY SURVEY
TUBAC RANCH PROJECT
FOR
J. T. JUHAN

4 MILES
18000 21000 FEET
5 KILOMETERS

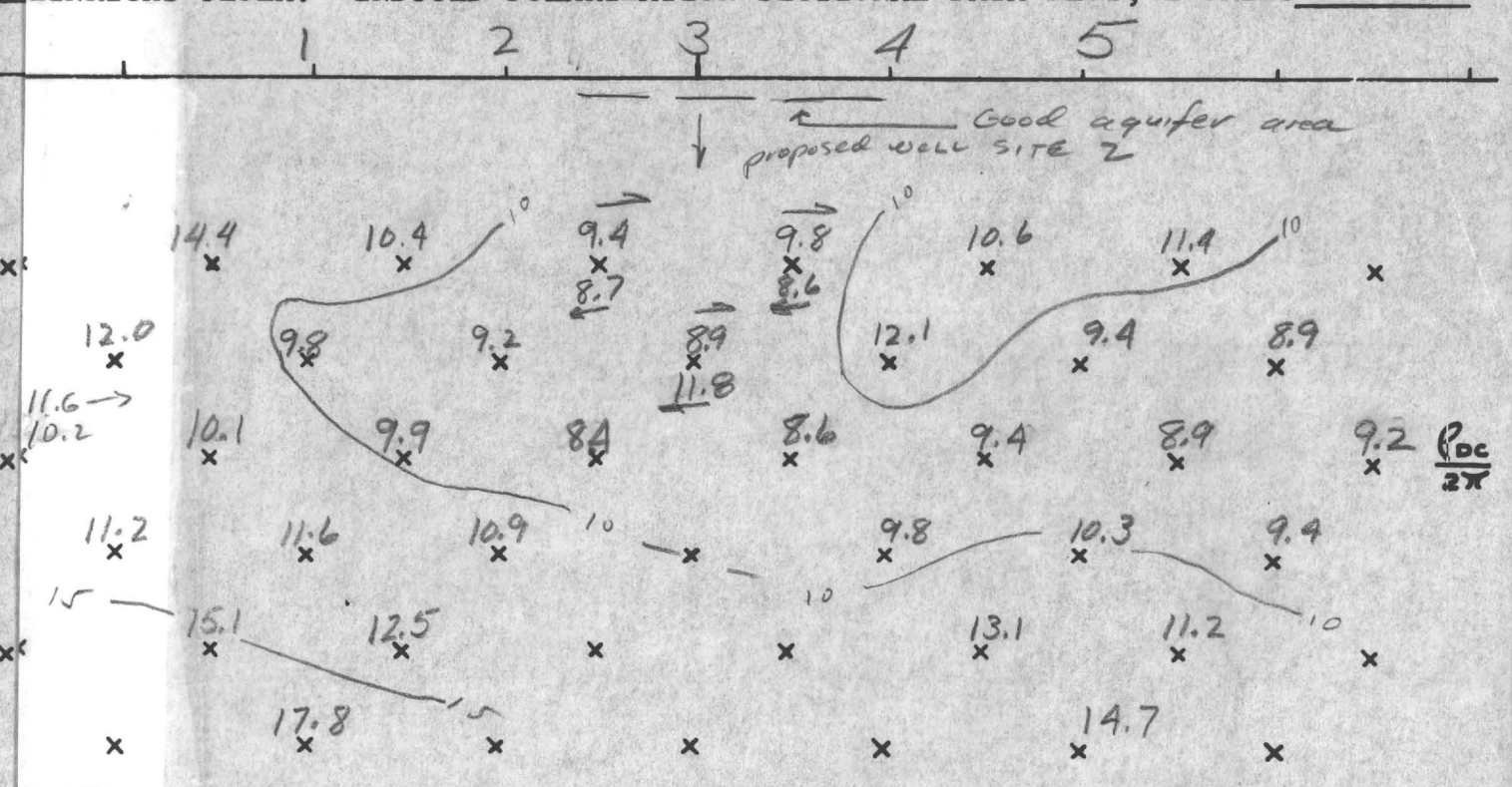
ARIZONA

TUBAC, ARIZ.

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING W



HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING W



Apparent Resistivity

TUBAC RANCH H_2O Project

for

J. T. JUHAN

by

Geoex

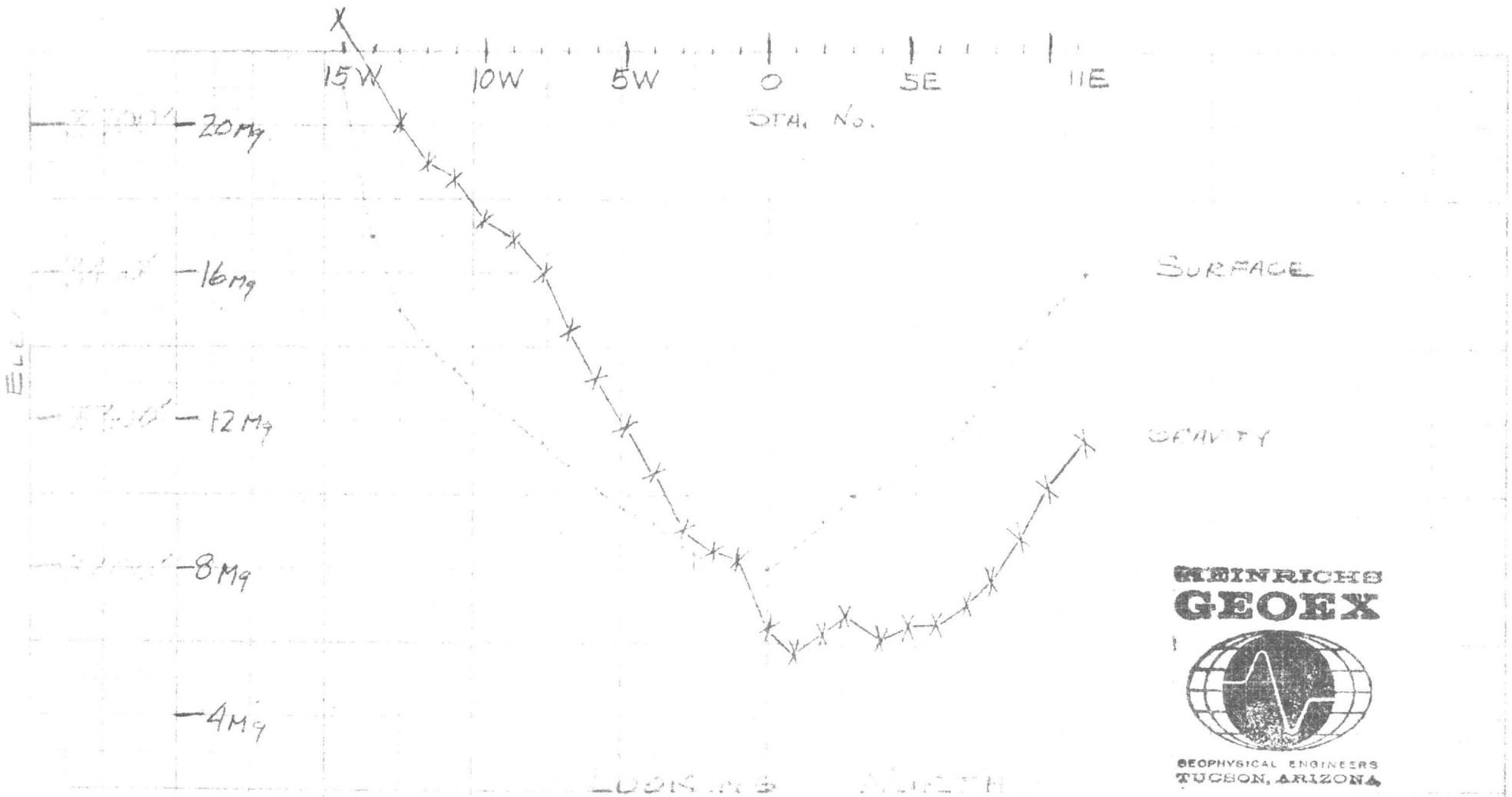
DATE

Scale

P.F.E.

M.C.F.

AREA TUBAC S.C. RIVER LINE 1 a = 500' SCALE: 1" = 500 DATE: TUBAC (S.C. RIVER) LINE 2 a = 500' SCALE: 1" - 500 DATE: 5-19-65



DENSITY 2.0 g/c.c.

