

SWANCO BROADCASTING, INC.
APPLICATION FOR LICENSE

RADIO STATION KLEO
WICHITA, KANSAS
1480 kHz, 1 kW, 5 kW-LS, DA-2
PROOF OF PERFORMANCE
DECEMBER 1970

A. EARL CULLUM, JR., AND ASSOCIATES,
CONSULTING ENGINEERS
701220

ENGINEERING STATEMENT OF DARWIN A. PETERSON
 OF THE FIRM OF A. EARL CULLUM, JR., AND ASSOCIATES, CONSULTING ENGINEERS,
 IN CONNECTION WITH ADJUSTMENTS AND PROOF OF PERFORMANCE MEASUREMENTS
 FOR THE OPERATION OF RADIO STATION KLEO ON 1480 KILOHERTZ
 WITH 5 KILOWATTS OF POWER DIRECTIONAL DAYTIME
 AND 1 KILOWATT OF POWER DIRECTIONAL NIGHTTIME
 FILE NO. BMP-13,000

* * *

I, Darwin A. Peterson, am an engineer associated with the firm of A. Earl Cullum, Jr., and Associates, Consulting Engineers, with offices located in Dallas, Texas. I graduated from Southern Methodist University in 1934 with a Bachelor of Science Degree in Electrical Engineering. I have been employed in an engineering capacity by broadcast stations since 1933. I have been a partner in the firm of A. Earl Cullum, Jr., and Associates since 1940. My qualifications as an engineer are known to the Federal Communications Commission. This engineering statement has been prepared on behalf of Swanco Broadcasting, Inc., licensee of Radio Station KLEO, Wichita, Kansas.

Swanco Broadcasting, Inc., was authorized by construction permit, File No. BMP-13,000, to relocate the transmitting plant to a new location at 5610 East 29th Street, Wichita, Kansas. Subsequently, the City of Wichita gave the official address of the location as 5620 East 29th Street. The location is the same but the street number was changed.

ADJUSTMENTS AND MEASUREMENTS

The antenna system at the new location consists of five towers. The daytime antenna uses towers #1, #2, #3, and #4 arranged in a parallelogram. The nighttime antenna uses towers #1, #2, #4 and #5 arranged in a parallelogram. For nondirectional test operation, tower #3 was fed and the towers #1, #2, #4, and #5 were detuned by adjusting the tap on the sampling line isolation coil for minimum current at the sampling loop. The tap on the isolation coil of tower #3 was then set at the average position of the taps on the other towers. The resistance at the base of tower #3 was measured with a radio-frequency bridge, and found to be 44.9 ohms. The current into tower #3 was maintained at 10.55 amperes for 5 kilowatts of power for nondirectional test operation. The daytime and nighttime patterns were adjusted to comply with the terms of the construction permit. The resistance at the common point of input was measured with a radio-frequency bridge and adjusted to 50 ohms. The current into the common point of input was maintained at 10.4 amperes and 4.65 amperes for 5 kilowatt daytime and 1 kilowatt nighttime operations.

Field intensity measurements were taken along 11 radials for three modes of operation and by the personnel with equipment shown in the following tabulation:

<u>Azimuth</u>	<u>ND</u>	<u>DA-D</u>	<u>DA-N</u>
00°	CMD & LFH	LFH	Not measured
18	CMD & LFH	Not measured	LFH
50	CMD & LFH	LFH	LFH

(Continued on Page 2)

<u>Azimuth</u>	<u>ND</u>	<u>DA-D</u>	<u>DA-N</u>
80°	CMD & LFH	LFH	LFH
110	CMD & LFH	LFH	LFH
155	CMD & LDB	LDB	LDB
190	CMD & LDB	LDB	LDB
215	CMD & LDB	LDB	LDB
258	CMD & LDB	LDB	LDB
302	CMD & LDB	LDB	LDB
345	CMD & LFH	LFH	LFH

CMD: Mr. C. M. Daniell, a partner in the firm of A. Earl Cullum, Jr., and Associates, measured the walk-in points within 1.5 to 2.0 miles with a field intensity meter Type 120E, Serial Number 811, which was last calibrated by Potomac Instruments on July 18, 1969.

LFH: Mr. L. F. Heithecker, an associate engineer in the firm of A. Earl Cullum, Jr., and Associates, measured the more distant points with a field intensity meter Type 120E, Serial Number 1391, which was last calibrated by Vitro Electronics on October 3, 1966.

LDB: Mr. Leonard D. Ballard, Chief Engineer of Swanco Broadcasting, Inc., measured the more distant points with a field intensity meter Type 120E, Serial Number 1707, which was last calibrated by Defense Electronics on June 29, 1970.

Messrs. Daniell, Heithecker, and Ballard are experienced in taking field intensity measurements. The three field intensity meters were compared during the proof of performance work and found to agree within the rated accuracy for these instruments.

The distances to points that were measured close in for nondirectional operation only were scaled from tower #3. The distances to points farther out were scaled from a point midway between the center of the daytime array and the center of the nighttime array.

The impedances at the base of the nondirectional test tower and at the common points of input to the daytime and nighttime antenna coupling equipment were measured by Mr. L. F. Heithecker who is known to me to be qualified for such work.

ATTACHED FIGURES

The following attached figures were prepared under my direction to show the results of the measurements and to furnish the exhibits required by Section II-A of FCC Form 302:

1. Description of the directional antenna system, theoretical and indicated parameters, and meter readings for normal operation.
2. Horizontal radiation patterns and data for nondirectional test operation, daytime directional operation, and nighttime directional operation.
3. Maps showing the 25-mV/m contour and a portion of the 15-mV/m contour for the daytime directional operation and showing the 25- and 5.7-mV/m contours for the nighttime directional operation.

4. Tabulations of field intensity measurement data taken along 11 radials.
5. Graphs of field intensity measurement data taken along 11 radials, together with a copy of Graph 18 of Section 73.184 of the FCC Rules.
6. Maps showing the locations where the field intensity measurements were taken along 11 radials.
7. Monitoring points descriptions and data.
8. Direct power measurement data.

CHANGES IN EQUIPMENT PROPOSED

The application for construction permit proposed to use a Collins Type 820E-1 transmitter. An RCA Type BTA-10U2 transmitter, factory modified for output power not to exceed 5 kilowatts, was installed instead. The transmitter has been type accepted for 5 kW and 1 kW operations. The BTA-10U2 has two 5-kilowatt tubes in the "last radio stage" although it will not operate at 10 kilowatts of power as modified. Operation of the BTA-10U2 at a Class III radio station requires a waiver of Section 73.42 of the Rules.

The application for construction permit proposed to use a Metron Type 506B-1 modulation monitor. An RCA Type BW-66F modulation monitor was installed instead.

The application for construction permit proposed to use a Collins Type 54Z-1 frequency monitor. An RCA Type BW-11A frequency monitor was installed instead.

CONCLUSION

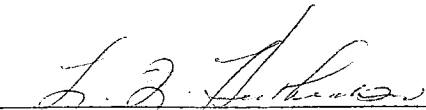
The attached figures show that the KLEO directional antenna patterns have been adjusted to comply with the terms of the construction permit and to conform closely to the radiation patterns proposed in the application for construction permit.



Darwin A. Peterson

Subscribed and Sworn to before me
on this 19th day of March, 1971.

My Commission expires June 1, 1971.



Notary Public, Dallas County, Texas

RADIO STATION KLEO

Wichita, Kansas

1480 kHz, 1 kW, 5 kW-LS, DA-2

DESCRIPTION OF DIRECTIONAL ANTENNA SYSTEM

No. and Type of Elements: Five (5) uniform cross-section, guyed, series excited vertical steel radiators.

Height above Insulators: 166' (90°)

Overall Height: 172'

Spacing and Orientation: DAYTIME - uses towers #1, #2, #3 and #4 - forming a parallelogram with long sides 245.5' (133°) bearing 171.62° true - short sides 166' (90°) bearing 205° true.
NIGHTTIME - uses towers #1, #2 and #4 of above plus #5 spaced 166' (90°) from #4 on a line bearing 205° true.

Ground System Consists of: 120 equally spaced buried copper radials 166' long plus 120 interspaced buried copper radials 30' long about the base of each tower. Intersecting radials shortened and bonded to transverse straps midway between adjacent towers.

THEORETICAL SPECIFICATIONS

Tower Number:		#1 (NE)	#2 (NW)	#3 (SE)	#4 (SC)	#5 (SW)
Phasing:	Night	+111°	0°	-	+111°	-4°
	Day	0°	-111°	+50°	-50°	-
Field Ratio:	Night	1.0	0.80	-	0.50	0.40
	Day	1.0	0.60	0.40	0.24	-

OPERATING SPECIFICATIONS

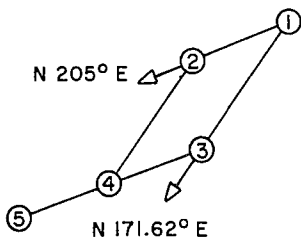
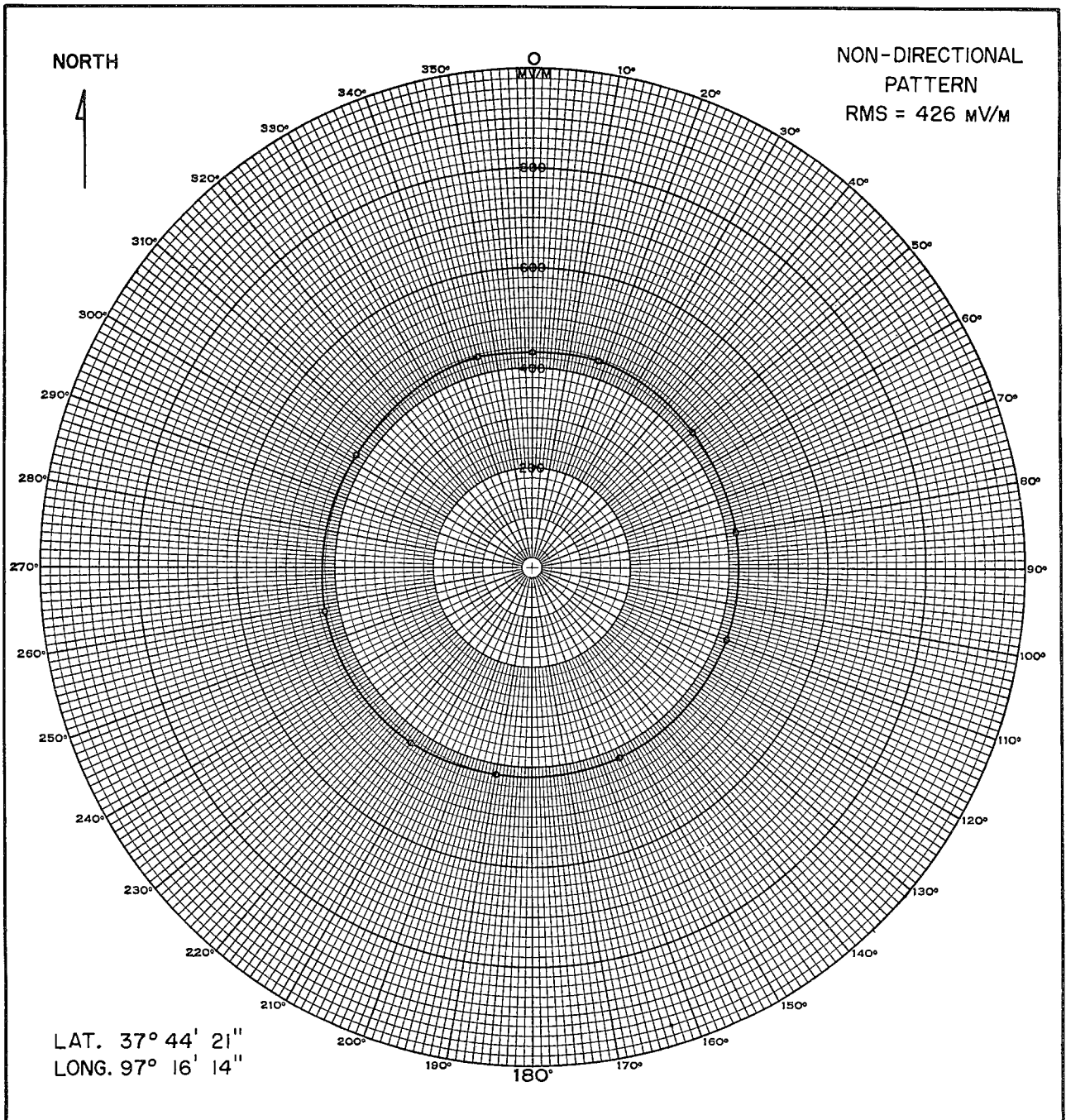
Phase Indication:*	Night	+114°	0.0°	-	+112°	-2°
	Day	0°	-103°	+50°	-48°	-
Antenna Base Current Ratio:	Night	1.243	1.000	-	0.746	0.594
	Day	1.000	0.534	0.410	0.280	-
Sample Current Ratio:	Night	1.299	1.000	-	0.696	0.537
	Day	1.000	0.537	0.394	0.254	-

*As indicated on Clarke 108-E phase monitor

METER READINGS FOR NORMAL OPERATION

Designation of Meter	Location of Meter	Make	Scale	Reading	
				Day	Night
Plate Voltmeter	Main Transmitter	Bach-Simpson	6 kV	5.15 kV	2.15 kV
Plate Ammeter	Main Transmitter	Bach-Simpson	3 A	1.27 A	0.61 A
Common Point Ammeter					
Daytime	Transmitter Building	Weston	15 A	10.4 A	-
Nighttime	Transmitter Building	Weston	8 A	-	4.65 A
#1 Base Ammeter					
Daytime	No. 1 Tower	Weston	15 A	10.3 A	-
Nighttime	No. 1 Tower	Weston	8 A	-	4.50 A
#2 Base Ammeter					
Daytime	No. 2 Tower	Weston	8 A	5.50 A	-
Nighttime	No. 2 Tower	Weston	5 A	-	3.62 A
#3 Base Ammeter	No. 3 Tower	Weston	8 A	4.22 A	-
#4 Base Ammeter					
Daytime	No. 4 Tower	Weston	5 A	2.88 A	-
Nighttime	No. 4 Tower	Weston	5 A	-	2.70 A
#5 Base Ammeter	No. 5 Tower	Weston	3 A	-	2.15 A
#1 Loop meter	Transmitter Building	Weston	100 uA	99.0 uA	43.5 uA
#2 Loop meter	Transmitter Building	Weston	100 uA	52.3 uA	33.5 uA
#3 Loop meter	Transmitter Building	Weston	100 uA	39.0 uA	-
#4 Loop meter	Transmitter Building	Weston	100 uA	25.2 uA	23.3 uA
#5 Loop meter	Transmitter Building	Weston	100 uA	-	18.0 uA
#1 Phase meter	Transmitter Building	Clarke*	180°	0°	+114°
#2 Phase meter	Transmitter Building	Clarke*	180°	-103°	0°
#3 Phase meter	Transmitter Building	Clarke*	180°	+ 50°	-
#4 Phase meter	Transmitter Building	Clarke*	180°	- 48°	+112°
#5 Phase meter	Transmitter Building	Clarke*	180°	-	-2°

*Type 108-E Phase Monitor



TOWER

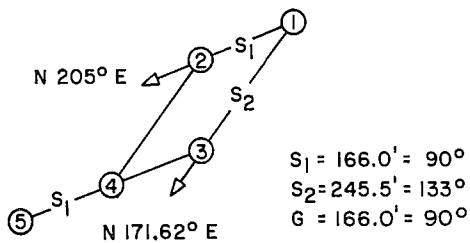
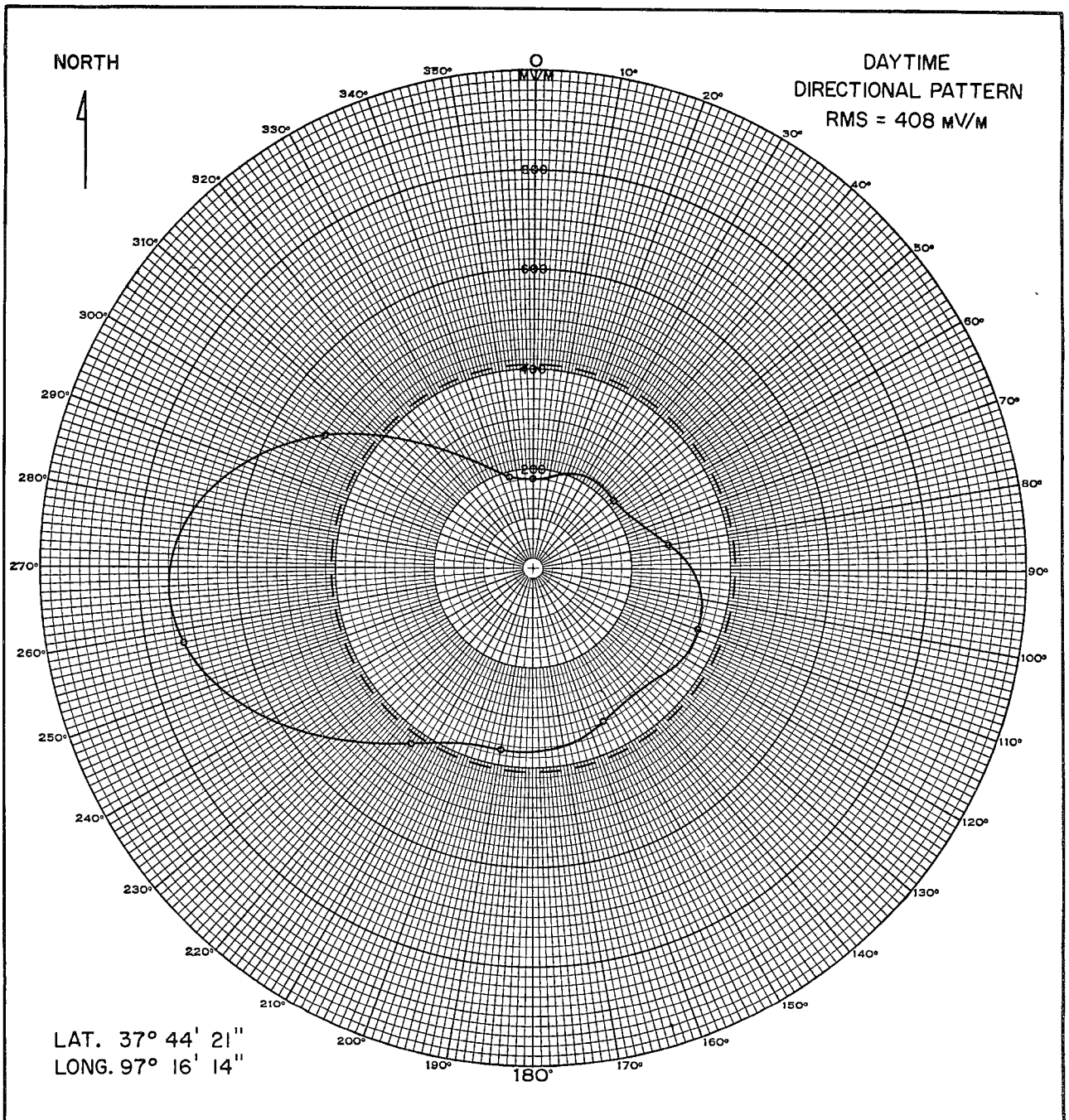
1
2
3
4
5

TEST OPERATION

DETUNED
DETUNED
SERIES FED
DETUNED
DETUNED

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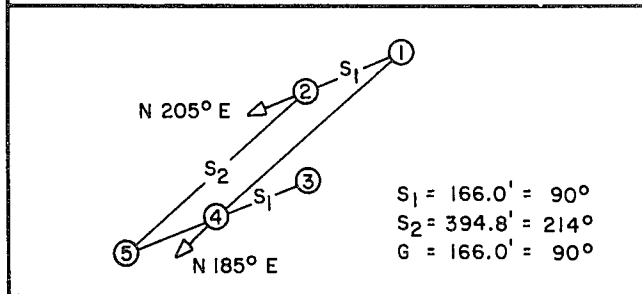
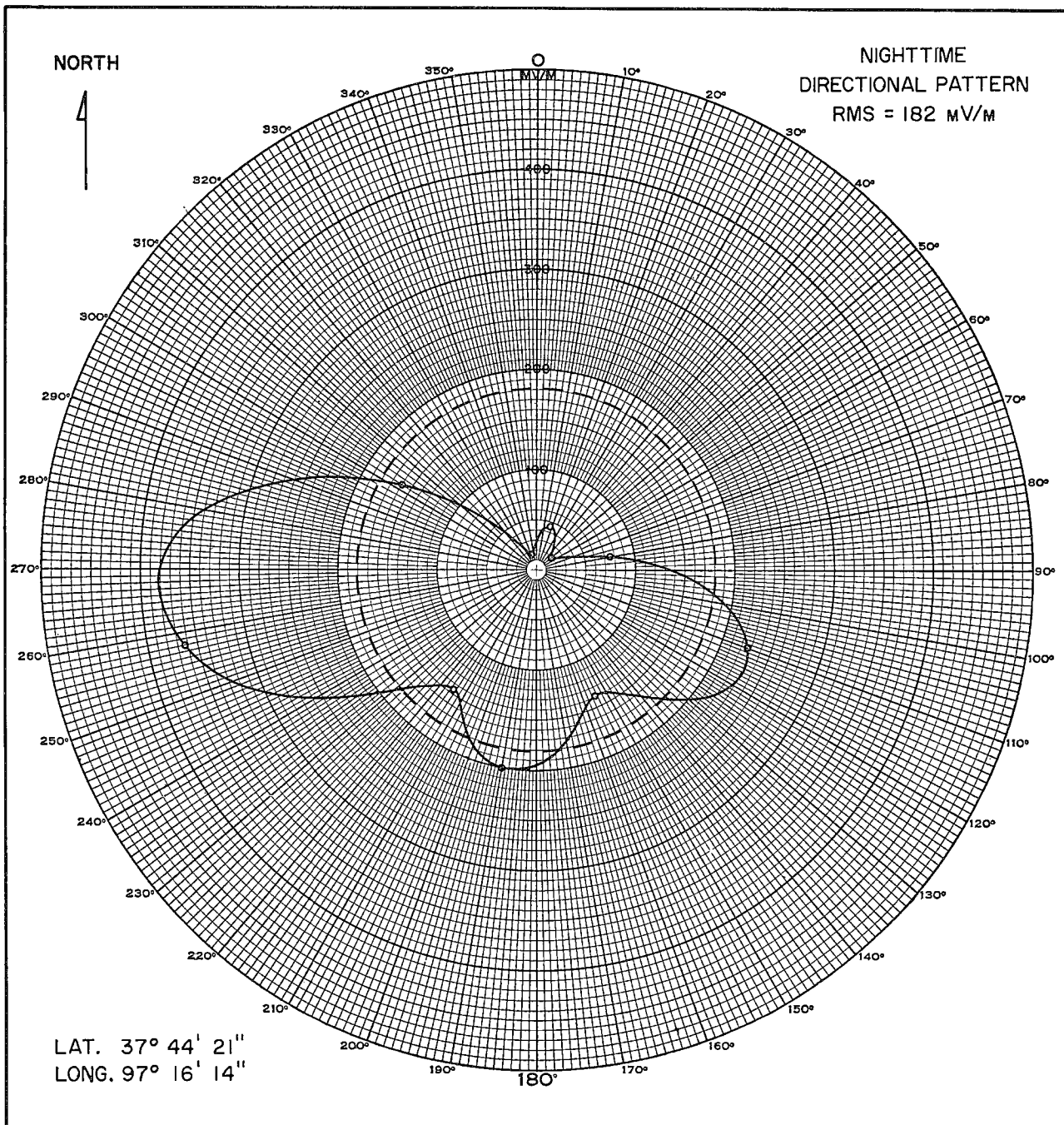
RADIO STATION KLEO
1480 kHz 1 kW 5 kW-LS DA-2
701220 FIGURE 2A



