STATEMENT OF A. EARL CULLUM, JR., IN CONNECTION WITH THE APPLICATION OF THE WICHITA BROADCASTING COMPANY, WICHITA FALLS, TEXAS, LICENSEE OF RADIO STATION KWFT, FOR CONSTRUCTION PERMIT TO MODIFY THE EXISTING DIRECTIONAL ANTENNA SO AS TO ALLOW RADIO STATION KWFT TO CHANGE THE OPERATING ASSIGNMENT FROM 5000 WATTS DAYTIME 1000 WATTS NIGHTTIME TO 5000 WATTS UNLIMITED TIME ON THE 620 KILOCYCLE CHANNEL.

* * * * * * * * * *

I, A. Earl Cullum, Jr., am a consulting radio engineer with offices located in Dallas, Texas. I graduated from the Massachusetts Institute of Technology in 1931 with a Bachelor of Science Degree in Communication Engineering. My experience includes almost continuous employment by broadcast stations since 1922. Since 1936 I have maintained an office as a consulting radio engineer. I have been employed by the Wichita Broadcasting Company, licensee of Radio Station KWFT, Wichita Falls, Texas, to make an allocation study of the 620 kilocycle channel and to design an antenna system to allow 5000 watt non-directional operation during daytime hours and 5000 watt directional operation during nighttime hours.

## EXISTING OPERATING CONDITIONS

The existing assignment of Radio Station KWFT provides for operation at Wichita Falls, Texas, on the 620 kilocycle channel with 5000 watt daytime, 1000 watts nighttime, using a directional antenna during daytime and nighttime hours. Complete details of the existing operation, including the Proof of Performance of the directional antenna, are on

FILE WITH THE FEDERAL COMMUNICATIONS COMMISSION.MEASUREMENTS TAKEN ON THE EXISTING OPERATION INDICATE THAT THE SOIL CONDUCTIVITY SURROUNDING THE KWFT PLANT SITE IS QUITE GOOD. THE 500, 250 AND 25 MILLIVOLTS PER METER CONTOURS OF THE EXISTING OPERATION WERE DETERMINED BY AN ANALYSIS OF THE MEASUREMENTS FILED WITH THE FEDERAL COMMUNICATIONS COMMISSION, FILE B3-P-2461. THE MORE DISTANT CONTOURS WERE DETERMINED BY USING THE SOIL CONDUCTIVITY MAP OF THE FEDERAL COMMUNICATIONS COMMISSION.

AN ALLOCATION STUDY HAS BEEN MADE OF THE EXISTING NIGHTTIME CONDITIONS ON THE 620 KILOCYCLE CHANNEL. THE LIMITATIONS TO THE STATIONS WERE CALCULATED USING THE SECOND HOUR SKY-WAVE CURVES OF THE FEDERAL COMMUNICATIONS COMMISSION AND A RATIO OF 20 TO 1 FOR DESIRED TO UNDESIRED SIGNAL. THE STUDY SHOWS THE FOLLOWING TO BE THE EXISTING NIGHTTIME CONDITIONS:

| LIMITATION TO | LIMITATION FROM | DISTANCE MILES | POWER WATTS | UNATTENUATED FIELD | INTERFERENCE LEVEL |
|---|---|---|---|---|---|
| WTMJ | KWFT | 845 | 1000 DA | 82 | 0.83 |
| WROL | KWFT | 830 | 1000 DA | 287 | 3.03 |
| WSUN | KWFT | 1025 | 1000 DA | 87 | 0.52 |
| XENK | KWFT | 995 | 1000 DA | 155 | 1.02 |
| KTAR | KWFT | 775 | 1000 DA | 82 | 1.02 |
| KGW | KWFT | 1500 | 1000 DA | 294 | 0.61 |
| CKCK | KWFT | 1180 | 1000 DA | 294 | 1.16 |
| KWFT | WTMJ | 845 | 5000 DA | 245 | 2.45 |
| KWFT | WROL | 830 | 500 DA | 142 | 1.50 |
| KWFT | WSUN | 1025 | 5000 DA | 200 | 1.19 |
| KWFT | XENK | 995 | 5000 | 392 | 2.57 |
| KWFT | KTAR | 775 | 5000 DA | 165 | 2.05 |
| KWFT | KGW | 1500 | 5000 DA | 270 | 0.56 |
| KWFT | CKCK | 1180 | 1000 | 175 | 0.69 |

## PROPOSED OPERATING CONDITIONS

AFTER A STUDY HAD BEEN MADE OF THE ALLOCATION CONDITIONS ON THE 620 KILOCYCLE CHANNEL, AN ANTENNA SYSTEM WAS DESIGNED TO ALLOW 5000 WATT DIRECTIONAL OPERATION DURING NIGHTTIME HOURS AND 5000 WATT NON-DIRECTIONAL OPERATION DURING DAYTIME HOURS IN THE VICINITY OF WICHITA FALLS, TEXAS. COMPLETE SPECIFICATIONS OF THE PROPOSED DIRECTIONAL ANTENNA ARE ATTACHED. NON-DIRECTIONAL OPERATION WOULD BE OBTAINED BY USING ONE TOWER AND DETUNING THE OTHER TOWERS. IT HAS BEEN ASSUMED THAT THE NON-DIRECTIONAL ANTENNA WOULD PRODUCE 437 MILLIVOLTS PER METER UNATTENUATED AT ONE MILE WHEN USING 5000 WATTS OF POWER. MEASUREMENTS TAKEN ON THE EXISTING OPERATION INDICATE THAT THE SOIL CONDUCTIVITY SURROUNDING THE KWFT PLANT SITE IS QUITE GOOD. THE 500, 250 AND 25 MILLIVOLTS PER METER CONTOURS OF THE PROPOSED OPERATION WERE DETERMINED BY AN ANALYSIS OF THE MEASUREMENTS FILED WITH THE FEDERAL COMMUNICATIONS COMMISSION, FILE B3-P-2461. THE MORE DISTANT CONTOURS WERE DETERMINED BY USING THE SOIL CONDUCTIVITY MAP OF THE FEDERAL COMMUNICATIONS COMMISSION.

AN ALLOCATION STUDY HAS BEEN MADE OF THE PROPOSED NIGHTTIME CONDITIONS ON THE 620 KILOCYCLE CHANNEL. THE LIMITATIONS TO THE STATIONS WERE CALCULATED USING THE SECOND HOUR SKY-WAVE CURVES OF THE FEDERAL COMMUNICATIONS COMMISSION AND A RATIO OF 20 TO 1 FOR DESIRED TO UNDESIRED SIGNAL. THE STUDY SHOWS THE FOLLOWING TO BE THE PROPOSED NIGHTTIME CONDITIONS:

| LIMITATION TO | LIMITATION FROM | DISTANCE MILES | POWER WATTS | UNATTENUATED FIELD | INTERFERENCE LEVEL |
|---|---|---|---|---|---|
| WTMJ | KWFT | 845 | 5000 DA | 100 | 1.04 |
| WROL | KWFT | 830 | 5000 DA | 330 | 3.50 |
| WSUN | KWFT | 1025 | 5000 DA | 250 | 1.50 |
| XENK | KWFT | 995 | 5000 DA | 263 | 1.75 |
| KTAR | KWFT | 775 | 5000 DA | 121 | 1.50 |
| KGW | KWFT | 1500 | 5000 DA | 720 | 1.50 |
| CKCK | KWFT | 1180 | 5000 DA | 534 | 2.30 |
| KWFT | WTMJ | 845 | 5000 DA | 245 | 2.45 |
| KWFT | WROL | 830 | 500 DA | 142 | 1.50 |
| KWFT | WSUN | 1025 | 5000 DA | 200 | 1.19 |
| KWFT | XENK | 995 | 5000 | 392 | 2.57 |
| KWFT | KTAR | 775 | 5000 DA | 165 | 2.05 |
| KWFT | KGW | 1500 | 5000 DA | 270 | 0.56 |
| KWFT | CKCK | 1180 | 1000 | 175 | 0.69 |

## LIST OF EXHIBITS ATTACHED

In making the allocation studies, designing the directional antenna and making a study of the coverage for each condition, a number of exhibits were prepared. Attached will be found the following exhibits prepared by me or under my directions:

1 Specifications of proposed antenna for Radio Station KWFT.

2 Directive antenna design formula.

3 Directive antenna calculations for 5000 watts.

4 Antenna and ground system specifications.

5 References supporting directive antenna design formula.

6A Directive antenna ground-wave pattern for 5000 watts.

6B Tabulation of directive antenna ground-wave pattern calculations when using 5000 watts of power.

7 Directive antenna sky-wave patterns and tabulations of calculations when using 5000 watts of power.

8 MAP OF NORTH AMERICA SHOWING THE LOCATIONS OF THE STATIONS ASSIGNED TO OPERATE ON THE 620 KILOCYCLE CHANNEL.

9A MAP SHOWING THE 500 AND 250 MILLIVOLTS PER METER CONTOURS FROM THE PROPOSED NON-DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

9B MAP SHOWING THE 25 MILLIVOLTS PER METER CONTOUR FROM THE PROPOSED NON-DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

9C MAP SHOWING THE 5.0, 2.0 AND 0.5 MILLIVOLTS PER METER CONTOURS FROM THE PROPOSED NON-DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

10A MAP SHOWING THE 500 AND 250 MILLIVOLTS PER METER CONTOURS FROM THE PROPOSED DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

10B MAP SHOWING THE 25 MILLIVOLTS PER METER CONTOUR FROM THE PROPOSED DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

10C MAP SHOWING THE 5.0, 2.0 AND 0.5 MILLIVOLTS PER METER CONTOURS FROM THE PROPOSED DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

10D MAP SHOWING THE 2.5 AND 3.2 MILLIVOLTS PER METER CONTOURS FROM THE PROPOSED DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

10E MAP SHOWING THE PRIMARY RADIO SERVICES AVAILABLE TO

WICHITA FALLS, TEXAS, AND THE SURROUNDING AREA DURING NIGHTTIME HOURS.

11A MAP SHOWING THE 500 AND 250 MILLIVOLTS PER METER CONTOURS FROM THE EXISTING DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

11B MAP SHOWING THE 25 MILLIVOLTS PER METER CONTOUR FROM THE EXISTING DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

11C MAP SHOWING THE 5.0, 2.0 AND 0.5 MILLIVOLTS PER METER CONTOURS FROM THE EXISTING DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

12A MAP SHOWING THE 500 AND 250 MILLIVOLTS PER METER CONTOURS FROM THE EXISTING DIRECTIVE ANTENNA USING 1000 WATTS OF POWER ON 620 KILOCYCLES.

12B MAP SHOWING THE 25 MILLIVOLTS PER METER CONTOUR FROM THE EXISTING DIRECTIVE ANTENNA USING 1000 WATTS OF POWER ON 620 KILOCYCLES.

12C MAP SHOWING THE 5.0 AND 2.0 MILLIVOLTS PER METER CONTOURS FROM THE EXISTING DIRECTIVE ANTENNA USING 1000 WATTS OF POWER ON 620 KILOCYCLES.

12D MAP SHOWING THE 2.5 AND 3.2 MILLIVOLTS PER METER CONTOURS FROM THE EXISTING DIRECTIVE ANTENNA USING 1000 WATTS OF POWER ON 620 KILOCYCLES.

13 PHOTOGRAPHS SHOWING THE KWFT PLANT SITE AND THE SURROUNDING AREA IN EACH OF THE DIRECTIONS NOTED.

WRH

## POPULATION ANALYSIS OF COVERAGE MAPS

A POPULATION ANALYSIS HAS BEEN PREPARED BASED ON THE CALCULATED COVERAGE MAPS, THE 1940 CENSUS FIGURES AND THE STANDARDS OF THE FEDERAL COMMUNICATIONS COMMISSION CONCERNING COVERAGE. THE TOTAL POPULATION FIGURES WERE DETERMINED BY AN ANALYSIS OF THE POPULATION DISTRIBUTION USING MINOR CIVIL DIVISION MAPS. FROM THE TOTAL POPULATION FIGURES WITHIN EACH CONTOUR THE URBAN AREAS NOT RECEIVING SATISFACTORY SERVICE IN ACCORDANCE WITH THE STANDARDS OF THE FEDERAL COMMUNICATIONS COMMISSION WERE SUBTRACTED. THE FOLLOWING IS A TABULATION OF THE COVERAGE FIGURES AS TAKEN FROM EACH POPULATION STUDY:

PROPOSED KWFT - 620 KC - 5000 WATTS - ND - DAYTIME

| CONTOUR | POPULATION | SQ. MI. |
|---|---|---|
| WITHIN THE 25 MV/M CONTOUR | 67,651 | 885 |
| WITHIN THE 5.0 MV/M CONTOUR | 249,089 | 9,480 |
| WITHIN THE 2.0 MV/M CONTOUR | 693,717 | 30,400 |
| WITHIN THE 0.5 MV/M CONTOUR | 2,136,291 | 103,700 |

PROPOSED KWFT - 620 KC - 5000 WATTS - DA - NIGHTTIME

| CONTOUR | POPULATION | SQ. MI. |
|---|---|---|
| WITHIN THE 25 MV/M CONTOUR | 68,792 | 843 |
| WITHIN THE 5.0 MV/M CONTOUR | 222,555 | 8,240 |
| WITHIN THE 3.2 MV/M CONTOUR | 336,874 | 14,900 |
| WITHIN THE 2.5 MV/M CONTOUR | 421,562 | 18,400 |
| WITHIN THE 2.0 MV/M CONTOUR | 552,381 | 25,200 |
| WITHIN THE 0.5 MV/M CONTOUR | 1,489,619 | 87,500 |

EXISTING KWFT - 620 KC - 5000 WATTS - DA - DAYTIME

| CONTOUR | POPULATION | SQ. MI. |
|---|---|---|
| WITHIN THE 25 MV/M CONTOUR | 72,505 | 985 |
| WITHIN THE 5.0 MV/M CONTOUR | 289,863 | 10,000 |
| WITHIN THE 2.0 MV/M CONTOUR | 698,900 | 30,800 |
| WITHIN THE 0.5 MV/M CONTOUR | 2,003,310 | 105,500 |

EXISTING KWFT - 620 KC - 1000 WATTS - DA - NIGHTTIME

| CONTOUR | POPULATION | SQ. MI. |
|---|---|---|
| WITHIN THE 25 MV/M CONTOUR | 54,882 | 224 |
| WITHIN THE 5.0 MV/M CONTOUR | 110,455 | 3,310 |
| WITHIN THE 3.2 MV/M CONTOUR | 183,353 | 6,350 |
| WITHIN THE 2.5 MV/M CONTOUR | 218,808 | 8,970 |
| WITHIN THE 2.0 MV/M CONTOUR | 283,125 | 12,000 |

A POPULATION STUDY OF THE 500 AND 250 MILLIVOLTS PER METER CONTOURS HAS BEEN MADE BY A COUNT OF HOUSES WITHIN THESE CONTOURS. IT WAS ASSUMED THAT 3.8 PEOPLE RESIDE WITHIN EACH HOUSE. IN VIEW OF THE FACT THAT THESE POPULATION STUDIES ARE BASED ON EXISTING CONDITIONS WE HAVE OBTAINED THE 1940 CENSUS FIGURES FOR THE CITY AND COUNTY WITHIN WHICH THE STATION IS LOCATED. THE FOLLOWING IS A TABULATION OF THE COVERAGE FIGURES AS TAKEN FROM EACH POPULATION STUDY:

PROPOSED KWFT - 620 KC - 5000 WATTS - ND - DAYTIME

| CONTOUR | SOURCE | POPULATION |
|---|---|---|
| WITHIN THE 500 MV/M CONTOUR | COUNT HOUSES | 171 |
| WITHIN THE 250 MV/M CONTOUR | COUNT HOUSES | 1,725 |
| WITHIN THE CITY OF WICHITA FALLS | 1940 CENSUS | 45,112 |
| WITHIN THE COUNTY OF WICHITA | 1940 CENSUS | 73,604 |

PROPOSED KWFT - 620 KC - 5000 WATTS - DA - NIGHTTIME

| CONTOUR | SOURCE | POPULATION |
|---|---|---|
| WITHIN THE 500 MV/M CONTOUR | COUNT HOUSES | 243 |
| WITHIN THE 250 MV/M CONTOUR | COUNT HOUSES | 726 |
| WITHIN THE CITY OF WICHITA FALLS | 1940 CENSUS | 45,112 |
| WITHIN THE COUNTY OF WICHITA | 1940 CENSUS | 73,604 |

EXISTING KWFT - 620 KC - 5000 WATTS - DA - DAYTIME

| CONTOUR | SOURCE | POPULATION |
|---|---|---|
| WITHIN THE 500 MV/M CONTOUR | COUNT HOUSES | 213 |
| WITHIN THE 250 MV/M CONTOUR | COUNT HOUSES | 2,295 |
| WITHIN THE CITY OF WICHITA FALLS | 1940 CENSUS | 45,112 |
| WITHIN THE COUNTY OF WICHITA | 1940 CENSUS | 73,604 |

EXISTING KWFT - 620 KC - 1000 WATTS - DA - NIGHTTIME

| CONTOUR | SOURCE | POPULATION |
|---|---|---|
| WITHIN THE 500 MV/M CONTOUR | COUNT HOUSES | 76 |
| WITHIN THE 250 MV/M CONTOUR | COUNT HOUSES | 194 |
| WITHIN THE CITY OF WICHITA FALLS | 1940 CENSUS | 45,112 |
| WITHIN THE COUNTY OF WICHITA | 1940 CENSUS | 73,604 |

## OTHER RADIO SERVICES

EXHIBIT 10E ATTACHED SHOWS THE RADIO SERVICES AVAILABLE TO WICHITA FALLS, TEXAS, AND THE SURROUNDING AREA DURING NIGHTTIME HOURS. IT SHOULD BE NOTED THAT NO STATION PROVIDES RADIO SERVICE TO ALL OF THE AREA THAT WOULD BE COVERED BY RADIO STATION KWFT SHOULD THIS APPLICATION BE GRANTED. IT SHOULD ALSO BE NOTED THAT THERE ARE CERTAIN URBAN AREAS WITHIN THE AREA COVERED BY THE OTHER RADIO STATIONS THAT DO NOT RECEIVE SATISFACTORY SERVICE, BUT WHICH WOULD RECEIVE SATISFACTORY SERVICE FROM THE PROPOSED OPERATION OF RADIO STATION KWFT. A POPULATION ANALYSIS OF THESE AREAS INDICATES THAT THE PROPOSED NIGHTTIME COVERAGE OF RADIO STATION KWFT WOULD PROVIDE SATISFACTORY PRIMARY RADIO SERVICE TO 119,718 PEOPLE NOT NOW RECEIVING SATISFACTORY PRIMARY RADIO SERVICE FROM ANY OTHER RADIO STATION.

A. EARL CULLUM, JR.

APRIL 6, 1942.

STATE OF TEXAS )
) SS:
COUNTY OF DALLAS )

A. EARL CULLUM, JR., BEING DULY SWORN, UPON HIS OATH DEPOSES AND SAYS THAT THE FACTS STATED IN THE FOREGOING, TOGETHER WITH ALL EXHIBITS ATTACHED THERETO, ARE TRUE OF HIS OWN KNOWLEDGE, EXCEPT AS TO SUCH STATEMENTS AS THEREIN STATED TO BE ON INFORMATION AND BELIEF, AND AS TO SUCH STATEMENTS HE BELIEVES THEM TO BE TRUE.

A. Earl Cullum, Jr.
A. EARL CULLUM, JR.

SWORN TO AND SUBSCRIBED BEFORE ME THIS 6TH DAY OF APRIL, 1942.

Ethelene Jackson
NOTARY PUBLIC IN AND FOR
DALLAS COUNTY, TEXAS

MY COMMISSION EXPIRES JUNE 1, 1942.

A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# SPECIFICATIONS OF PROPOSED ANTENNA FOR RADIO STATION KWFT

| | |
|---|---|
| Frequency | 620 kilocycles |
| Rated power day | 5,000 watts - non-directional |
| Rated power night | 5,000 watts - directional |
| Number of towers | 4 towers |
| Type of towers | self supported, square, tapered |
| Tower base width | 5% of tower height |
| Tower feed system | series fed |
| Tower height above insulators | 400 feet |
| Tower height above ground | 405 feet |
| Tower height above sea level | 1,405 feet |
| Line of towers | See Exhibit 4 |
| Tower spacing | See Exhibit 4 |
| Tower field ratio | See Exhibit 3 |
| Tower phasing | See Exhibit 3 |
| Ground system | See Exhibit 4 |
| Transmission line from plant to 2 | 300 ohm open wire lines |
| Transmission line from plant to 4 | 300 ohm open wire lines |
| Transmission line from 2 to 1 | 65 ohm concentric lines |
| Transmission line from 4 to 3 | 65 ohm concentric lines |
| Antenna ammeters | Thermal and remote thermal |
| Current ratio measurements | Current monitor from sampling loops |
| Current phase measurements | Phase monitor from sampling loops |

| | |
|---|---|
| Location | Same as existing location |
| | N. Lat. 33° 55' 07" |
| | W. Long. 98° 32' 37" |

420325

EXHIBIT 1

DIRECTIVE ANTENNA DESIGN FORMULA

$$F_X(E): \sqrt{1 + (M_X)^2 + 2(M_X)\ \mathrm{Cos}\ (\Psi_X - KD_X\ \mathrm{Cos}\Theta\ \mathrm{Cos}\Phi)} \qquad (1)$$

$$F_Y(E): \sqrt{1 + (M_Y)^2 + 2(M_Y)\ \mathrm{Cos}\ (\Psi_Y - KD_Y\ \mathrm{Cos}\Theta\ \mathrm{Cos}\Phi + A)} \qquad (1)$$

$$F_\Theta(E): \frac{\mathrm{Cos}\ (G\ \mathrm{Sin}\Theta) - \mathrm{Cos}\ G}{(\mathrm{Cos}\ \Theta)\ (1 - \mathrm{Cos}\ G)} \qquad (2)$$

$$K: \frac{1 - \mathrm{Cos}\ G}{\mathrm{Sin}\ G} \qquad (3)$$

$$P: (R_1 \times I_1^2) + (R_2 \times I_2^2) + (R_3 \times I_3^2) + (R_4 \times I_4^2) \qquad (4)$$

$$E: 37.25 \times I \times K \times F_X(E) \times F_Y(E) \times F_\Theta(E) \qquad (5)$$

WHERE

- $P$ IS POWER RADIATED IN WATTS
- $E$ IS FIELD INTENSITY IN MILLIVOLTS PER METER AT ONE MILE
- $I$ IS THEORETICAL UNIT VECTOR CURRENT FOR THE ANTENNA SYSTEM
- $I_1$ IS CURRENT AT BASE OF ELEMENT 1 OPERATING DIRECTIONAL
- $I_2$ IS CURRENT AT BASE OF ELEMENT 2 OPERATING DIRECTIONAL
- $I_3$ IS CURRENT AT BASE OF ELEMENT 3 OPERATING DIRECTIONAL
- $I_4$ IS CURRENT AT BASE OF ELEMENT 4 OPERATING DIRECTIONAL
- $R_1$ IS RESISTANCE AT BASE OF ELEMENT 1 OPERATING DIRECTIONAL
- $R_2$ IS RESISTANCE AT BASE OF ELEMENT 2 OPERATING DIRECTIONAL
- $R_3$ IS RESISTANCE AT BASE OF ELEMENT 3 OPERATING DIRECTIONAL
- $R_4$ IS RESISTANCE AT BASE OF ELEMENT 4 OPERATING DIRECTIONAL
- $M_X$ IS RATIO BETWEEN THE CURRENTS IN THE FUNCTION $F_X(E)$
- $M_Y$ IS RATIO BETWEEN THE CURRENTS IN THE FUNCTION $F_Y(E)$
- $\Psi_X$ IS PHASE BETWEEN THE CURRENTS IN THE FUNCTION $F_X(E)$
- $\Psi_Y$ IS PHASE BETWEEN THE CURRENTS IN THE FUNCTION $F_Y(E)$
- $KD_X$ IS DISTANCE BETWEEN THE ELEMENTS IN THE FUNCTION $F_X(E)$
- $KD_Y$ IS DISTANCE BETWEEN THE ELEMENTS IN THE FUNCTION $F_Y(E)$
- $G$ IS HEIGHT OF THE ELEMENTS
- $\Theta$ IS ANGLE FROM HORIZONTAL TO RADIATION VECTOR
- $\Phi$ IS ANGLE FROM LINE OF ELEMENTS OF $F_X(E)$ TO RADIATION VECTOR
- $A$ IS ANGLE FROM LINE OF ELEMENTS OF $F_Y(E)$ TO ELEMENTS OF $F_X(E)$
- $K$ IS FORM FACTOR OF ELEMENTS

# DIRECTIVE ANTENNA CALCULATIONS FOR 5,000 WATTS

GIVEN:

| | | |
|---|---|---|
| P | 4,530 | WATTS |
| $M_X$ | 0.80 TO 1.00 | |
| $M_Y$ | 0.65 TO 1.00 | |
| $\Psi_X$ | +78.0 | DEGREES |
| $\Psi_Y$ | -137.5 | DEGREES |
| $KD_X$ | 225.0 | DEGREES |
| $KD_Y$ | 60.0 | DEGREES |
| G | 92 | DEGREES |
| A | 60 | DEGREES |

ASSUMED: TOTAL PROBABLE LOSSES 16%
CURRENT DISTRIBUTION SINUSOIDAL

EXPECTED RESULTS:

| TOWER NUMBER | (1) | (2) | (3) | (4) | | |
|---|---|---|---|---|---|---|
| CURRENT RATIO | 0.52 | 0.80 | 0.65 | 1.00 | | |
| CURRENT PHASE | -59.5 | +78.0 | -137.5 | 0.0 | DEGREES | |
| VECTOR RESISTANCE | -20.2 | +25.1 | +13.7 | +21.7 | OHMS | (6) |
| VECTOR REACTANCE | +J76.2 | +J45.4 | +J85.9 | +J23.1 | OHMS | (6) |
| VECTOR CURRENT | 5.67 | 8.72 | 7.09 | 10.90 | AMPERES | (4) |
| POWER | -649 | 1910 | 689 | 2580 | WATTS | (4) |

VECTOR CURRENT I IS 10.90 (4)

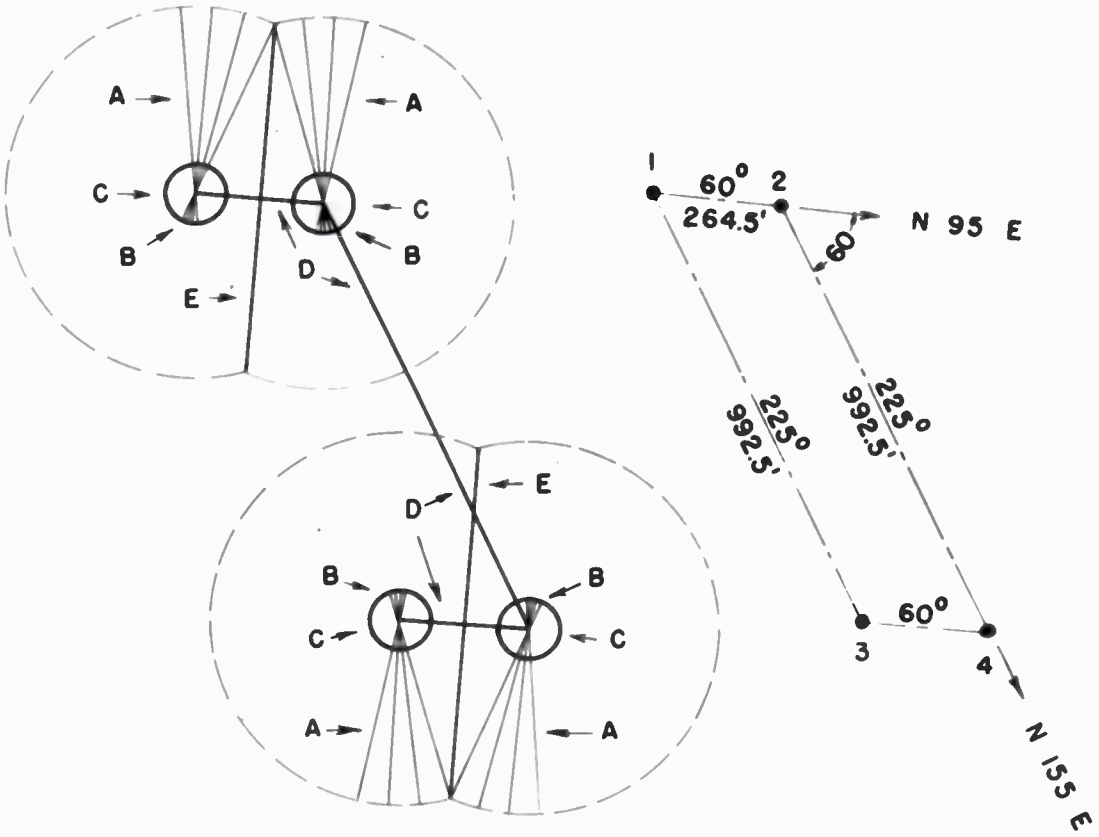
FORM FACTOR K IS 1.035 (3)

FIELD INTENSITY AT ONE MILE IN ANY DIRECTION ) $E \text{ IS } 420 \times F_X(E) \times F_Y(E) \times F_\Theta(E)$ (5)

VARIOUS VALUES WERE THEN ASSIGNED TO $\Theta$ AND $\Phi$ AND THE CORRESPONDING VALUES OF $F_X(E)$, $F_Y(E)$ $F_\Theta(E)$ AND E DETERMINED. THE RESULTS OF EACH OF THESE CALCULATIONS ARE LISTED ON EACH OF THE ATTACHED EXHIBITS.

AFTER THE HORIZONTAL RADIATION PATTERN WAS PLOTTED AND PLANIMETERED, THE R.M.S. VALUE OF THE HORIZONTAL FIELD WAS FOUND TO BE 448 MV/M UNATTENUATED AT ONE MILE FROM THE ANTENNA.

## ANTENNA AND GROUND SYSTEM SPECIFICATIONS




### GROUND SYSTEM

| | |
|---|---|
| A | 120 Radials 400 feet long buried 6 to 8 inches |
| B | 120 Radials 60 feet long buried 6 to 8 inches |
| C | Bonding Ring about each tower |
| D | Bonding Strap between each of the towers |
| E | Bonding Strap between overlapping radials |

REFERENCES - ACCORDING TO LINE NUMBER


(1) I.R.E. JANUARY, 1937 PAGE 99 (60)

(2) I.R.E. JANUARY, 1936 PAGE 51 (5)

(3) I.R.E. JANUARY, 1936 PAGE 52 (6)

(4) I.R.E. JANUARY, 1937 PAGE 102 (72)

(5) I.R.E. JANUARY, 1937 PAGE 102 (75)

(6) I.R.E. JANUARY, 1937 PAGE 102 (71)

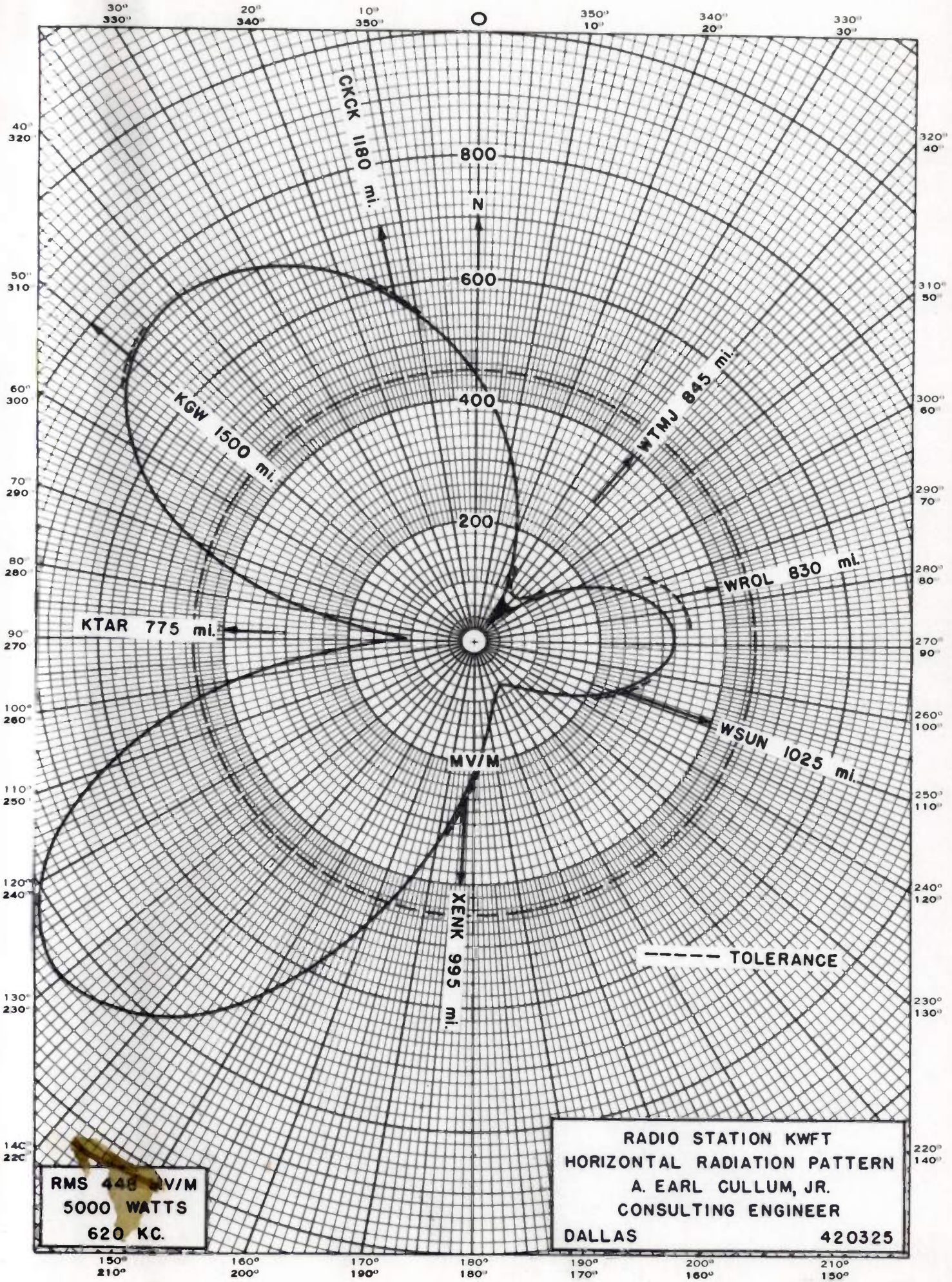

CKCK 1180 mi.
KGW 1500 mi.
WTMJ 845 mi.
WROL 830 mi.
KTAR 775 mi.
WSUN 1025 mi.
XENK 995 mi.
800
600
400
200
N
MV/M
TOLERANCE
RMS 448 mV/M
5000 WATTS
620 KC.
RADIO STATION KWFT
HORIZONTAL RADIATION PATTERN
A. EARL CULLUM, JR.
CONSULTING ENGINEER
DALLAS 420325

EXHIBIT 6 A

## KWFT DIRECTIVE ARRAY

## HORIZONTAL RADIATION PATTERN

| BEARING | Φ | $F_X(E)$ | $F_Y(E)$ | $E_{5000}$ |
|---|---|---|---|---|
| 155 | 00 | 0.546 | 0.393 | 90.1 |
| 165 | 10 | 0.594 | 0.466 | 116.3 |
| 175 | 20 | 0.735 | 0.567 | 175.0 |
| 185 | 30 | 0.958 | 0.681 | 274. |
| 195 | 40 | 1.232 | 0.799 | 413. |
| 205 | 50 | 1.508 | 0.913 | 578. |
| 215 | 60 | 1.720 | 1.016 | 734. |
| 225 | 70 | 1.800 | 1.105 | 835. |
| 235 | 80 | 1.698 | 1.178 | 840. |
| 245 | 90 | 1.404 | 1.234 | 728. |
| 255 | 100 | 0.955 | 1.274 | 511. |
| 265 | 110 | 0.437 | 1.297 | 238. |
| 275 | 120 | 0.258 | 1.306 | 142. |
| 285 | 130 | 0.680 | 1.297 | 370. |
| 295 | 140 | 1.050 | 1.274 | 562. |
| 305 | 150 | 1.311 | 1.234 | 679. |
| 315 | 160 | 1.474 | 1.178 | 729. |
| 325 | 170 | 1.559 | 1.105 | 724. |
| 335 | 180 | 1.585 | 1.016 | 676. |
| 345 | 190 | 1.559 | 0.913 | 598. |
| 355 | 200 | 1.474 | 0.799 | 495. |
| 005 | 210 | 1.311 | 0.681 | 375. |
| 015 | 220 | 1.055 | 0.567 | 251. |
| 025 | 230 | 0.680 | 0.466 | 133.1 |
| 035 | 240 | 0.258 | 0.393 | 42.6 |
| 045 | 250 | 0.437 | 0.355 | 65.1 |
| 055 | 260 | 0.955 | 0.353 | 141.6 |
| 065 | 270 | 1.404 | 0.375 | 221. |
| 075 | 280 | 1.698 | 0.401 | 286. |
| 085 | 290 | 1.800 | 0.420 | 317. |
| 095 | 300 | 1.720 | 0.427 | 308. |
| 105 | 310 | 1.508 | 0.420 | 266. |
| 115 | 320 | 1.232 | 0.401 | 207. |
| 125 | 330 | 0.958 | 0.375 | 150.9 |
| 135 | 340 | 0.735 | 0.353 | 109.0 |
| 145 | 350 | 0.594 | 0.355 | 88.6 |

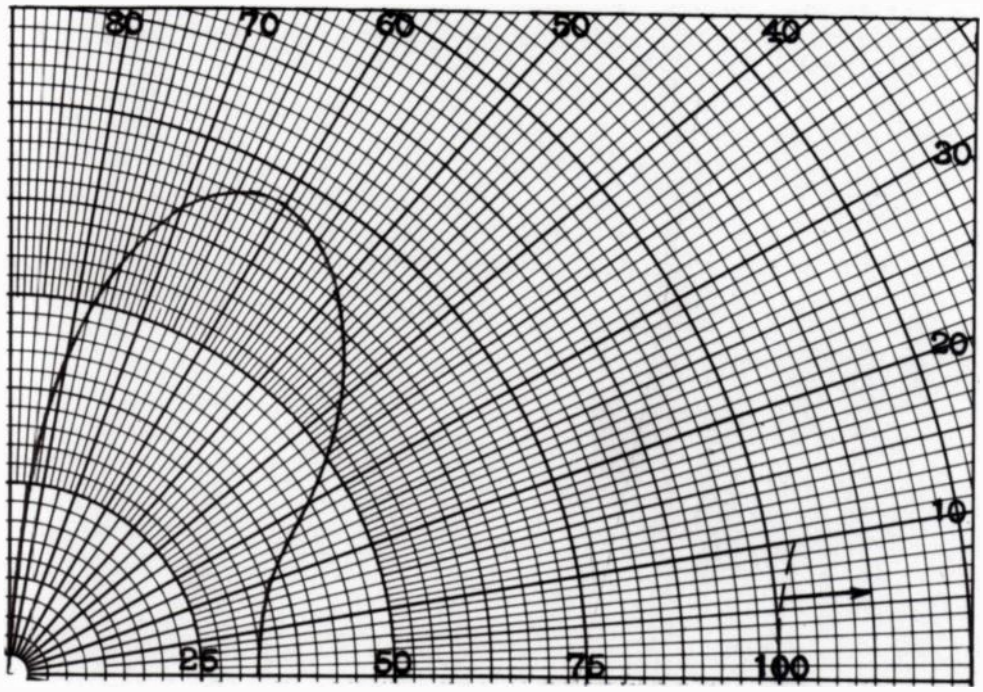
**A. EARL CULLUM, JR.**
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

KWFT DIRECTIVE ARRAY

VERTICAL RADIATION PATTERN

IN PLANE N 39 E

THROUGH NULL TOWARD MILWAUKEE, WISCONSIN




P 5000 Φ -116

| Θ | $F_X(E)$ | $F_Y(E)$ | $F_\Theta(E)$ | $E_{5000}$ |
|---|---|---|---|---|
| 00 | 0.207 | 0.372 | 1.000 | 32.3 |
| 10 | 0.214 | 0.375 | 0.977 | 32.9 |
| 20 | 0.247 | 0.383 | 0.913 | 36.3 |
| 30 | 0.326 | 0.398 | 0.814 | 44.4 |
| 40 | 0.456 | 0.422 | 0.691 | 55.8 |
| 50 | 0.624 | 0.457 | 0.555 | 66.5 |
| 60 | 0.818 | 0.502 | 0.414 | 71.4 |
| 70 | 1.032 | 0.556 | 0.274 | 65.5 |
| 80 | 1.224 | 0.616 | 0.136 | 43.1 |
| 90 | -.--- | -.--- | 0.000 | 00.0 |

Θ WTMJ APPROX. 6.0 DEGREES WITH DISTANCE 845 MILES.