$12.77\,\sigma T = \Delta g$

σ = density contrast

T = thickness in kilofeet

Δg = gravity anomaly in mgals

GRAV. X—X

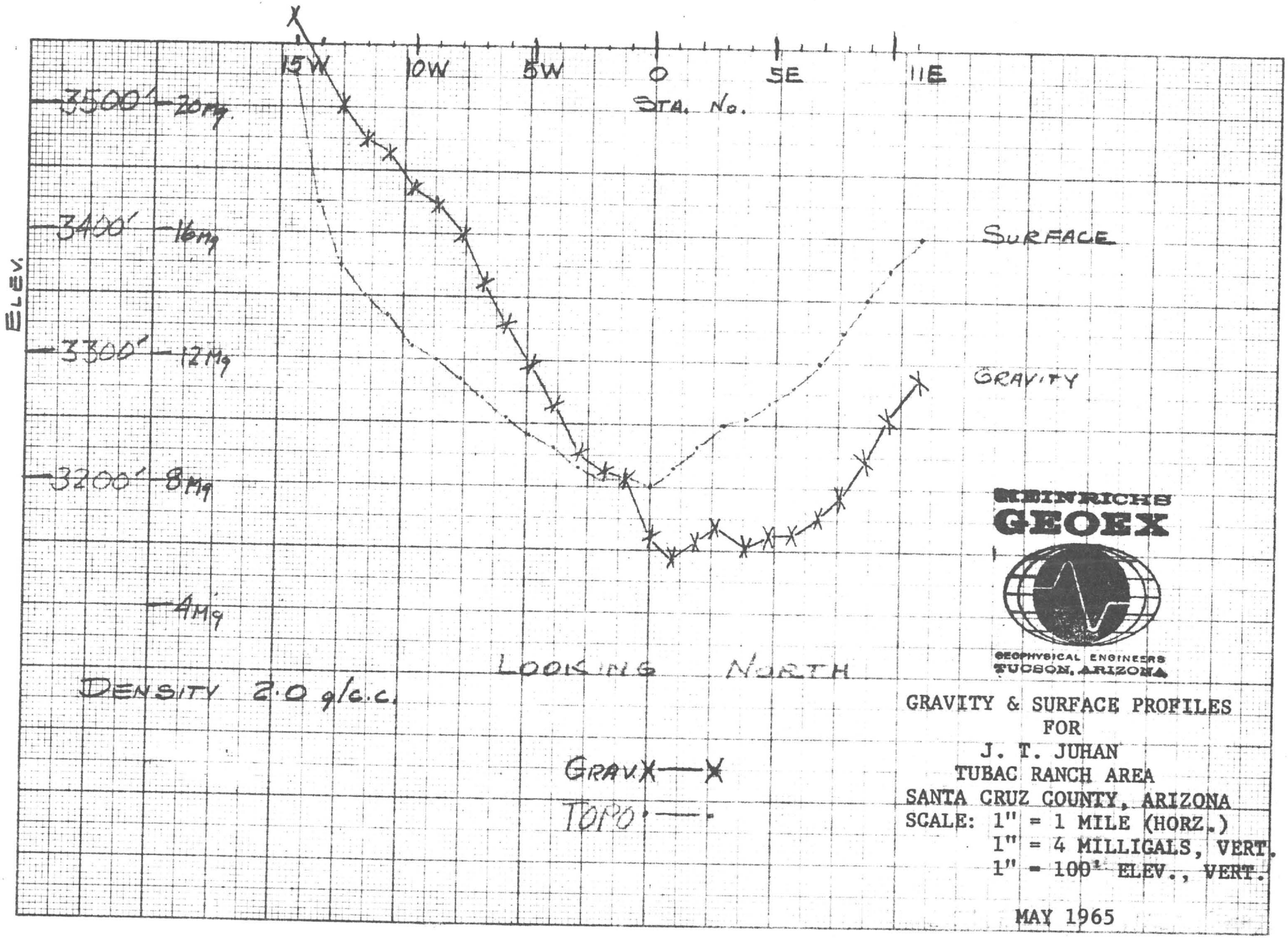
HEINRICHS GEOEX

GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA

GRAVITY & SURFACE PROFILES
FOR
J. T. JUHAN
TUBAC RANCH AREA
SANTA CRUZ COUNTY, ARIZONA
SCALE: 1" = 1 MILE (HORZ.)
1" = 4 MILLIGALS, VERT.
1" = 100' ELEV., VERT.

MAY 1965

K+E 20 X 20 TO THE INCH KEUFFEL & ESSER CO. 359-10 1/2G



GRAVITY & SURFACE PROFILES
FOR
J. T. JUHAN
TUBAC RANCH AREA
SANTA CRUZ COUNTY, ARIZONA
SCALE: 1" = 1 MILE (HORZ.)
1" = 4 MILLIGALS, VERT.
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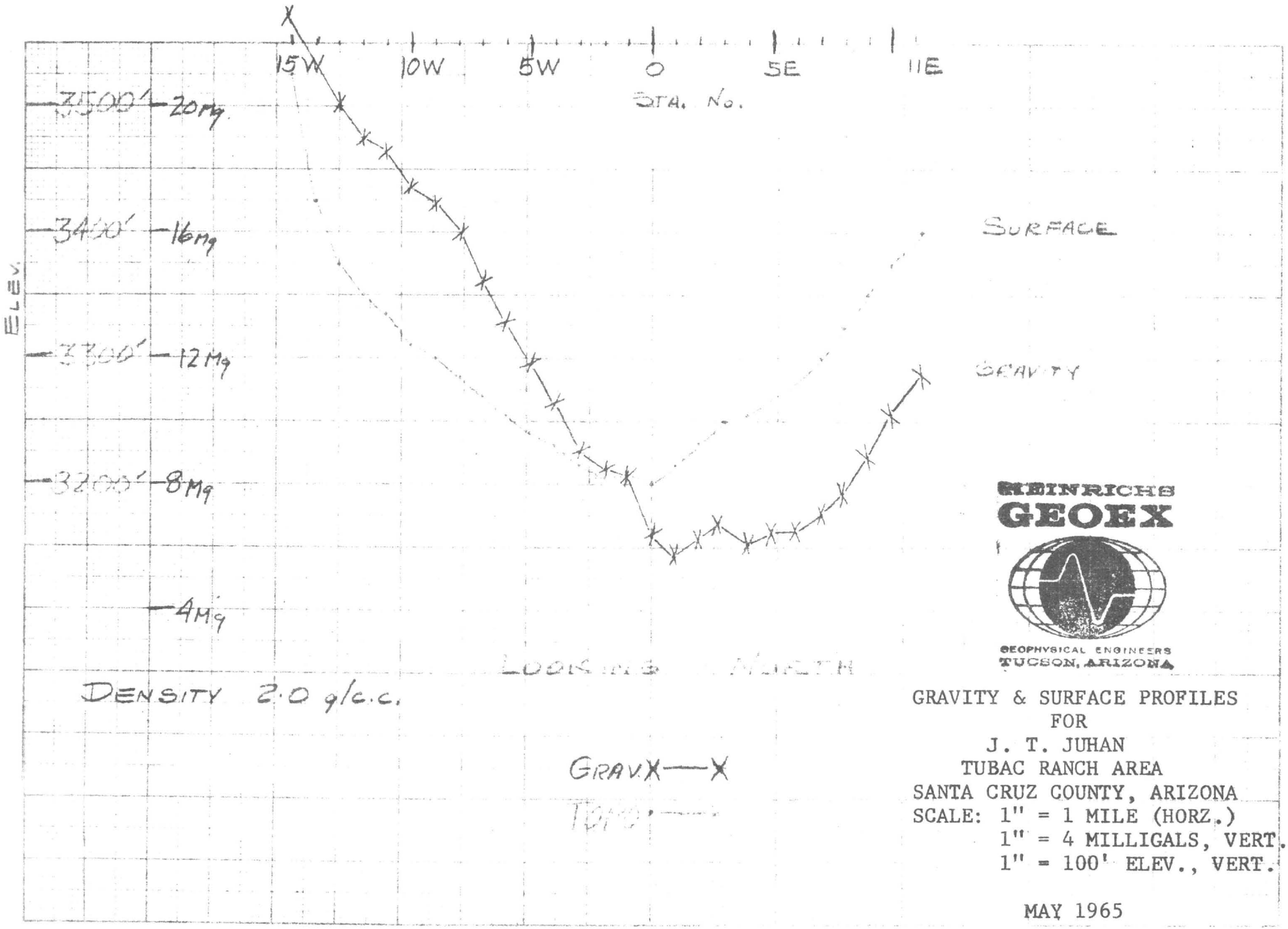
MAY 1965



REINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA

GRAVITY & SURFACE PROFILES
FOR
J. T. JUHAN
TUBAC RANCH AREA
SANTA CRUZ COUNTY, ARIZONA
SCALE: 1" = 1 MILE (HORZ.)
1" = 4 MILLIGALS, VERT.
1" = 100' ELEV., VERT.