TOWER	ANTENNA PARAMETERS			
	THEORETICAL		INDICATED	
	FIELD	PHASE	FIELD	PHASE
1	1.000	0.00°	1.000	0.00°
2	0.600	-100.00°	0.537	-103.00°
3	0.400	50.00°	0.394	50.00°
4	0.240	-50.00°	0.254	-48.00°
5	—	—	—	—

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RADIO STATION KLEO
1480 kHz 1 kW 5 kW-LS DA-2
701220
FIGURE 2B



TOWER	ANTENNA PARAMETERS			
	THEORETICAL		INDICATED	
	FIELD	PHASE	FIELD	PHASE
1	1.000	0.00°	1.299	114.00°
2	0.800	-111.00°	1.000	0.00°
3	—	—	—	—
4	0.500	-4.00°	0.696	112.00°
5	0.400	-115.00°	0.537	-2.00°

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RADIO STATION KLEO
 1480 kHz 1 kW 5 kW-LS DA-2
 701220 FIGURE 2C

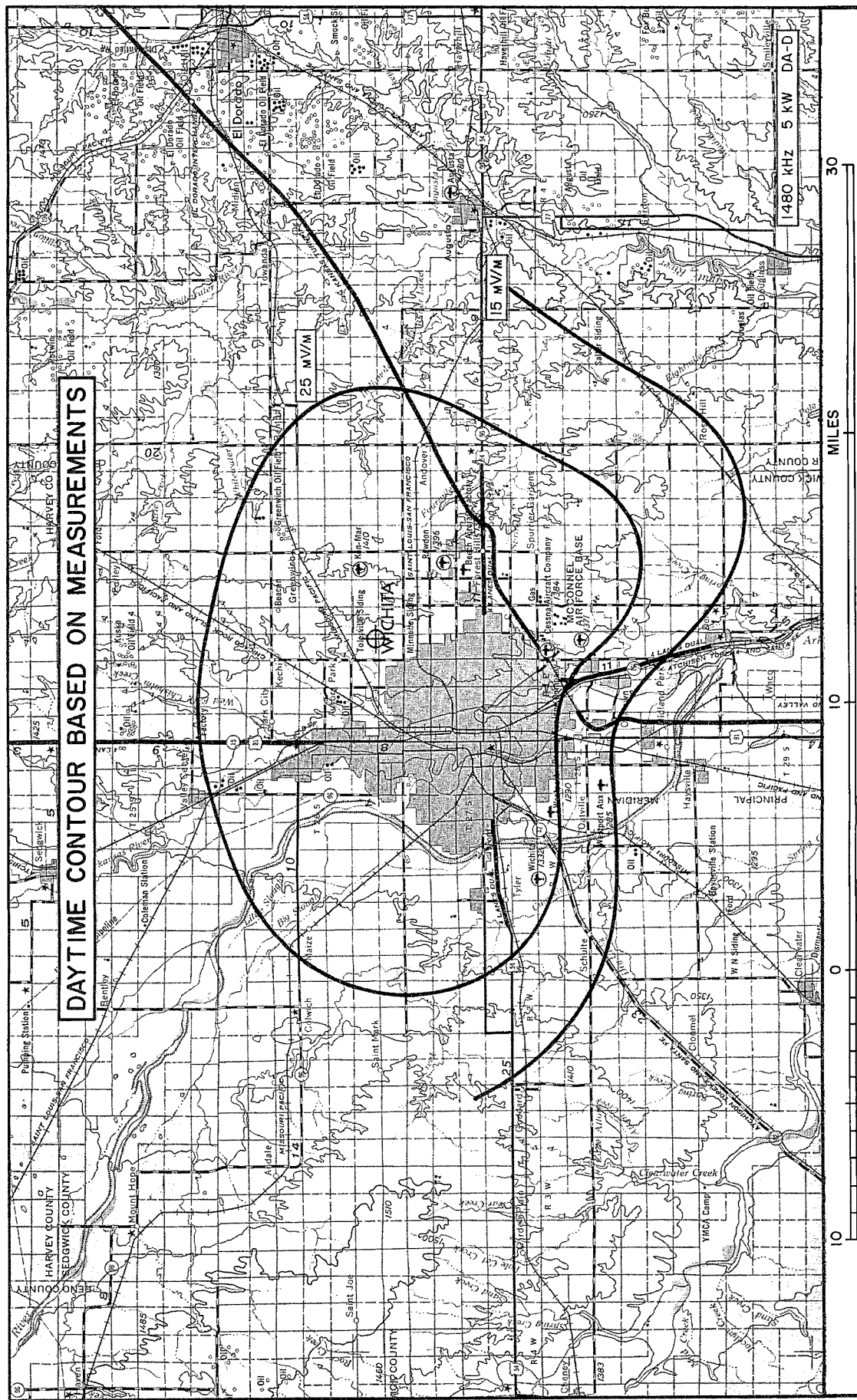
RADIO STATION KLEO
Wichita, Kansas

TABULATION OF UNATTENUATED FIELDS - mV/m

<u>Bearing</u>	<u>5 kW ND</u>	<u>5 kW DA-D</u>		<u>1 kW DA-N</u>	
	<u>Measured</u>	<u>Measured</u>	<u>Specified*</u>	<u>Measured</u>	<u>Specified*</u>
000°	430	181	190	-	-
018°	435	-	-	46.1	-
050°	425	213	230	19.0	48.0
080°	420	278	-	76.0	-
110°	420	355	370	227	248
155°	420	339	-	139	160
190°	423	370	387	200	212
215°	430	431	-	146	175
258°	428	724	-	363	-
302°	423	499	-	159	-
345°	435	192	-	16.5	42.0

*In Construction Permit File No. BP-17,341

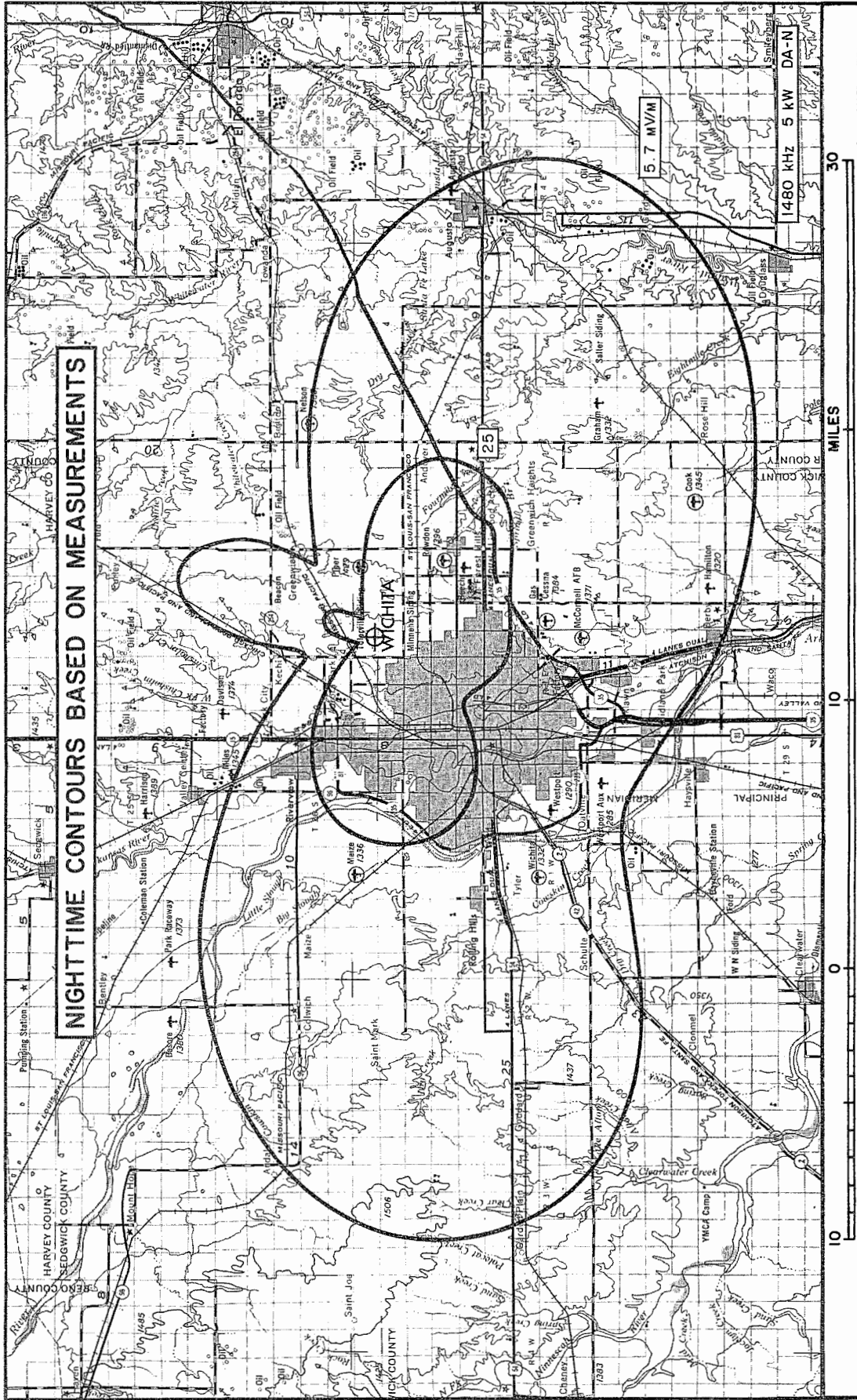
Note: A typographical error on page 3 of the Construction Permit specified an inverse distance field of 110 mV/m at the Bearing 190° true North. The correct value is 212 mV/m.



DAYTIME CONTOUR BASED ON MEASUREMENTS

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**RADIO STATION KLEO
WICHITA, KANSAS
701220
FIGURE 3A**



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RADIO STATION KLEO
WICHITA, KANSAS
 701220 **FIGURE 3B**

RADIO STATION KLEO

Wichita, Kansas

RADIAL FIELD INTENSITY MEASUREMENTS

RADIAL BEARING N 018° E

Point No.	Miles	5 kW ND		5 kW DA-D		1 kW DA-N		Log of Ratio	
		Time	mV/m	Time	mV/m	Time	mV/m	DA-D/ND	DA-N/ND
1	0.30	1013	1400	-	-	-	-	-	-
2	0.34	1009	1200	-	-	-	-	-	-
3	0.46	1002	940	-	-	-	-	-	-
4	0.56	0958	805	-	-	-	-	-	-
5	0.66	0950	685	-	-	-	-	-	-
6	0.76	0944	615	-	-	-	-	-	-
7	1.14	0919	390	-	-	-	-	-	-
8	1.23	0912	325	-	-	-	-	-	-
9	1.31	0904	333	-	-	-	-	-	-
10	1.47	0838	319	-	-	0832	38.0	-	-.943
11	1.60	0848	257	-	-	-	-	-	-
12	1.72	0840	238	-	-	-	-	-	-
13	1.92	0826	200	-	-	-	-	-	-
14	2.03	0826	200	-	-	0835	23.7	-	-.927
15	3.02	0846	134	-	-	0845	13.4	-	-1.000
16	3.06	0848	129	-	-	0849	12.3	-	-1.021
17	3.86	0853	106	-	-	0857	10.0	-	-1.025
18	4.13	0859	91.0	-	-	0903	8.10	-	-1.051
19	4.44	0905	86.0	-	-	0909	8.40	-	-1.011
20	4.64	0911	84.0	-	-	0913	9.30	-	-.956
21	5.13	0917	80.0	-	-	0917	8.00	-	-1.000
22	6.19	0928	65.5	-	-	0925	7.60	-	-.936
23	6.31	0933	56.0	-	-	0931	6.10	-	-.963
24	7.30	0943	51.0	-	-	0939	6.20	-	-.916
25	7.87	0949	46.5	-	-	0944	5.60	-	-.920
26	8.40	0959	41.4	-	-	0950	4.60	-	-.955
27	9.42	1004	42.5	-	-	0956	4.70	-	-.957
28	10.0	1009	41.1	-	-	1001	4.50	-	-.961
29	10.5	1016	35.2	-	-	1007	4.00	-	-.946
30	11.5	1023	32.0	-	-	1011	3.05	-	-1.021
31	12.6	1034	26.4	-	-	1020	2.80	-	-.975
32	13.6	1042	22.1	-	-	1027	2.41	-	-.963
33	14.7	1052	20.2	-	-	1034	2.30	-	-.944
34	15.7	1101	20.2	-	-	1042	2.10	-	-.983
35	16.8	1109	16.9	-	-	1049	1.71	-	-.995
36	17.6	1115	16.0	-	-	1055	1.61	-	-.997
							Average Log	-	-.973
							Antilog	-	0.106
	Unattenuated Field, mV/m		435				46.1		

Non-directional measurements:

All points, December 4, 1970; Sunrise 0728, Sunset 1711, CST

Nighttime directional measurements:

All points, December 9, 1970; Sunrise 0733, Sunset 1711, CST

RADIO STATION KLEO

Wichita, Kansas

RADIAL FIELD INTENSITY MEASUREMENTS

RADIAL BEARING N 050° E

Point No.	Miles	5 kW ND		5 kW DA-D		1 kW DA-N		Log of Ratio	
		Time	mV/m	Time	mV/m	Time	mV/m	DA-D/ND	DA-N/ND
1	0.23	1313	1910	-	-	-	-	-	-
2	0.28	1258	1380	-	-	-	-	-	-
3	0.38	1248	1160	-	-	-	-	-	-
4	0.42	1245	1020	-	-	-	-	-	-
5	0.47	1243	960	-	-	-	-	-	-
6	0.67	1231	635	-	-	-	-	-	-
7	0.71	1228	620	-	-	-	-	-	-
8	0.81	1222	495	-	-	-	-	-	-
9	0.90	1216	460	-	-	-	-	-	-
10	1.08	1203	375	-	-	-	-	-	-
11	1.43	1504	332	1410	155	1416	6.30	-.336	-1.722*
12	1.58	1127	257	-	-	-	-	-	-
13	1.76	1115	217	-	-	-	-	-	-
14	1.86	1457	217	1414	110	1419	6.00	-.296	-1.558
15	2.61	1450	147	1419	76.0	1423	9.50	-.287	-1.190
16 (MP)	2.77	1444	134	1421	67.0	1425	8.50	-.314	-1.198
17	3.20	1440	117	1427	61.5	1429	6.60	-.279	-1.249
18	4.48	1433	80.5	1433	42.2	1433	4.40	-.281	-1.262
19	4.56	1429	78.5	1435	41.0	1435	4.80	-.282	-1.214
20	4.76	1426	80.0	1439	39.0	1438	4.80	-.313	-1.222
21	4.90	1419	75.0	1443	36.0	1442	4.00	-.319	-1.273
22	5.77	1408	68.0	1449	33.0	1448	2.65	-.314	-1.409
23	6.13	1400	68.0	1452	33.4	1451	2.80	-.309	-1.386
24	7.07	1352	58.0	1459	29.0	1456	3.20	-.301	-1.258
25	7.64	1343	44.0	1503	23.0	1500	2.20	-.282	-1.301
26	8.43	1337	39.8	1508	19.7	1503	1.55	-.306	-1.410
27	9.18	1333	34.5	1514	17.4	1508	0.95	-.298	-1.560
28	9.83	1324	32.5	1519	16.7	1511	1.30	-.289	-1.398
29	10.7	1317	27.0	1524	14.0	1516	1.05	-.285	-1.410
30	11.8	1309	25.5	1528	12.9	1522	1.15	-.296	-1.346
31	12.3	1305	24.2	1532	12.5	1525	1.12	-.287	-1.334
32	12.5	1300	24.4	1534	12.7	1528	1.08	-.284	-1.354
33	13.9	1253	20.7	1540	10.4	1533	0.85	-.299	-1.387
34	15.1	1244	18.2	1545	9.00	1538	0.75	-.301	-1.385
35	16.4	1235	17.2	1551	8.70	1545	0.74	-.296	-1.367
36	16.9	1229	13.9	1555	6.90	1548	0.59	-.304	-1.373
37	17.7	1218	14.7	1601	7.20	1554	0.54	-.310	-1.435
38	18.5	1213	13.8	1605	6.90	1558	0.56	-.301	-1.392
39	19.0	1206	13.8	1609	6.70	1603	0.52	-.314	-1.424

Average Log -.299 -1.350
 Antilog 0.502 0.0447

Unattenuated Field, mV/m 425 213 19.0

Non-directional measurements:
 All points, December 4, 1970; Sunrise 0728, Sunset 1711, CST

Daytime directional measurements:
 All points, December 13, 1970; Sunrise 0736, Sunset 1712, CST

Nighttime directional measurements:
 All points, December 9, 1970; Sunrise 0733, Sunset 1711, CST

*Not included in analysis

RADIO STATION KLEO

Wichita, Kansas

RADIAL FIELD INTENSITY MEASUREMENTS

RADIAL BEARING N 080° E

Point No.	Miles	5 kW ND		5 kW DA-D		1 kW DA-N		Log of Ratio	
		Time	mV/m	Time	mV/m	Time	mV/m	DA-D/ND	DA-N/ND
1	0.23	1543	1700	-	-	-	-	-	-
2	0.28	1538	1360	-	-	-	-	-	-
3	0.34	1532	1180	-	-	-	-	-	-
4	0.39	1528	1030	-	-	-	-	-	-
5	0.57	1516	775	-	-	-	-	-	-
6	0.61	1503	700	-	-	-	-	-	-
7	0.70	1458	585	-	-	-	-	-	-
8	0.78	1452	493	-	-	-	-	-	-
9	0.82	1447	445	-	-	-	-	-	-
10	1.01	1438	357	-	-	-	-	-	-
11	1.20	1424	320	-	-	-	-	-	-
12	1.25	1422	305	-	-	-	-	-	-
13	1.41	1513	263	0842	183	0858	51.5	-.158	-.708
14	1.45	1516	278	0845	177	0902	47.0	-.196	-.772
15	2.43	1521	144	0851	94.5	0907	26.3	-.183	-.738
16	2.47	1528	158	0853	108	0910	29.5	-.166	-.729
17	2.55	1530	151	0855	105	0913	28.0	-.158	-.733
18	3.44	1540	106	0901	70.0	0919	19.7	-.180	-.731
19	3.55	1543	99.0	0904	66.5	0922	18.3	-.173	-.733
20	4.43	1551	79.0	0909	51.5	0930	12.7	-.186	-.793
21	4.51	1553	77.0	0911	49.0	0927	12.4	-.197	-.793
22	4.92	1558	70.5	0914	45.8	0934	12.5	-.188	-.757
23	5.27	1602	57.0	0916	37.8	0940	10.5	-.178	-.735
24	5.53	1605	61.0	0918	41.6	0943	11.0	-.166	-.745
25	6.04	1608	54.5	0922	36.2	0946	9.50	-.178	-.759
26	6.55	1614	52.0	0925	34.7	0950	9.60	-.176	-.734
27	7.51	0920	46.0	0930	28.0	0956	8.50	-.216	-.734
28	7.57	0925	44.5	0933	27.9	1000	8.20	-.203	-.735
29	8.55	0933	42.5	0938	27.6	1006	8.00	-.188	-.726
30	8.64	0936	41.0	0940	27.3	1009	7.60	-.177	-.733
31	9.53	0945	35.3	0946	23.3	1016	6.60	-.181	-.729
32	10.6	0950	33.6	0951	22.2	1022	6.20	-.180	-.735
33	11.1	0956	29.0	0955	20.1	1027	5.25	-.160	-.743
34	11.6	1001	28.3	0959	18.6	1031	5.10	-.182	-.745
35	12.6	1008	25.0	1005	16.4	1037	4.85	-.183	-.712
36	14.7	1022	20.0	1015	12.7	1049	3.60	-.197	-.745
37	15.7	1033	17.7	1021	11.9	1057	3.15	-.173	-.750
38	17.1	1043	16.0	1030	10.5	1106	2.90	-.183	-.742
39	17.7	1048	14.7	1035	9.90	1111	2.50	-.172	-.770
40	18.8	1100	12.7	1043	8.90	1121	2.30	-.155	-.742
						Average Log		-.180	-.743
						Antilog		0.661	0.181
Unattenuated Field, mV/m			420		278		76.0		