420325

EXHIBIT 7A

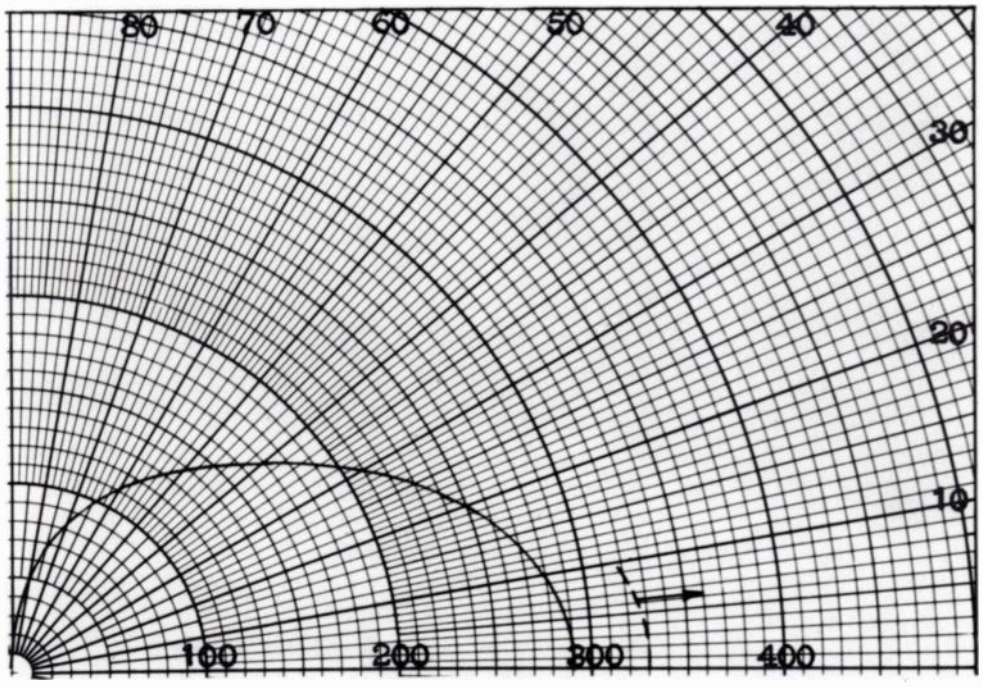
**A. EARL CULLUM, JR.**
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

KWFT DIRECTIVE ARRAY

VERTICAL RADIATION PATTERN

IN PLANE N 76 E

TOWARD KNOXVILLE, TENNESSEE




P 5000 Φ -79

| Θ | $F_X(E)$ | $F_Y(E)$ | $F_\Theta(E)$ | $E_{5000}$ |
|---|---|---|---|---|
| 00 | 1.717 | 0.403 | 1.000 | 291. |
| 10 | 1.714 | 0.397 | 0.977 | 279. |
| 20 | 1.705 | 0.382 | 0.913 | 250. |
| 30 | 1.689 | 0.362 | 0.814 | 209. |
| 40 | 1.664 | 0.350 | 0.691 | 169.0 |
| 50 | 1.631 | 0.360 | 0.555 | 136.9 |
| 60 | 1.588 | 0.402 | 0.414 | 111.0 |
| 70 | 1.536 | 0.476 | 0.274 | 84.1 |
| 80 | 1.474 | 0.611 | 0.136 | 51.4 |
| 90 | -.--- | -.--- | 0.000 | 00.0 |

Θ WROL APPROX. 6.2 DEGREES WITH DISTANCE 830 MILES.

420325 EXHIBIT 7B

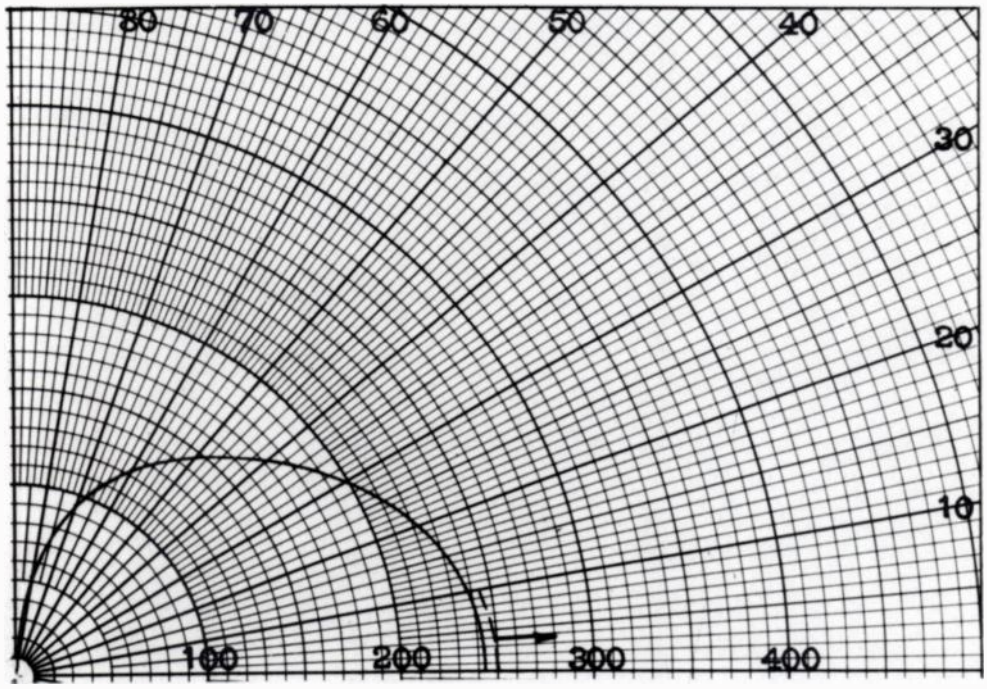
**A. EARL CULLUM, JR.**
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

KWFT DIRECTIVE ARRAY

VERTICAL RADIATION PATTERN

IN PLANE N 109 E

TOWARD ST. PETERSBURG, FLORIDA




P 5000 Φ -46

| Θ | $F_X(E)$ | $F_Y(E)$ | $F_\Theta(E)$ | $E_{5000}$ |
|---|---|---|---|---|
| 00 | 1.401 | 0.414 | 1.000 | 244. |
| 10 | 1.425 | 0.407 | 0.977 | 238. |
| 20 | 1.490 | 0.390 | 0.913 | 223. |
| 30 | 1.590 | 0.367 | 0.814 | 199. |
| 40 | 1.684 | 0.351 | 0.691 | 171.5 |
| 50 | 1.766 | 0.357 | 0.555 | 147.0 |
| 60 | 1.800 | 0.397 | 0.414 | 124.2 |
| 70 | 1.760 | 0.471 | 0.274 | 95.4 |
| 80 | 1.628 | 0.570 | 0.136 | 53.0 |
| 90 | -.--- | -.--- | 0.000 | 00.0 |

Θ WSUN APPROX. 3.8 DEGREES WITH DISTANCE 1025 MILES.

420325 EXHIBIT 7C

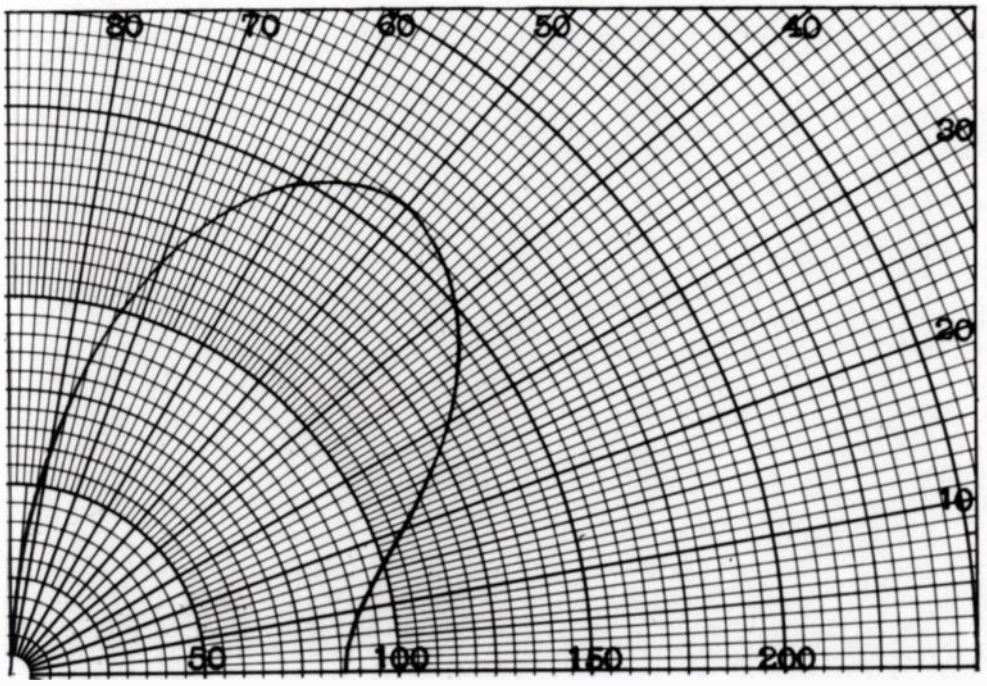
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 150 E

## THROUGH NULL




P 5000 Φ -5

| Θ | $F_X(E)$ | $F_Y(E)$ | $F_\Theta(E)$ | $E_{5000}$ |
|---|---|---|---|---|
| 00 | 0.558 | 0.368 | 1.000 | 86.2 |
| 10 | 0.605 | 0.370 | 0.977 | 91.8 |
| 20 | 0.746 | 0.378 | 0.913 | 108.1 |
| 30 | 0.968 | 0.393 | 0.814 | 130.0 |
| 40 | 1.240 | 0.417 | 0.691 | 150.1 |
| 50 | 1.513 | 0.452 | 0.555 | 159.4 |
| 60 | 1.723 | 0.497 | 0.414 | 148.7 |
| 70 | 1.800 | 0.552 | 0.274 | 114.3 |
| 80 | 1.698 | 0.615 | 0.136 | 59.6 |
| 90 | -.--- | -.--- | 0.000 | 00.0 |

420325

EXHIBIT 7D

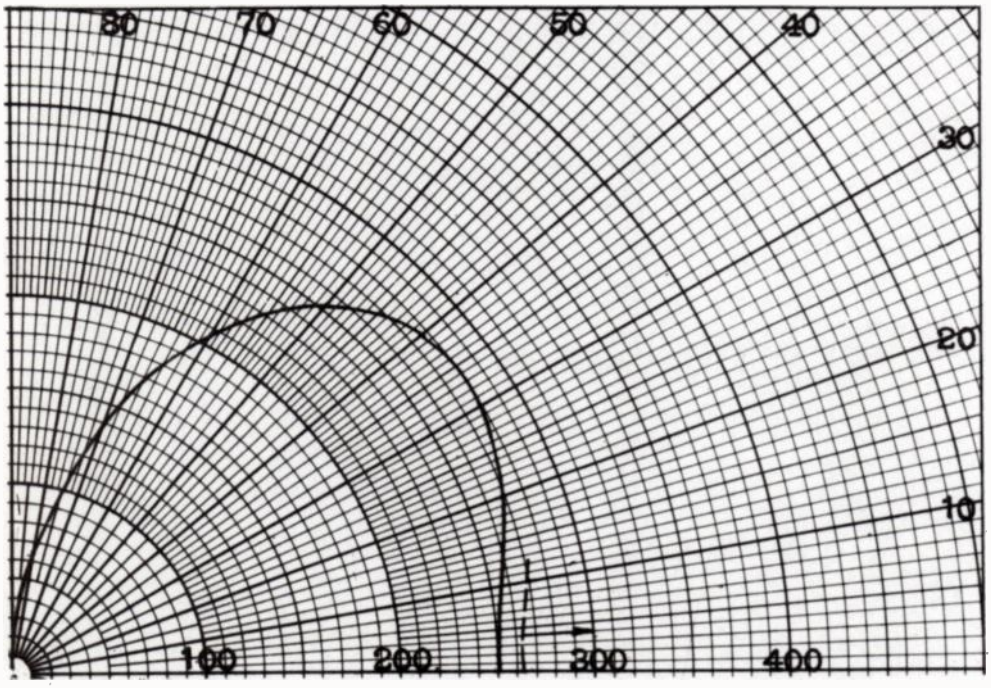
**A. EARL CULLUM, JR.**
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

KWFT DIRECTIVE ARRAY

VERTICAL RADIATION PATTERN

IN PLANE N 183 E

TOWARD MEXICO, D. F.




P 5000 Φ +28

| Θ | $F_X(E)$ | $F_Y(E)$ | $F_\Theta(E)$ | $E_{5000}$ |
|---|---|---|---|---|
| 00 | 0.908 | 0.658 | 1.000 | 251. |
| 10 | 0.947 | 0.658 | 0.977 | 256. |
| 20 | 1.062 | 0.659 | 0.913 | 268. |
| 30 | 1.236 | 0.661 | 0.814 | 279. |
| 40 | 1.441 | 0.663 | 0.691 | 277. |
| 50 | 1.636 | 0.666 | 0.555 | 254. |
| 60 | 1.770 | 0.669 | 0.414 | 206. |
| 70 | 1.793 | 0.673 | 0.274 | 139. |
| 80 | 1.674 | 0.677 | 0.136 | 65. |
| 90 | -.--- | -.--- | 0.000 | 00.0 |

Θ XENK APPROX. 4.0 DEGREES WITH DISTANCE 995 MILES.
420325 EXHIBIT 7E

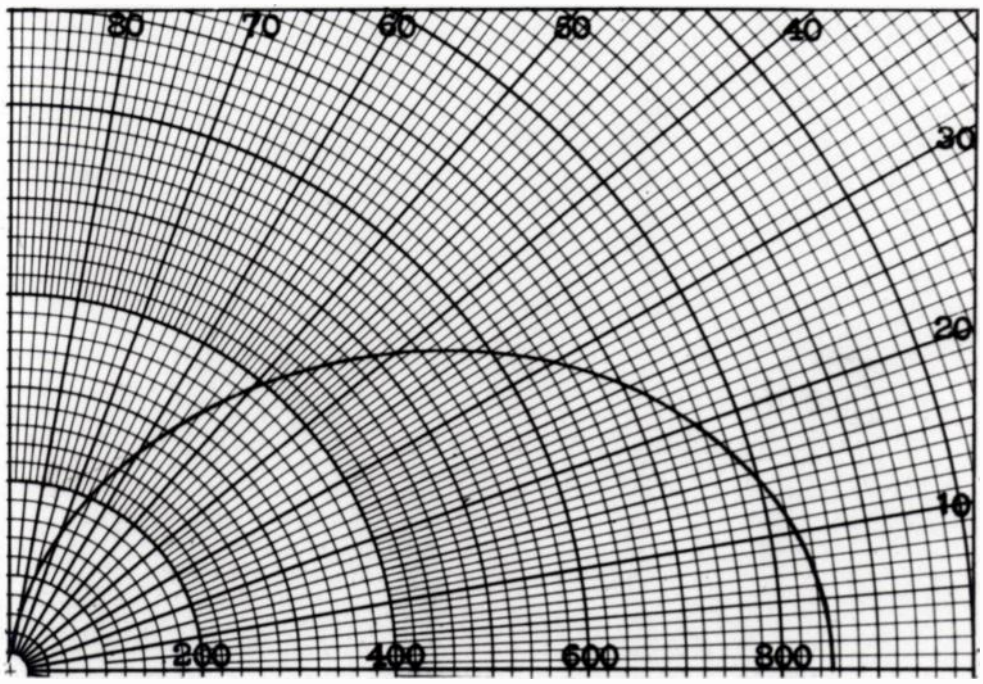
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 230 E

## THROUGH MAXIMUM




P 5000 Φ +75

| Θ | $F_X(E)$ | $F_Y(E)$ | $F_\Theta(E)$ | $E_{5000}$ |
|---|---|---|---|---|
| 00 | 1.780 | 1.143 | 1.000 | 855. |
| 10 | 1.771 | 1.137 | 0.977 | 826. |
| 20 | 1.764 | 1.117 | 0.913 | 755. |
| 30 | 1.749 | 1.086 | 0.814 | 649. |
| 40 | 1.726 | 1.043 | 0.691 | 522. |
| 50 | 1.690 | 0.986 | 0.555 | 388. |
| 60 | 1.640 | 0.920 | 0.414 | 262. |
| 70 | 1.577 | 0.845 | 0.274 | 153. |
| 80 | 1.497 | 0.765 | 0.136 | 65. |
| 90 | -.--- | -.--- | 0.000 | 00.0 |

420325

EXHIBIT 7F

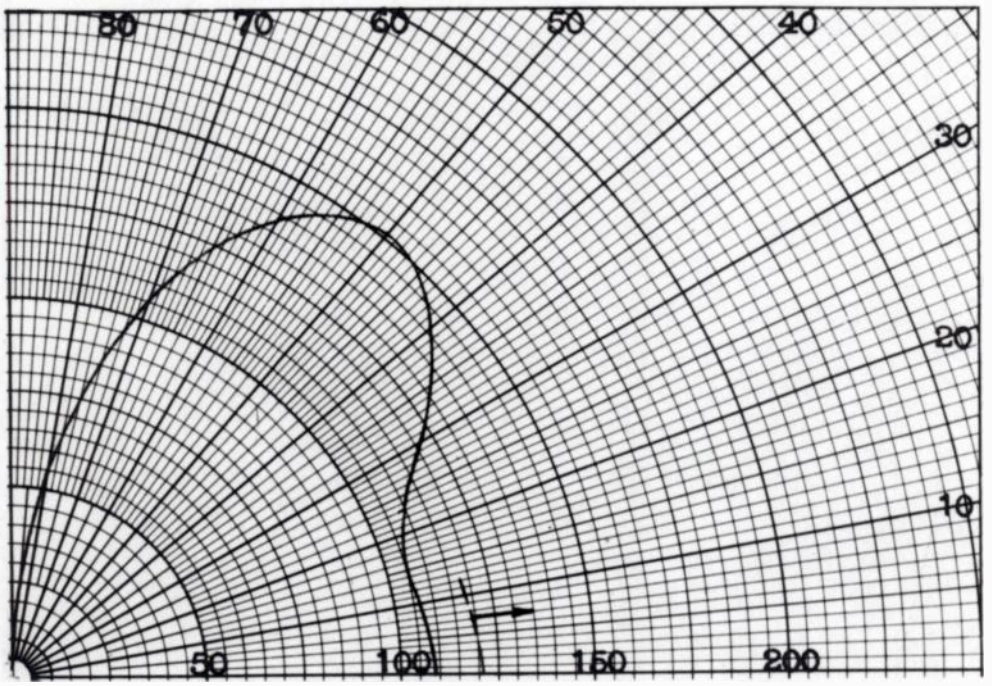
**A. EARL CULLUM, JR.**
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

KWFT DIRECTIVE ARRAY

VERTICAL RADIATION PATTERN

IN PLANE N 272 E

THROUGH NULL TOWARD PHOENIX, ARIZONA




P 5000 Φ +117

| θ | $F_X(E)$ | $F_Y(E)$ | $F_\theta(E)$ | $E_{5000}$ |
|---|---|---|---|---|
| 00 | 0.200 | 1.292 | 1.000 | 108.5 |
| 10 | 0.201 | 1.284 | 0.977 | 105.9 |
| 20 | 0.221 | 1.261 | 0.913 | 106.9 |
| 30 | 0.291 | 1.222 | 0.814 | 121.6 |
| 40 | 0.419 | 1.167 | 0.691 | 141.9 |
| 50 | 0.593 | 1.094 | 0.555 | 151.2 |
| 60 | 0.795 | 1.007 | 0.414 | 139.2 |
| 70 | 1.008 | 0.907 | 0.274 | 105.2 |
| 80 | 1.216 | 0.796 | 0.136 | 55.3 |
| 90 | -.--- | -.--- | 0.000 | 00.0 |

θ KTAR APPROX. 7.1 DEGREES WITH DISTANCE 775 MILES.

420325 EXHIBIT 7G

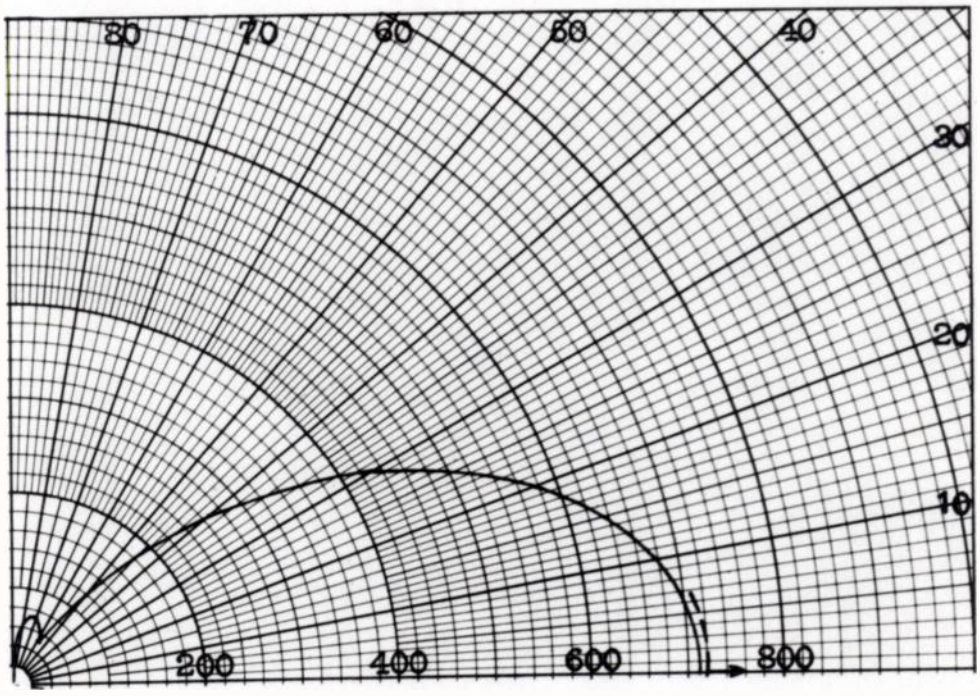
**A. EARL CULLUM, JR.**
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

KWFT DIRECTIVE ARRAY

VERTICAL RADIATION PATTERN

IN PLANE N 310 E

TOWARD PORTLAND, OREGON




P 5000 Φ +155

| Θ | $F_X(E)$ | $F_Y(E)$ | $F_\Theta(E)$ | $E_{5000}$ |
|---|---|---|---|---|
| 00 | 1.404 | 1.208 | 1.000 | 712. |
| 10 | 1.373 | 1.201 | 0.977 | 677. |
| 20 | 1.276 | 1.180 | 0.913 | 577. |
| 30 | 1.103 | 1.145 | 0.814 | 432. |
| 40 | 0.839 | 1.095 | 0.691 | 267. |
| 50 | 0.492 | 1.033 | 0.555 | 118. |
| 60 | 0.200 | 0.957 | 0.414 | 33. |
| 70 | 0.536 | 0.871 | 0.274 | 54. |
| 80 | 1.002 | 0.778 | 0.136 | 45. |
| 90 | -.--- | -.--- | 0.000 | 00.0 |

Θ KGW APPROX. 0.0 DEGREES WITH DISTANCE 1500 MILES.
420325
EXHIBIT 7H

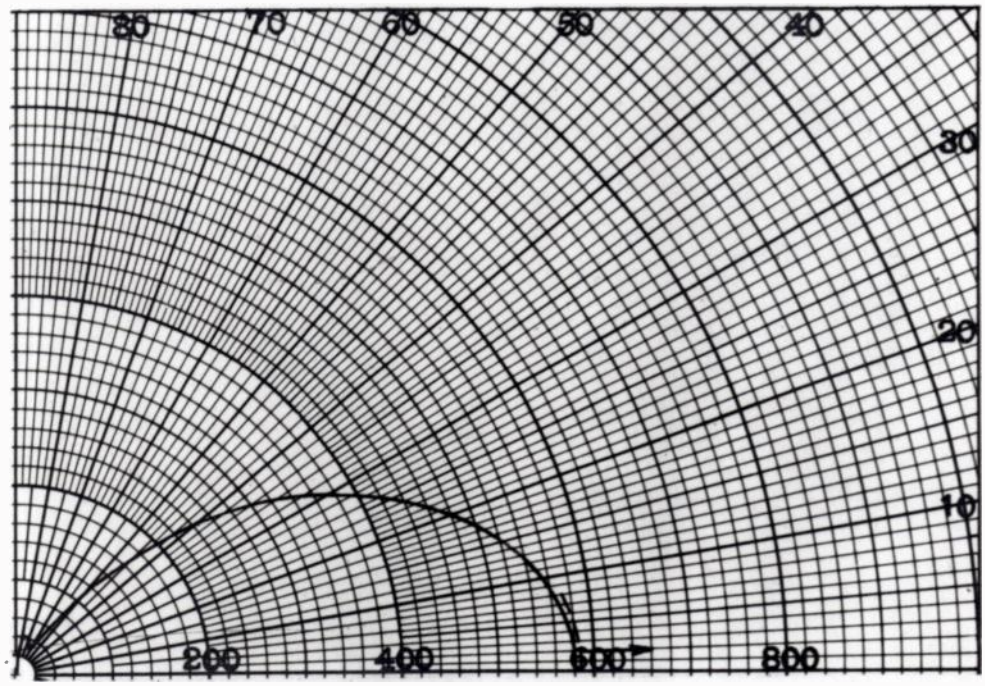
**A. EARL CULLUM, JR.**
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE.
DALLAS, TEXAS

KWFT DIRECTIVE ARRAY

VERTICAL RADIATION PATTERN

IN PLANE N 347 E

TOWARD REGINA, SASKATCHEWAN




P 5000 Φ -168

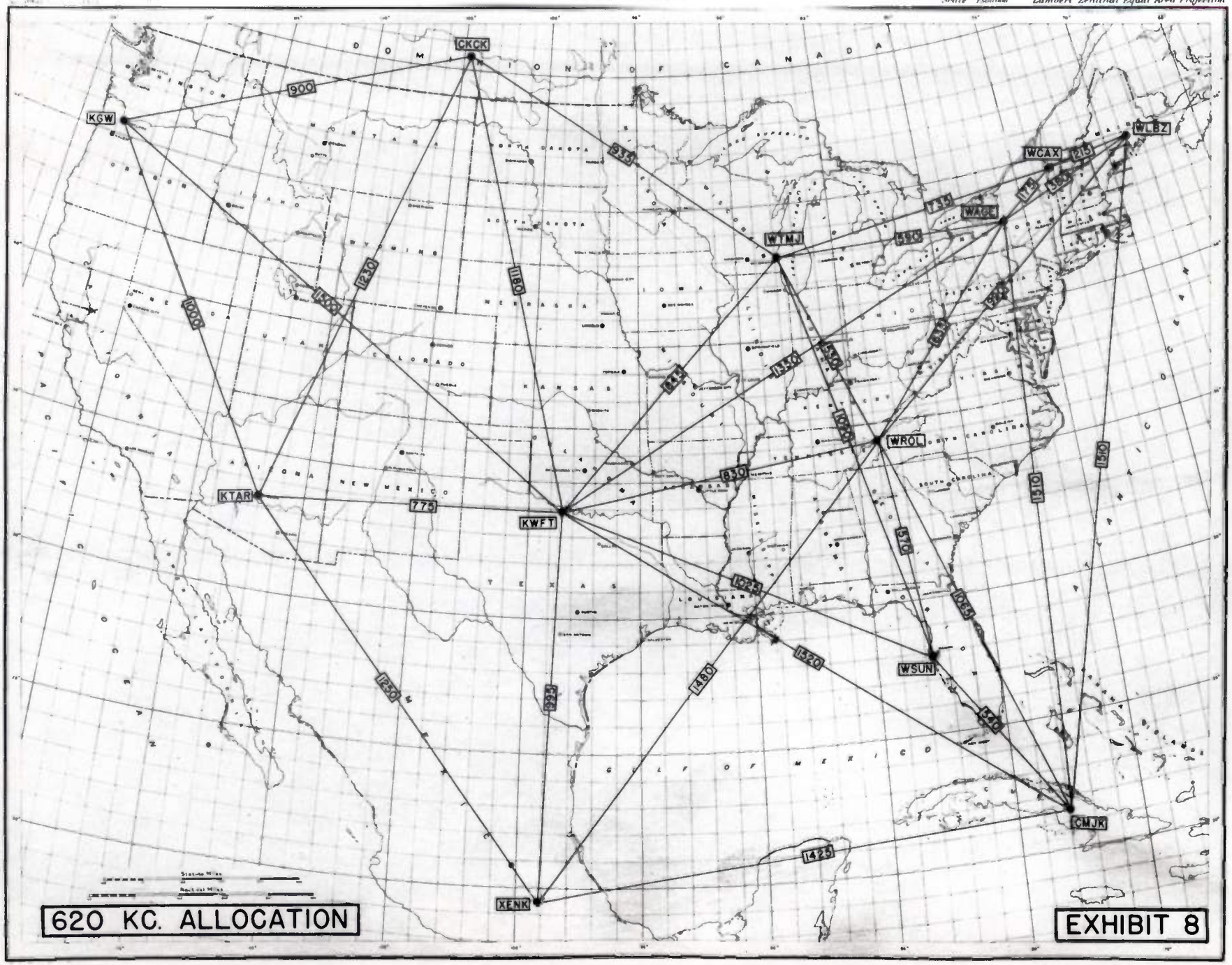
| θ | F (E) | F (E) | F (E) | $E_{5000}$ |
|---|---|---|---|---|
| 00 | 1.548 | 0.891 | 1.000 | 579. |
| 10 | 1.521 | 0.888 | 0.977 | 554. |
| 20 | 1.430 | 0.878 | 0.913 | 481. |
| 30 | 1.265 | 0.863 | 0.814 | 373. |
| 40 | 1.002 | 0.842 | 0.691 | 245. |
| 50 | 0.636 | 0.816 | 0.555 | 121. |
| 60 | 0.236 | 0.785 | 0.414 | 32. |
| 70 | 0.459 | 0.753 | 0.274 | 40. |
| 80 | 0.965 | 0.718 | 0.316 | 40. |
| 90 | -.--- | -.--- | 0.000 | 00.0 |

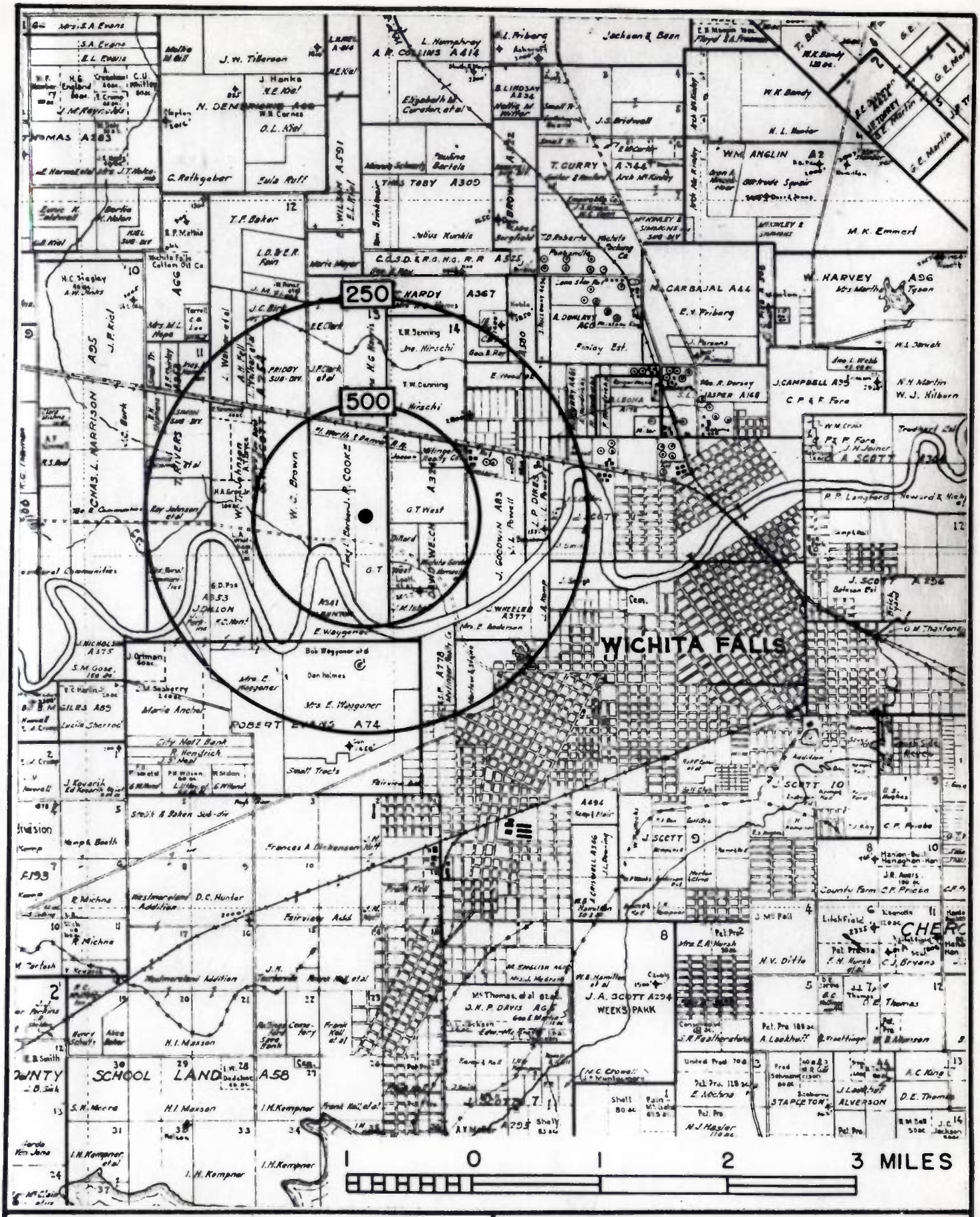
θ CKCK APPROX. 2.0 DEGREES WITH DISTANCE 1180 MILES.
420325 EXHIBIT 71

OUTLINE MAP

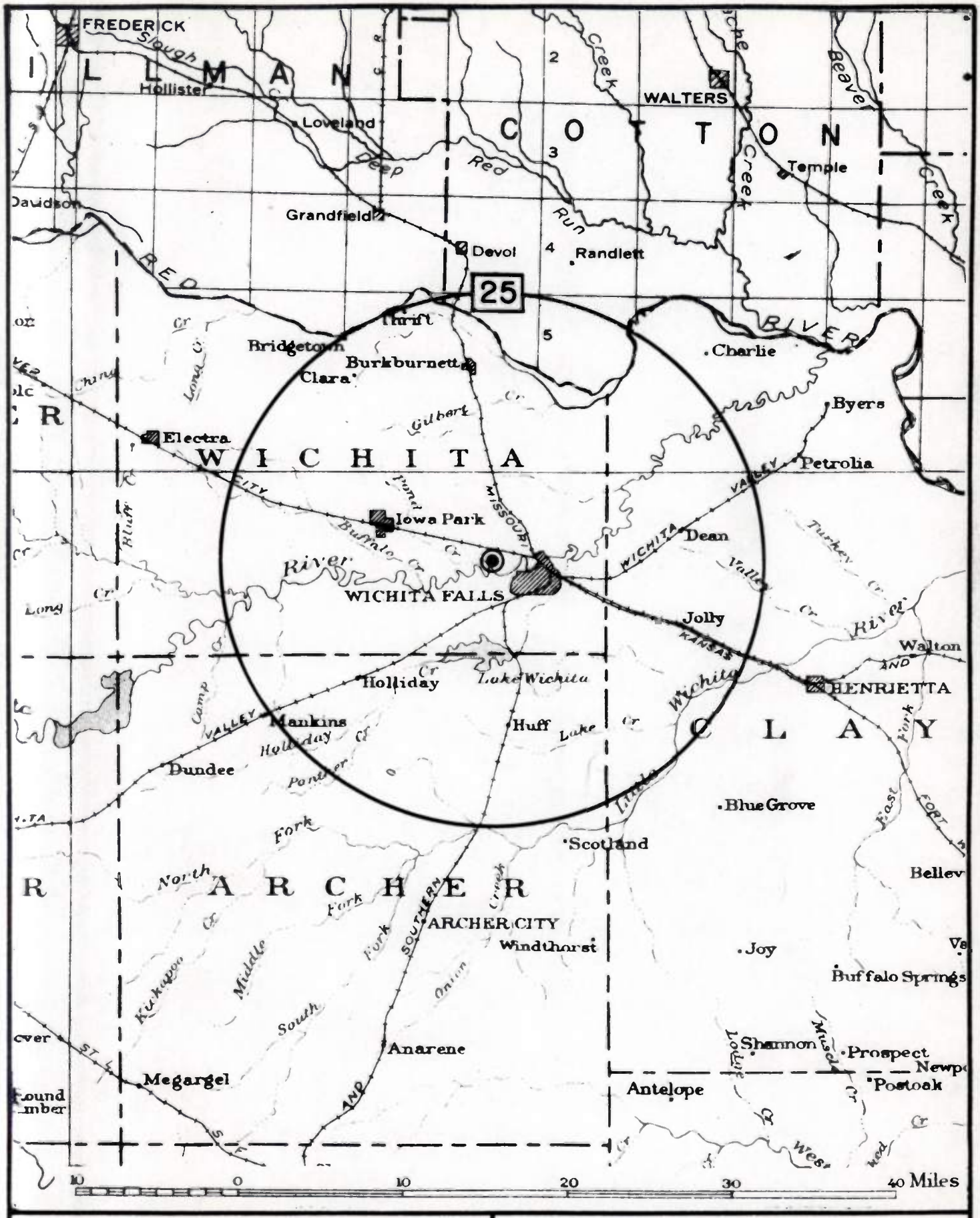
UNITED STATES

Scale 1:6,000,000 Lambert Zenithal Equal Area Projection

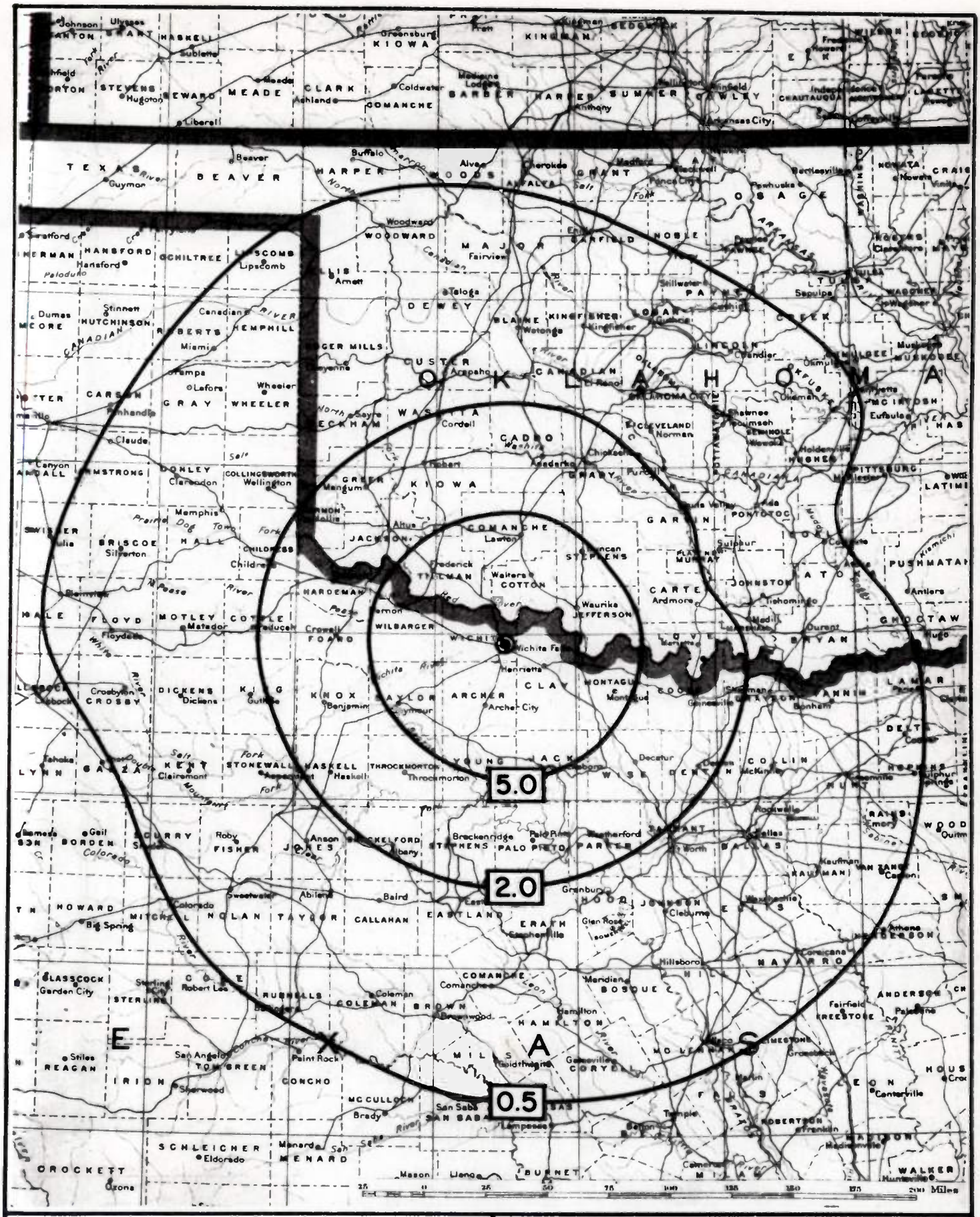




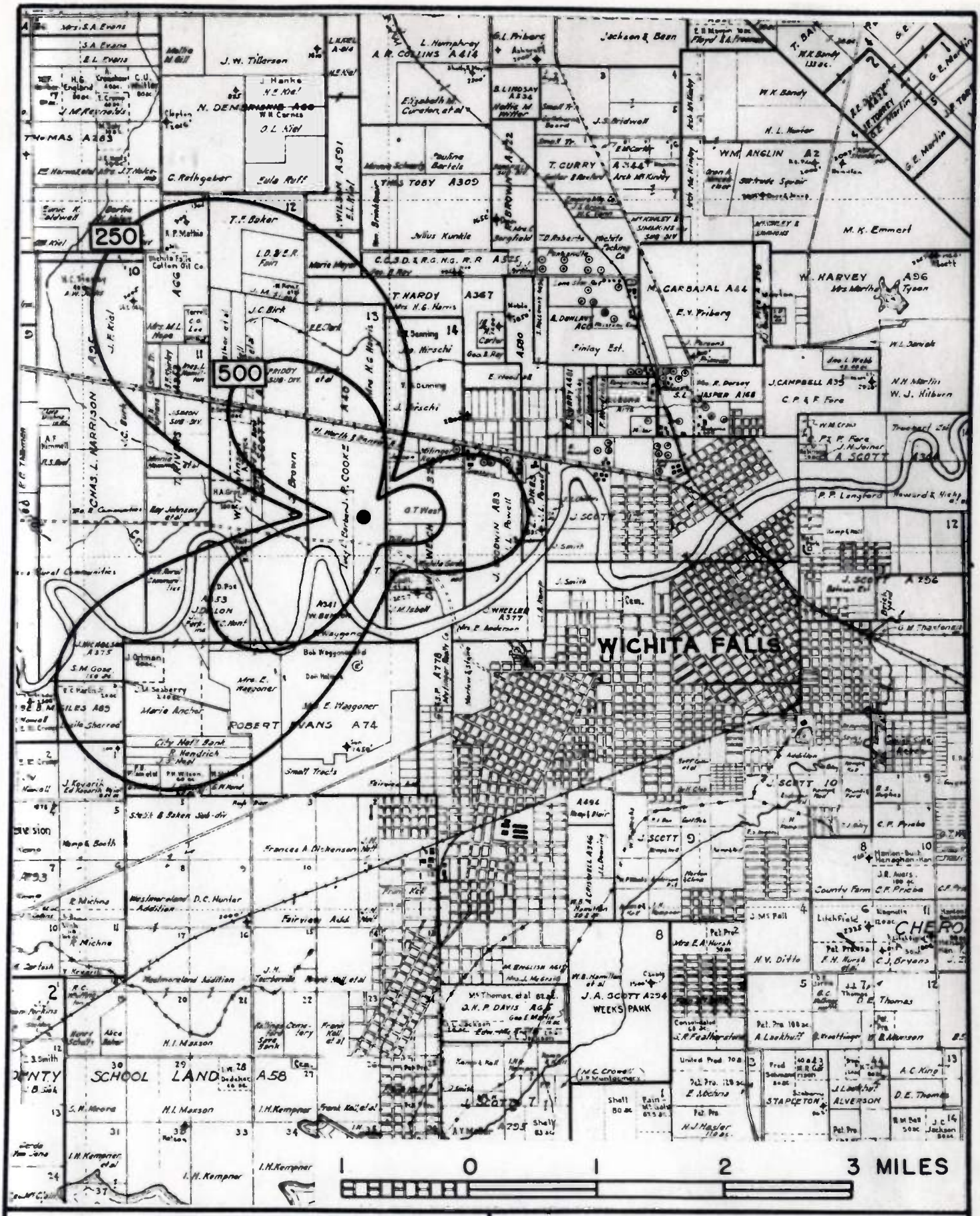

| | |
|---|---|
| A. EARL CULLUM JR. | RADIO STATION KWFT |
| CONSULTING RADIO ENGINEER | PROPOSED 620 KC 5 KW-ND |
| DALLAS 420325 | EXHIBIT NUMBER 9A |




| | |
|---|---|
| A. EARL CULLUM JR.<br>CONSULTING RADIO ENGINEER<br>DALLAS 420325 | RADIO STATION KWFT<br>PROPOSED 620 KC 5 KW-ND<br>EXHIBIT NUMBER 9B |