MAY 1965

Gravity Data

for

Juhan

Tubac, Arizona

PROJECT : JUHAN

AREA : TUBAC

5-14-65

(1)

SANTA CRUZ RIVER
BASIN PROJECT

TR.MK. REG. U.S. PAT. OFF

		#	DATE
BASE STA	USG&GS	S 334	1953
	1072.5		
	72.5		
	72.5		
1000W	1087.1		
2000W	90.4		
3000W	86.8		
4000W	90.1	4800 to	
5000W	99.8	Highway	
6000W	1106.7	Hy-Rd intersection	
7000W	09.2		
8000W	13.8		
9000W	13.9		
10,000W	13.6		
11,000W	07.4		
12,000W	01.3		
13,000W	1094.4		
14,000W	61.9		
15,000W	1011.1		
BASE	1072.5		
BASE	1078.8		
1000E	1056.6		
2000E	50.0		
3000E	42.5		
4000E	32.6		
5000E	26.5		
6000E	16.1		
7000E	05.0		

ORIGINAL CO... BY J. C. PARKER
LEFAX, PHILADELPHIA, 7 PA. MADE IN U.S.A.

ORIGINAL COPYRIGHT BY J. C. PARKER
TR.MK. REG. U.S. PAT. OFF.

8000E		990.1	
9000E		981.5	
10000E		976.7	
11 E		971.4	
12 E	BASE		1079.3
13 E			
14 E			
15 E			
1000N		~~99~~ 99	1097.5
2000N		1107.7	
3 N		1118.2	
4N		1125.0	
5N		1128.3	
6N		1132.0	
1 S		1074.3	
2 S		71.1	
3 S		62.6	
4 S		55.3	
5 S		45.5	
6 S		39.2	
7 S		34.5	
8 S		27.9	
9 S		21.6	
10 S		23.9	
11 S		23.0	
BASE		1078.9	

LEFAX, PHILADELPHIA, 7 PA. MADE IN U.S.A.

Density = 2.0 g/cc CBFA = .06855 Scale Const = 0.08887 LAT Corr = 1.166 Mg/Mi

STA	1 Reading	2 Daily & Diurnal Drift	4 Miles N-S of Base (N, S)	6 Elevation	3 1+2x SC Corr Milligals	5 4x Lat Cor	7 6xCBFA	8 3+5+7	9
BASE	1079.3	-6.8	-2.2	3200-	95.31	2.57	13.71	106.45	
1N	1097.5	-6.78	-2.4	190-	96.93	2.80	13.02	107.15	
2N	1107.7	76	-2.6	180-	97.84	3.03	12.34	107.15	
3N	1118.2	74	-2.8	179-	98.78	3.26	12.27	107.79	
4N	1125.0	72	-3.0	178-	99.38	3.49	12.20	108.09	
5N	1128.3	70	-3.2	177-	99.68	3.72	12.13	108.09	
6N	1132.0	68	-3.4	176-	100.01	3.95	12.06	108.11	
1S	1074.3	66	-2.0	3201-	94.88	2.33	13.78	106.33	
2S	1071.1	64	-1.8	03-	94.60	2.10	13.92	106.42	
3S	1062.6	62	-1.6	04-	93.84	1.87	13.98	105.95	
4S	1055.3	60	-1.4	06-	93.20	1.63	14.12	105.69	
5S	1045.5	58	-1.2	07-	92.33	1.40	14.19	105.12	
6S	1039.2	56	-1.0	08-	91.77	1.17	14.26	104.86	
7S	1034.5	54	-.8	12-	91.35	.93	14.53	104.95	
8S	1027.9	52	-.6	17-	90.77	.70	14.88	104.95	
9S	1021.6	50	-.4	21-	90.21	.46	15.15	104.90	
10	1023.9	48	-.2	26-	90.42	.23	15.49	105.68	
11S	1023.0	46	-0	30-	90.34	.00	15.78	106.09	
BASE	1078.9	-6.4		00-	95.31				

Den = 2.0 CBFA = .06855 SC = 0.08887 Ø Corr 1.166

STA	1 Reading	2 Drift Daily & Diurnal	4 Miles N-S of Base	6 Elev	3 1+2-SC Corr Milligals	5 4 x Ø Corr	7 6 x CBFA	8 3+5+7
BASE	1072.5	Ø	2.2	3200	9531	- 257	1371	10645
1000 W	1087.1		2.2	08	9661	- 257	1426	10830
2 — W	90.4		2.1	06	9690	- 245	1412	10857
3 — W	86.8		2.0	16	9658	- 233	1481	10906
4 — W	90.1		1.9	32	9688	- 222	1590	11056
5 — W	99.8		2.0	40	9774	- 233	1645	11186
6 — W	1106.7		2.3	55	9835	- 268	1748	11315
7 — W	09.2		2.3	70	9857	- 268	1851	11440
8 — W	13.8		2.2	85	9898	- 257	1954	11595
9 — W	13.9		2.3	3300	9899	- 268	2057	11688
10 — W	13.6		2.4	10	9897	- 280	2125	11742
11 — W	07.4		2.4	35	9841	- 280	2296	11857
12 — W	01.3		2.5	50	9787	- 292	2399	11894
13 — W	1094.4		2.5	75	9726	- 292	2571	12005
14 — W	61.9		2.5	3425	9437	- 292	2913	12058
15 — W	1011.1		2.5	3525	8986	- 292	3599	12293
BASE W	1072.5							
BASE	1078.8	- 6.30	2.2	—	9531	- 257		
1000 E	66	6.35	2.1	3216	9334	- 245	1481	10570
2 — E	50.0	40	2.1	33	9274	- 245	1597	10626
3 — E	42.5	45	2.1	50	9207	- 245	1714	10676
4 — E	32.6	50	2.2	55	9119	- 257	1748	10610
5 — E	26.5	55	2.2	68	9064	- 257	1837	10644
6 — E	16.1	55	2.1	80	8972	- 245	1919	10646
7 — E	05.0	60	1.9	3300	8873	- 222	2056	10708
8 — E	990.1	65	1.7	25	8740	- 198	2228	10770
9 — E	981.5	70	1.5	50	8663	- 175	2399	10887
10 — E	9767	75	1.4	75	8620	- 163	2571	11028
11 — E	9714	80	1.4	3400	8572	- 163	2742	11151
BASE	10793	80						

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Tuhan Line: 1 N½ Int.Cal _____ Date: 5-18

Send	1-2	1-2	2-3	1-2	2-3	3-4	1-2	2-3	3-4	4-5		
Rec.	0-5 →	5-10 →		10-15	→		15-20	→		→		
Time	30											
DC-1	12.0											
DC-2	11.4											
Σ												
DC-3	12.0											
Dc-4	11.3											
Σ												
DC-AV												
AC-1												
AC-2												
Σ												
S. P.	+36.3											
AC-N												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: JUHAN Line: 1 N½ Int.Cal _____ Date: _____

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		2-3		
Rec.	20-25	→	→	→	25-30	→	→	→		CAL		
Time											300 RANGE	
DC-1											95.0	
DC-2											95.0	
Σ											190.0	
DC-3											95.0	
Dc-4											95.0	
Σ											190.	
DC-AV												
AC-1												
AC-2												
Σ												
S. P.												
AC-N												

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 1

Project JUHAN Line 1 N 1/2 Field date 5-18-65 Data page 1 Comp. date 5-19-65. Comp by DA

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-5 N	5-10N →		10-15N →			15-20N →					
(C) ~~n separation~~ RANGE	30	30	3	10	3	1	30	3	1			
(D) I	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6			
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}	1.5	1.5	6.0	1.5	6.0	15.0	1.5	6.0	15.0	30.0		
(H) ρ dc=ExFxGx10^3/D	11.2	11.6	9.8	9.7	9.6	9.5	~~10~~ 11.6	8.8	~~8~~ 9.2			
(I) Vac Σ	12.0	12.4	2.62	10.34	2.56	1.016	12.4	2.34	.984			
(J) AC noise x 2	.1	.06		.06			?					
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