Non-directional measurements:

All points, December 4, 1970; Sunrise 0728, Sunset 1711, CST

Daytime directional measurements:

All points, December 13, 1970; Sunrise 0736, Sunset 1712, CST

Nighttime directional measurements:

All points, December 10, 1970; Sunrise 0734, Sunset 1711, CST

RADIO STATION KLEO

Wichita, Kansas

RADIAL FIELD INTENSITY MEASUREMENTS

RADIAL BEARING N 155° E

Point No.	Miles	5 kW ND		5 kW DA-D		1 kW DA-N		Log of Ratio	
		Time	mV/m	Time	mV/m	Time	mV/m	DA-D/ND	DA-N/ND
1	0.33	1411	1230	-	-	-	-	-	-
2	0.43	1403	930	-	-	-	-	-	-
3	0.48	1357	870	-	-	-	-	-	-
4	0.53	1348	760	-	-	-	-	-	-
5	0.58	1344	710	-	-	-	-	-	-
6	0.73	1328	575	-	-	-	-	-	-
7	0.92	1316	480	-	-	-	-	-	-
8	1.27	1226	350	-	-	-	-	-	-
9	1.36	1219	305	-	-	-	-	-	-
10	1.46	1214	292	-	-	-	-	-	-
11	1.58	1207	242	-	-	-	-	-	-
12 (MP)	1.82	0925	222	0842	179	0842	71.0	-.111	-.495
13	1.94	1140	219	-	-	-	-	-	-
14	2.09	0932	188	0852	150	0848	51.5	-.098	-.464
15	2.33	0944	160	0857	130	0853	53.0	-.090	-.480
16	3.21	0956	125	0859	110	0855	42.5	-.056	-.469
17	3.80	1007	99.0	0908	84.0	0905	32.0	-.072	-.491
18	3.98	1016	100	0911	80.0	0908	32.0	-.097	-.495
19	4.69	1025	75.0	0916	68.0	0914	28.0	-.042	-.428
20	5.65	1034	70.0	0921	61.0	0920	24.5	-.060	-.456
21	5.91	1045	64.0	0925	49.0	0925	20.0	-.116	-.505
22	6.78	1057	53.5	0929	45.0	0928	19.2	-.075	-.445
23	7.88	1105	43.0	0932	35.5	0931	14.8	-.083	-.463
24	8.18	1113	46.0	0934	34.5	0934	13.2	-.125	-.542
25	8.99	1121	38.0	0938	28.0	0937	11.8	-.132	-.508
26	10.1	1130	33.8	0943	28.3	0942	12.1	-.077	-.447
27	10.6	1139	32.5	0945	25.2	0945	10.8	-.111	-.478
28	11.2	1145	28.8	0947	23.9	0950	10.0	-.081	-.460
29	12.3	1154	23.5	0952	21.9	0955	8.00	-.031	-.468
30	13.0	1200	22.0	0955	16.5	0958	6.90	-.125	-.504
31	14.0	1211	22.3	0958	16.2	1001	6.60	-.139	-.529
32	14.5	1216	21.8	1001	15.9	1005	6.70	-.137	-.507
33	15.4	1222	17.8	1005	13.4	1010	5.50	-.123	-.511
34	16.7	1230	15.8	1009	13.0	1024	5.00	-.084	-.458
35	17.6	1241	14.9	1012	12.0	1028	4.70	-.094	-.501
36	19.0	1249	13.1	1016	11.1	1040	4.40	-.072	-.474
Average Log								-.093	-.482
Antilog								0.807	0.330
Unattenuated Field, mV/m		420		339		139			

Non-directional measurements:

All points, December 5, 1970; Sunrise 0729, Sunset 1711, CST

Daytime directional measurements:

All points, December 12, 1970; Sunrise 0735, Sunset 1711, CST

Nighttime directional measurements:

All points, December 9, 1970; Sunrise 0733, Sunset 1711, CST

RADIO STATION KLEO

Wichita, Kansas

RADIAL FIELD INTENSITY MEASUREMENTS

RADIAL BEARING N 190° E

Point No.	Miles	5 kW ND		5 kW DA-D		1 kW DA-N		Log of Ratio	
		Time	mV/m	Time	mV/m	Time	mV/m	DA-D/ND	DA-N/ND
1	0.31	1628	1360	-	-	-	-	-	-
2	0.37	1624	1200	-	-	-	-	-	-
3	0.46	1617	970	-	-	-	-	-	-
4	0.52	1613	820	-	-	-	-	-	-
5	0.57	1610	765	-	-	-	-	-	-
6	0.66	1601	680	-	-	-	-	-	-
7	0.85	1550	495	-	-	-	-	-	-
8	0.99	1542	432	-	-	-	-	-	-
9	1.19	1528	330	-	-	-	-	-	-
10	1.23	1525	325	-	-	-	-	-	-
11	1.44	1506	277	-	-	-	-	-	-
12	1.54	1502	260	-	-	-	-	-	-
13	1.70	1125	230	1213	202	1342	110	-.056	-.321
14	2.02	1115	175	1210	130	1338	79.0	-.129	-.346
15	2.40	1110	171	1205	135	1335	82.0	-.102	-.319
16(MP)	2.71	1105	140	1203	125	1331	75.0	-.050	-.272
17	2.95	1057	123	1200	89.0	1328	53.5	-.141	-.362
18	3.55	1045	120	1156	110	1325	63.0	-.038	-.280
19	3.79	1040	100	1154	90.0	1320	47.5	-.046	-.324
20	4.17	1030	81.0	1150	58.5	1315	33.7	-.141	-.381
21	4.31	1020	57.0	1147	42.0	1240	24.0	-.132	-.376
22	4.77	1008	51.5	1144	49.0	1235	25.1	-.022	-.312
23	5.42	0958	47.5	1140	40.0	1228	20.0	-.075	-.376
24	5.95	0950	40.0	1135	36.0	1225	20.1	-.046	-.299
25	6.38	0940	40.0	1132	32.0	1221	18.5	-.097	-.335
26	6.98	0930	37.5	1130	33.7	1217	18.3	-.047	-.312
27	7.20	0925	38.5	1128	31.6	1213	17.0	-.086	-.355
28	7.53	0915	31.0	1124	25.1	1209	14.5	-.092	-.330
29	8.29	0900	26.2	1120	20.0	1204	10.2	-.117	-.410
30	8.61	1628	21.8	1117	16.0	1200	10.0	-.134	-.339
31	9.22	1619	18.0	1113	17.1	1150	9.20	-.022	-.292
32	9.51	1608	18.0	1111	19.5	1147	8.70	.034	-.316
33	10.5	1557	16.0	1105	15.0	1140	7.80	-.028	-.313
34	11.4	1547	9.40	1100	9.00	1135	4.60	-.019	-.311
35	12.3	1538	11.0	1057	10.0	1133	5.70	-.042	-.286
36	13.2	1529	8.20	1054	8.00	1128	4.00	-.011	-.313
37	14.2	1521	7.30	1051	7.35	1125	3.40	.003	-.320
38	15.3	1509	7.30	1047	7.60	1121	3.50	.017	-.320
39	16.3	1457	6.60	1044	6.00	1115	3.05	-.041	-.336
40	17.3	1444	6.00	1038	5.65	1111	3.05	-.026	-.294
41	18.4	1436	5.85	1035	5.65	1106	2.90	-.015	-.305
42	19.2	1428	5.45	1030	5.21	1103	2.65	-.020	-.314
Average Log								-.058	-.326
Antilog								0.876	0.472
Unattenuated Field, mV/m		423	370	200					

Non-directional measurements:

Points 1-12 and 30-42, December 5, 1970; Sunrise 0729, Sunset 1711, CST

Points 13-29, December 6, 1970; Sunrise 0730, Sunset 1711, CST

Daytime directional measurements:

All points, December 13, 1970; Sunrise 0736, Sunset 1712, CST

Nighttime directional measurements:

All points, December 9, 1970; Sunrise 0733, Sunset 1711, CST

RADIO STATION KLEO

Wichita, Kansas

RADIAL FIELD INTENSITY MEASUREMENTS

RADIAL BEARING N 215° E

Point No.	Miles	5 kW ND		5 kW DA-D		1 kW DA-N		Log of Ratio	
		Time	mV/m	Time	mV/m	Time	mV/m	DA-D/ND	DA-N/ND
1	0.37	1004	1100	-	-	-	-	-	-
2	0.42	1000	940	-	-	-	-	-	-
3	0.52	0954	810	-	-	-	-	-	-
4	0.57	0952	775	-	-	-	-	-	-
5	0.62	0948	700	-	-	-	-	-	-
6	0.66	0945	680	-	-	-	-	-	-
7	0.71	0941	630	-	-	-	-	-	-
8	0.84	0932	560	-	-	-	-	-	-
9	1.22	0916	387	-	-	-	-	-	-
10	1.43	0903	330	-	-	-	-	-	-
11	1.66	0853	243	-	-	-	-	-	-
12	1.77	0845	212	-	-	-	-	-	-
13	1.92	0835	186	-	-	-	-	-	-
14	2.01	1135	135	1215	138	1345	45.5	.009	-.473
15(MP)	2.29	1145	190	1217	180	1350	65.0	-.023	-.466
16	2.60	1155	155	1220	151	1354	49.0	-.011	-.500
17	2.91	1200	133	1223	125	1358	44.0	-.027	-.480
18	3.31	1210	64.0	1225	59.0	1400	25.1	-.035	-.407
19	3.38	1215	88.0	1228	85.0	1403	27.9	-.016	-.499
20	3.70	1225	100	1231	99.0	1405	29.5	-.004	-.530
21	4.48	1310	59.5	1258	65.5	1411	18.5	.042	-.507
22	4.77	1320	60.0	1300	61.0	1414	19.5	.007	-.489
23	4.95	1335	63.5	1303	64.5	1416	23.0	.007	-.441
24	5.30	1342	54.5	1307	54.0	1419	18.5	-.004	-.469
25	5.81	1348	44.0	1310	44.5	1425	15.8	.005	-.445
26	6.32	1400	37.0	1314	37.5	1428	12.7	.006	-.464
27	6.95	1405	36.2	1317	38.8	1432	11.7	.030	-.490
28	7.25	1410	26.2	1320	24.5	1434	8.90	-.029	-.469
29	7.91	1425	24.8	1323	25.0	1440	7.80	.003	-.503
30	8.28	1430	25.0	1327	25.0	1444	7.80	.000	-.506
31	8.82	1435	23.3	1330	23.5	1448	7.90	.003	-.470
32	9.20	1440	18.9	1332	19.5	1452	7.10	.014	-.425
33	9.85	1455	17.9	1336	18.5	1457	5.90	.014	-.482
34	11.0	1505	16.0	1342	16.1	1501	5.75	.003	-.445
35	11.3	1515	15.9	1345	16.0	1504	5.75	.003	-.442
36	12.3	1520	10.8	1349	10.8	1506	3.75	.000	-.460
37	13.1	1530	9.40	1352	9.90	1511	3.65	.023	-.411
38	13.5	1535	10.7	1355	10.8	1514	3.80	.004	-.450
39	14.8	1540	8.60	1400	8.30	1519	2.92	-.016	-.469
40	16.0	1550	9.20	1403	8.80	1524	2.95	-.020	-.494
41	16.5	1555	6.40	1405	6.60	1529	2.21	.014	-.462
42	17.3	1600	7.25	1408	7.00	1534	2.85	-.016	-.406
43	18.2	1606	6.10	1411	6.20	1537	1.95	.008	-.499
						Average Log		.001	-.469
						Antilog		1.002	0.340
Unattenuated Field, mV/m			430		431		146		

Non-directional measurements:

All points, December 6, 1970; Sunrise 0730, Sunset 1711, CST

Daytime directional measurements:

All points, December 13, 1970; Sunrise 0736, Sunset 1712, CST

Nighttime directional measurements:

All points, December 9, 1970; Sunrise 0733, Sunset 1711, CST

RADIO STATION KLEO
Wichita, Kansas

RADIAL FIELD INTENSITY MEASUREMENTS

RADIAL BEARING N 302° E

Point No.	Miles	5 kW ND		5 kW DA-D		1 kW DA-N		Log of Ratio	
		Time	mV/m	Time	mV/m	Time	mV/m	DA-D/ND	DA-N/ND
1	0.60	1504	695	-	-	-	-	-	-
2	0.70	1458	583	-	-	-	-	-	-
3	0.84	1448	480	-	-	-	-	-	-
4	0.93	1439	465	-	-	-	-	-	-
5	0.98	1435	445	-	-	-	-	-	-
6	1.17	1424	350	-	-	-	-	-	-
7	1.26	1416	330	-	-	-	-	-	-
8	1.31	1411	292	-	-	-	-	-	-
9	1.40	1405	285	-	-	-	-	-	-
10	1.49	1358	242	-	-	-	-	-	-
11	1.61	1455	240	1150	290	1532	95.0	.082	-.403
12	1.88	1415	205	1158	220	1523	69.0	.031	-.474
13	2.28	1459	145	1200	180	1517	56.5	.094	-.409
14	2.41	1410	185	1205	230	1513	75.0	.094	-.393
15	3.01	1403	118	1232	140	1510	47.5	.075	-.395
16	3.36	1512	119	1235	135	1506	44.0	.055	-.432
17	3.61	1345	100	1240	128	1503	38.1	.107	-.419
18	4.20	1259	100	1243	100	1500	35.2	.041	-.453
19	4.82	1253	49.0	1246	51.0	1455	16.0	.017	-.486
20	5.85	1240	42.5	1249	47.0	1449	13.5	.044	-.498
21	6.56	1233	45.5	1300	46.5	1445	13.8	.010	-.518
22	7.40	1225	30.0	1302	31.5	1434	11.5	.021	-.417
23	8.92	1220	26.0	1306	30.2	1430	9.40	.065	-.442
24	10.1	1200	20.2	1313	25.5	1421	8.00	.101	-.403
25	11.3	1150	15.0	1317	22.0	1415	6.90	.166	-.338
26	13.1	1141	14.0	1323	16.8	1406	5.25	.079	-.426
27	13.7	1135	13.0	1325	15.0	1403	5.00	.062	-.415
28	14.9	1316	10.7	1330	13.1	1358	4.25	.088	-.402
29	16.1	1308	8.80	1335	10.1	1353	3.25	.060	-.433
30	16.9	1300	6.80	1338	8.60	1348	2.73	.102	-.397
31	17.3	1254	7.35	1342	9.10	1343	2.90	.093	-.404
32	18.4	1237	6.30	1346	7.90	1330	2.50	.098	-.402
33	19.6	1234	5.40	1350	6.70	1322	2.21	.093	-.388
Average Log								.073	-.424
Antilog								1.18	0.377
Unattenuated field, mV/m		423		499		159			

Non-directional measurements:

Points 1-11, December 6, 1970; Sunrise 0730, Sunset 1711, CST
Points 12-33, December 7, 1970; Sunrise 0731, Sunset 1711, CST

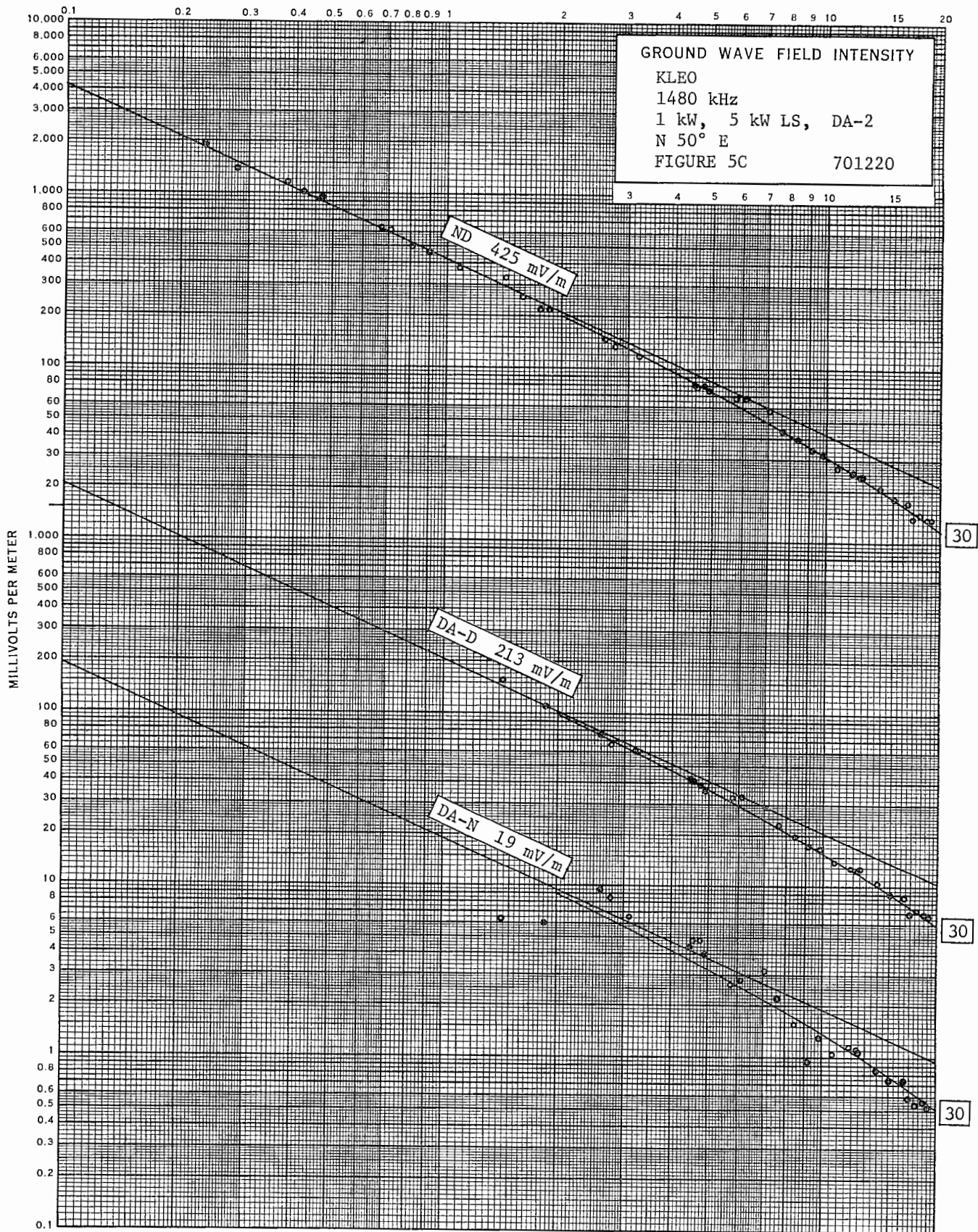
Daytime directional measurements:

All points, December 12, 1970; Sunrise 0735, Sunset 1711, CST

Nighttime directional measurements:

All points, December 10, 1970; Sunrise 0734, Sunset 1711, CST

MILES FROM ANTENNA



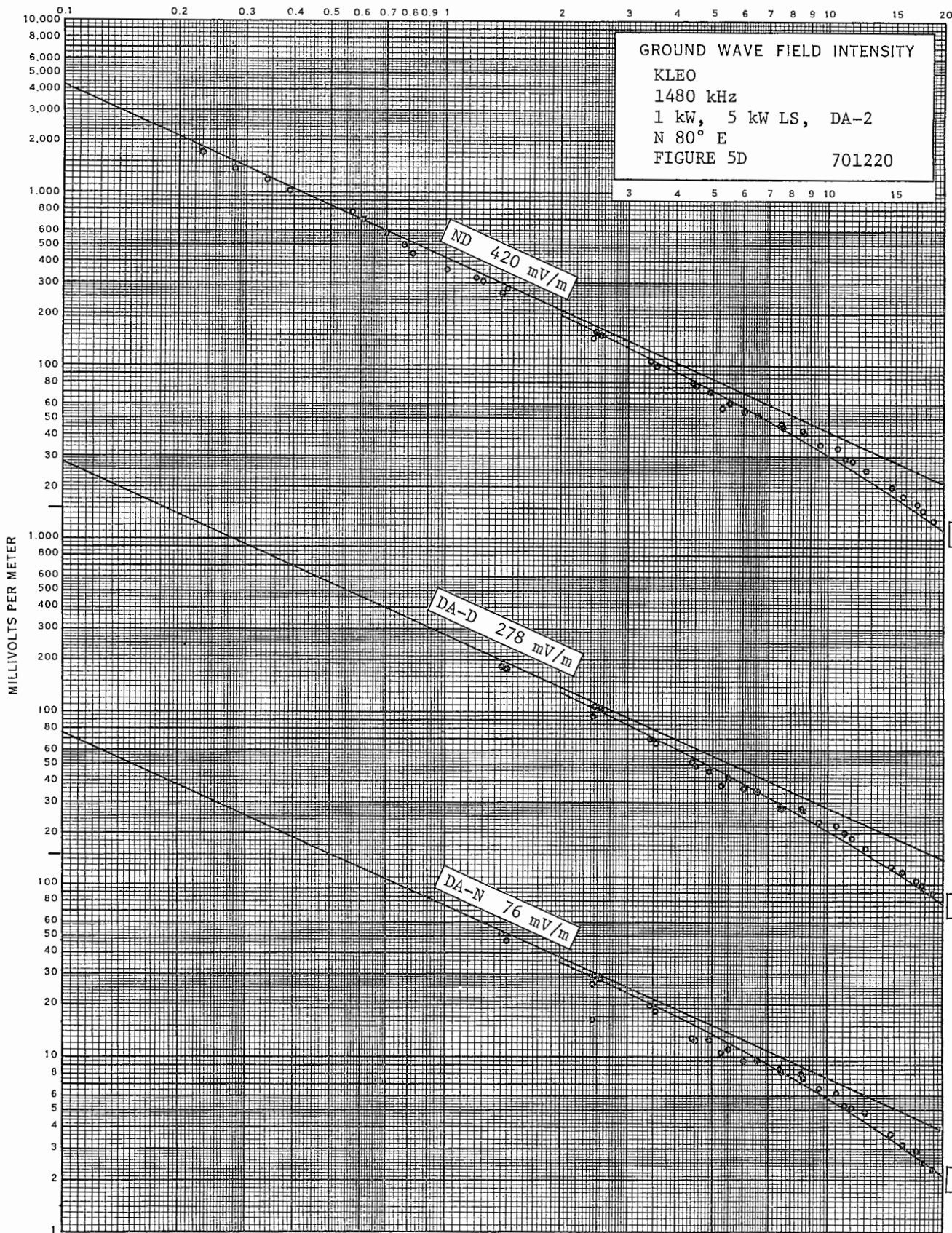
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MILES FROM ANTENNA