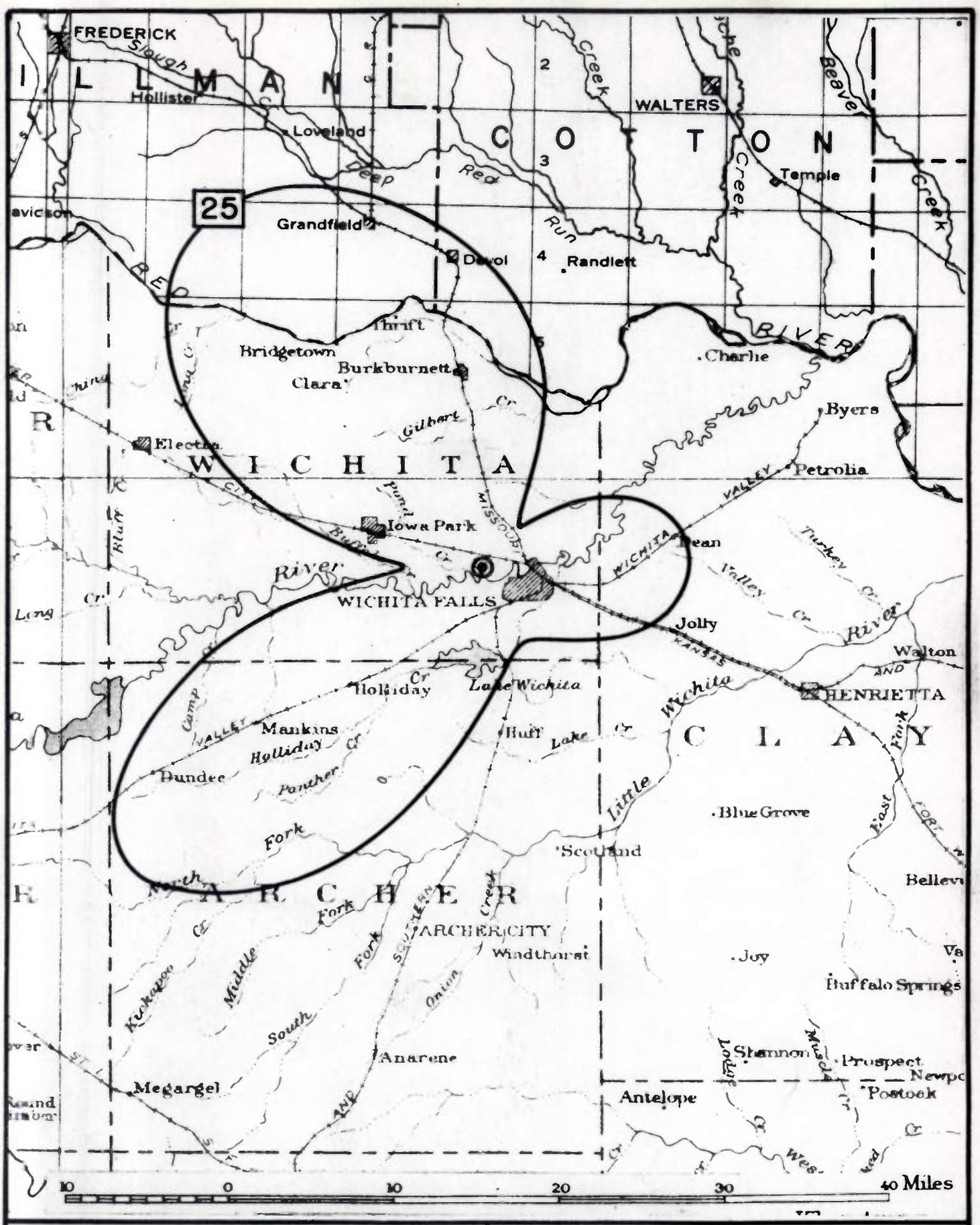



| | |
|---|---|
| A. EARL CULLUM JR.<br>CONSULTING RADIO ENGINEER<br>DALLAS 420325 | RADIO STATION KWFT<br>PROPOSED 620 KC 5 KW-ND<br>EXHIBIT NUMBER 9C |

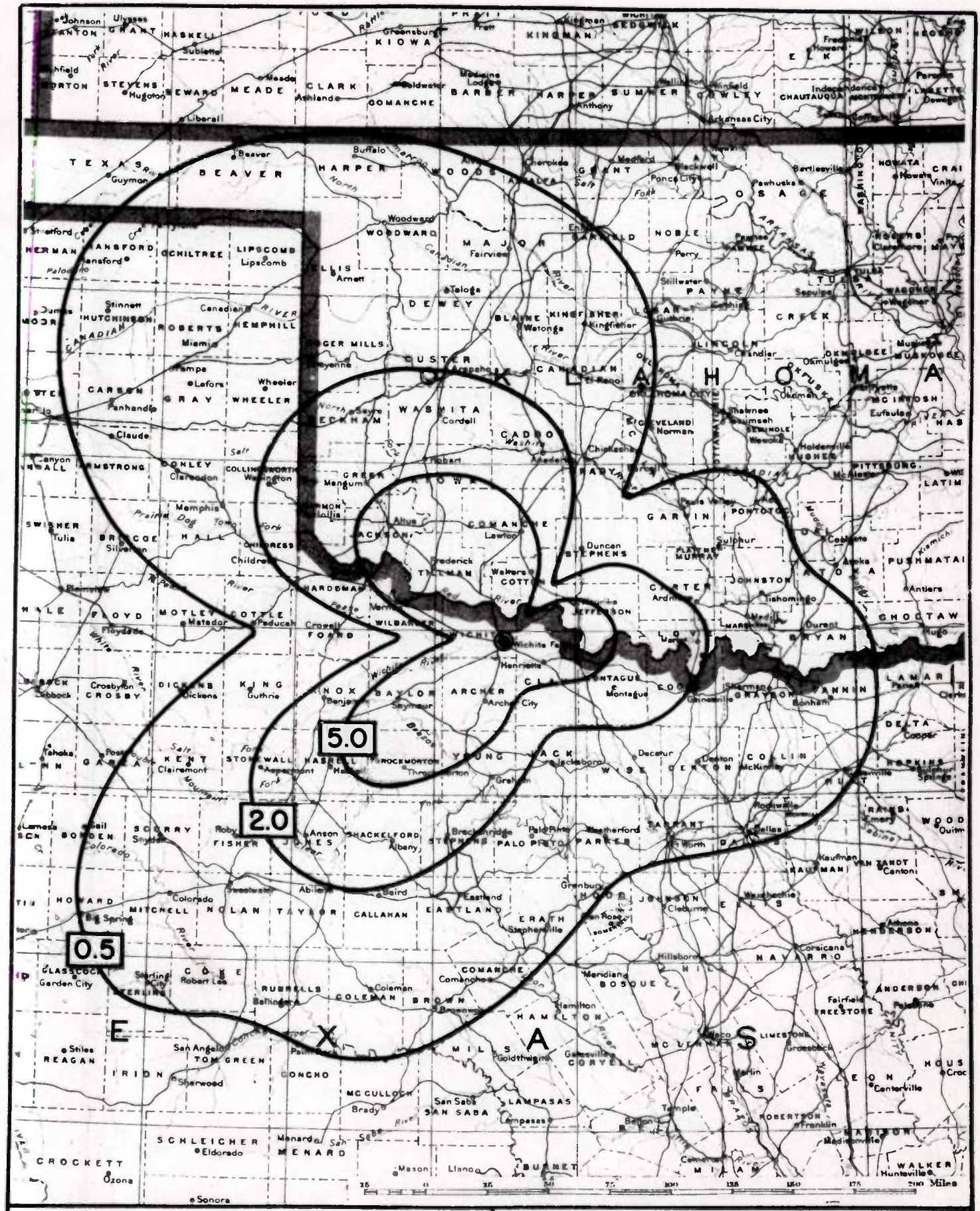



A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
DALLAS 420325

RADIO STATION KWFT
PROPOSED 620 KC. 5 KW-DA.
EXHIBIT NUMBER 10A

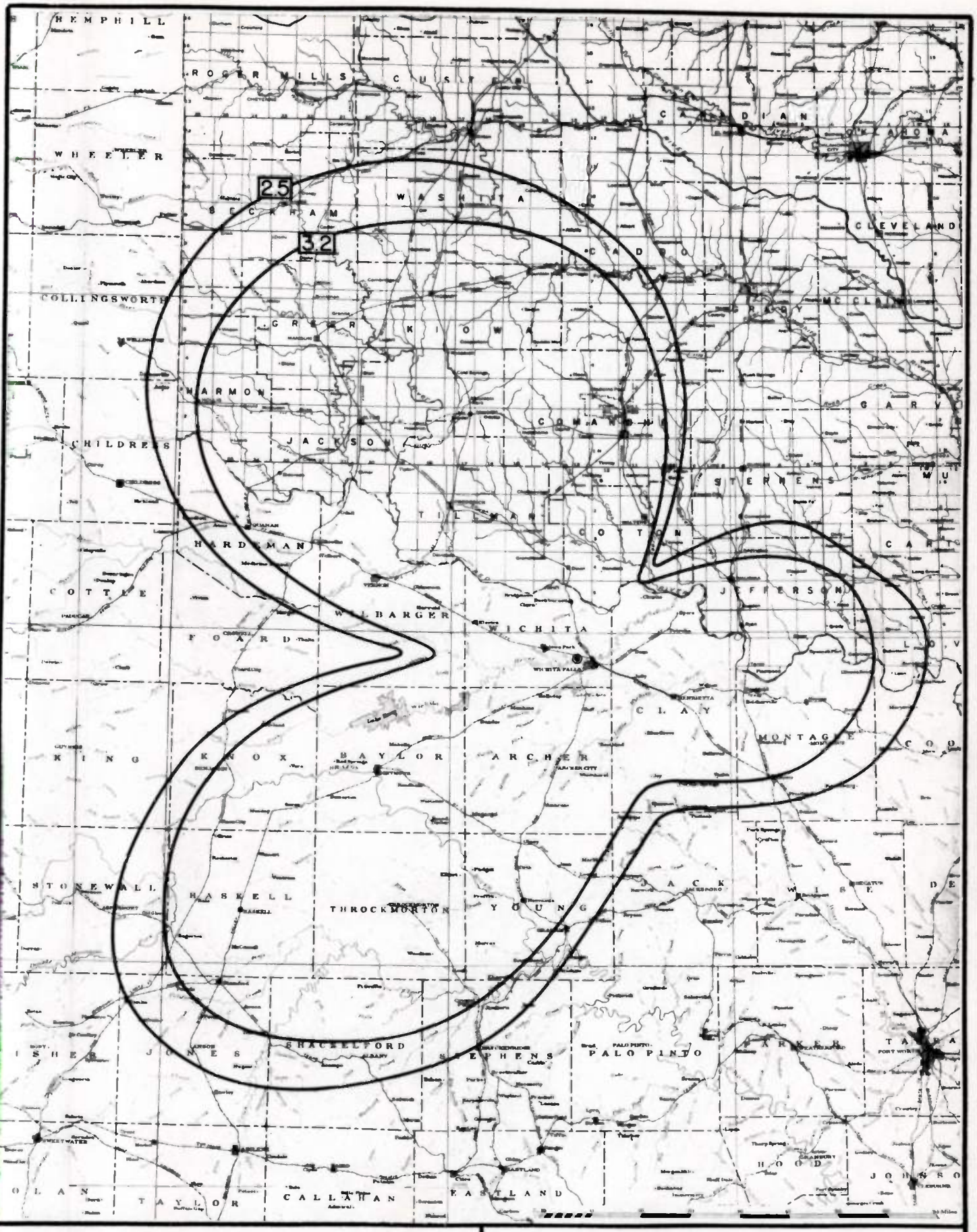



| | |
|---|---|
| A. EARL CULLUM, JR.<br>CONSULTING RADIO ENGINEER<br>DALLAS 420325 | RADIO STATION KWFT<br>PROPOSED 620 KC. 5 KW-DA.<br>EXHIBIT NUMBER 10B |

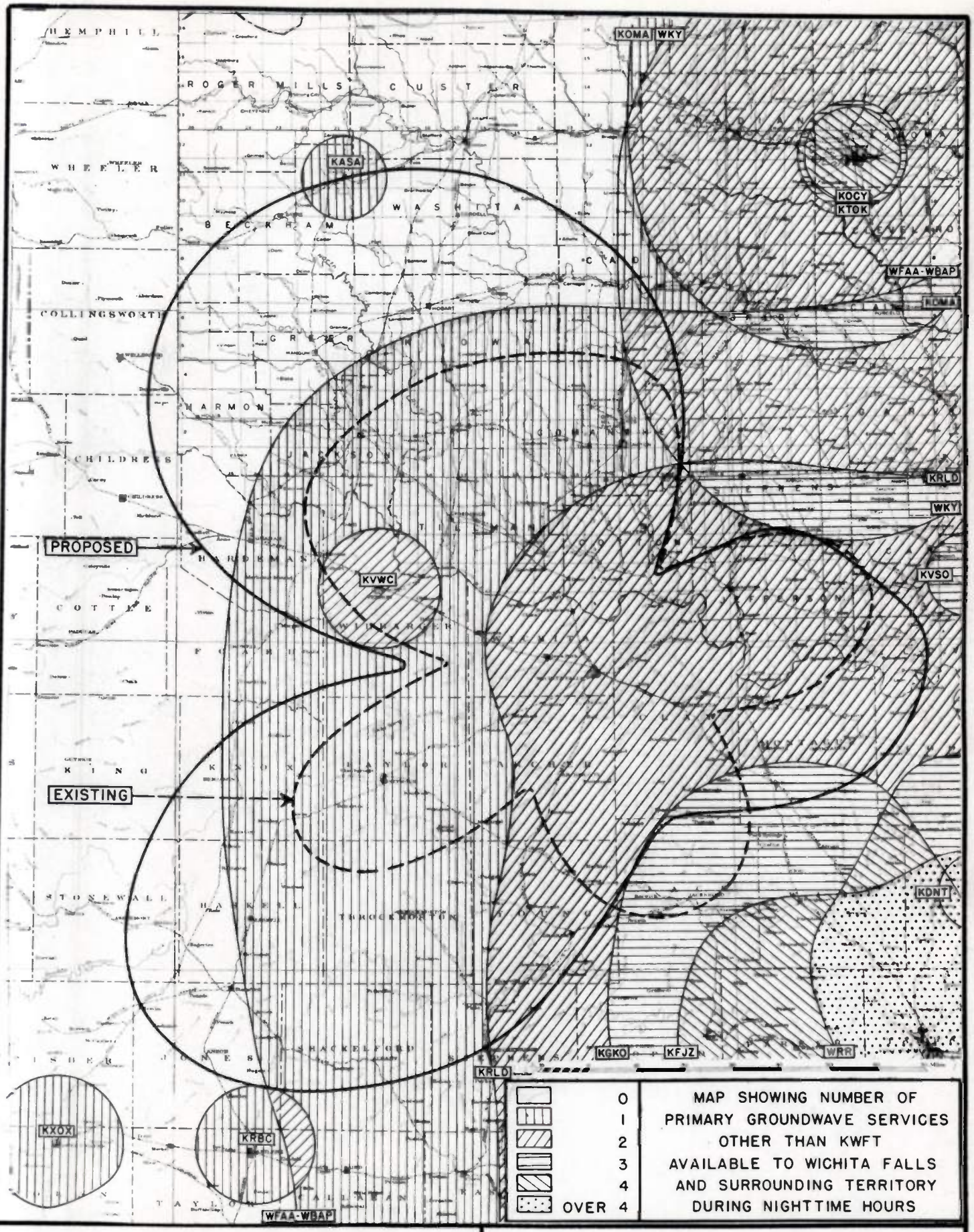



A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
DALLAS 420325

RADIO STATION KWFT
PROPOSED 620 KC. 5 KW-DA.
EXHIBIT NUMBER 10C

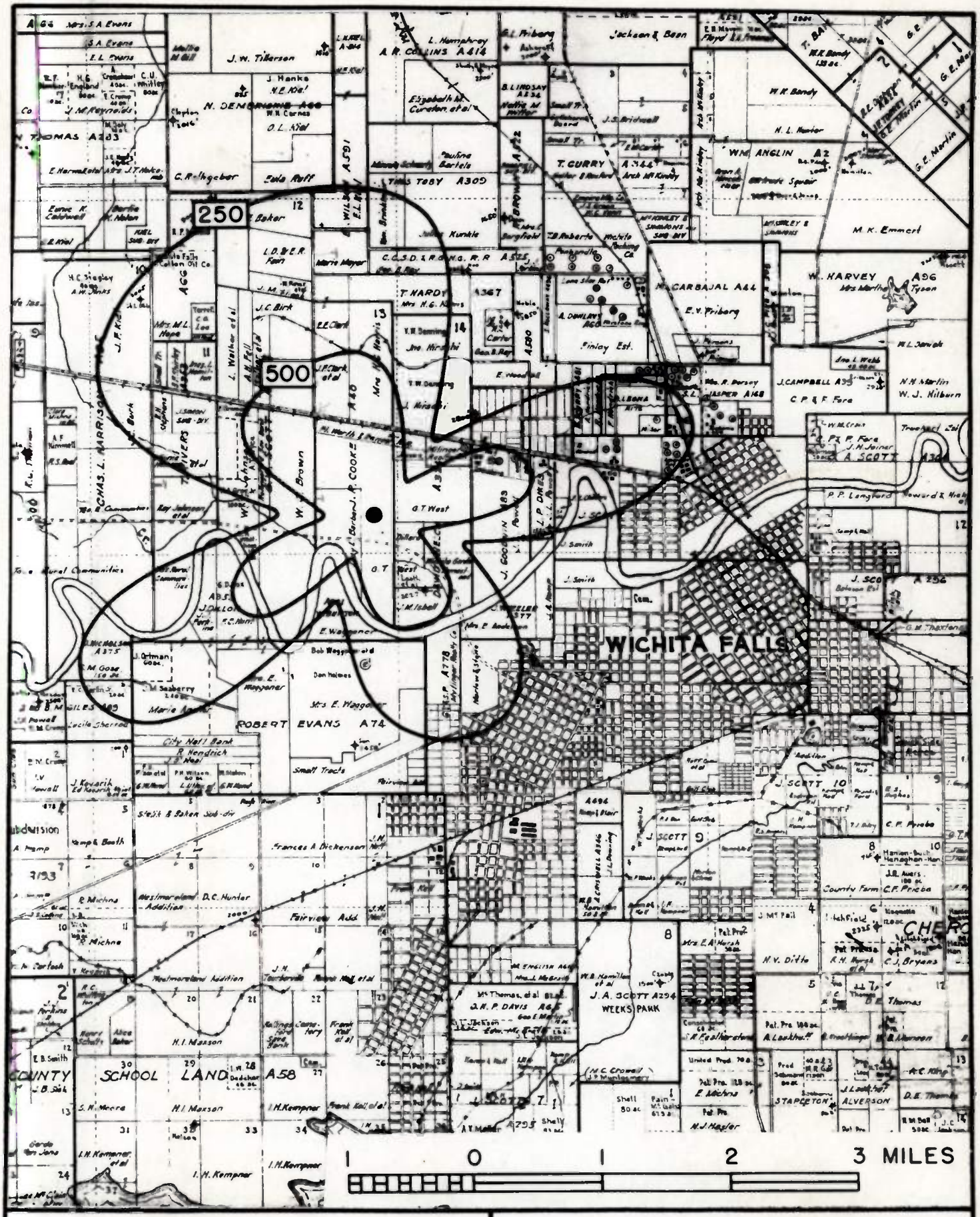



| | |
|---|---|
| A. EARL CULLUM, JR.<br>CONSULTING RADIO ENGINEER<br>DALLAS 420325 | RADIO STATION KWFT<br>PROPOSED 620 KC. 5 KW-DA.<br>EXHIBIT NUMBER 10D |

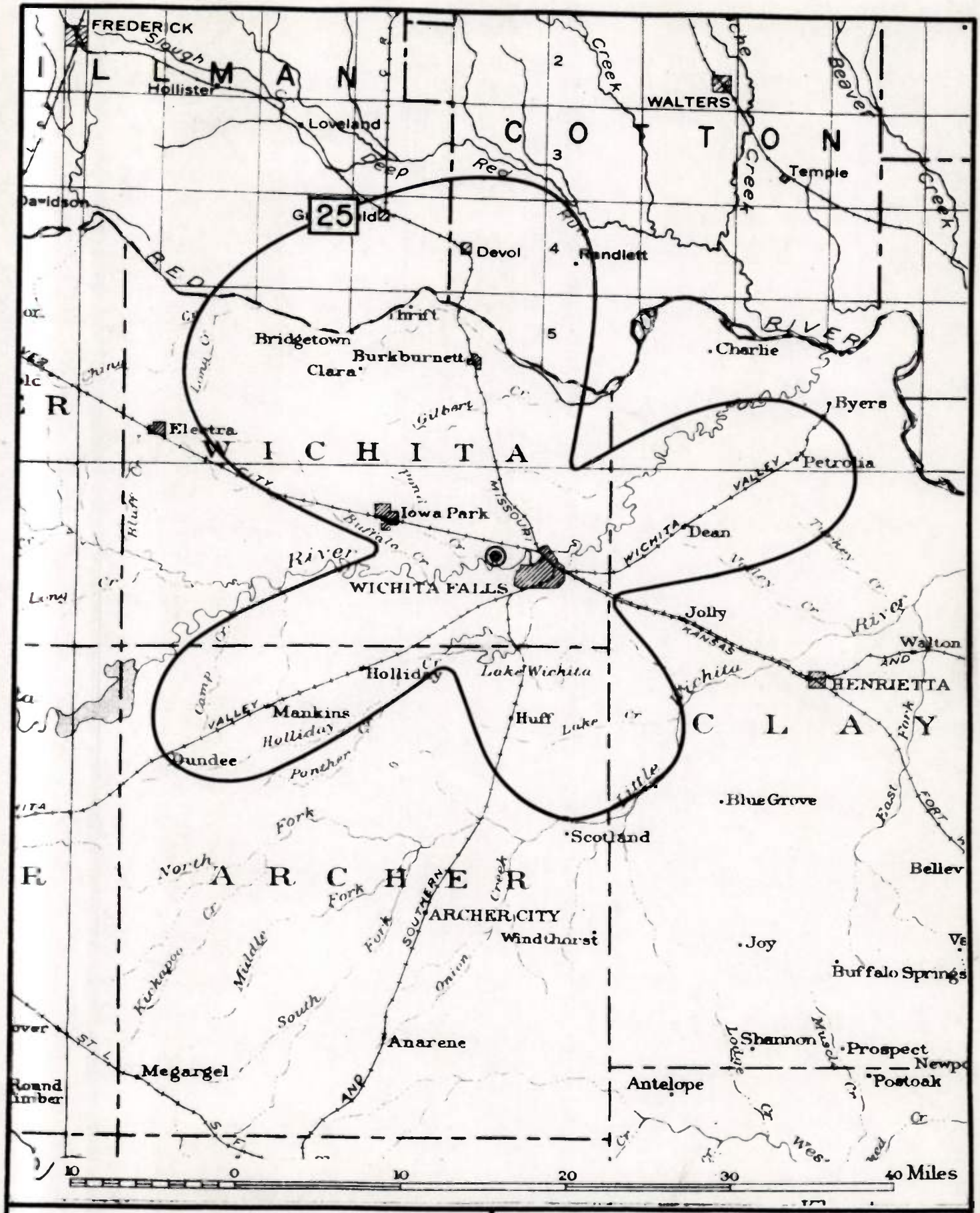



A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
DALLAS 420325

RADIO STATION KWFT
PROPOSED 620 KC. 5 KW-DA.
EXHIBIT NUMBER 10E




| | |
|---|---|
| A. EARL CULLUM, JR. | RADIO STATION KWFT |
| CONSULTING RADIO ENGINEER | EXISTING 620 KC 5 KW-DA |
| DALLAS 420325 | EXHIBIT NUMBER IIA |




| | |
|---|---|
| A. EARL CULLUM, JR.<br>CONSULTING RADIO ENGINEER<br>DALLAS 420325 | RADIO STATION KWFT<br>EXISTING 620 KC 5 KW-DA<br>EXHIBIT NUMBER 11B |

ASSOCIATE ENGINEERS
C. M. DANIELL
D. A. PETERSON

A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

JULY 23, 1941

MR. A. D. RING, CONSULTING ENGINEER
RING & CLARK
MUNSEY BUILDING
WASHINGTON, D. C.

DEAR ANDY:

THIS WILL REFER TO YOUR LETTER DATED JULY 15TH REGARDING THE MUTUAL PROBLEMS OF KWFT AND WTMJ.

IN ORDER TO CONSIDER THE PROBLEMS ON THE 620 KC CHANNEL WE PREPARED SOME TIME AGO A RATHER COMPLETE ALLOCATION STUDY OF THE CHANNEL. A COPY OF THE VARIOUS LIMITATIONS IS ATTACHED FOR YOUR FILES AND INFORMATION. I CAN HARDLY SEE HOW WTMJ CAN EXPECT ANY BETTER PROTECTION THAN THAT PROPOSED BY KWFT. IF WE CONSIDER THE OTHER STATIONS ON THE 620 KC CHANNEL, THE R.S.S. LIMITATION TO WTMJ SEEMS TO BE TO APPROXIMATELY THE 1.64 MV/M CONTOUR. WITH THE PROPOSED KWFT OPERATION THE R.S.S. LIMITATION TO WTMJ WOULD ONLY BE TO APPROXIMATELY THE 1.81 MV/M CONTOUR. I CAN HARDLY SEE HOW WTMJ CAN OBJECT TO THIS SLIGHT INCREASE IN LIMITATION.

ON THE OTHER HAND I AM QUITE SURE THAT KWFT DOES NOT WANT TO CAUSE ANYONE ANY TROUBLE ON THE CHANNEL, AS MY RELATIONS WITH THE CLIENT HAVE INDICATED THAT THEY ARE QUITE COOPERATIVE AND WILLING TO ASSIST IN WORKING OUT PROBLEMS WHEREVER POSSIBLE. IF IT SHOULD BE DESIRABLE TO REDUCE THE RADIATION FROM KWFT IN THE DIRECTION OF WTMJ, I BELIEVE THAT IT WOULD ONLY BE FAIR TO IN TURN REQUEST THAT WTMJ PROVIDE A SMALL ADDITIONAL PROTECTION TO KWFT SUFFICIENT TO WARRANT SUCH A CHANGE. IF WE ATTEMPT TO NEGOTIATE THIS SORT OF A PLAN, HOWEVER, WE IMMEDIATELY ENCOUNTER A NUMBER OF ENGINEERING COSTS THAT WOULD HAVE TO BE INCURRED BY BOTH STATIONS. IT WOULD BE NECESSARY TO FILE APPLICATIONS, ENDEAVOR TO OBTAIN APPROVAL, AND THEN MAKE THE NECESSARY ADJUSTMENTS AND PROOF OF PERFORMANCE. I CAN HARDLY SEE HOW WTMJ CAN EXPECT KWFT TO DO ALL THIS IF I AM CORRECT IN MY UNDERSTANDING OF THE SMALL GAIN TO BE HAD.

IT SHOULD BE KEPT IN MIND THAT IF THE RADIATION OF KWFT IS REDUCED IN THE DIRECTION OF WTMJ, THE RADIATION IN THE DIRECTION OF WROL IS AUTOMATICALLY INCREASED. THIS MIGHT

BE WORKED OUT, BUT AS YOU KNOW WE ALREADY HAVE AN INTERFERENCE PROBLEM WITH WROL.

IF YOU SHOULD HAVE ANY SPECIFIC PLAN IN MIND THAT MIGHT BE ACCEPTABLE TO WTMJ AND YET AT THE SAME TIME NOT INJURE KWFT, I WILL BE VERY GLAD TO TAKE THE PLAN UP WITH THE KWFT PEOPLE. I CAN APPRECIATE YOUR POSITION IN THE MATTER AND I CERTAINLY HOPE THAT YOU CAN WORK IT OUT SO THAT YOU CAN REPRESENT WTMJ WITH THEIR MANY INTERESTS, BUT AT THE SAME TIME I WOULD NOT WANT YOU TO NEGLECT THE INTERESTS OF KWFT. SOME OF THE ENGINEERS SEEM TO BE ABLE TO REPRESENT A NUMBER OF STATIONS ON ONE CHANNEL, BUT OUR OBSERVATIONS HAVE BEEN SUCH AS TO INDICATE THAT ONE STATION OR THE OTHER LOSES BY MULTIPLE REPRESENTATION. OUR OFFICE DOES NOT ACCEPT THE REPRESENTATION OF TWO STATIONS ON A REGIONAL CHANNEL WHICH ARE IMMEDIATELY ADJACENT TO EACH OTHER. IT IS A DISTINCT ADVANTAGE TO HAVE ANOTHER ENGINEER REPRESENT A STATION IN BETWEEN TWO CLIENTS REPRESENTED BY THE SAME ENGINEER.

LET ME KNOW IF I CAN BE OF ANY ASSISTANCE TO YOU IN WORKING OUT THIS PROBLEM.

YOURS VERY TRULY,

A. EARL CULLUM, JR.

AECJR/GH
ENCL-

## LIMITATIONS TO STATIONS ON 620 KC - PENDING
APRIL 24, 1941

| LIMITATION TO | LIMITATION FROM | DISTANCE MILES | POWER WATTS | UNATTENUATED FIELD | INTERFERENCE LEVEL |
|---|---|---|---|---|---|
| KGW | CKCK | 920 | 1000 | 175 | 1.43 |
| | KTAR | 1010 | 5000 DA | 165 | 1.04 |
| | WTMJ | 1745 | 5000 DA | 330 | 0.48 |
| | KWFT | 1520 | 5000 DA | 658 | 1.33 |
| KTAR | KGW | 1010 | 5000 DA | 170 | 1.39 |
| | CKCK | 1250 | 1000 | 175 | 0.59 |
| | WTMJ | 1475 | 5000 DA | 365 | 0.80 |
| | XENK | 1250 | 5000 | 392 | 1.32 |
| | KWFT | 780 | 5000 DA | 185 | 2.22 |
| WTMJ | WROL | 539 | 500 DA | 22 | 0.45 |
| | KGW | 1745 | 5000 DA | 255 | 0.37 |
| | CKCK | 1025 | 1000 | 175 | 1.05 |
| | WAGE | 590 | 1000 DA | 10 | 0.20 |
| | WLBZ | 970 | 5000 DA | 180 | 1.26 |
| | KWFT | 860 | 5000 DA | 185 | 1.81 |
| WSUN | WTMJ | 1090 | 5000 DA | 150 | 0.75 |
| | WROL | 563 | 500 DA | 24 | 0.52 |
| | CMJK | 526 | 250 | 75 | 1.79 |
| | KWFT | 1025 | 5000 DA | 195 | 1.17 |
| WROL | WAGE | 645 | 1000 DA | 60 | 1.04 |
| | WTMJ | 539 | 5000 DA | 155 | 3.54 |
| | WSUN | 563 | 5000 DA | 150 | 3.24 |
| | KWFT | 845 | 5000 DA | 643 | 6.50 |
| CKCK | KGW | 920 | 5000 DA | 170 | 1.39 |
| | KTAR | 1250 | 5000 DA | 383 | 1.29 |
| | WTMJ | 1025 | 5000 DA | 440 | 2.64 |
| | KWFT | 1190 | 5000 DA | 658 | 2.51 |
| XENK | KTAR | 1250 | 5000 DA | 560 | 1.88 |
| | WSUN | 1210 | 5000 DA | 435 | 1.58 |
| | KWFT | 990 | 5000 DA | 340 | 2.24 |
| KWFT | KGW | 1520 | 5000 DA | 270 | 0.55 |
| | KTAR | 780 | 5000 DA | 170 | 2.07 |
| | WTMJ | 860 | 5000 DA | 245 | 2.40 |
| | WSUN | 1025 | 5000 DA | 200 | 1.20 |
| | WROL | 845 | 1000 DA | 201 | 2.02 |
| | CKCK | 1190 | 1000 | 175 | 0.67 |
| | XENK | 990 | 5000 | 392 | 2.59 |

F.C.C. Form 304
Revised July, 1940

File No. _____

Call letters KWFT

# MODIFICATION OF

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

APPLICATION FOR (Construction Permit / [illegible]) FOR AN EXISTING STANDARD BROADCAST STATION 1/

(Submit application and all exhibits, in duplicate, except as otherwise required in this form or the Standards of Good Engineering Practice Concerning Standard Broadcast Stations, to Federal Communications Commission, Washington, D. C. Swear to both copies. If space provided is insufficient attach inserts)

Before executing application see Communications Act of 1934, as amended, Part 1 (Rules of Practice and Procedure), Part 2 (General Rules and Regulations), and Part 3 (Standard Broadcast Rules) of the Commission's Rules and Regulations and the Standards of Good Engineering Practice Concerning Standard Broadcast Stations. All technical terms, such as "normally protected contours" and "objectionable interference", are for convenient reference only and are to be construed as having the same meaning as when used in the Rules and regulations and the Standards. The use of the terms "normally protected contours" and "objectionable interference" shall not be taken as implying any right to protection of such contours or from such interference.

TO THE FEDERAL COMMUNICATIONS COMMISSION:

1. Name of applicant 2/ WICHITA BROADCASTING COMPANY

2. Post-office address: State TEXAS City WICHITA FALLS

   Street and number 800 EIGHTH STREET

3. Is this application for--

   (a) Authorization to change present location of transmitter of existing station? No If so, what is distance in miles between present location and proposed location of transmitter? XX

   (b) Approval of transmitter location and antenna system? YES

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1/ If any information or documents which are already on file with the Commission are required to be filed with the application, proper reference thereto should be made herein, together with a statement that there has been no change therein since date of filing thereof.

2/ If a corporation, state exact corporate name; if a partnership, state the names of all partners, and the name under which the partnership does business; if an unincorporated association, state the name of an executive officer, the office held by him, and the name of the association.

(c) Authorization to change maximum rated carrier power, which necessitates installation of new equipment? No
If so, applicant represents:
(1) That present maximum rated carrier power is 5000 watts.

(2) That proposed maximum rated carrier power is 5000 watts.

(d) Authorization to install new equipment? No If so, indicate (by check mark) what new equipment is to be installed:

(1) New transmitter XX (2) Change in system of modulation XX
(3) Change in type or number of vacuum tubes in last radio stage XX
(4) Change in automatic frequency control equipment XX (5) Other changes (specify) XX

(e) Changes in antenna system MODIFY DIRECTIONAL ANTENNA

(f) Other changes (specify fully) OPERATE NON-DIRECTIONAL DAYTIME

4. Applicant states--

(a) That the estimated costs 3/ of establishing the station facilities are: Transmitter, $XX Radiating system: (1) Coupling equipment, $XX: (2) Antenna, $10,070.00: (3) Ground equipment, $100.00: Studio (technical), $XX Studio (other than technical), $XX Acquiring land, $XX Improvements to leased property, $XX: Engineering fees, $1,000.00: Other items (state nature), TOWER ERECTION $5,000.00 Total, $16,170.00 that the estimated total annual expense of operation under the proposed plan is $75,000.00 and that the estimated total annual revenue under the proposed plan is $100,000.00

(b) That there are submitted herewith the detailed facts upon which the estimates in (a) above are predicted BASED ON CURRENT PURCHASES, AND ON EXPERIENCE ACQUIRED FROM THE PAST OPERATION OF RADIO STATION KWFT.

3/ If construction is to be performed under a contract for the completed work, the facts as to such contract must be stated in lieu of estimates as to the several items. In any event, the costs shown must be the costs in place and ready for service, including the amounts for labor, supervision, materials, supplies, and freight.

(c) That the proposed construction is to be financed and paid for in the following manner (including specific statements as to the approximate amount to be met and paid for from each source): Existing capital, $ 6,000.00 : New capital $ XX : Loans, $ XX : Profits, $ XX : Donations, $ XX : Credit, $ 10,170.00 : Other sources (specify), XX $ XX .

(d) That there is attached hereto, on Form 706, a detailed balance sheet of the applicant, as at the close of the month preceding the date of the application showing the financial ability of the applicant to construct and operate the station. 1/ SEE EXHIBIT 1 ON FILE.

5. (a) Do the reports filed by applicant under Sections 1.361 of the Rules of Practice and Procedure and 43.1 of the Rules and Regulations reflect substantially applicant's status with regard to all conditions stated in such reports as of the date this application was executed? YES - STOCK OWNERSHIP CHANGED AND FCC NOTIFIED ACCORDINGLY.
(Answer Yes or No)

(b) If not, submit a separate detailed statement herewith showing changes. (Full report of changes must also be filed on the forms as required by the above rules.) SEE FCC FILE B3-ML-1057.

APPLICANT'S INTERESTS

6. If applicant, or any partner, officer, member of the governing board, director, or principal stockholder has, or has had, any interest of any character whatever in, or any connection with, any of the following, there is submitted herewith a full and complete disclosure of the nature and extent of the interest in or connection with each. (If neither applicant, nor any of said parties, has, or has had, any such interest or connection, so state) NO SUCH INTEREST

(a) Any application pending before the Commission, or which has been denied within 12 months preceding the date of execution of this application? No

(b) Any radio broadcast station? No

1/ See footnote 1/, Page 1.

(c) Any broadcast station the license of which has been revoked or application for renewal of license for which has been denied? No

(d) Is any party named in 6 directly or indirectly controlled by any party with respect to whom any part of 6 applies? No (Yes or No)

If so, state fully XX

FACILITIES REQUESTED

7. The class, frequency, power, and hours of operation requested for the proposed station are as follows:

(a) Frequency 620 kilocycles.

(b) Power (night) 5000 (DA) watts. (c) Power (day) 5000 (ND) watts.

(d) Hours of operation:

(1) Unlimited YES (2) Daytime only XX (3) Limited XX

(4) Sharing with (specify stations) NONE

(5) Other (specify) XX

(e) State number of hours per day proposed station will operate 19

8. (a) Does applicant request the assignment of all or any part of the facilities (i.e., frequency, power, and/or hours of operation) now assigned to any other station or stations? No (Yes or No)

(b) If so, specify the station or stations and state accurately the facilities requested to be withdrawn therefrom XX

(b) Attach statement giving the conductivities, effective field intensities, interference fields and other pertinent data used for determining the contours required above.

13. As determined by the 1930 Census: 5/ 7/ SEE ATTACHED ENGINEERING EXHIBIT 2(A)

(a) State number of persons residing within the contours required by section 18 (a) (1).

| | 250 mv/m | 25 mv/m | 5 mv/m | 2 mv/m |
|---|---|---|---|---|
| Night | | | | |
| Day | | | | |

(b) State areas and number of persons residing within the contours required by section 18 (a) (2).