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

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	20-25N →				25-30N →							
(C) n separation	3	1	—	—	1							
(D) I	1.6	1.6			1.6							
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}	6.0	15.0	30.0	52.5	15.0							
(H) ρ dc=ExFxGx10^3/D	10.3	~~8~~ 9.0			10.2							
(I) Vac Σ	2.74	.964			1.088							
(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 _____

Project: JUAN Line: 1A N Int.Cal _____ Date: _____

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-3	3-4	2-3	1-2		
Rec.												
Time	30	30	3	10	3	1	30	3	1			
DC-1												
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1	6.0	6.2	1.31	5.17	1.28	.508	6.2	1.17	.492			
AC-2												
Σ												
S. P.	.05	.03		.03								
AC-N												

Forth Spread

TOO WEAK

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: JUAN Line: 1 A N Int.Cal _____ Date: _____

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
Rec.	3	1										
Time												
DC-1			TOO WEAK	TOO WEAK		TOO WEAK						
DC-2									Dead			
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1	1.37	.482			.544							
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION N SENDER NOTES

Project: Juhan Line: 1A Date: 5-18-65

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6		
Time												
Range												
Current												
Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
Receive	1.6	1.6	1.6	1.6	1.6							
Time												
Range												
Current												

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 2

Project JUHAN Line 1 5½ Field date 5-18-65 Data page 1 Comp. date 5-19-65 Comp by

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-5S	5-10S	→	10-15S	→	→	15-20S	→	→	→		
(C) n separation	30	10	3	30	3	1	3	3	1	1		
(D) I 4	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6		
(E) Vdc (avg)												
(F) DCcal 2	1.000	→	→	→	→	→	→	→	→	→		
(G) Kn x 10^{-3} 3	1.5	1.5	6.0	1.5	6.0	15.0	1.5	6.0	15.0	30.0		
(H) ρ dc=ExFxGx10^3/D	11.81	10.84	10.2	13.9	9.1	9.8 ~~1.0~~	2.3	4.7	~~0.6~~ 5.9	4.6		
(I) Vac Σ 1	12.6	11.56	2.72	14.8	2.42	1.046	2.43	1.26	.630	.246		
(J) AC noise x 2	.10	.04		.06			.08					
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

Project Line Field date Data page Comp. date Comp by 1.056

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL		
(B) Receive	20-25S	→	→	→	25-30S	→	→	→				
(C) n separation										1.000		
(D) I												
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}												
(H) ρ dc=ExFxGx10^3/D												
(I) Vac Σ										95.0		
(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 _____

Project: JUAN Line: KA S Int.Cal _____ Date: _____

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL
Rec.	0-5	5-10 →		10-15		→	15-20			→		
Time	30	10	3	30	3	1	3	3	1			
DC-1												49
DC-2					South	Spread	A					49
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1	6.3	5.78	1.36	7.14	1.21	.523	1.23	.63	.315	.123		47.5
AC-2	6.3											47.5
Σ												
S. P.												
AC-N	.05	.02	.	.03		.04 →						

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: JUAN Line: 1A-S Int.Cal _____ Date: _____

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
Rec.	20-22	→	→	→	25-30	→	→	→				
Time												
DC-1												
DC-2												
Σ		Too Weak										
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1					Small Spread							
AC-2												
Σ												
S. P.												
AC-N												

INDUCED POLARIZATION SENDER NOTES

Project: Uvhan Line: ZAS Date: 5-18-65

Send	45	34	45	23	34	45	12	23	34	45		
Receive	→		→		→		→		→			
Time	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6		
Range												
Current												
Send	12	23	34	45	12	23	34	45				
Receive				→		→						
Time												
Range												
Current												

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 3

Project JUHAN Line 2 N½ Field date 5-18-65 Data page 1 Comp. date 5-19-65. Comp by

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-5N	5-10N	→	10-15N	→	→	15-20N	→	→	→		
(C) ~~n separation~~ RANGE	10	10	3	10	3	1	10	3	1	1		
(D) I	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6		
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}	1.5	1.5	6.0	1.5	6.0	15.0	1.5	6.0	15.0	30.0		
(H) ρ dc=ExFxGx10^3/D	9.4	9.8	8.9	10.6	12.1	0.8	11.4	9.4	0.9.4	9.8		
(I) Vac Σ	10.03	10.44	2.38	11.36	2.32	.916	12.20	2.50	1.00	.524		
(J) AC noise x 2	.34	.30		.34			.04					
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

Project Line Field date Data page Comp. date Comp by

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
(B) Receive	20-25N	→	→	→	25-30N	→	→	→				
(C) n separation	3	1	1	1	1	1	1	1				
(D) I	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6				
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}	6.0	15.0	30.0	52.5	15.0	30.0	52.5	84.0				
(H) ρ dc=ExFxGx10^3/D	8.9	0.9	10.3	13.1	0.9.2	9.4	11.2	14.7				
(I) Vac Σ	2.38	.950	.550	.398	.984	.50	.34	.28				
(J) AC noise x 2	.16				.14							
(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												

1" = 10 Mg

1" = Mi

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Tufton Line: 2N 1/2 Int.Cal 5 Date: _____

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Rec.	0-5	5-10	→	10-15	→	→	15-20	→	→	→		
Time	10	10	3	10	3	1	10	3	1	1		
DC-1												
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1	5.02	5.22	1.19	5.68	1.16	.458	6.10	1.25	.50	.262		
AC-2	5.01	5.22	1.19	5.68	1.16	.458	6.10	1.25	.50			
Σ	10.											
S. P.												
AC-N	.12	.15	.17				.01					

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Juhan Line: 2 N½ Int.Cal _____ Date: _____

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
Rec.	20-25	→	→	→	25-30	→	→	→				
Time	3	1	1	1	1	1	1	1				
DC-1												
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1	1.19	.475	275	.199	.492	25	170	.14				
AC-2	1.19	475	275	199	492	25	170	.14				
Σ	2.38	.950	.550	398	984	.50	.340	.28				
S. P.												
AC-N	.08				.07							

INDUCED POLARIZATION SENDER NOTES

Project: Juhan Line: 2 N½ Date: 5-18-65

Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
Receive												
Time	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6		
Range												
Current												
Send	~~4-5~~	3-4	2-3	1-2	4-5	3-4	2-3	1-2				
Receive												
Time	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6				
Range												
Current												

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page 4

Project JUHAN Line 2 5½ Field date 5-18-65 Data page 1 Comp. date 5-19-65 Comp by

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-5 S	5-10 S	→	10-15 S	→	→	15-20 S	→	→	→		
(C) ~~n separation~~ RANGE	30	30	10	10	10	3	10	3	1	1		
(D) I	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6		
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}	1.5	1.5	6.0 11.8	1.5	6.0	15.0	1.5	6.0	15.0	30.0		
(H) ρ dc=ExFxGx10^3/D	8.6	8.7	~~37.4~~	10.4	9.2	~~8.9~~	14.4	9.8	~~9.8~~	10.9		
(I) Vac Σ	9.16	9.30	~~9.96~~	11.10	2.44	0.94	15.34	2.60	1.06	.58		
(J) AC noise x 2	.10	.20	3.16	.20			.32					
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

Project Line Field date Data page Comp. date Comp by

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
(B) Receive	20-25 S	→	→	→	25-30 S	→	→	→				
(C) n separation	3	1	1	1	3	1	1	1				
(D) I	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6				
(E) Vdc (avg)												
(F) DCcal												
(G) Kn x 10^{-3}	6.0	15.0	30.0	52.5	15.0	30.0	52.0	84.0				
(H) ρ dc=ExFxGx10^3/D	12.0	10.1	11.6	12.5	1.26	11.2	15.1	17.8				
(I) Vac Σ	3.20	1.08	.62	.38	1.24	.60	.46	.34				
(J) AC noise x 2	.22				.36							
(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 _____

Project: Ju 'hon Line: 2 5½ Int.Cal _____ Date: _____

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Rec.	0-5	5-10	→	10-15	→		15-20	→				
Time	30	30	10	10	10	3	10	3	1	1		
DC-1												
DC-2												
Σ												
DC-3												
Dc-4												
Σ				1.58	on 3							
DC-AV												
AC-1	4.58	4.65	4.98	5.55	1.22	0.47	7.67	1.30	.53	.29		
AC-2	4.58	4.65	4.98	5.55	1.22	0.47	7.67	1.30	.53	.29		
Σ												
S. P.												
AC-N	.05	.10		.10			.16					