MILES FROM ANTENNA



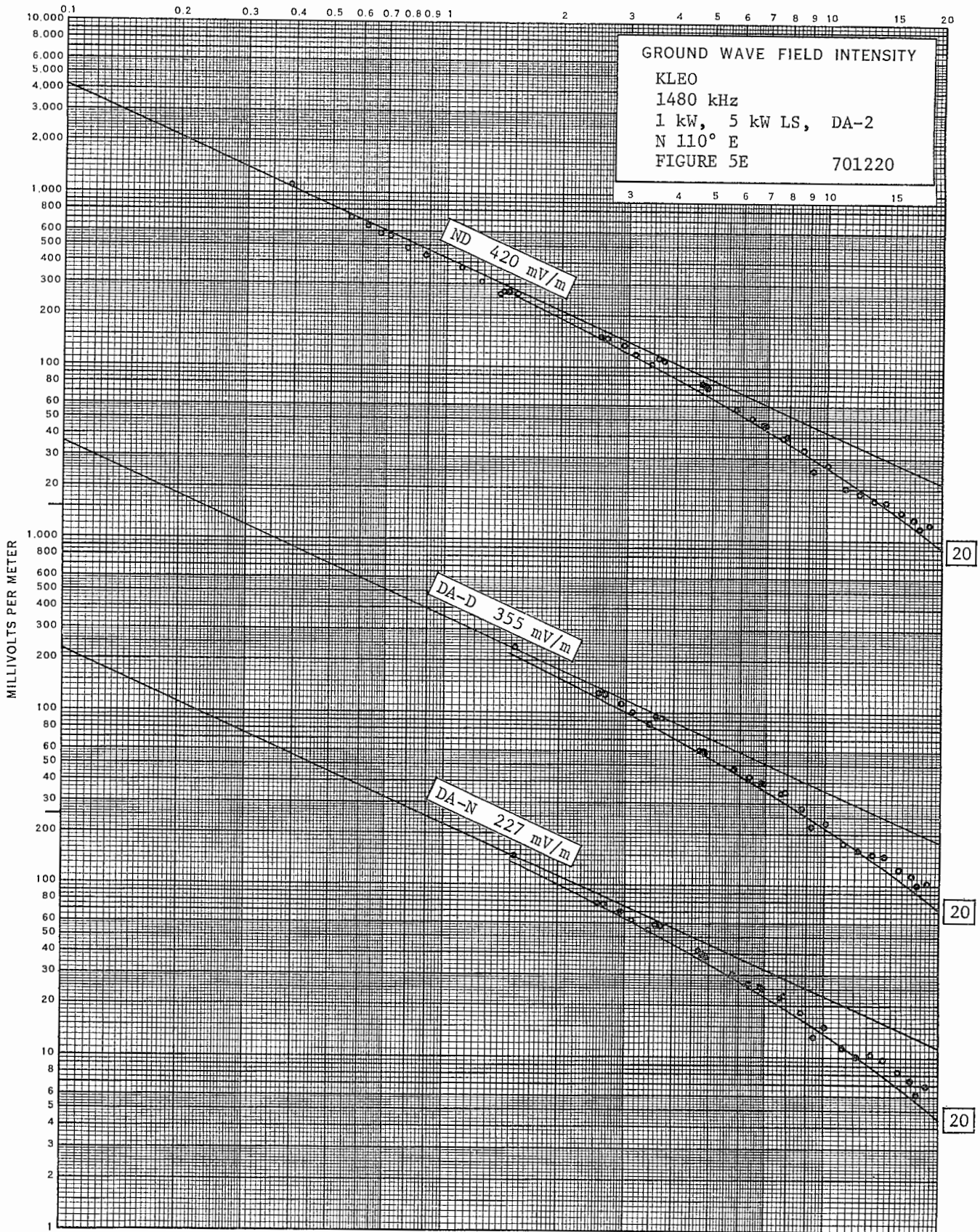
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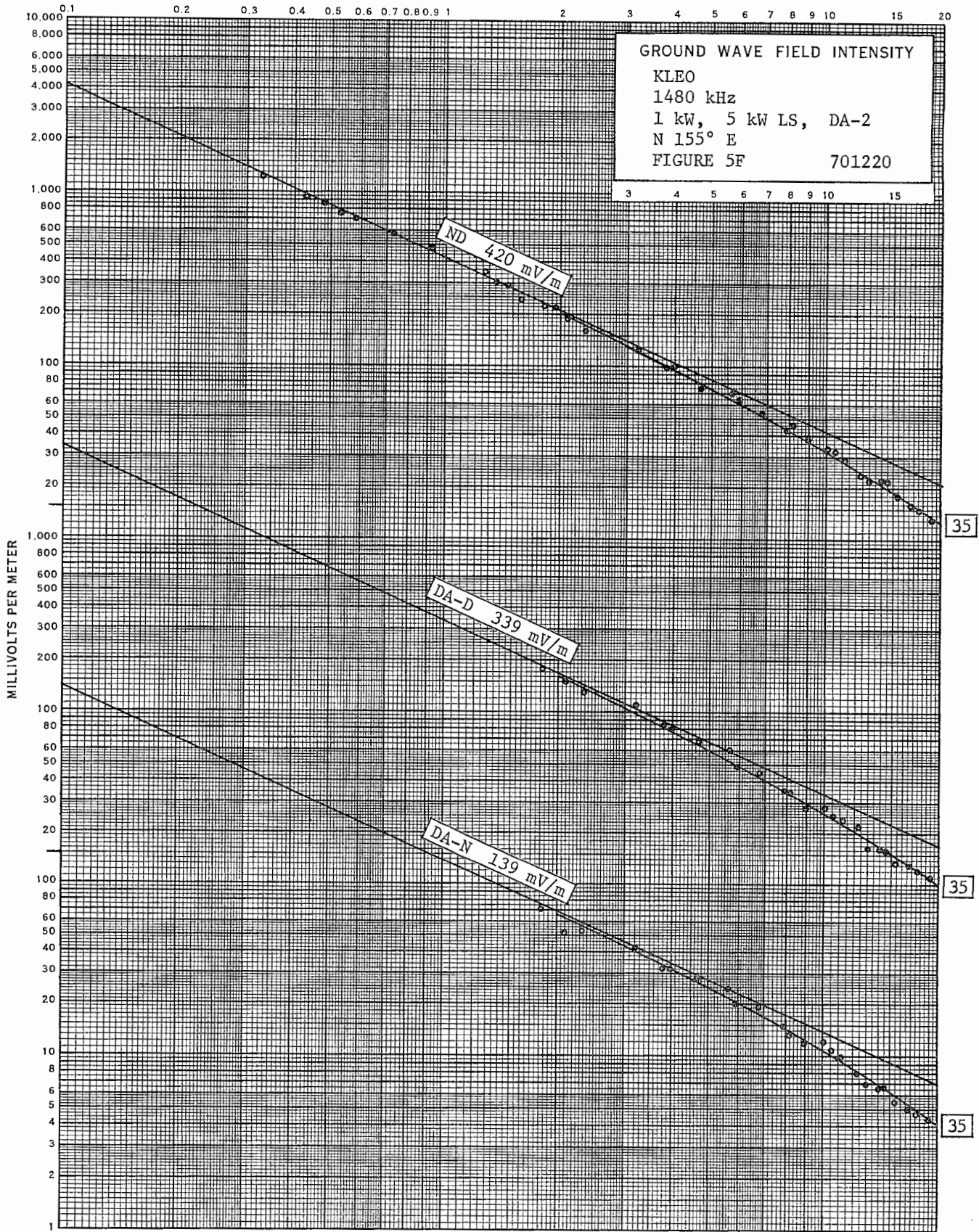
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MILES FROM ANTENNA



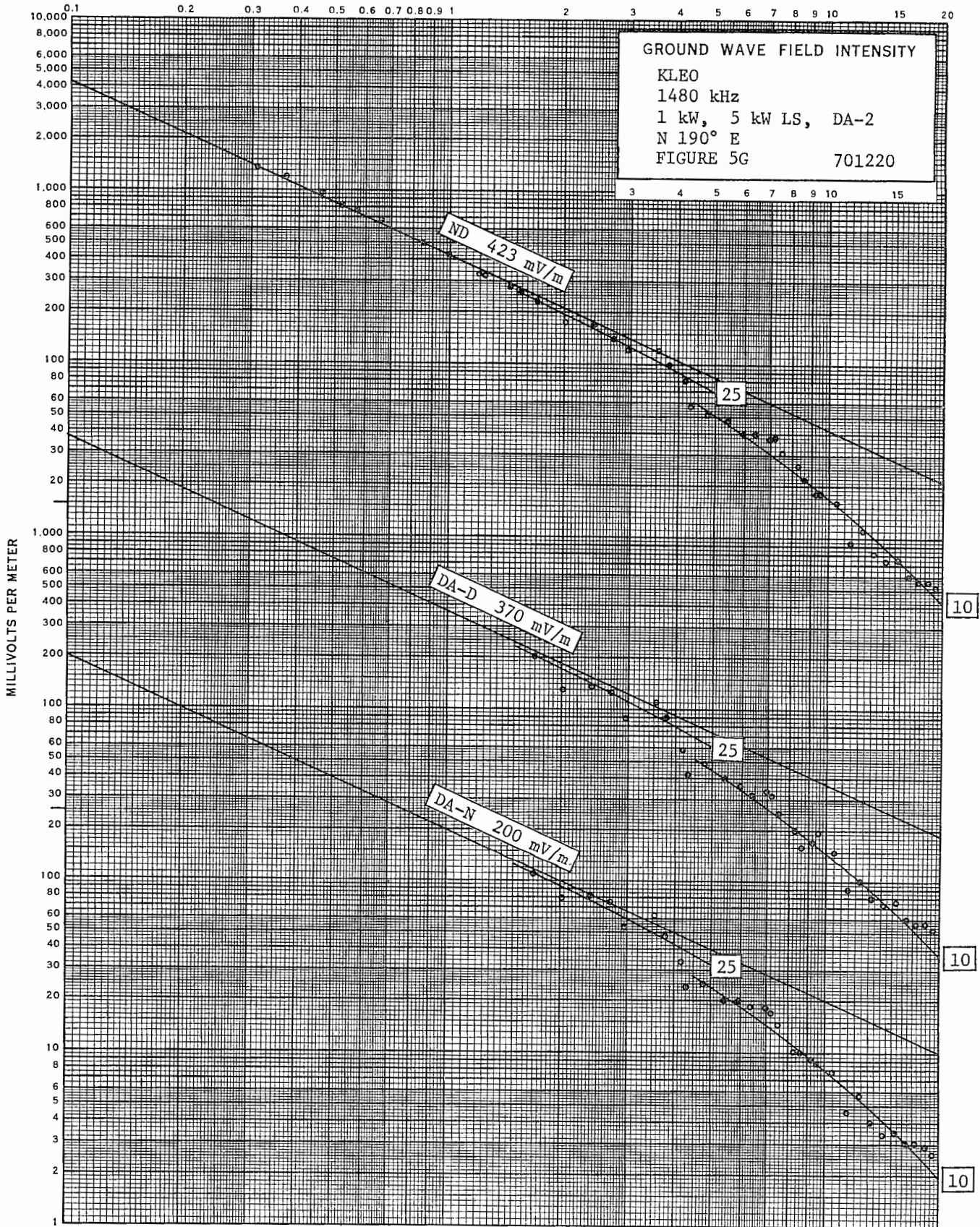
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MILES FROM ANTENNA



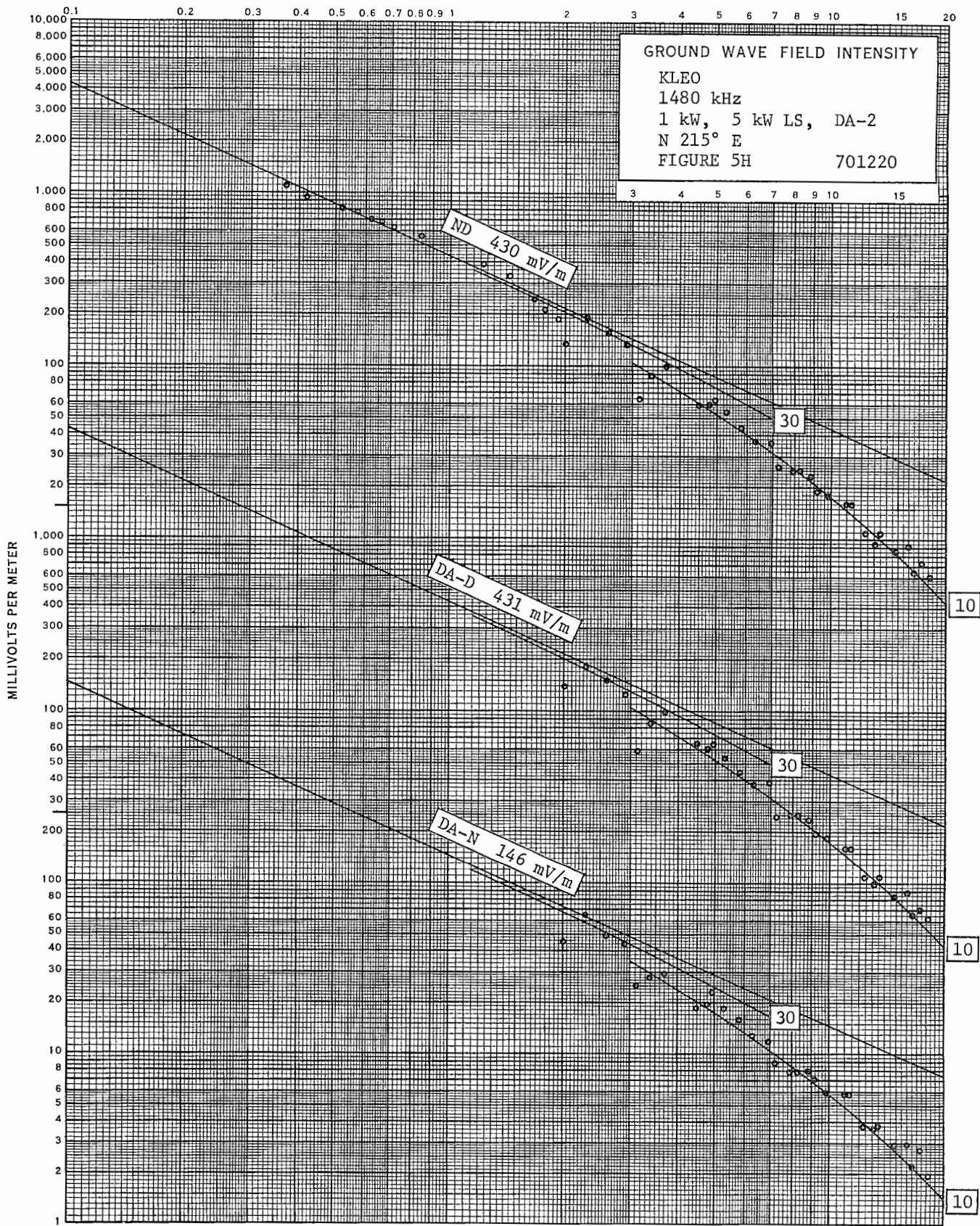
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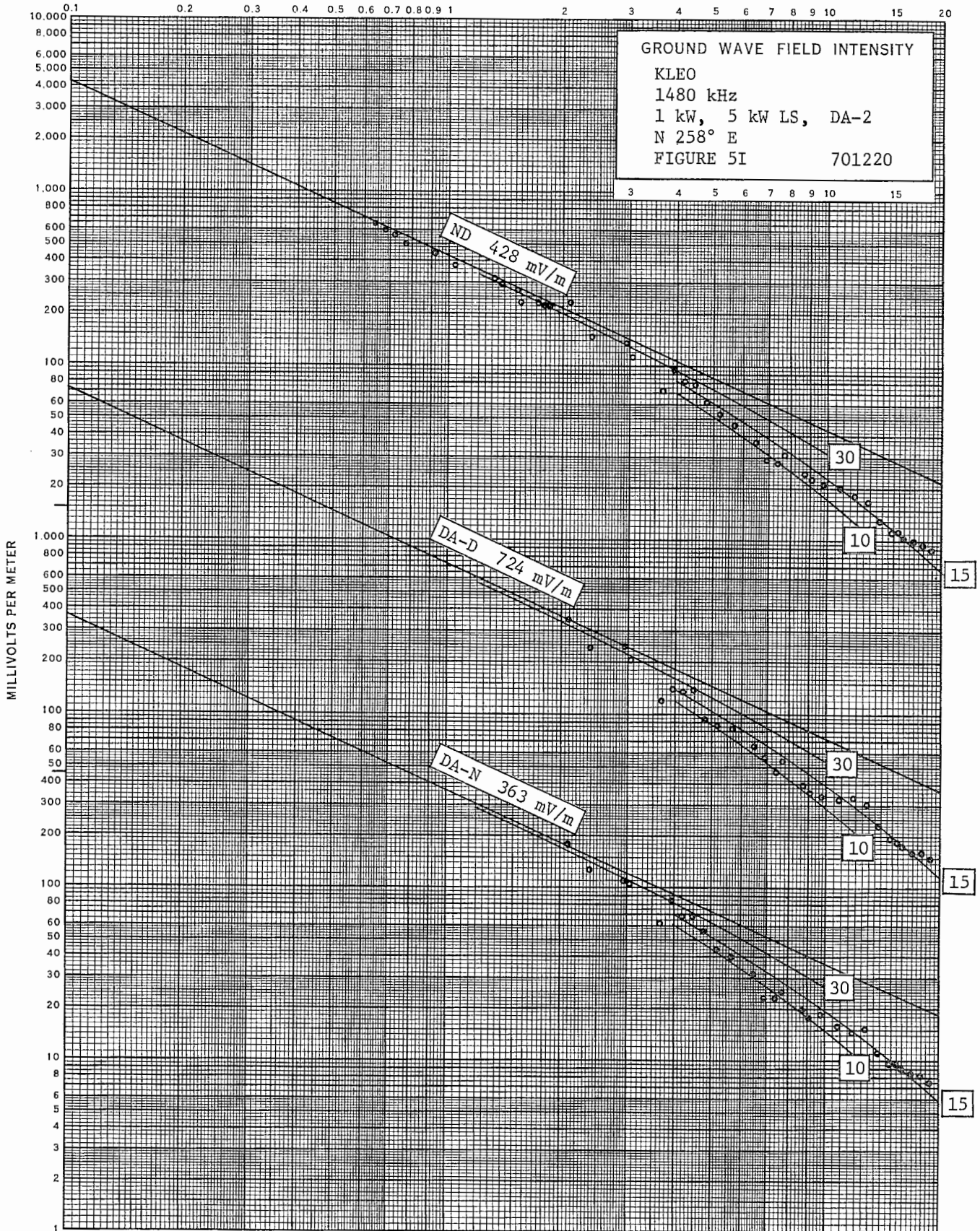
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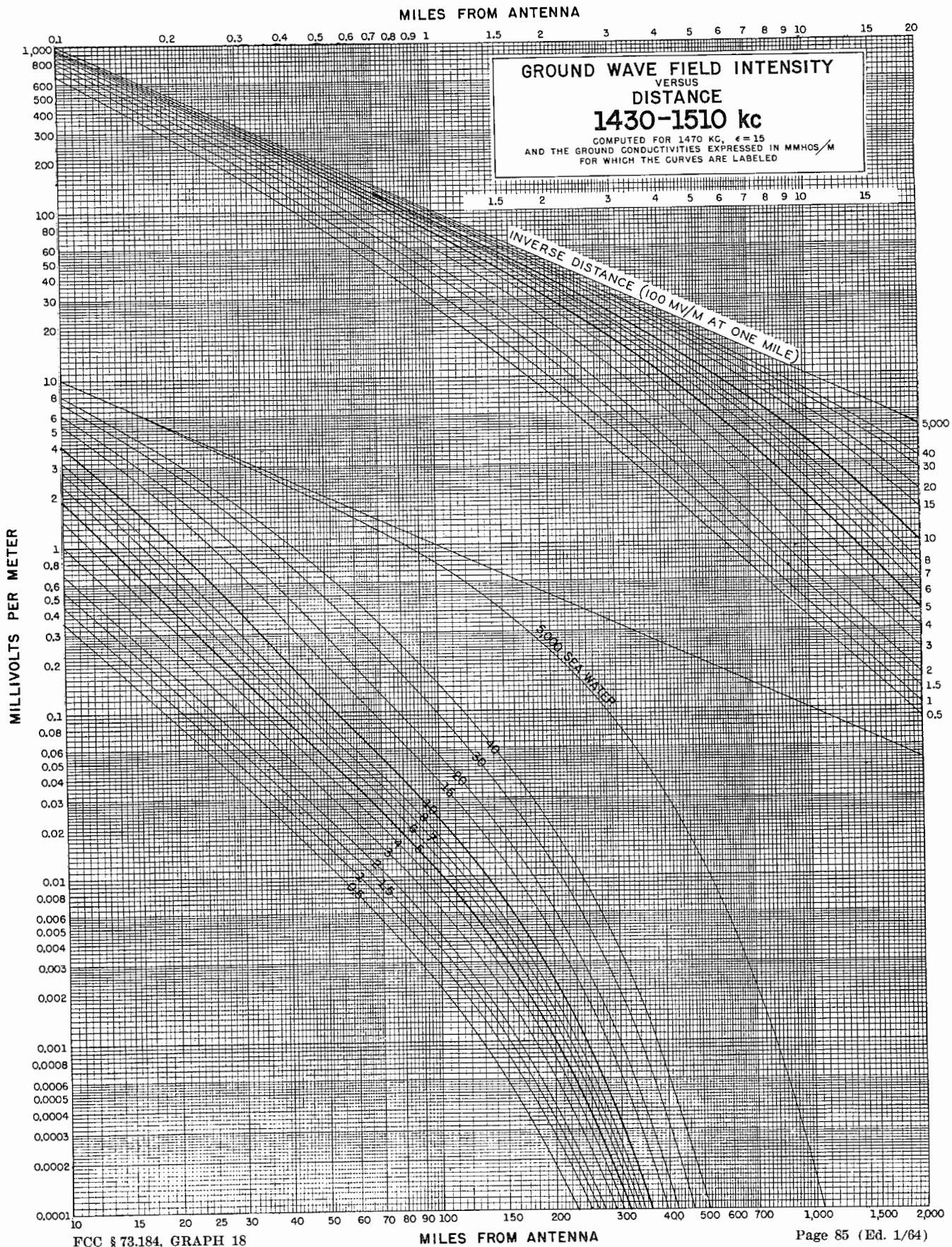