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night | | | |
| Day | | | |

(c) State areas and number of persons residing within the contours required by section 18 (a) (3).

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night | | | |
| Day | | | |

(d) State areas and number of persons residing within the contours required by section 18 (a) (4). 8/

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night | | | |
| Day | | | |

5/ See footnote 5/, page 11.

7/ Supplemental population estimates may be also submitted based upon later census estimates, if considered substantially different from the 1930 Census.

8/ If interference is from more than one station, show totals and attach figures of each station.

clearly show the terrain to the 250 mv/m contour and are taken in at least eight directions from the site: North, northeast, east, etc.)

18. (a) Attach triplicate map or maps (same map or maps supplied for section 17 (a) may be used) having reasonable scales showing the following: 5/ 6/ SEE ATTACHED ENGINEERING EXHIBIT 2(A)

(1) The 250, 25, 5, and 2 mv/m contours and if existing station show the same contours for licensed operation.

(2) If existing station, present normally protected or interference-free contours of the station (whichever includes the least area—all sources of interference must be considered in determining interference-free contours 6/) for both day and night operation.

(3) The normally protected contours of the station as proposed by your application for both night and day operation (without regard to interference from other stations).

(4) The interference-free contours of the station as proposed by your application for both night and day operation (if station would be limited inside the normally protected contours by any other station or stations).

(5) The present normally protected or interference-free contours of other stations to which objectionable interference may be caused by operation of the station as proposed by your application.

(6) The interference-free contours of the stations in (5) above considering the interference resulting from the operation of the station as proposed by your application.

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5/ See Standards of Good Engineering Practice Concerning Standard Broadcast Stations, Section I.

6/ Maps showing service contours shall exclude the areas which do not receive adequate service due to interference from electrical apparatus. All towns and cities having population in excess of those given in Table II of Section I of the Standards of Good Engineering Practice or other areas not receiving adequate service due to interference from electrical apparatus shall not be included in the tabulation of areas and populations within the service contours. The 1930 Census Minor Civil Division maps should be used in making population counts, subtracting any towns or cities not receiving adequate service and where the contour cuts a minor division, assume uniform distribution of population within division to determine the population included in the contours unless a more accurate count is made.

location of transmitter

KELL FIELD - 5 MILES NORTH OF WICHITA FALLS

(b) Give distance from proposed location of transmitter to each of such airports

KELL FIELD - 5 MILES NNE OF KWFT PLANT

(c) Name and give distance to any established AIRWAYS within 10 miles of proposed location of transmitter

FT. WORTH - WICHITA FALLS - AMARILLO AIRWAY

5 MILES NNE OF KWFT PLANT

17. Attach in triplicate: SEE ATTACHED ENGINEERING EXHIBIT 2(A)

(a) Map or maps having reasonable scales (not less than one-half inch per mile) clearly showing:

(1) Proposed location and present location if existing station;

(2) The character of the surrounding area, particularly the retail business, wholesale business, manufacturing, residential, and unpopulated areas (by symbols, cross-hatching, colored crayons, or other means);

(3) The density and distribution of population;

(4) The heights of all tall buildings or other structures in the vicinity of the antenna, indicating their location and how marked for air navigation;

(5) The location of airports, airways, and other radio stations, including receiving stations, except broadcast or amateur;

(6) The terrain and types of soil.

(b) Aerial photograph or photographs taken of the proposed location of the antenna showing clearly the character of the area within the 250 mv/m contour. (Ordinary photographs will be accepted if they

(j) Antenna ground (if used): How obtained 120 RADIALS, EACH
(Number and length
100 FEET LONG EXCEPT FOR OVERLAP, EQUALLY SPACED ABOUT
of radials and depth buried, etc.)
EACH TOWER AND BURIED 6 TO 8 INCHES.

(k) How is antenna excited (shunt or series)? SERIES

13. From whom will equipment be purchased? (Specify whether new or used SEE FOLLOWING LIST If used, where, how long, and what changes have been made or proposed. Attach additional sheets if necessary)

| | | |
|---|---|---|
| Transmitter | RCA MANUFACTURING CO. | EXISTING |
| Antenna | BLAW-KNOX COMPANY (2) | NEW |
| | LEHIGH STRUCTURAL STEEL CO. (2) | EXISTING |
| Studio equipment | RCA MANUFACTURING CO. | EXISTING |
| Frequency monitor | GENERAL RADIO CO. | EXISTING |
| Modulation monitor | GENERAL RADIO CO. | EXISTING |
| Other equipment | COUPLING EQUIPMENT | EXISTING |

14. Proposed location of transmitter: State TEXAS County WICHITA

City or town WICHITA FALLS Street and number APPROXIMATELY 2.5 MILES WNW AT RESETTLEMENT ROAD

North latitude: Degrees 33, minutes 55, seconds 07

West longitude: Degrees 98, minutes 32, seconds 37

15. (a) Number of broadcasting stations (by call letters) located within various distances of proposed location of transmitter is as follows:

1 mile NONE 2 miles NONE

3 miles NONE 8 miles NONE

(b) Number of nonbroadcasting (commercial or Government) RECEIVING stations located within various distances of proposed location of transmitter is as follows:

1 mile NONE 2 miles NONE 3 miles NONE

16. (a) Name and give location of all AIRPORTS within 10 miles of proposed

(n) Describe checking means used for determining if transmitter retains assigned frequency BY USE OF SEPARATE FREQUENCY MONITOR AND EMPLOYMENT OF A FREQUENCY CHECKING SERVICE.

(o) State name and type number of separate frequency monitor GENERAL RADIO FREQUENCY MONITOR TYPE 475B/681A

(p) Give Federal Communications Commission approval number 1452

11. Applicant states that there are attached hereto copies of an accurate schematic diagram of the fundamental radio and audio circuits of the transmitter proposed, including antenna and ground or counterpoise connections, antenna feed system, and that it indicates the type of tubes. (This diagram should be a blue print or ink drawing, if possible the size of this application.)

12. (a) Type of antenna4/ NON-DIRECTIONAL DAY;DIRECTIONAL NIGHT

(b) Height of vertical lead 400 feet. (Height above base insulator or base if grounded.)

(c) Length of flat top (if any) NONE feet.

(d) Give over-all height (in feet) above ground level 405 FEET

(e) Give over-all height (in feet) above mean sea level 1405 FEET

(f) Height (in feet) of building or substructure (distance from ground to base of antenna) 5 FEET

(g) Type (uniform cross section, tapered, etc., guyed or self-supporting) FOUR SELF-SUPPORTED, SQUARE, TAPERED, STEEL TOWERS

(h) If not fully described above, give complete details or attach sketch SEE ATTACHED ENGINEERING EXHIBIT 2(A)

(i) Counterpoise (if used): Type and dimensions NONE

4/ If directional antenna is proposed, complete engineering data thereon, in addition to the information under (a) to (l) inclusive, on each element, shall be submitted in triplicate properly verified by the engineer who designed it. It shall be clearly shown whether directional operation is for day or night or both and if so, whether the same pattern is proposed for both. If not, full information shall be submitted on each pattern.

10. Description of automatic frequency control equipment:

(a) Make RCA MANUFACTURING Co. Type No. UL4292

ALL DETAILS ON FILE WITH FCC.

(b) Give manufacturer's name, type of cut, and temperature coefficient in cycles per degree centigrade of the quartz crystal _____

_____

(c) By whom will unit be calibrated? _____

Calibrated frequency: _____ kilocycles at _____ degrees centigrade.

Proposed operating frequency: _____ kilocycles. (Give exact figure, correct to third decimal place at _____ degrees centigrade.)

(d) State guaranteed accuracy of the calibration: _____ cycles.

(e) State number of frequency control oscillators which will be maintained constantly at correct operating temperature and frequency in heat-controlled chambers _____

(f) Is provision made for instantaneous connection of spare frequency control units? _____

(g) Manufacturer's name and type of automatic temperature control _____

_____

(h) State within what limit automatic temperature control will hold the temperature _____ degrees centigrade.

(i) State temperature coefficient of the frequency control units: _____ cycles per degree centigrade.

(j) Is temperature coefficient positive or negative? _____

(k) State manufacturer's name and rated accuracy of: Thermostat _____

_____ Thermometer _____

(l) Attach the circuit diagram of automatic temperature-control system if not already on file with the Commission.

(m) Attach a sketch or drawing of the automatic temperature-control chamber, if not already on file with the Commission.

(f) Which radio stage is modulated? _____

(g) What system of modulation is employed (high level, low level, grid bias in last radio stage etc.)? _____

_____

(h) If low-level modulation is employed, give for modulated radio stage:

Number and type of tubes _____

Plate current, per tube _____ Plate voltage _____

(i) The transmitter is designed for what maximum percentage of satisfactory modulation? _____

_____

_____

(j) State name and type number of modulation monitor _____

RCA MODULATION MONITOR TYPE 66-A

_____

(k) Give Federal Communications Commission approval number 1552

(l) Specify manufacturer's name, type, number, and full-scale reading of the following meters:

(1) In last radio stage:

Plate voltmeter _____

Plate ammeter _____

(2) Antenna ammeter _____

(m) Describe the plate power supply for last radio stage _____

_____

Rating: Current _____ Voltage _____

(n) Maximum carrier power output of transmitter for satisfactory operation is _____ watts.

(o) Maximum rated carrier power of transmitter as determined by orders of the Federal Communications Commission is _____ watts.

TECHNICAL INFORMATION

9. Description of transmitting apparatus proposed to be installed:

(a) Make RCA MANUFACTURING Co. Type No. 5-DX
ALL DETAILS ON FILE WITH FCC.

(b) Oscillator: Type of circuit _____ Number, manufacturer's name, and type of tubes _____

Normal plate current, per tube _____ Plate voltage _____

(c) List buffer and intermediate power amplifier stages, by number and type of tubes in each stage _____

(d) Last radio stage: Number, manufacturer's name, and type of tubes _____

Normal night operation for power requested: Plate current, per tube _____

Plate voltage _____ If greater day power than night power is requested, specify the following:

Normal day operation: Plate current, per tube _____

Plate voltage _____

Describe fully the proposed method and procedure of reducing power at sunset _____

(e) Modulator or last audio stage: Number, manufacturer's name, and type of tubes and how operated (Class "A", "A Prime", or "B") _____

Normal plate current, per tube _____ Plate voltage _____

(e) State areas and number of persons residing within the contours required by section 18 (a) (5). 9/

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night | | | |
| Day | | | |

(f) State areas and number of persons residing within the contours required by section 18 (a) (6). 9/

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night | | | |
| Day | | | |

(g) Attach full explanation of methods used in determining the areas and populations.

20. Proposed location of main studio: State TEXAS County WICHITA

City or town WICHITA FALLS Street and number 800 EIGHTH STREET

Other studios maintained by station NONE

PROPOSED SERVICE

21. (a) Describe fully the character of program service proposed, showing the total average daily time to be devoted to each type of program, the sources of each, and attach as exhibits copies of all contracts or the substance of all understandings covering program service.

SHOWN BY WEEKLY PROGRAM - EXHIBIT 6 ON FILE

9/ If interference is to more than one station, attach figures for each station.

(b) The following is an analysis of the average number of hours proposed to be devoted monthly to the types of programs indicated including the percentage of the total monthly time during which it is proposed to carry commercial and sustaining programs. (The combined totals should equal 100 percent of the monthly time station is operated.)

| Commercial Programs | | | Sustaining Programs | | |
|---|---|---|---|---|---|
| | Number of hours | Percentage of total monthly hours station operated | | Number of hours | Percentage of total monthly hours station operated |
| (1) Entertainment | 208 | 40% | (1) Entertainment | 171.6 | 33% |
| (2) Educational | 32.2 | 6% | (2) Educational | 52. | 10% |
| (3) Religious | 20.8 | 4% | (3) Religious | 20.8 | 4% |
| (4) Agricultural | | 0 | (4) Agricultural | 15.6 | 3% |
| (5) Fraternal | | 0 | (5) Fraternal | | 0 |
| (6) News | | INCLUDED IN EDUCATIONAL | (6) News | | INCLUDED IN EDUCATIONAL |
| (7) | | | (7) | | |

22. Describe fully any new or additional service not now rendered in the area to be served which will be given by the proposed station or as a result of the construction proposed in the application. Show how the proposed service will differ from service presently rendered in the area.

KWFT PROPOSES TO SERVE A LARGER AREA NIGHTTIME THAN IT IS NOW SERVING BY VIRTUE OF THE INCREASED POWER WITH THE SAME TYPE PROGRAM SERVICE HERETOFORE USED. THE INCREASED AREA (EXCEPT THAT ADJACENT TO FORT WORTH AND DALLAS) IS NOT NOW RECEIVING A DEPENDABLE RADIO SERVICE FROM ANY RADIO STATION.

23. If any change, set forth fully plans for staffing the station and set forth as fully as possible in Exhibit XX the name, address, citizenship, experience, and salary of each member of station personnel. Show the position and duties of each and the specific part

each will take in carrying out applicant's proposed plan of program service. If none, so state NONE REQUIRED

24. (a) What percentage of the total monthly time will be used for mechanical records (i.e., phonograph records, electrical transcriptions, etc.)? 14% MONTHLY

(b) Does applicant contemplate obtaining programs from a chain? YES If so, what percentage of the total monthly time will be used for chain programs (i.e., programs both paid and sustaining)? 45% MONTHLY

(c) Has any correspondence been had, or have any negotiations, discussions, or understandings (oral or written) been entered into with respect to chain or network programs? NONE WITH RESPECT TO THIS APPLICATION (Yes or No)

If so, attach as Exhibit 3 ON FILE a full and detailed description thereof with copies of all correspondence, understandings, and contracts.

(d) Does applicant retain the right to determine at all times what programs shall in the public interest be broadcast? YES (Yes or No)

Attach as Exhibit 4 ON FILE a statement fully describing this condition, show to what extent applicant will or will not have such right and cite the contract provisions upon which applicant relies in making this statement.

FULL INFORMATION

25. Applicant states that if any further information is necessary for a full disclosure with respect to construction, location, facilities, operation, service, assets, obligations, or otherwise not already fully explained, the following is a complete disclosure with respect thereto

COMPLETE DISCLOSURE IS MADE

26. Applicant states--
That the direct objects to be attained by the construction, changes in construction or modification of license contemplated by the application are as follows: TO INCREASE THE SERVICE AREA OF KWFT NIGHTTIME THROUGHOUT TEXAS AND OKLAHOMA, PARTICULARLY IN THAT PORTION OF THE PROPOSED INCREASED COVERAGE AREA THAT DOES NOT NOW RECEIVE DEPENDABLE RADIO SERVICE FROM ANY OTHER BROADCAST STATION. THE PROPOSED NIGHTTIME INCREASE WILL SERVE APPROXIMATELY 300,000 PEOPLE NOT NOW RECEIVING DEPENDABLE RADIO SERVICE, NIGHTTIME, FROM ANY REGIONAL RADIO STATION.

EXHIBITS IDENTIFIED

27. There are attached hereto the following described and identified exhibits, which have been prepared by applicant (if an individual or partnership) or by or under the direction of the officer or officers of applicant whose respective names and official titles appear opposite the exhibit prepared by each. (List here all exhibits attached to the application.)

| Exhibit No. | Description of information | Name of officer (1) by whom or (2) under whose direction exhibit was prepared (show which) | Official title |
|---|---|---|---|
| 1 * | F.C.C. 706 FORM | JOE B. CARRIGAN | PRESIDENT |
| 2 * | ENGINEERING EXHIBITS | JOE B. CARRIGAN | PRESIDENT |
| 3 * | NETWORK PROGRAMS | JOE B. CARRIGAN | PRESIDENT |
| 4 * | CONTROL OF PROGRAMS | JOE B. CARRIGAN | PRESIDENT |
| 5 * | AUTHORIZATION OF APPLICATION | DOROTHY DIEBOLD | ASST.SECRETARY |
| 6 * | WEEKLY PROGRAM KWFT | JOE B. CARRIGAN | PRESIDENT |
| 2 (A) | ENGINEERING EXHIBITS | JOE B. CARRIGAN | PRESIDENT |
| * DENOTES THAT EXHIBIT IS ON FILE - B3-ML-1057. | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

28. There are listed below the names and addresses of all counsel (legal, engineering, accounting, or persons in any other capacity), together with the name and address of firm, if any, with which connected who prepared or assisted in preparing the application and/or exhibits. (Identify opposite the name of each such person the item number of this application and/or the exhibit which he prepared or assisted in preparing. Where the answer contained in any such item or exhibit involves representations of fact an affidavit must be furnished from the person on whose knowledge the statement is based to the effect that the facts stated are true of his own knowledge, except as to such statements as are therein stated on information and belief, and as to such statements he believes them to be true. Where the statement of information consists of expert opinion such statement must be signed by the attorney, engineer, or accountant. There must also be included in such statement a full description of the qualifications of the expert.) 1/

| Item or Exhibit No. | Description of information | Name and address of the party who prepared or assisted in preparing the Item or Exhibit and name and address of firm with which connected. |
|---|---|---|
| 2 & 2(A) | ENGINEERING EXHIBITS | A. EARL CULLUM, JR. |
| | | CONSULTING RADIO ENGINEER |
| | | DALLAS, TEXAS |
| X | LEGAL REPRESENTATION | JOE B. CARRIGAN |
| | | WICHITA FALLS, TEXAS |
| | | BRYON G. CARSON |
| | | WASHINGTON, D.C. |
| | | |

AUTHORITY OF ANY OTHER REGULATORY AGENCY OBTAINED

29. If any part of the proposal involved in this application is subject to regulation or approval by any other Federal or State body, show here the character and status of such proceeding and submit certified copies of all pleadings filed therewith, together with any orders issued by said body No

1/ See footnote 1/, page 1.

30. If the construction permit is granted, the construction will be commenced within 21 days of the granting thereof and will be completed and the station ready for operation within 90 days thereafter.

31. The applicant waives any claim to the use of any particular frequency or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests a construction permit, modification of construction permit or modification of license in accordance with this application.

32. (A) Applicant, if a legal entity other than an individual or partnership, states:

(a) That the making of this application is authorized by RESOLUTION (Resolution or act) of the BOARD OF DIRECTORS AND STOCKHOLDERS (Board of directors or other governing body) adopted at a meeting held at WICHITA FALLS, TEXAS (Place) on JANUARY 13, 1941 (Date)

(b) That there are attached hereto as Exhibits 5 ON FILE properly certified copies of extracts from the minutes of said meeting affirmatively showing:

(1) That a quorum of members required by the bylaws having authority to act was present.

(2) That the resolution was voted upon favorably by a majority (or the number required by the bylaws) of those present and having authority to vote on the resolution.

(3) That the officer executing this application is authorized to do so.

(B) If application is executed on behalf of applicant by attorney

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1/ See footnote 1/ on page 1.

there is attached hereto as Exhibit XX cogent evidence of his authority to act. 10/

33. All the statements made in the application and attached exhibits are considered material representations, and all the exhibits are a material part hereof and are incorporated herein as if set out in full in the application.

Dated this 6TH day of APRIL, 1942.

WICHITA BROADCASTING COMPANY
(Name of applicant) 2/

By Lee B. Garrigan
PRESIDENT AND ATTORNEY
(Authorized officer or attorney) 10/

(Be sure all necessary information is furnished and all questions are fully answered. If any portions of the application are not applicable, specifically so state, and show reasons therefor. Defective applications may be returned without consideration—Sec. 1.72, Rules of Practice and Procedure.)

---

2/ See footnote 2/ on page 1.

10/ Must be executed by applicant if an individual; by one of the partners of applicant, if a partnership; by an officer of applicant, if a corporation or association or by attorney of applicant only under conditions shown in Sec. 1.121, Rules of Practice and Procedure, in which event satisfactory evidence of disability of applicant or his absence from the continental United States, and authority of attorney to act must be submitted with application.

(OVER)

STATE OF TEXAS )
) ss:
COUNTY OF DALLAS )

JOE B. CARRIGAN, being duly (sworn upon his oath, (affirmed according to law,

deposes and says that he is the _____
(If applicant is not an individual, show

PRESIDENT AND ATTORNEY OF WICHITA BROADCASTING COMPANY
official relationship of affiant to applicant)

above-named applicant, and that the facts stated in the foregoing application and all exhibits attached thereto are true of his own knowledge, except as to such statements as are therein stated on information and belief, and as to such statements he believes them to be true. (See Sec. 1.121, Rules of Practice and Procedure.)

Joe B. Carrigan
Affiant 10/

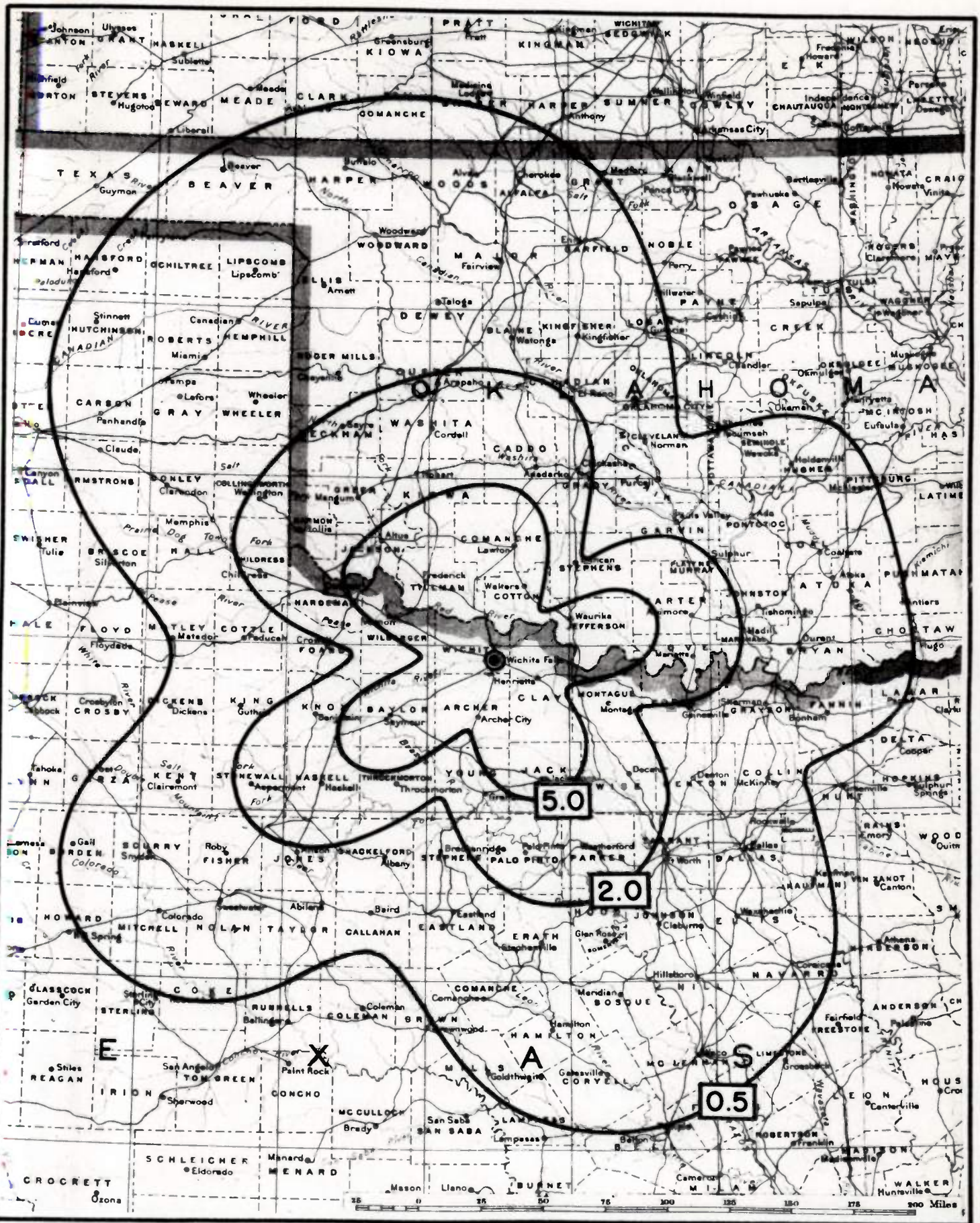
Subscribed and sworn to before me this 6TH day of APRIL, 1942.

[SEAL]

Ethelene Jackson
Dallas County Notary Public.

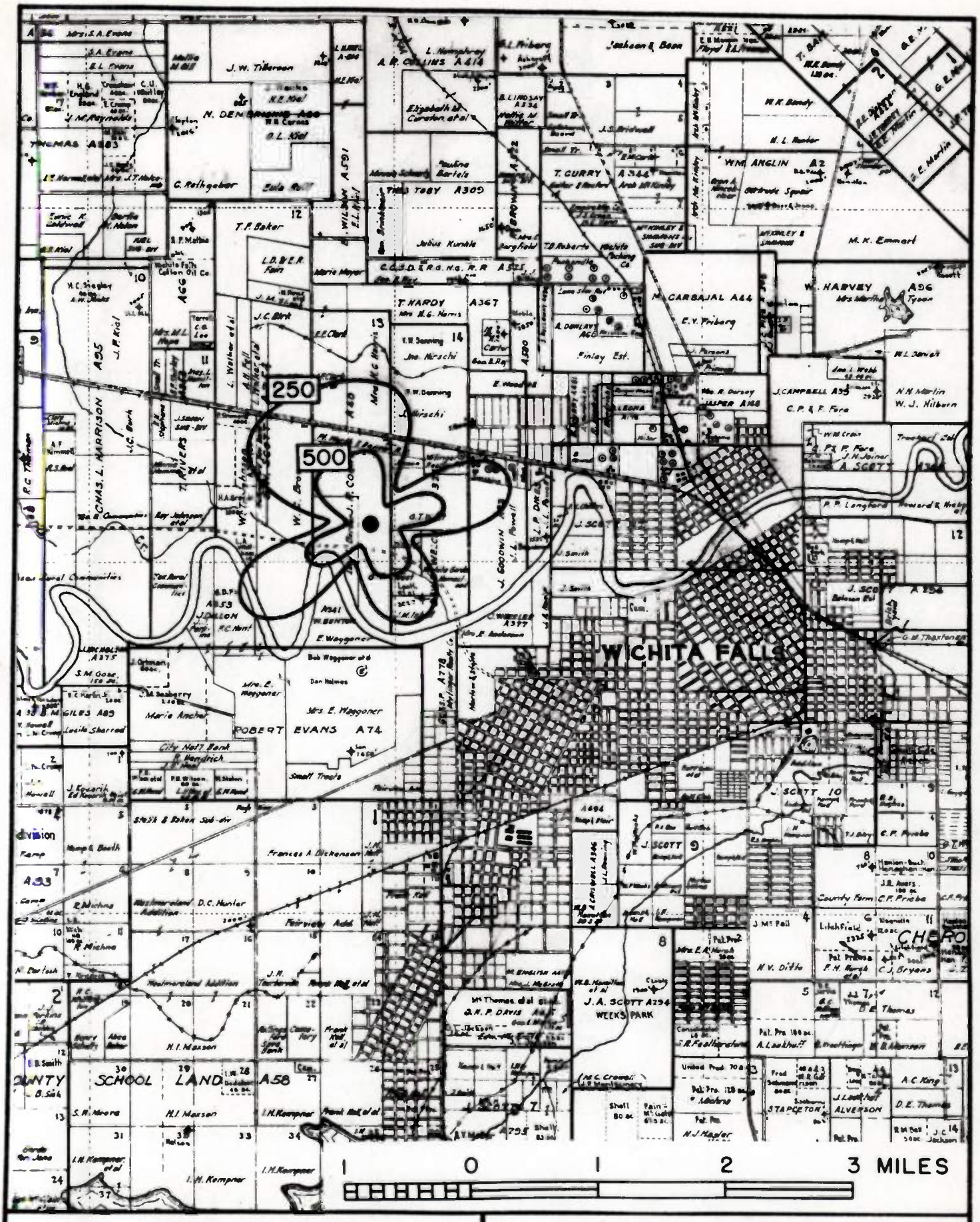
(Notary public's seal must be affixed where law of jurisdiction requires, otherwise state that law does not require seal.)

My commission expires JUNE 1, 19 43.



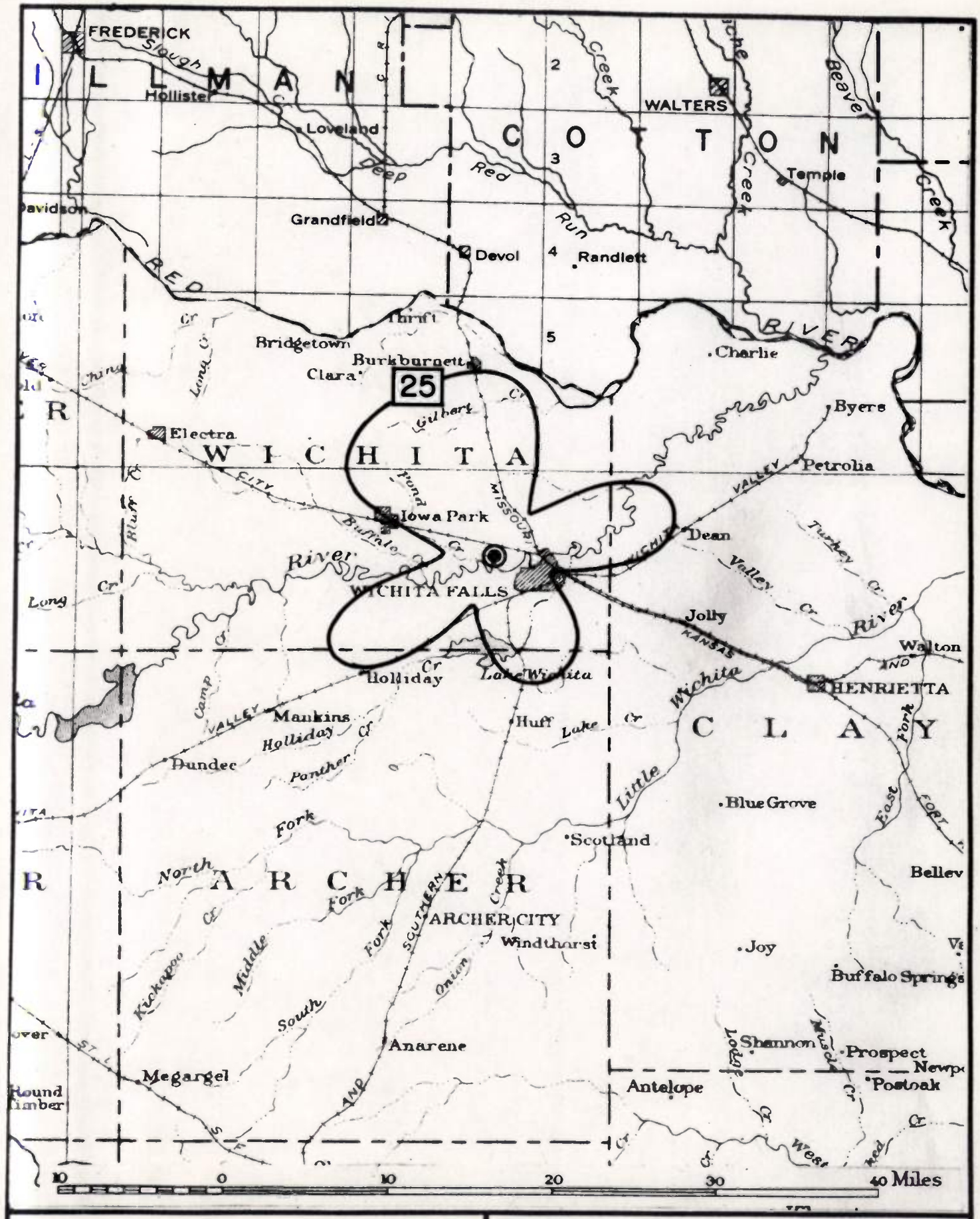

A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
DALLAS 420325

RADIO STATION KWFT
EXISTING 620 KC 5 KW-DA
EXHIBIT NUMBER IIC

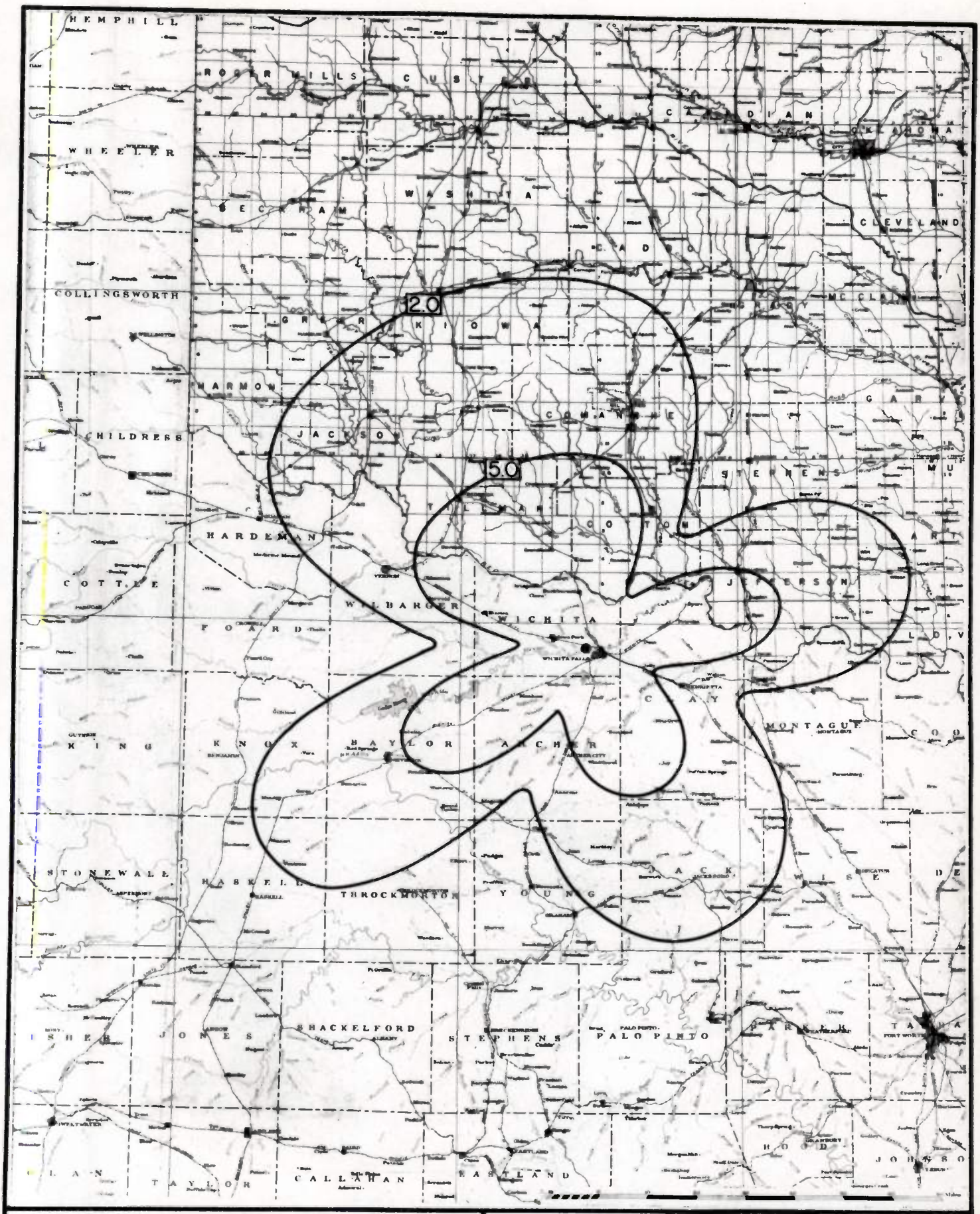



A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
DALLAS 420325

RADIO STATION KWFT
EXISTING 620 KC. 1 KW-DA.
EXHIBIT NUMBER 12A




| | |
|---|---|
| A. EARL CULLUM, JR.<br>CONSULTING RADIO ENGINEER<br>DALLAS 420325 | RADIO STATION KWFT<br>EXISTING 620 KC. 1 KW-DA.<br>EXHIBIT NUMBER 12 B |




| | |
|---|---|
| A. EARL CULLUM, JR.<br>CONSULTING RADIO ENGINEER<br>DALLAS 420325 | RADIO STATION KWFT<br>EXISTING 620 KC. 1 KW-DA.<br>EXHIBIT NUMBER 12C |

| | |
|---|---|
| A. EARL CULLUM, JR.<br>CONSULTING RADIO ENGINEER<br>DALLAS 420325 | RADIO STATION KWFT<br>EXISTING 620 KC. 1 KW-DA.<br>EXHIBIT NUMBER 12D |

NORTH
EXHIBIT 13A

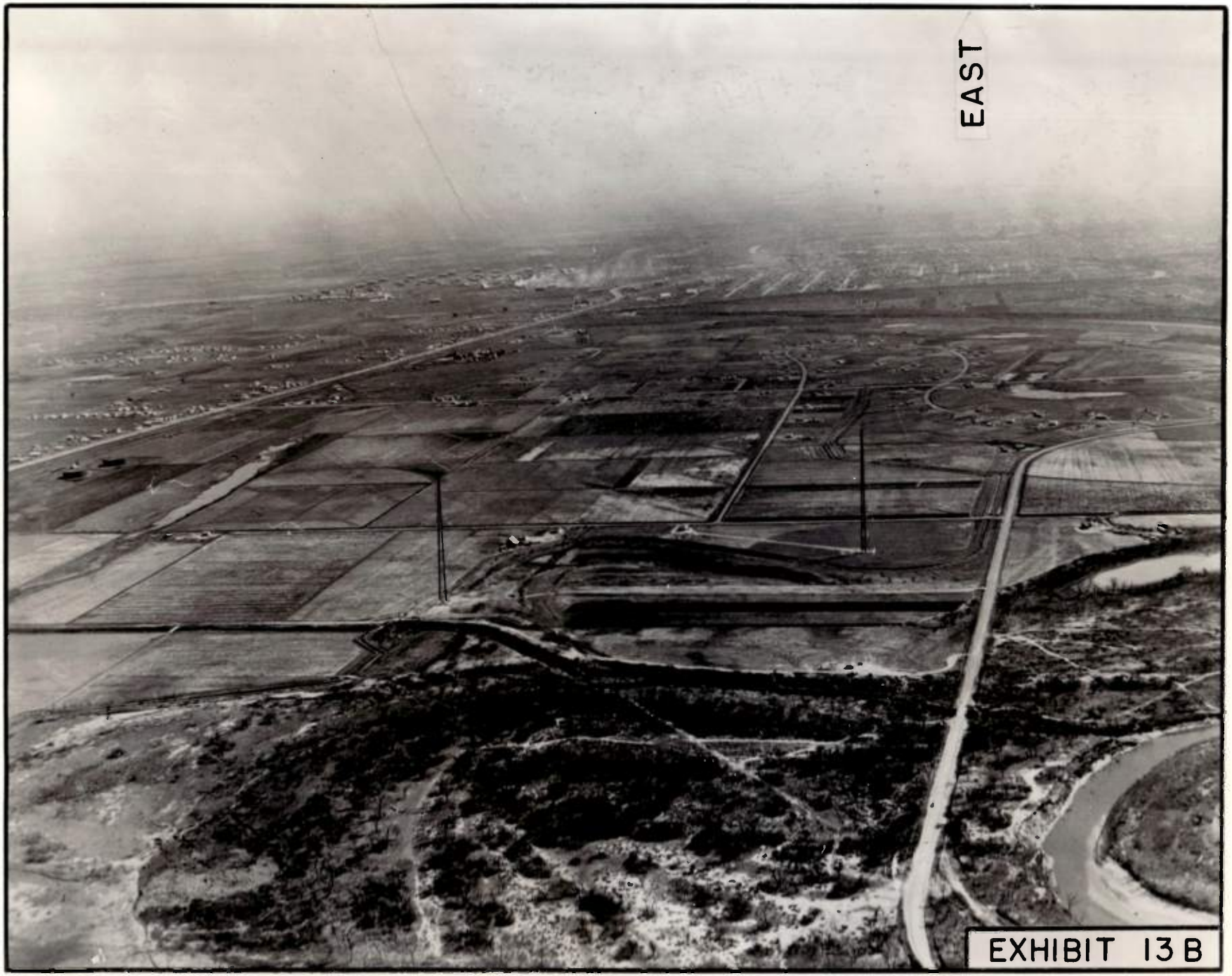

EAST
EXHIBIT 13 B

EXHIBIT 13C

WEST
EXHIBIT 13D

EXHIBIT_____

STAUFFER PUBLICATIONS, INCORPORATED

ADJUSTMENTS, MEASUREMENTS, AND

APPLICATION FOR DIRECT MEASUREMENT OF POWER

RADIO STATION KGNC

AMARILLO, TEXAS

710 kHz, 10 kW, DA-2

A. EARL CULLUM, JR. AND ASSOCIATES

CONSULTING ENGINEERS

671130

ENGINEERING STATEMENT OF DARWIN A. PETERSON OF THE FIRM OF A. EARL CULLUM, JR. AND ASSOCIATES, CONSULTING ENGINEERS, IN CONNECTION WITH ADJUSTMENTS, MEASUREMENTS, AND APPLICATION FOR DIRECT MEASUREMENT OF POWER FOR OPERATION OF RADIO STATION KGNC, AMARILLO, TEXAS, ON 710 KILOHERTZ WITH 10 KILOWATTS OF POWER AND DIFFERENT DIRECTIONAL ANTENNA PATTERNS DAYTIME AND NIGHTTIME

* * *

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 firm has been employed by Stauffer Publications, Incorporated, in connection with adjustments, measurements, and application for direct measurement of power for operation of Radio Station KGNC, Amarillo, Texas, on 710 kilohertz with 10 kilowatts of power and different directional antenna patterns daytime and nighttime.