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: JUHAN Line: 2 5½ Int.Cal _____ Date: _____

Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
Rec.	30-25	→	→	→	25-30	→	→	→				
Time	3	1	1	1	3	1	1	1				
DC-1												
DC-2												
Σ												
DC-3												
Dc-4												
Σ												
DC-AV												
AC-1	1.6	.54	.31	.19	.62	.30	.23	.17				
AC-2	1.6	.54	.31	.19	.62	.30	.23	.17				
Σ												
S. P.												
AC-N	.11				.18							

INDUCED POLARIZATION SENDER NOTES

Project: JUHAN Line: 2 5 1/2 Date: 5-18-65

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
Receive	→	—	→	—	—	→	—	—	—	→		
Time												
Range	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6		
Current												
Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5				
Receive	—	—	—	→	—	—	—	→				
Time												
Range	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6				
Current												

GEOPHYSICAL WATER SURVEY

TUBAC RANCH AREA

SANTA CRUZ COUNTY, ARIZONA

FOR

J. T. JUHAN

MAY 1965

by

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

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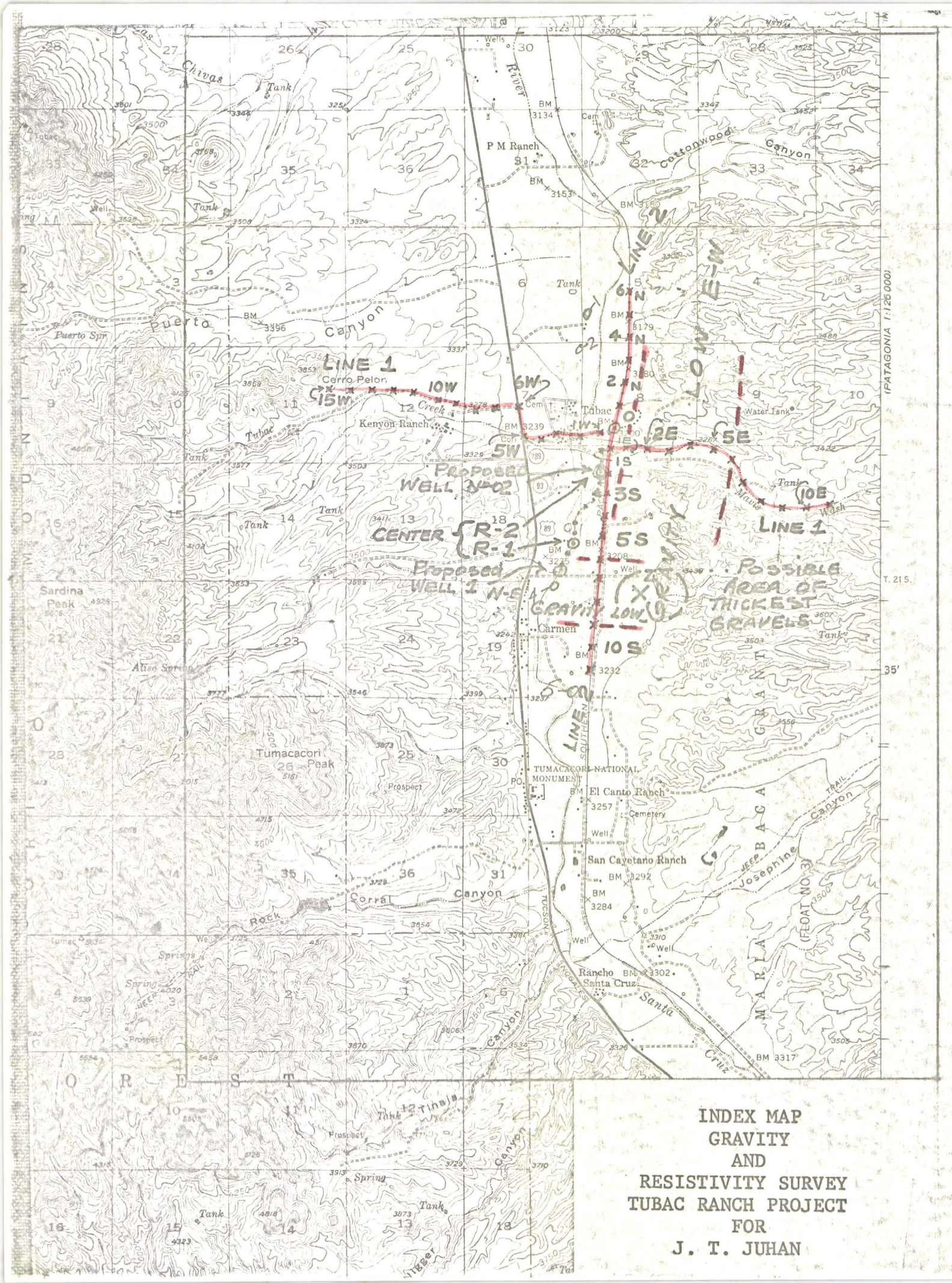


INDEX MAP
GRAVITY
AND
RESISTIVITY SURVEY
TUBAC RANCH PROJECT
FOR
J. T. JUHAN

INTRODUCTION

At the request of Mr. J. T. Juhan, Heinrichs Geoexploration Company conducted gravity and electrical resistivity surveys in the Tubac area of the Santa Cruz River Basin, traversing through Sections 5, 7, 8, 15, 16, 17, 18, and 20 of T 21 S, R 13 E, and Sections 11 and 12 of T 21 S, R 12 E, for the purpose of determing the most favorable water well locations. This work was done in the interim of May 14 - 18, 1965.

CONCLUSIONS AND RECOMMENDATIONS

The Gravity survey indicates a gravity low between Station 1E and 5E on Line 1. Using a rule of thumb computation the thickness of the gravels at the apex of the low is approximately 2000'. The low between Station 6S and 9S, on Line 2, is approximately 200' lower, or around 2200' of gravels at the lower point. It is interpreted that an area at the intersection of E-W gravity low and N-S gravity low, about 1500-2000' east of Station 7E on Line 2, would be the point of thickest gravels in the area surveyed and would be expected to be the best zone for a deep, high production well.

The resistivity shows two zones of lower resistivity. The best zone appears to be 500' south of Electrode 1, Center R-1. This zone is not closed off to the south. The second zone, at the center of R-2, has a higher resistivity value and is likely not as good an area from our interpretation of strictly the resistivity values.

PROCEDURES

GRAVITY:

All elevations were interpolated from U.S.G.S. 15' Quad Map, Tubac, Arizona, dated 1957. A Worden Gravity Meter, with a scale constant of 0.0888(7) was used. Maximum instrumental drift observed was 0.04 milligals, which was compensated for in the computations. The combined Bouguer and free air correction factor was 0.06855 milligals per foot, with a density of 2.0 g/c.c and a latitude correction factor of 1.166 milligals per mile N-S from base station. (USC & GSBM #S334, dated 1953, elevation 3200 feet above MSL).

RESISTIVITY:

Lines 1 and 2 were run north-south in the Santa Cruz River bed, in Section 17, T 21 S, R 13 E, and were layed out in such a

manner as to make possible the necessary overlap in order to obtain a subsurface tie. The AC resistivity is below the horizontal line representing the spread layout with electrodes numbered 1 through 5. In both cases, the sender equipment was located at #3 electrode and the receiver was located and readings observed at 500 foot intervals up to a maximum of 2500-3000' either side of the sender position.

It must be emphasized that the sectional presentation has no linear vertical scale, and the values plotted are at the intersection of 45° lines extending from the center of the sender position to the center of the receiver position. This is somewhat arbitrary, and we must stress that the actual depths of the values is an indeterminate function of the absolute AC resistivity distribution. In general, it may be said the data acquired will be most apt to vary from a depth of 0.2 to 2.0 times the dipole spacing of 500'. The dats is contoured in sectional form as a matter of convenience in interpretation only.