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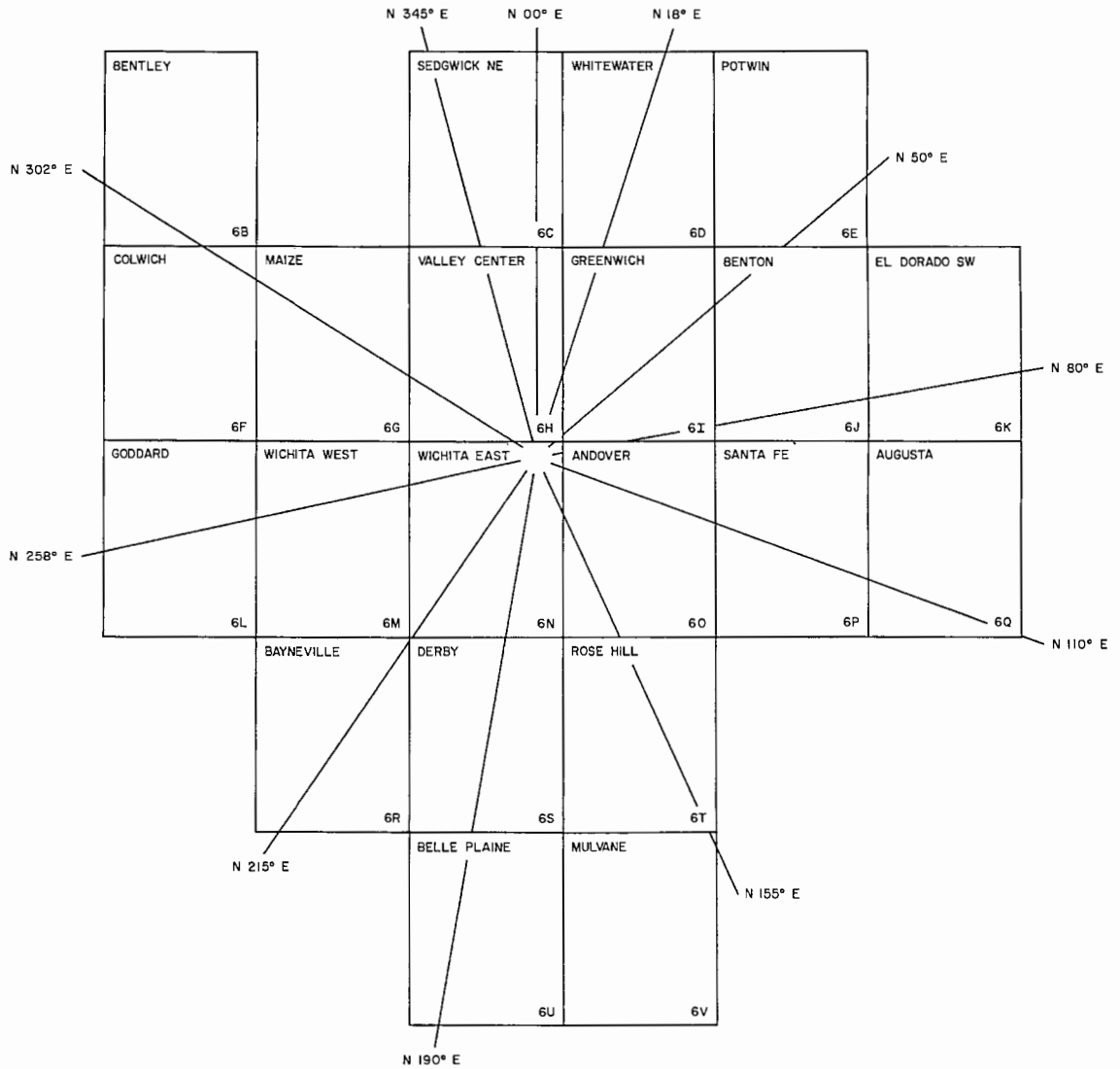
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MILES FROM ANTENNA

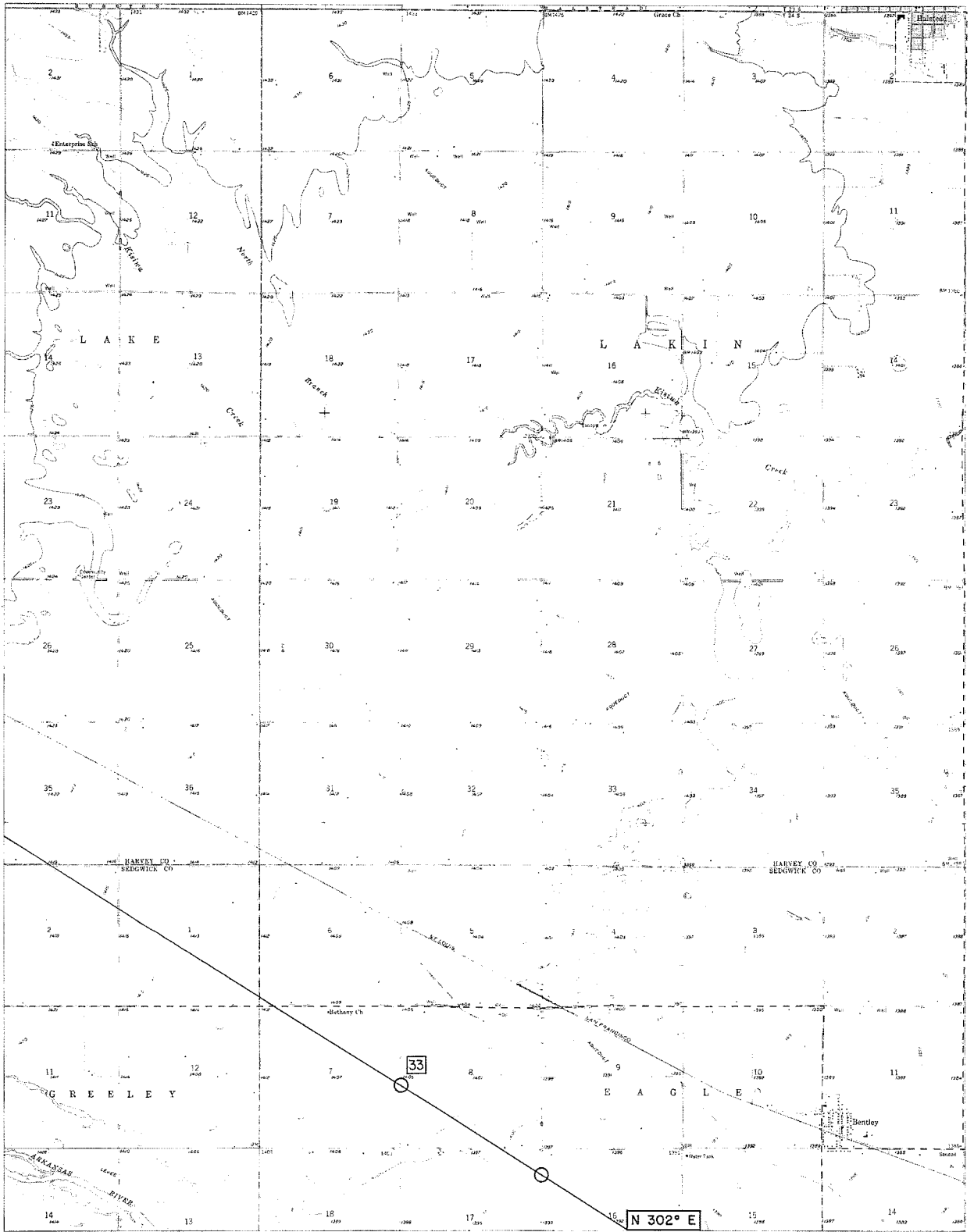


POINT LOCATION MAP INDEX

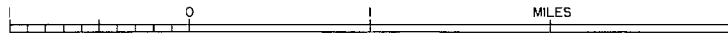


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 CONSULTING ENGINEERS

RADIO STATION KLEO
 WICHITA, KANSAS
 701220 FIGURE 6A

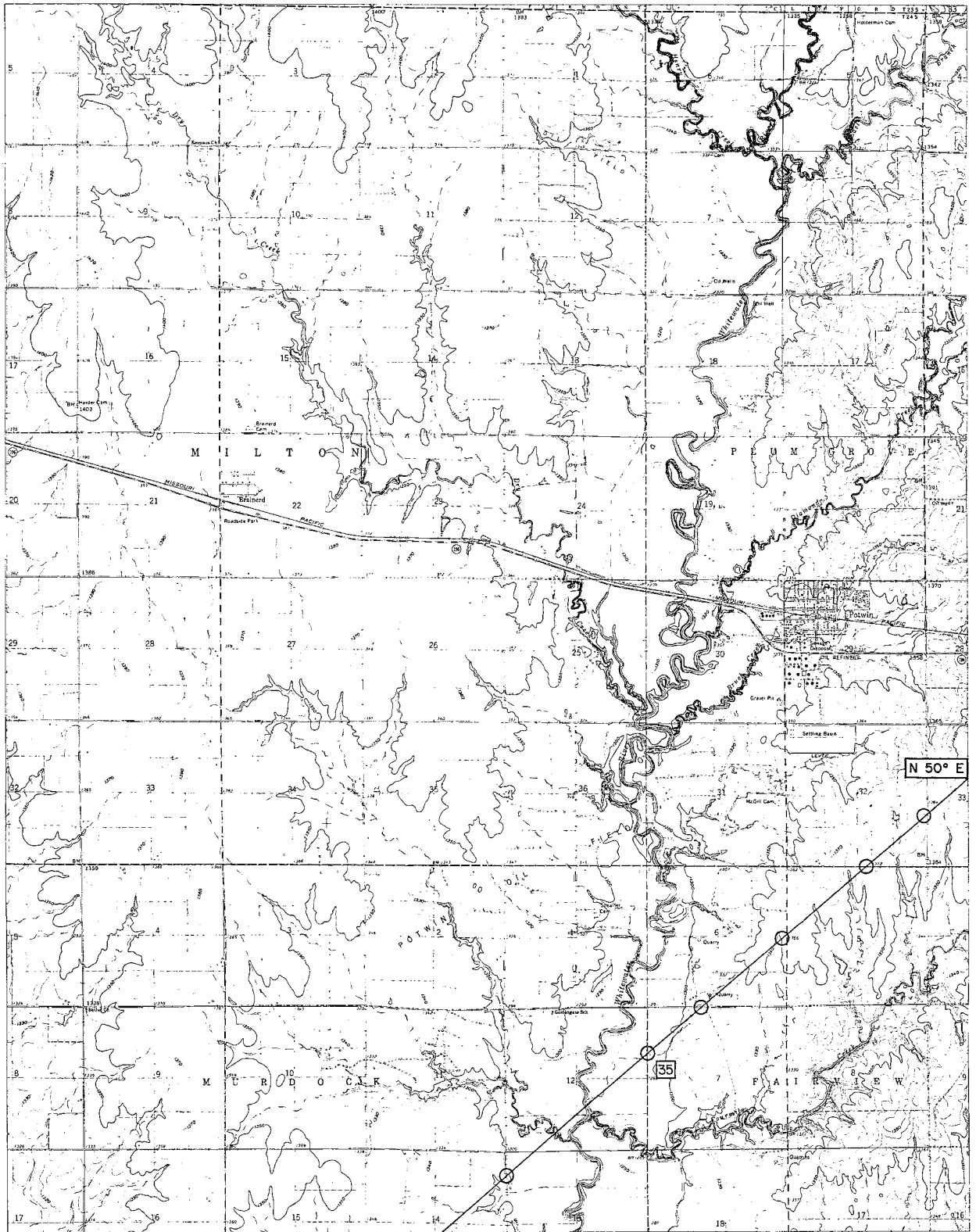


BENTLEY, KANS.
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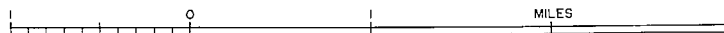


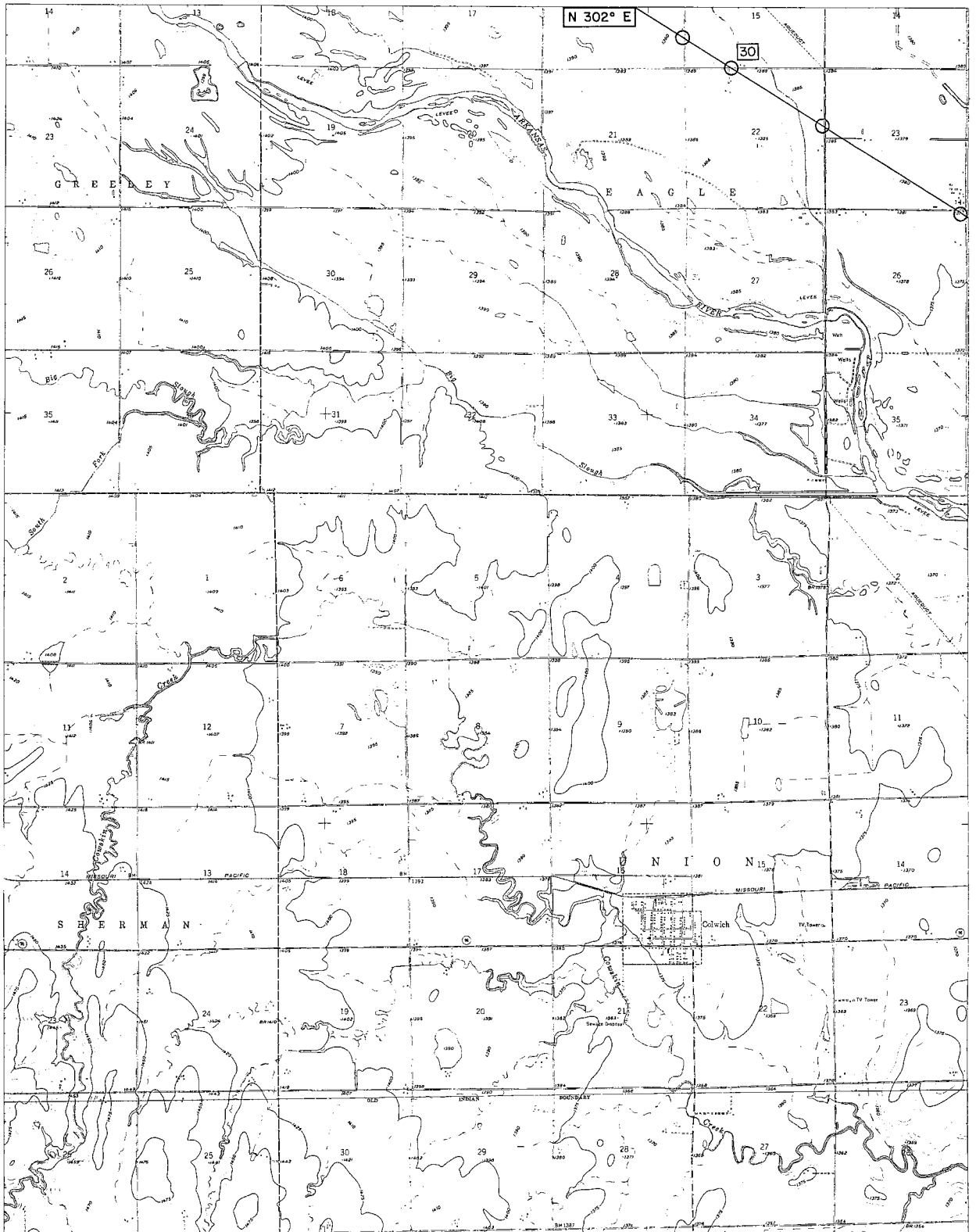
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FIGURE 6 B