On September 3, 1967, a tornado struck the KGNC transmitting facility and destroyed all five towers, coaxial transmission lines, coaxial sampling lines, and power and control circuits between the transmitter building and the towers. All of the damaged material has been replaced, the antenna system has been adjusted substantially in accordance with the licensed operating parameters, and the facility is back in operation with 10 kilowatts of power determined by the indirect method.

## ADJUSTMENT AND MEASUREMENTS

The KGNC nighttime directional array consists of five towers in a line. The KGNC daytime directional array consists of three of the five towers. The center tower is used for non-directional test operation. The sampling line isolation coil at the base of each of the five towers was adjusted by means of a capacitor to provide minimum tower current at the sampling loop which is located on the tower approximately twenty feet above ground.

The resistance at the base of the center tower was measured with a radio-frequency bridge. The tower was fed with 5 kilowatts of power while field intensity measurements were carried along seven radials starting at the line of towers north, proceeding clockwise to include four radials with specified fields and one unspecified radial, and stopping at the line of towers south. Measurements of non-directional operation were not taken on the west side of the array because previous proofs of performance had shown that the radiation patterns were symmetrical about the line of towers.

The resistance at the common point of input to the antenna system was measured with a radio-frequency bridge for both the daytime and nighttime arrays. The common point of input was fed with 10.5 kilowatts of power while field intensity measurements were carried out along the above seven radials and six additional radials to include all radials with specified fields and additional radials to determine the shape of the daytime and nighttime patterns.

The adjustments of the antenna system, the radio-frequency bridge measurements, and the field intensity measurements were made by L. F. Heithecker, an associate engineer of this firm who is known to me to be qualified for such work. The field intensity measurements were taken with a Nems-Clarke Type 120E field intensity meter, Serial Number 1391, which was last calibrated by the manufacturer on October 3, 1966. On October 24, 1967, the meter was compared with a Type 120E, Serial Number 1409, which was last calibrated by the manufacturer on November 18, 1966, and found to agree within the rated accuracy of these meters.



WRH

New point locations maps have been prepared from 7.5-minute topographic quadrangle maps which were not available when the original 1947 proof of performance was made. Several of the monitoring points have been relocated slightly to put them on the radials based on the newer maps. New photographs and descriptions of the monitoring points have been prepared.

## ATTACHED FIGURES

The following attached figures have been prepared under my direction to show the results of the adjustment and measurements:

1. Description of the antenna system, theoretical and operating parameters, and meter data.
2. Horizontal radiation patterns and data for 5-kW non-directional, 10-kW daytime directional, and 10-kW nighttime directional operations.
3. Data and graph for field intensity measurements along radial 5 degrees true.
4. Data and graph for field intensity measurements along radial 38 degrees true.
5. Data and graph for field intensity measurements along radial 59 degrees true.
6. Data and graph for field intensity measurements along radial 79 degrees true.
7. Data and graph for field intensity measurements along radial 100 degrees true.
8. Data and graph for field intensity measurements along radial 128 degrees true.
9. Data and graph for field intensity measurements along radial 144 degrees true.
10. Data and graph for field intensity measurements along radial 185 degrees true.
11. Data and graph for field intensity measurements along radial 226 degrees true.
12. Data and graph for field intensity measurements along radial 270 degrees true.
13. Data and graph for field intensity measurements along radial 291 degrees true.
14. Data and graph for field intensity measurements along radial 311 degrees true.
15. Data and graph for field intensity measurements along radial 332 degrees true.
16. Maps showing locations at which field intensity measurements were taken.
17. Monitoring point descriptions and data.
18. Description of equipment and method used and results of measurements for determining power by the direct method.

## CONCLUSION

On the basis of the attached measurement data, it is my belief that the KGNC directional antenna system has been adjusted so that the radiation patterns are in substantial agreement with the original proof of performance patterns and that all protection requirements are being met.

Darwin A. Peterson

Subscribed and sworn to before me
on this 3rd day of February, 1968.
My Commission expires June 1, 1969.

Notary Public, Dallas County, Texas

RADIO STATION KGNC

AMARILLO, TEXAS

## DESCRIPTION OF DIRECTIONAL ANTENNA SYSTEM

| | |
|---|---|
| Number and Type of Elements: | Five, uniform cross-section, guyed, series-excited vertical steel towers. |
| Height above Insulators: | 300' (78°) |
| Overall Height: | 308' |
| Spacing and Orientation: | Spaced 616' (160°)between adjacent towers. Line of towers bears 5° true. |
| Nondirectional Antenna: | None used |
| Ground System consists of: | 120 - 350' copper radials elevated 7' above ground for the first 45' and buried 6 to 8 inches beyond 45'. Radials equally spaced about the base of each tower. |

## THEORETICAL SPECIFICATIONS

| | | S (1) | SC (2) | C (3) | NC (4) | N (5) |
|---|---|---|---|---|---|---|
| Phasing | Night: | 120° | -120° | 0° | 120° | -120° |
| | Day: | 180° | -90° | 0° | - | - |
| Field Ratios | Night: | 1.00 | 2.88 | 3.88 | 2.88 | 1.00 |
| | Day: | 0.16 | 0.693 | 1.00 | - | - |

## OPERATING SPECIFICATIONS

| | | | | | | |
|---|---|---|---|---|---|---|
| Phase Indication* | Night: | 129° | -119° | 0° | 117° | -126° |
| | Day: | 170° | -90° | 0° | - | - |
| Antenna Base Current Ratio | Night: | 0.264 | 0.700 | 1.00 | 0.709 | 0.255 |
| | Day: | 0.162 | 0.697 | 1.00 | - | - |
| Phase Monitor Sample Current Ratio* | Night: | 0.252 | 0.685 | 1.00 | 0.710 | 0.250 |
| | Day: | 0.165 | 0.700 | 1.00 | - | - |

* As indicated by Nems-Clarke Type 112 Phase Monitor

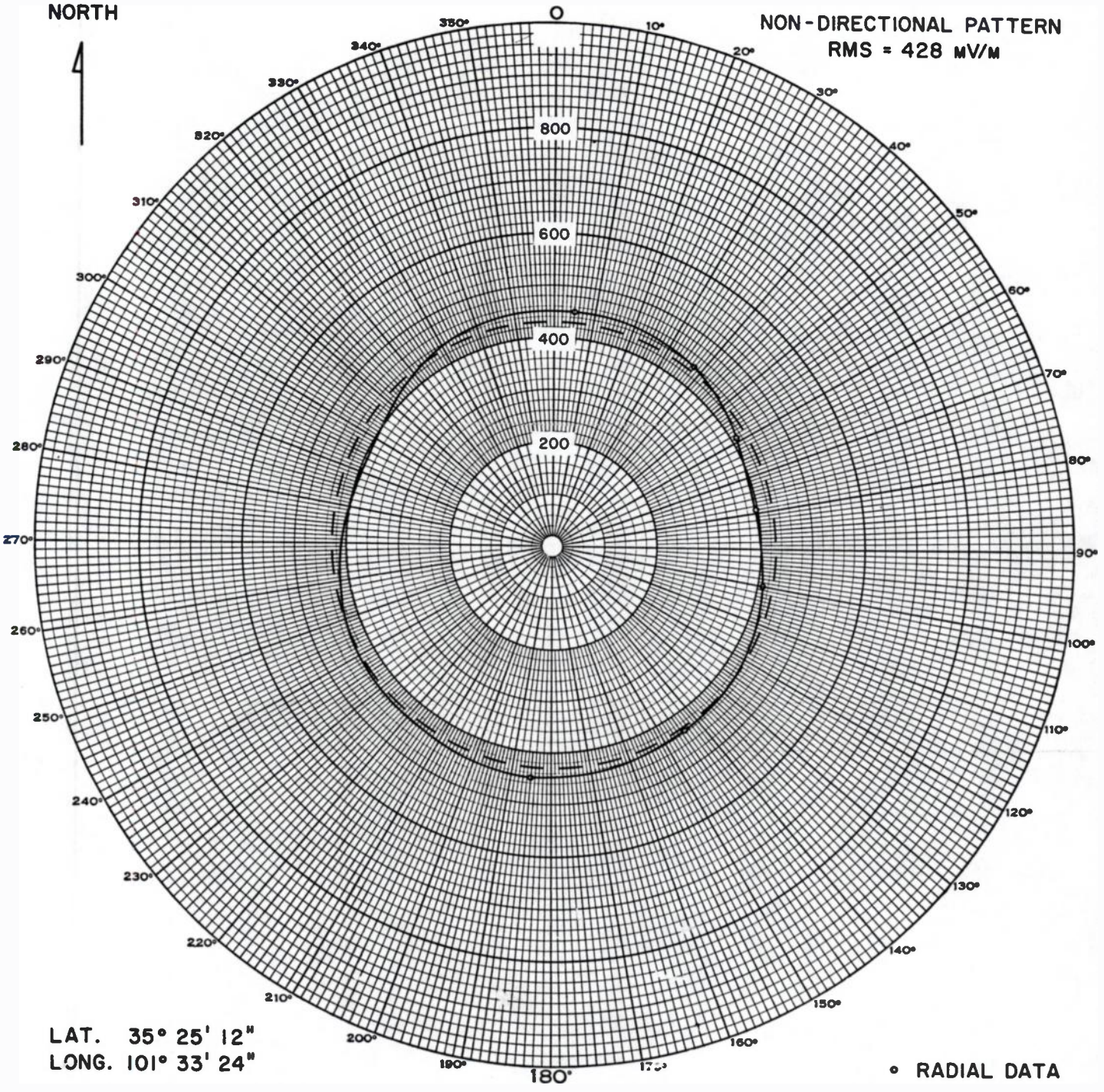
RADIO STATION KGNC

AMARILLO, TEXAS

METER READINGS FOR NORMAL OPERATION

| Meter Function | Location | Make | Model | Full Scale | Observed Indication DA-D | Observed Indication DA-N |
|---|---|---|---|---|---|---|
| Plate Voltage | Transmitter | Weston | 741 | 12 kV | 9.3 kV | 9.3 kV |
| Plate Current | Transmitter | Weston | 741 | 3 A | 1.43 A | 1.42 A |
| Common Point | Trans. Bldg. | Weston | 743ES | 20 A | 14.43 A | 14.43 A |
| Antenna No. 1 Loop Current | Trans. Bldg. | API | * | 110 uA | 16.5 uA | 25.2 uA |
| Antenna No. 2 Loop Current | Trans. Bldg. | API | * | 110 uA | 70.0 uA | 68.5 uA |
| Antenna No. 3 Loop Current | Trans. Bldg. | API | * | 110 uA | 100 uA | 100 uA |
| Antenna No. 4 Loop Current | Trans. Bldg. | API | * | 110 uA | - | 71.0 uA |
| Antenna No. 5 Loop Current | Trans. Bldg. | API | * | 110 uA | - | 25.0 uA |
| Antenna No. 1 Base Current | South Tower | Weston | 743ES | 5 A | 2.35 A | 2.90 A |
| Antenna No. 2 Base Current | South-Center Tower | Weston | 743ES | 15 A | 10.1 A | 7.70 A |
| Antenna No. 3 Base Current | Center Tower | Weston | 743ES | 20 A | 14.5 A | 11.0 A |
| Antenna No. 4 Base Current | North-Center Tower | Weston | 743ES | 15 A | - | 7.80 A |
| Antenna No. 5 Base Current | North Tower | Weston | 743ES | 5 A | - | 2.80 A |

* Part of Nems-Clarke Phase Monitor

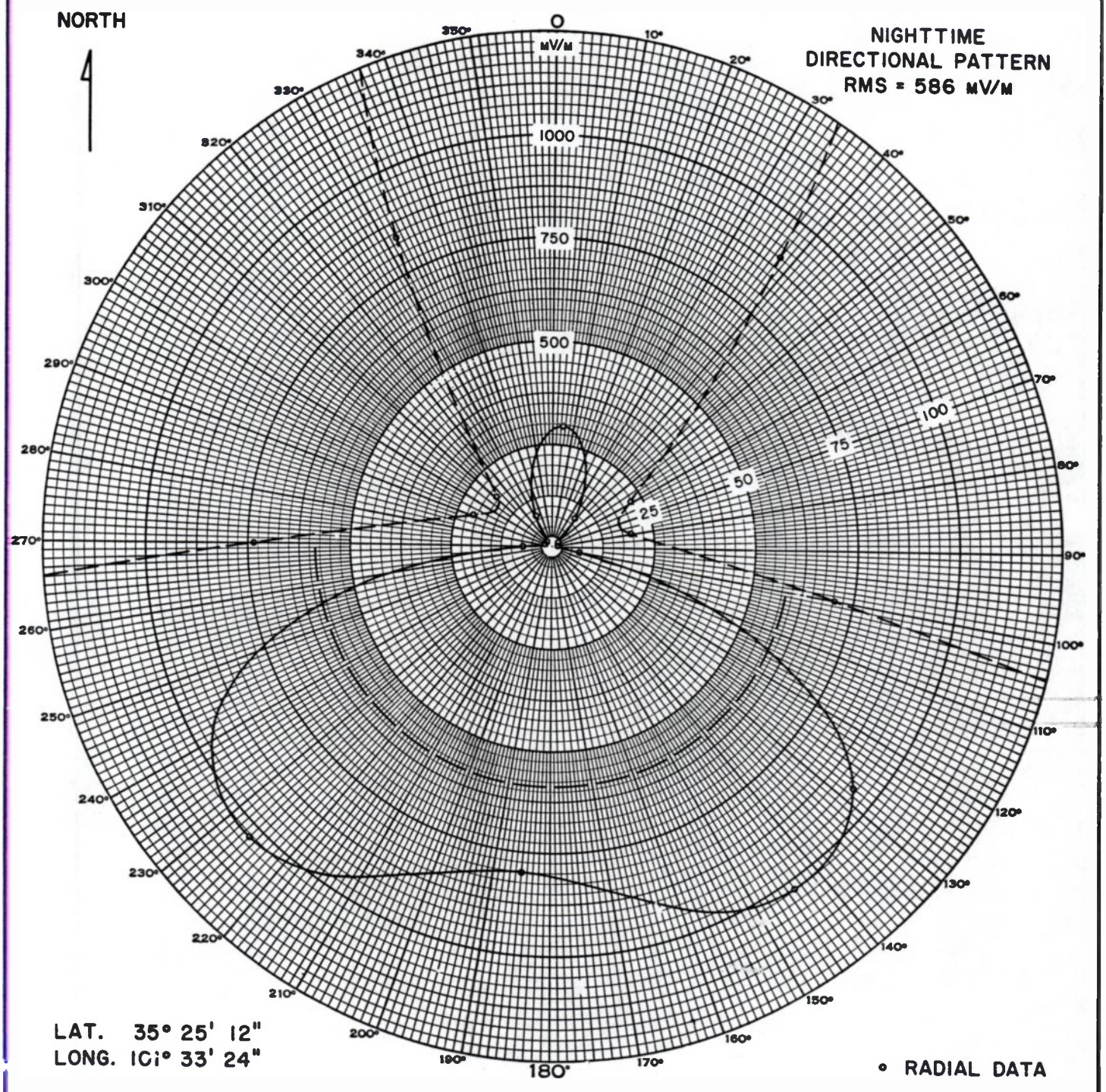


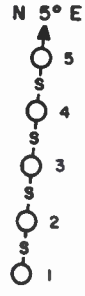
G = 300' = 78°
S = 616' = 160°

5 KILOWATT
NON-DIRECTIONAL
TEST OPERATION

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

RADIO STATION KGNC
710 kHz 10 kW DA-2
671130 FIGURE 2A



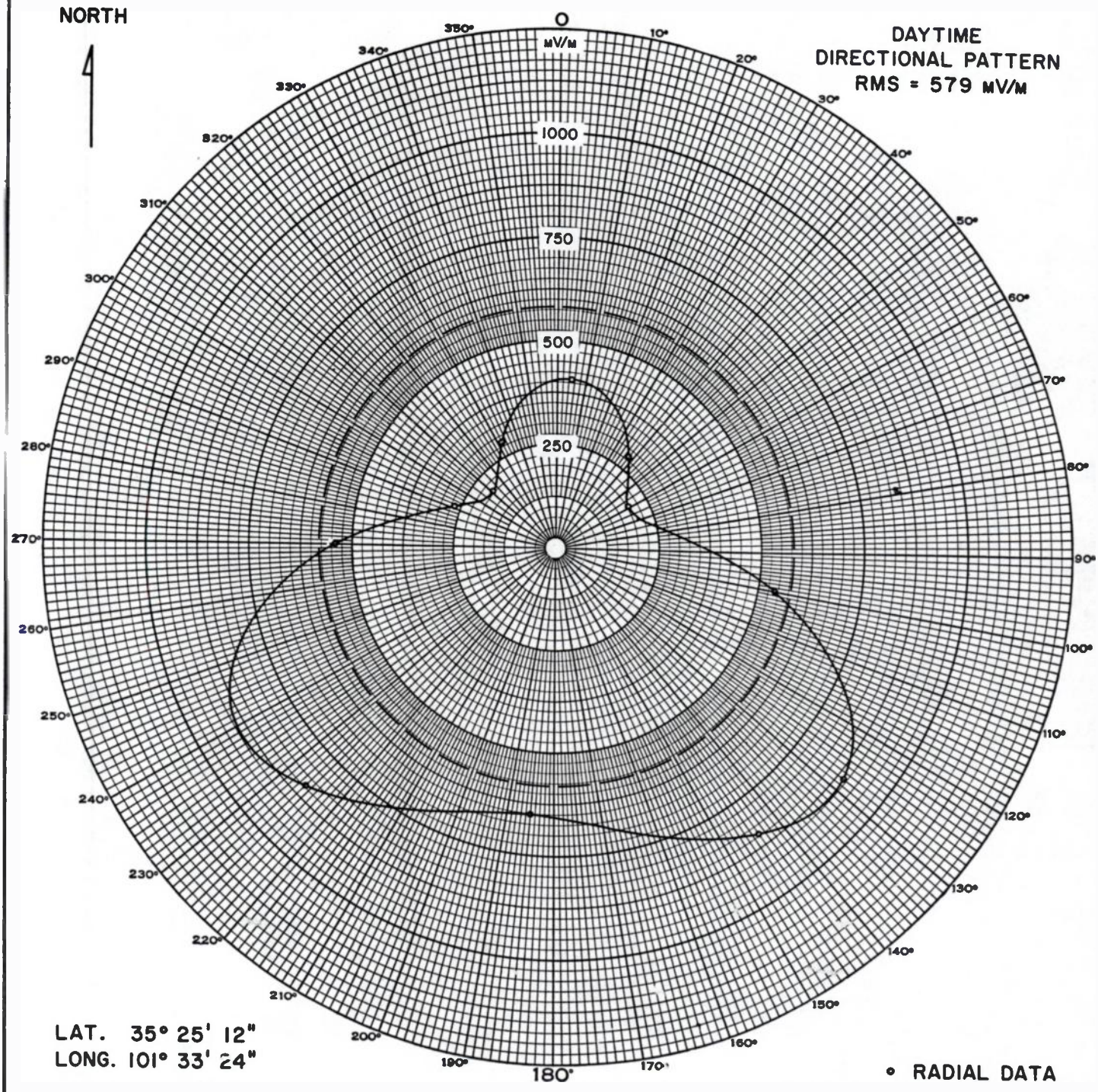

G = 300' = 78°
S = 616' = 160°

OPERATING PARAMETERS

| TOWER | THEORETICAL FIELD | THEORETICAL PHASE | OBSERVED FIELD | OBSERVED PHASE |
|---|---|---|---|---|
| 1 | 1.000 | 120° | 0.252 | 129° |
| 2 | 2.880 | -120° | 0.685 | -119° |
| 3 | 3.880 | 0° | 1.000 | 0° |
| 4 | 2.880 | 120° | 0.710 | 117° |
| 5 | 1.000 | -120° | 0.250 | -126° |

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

RADIO STATION KGNC
710 kHz 10 kW DA-2
671130 FIGURE 2C



G = 300' = 78°
S = 616' = 160°

OPERATING PARAMETERS

| TOWER | THEORETICAL FIELD | THEORETICAL PHASE | OBSERVED FIELD | OBSERVED PHASE |
|---|---|---|---|---|
| 1 | 0.160 | 180° | 0.165 | 170° |
| 2 | 0.693 | - 90° | 0.700 | - 90° |
| 3 | 1.000 | 0° | 1.000 | 0° |
| 4 | — | — | — | — |
| 5 | — | — | — | — |

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

RADIO STATION KGNC
710 kHz 10 kW DA-2
671130 FIGURE 2B

RADIO STATION KGNC

AMARILLO, TEXAS

TABULATION OF UNATTENUATED FIELDS

| Radial Azimuth | 5 kW ND mV/m | 10 kW DA-D | | 10 kW DA-N | |
|---|---|---|---|---|---|
| | | Measured mV/m | Specified mV/m | Measured mV/m | Specified mV/m |
| 05° | 450 | 407 | 448 | 294 | 310 |
| 38° | 440 | 287 | - | 90.2 | 100 |
| 59° | 408 | 203 | 250 | 22.3 | 46 |
| 79° | 397 | - | - | 19.3 | 40 |
| 100° | 410 | 541 | - | 70.5 | 105 |
| 128° | - | 890 | - | 943 | - |
| 144° | 437 | 843 | - | 1123 | - |
| 185° | 450 | 652 | - | 801 | - |
| 226° | 437* | 845 | - | 1130 | - |
| 270° | 410* | 542 | - | 73.2 | 105 |
| 291° | 397* | 267 | - | 21.3 | 40 |
| 311° | 408* | 203 | 250 | 18.1 | 46 |
| 332° | 440* | 287 | - | 83.8 | 100 |

* Nondirectional test pattern assumed to be symmetrical about line of towers.

671130

FIGURE 2D

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

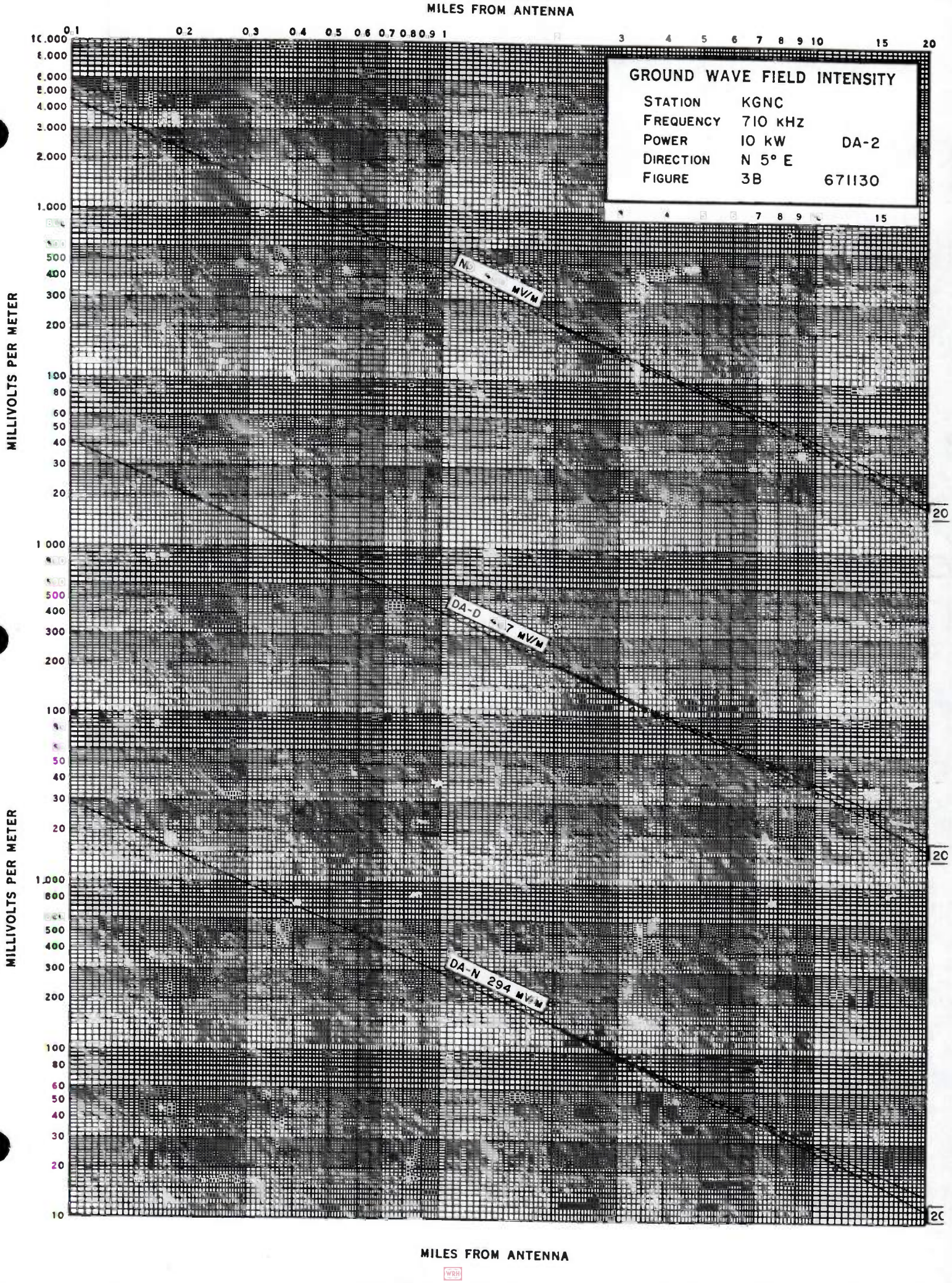
AZIMUTH N 05° E

| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | Log of Ratio DA-N/DA-D | Log of Ratio DA-D/ND | Log of Ratio DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 2.44 | 193 | 174 | 125 | -.144 | -.045 | -.189 |
| 2 | 2.63 | 194 | 172 | 125 | -.139 | -.052 | -.191 |
| 3 | 2.90 | 160 | 147 | 103 | -.155 | -.037 | -.191 |
| 4 | 3.05 | 140 | 127 | 93.0 | -.136 | -.042 | -.178 |
| 5 | 3.28 | 123 | 113 | 83.0 | -.134 | -.037 | -.172 |
| 6 | 3.52 | 121 | 111 | 82.0 | -.132 | -.037 | -.169 |
| 7 | 3.79 | 113 | 105 | 75.0 | -.146 | -.032 | -.178 |
| 8 | 4.03 | 117 | 104 | 78.0 | -.125 | -.051 | -.177 |
| 9 | 4.37 | 100 | 90.5 | 65.5 | -.141 | -.044 | -.184 |
| 10 | 4.83 | 95.0 | 84.0 | 62.3 | -.130 | -.054 | -.183 |
| 11 | 5.27 | 89.0 | 80.0 | 59.0 | -.133 | -.047 | -.179 |
| 12 | 5.76 | 79.0 | 71.5 | 52.0 | -.138 | -.043 | -.182 |
| 13 | 6.28 | 72.0 | 68.0 | 48.0 | -.151 | -.025 | -.177 |
| 14 | 6.76 | 63.5 | 57.0 | 41.6 | -.137 | -.047 | -.184 |
| 15 | 7.79 | 58.0 | 52.5 | 37.8 | -.143 | -.043 | -.186 |
| 16 | 8.37 | 49.5 | 43.8 | 32.0 | -.136 | -.053 | -.190 |
| 17 | 9.48 | 43.8 | 39.7 | 28.0 | -.152 | -.043 | -.195 |
| 18 | 9.83 | 45.0 | 40.2 | 29.0 | -.142 | -.049 | -.191 |
| 19 | 10.1 | 39.8 | 35.3 | 25.5 | -.141 | -.052 | -.193 |
| 20 | 11.5 | 33.7 | 30.5 | 21.5 | -.152 | -.044 | -.195 |
| 21 (MP) | 14.2 | 29.7 | 27.2 | 19.5 | -.144 | -.038 | -.183 |
| | | Log Average | | | -.140 | -.044 | -.184 |
| | | Antilog | | | .725 | .904 | .654 |

Nondirectional measured November 9 and 10, 1967

Daytime directional measured November 15, 1967

Nighttime directional measured November 16, 1967


MILES FROM ANTENNA
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 3 4 5 6 7 8 9 10 15 20
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW DA-2
DIRECTION N 5° E
FIGURE 3B 671130
MILLIVOLTS PER METER
10,000 8,000 6,000 5,000 4,000 3,000 2,000 1,000 500 400 300 200 100 80 60 50 40 30 20 10
DA-D 7 MV/M
DA-N 294 MV/M
20
MILLIVOLTS PER METER
1,000 800 500 400 300 200 100 80 60 50 40 30 20
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

AZIMUTH N 38° E

| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | Log of Ratio DA-N/DA-D | Log of Ratio DA-D/ND | Log of Ratio DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 2.03 | 224 | 146 | 45.3 | -.508 | -.186 | -.694 |
| 2 | 2.20 | 206 | 130 | 42.0 | -.491 | -.200 | -.691 |
| 3 | 2.37 | 196 | 123 | 38.6 | -.503 | -.202 | -.705 |
| 4 | 2.67 | 179 | 117 | 39.0 | -.477 | -.185 | -.662 |
| 5 | 3.22 | 130 | 89.0 | 25.0 | -.551 | -.165 | -.716 |
| 6 | 3.42 | 129 | 90.0 | 25.6 | -.546 | -.156 | -.703 |
| 7 | 3.65 | 129 | 89.0 | 25.6 | -.541 | -.162 | -.703 |
| 8 | 3.82 | 115 | 79.5 | 23.0 | -.539 | -.161 | -.699 |
| 9 | 4.06 | 112 | 78.8 | 22.7 | -.541 | -.153 | -.694 |
| 10 | 4.33 | 107 | 72.5 | 21.0 | -.538 | -.169 | -.707 |
| 11 | 4.62 | 100 | 68.0 | 20.7 | -.516 | -.168 | -.684 |
| 12 | 4.90 | 93.0 | 59.5 | 18.8 | -.500 | -.194 | -.694 |
| 13 | 5.23 | 84.0 | 55.5 | 18.1 | -.487 | -.180 | -.667 |
| 14 | 6.83 | 67.0 | 42.7 | 13.3 | -.506 | -.196 | -.702 |
| 15 | 7.95 | 53.8 | 33.0 | 9.70 | -.532 | -.212 | -.744 |
| 16 | 8.20 | 42.2 | 24.6 | 7.80 | -.499 | -.235 | -.734 |
| 17 | 8.87 | 45.3 | 28.2 | 9.20 | -.487 | -.206 | -.693 |
| 18 | 9.59 | 41.5 | 26.6 | 9.10 | -.466 | -.193 | -.659 |
| 19 | 10.3 | 38.7 | 24.4 | 8.50 | -.458 | -.201 | -.659 |
| 20 | 11.2 | 33.3 | 22.1 | 7.00 | -.500 | -.178 | -.678 |
| 21 | 11.5 | 32.7 | 21.3 | 7.00 | -.483 | -.186 | -.670 |
| 22 | 12.7 | 29.4 | 19.4 | 6.60 | -.468 | -.181 | -.649 |
| 23 (MP) | 13.3 | 26.9 | 17.5 | 6.30 | -.444 | -.187 | -.631 |
| | | Log Average | | | -.503 | -.185 | -.688 |
| | | Antilog | | | .314 | .653 | .205 |

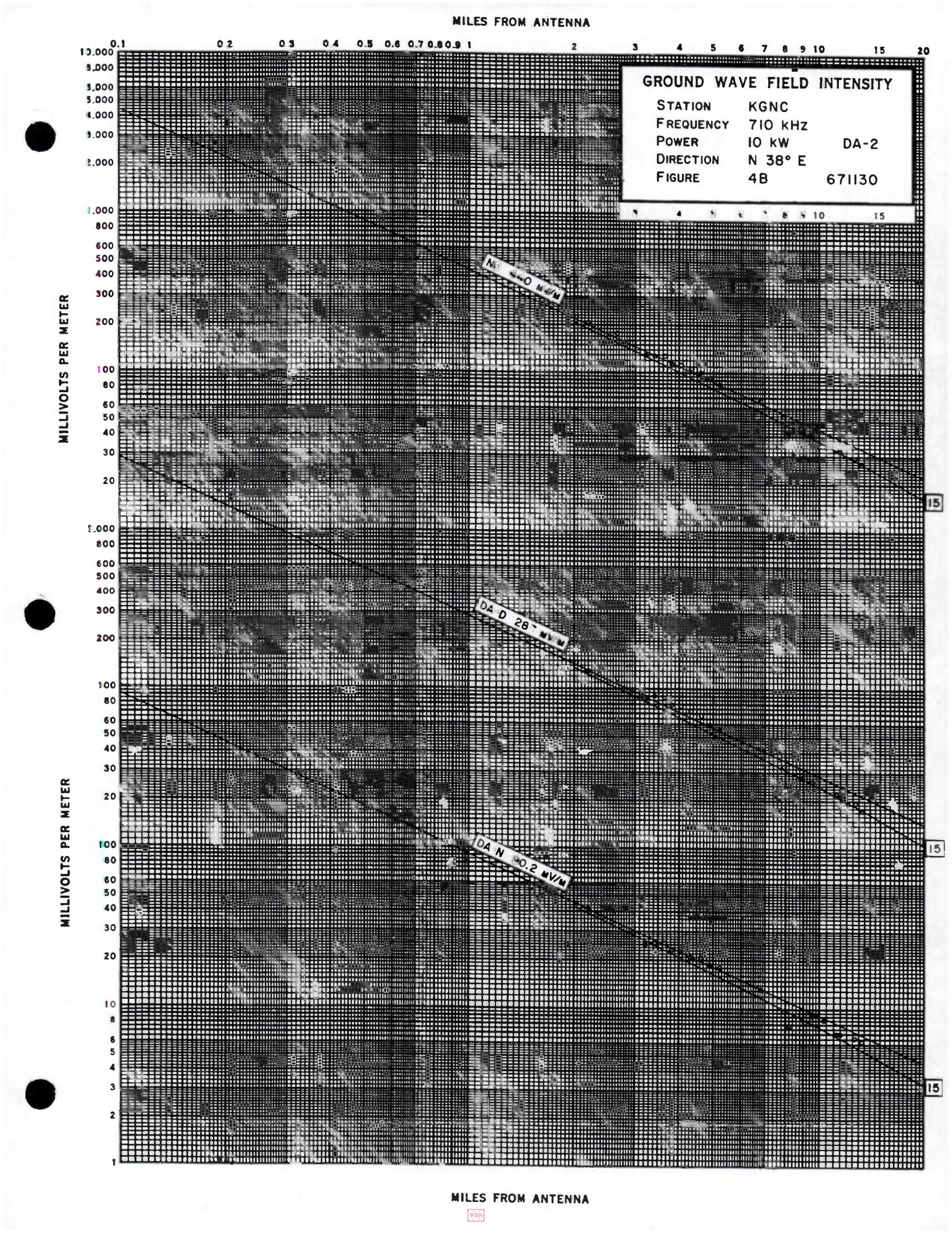
Nondirectional measured November 10, 1967

Daytime directional measured November 15, 1967

Nighttime directional measured November 16, 1967



FIGURE 4A


MILES FROM ANTENNA
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 15 20
MILLIVOLTS PER METER
10,000 5,000 5,000 4,000 3,000 2,000 1,000 800 600 500 400 300 200 100 80 60 50 40 30 20 1,000 800 600 500 400 300 200 100 80 60 50 40 30 20 100 80 60 50 40 30 20 10 8 6 5 4 3 2 1
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW DA-2
DIRECTION N 38° E
FIGURE 4B 671130
DA D 28 MV/M
DA N 0.2 MV/M
15
15
15
MILLIVOLTS PER METER
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

AZIMUTH N 59° E

| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | Log of Ratio DA-N/DA-D | Log of Ratio DA-D/ND | Log of Ratio DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 1.54 | 247 | 125 | 17.8 | -.847 | -.296 | -1.142 |
| 2 | 1.59 | 237 | 119 | 16.8 | -.851 | -.299 | -1.149 |
| 3 | 1.63 | 252 | 125 | 17.3 | -.859 | -.305 | -1.163 |
| 4 | 1.69 | 242 | 122 | 17.3 | -.848 | -.298 | -1.146 |
| 5 | 2.13 | 196 | 95.0 | 10.0 | -.978 | -.315 | -1.292 |
| 6 | 2.24 | 155 | 82.0 | 8.65 | -.977 | -.277 | -1.254 |
| 7 | 2.78 | 137 | 69.0 | 7.50 | -.964 | -.298 | -1.262 |
| 8 | 2.97 | 132 | 68.0 | 5.20 | -1.117 | -.288 | -1.405 |
| 9 | 3.17 | 121 | 63.0 | 5.70 | -1.044 | -.284 | -1.337 |
| 10 | 3.34 | 113 | 60.0 | 7.50 | -.903 | -.275 | -1.178 |
| 11 | 3.49 | 105 | 55.5 | 8.40 | -.820 | -.277 | -1.097 |
| 12 | 3.71 | 114 | 57.5 | 8.70 | -.821 | -.297 | -1.118 |
| 13 | 3.86 | 98.0 | 44.8 | 5.10 | -.944 | -.340 | -1.284 |
| 14 | 4.00 | 99.0 | 47.0 | 3.30 | -1.154 | -.324 | -1.477 |
| 15 | 4.21 | 90.0 | 43.5 | 3.50 | -1.095 | -.316 | -1.410 |
| 16 | 4.83 | 79.0 | 38.7 | 4.90 | -.898 | -.310 | -1.208 |
| 17 | 5.20 | 75.0 | 35.6 | 4.50 | -.898 | -.324 | -1.222 |
| 18 | 5.91 | 61.0 | 29.8 | 1.05 | -1.453* | -.311 | -1.764* |
| 19 | 6.20 | 61.0 | 30.1 | 0.70 | -1.634* | -.307 | -1.941* |
| 20 | 6.83 | 58.0 | 29.8 | 2.60 | -1.059 | -.290 | -1.349* |
| 21 | 7.66 | 47.8 | 23.5 | 2.20 | -1.029 | -.308 | -1.337 |
| 22 | 9.21 | 41.6 | 20.7 | 2.0C | -1.015 | -.303 | -1.318 |
| 23 | 10.2 | 32.3 | 15.2 | 1.40 | -1.036 | -.327 | -1.363 |
| 24 (MP) | 10.7 | 34.0 | 16.4 | 1.80 | -.960 | -.317 | -1.276 |
| | Log Average | | | | -.960 | -.303 | -1.262 |
| | Antilog | | | | .110 | .498 | .0547 |

Nondirectional measured November 11, 1967

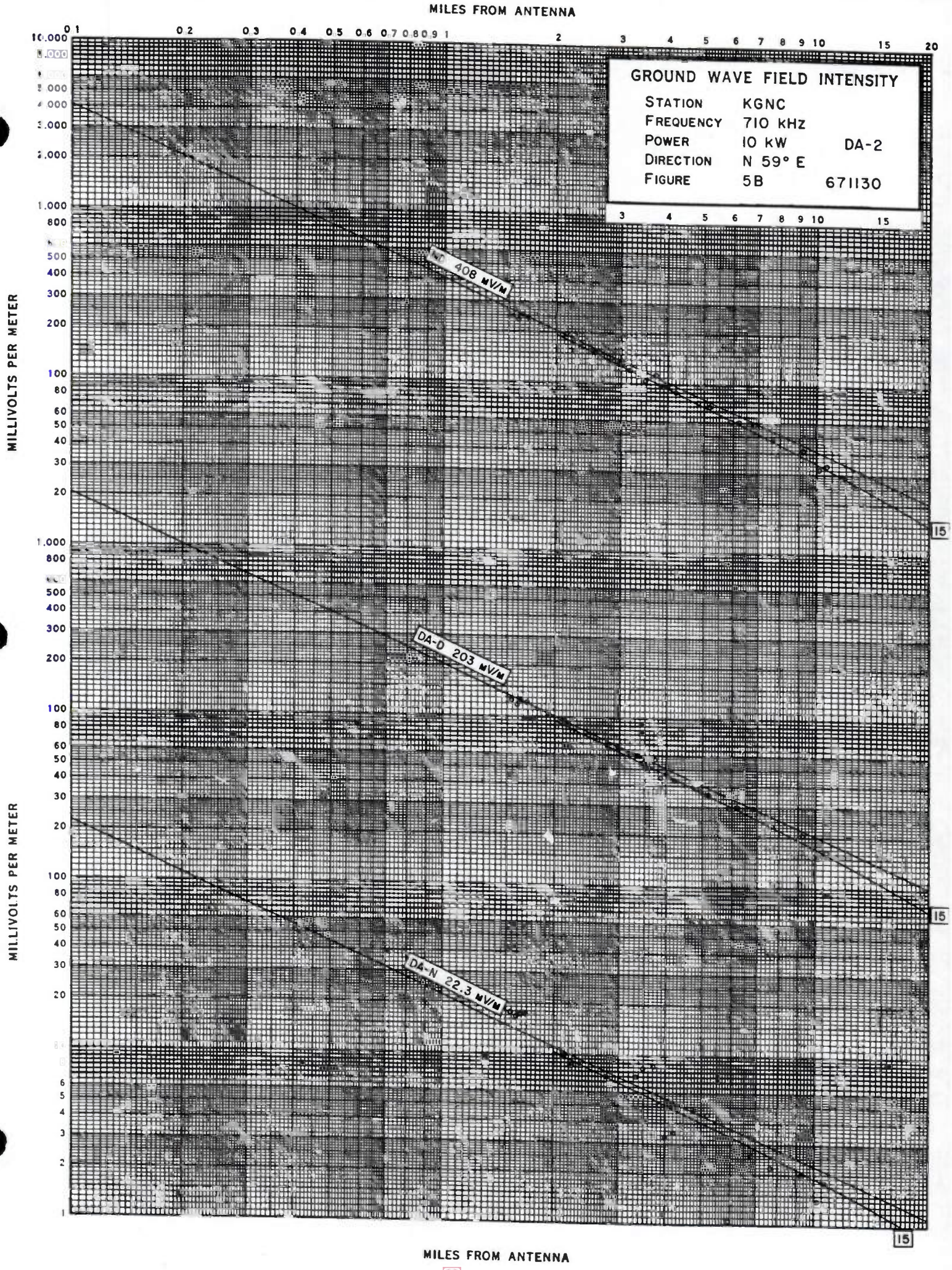
Daytime directional measured November 15, 1967