INTERPRETATION

GRAVITY LINES 1 & 2:

Line 1 was run from the foot of Cerro Pelon (15W) east across the Santa Cruz Valley about two miles east of the river (11E). Cerro Pelon was the nearest known bedrock outcrop to the west and, therefore, was the point from which the bedrock-alluvium surface was extrapolated. The contact appears to be a fairly uniform slope down all the way to Station 1E, where the basin is deepest. The depth of this point is estimated to be around 2000'. The basin floor rises very slightly to the east to Station 6E where it becomes steeper toward the Santa Rita Mountains. The deep portion of the basin is at least a mile across, making a large water reservoir.

Line 2 indicates that the basin is several hundred feet deeper between Stations 5S and 9S, south of Line 1, making this area the most promising for any deep, high production wells.

RESISTIVITY LINE:

The most striking feature is the strong resistivity low south of Electrode #1, Center R-1. This zone correlates with the deepest part of the basin as determined by the gravity, as well as correlating with the best producing well in the area (0-4). Several other minor

resistivity lows were also found, one between Electrodes 2 and 4, Center R-1, and one between Electrodes 4 and 5, Center R-1 of which the first looks better, in that it is broader. There may be another low starting at the north end of the line, but there is not sufficient data for a good interpretation.

Respectfully submitted,

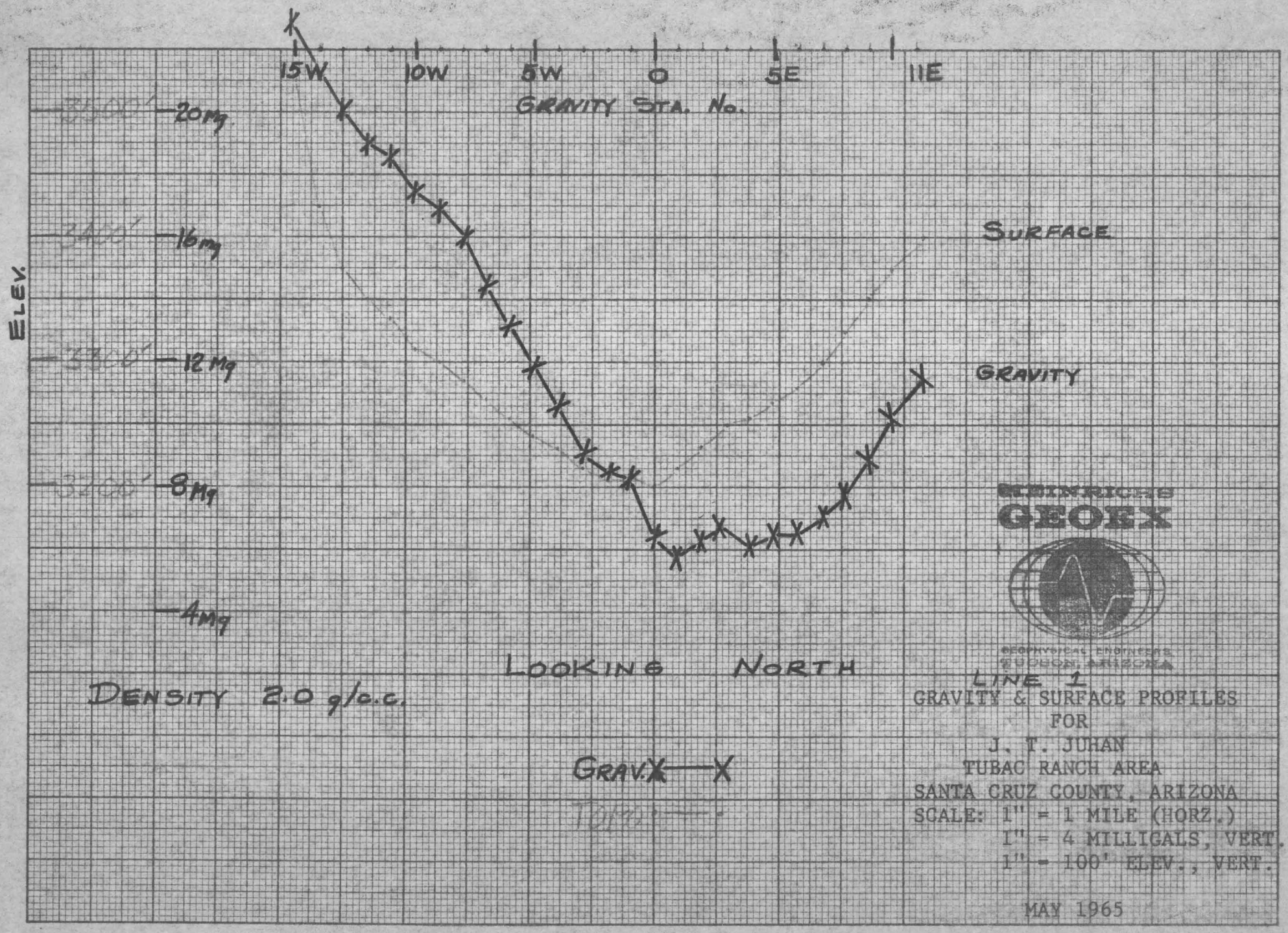
HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig

Chris S. Ludwig
Senior Geophysicist

June 4, 1965
P. O. Box 5671
Tucson, Arizona

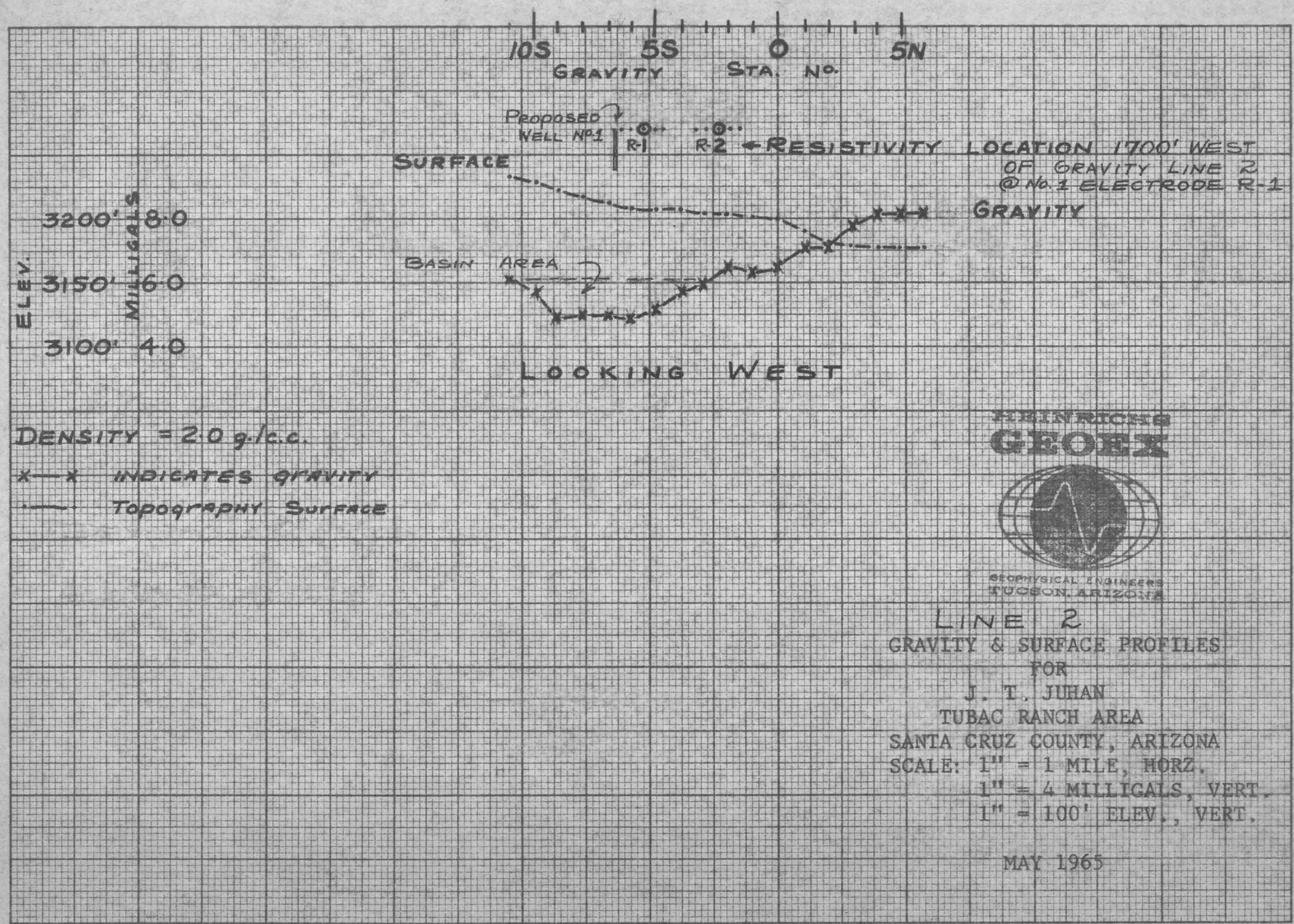
K+E 20 X 20 TO THE INCH KEUFFEL & ESSER CO. 359-10½G MADE IN U.S.A.