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 147525-89700-73
 1961

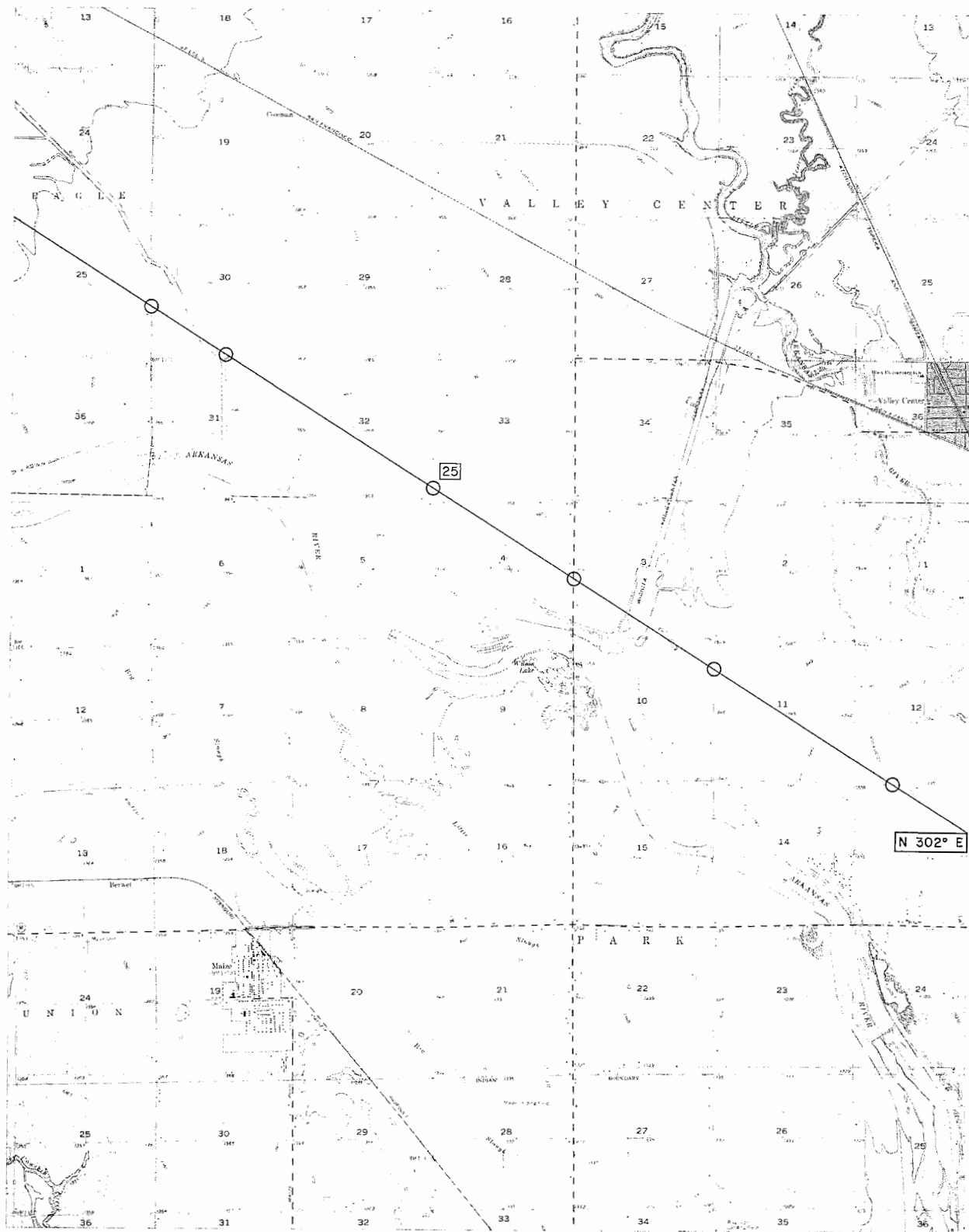


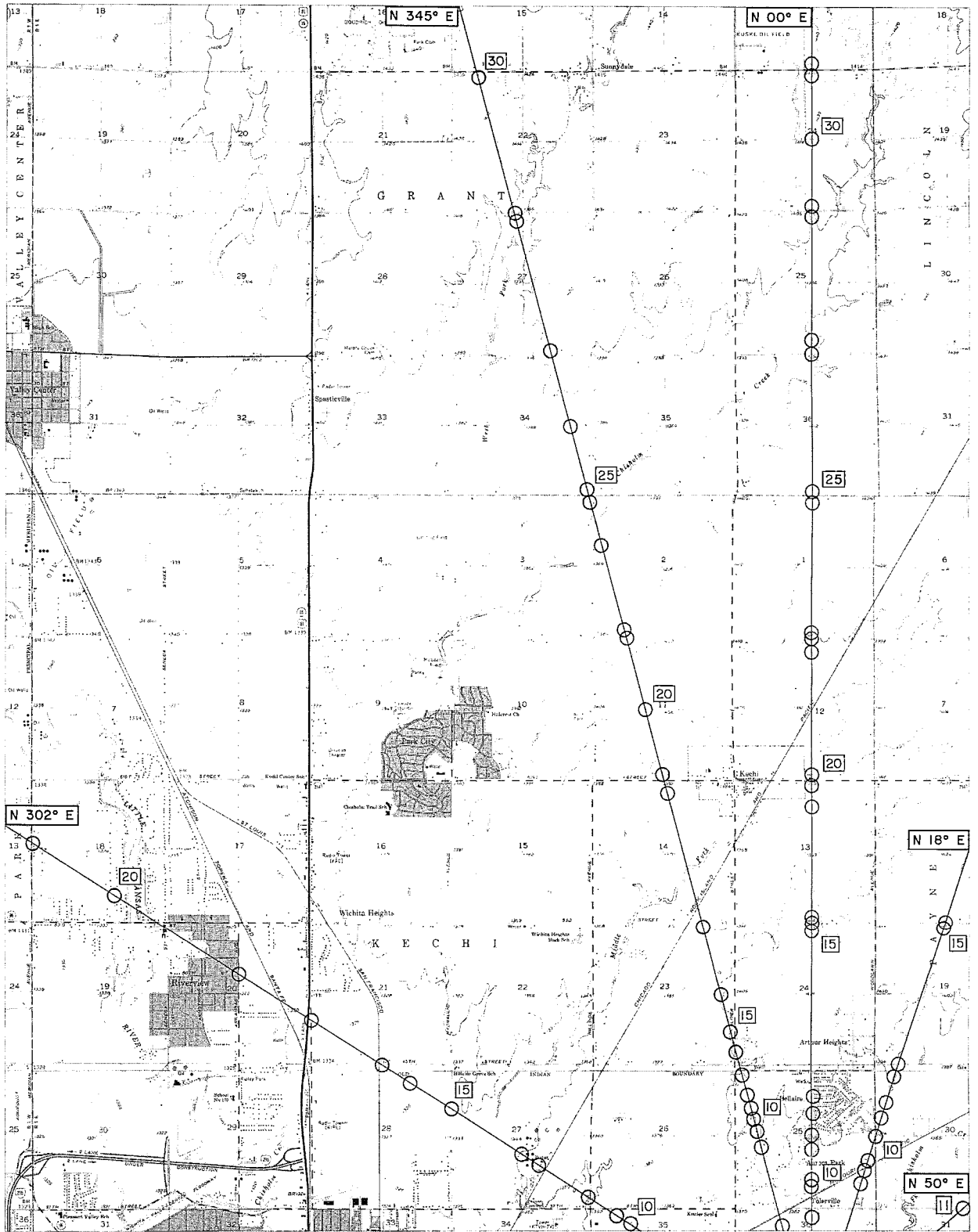


COLWICH, KANS.
 N 3745—N 973077.5
 1958

701220

FIGURE 6F

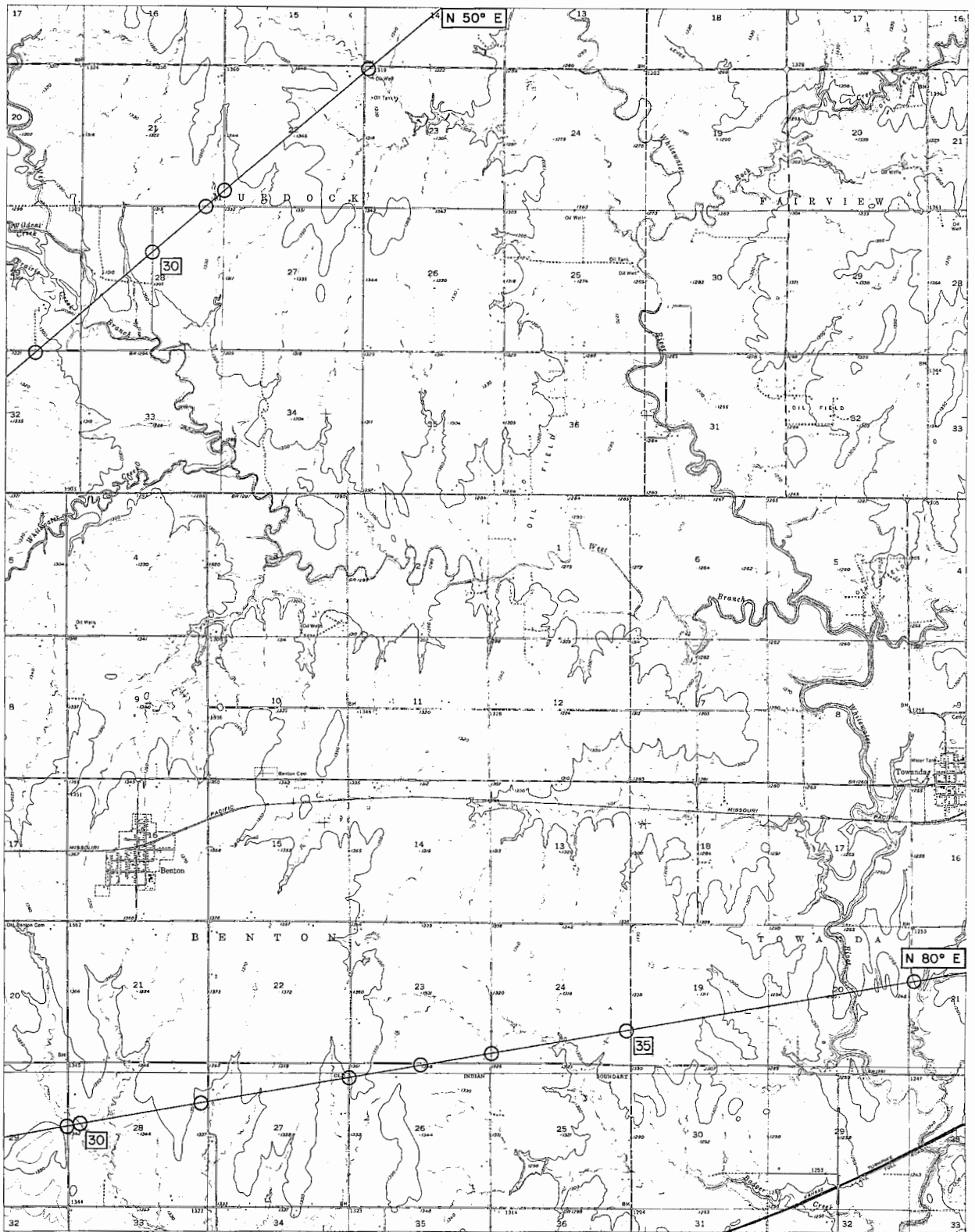




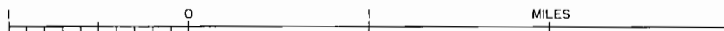
VALLEY CENTER, KANS.
N 3745-W 9715/7.5
1960

701220

FIGURE 6 H

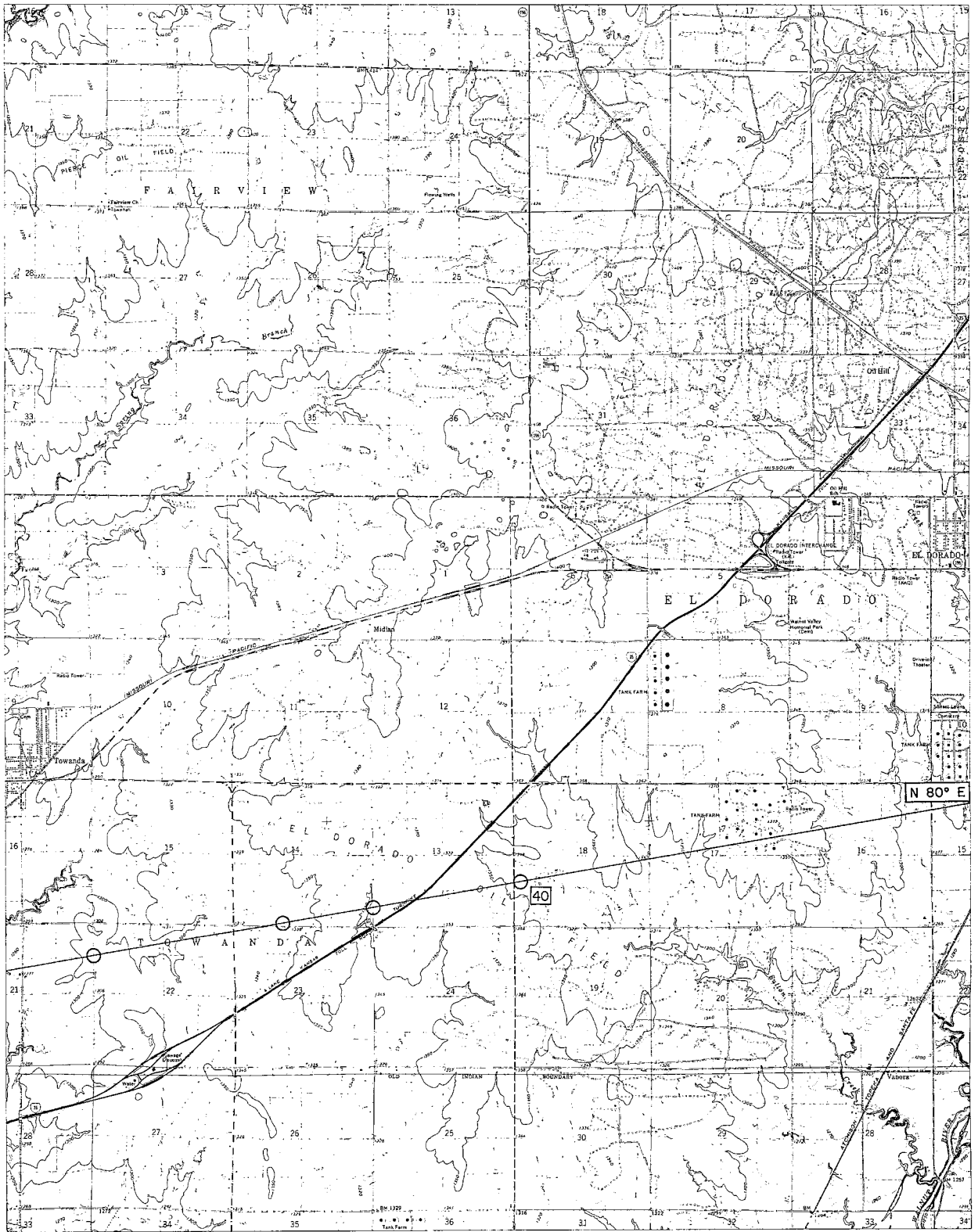


BENTON, KANS.
 N8745-109200/7.5
 1955



701220

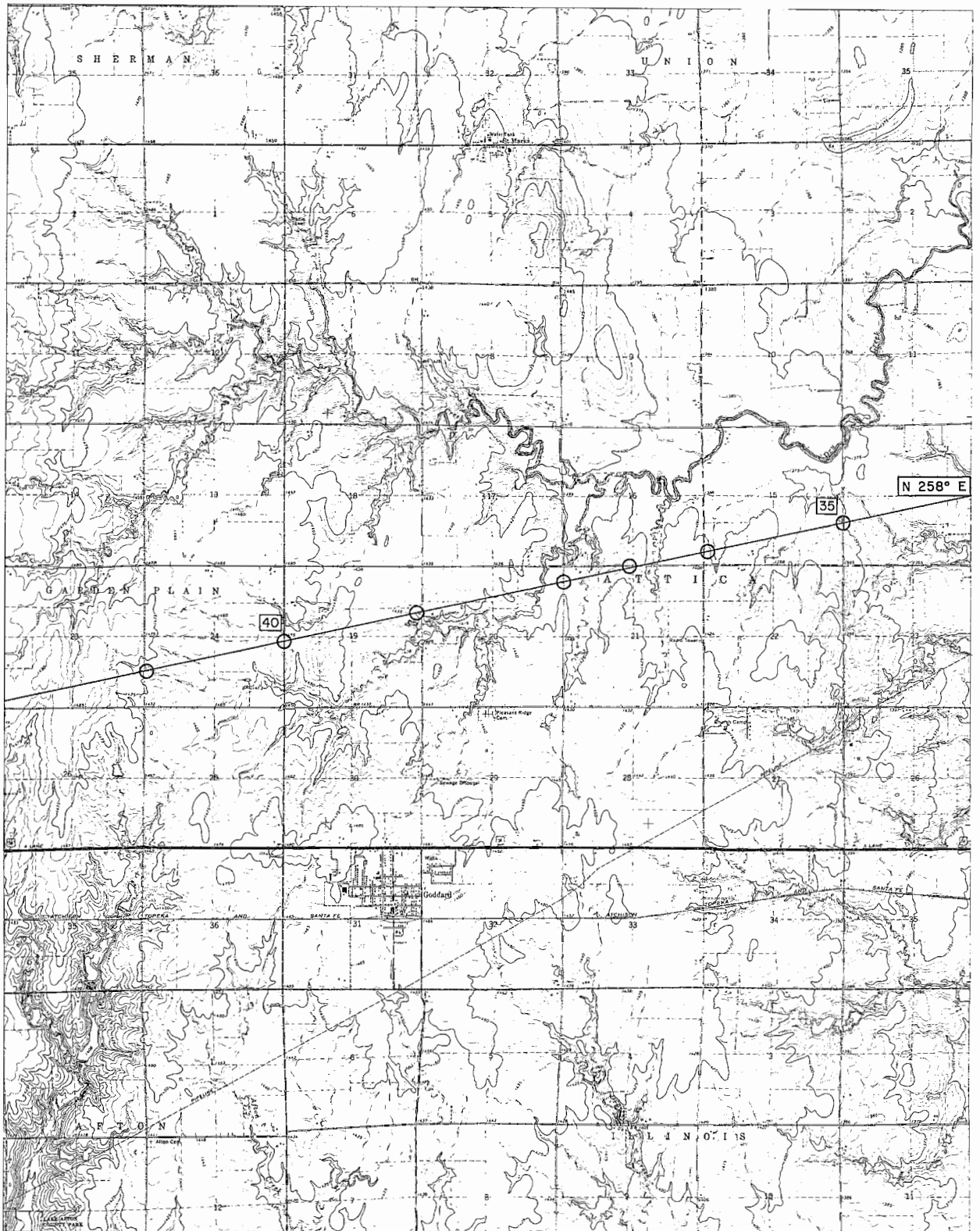
FIGURE 6 J



EL DORADO SW, KANS.
 N3745-W9652.5/7.5
 1961

701220

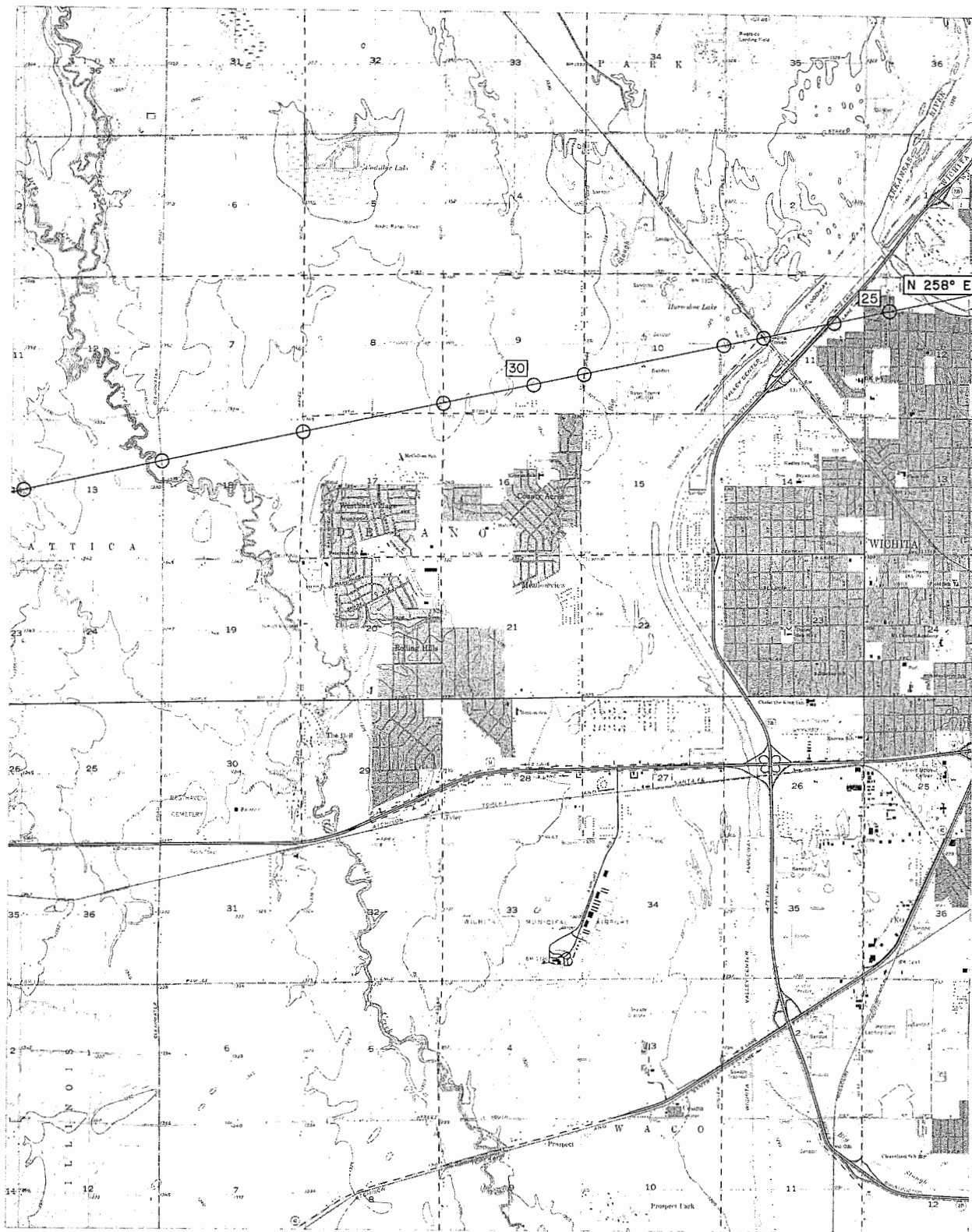
FIGURE 6 K



GODDARD, KANS.
 643737 5—W873077.5
 1965
 AMS 5459 II NE—SERIES 9819

701220

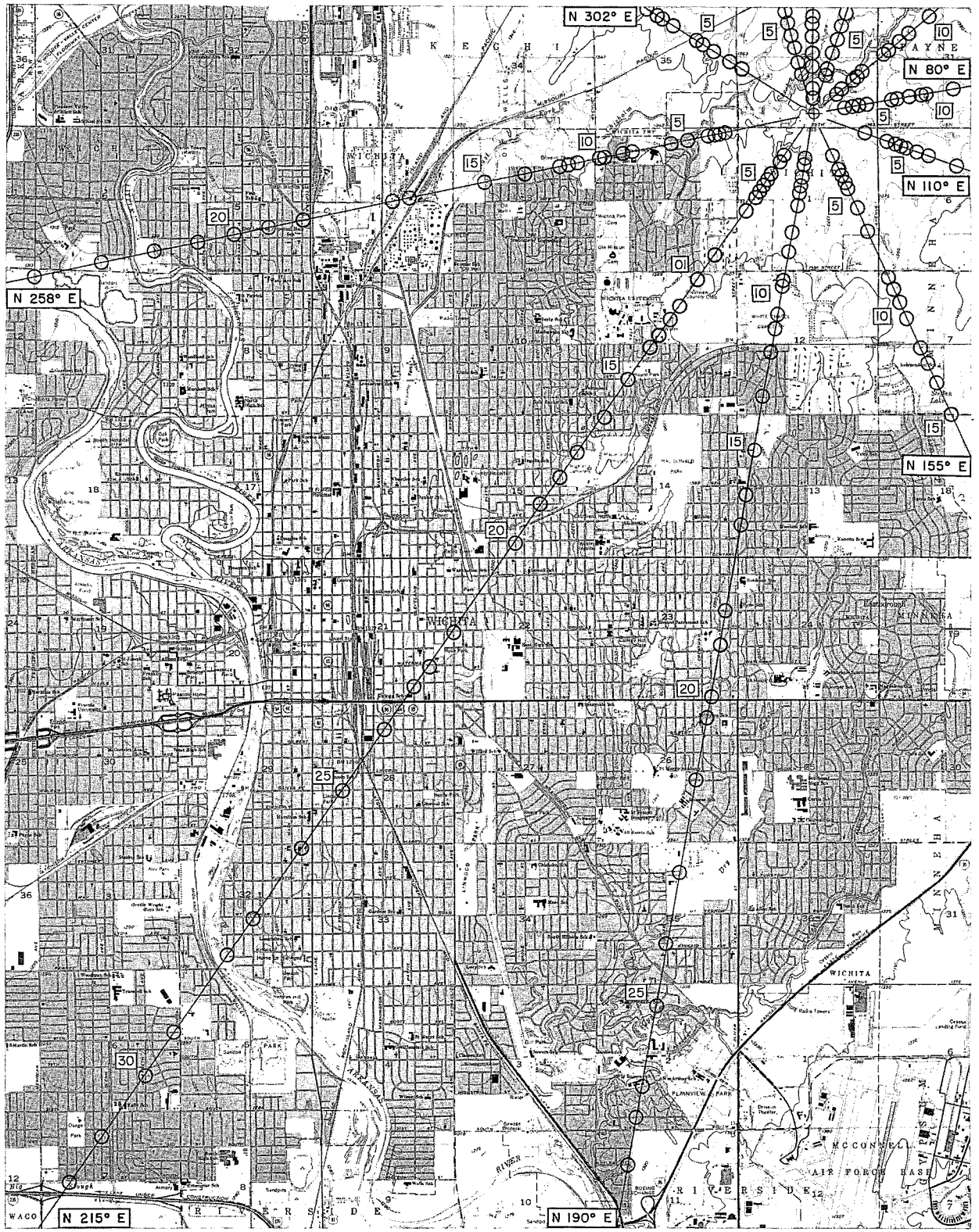
FIGURE 6 L



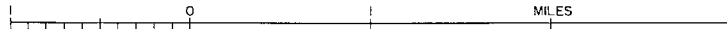
WICHITA WEST, KANS.
 N 4727 5 4872 3 5 7
 1961