Nighttime directional measured November 16, 1967

* Points not included in analysis

671130

FIGURE 5A


MILES FROM ANTENNA
0 1
0 2
0 3
0 4
0 5
0 6
0 7
0 8
0 9
1
2
3
4
5
6
7
8
9
10
15
20
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW
DIRECTION N 59° E
FIGURE 5B
DA-2
671130
MILLIVOLTS PER METER
10,000
1,000
800
500
400
300
200
100
80
60
50
40
30
20
1,000
800
500
400
300
200
100
80
60
50
40
30
20
100
80
60
50
40
30
20
6
5
4
3
2
1
408 MV/M
DA-D 203 MV/M
DA-N 22.3 MV/M
15
15
15
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

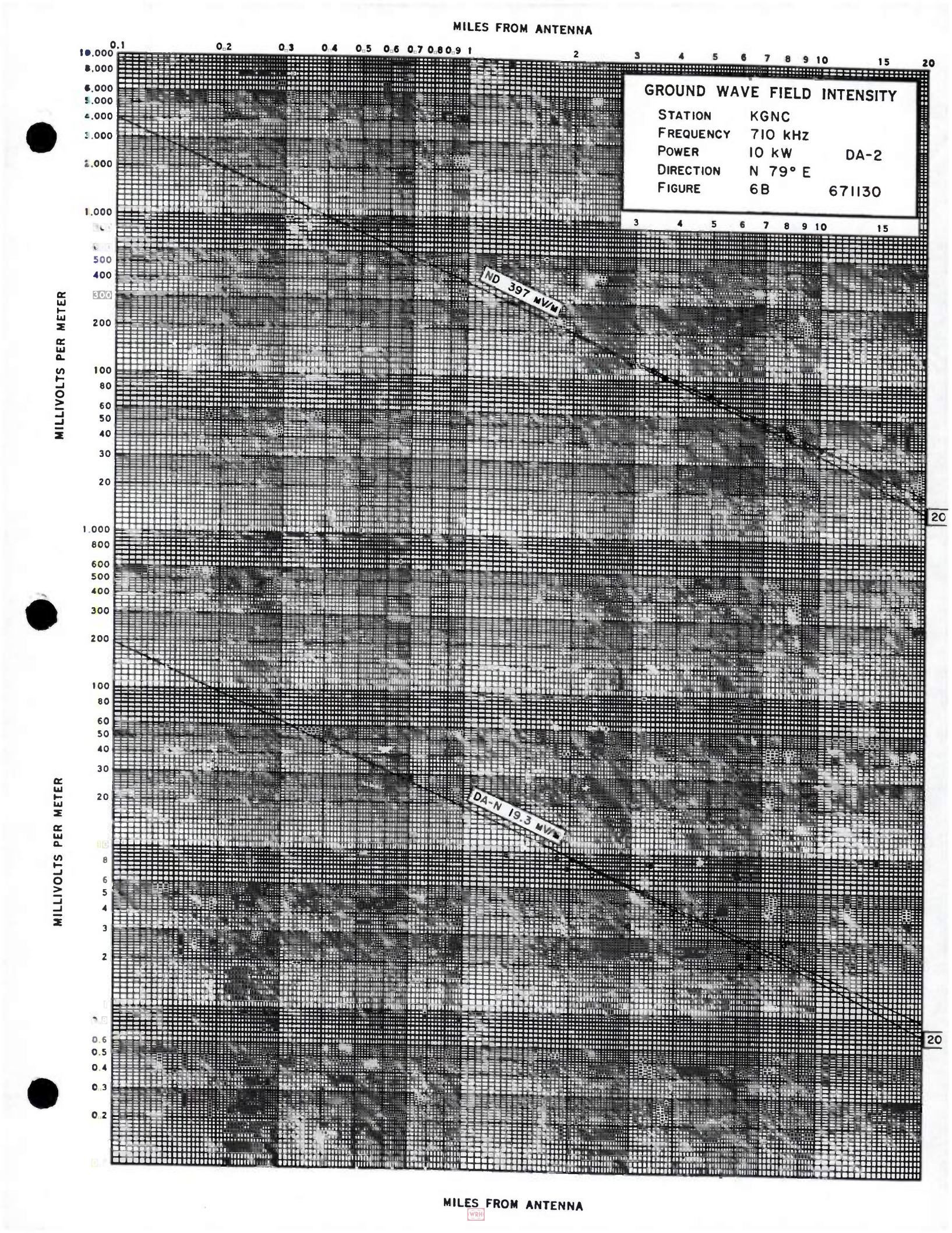
AZIMUTH N 79° E

| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | Log of Ratio DA-N/DA-D | Log of Ratio DA-D/ND | Log of Ratio DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 1.33 | 303 | - | 9.60 | - | - | -1.500 |
| 2 | 1.85 | 197 | - | 9.40 | - | - | -1.322 |
| 3 | 1.97 | 174 | - | 8.00 | - | - | -1.338 |
| 4 | 2.32 | 143 | - | 7.40 | - | - | -1.286 |
| 5 | 2.89 | 127 | - | 4.90 | - | - | -1.414 |
| 6 | 2.97 | 124 | - | 3.60 | - | - | -1.537 |
| 7 | 3.38 | 119 | - | 8.80 | - | - | -1.131 |
| 8 | 3.42 | 116 | - | 8.60 | - | - | -1.130 |
| 9 | 3.62 | 104 | - | 4.50 | - | - | -1.364 |
| 10 | 3.67 | 103 | - | 3.65 | - | - | -1.451 |
| 11 | 3.95 | 100 | - | 4.40 | - | - | -1.357 |
| 12 | 4.45 | 90.0 | - | 3.85 | - | - | -1.369 |
| 13 | 4.91 | 81.0 | - | 4.35 | - | - | -1.270 |
| 14 | 4.97 | 81.5 | - | 4.10 | - | - | -1.298 |
| 15 | 5.23 | 76.0 | - | 4.00 | - | - | -1.279 |
| 16 | 6.21 | 59.5 | - | 2.10 | - | - | -1.452 |
| 17 | 6.48 | 60.5 | - | 2.80 | - | - | -1.335 |
| 18 | 7.00 | 54.5 | - | 2.05 | - | - | -1.425 |
| 19 | 8.03 | 51.5 | - | 3.10 | - | - | -1.221 |
| 20 | 8.17 | 46.5 | - | 2.85 | - | - | -1.213 |
| 21 | 8.38 | 46.7 | - | 3.00 | - | - | -1.192 |
| 22 | 9.27 | 41.5 | - | 2.70 | - | - | -1.187 |
| 23 (R2) | 10.1 | 38.5 | - | 2.70 | - | - | -1.154 |
| | | Average Log | | | | | -1.314 |
| | | Antilog | | | | | .0485 |

Nondirectional measured November 11 and 12, 1967

Daytime directional - not measured

Nighttime directional measured November 18, 1967


MILES FROM ANTENNA
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 15 20
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW
DIRECTION N 79° E
FIGURE 6B
DA-2
671130
ND 397 MV/M
DA-N 19.3 MV/M
MILLIVOLTS PER METER
MILLIVOLTS PER METER
MILES FROM ANTENNA
WRH

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

AZIMUTH N 100° E

| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | Log of Ratio DA-N/DA-D | Log of Ratio DA-D/ND | Log of Ratio DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 1.32 | 319 | 396 | 89.0 | -.659* | .094* | -.555* |
| 2 | 1.97 | 195 | 243 | 38.5 | -.801 | .096 | -.705 |
| 3 | 2.37 | 164 | 212 | 35.5 | -.777 | .112 | -.665 |
| 4 | 2.43 | 158 | 211 | 33.5 | -.799 | .125 | -.674 |
| 5 | 2.88 | 133 | 174 | 25.7 | -.831 | .117 | -.714 |
| 6 | 3.13 | 120 | 149 | 23.2 | -.808 | .094 | -.714 |
| 7 | 3.43 | 113 | 142 | 19.6 | -.860 | .099 | -.761 |
| 8 | 3.83 | 105 | 134 | 17.5 | -.884 | .106 | -.779 |
| 9 | 3.94 | 101 | 130 | 16.9 | -.887 | .114 | -.772 |
| 10 | 4.36 | 91.5 | 117 | 15.3 | -.884 | .107 | -.777 |
| 11 | 4.86 | 81.0 | 108 | 12.7 | -.930 | .125 | -.802 |
| 12 | 4.98 | 77.5 | 103 | 11.0 | -.971 | .124 | -.848 |
| 13 | 5.97 | 67.0 | 91.0 | 10.8 | -.926 | .133 | -.793 |
| 14 | 6.07 | 67.0 | 91.5 | 11.0 | -.920 | .135 | -.785 |
| 15 | 6.77 | 60.5 | 82.0 | 10.2 | -.905 | .132 | -.774 |
| 16 | 6.99 | 56.5 | 78.5 | 9.30 | -.926 | .142 | -.784 |
| 17 | 7.99 | 48.5 | 67.0 | 8.15 | -.915 | .140 | -.775 |
| 18 | 8.41 | 46.5 | 62.5 | 7.90 | -.898 | .128 | -.770 |
| 19 | 8.61 | 46.0 | 60.0 | 7.70 | -.892 | .116 | -.777 |
| 20 | 9.13 | 37.3 | 51.5 | 5.60 | -.964 | .140 | -.824 |
| 21 (MP) | 10.0 | 37.0 | 54.0 | 6.40 | -.926 | .164 | -.762 |
| | Average Log | | | | -.885 | .121 | -.763 |
| | Antilog | | | | .130 | 1.32 | .172 |

Nondirectional measured November 12, 1967

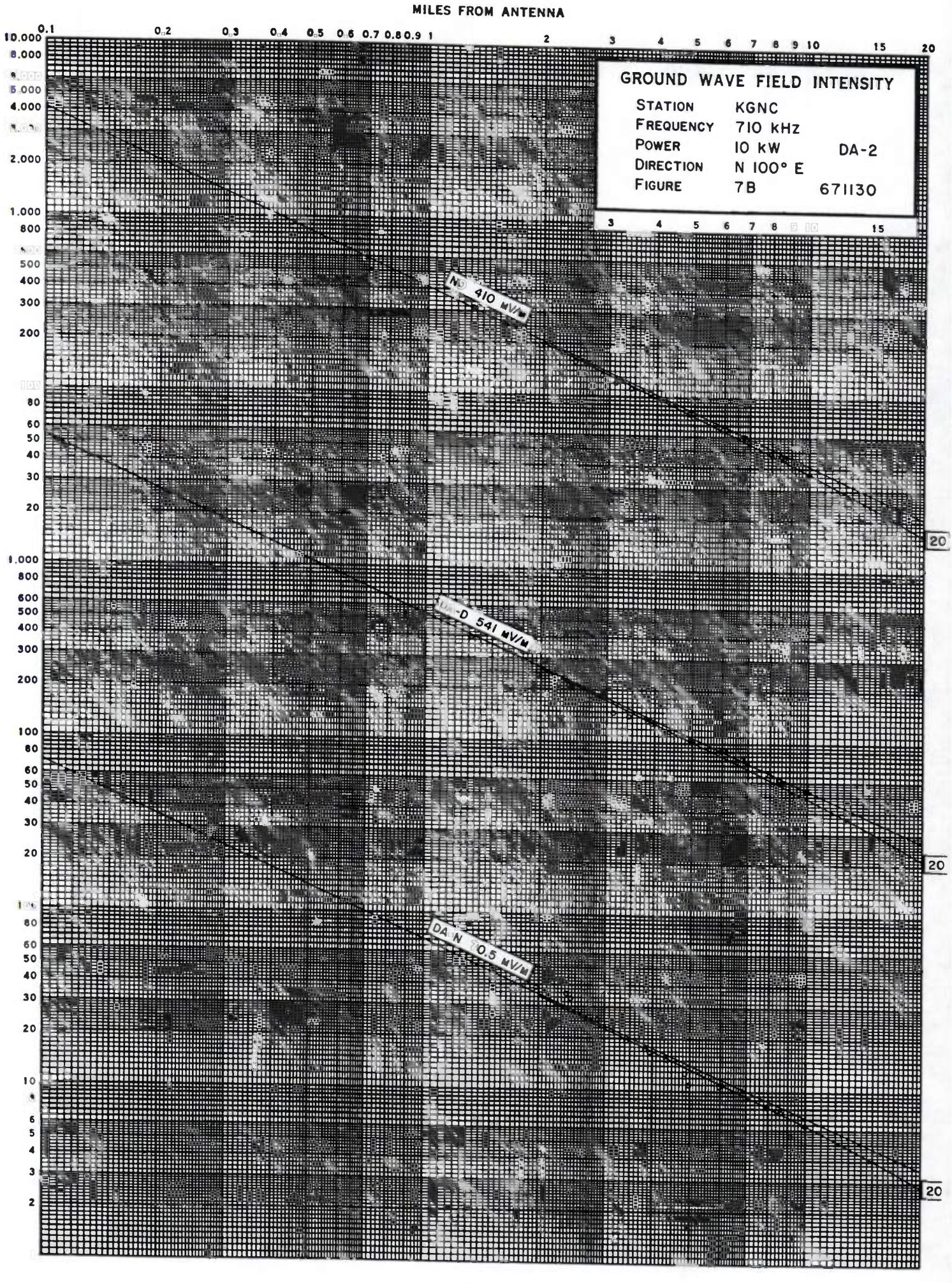
Daytime directional measured November 17, 1967

Nighttime directional measured November 16, 1967

* Points not included in analysis

671130

FIGURE 7A


MILES FROM ANTENNA
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 15 20
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW DA-2
DIRECTION N 100° E
FIGURE 7B 671130
3 4 5 6 7 8 9 10 15
MILLIVOLTS PER METER
10,000 8,000 5,000 4,000 2,000 1,000 800 500 400 300 200 100 80 60 50 40 30 20 1,000 800 600 500 400 300 200 100 80 60 50 40 30 20 100 80 60 50 40 30 20 10 8 6 5 4 3 2
N-D 410 MV/M
UNL-D 541 MV/M
DA-N 70.5 MV/M
20
20
20
MILES FROM ANTENNA

RADIO STATIAON KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

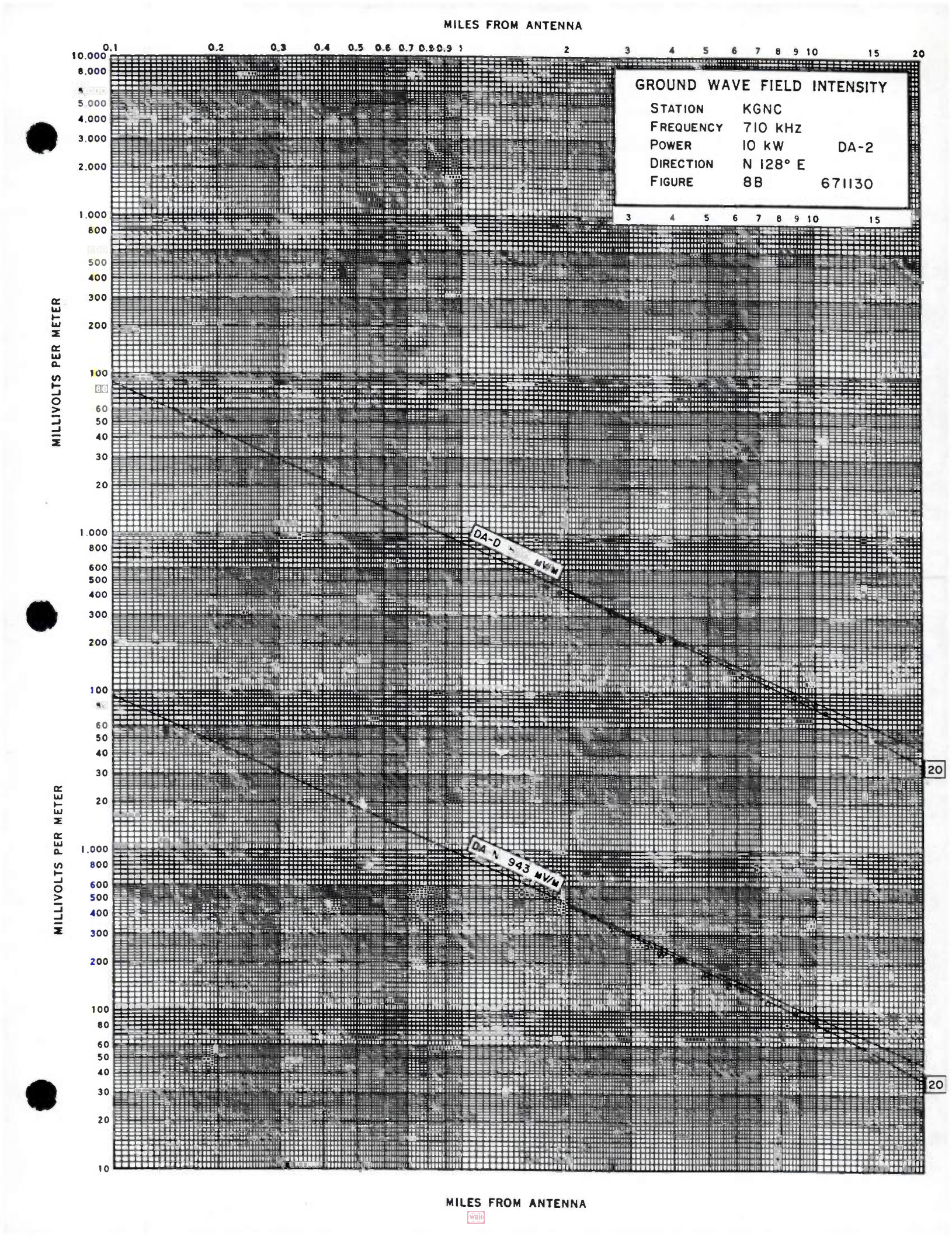
AZIMUTH N 128° E

| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | Log of Ratio DA-N/DA-D | Log of Ratio DA-D/ND | Log of Ratio DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 1.74 | - | 460 | 490 | .028 | - | - |
| 2 | 1.89 | - | 425 | 460 | .034 | - | - |
| 3 | 2.33 | - | 390 | 398 | .009 | - | - |
| 4 | 2.63 | - | 306 | 325 | .026 | - | - |
| 5 | 3.33 | - | 247 | 255 | .014 | - | - |
| 6 | 3.62 | - | 219 | 232 | .024 | - | - |
| 7 | 3.67 | - | 213 | 225 | .023 | - | - |
| 8 | 3.72 | - | 220 | 233 | .025 | - | - |
| 9 | 4.08 | - | 202 | 210 | .017 | - | - |
| 10 | 4.21 | - | 203 | 215 | .024 | - | - |
| 11 | 4.83 | - | 156 | 164 | .022 | - | - |
| 12 | 4.93 | - | 162 | 174 | .031 | - | - |
| 13 | 5.03 | - | 153 | 169 | .043 | - | - |
| 14 | 5.73 | - | 134 | 143 | .028 | - | - |
| 15 | 6.21 | - | 128 | 135 | .023 | - | - |
| 16 | 7.34 | - | 109 | 113 | .015 | - | - |
| 17 | 8.77 | - | 94.0 | 99.0 | .023 | - | - |
| 18 | 9.41 | - | 87.0 | 92.0 | .024 | - | - |
| 19 | 10.0 | - | 83.0 | 87.0 | .020 | - | - |
| 20 | 10.7 | - | 75.0 | 79.0 | .022 | - | - |
| | | Average Log | | | .024 | | |
| | | Antilog | | | 1.06 | | |

Nondirectional - not measured

Daytime directional measured November 17, 1967

Nighttime directional measured November 18, 1967


MILES FROM ANTENNA
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 15 20
10,000 8,000 5,000 4,000 3,000 2,000 1,000 800 500 400 300 200 100 80 60 50 40 30 20 1,000 800 600 500 400 300 200 100 60 50 40 30 20 1,000 800 600 500 400 300 200 100 80 60 50 40 30 20 10
MILLIVOLTS PER METER
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW DA-2
DIRECTION N 128° E
FIGURE 8B 671130
3 4 5 6 7 8 9 10 15
DA-D 1 MV/M
DA-N 943 MV/M
20
20
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

AZIMUTH N 144° E

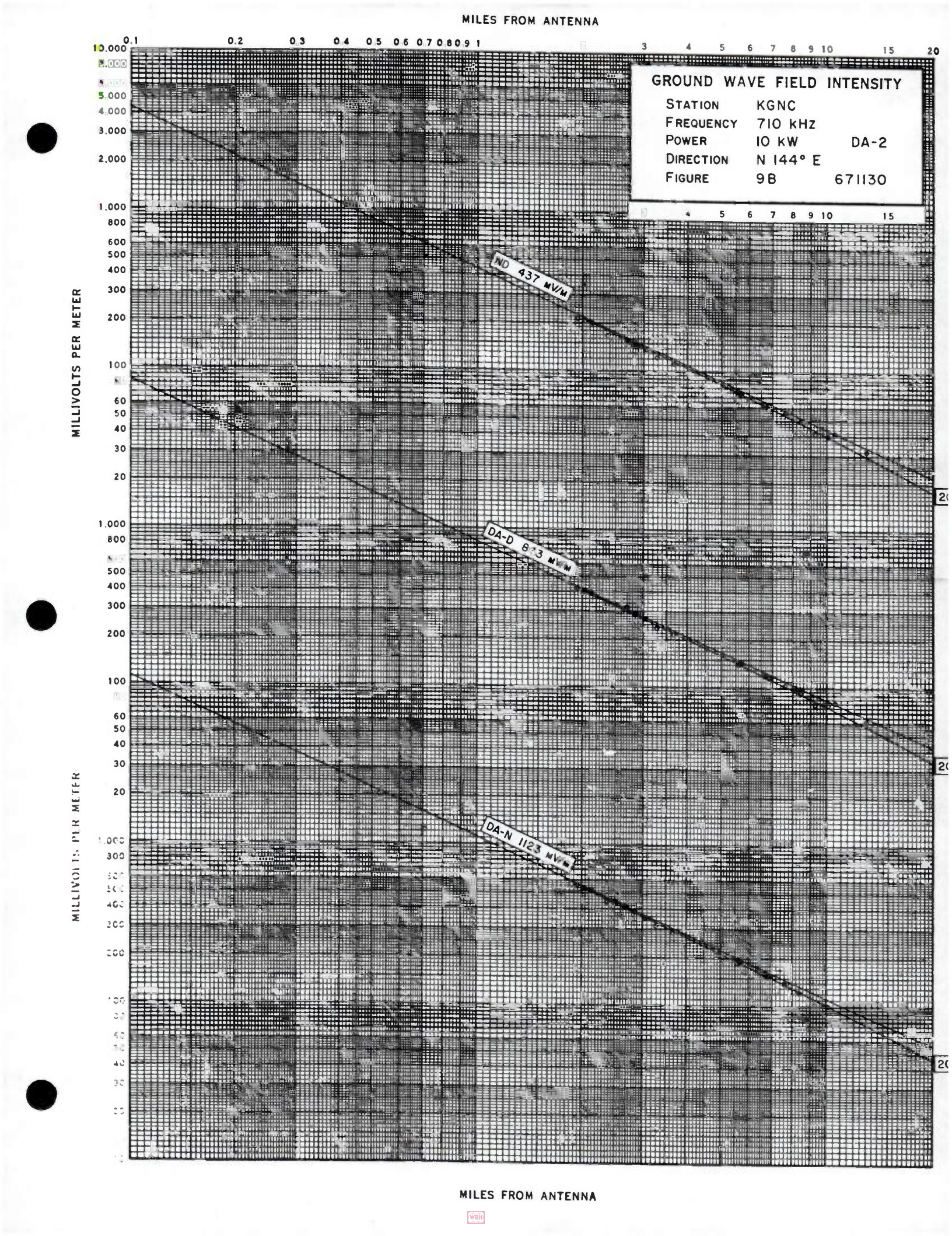
| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | Log of Ratio DA-N/DA-D | Log of Ratio DA-D/ND | Log of Ratio DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 0.71 | 618 | 1070 | 1230 | .060* | .238* | .299* |
| 2 | 1.94 | 214 | 420 | 565 | .128 | .293 | .421 |
| 3 | 2.04 | 206 | 405 | 540 | .125 | .293 | .418 |
| 4 | 2.14 | 200 | 390 | 528 | .132 | .290 | .421 |
| 5 | 2.37 | 168 | 332 | 445 | .127 | .295 | .423 |
| 6 | 2.53 | 165 | 331 | 440 | .123 | .302 | .426 |
| 7 | 2.70 | 159 | 321 | 415 | .111 | .305 | .416 |
| 8 | 2.85 | 144 | 290 | 390 | .129 | .304 | .432 |
| 9 | 3.06 | 138 | 270 | 355 | .119 | .291 | .410 |
| 10 | 3.29 | 122 | 237 | 318 | .128 | .288 | .416 |
| 11 | 3.67 | 112 | 215 | 288 | .127 | .283 | .410 |
| 12 | 5.57 | 75.5 | 141 | 189 | .127 | .271 | .398 |
| 13 | 5.67 | 74.5 | 142 | 190 | .126 | .280 | .406 |
| 14 | 6.67 | 64.5 | 120 | 161 | .127 | .269 | .397 |
| 15 | 6.85 | 63.5 | 117 | 154 | .119 | .265 | .385 |
| 16 | 7.61 | 56.0 | 104 | 139 | .126 | .269 | .395 |
| 17 | 8.42 | 50.0 | 94.0 | 122 | .113 | .274 | .387 |
| 18 | 9.28 | 41.3 | 79.5 | 103 | .113 | .284 | .397 |
| 19 | 10.1 | 40.0 | 79.0 | 101 | .107 | .295 | .402 |
| 20 | 10.6 | 41.7 | 80.5 | 107 | .124 | .285 | .409 |
| 21 | 13.0 | 32.0 | 61.0 | 81.5 | .126 | .280 | .405 |
| | | Average Log | | | .123 | .286 | .409 |
| | | Antilog | | | 1.33 | 1.93 | 2.57 |

Nondirectional measured November 12, 1967

Daytime directional measured November 17, 1967

Nighttime directional measured November 18, 1967

* Point not included in analysis


MILES FROM ANTENNA
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
3
4
5
6
7
8
9
10
15
20
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW DA-2
DIRECTION N 144° E
FIGURE 9B 671130
ND 437 MV/M
DA-D 843 MV/M
DA-N 1123 MV/M
MILLIVOLTS PER METER
10,000
5,000
4,000
3,000
2,000
1,000
800
600
500
400
300
200
100
60
50
40
30
20
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

AZIMUTH N 185° E

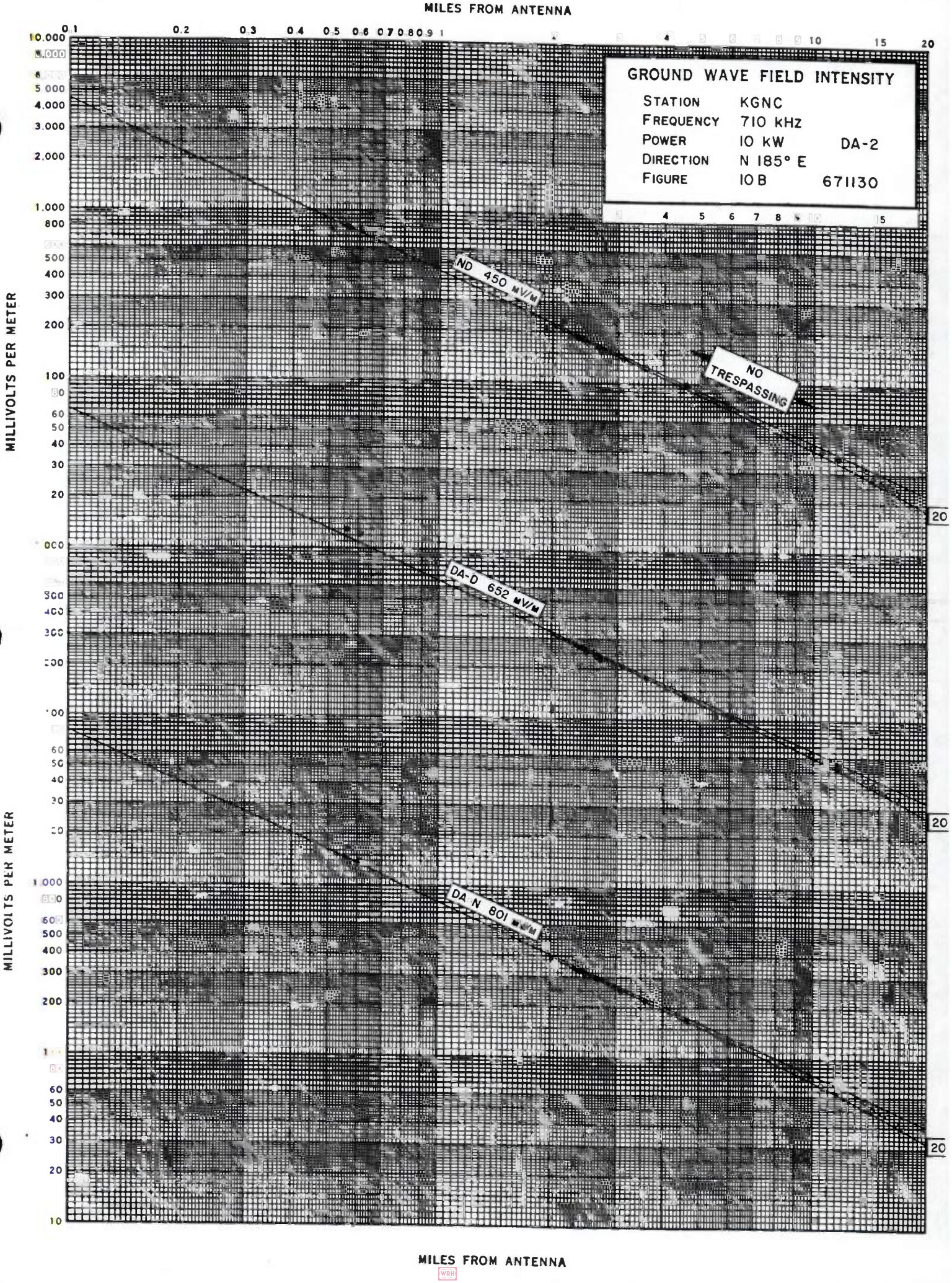
| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | Log of Ratio DA-N/DA-D | Log of Ratio DA-D/ND | Log of Ratio DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 0.56 | 810 | 1300 | 1480 | .056* | .205* | .262* |
| 2 | 0.61 | 760 | 1220 | 1400 | .060* | .205* | .265* |
| 3 | 2.34 | 188 | 278 | 340 | .087 | .170 | .257 |
| 4 | 2.39 | 187 | 271 | 333 | .089 | .161 | .250 |
| 5 | 2.44 | 183 | 268 | 329 | .089 | .165 | .254 |
| 6 | 2.49 | 174 | 254 | 319 | .099 | .164 | .263 |
| 7 | 2.66 | 164 | 239 | 299 | .097 | .164 | .260 |
| 8 | 2.72 | 159 | 231 | 287 | .094 | .162 | .256 |
| 9 | 3.10 | 140 | 211 | 250 | .074 | .178 | .251 |
| 10 | 3.59 | 123 | 178 | 220 | .092 | .160 | .252 |
| 11 | 4.56 | 100 | 140 | 176 | .099 | .146 | .245 |
| 12 | 4.63 | 98.0 | 134 | 167 | .095 | .136 | .232 |
| 13 | 9.91 | 43.5 | 63.5 | 78.0 | .089 | .164 | .253 |
| 14 | 9.95 | 43.5 | 63.0 | 77.0 | .087 | .161 | .248 |
| 15 | 10.6 | 40.7 | 58.5 | 71.0 | .084 | .158 | .242 |
| 16 | 11.6 | 37.2 | 53.5 | 64.0 | .078 | .158 | .235 |
| 17 | 11.7 | 36.5 | 53.0 | 65.0 | .088 | .162 | .251 |
| 18 | 13.8 | 31.8 | 44.7 | 57.0 | .105 | .148 | .253 |
| 19 | 14.4 | 28.3 | 41.8 | 51.5 | .091 | .161 | .252 |
| 20 | 15.3 | 27.2 | 38.7 | 49.0 | .103 | .153 | .256 |
| 21 | 15.8 | 25.7 | 37.6 | 47.2 | .099 | .165 | .263 |
| 22 | 16.7 | 23.9 | 35.1 | 42.8 | .086 | .167 | .253 |
| | | Average Log | | | .09? | .160 | .251 |
| | | Antilog | | | 1.24 | 1.45 | 1.78 |

Nondirectional measured November 10, 11 and 12, 1967

Daytime directional measured November 17, 1967

Nighttime directional measured November 18, 1967

* Points not included in analysis


MILES FROM ANTENNA
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
3
4
5
6
7
8
9
10
15
20
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 KHZ
POWER 10 kW
DIRECTION N 185° E
FIGURE 10 B
DA-2
671130
MILLIVOLTS PER METER
10,000
5,000
5 000
4,000
3,000
2,000
1,000
800
500
400
300
200
100
60
50
40
30
20
10
ND 450 MV/M
NO TRESPASSING
DA-D 652 MV/M
DA-N 801 MV/M
MILLIVOLTS PER METER
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

AZIMUTH N 226° E

| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | Log of Ratio DA-N/DA-D | Log of Ratio DA-D/ND | Log of Ratio DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 1.61 | - | 507 | 680 | .127 | - | - |
| 2 | 1.82 | - | 433 | 575 | .123 | - | - |
| 3 | 2.01 | - | 393 | 525 | .135 | - | - |
| 4 | 2.21 | - | 368 | 495 | .138 | - | - |
| 5 | 2.31 | - | 327 | 435 | .124 | - | - |
| 6 | 2.90 | - | 278 | 361 | .113 | - | - |
| 7 | 3.06 | - | 267 | 350 | .118 | - | - |
| 8 | 3.71 | - | 228 | 305 | .126 | - | - |
| 9 | 4.33 | - | 185 | 244 | .120 | - | - |
| 10 | 5.37 | - | 142 | 197 | .142 | - | - |
| 11 | 5.77 | - | 133 | 184 | .140 | - | - |
| 12 | 6.57 | - | 118 | 160 | .132 | - | - |
| 13 | 6.73 | - | 113 | 150 | .123 | - | - |
| 14 | 8.93 | - | 84.0 | 104 | .093 | - | - |
| 15 | 9.57 | - | 77.0 | 100 | .114 | - | - |
| 16 | 11.0 | - | 71.5 | 95.0 | .123 | - | - |
| 17 | 11.8 | - | 64.0 | 84.0 | .118 | - | - |
| 18 | 13.2 | - | 54.5 | 74.0 | .133 | - | - |
| 19 | 14.1 | - | 53.0 | 73.0 | .139 | - | - |
| 20 | 14.5 | - | 52.5 | 72.5 | .140 | - | - |
| | | Average Log | | | .126 | | |
| | | Antilog | | | 1.34 | | |

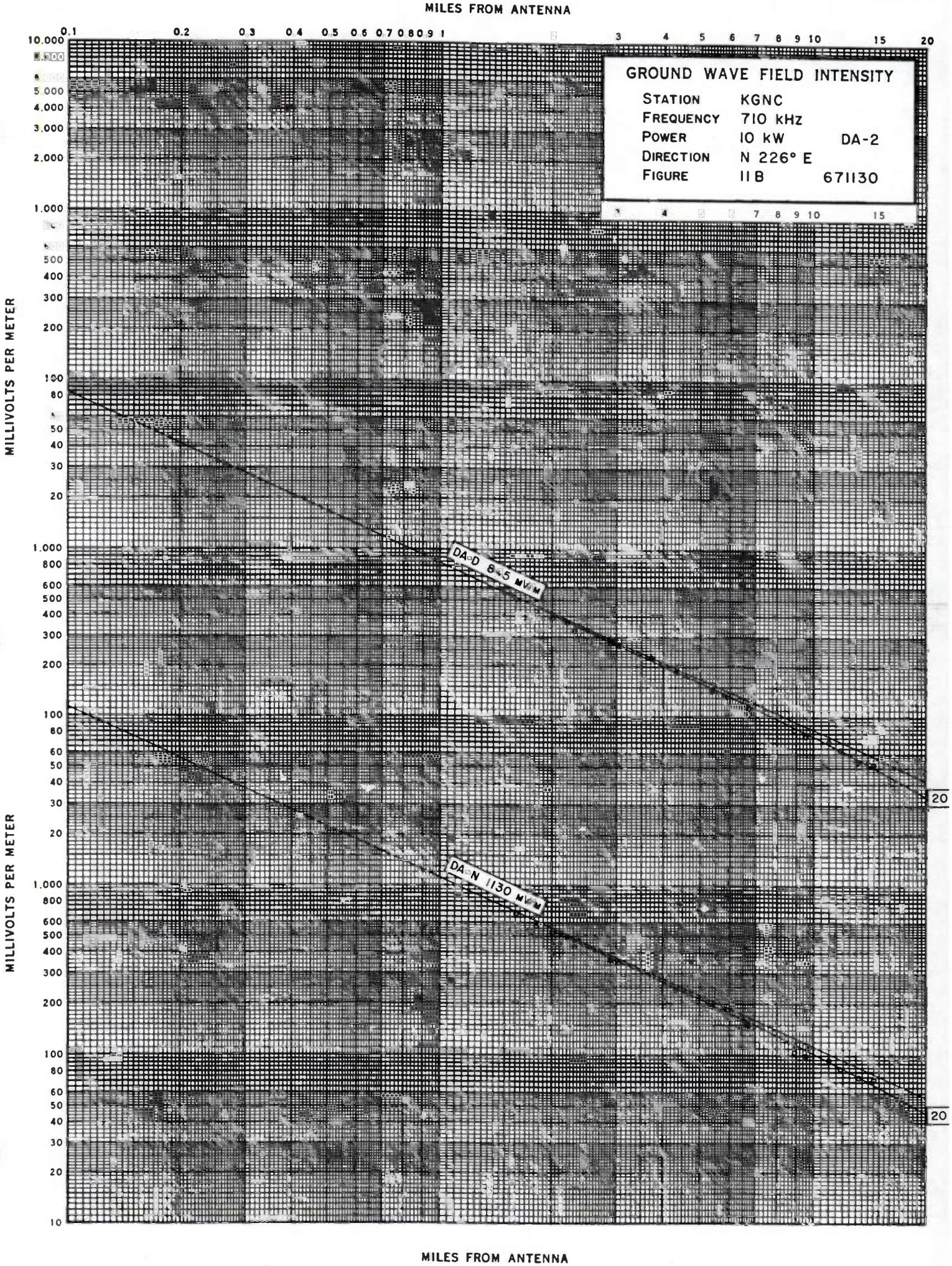
Nondirectional - not measured

Daytime directional measured November 19, 1967

Nighttime directional measured November 20, 1967



FIGURE 11A


MILES FROM ANTENNA
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 15 20
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW DA-2
DIRECTION N 226° E
FIGURE 11B 671130
MILLIVOLTS PER METER
10,000 5,000 4,000 3,000 2,000 1,000 500 400 300 200 100 80 50 40 30 20 1,000 800 600 500 400 300 200 100 80 60 50 40 30 20 1,000 800 600 500 400 300 200 100 80 60 50 40 30 20 10
DA-D 845 MV/M
DA-N 1130 MV/M
20
20
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