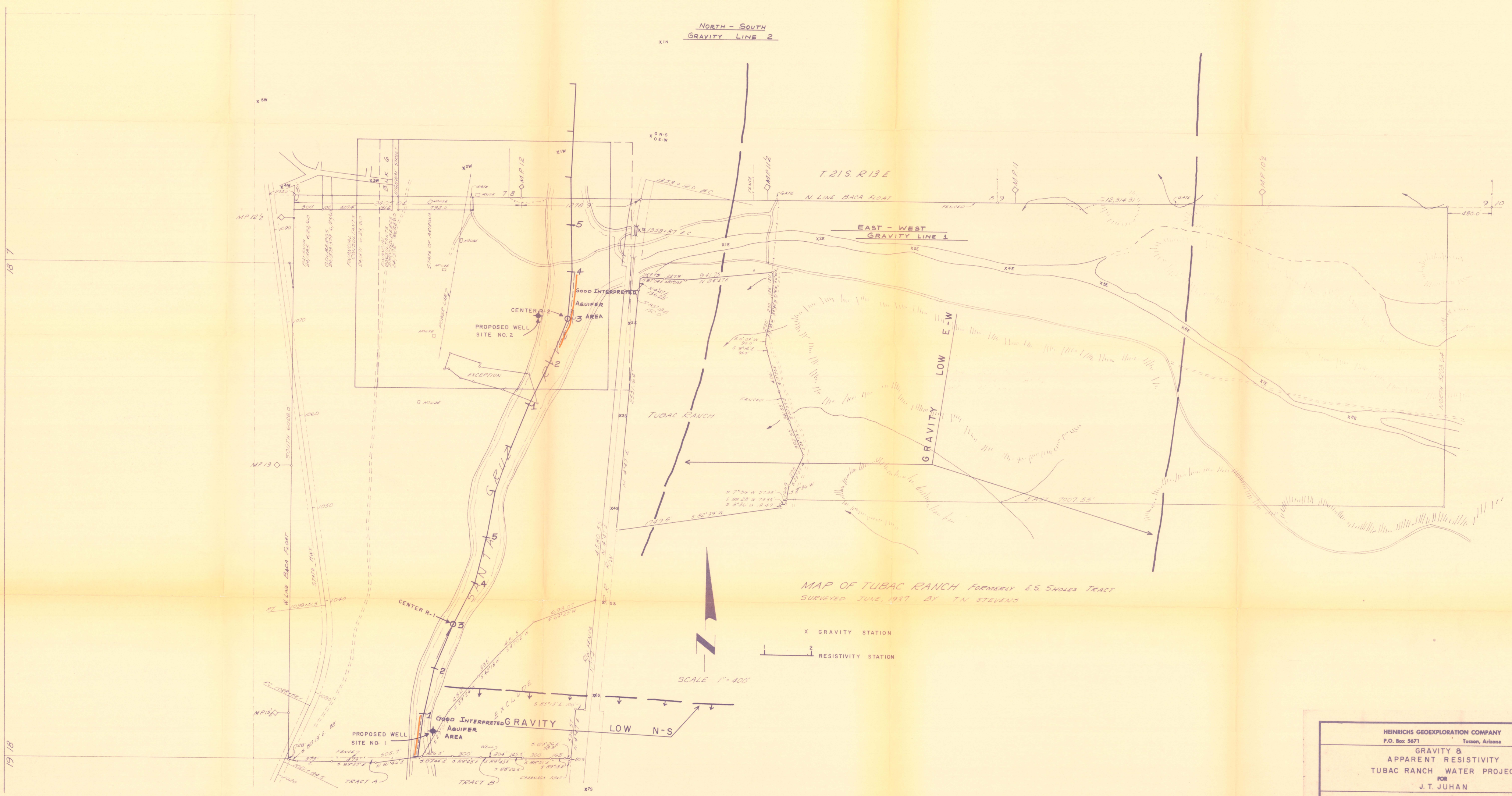


LINE 1
GRAVITY & SURFACE PROFILES
FOR
J. T. JUHAN
TUBAC RANCH AREA
SANTA CRUZ COUNTY, ARIZONA
SCALE: 1" = 1 MILE (HORZ.)
1" = 4 MILLIGALS, VERT.
1" = 100' ELEV., VERT.

MAY 1965

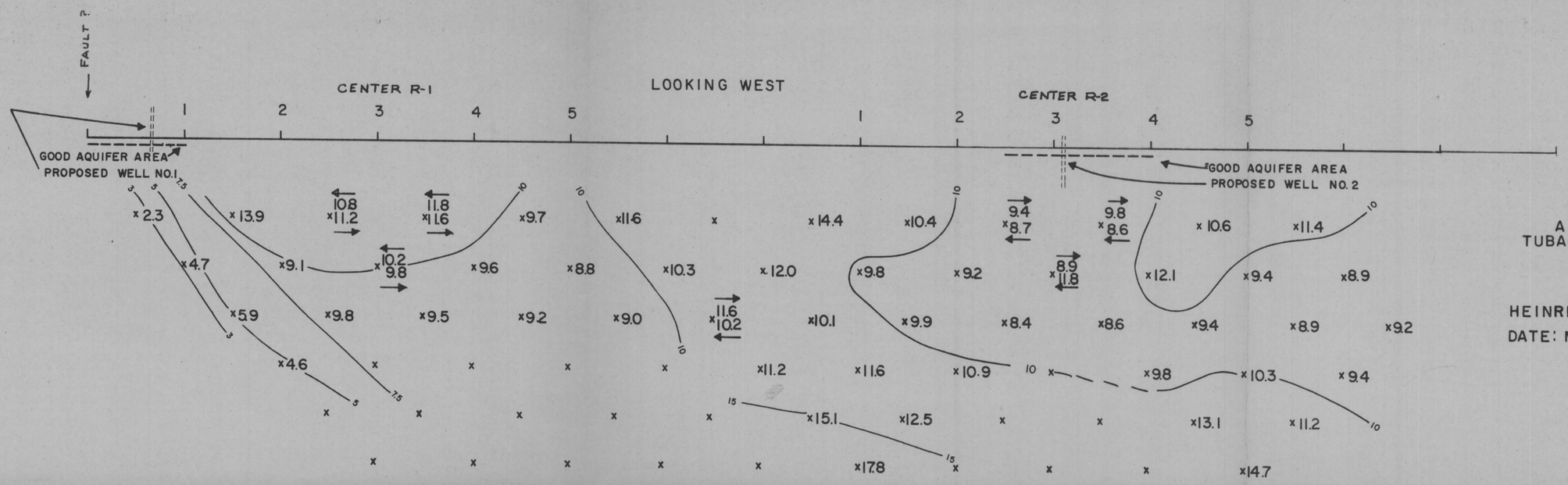
K+E 20 X 20 TO THE INCH KEUFFEL & ESSER CO. 359-10½G MADE IN U.S.A.