701220

FIGURE 6 M

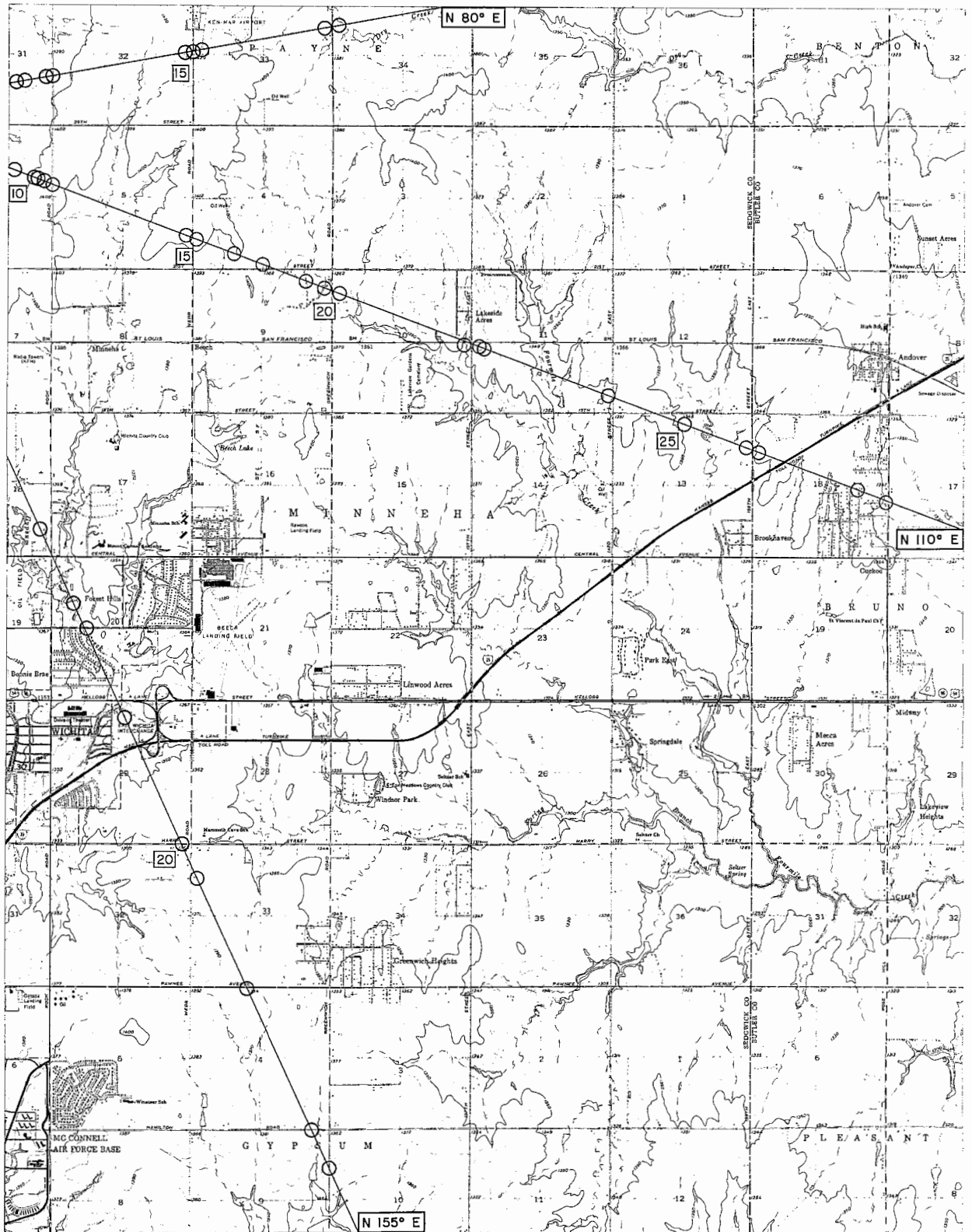


WICHITA EAST, KANS.
 N3737.5-W9715.7.5
 1961

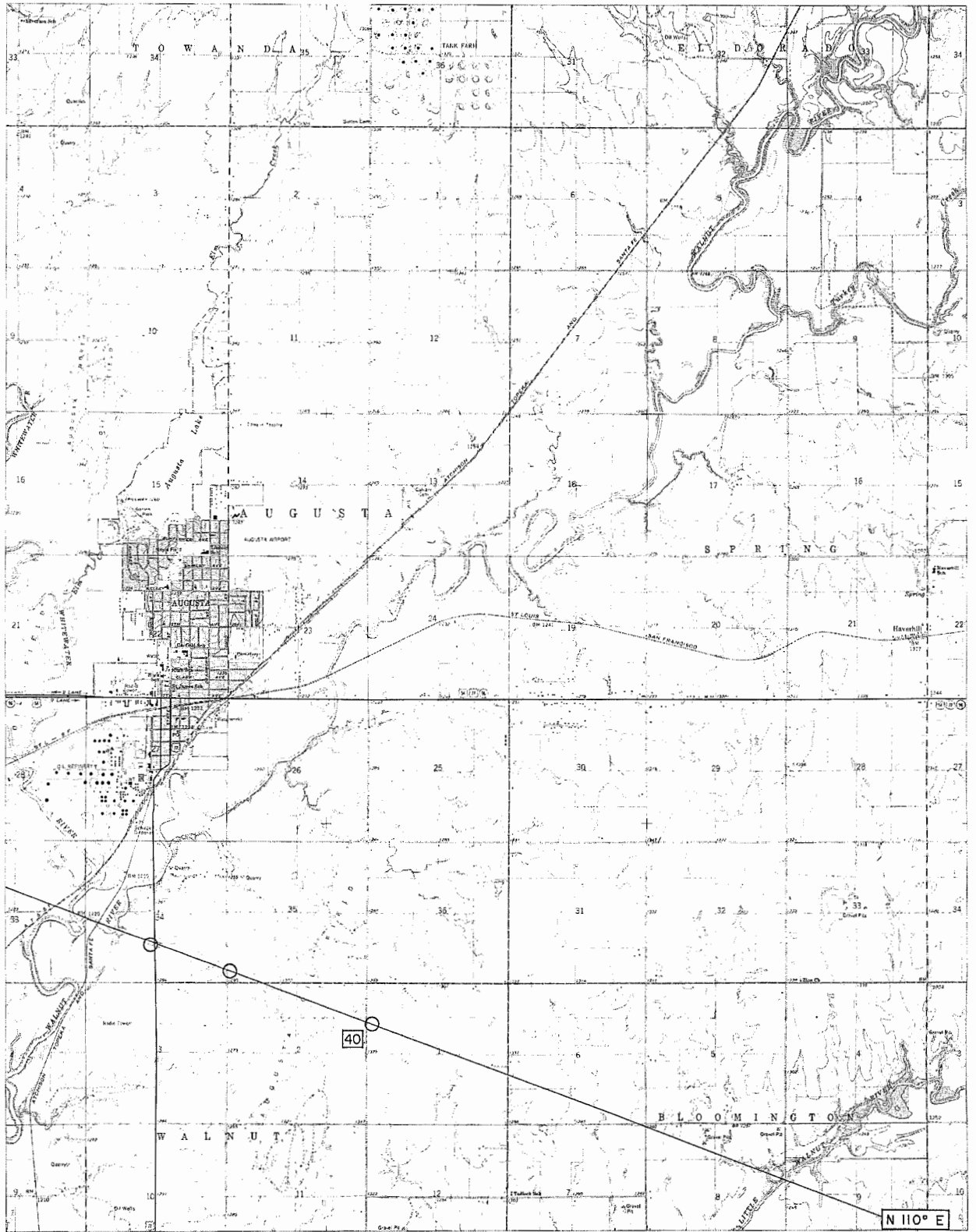


701220

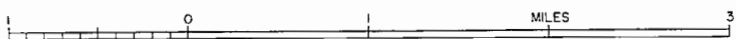
FIGURE 6 N

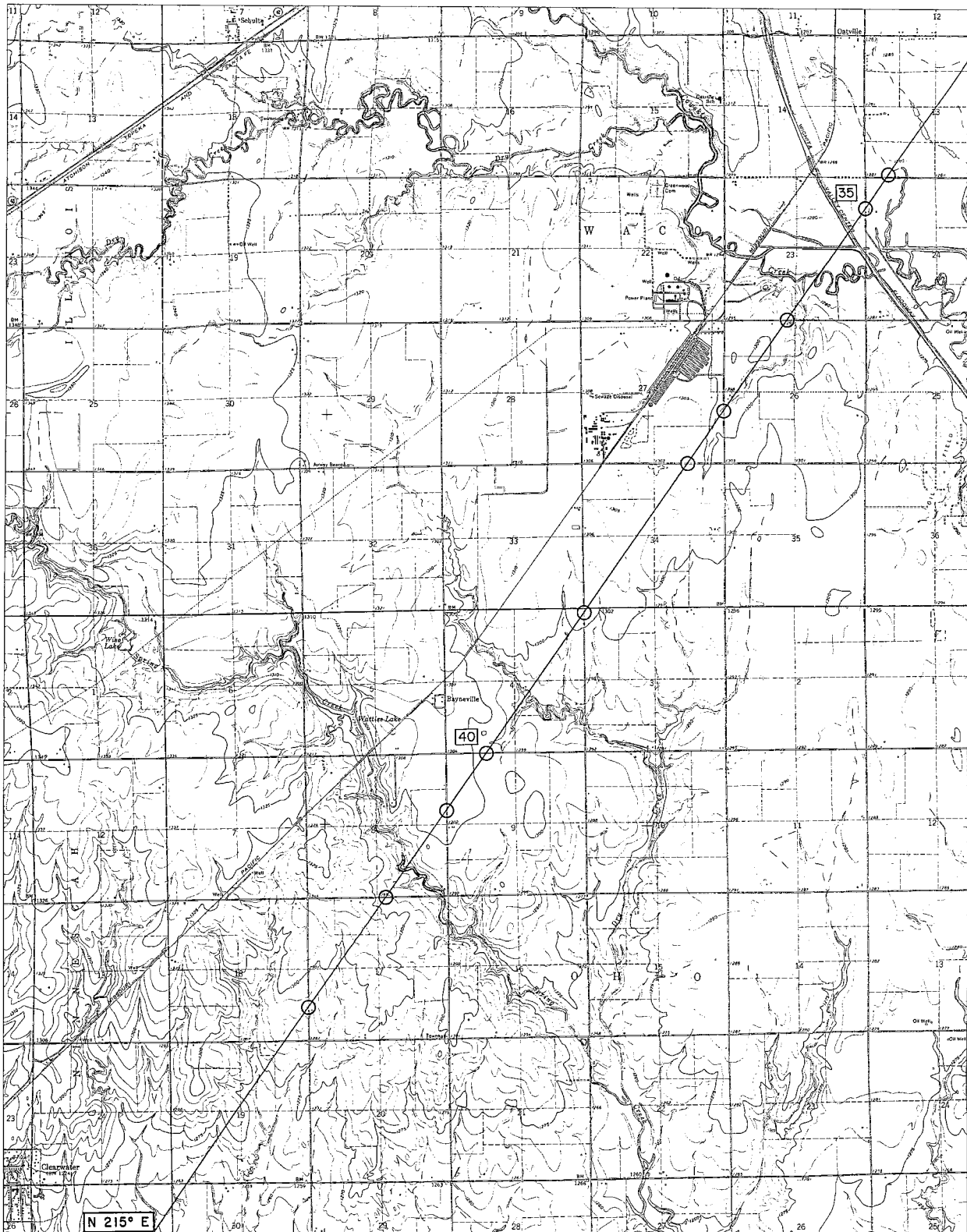


ANDOVER, KANS.
N3737.5-W9702.5/7.5
1961



AUGUSTA, KANS.
 N3737 S-W9652 S/7.5
 1961

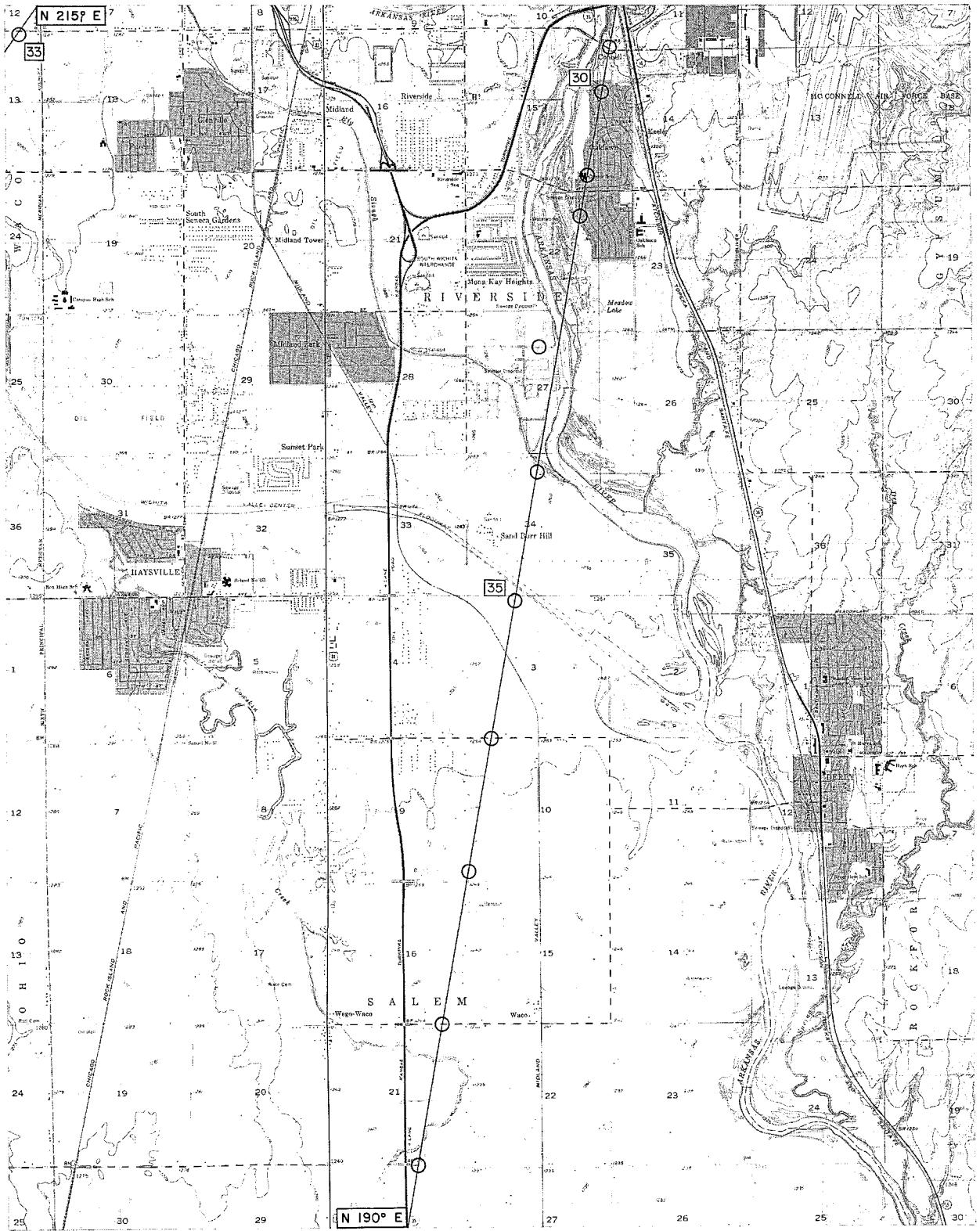




BAYNEVILLE, KANS.
 N3730-W9722.5/7.3
 1961

701220

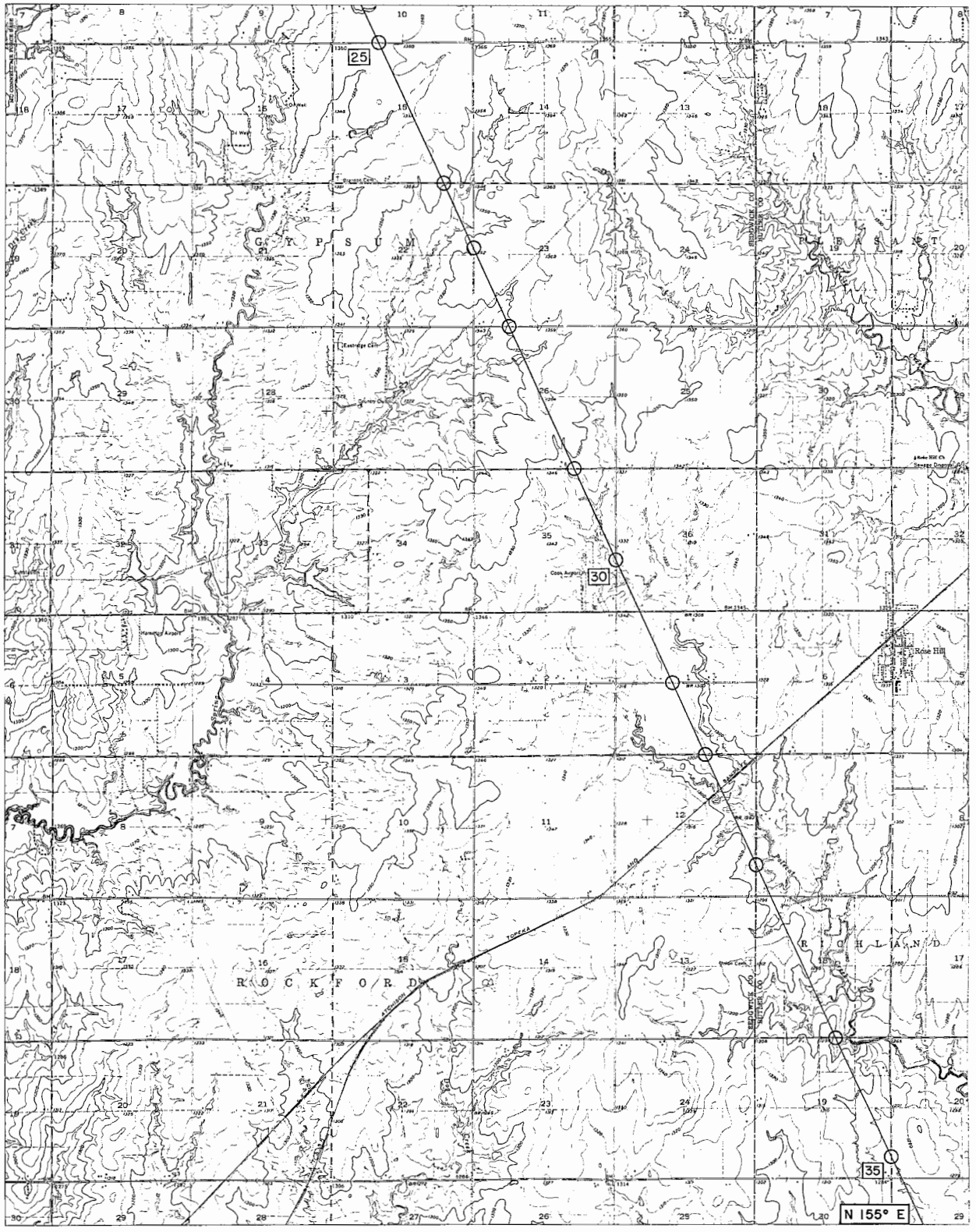
FIGURE 6 R



DERBY, KANS.
 13730-49715/7.5
 1960

701220

FIGURE 6 S

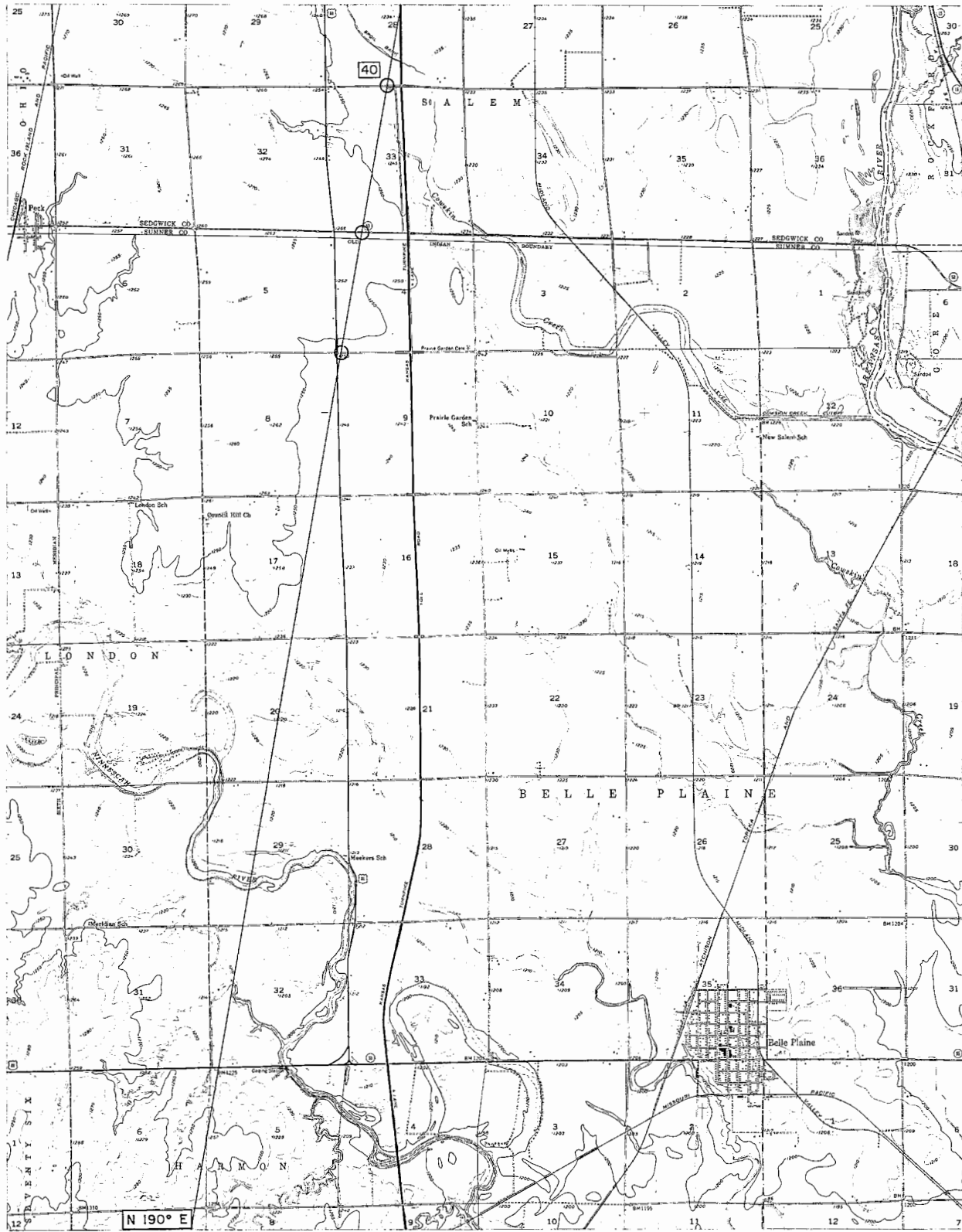


ROSE HILL, KANS.
 1:25,000-5737-5/7.5
 1960



701220

FIGURE 6 T

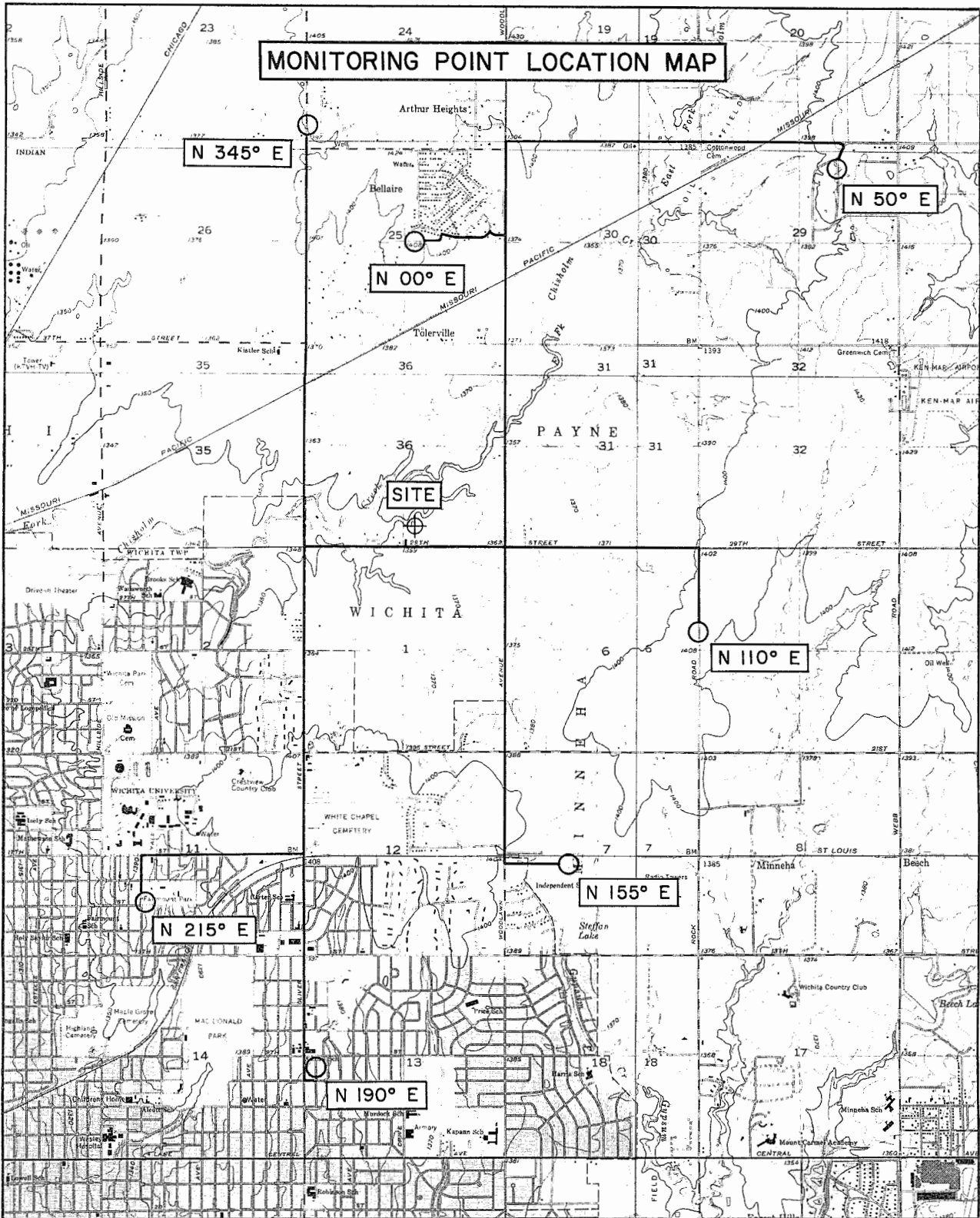


BELLE PLAINE, KANS.
 N 37225-W 97107.5
 1955

701220

FIGURE 6 U

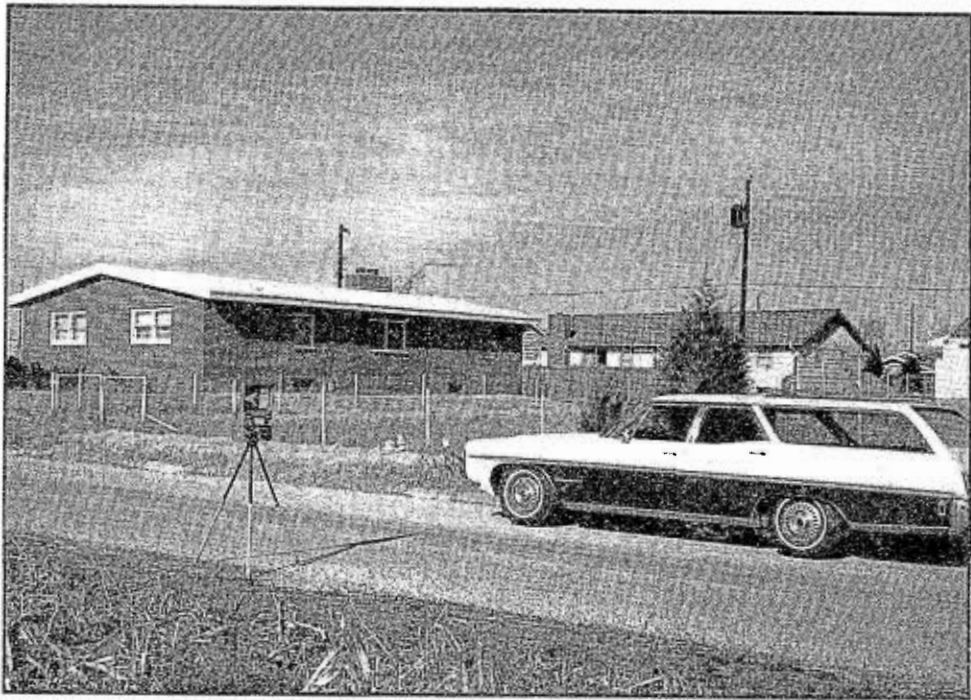
MONITORING POINT LOCATION MAP



PREPARED BY
THE FIRM OF A. EARL CULLUM, JR.
CONSULTING ENGINEERS

RADIO STATION KLEO
WICHITA, KANSAS
701220 FIGURE 7B

MONITORING POINT PHOTOGRAPHS



N 00° E



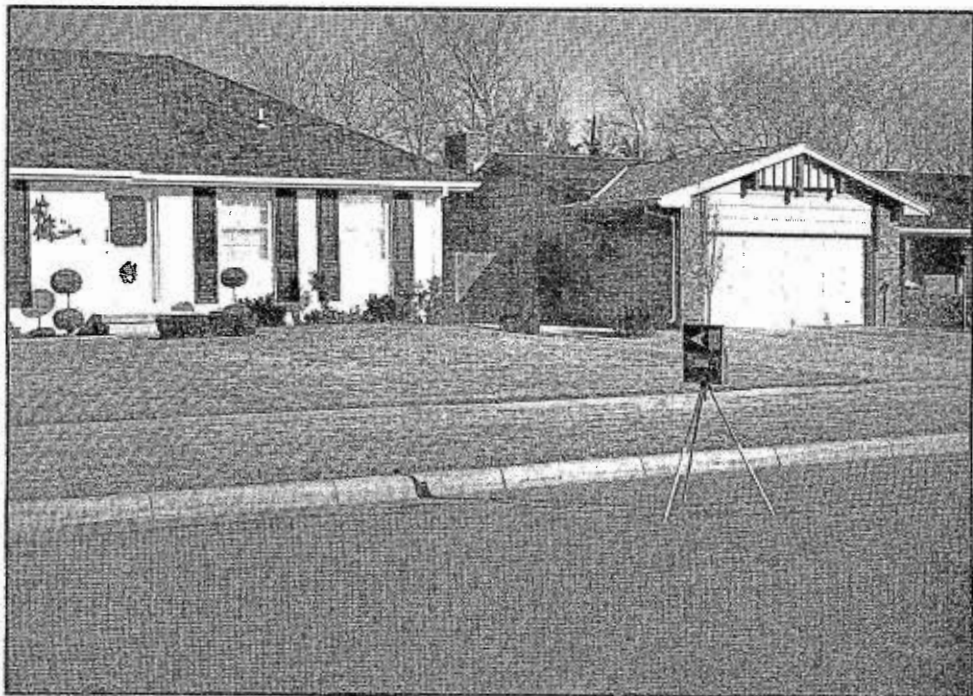
N 50° E

DECEMBER 1970

MONITORING POINT PHOTOGRAPHS



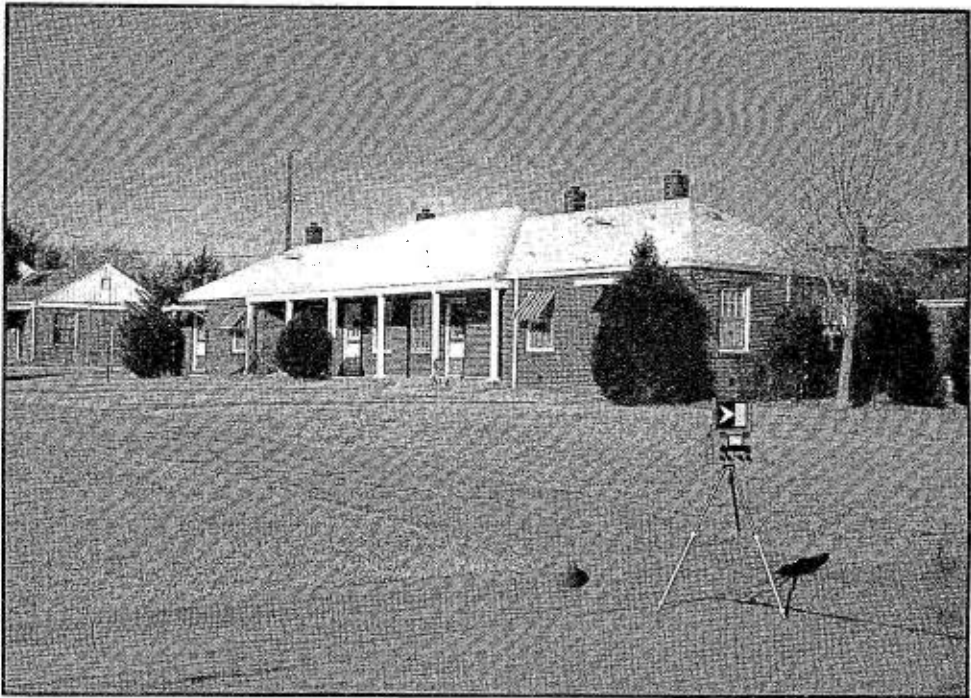
N 110° E



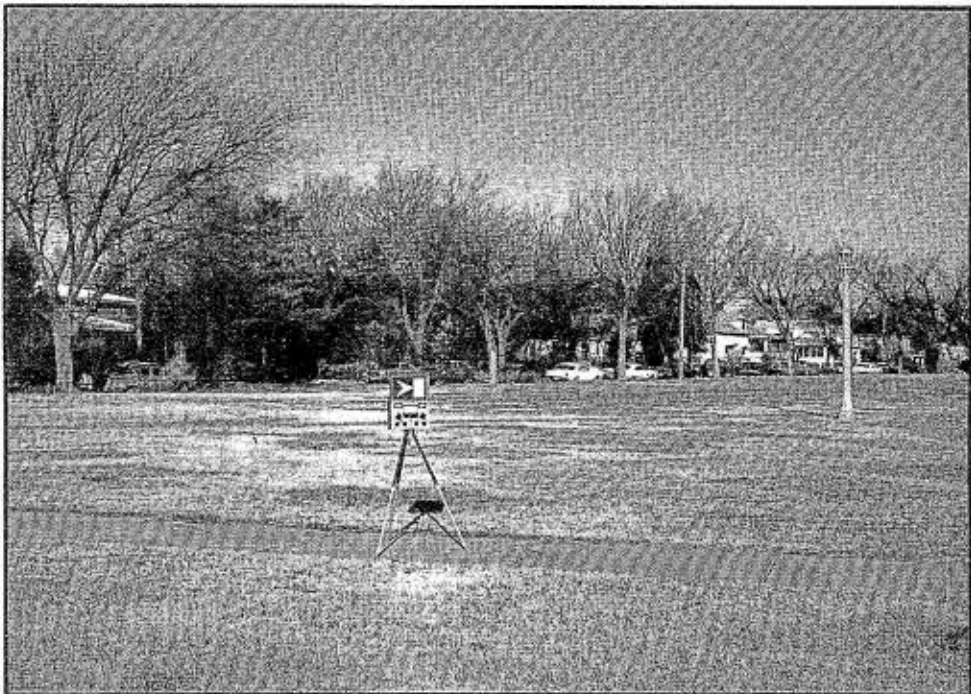
N 155° E

DECEMBER 1970

MONITORING POINT PHOTOGRAPHS



N 190° E



N 215° E

DECEMBER 1970

MONITORING POINT PHOTOGRAPH



N 345° E

DECEMBER 1970

RADIO STATION KLEO
Wichita, Kansas

MONITORING POINT DATA

DAYTIME DIRECTIONAL OPERATION

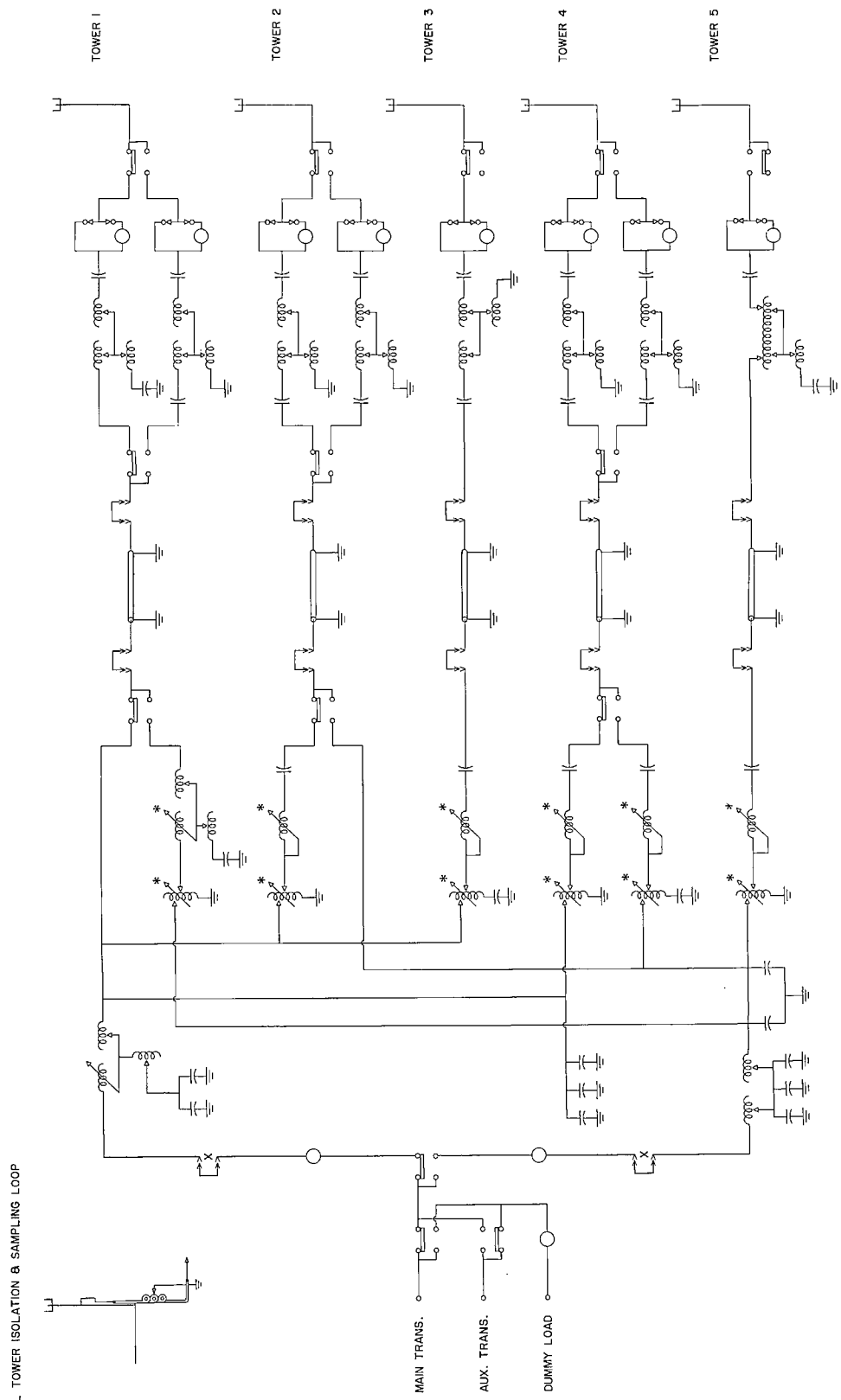
Date Field Intensity was measured	5 kW Operation - mV/m			