AZIMUTH N 270° E

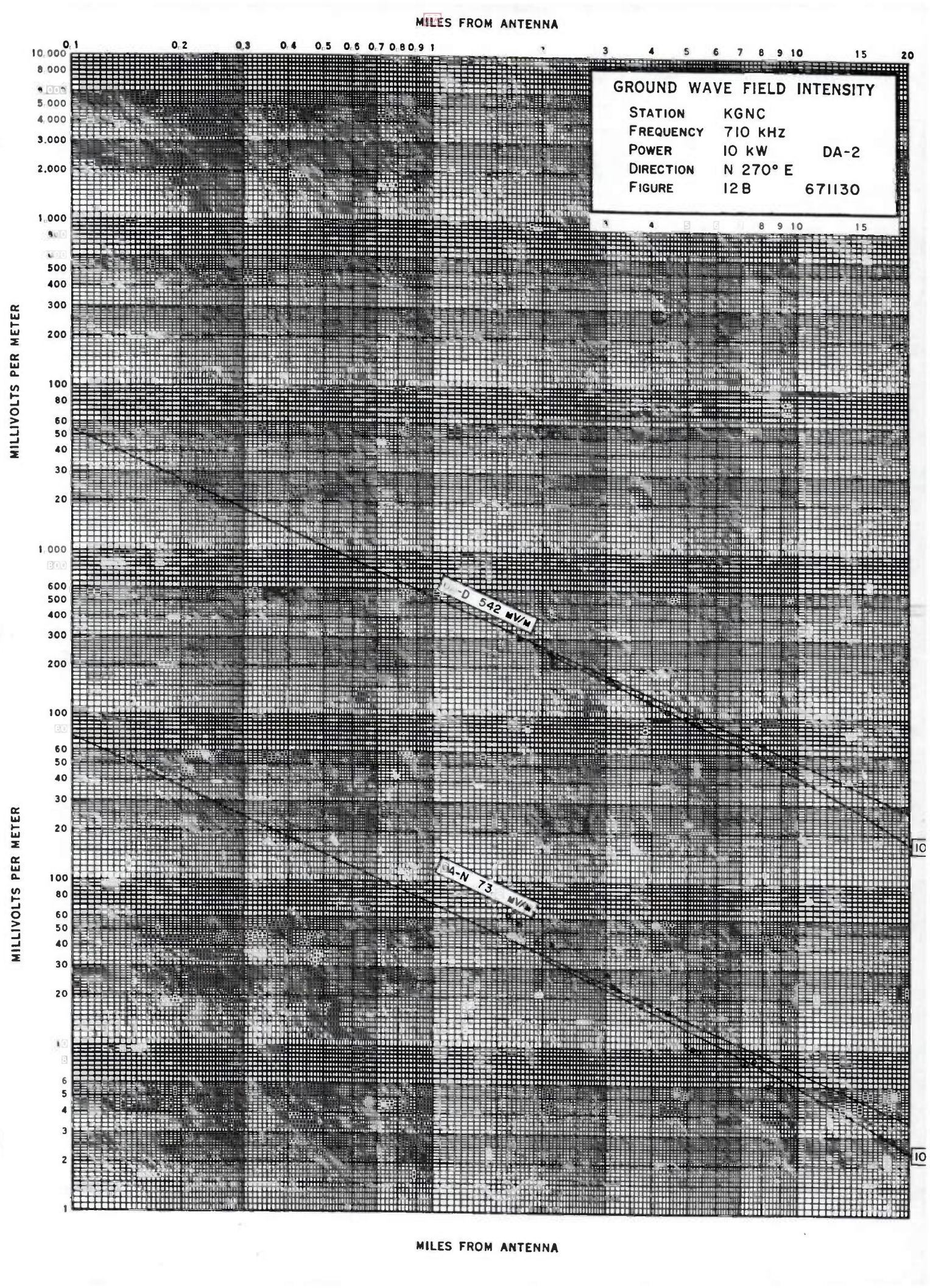
| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | LOG OF RATIO DA-N/DA-D | DA-D/ND | DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 1.61 | - | 330 | 62.5 | -.723* | - | - |
| 2 | 1.73 | - | 300 | 56.0 | -.729* | - | - |
| 3 | 1.93 | - | 270 | 43.4 | -.794 | - | - |
| 4 | 2.12 | - | 239 | 42.4 | -.751 | - | - |
| 5 | 2.23 | - | 235 | 39.2 | -.778 | - | - |
| 6 | 3.03 | - | 172 | 27.9 | -.790 | - | - |
| 7 | 3.13 | - | 162 | 24.0 | -.830 | - | - |
| 8 | 3.23 | - | 156 | 22.7 | -.837 | - | - |
| 9 | 3.74 | - | 138 | 18.2 | -.880 | - | - |
| 10 | 3.94 | - | 125 | 18.6 | -.827 | - | - |
| 11 | 4.41 | - | 109 | 16.8 | -.812 | - | - |
| 12 (MP) | 4.43 | - | 109 | 16.7 | -.815 | - | - |
| 13 | 4.97 | - | 100 | 10.6 | -.975 | - | - |
| 14 | 5.17 | - | 94.5 | 10.0 | -.976 | - | - |
| 15 | 5.37 | - | 91.0 | 9.70 | -.972 | - | - |
| 16 | 7.11 | - | 68.5 | 8.30 | -.917 | - | - |
| 17 | 7.23 | - | 66.0 | 8.25 | -.903 | - | - |
| 18 | 7.63 | - | 61.0 | 8.60 | -.851 | - | - |
| 19 | 8.08 | - | 67.0 | 8.30 | -.907 | - | - |
| 20 | 8.28 | - | 53.0 | 6.00 | -.946 | - | - |
| 21 | 8.53 | - | 54.5 | 6.35 | -.934 | - | - |
| | | Average Log | | | -.869 | | |
| | | Antilog | | | .135 | | |

Nondirectional - not measured

Daytime directional measured November 19, 1967

Nighttime directional measured November 20, 1967

* Points not included in analysis


MILES FROM ANTENNA
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 15 20
10,000 8,000 5,000 4,000 3,000 2,000 1,000 500 400 300 200 100 80 60 50 40 30 20 1,000 600 500 400 300 200 100 60 50 40 30 20 100 80 60 50 40 30 20 6 5 4 3 2 1
MILLIVOLTS PER METER
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW DA-2
DIRECTION N 270° E
FIGURE 12B 671130
D-D 542 MV/M
DA-N 73 MV/M
MILLIVOLTS PER METER
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

AZIMUTH N 291° E

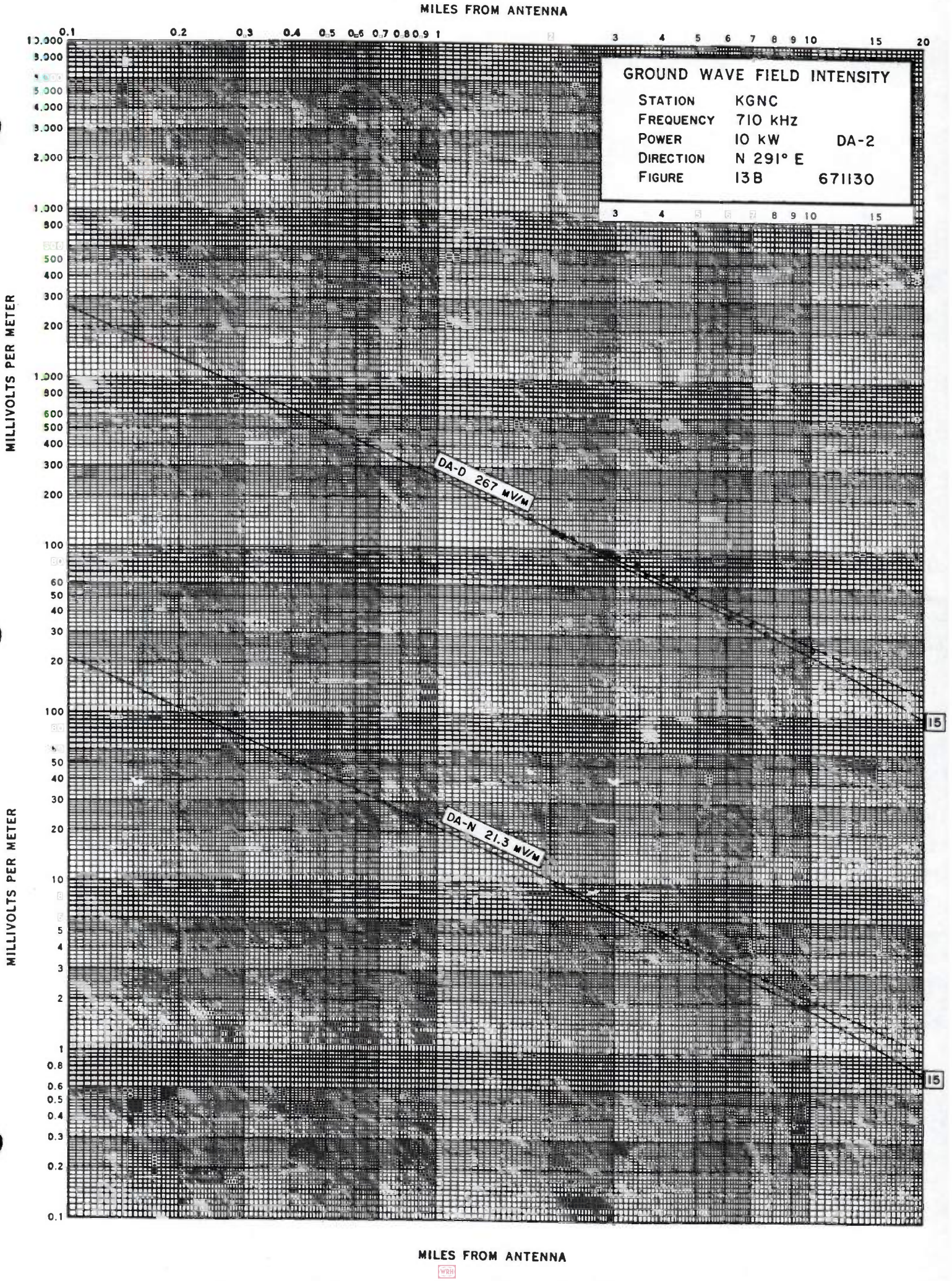
| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | LOG OF RATIO DA-N/DA-D | DA-D/ND | DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 1.77 | - | 157 | 6.90 | -1.357* | - | - |
| 2 | 2.06 | - | 129 | 5.70 | -1.355* | - | - |
| 3 | 2.17 | - | 122 | 6.20 | -1.294* | - | - |
| 4 | 2.32 | - | 118 | 8.80 | -1.128 | - | - |
| 5 | 2.60 | - | 103 | 9.40 | -1.040 | - | - |
| 6 | 2.79 | - | 94.0 | 4.90 | -1.283 | - | - |
| 7 | 2.97 | - | 92.0 | 3.80 | -1.384 | - | - |
| 8 | 3.07 | - | 90.0 | 4.90 | -1.264 | - | - |
| 9 | 3.26 | - | 87.5 | 8.50 | -1.013 | - | - |
| 10 | 3.46 | - | 80.5 | 7.30 | -1.043 | - | - |
| 11 | 3.66 | - | 73.0 | 3.50 | -1.319 | - | - |
| 12 | 4.03 | - | 70.5 | 5.20 | -1.132 | - | - |
| 13 | 4.40 | - | 67.5 | 5.40 | -1.097 | - | - |
| 14 | 4.73 | - | 54.2 | 4.70 | -1.062 | - | - |
| 15 (MP) | 4.75 | - | 54.5 | 4.60 | -1.074 | - | - |
| 16 | 4.86 | - | 57.5 | 4.10 | -1.147 | - | - |
| 17 | 6.14 | - | 39.5 | 3.40 | -1.065 | - | - |
| 18 | 6.23 | - | 40.8 | 3.75 | -1.037 | - | - |
| 19 | 6.51 | - | 41.7 | 4.30 | -0.987 | - | - |
| 20 | 7.00 | - | 35.8 | 2.95 | -1.084 | - | - |
| 21 | 8.63 | - | 31.9 | 2.80 | -1.057 | - | - |
| 22 | 9.04 | - | 32.7 | 3.10 | -1.023 | - | - |
| 23 | 9.69 | - | 22.3 | 2.6[illegible] | -0.925 | - | - |
| 24 | 10.1 | - | 25.2 | 2.95 | -0.932 | - | - |
| | | Average Log | | | -1.099 | | |
| | | Antilog | | | .0797 | | |

Nondirectional - not measured

Daytime directional measured November 21 and 22, 1967

Nighttime directional measured November 20 and 24, 1967

* Points not included in analysis


MILES FROM ANTENNA
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
3
4
5
6
7
8
9
10
15
20
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW
DA-2
DIRECTION N 291° E
FIGURE 13B
671130
MILLIVOLTS PER METER
10,000
9,000
5,000
4,000
3,000
2,000
1,000
900
500
400
300
200
1,000
900
600
500
400
300
200
100
60
50
40
30
20
100
50
40
30
20
10
5
4
3
2
1
0.8
0.6
0.5
0.4
0.3
0.2
0.1
DA-D 267 MV/M
DA-N 21.3 MV/M
15
15
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

AZIMUTH N 311° E

| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | LOG OF RATIO DA-N/DA-D | DA-D/ND | DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 1.92 | - | 100 | 9.00 | -1.046 | - | - |
| 2 | 2.12 | - | 87.0 | 6.90 | -1.101 | - | - |
| 3 | 2.23 | - | 80.5 | 8.25 | - .990 | - | - |
| 4 | 2.97 | - | 68.5 | 6.90 | - .997 | - | - |
| 5 | 3.28 | - | 64.0 | 4.80 | -1.125 | - | - |
| 6 | 3.60 | - | 62.0 | 3.48 | -1.251 | - | - |
| 7 | 3.81 | - | 53.7 | 3.32 | -1.209 | - | - |
| 8 | 4.02 | - | 50.5 | 4.40 | -1.060 | - | - |
| 9 | 4.27 | - | 48.0 | 5.25 | - .961 | - | - |
| 10 | 4.43 | - | 52.5 | 6.55 | - .904 | - | - |
| 11 | 4.67 | - | 43.7 | 7.25 | - .781 | - | - |
| 12 | 4.88 | - | 41.2 | 6.60 | - .795 | - | - |
| 13 | 5.17 | - | 36.3 | 5.10 | - .853 | - | - |
| 14 | 5.44 | - | 29.0 | 3.17 | - .961 | - | - |
| 15 (MP-D) | 5.87 | - | 34.0 | 2.73 | -1.095 | - | - |
| 16 (MP-N) | 5.89 | - | 33.5 | 2.65 | -1.102 | - | - |
| 17 | 6.58 | - | 27.0 | 0.98 | -1.440 | - | - |
| 18 | 6.89 | - | 25.5 | 1.76 | -1.161 | - | - |
| 19 | 7.10 | - | 26.2 | 2.80 | - .971 | - | - |
| 20 | 7.20 | - | 26.4 | 2.20 | -1.079 | - | - |
| 21 | 7.88 | - | 25.3 | 2.32 | -1.036 | - | - |
| 22 | 8.26 | - | 22.9 | 3.06 | - .875 | - | - |
| 23 | 8.97 | - | 19.1 | 2.08 | - .963 | - | - |
| 24 | 10.3 | - | 16.7 | 0.60 | -1.445 | - | - |
| 25 | 11.0 | - | 15.4 | 1.46 | -1.023 | - | - |
| | | Average Log | | | -1.049 | | |
| | | Antilog | | | .0893 | | |

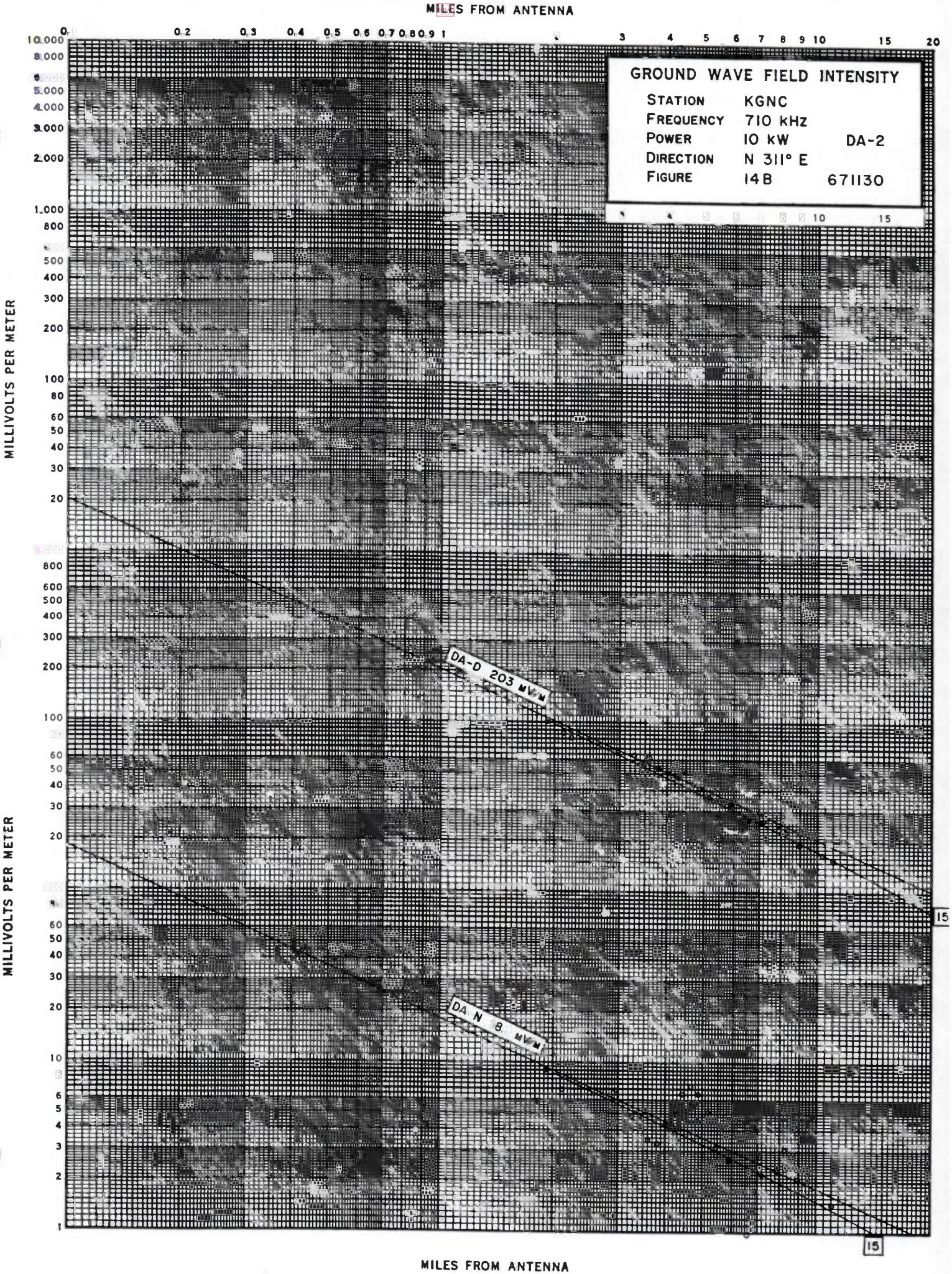
Nondirectional - not measured

Daytime directional measured November 21 and 22, 1967

Nighttime directional measured November 24 and 25, 1967



FIGURE 14A


MILES FROM ANTENNA
0
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
3
4
5
6
7
8
9
10
15
20
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW DA-2
DIRECTION N 311° E
FIGURE 14B 671130
MILLIVOLTS PER METER
10,000
8,000
5,000
4,000
3,000
2,000
1,000
800
500
400
300
200
100
80
60
50
40
30
20
800
600
500
400
300
200
100
60
50
40
30
20
60
50
40
30
20
10
6
5
4
3
2
1
DA-D 203 MV/M
DA N 8 MV/M
15
15
MILES FROM ANTENNA

RADIO STATION KGNC

AMARILLO, TEXAS

RADIAL FIELD INTENSITY MEASUREMENTS

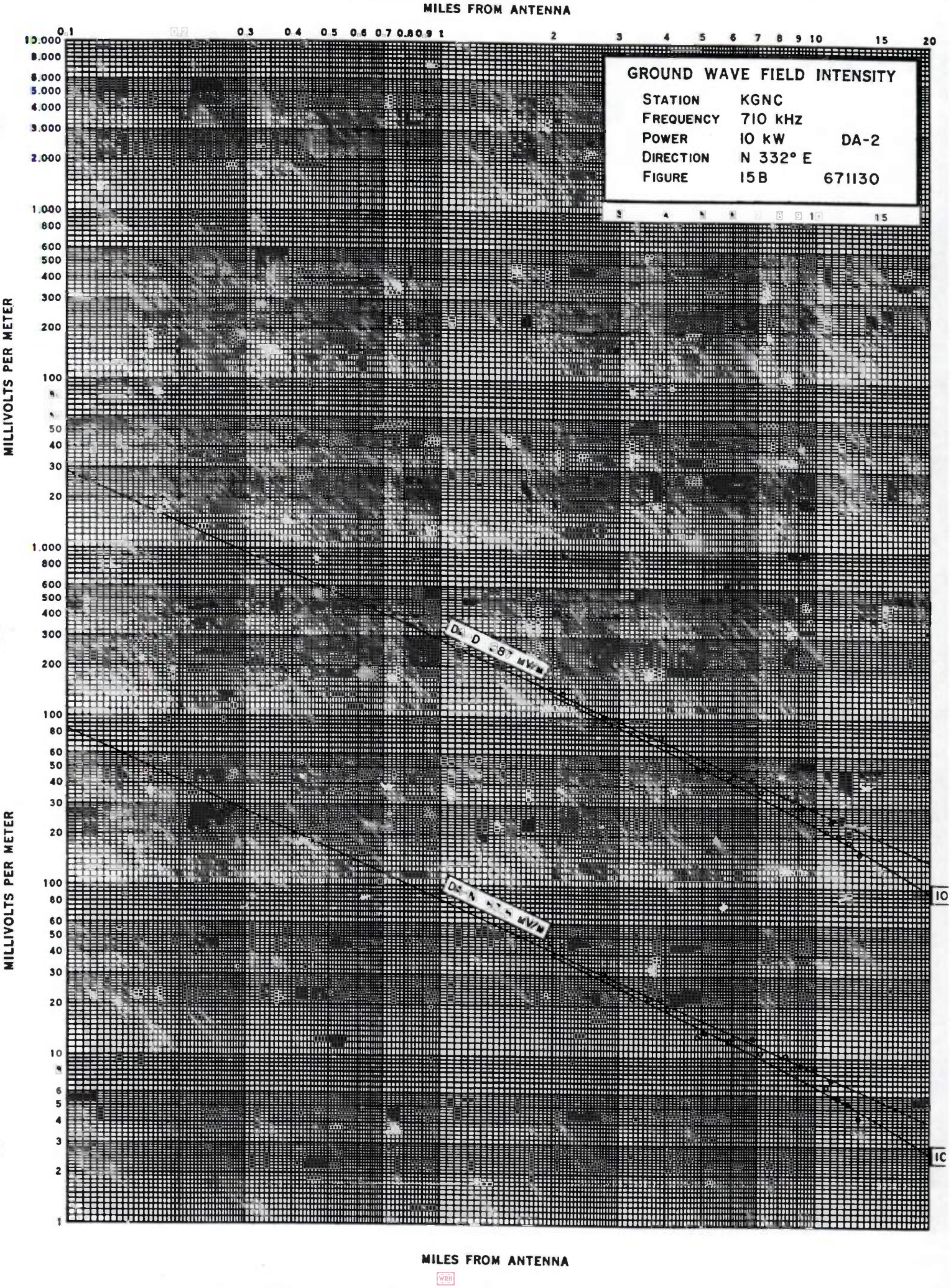
AZIMUTH N 332° E

| Point Number | Distance Miles | 5 kW ND, mV/m | 10 kW DA-D, mV/m | 10 kW DA-N, mV/m | LOG OF RATIO DA-N/DA-D | DA-D/ND | DA-N/ND |
|---|---|---|---|---|---|---|---|
| 1 | 1.98 | - | 149 | 46.4 | -.507 | - | - |
| 2 | 2.13 | - | 140 | 45.4 | -.490 | - | - |
| 3 | 2.32 | - | 123 | 41.1 | -.473 | - | - |
| 4 | 2.74 | - | 101 | 30.8 | -.516 | - | - |
| 5 | 3.04 | - | 97.0 | 25.6 | -.578 | - | - |
| 6 | 3.27 | - | 81.5 | 22.4 | -.561 | - | - |
| 7 | 3.61 | - | 79.0 | 22.3 | -.549 | - | - |
| 8 | 3.87 | - | 78.0 | 22.2 | -.546 | - | - |
| 9 | 4.07 | - | 68.0 | 19.7 | -.538 | - | - |
| 10 | 4.88 | - | 50.0 | 13.3 | -.575 | - | - |
| 11 | 5.12 | - | 51.0 | 14.1 | -.558 | - | - |
| 12 | 5.92 | - | 43.8 | 12.5 | -.545 | - | - |
| 13 | 6.04 | - | 45.4 | 13.1 | -.540 | - | - |
| 14 | 6.81 | - | 44.8 | 13.1 | -.534 | - | - |
| 15 | 7.17 | - | 37.4 | 10.7 | -.544 | - | - |
| 16 | 8.37 | - | 35.4 | 10.4 | -.532 | - | - |
| 17 | 8.76 | - | 29.6 | 8.75 | -.530 | - | - |
| 18 | 9.18 | - | 29.8 | 9.00 | -.520 | - | - |
| 19 | 9.97 | - | 29.6 | 8.90 | -.522 | - | - |
| 20 | 9.99 (MP) | - | 29.8 | 8.80 | -.530 | - | - |
| 21 | 10.7 | - | 21.6 | 6.75 | -.506 | - | - |
| 22 | 11.0 | - | 24.8 | 7.40 | -.526 | - | - |
| 23 | 11.5 | - | 20.2 | 5.75 | -.546 | - | - |
| 24 | 12.2 | - | 18.9 | 5.35 | -.548 | - | - |
| 25 | 13.0 | - | 15.8 | 4.43 | -.553 | - | - |
| | Average Log | | | | -.535 | | |
| | Antilog | | | | .292 | | |

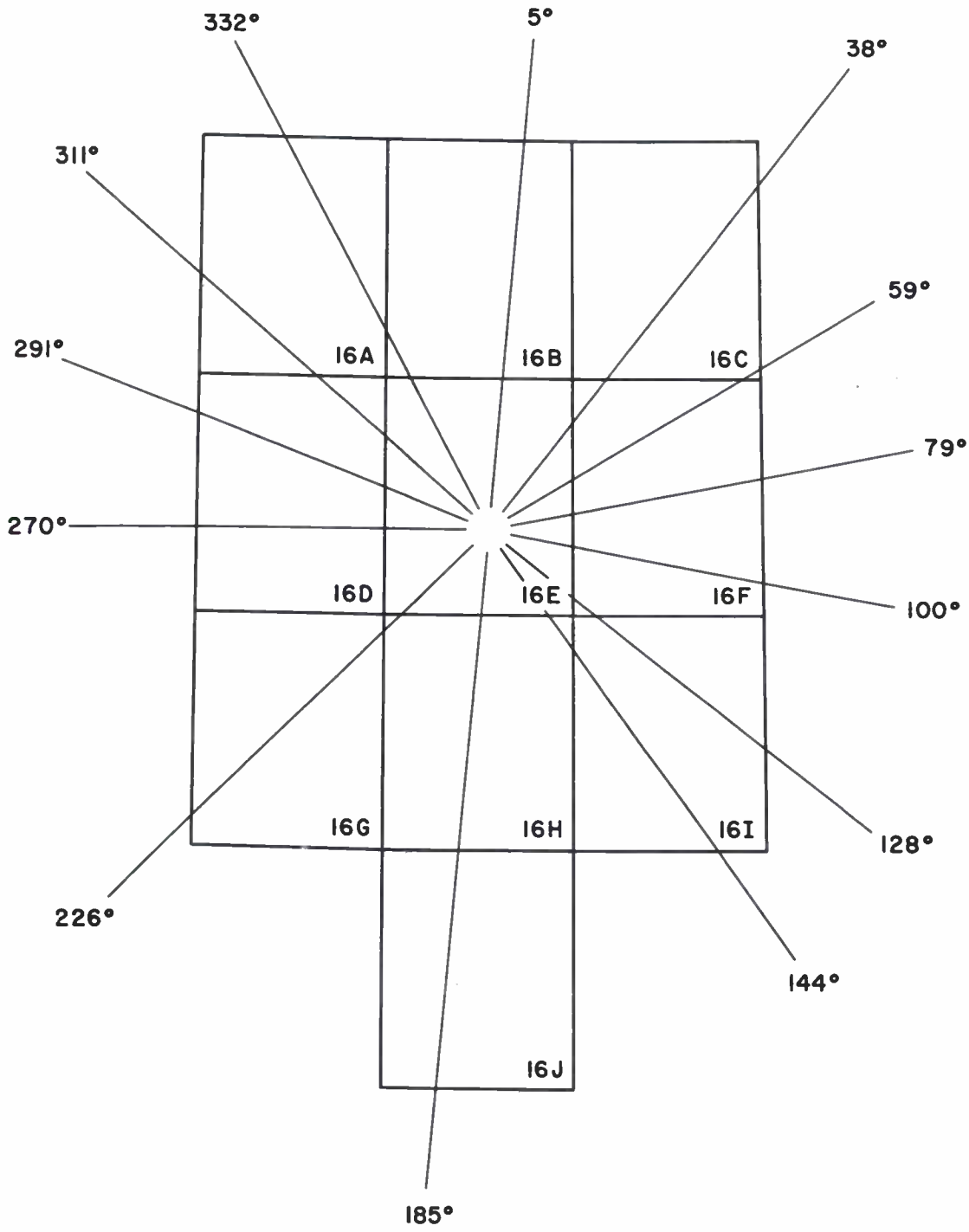
Nondirectional - not measured

Daytime directional measured November 21 and 25, 1967

Nighttime directional measured November 24, 1967


MILES FROM ANTENNA
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 15 20
MILLIVOLTS PER METER
10,000 8,000 6,000 5,000 4,000 3,000 2,000 1,000 800 600 500 400 300 200 100 50 40 30 20 1,000 800 600 500 400 300 200 100 80 60 50 40 30 20 100 80 60 50 40 30 20 10 6 5 4 3 2 1
GROUND WAVE FIELD INTENSITY
STATION KGNC
FREQUENCY 710 kHz
POWER 10 kW DA-2
DIRECTION N 332° E
FIGURE 15B 671130
MILLIVOLTS PER METER
MILES FROM ANTENNA

# POINT MAP INDEX



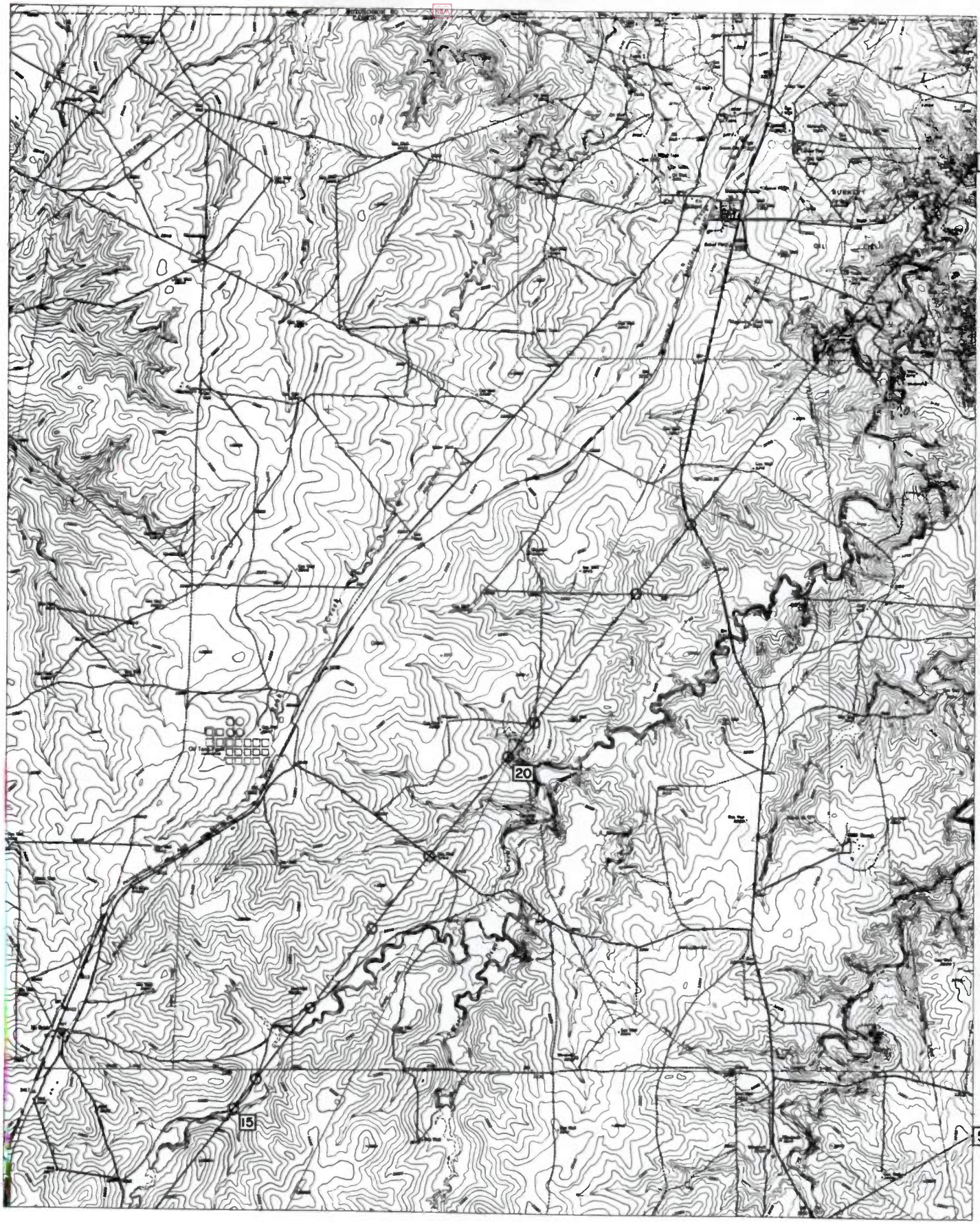

| | |
|---|---|
| PREPARED BY<br>THE FIRM OF A. EARL CULLUM, JR.<br>CONSULTING ENGINEERS | RADIO STATION KGNC<br>AMARILLO, TEXAS<br>671130 FIGURE 16 |