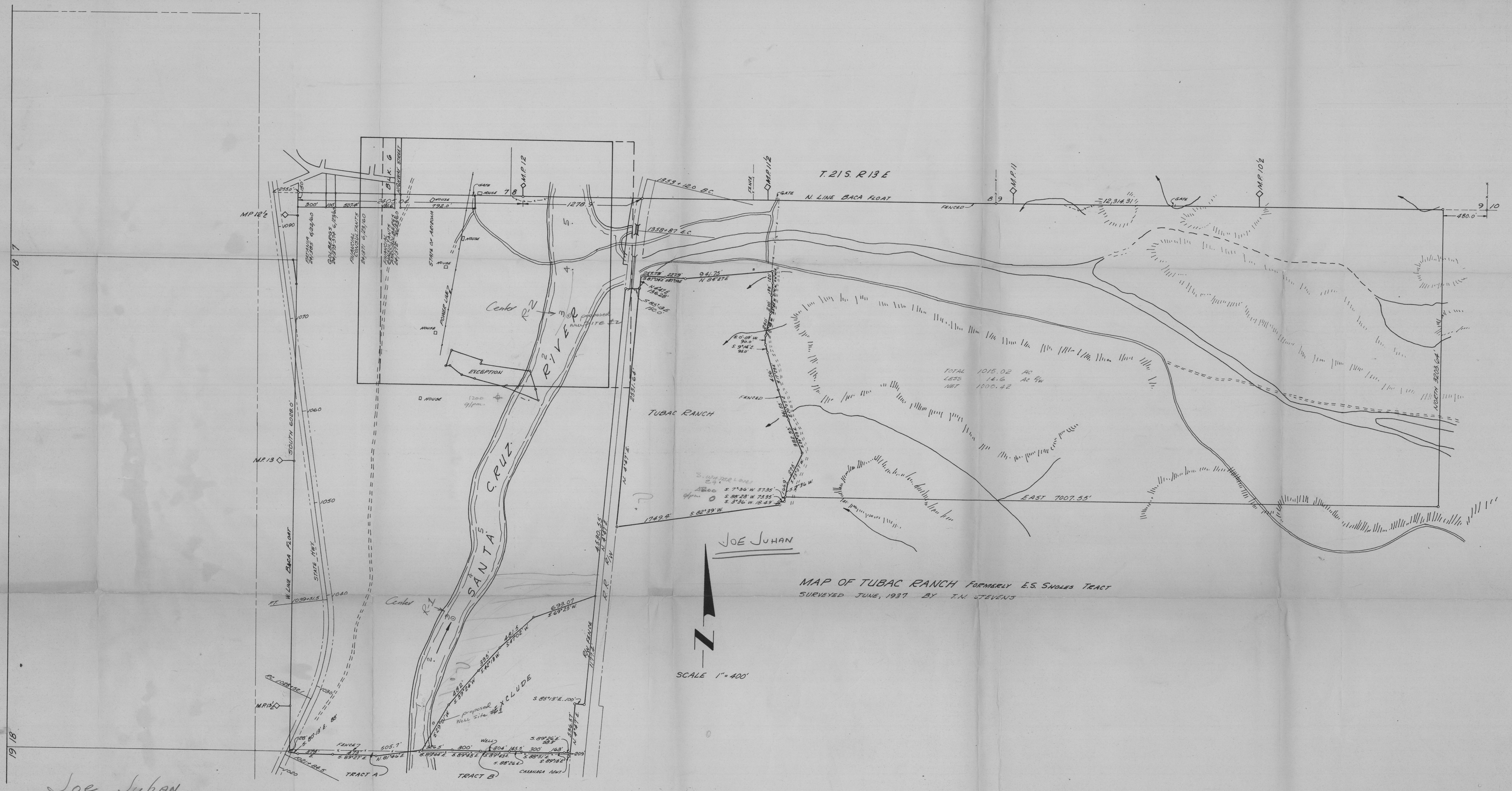


NOTE:
BASE MAP FROM J. T. JUHAN

HEINRICHS GEOEXPLORATION COMPANY P.O. Box 5671 Tucson, Arizona		
GRAVITY & APPARENT RESISTIVITY TUBAC RANCH WATER PROJECT FOR J. T. JUHAN		
SCALE: 1" = 400'	CONTOUR INTERVAL:	REVISIONS
	DATA BY: D.A.	
DATE: MAY 1965	SHEET OF	
DRAWN BY: H.R.M.	DRAWING NO.:	FILE:



APPARENT RESISTIVITY
TUBAC RANCH WATER PROJECT
FOR
J. T. JUHAN
BY
HEINRICHS GEOEXPLORATION CO.
DATE: MAY 1965 SCALE: 1" = 400'

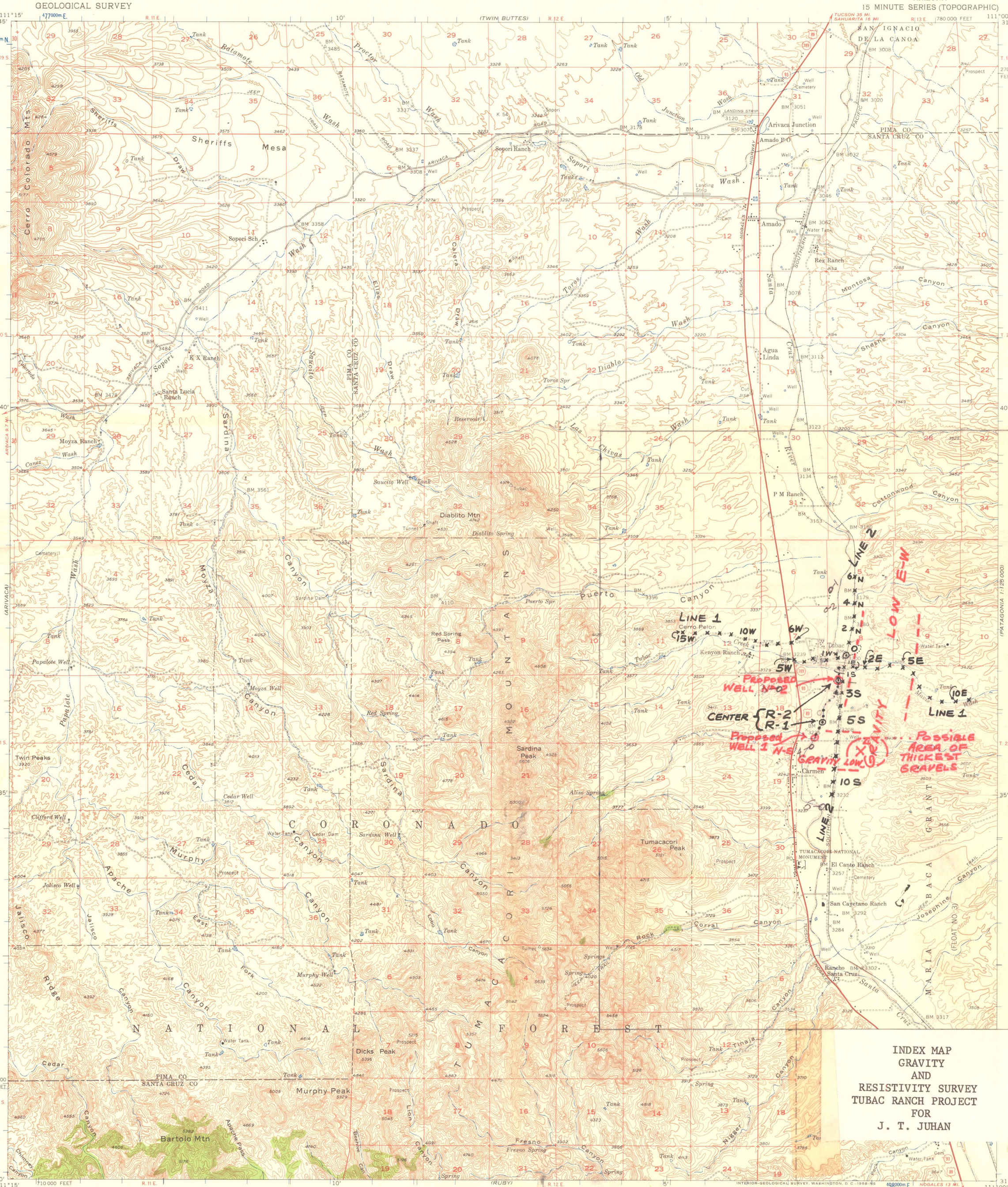


MAP OF TUBAC RANCH FORMERLY E.S. SHOLES TRACT
SURVEYED JUNE, 1937 BY T.N. STEVENS

Joe Suhan
H_2O

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TUBAC QUADRANGLE
ARIZONA
15 MINUTE SERIES (TOPOGRAPHIC)



INDEX MAP
GRAVITY
AND
RESISTIVITY SURVEY
TUBAC RANCH PROJECT
FOR
J. T. JUHAN

Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and USCE

Topography by planetable surveys 1939
Culture revision and field check 1957

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Certain land lines are omitted in T. 22 S., R. 11 E. because of insufficient data

TRUE NORTH
MAGNETIC NORTH
13°
APPROXIMATE MEAN DECLINATION, 1957

SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

ARIZONA
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Unimproved dirt
U. S. Route — State Route

TUBAC, ARIZ.
N3130—W11100/15

1957

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1958—NS
MR 2195

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