	N 000° E	N 050° E	N 110° E	N 190° E
December 12, 1970	143*	-	237*	-
December 13, 1970	-	67.0*	-	125*
December 18, 1970	138	62.0	232	122
December 20, 1970	140	67.0	237	125
December 21, 1970	145	67.0	238	122
December 22, 1970	132	63.0	223	120
December 23, 1970	135	64.0	233	122
December 26, 1970	135	66.0	235	123
Unattenuated field determined from measured radial	181	213	355	370
Maximum allowable unattenuated field specified in BP-17,341	190	230	370	387
Maximum permissible field at monitoring point	150	72.5	247	131

NIGHTTIME DIRECTIONAL OPERATION

Date Field Intensity was measured	1 kW Operation - mV/m					
	N 050° E	N 110° E	N 155° E	N 190° E	N 215° E	N 345° E
December 9, 1970	8.50*	-	71.0*	75.0*	65.0*	4.70*
December 10, 1970	-	149*	-	-	-	-
December 18, 1970	7.30	147	70.0	69.0	60.0	3.70
December 20, 1970	7.80	148	71.0	69.0	60.0	4.20
December 21, 1970	8.30	149	65.5	69.0	57.0	4.90
December 22, 1970	6.20	145	66.0	64.0	57.0	3.90
December 23, 1970	7.40	142	66.0	63.5	58.0	3.30
December 26, 1970	7.60	145	65.5	65.0	57.0	3.20
December 29, 1970	7.80	142	64.0	65.0	57.0	4.40
December 30, 1970	8.40	145	64.0	65.0	56.0	4.80
Unattenuated field determined from measured radial	19.0	227	139	200	146	16.5
Maximum allowable unattenuated field specified in BP-17,341	48	248	160	212	175	42
Maximum permissible field at monitoring point	21.5	163	81.5	79.5	78.0	12.0

*Date of radial measurement

KLEO ANTENNA COUPLING EQUIPMENT



X POINT OF IMPEDANCE MEASUREMENTS
 * DENOTES FRONT PANEL CONTROL RELAYS SHOWN IN DAY POSITION

FIGURE 8D