671130

FIGURE 16A

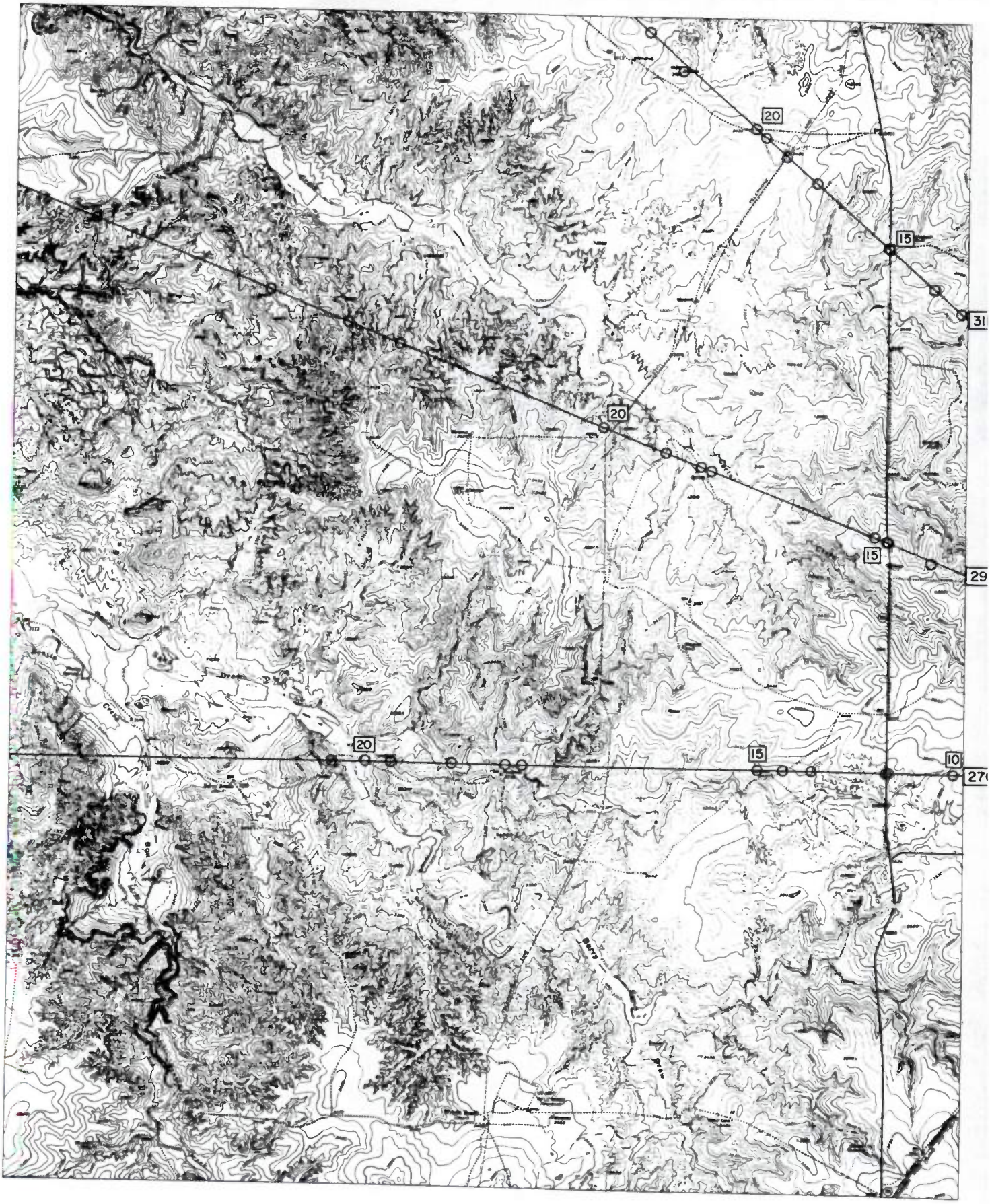
671130

FIGURE 16B



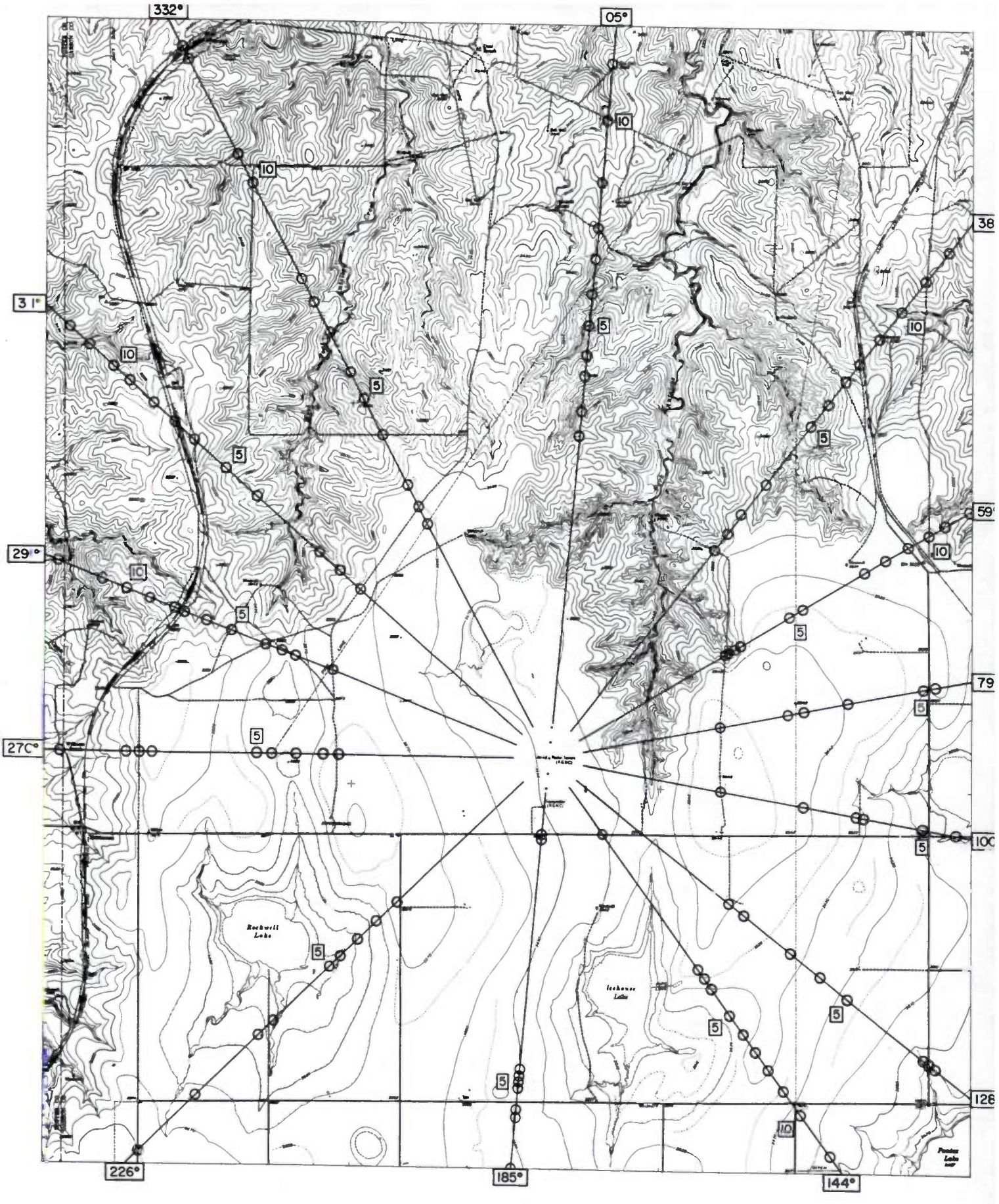

671130

FIGURE 16C



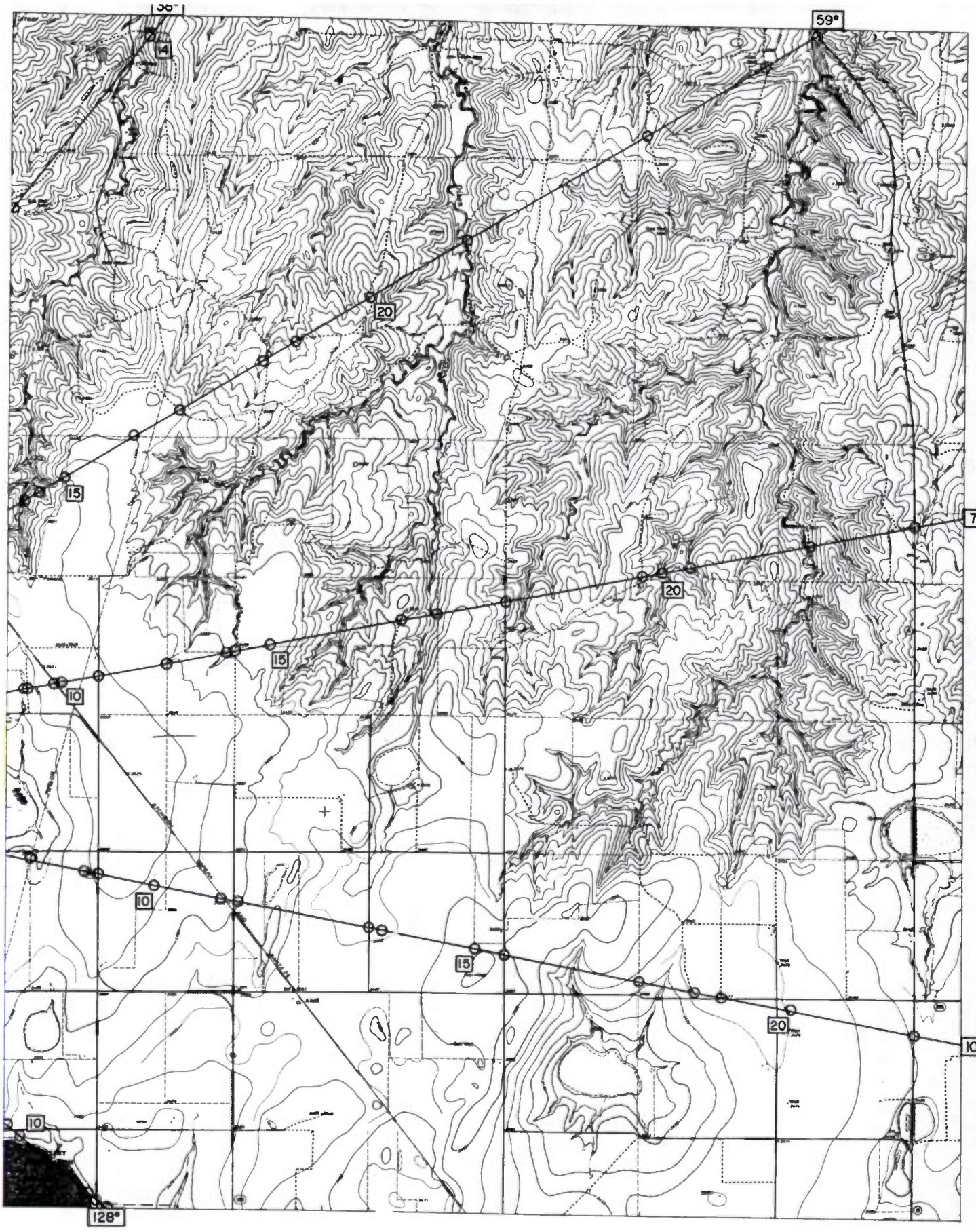

671130

FIGURE 16D



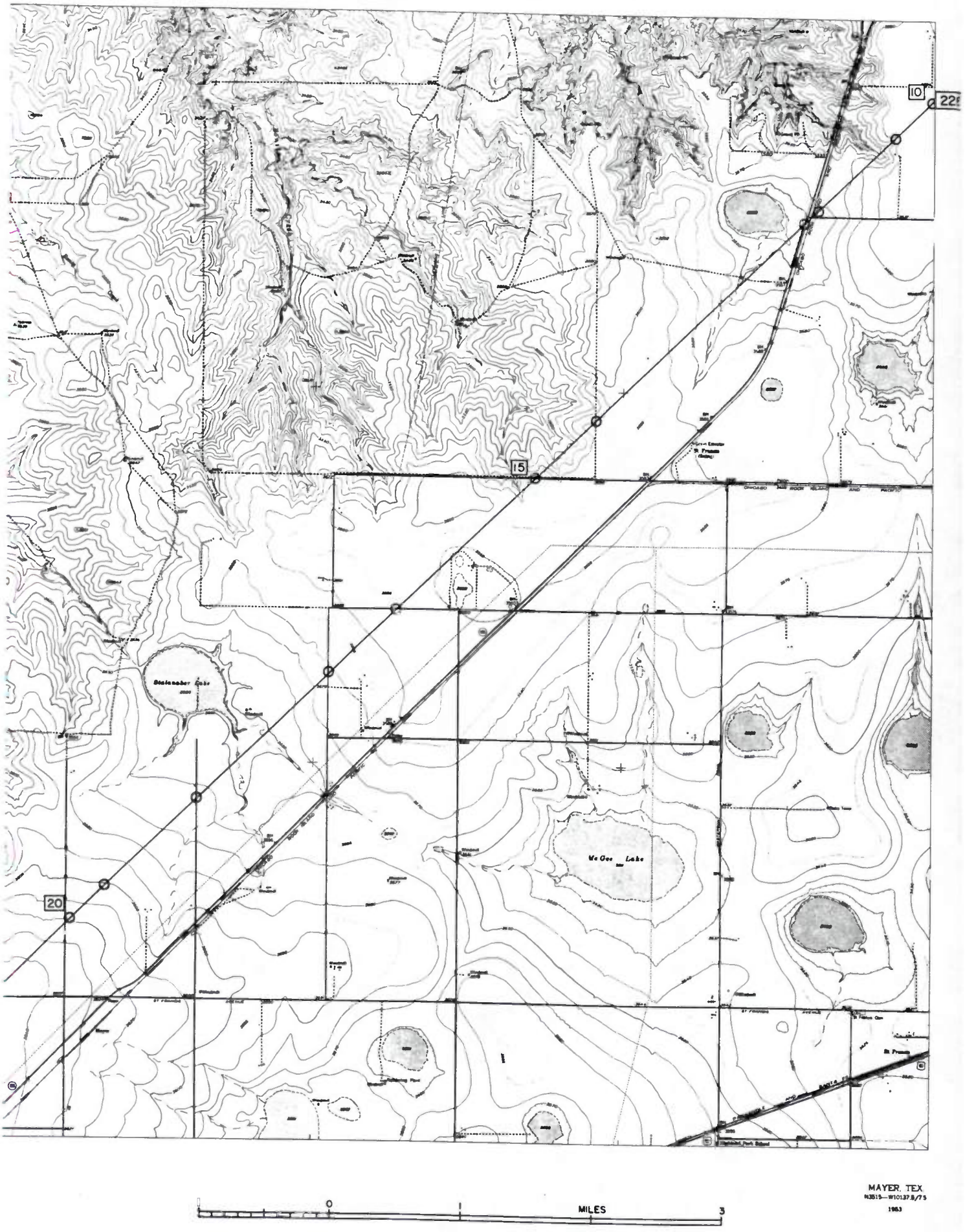

671130

FIGURE 16E




671130

FIGURE 16F



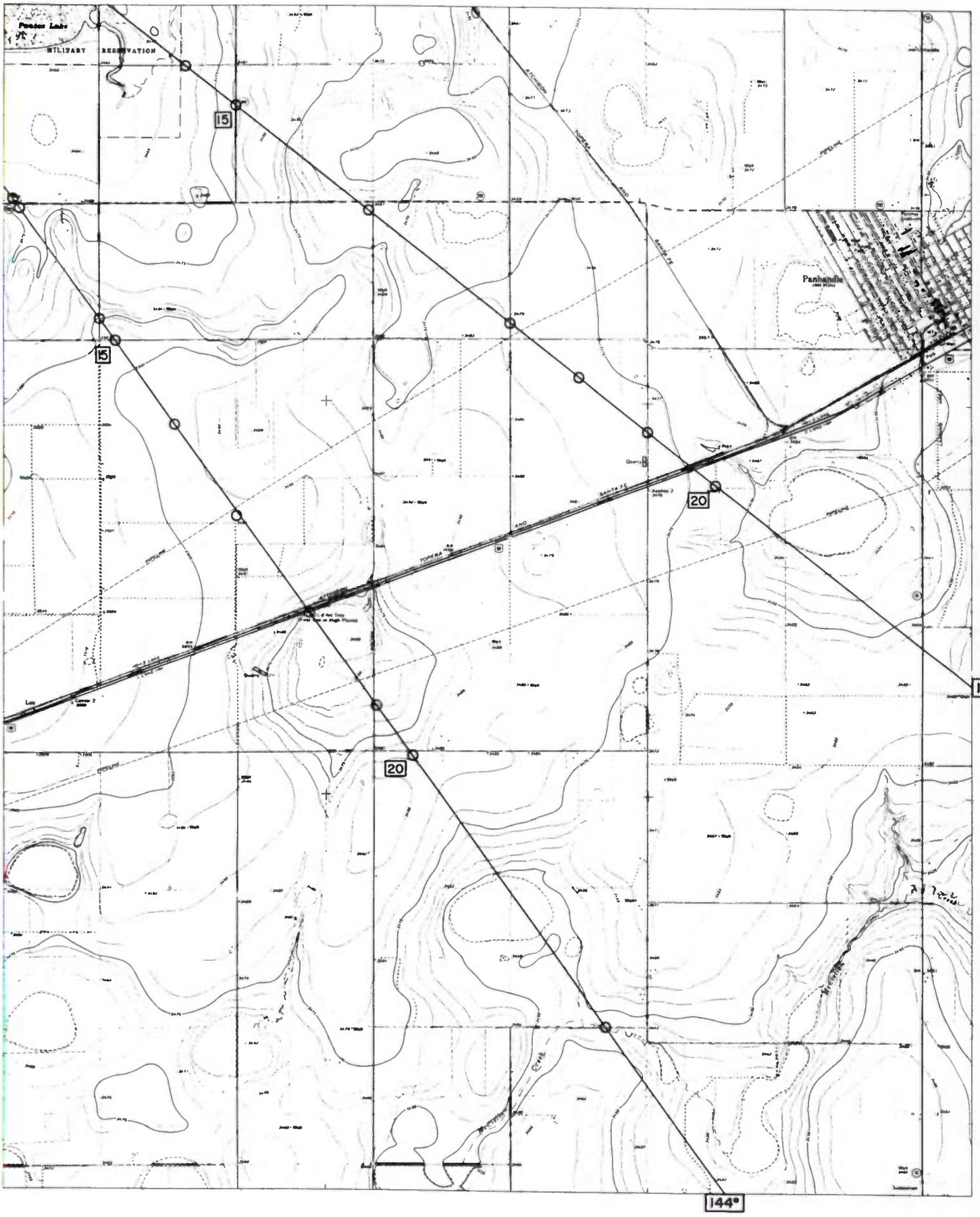

671130

FIGURE 16G

SEVENMILE BASIN, TEX.
N3515—W10130/7.5
1953

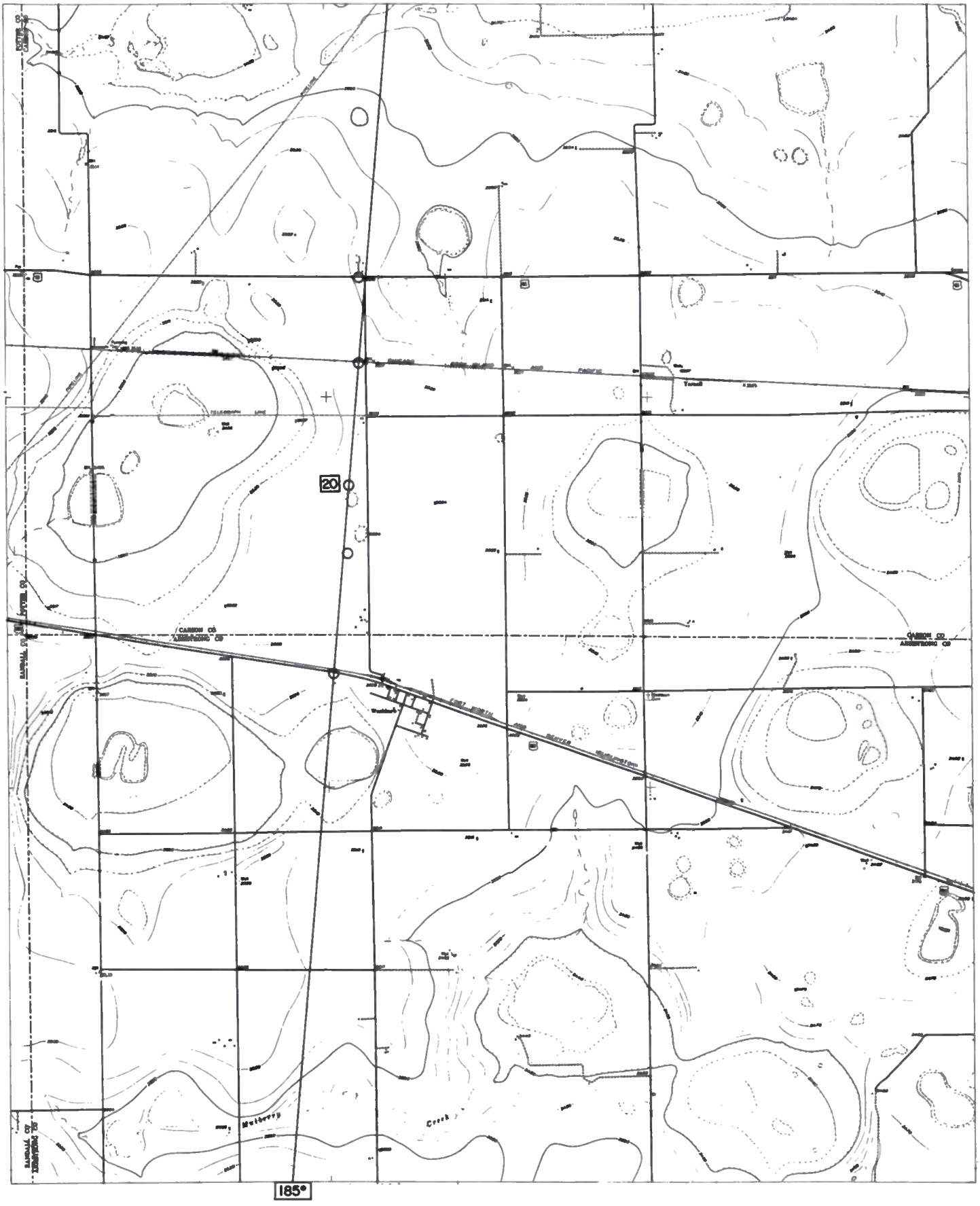
671130

FIGURE 16H




671130

FIGURE 16 I




WASHBURN, TEX

671130

FIGURE 16 J

RADIO STATION KGNC

AMARILLO, TEXAS

## DESCRIPTION OF MONITORING POINTS

### Daytime Monitoring Points

Monitoring Point No. 8, direction of 311° true north, distance 5.9 miles. From the KGNC entrance road proceed west 4.5 miles to Texas Highway 136, northerly 4.55 miles to monitoring point located approximately 200 feet south of a field gate to windmill. The monitoring point is 10 feet east of the paved surface. A post marked 311 is located in the east fence line opposite the monitoring point.

Monitoring Point No. 1, direction of 05° true north, distance 14.2 miles. From Monitoring Point No. 8 proceed northerly and easterly 16.5 miles on Texas Highway 136 to monitoring point located 0.2 mile east of the bridge over Antelope Creek. The monitoring point is 25 feet south of the paved surface. A post marked 05 is located in the south fence line opposite the monitoring point.

Monitoring Point No. 3, direction of 59° true north, distance 10.7 miles. From Monitoring Point No. 1 proceed easterly 8.11 miles to Texas Highway 15, southerly 11.38 miles to monitoring point located 0.1 mile south of the bridge over Middle Dixon Creek. The monitoring point is 10 feet west of the paved surface. A post marked 59 is located in the east fence line opposite the monitoring point.

### Nighttime Monitoring Points

Monitoring Point No. 5, direction of 100° true north, distance 10.0 miles. From Monitoring Point No. 3 proceed southerly 7.39 miles on Texas Highway 15 to monitoring point located 0.25 mile south of Farm Road 2385. The monitoring point is 10 feet east of the paved surface. A post marked 100 is located in the east fence line opposite the monitoring point.

Monitoring Point No. 4, direction of 79° true north, distance 10.1 miles. From Monitoring Point No. 5 proceed northerly 3.67 miles on Texas Highway 15 to monitoring point located 25 feet south of driveway to farm home to the west. The monitoring point is located 10 feet east of the paved surface. A post marked 79 is located in the west fence line opposite the monitoring point.

Monitoring Point No. 3, direction of 59° true north, distance 10.7 miles. From Monitoring Point No. 4 proceed northerly 3.72 miles on Texas Highway 15 to monitoring point located 0.1 mile south of the bridge over Middle Dixon Creek. The monitoring point is 10 feet east of the paved surface. A post marked 59 is located in the east fence line at the monitoring point.

Monitoring Point No. 2, direction of 38° true north, distance 13.3 miles. From Monitoring Point No. 3 proceed northerly 5.22 miles on Texas Highway 15 to monitoring point located 0.41 mile south of Cities Service lease road. The monitoring point is 10 feet east of the paved surface. A post marked 38 is located in the west fence line opposite the monitoring point.

Monitoring Point No. 1, direction of 05° true north, distance 14.2 miles. From Monitoring Point No. 2 proceed northerly 6.17 miles on Texas Highway 15 to Texas Highway 136, westerly 8.11 miles on Texas Highway 136 to monitoring point located 0.2 mile east of the bridge over Antelope Creek. The monitoring point is located 10 feet north of the paved surface. A post marked 05 is located in the south fence line opposite the monitoring point.

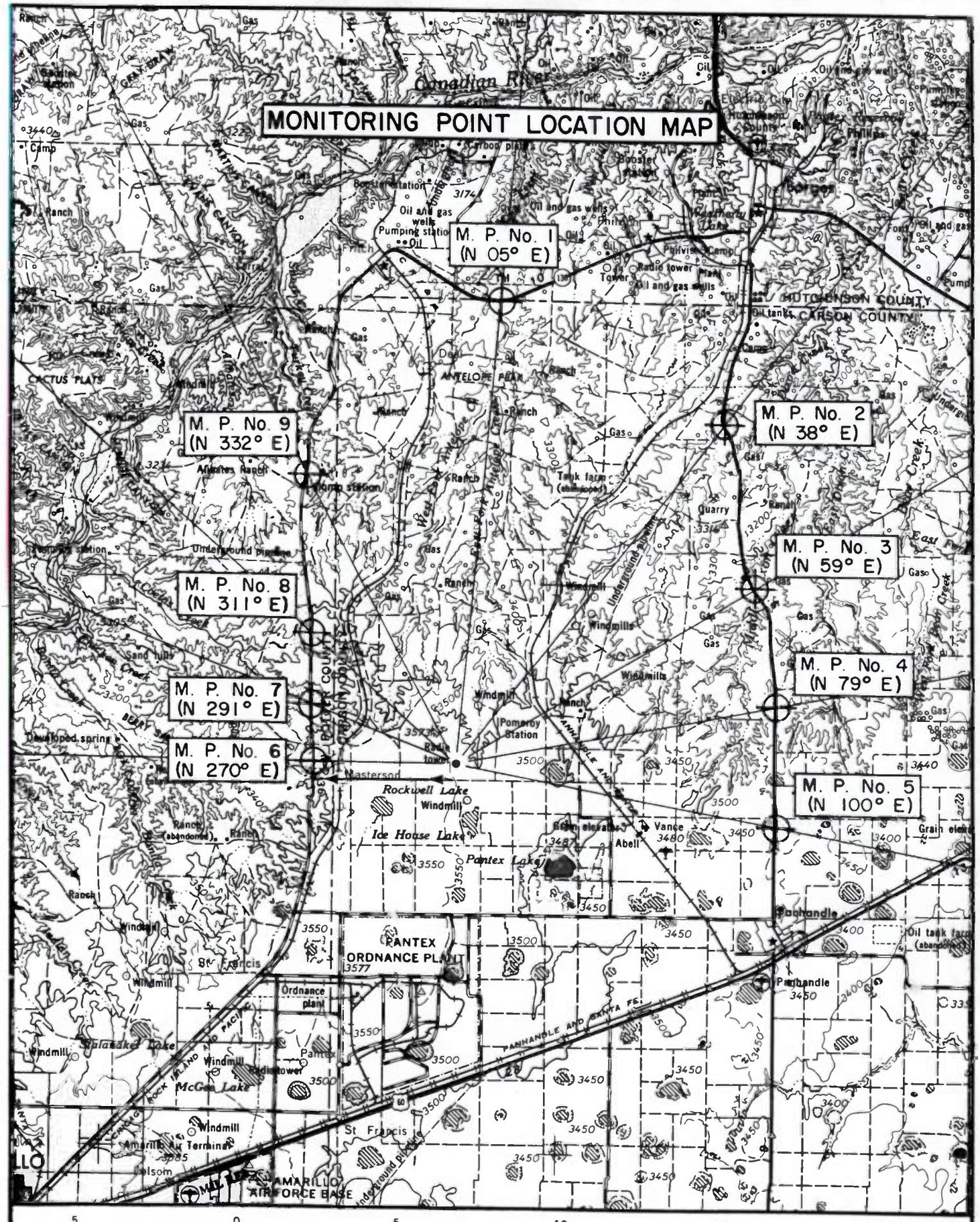
Monitoring Point No. 9, direction of 332° true north, distance 9.99 miles. From Monitoring Point No. 1 proceed westerly and southerly 11.55 miles on Texas Highway 136 to monitoring point located 0.40 north of the Turkey Creek Pumping Station water tank and 10 feet south of a field gate to the east. The monitoring point is located 10 feet west of the paved surface. A post marked 332 is located in the east fence line opposite the monitoring point.

Monitoring Point No. 8, direction of 311° true north, distance 5.89 miles. From Monitoring Point No. 9 proceed southerly 4.93 miles on Texas Highway 136 to monitoring point located approximately 200 feet south of a field gate to windmill. The monitoring point is located 10 feet west of the paved surface. A post marked 311 is located in the east fence line opposite the monitoring point.

Monitoring Point No. 7, direction of 291° true north, distance 4.75 miles. From Monitoring Point No. 8 proceed southerly 2.18 miles on Texas Highway 136 to monitoring point located approximately due east of a windmill to the west. The monitoring point is located 10 feet west of the paved surface. A post marked 291 is located in the east fence line opposite the monitoring point.

Monitoring Point No. 6, direction of 270° true north, distance 4.43 miles. From Monitoring Point No. 8 proceed southerly 1.71 mile on Texas Highway 136 to monitoring point located due west of the Williams Ranch. The monitoring point is located 10 feet west of the paved surface. A post marked 270 is located in the east fence line opposite the monitoring point.

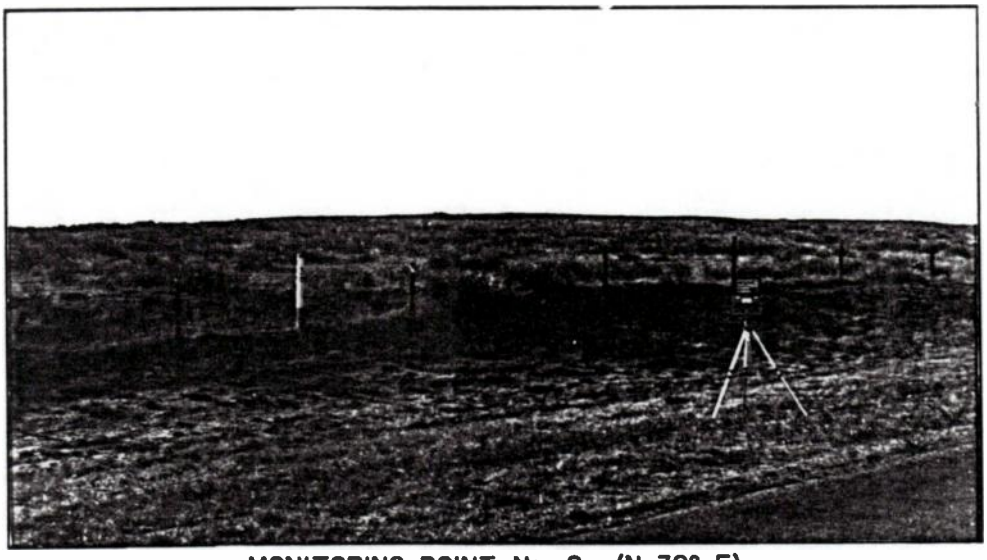
NOTE: The above monitoring points have been located at distances of not less than four miles and not more than fifteen miles from the antenna in the directions specified. Such range of distances is due to the fact that the locations are the nearest points which are in the clear and accessible throughout the year. In view of the distances from the KGNC array, the monitoring points may be measured on either side of the highways which are clear of overhead wires. The practice has been to measure the points on the right side of the road determined by the direction of travel to the monitoring point.



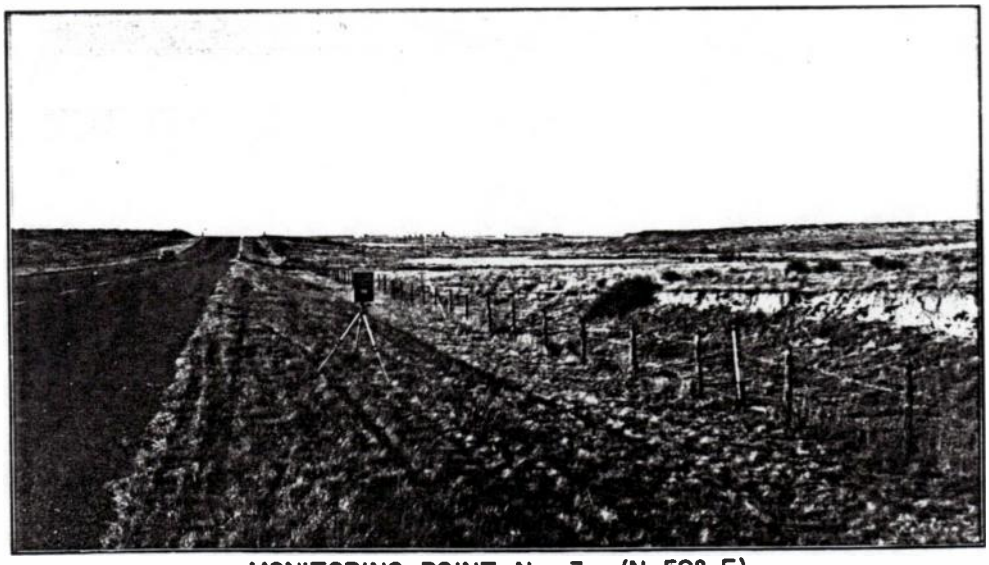

PREPARED BY
THE FIRM OF A. EARL CULLUM, JR.
CONSULTING ENGINEERS

RADIO STATION KGNC
AMARILLO, TEXAS
671130 FIGURE 17B

MONITORING POINT No. 1 (N 05° E)

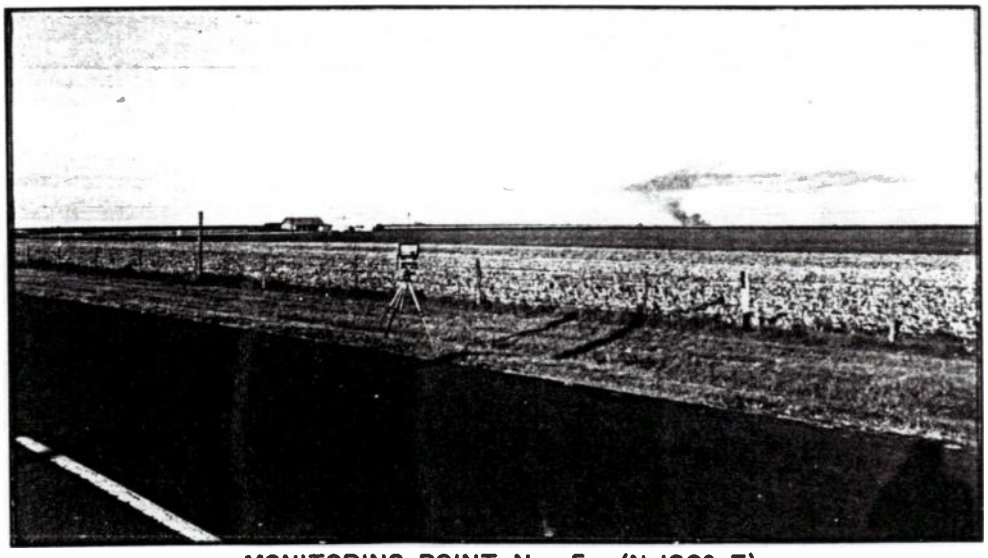


MONITORING POINT No. 2 (N 38° E)

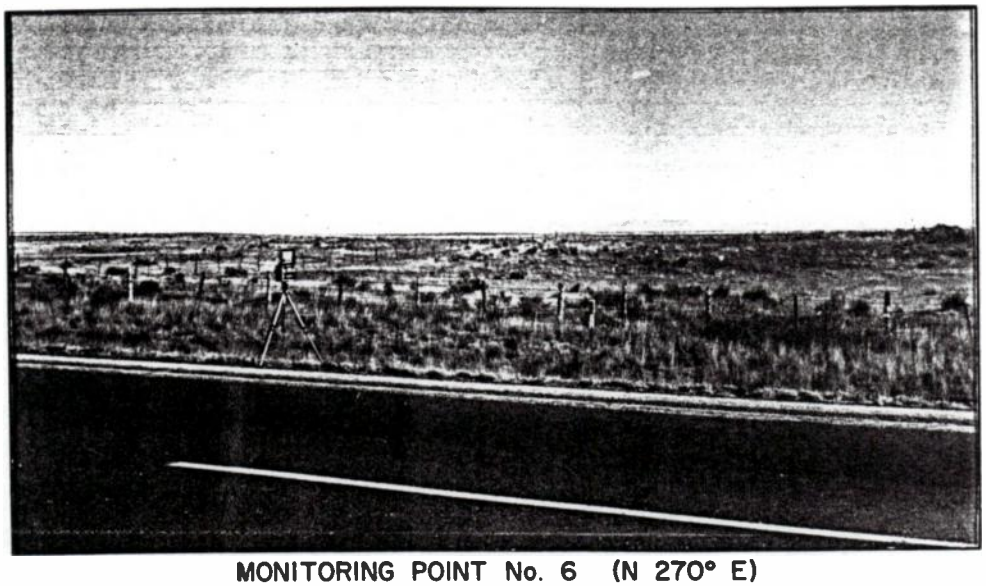


MONITORING POINT No. 3 (N 59° E)

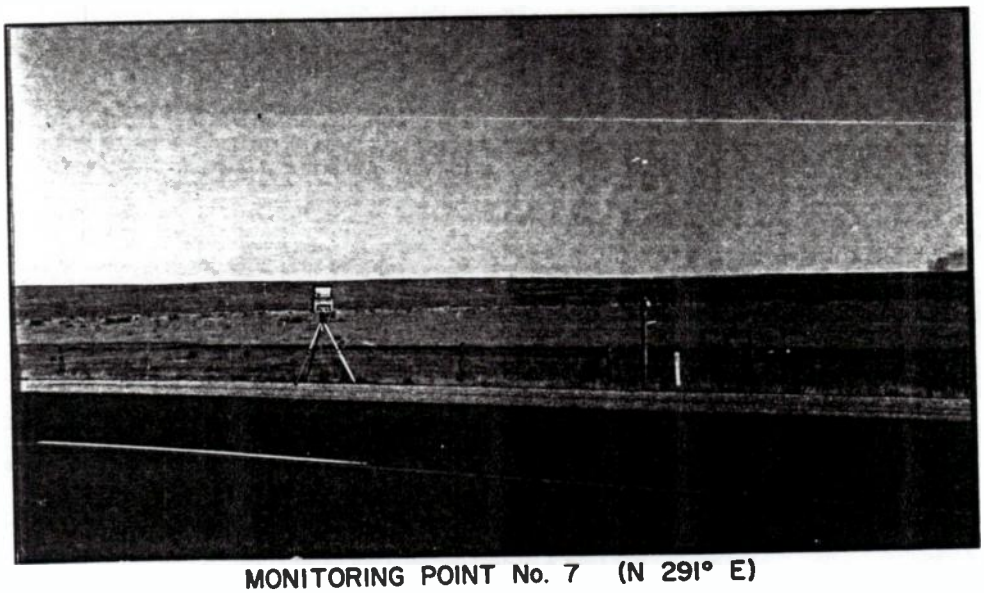
MONITORING POINT No. 4 (N 79° E)



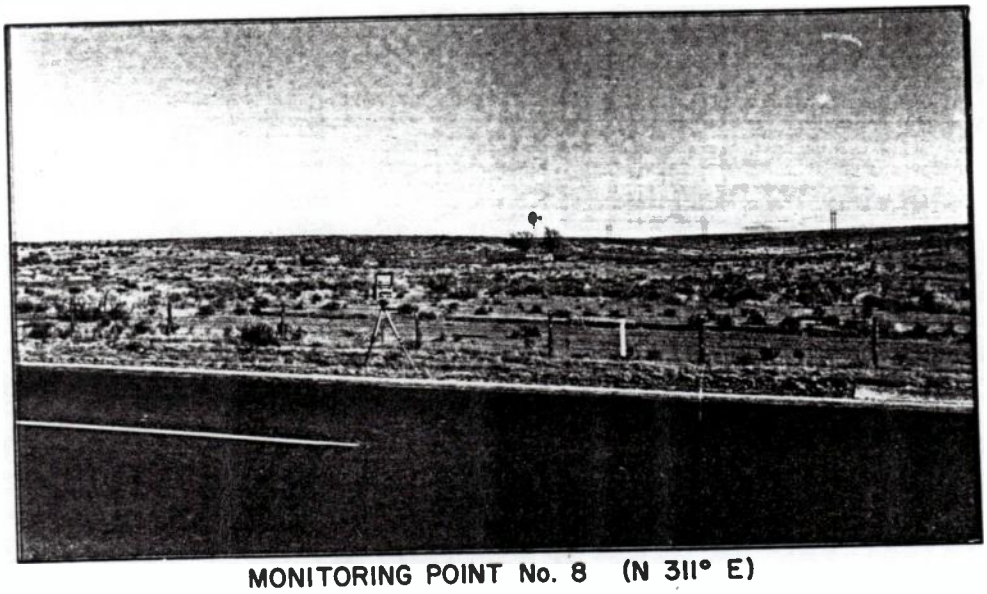
MONITORING POINT No. 5 (N 100° E)



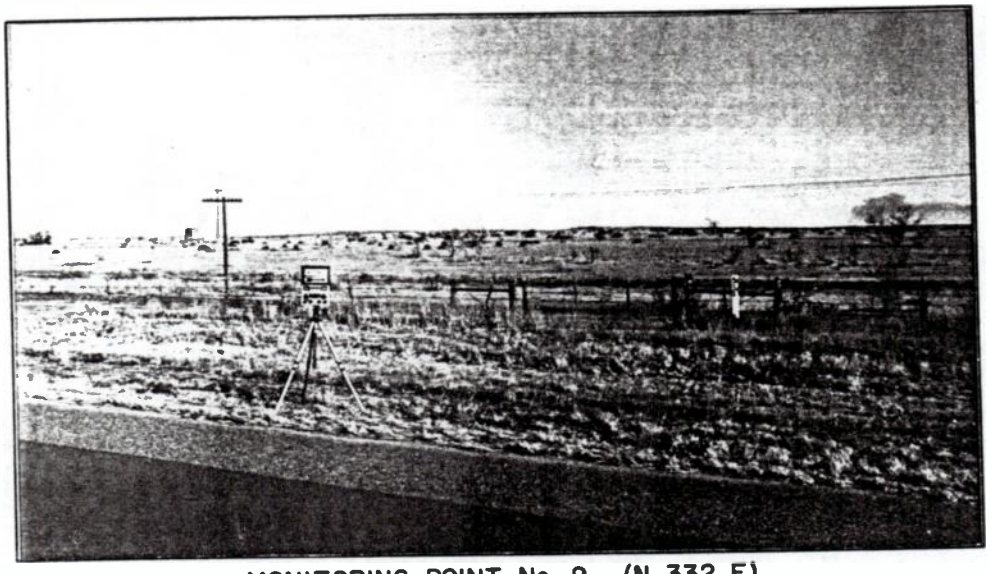
MONITORING POINT No. 6 (N 270° E)



MONITORING POINT No. 7 (N 291° E)



MONITORING POINT No. 8 (N 311° E)



MONITORING POINT No. 9 (N 332 E)

RADIO STATION KGNC

AMARILLO, TEXAS

MONITORING POINT DATA

Daytime Directional Antenna

| Date | MP No. 1 N 05° E | MP No. 3 N 59° E | MP No. 8 N 311° E |
|---|---|---|---|
| November 15, 1967 | 27.2* | 16.4* | - |
| November 17, 1967 | 27.0 | 16.5 | - |
| November 21, 1967 | - | - | 34.0* |
| November 24, 1967 | 26.8 | 16.7 | 33.5 |
| November 25, 1967 | 27.0 | 16.8 | 34.0 |
| Unattenuated field intensity from radial measurements | 407 | 203 | 203 |
| Permissible unattenuated field specified | 448 | 250 | 250 |
| Permissible field intensity at monitoring point | 29.9 | 20.2 | 41.9 |

Nighttime Directional Antenna

| Date | MP No. 1 N 05° E | MP No. 2 N 38° E | MP No. 3 N 59° E | MP No. 4 N 79° E | MP No. 5 N 100° E | MP No. 6 N 270° E | MP No. 7 N 291° E | MP No. 8 N 311° E | MP No. 9 N 332° E |
|---|---|---|---|---|---|---|---|---|---|
| Nov. 16, 1967 | 19.5* | 6.30* | 1.80* | - | 6.40* | - | - | - | - |
| Nov. 18, 1967 | - | - | 1.68 | 2.70* | 6.50 | - | - | - | - |
| Nov. 20, 1967 | - | - | - | - | - | 16.7* | 4.60* | - | - |
| Nov. 24, 1967 | 19.6 | - | - | - | - | 15.5 | 4.50 | 2.65* | 8.80* |
| Nov. 25, 1967 | 19.5 | 5.90 | 1.58 | 2.55 | 6.25 | 15.7 | 4.40 | 2.55 | 8.70 |
| Nov. 26, 1967 | 19.6 | 6.10 | 1.67 | 2.75 | 6.50 | 15.5 | 4.60 | 2.73 | 8.90 |
| Unattenuated field intensity from radial measurements | 294 | 90.2 | 22.3 | 19.3 | 70.5 | 73.2 | 21.3 | 18.1 | 83.8 |
| Permissible unattenuated field specified | 310 | 100 | 46 | 40 | 105 | 105 | 40 | 46 | 100 |
| Permissible field intensity at monitoring point | 20.6 | 6.98 | 3.71 | 5.59 | 9.53 | 23.9 | 8.63 | 6.73 | 10.5 |

Permissible monitoring point field is the measured monitoring point field times the ratio of the permissible radial field to the measured radial field.

* Monitoring point field intensity on date of radial measurement.

671130

FIGURE 17D

RADIO STATION KGNC

AMARILLO, TEXAS

## DESCRIPTION OF METHOD USED TO MAKE IMPEDANCE MEASUREMENTS

The impedance at the base of Tower No. 3 with all other towers detuned for nondirectional operation and at the common point of input to the KGNC daytime and nighttime directional antenna systems for normal operation, was measured with a radio-frequency bridge in the following manner: a radio-frequency oscillator was connected to the "Generator" terminals of the bridge. A radio-frequency receiver was connected to the "Detector" terminals of the bridge. The calibration of the radio-frequency oscillator was checked by beating the output of the oscillator against standard broadcast stations of known frequency. The calibration of the bridge was checked by placing known standards across the "Unknown" terminals of the bridge. The initial balance of the bridge was made with the "Unknown" terminals of the bridge shorted. The final balance of the bridge was made with the "Unknown" terminals of the bridge connected between the point of measurement and ground.

The frequency of measurement and all bridge indications were recorded for each condition of balance, and the impedance of the directional common point was then computed from the recorded data.

## MANUFACTURER'S NAME AND RATED ACCURACY OF EACH CALIBRATED INSTRUMENT

| Instrument | Manufacturer | Rated Accuracy |
|---|---|---|
| Radio-Frequency Bridge Type 916-AL, Serial 1507 | General Radio | Resistance ± (1% + 0.1 ohm)<br>Reactance ± (2% + 0.1 ohm) |
| Radio-Frequency Oscillator | L. F. Heithecker | Not Rated |

## DATE, ACCURACY, AND BY WHOM EACH INSTRUMENT WAS LAST CALIBRATED

| Instrument | Calibrated By | Date | Accuracy |
|---|---|---|---|
| Radio-Frequency Bridge Type 916-AL, Serial 1507 | L. F. Heithecker | November 26, 1967 | Resistance ± 1%<br>Reactance ± 1% |
| Oscillator | L. F. Heithecker | November 26, 1967 | Frequency ± 0.1% |

RADIO STATION KGNC

AMARILLO, TEXAS

COMMON-POINT IMPEDANCE FOR DAYTIME ARRAY NOVEMBER 26, 1967

| Frequency | Initial Balance | | Final Balance | | Common-Point Impedance | |
|---|---|---|---|---|---|---|
| Kilohertz | $R_0$ | $X_0$ | $R_1$ | $X_1$ | R | X |
| 680 | 0.0 | 535 | 60.1 | 659 | 60.1 | 18.2 |
| 685 | 0.0 | 535 | 64.8 | 620 | 64.8 | 12.4 |
| 690 | 0.0 | 535 | 65.7 | 566 | 65.7 | 4.5 |
| 695 | 0.0 | 535 | 62.5 | 531 | 62.5 | -0.6 |
| 700 | 0.0 | 535 | 57.8 | 514 | 57.8 | -3.0 |
| 705 | 0.0 | 535 | 53.4 | 519 | 53.4 | -2.3 |
| 710 | 0.0 | 535 | 50.5 | 536 | 50.5 | 0.0 |
| 715 | 0.0 | 535 | 49.0 | 561 | 49.0 | 2.2 |
| 720 | 0.0 | 535 | 49.7 | 587 | 49.7 | 7.2 |
| 725 | 0.0 | 535 | 51.9 | 611 | 51.9 | 10.5 |
| 730 | 0.0 | 535 | 55.9 | 623 | 55.9 | 12.1 |
| 735 | 0.0 | 535 | 60.2 | 618 | 60.2 | 9.9 |
| 740 | 0.0 | 535 | 63.8 | 592 | 63.8 | 7.7 |

$$R = R_1 - R_0 \qquad X = \frac{X_1 - X_0}{10f_{(MHz)}}$$

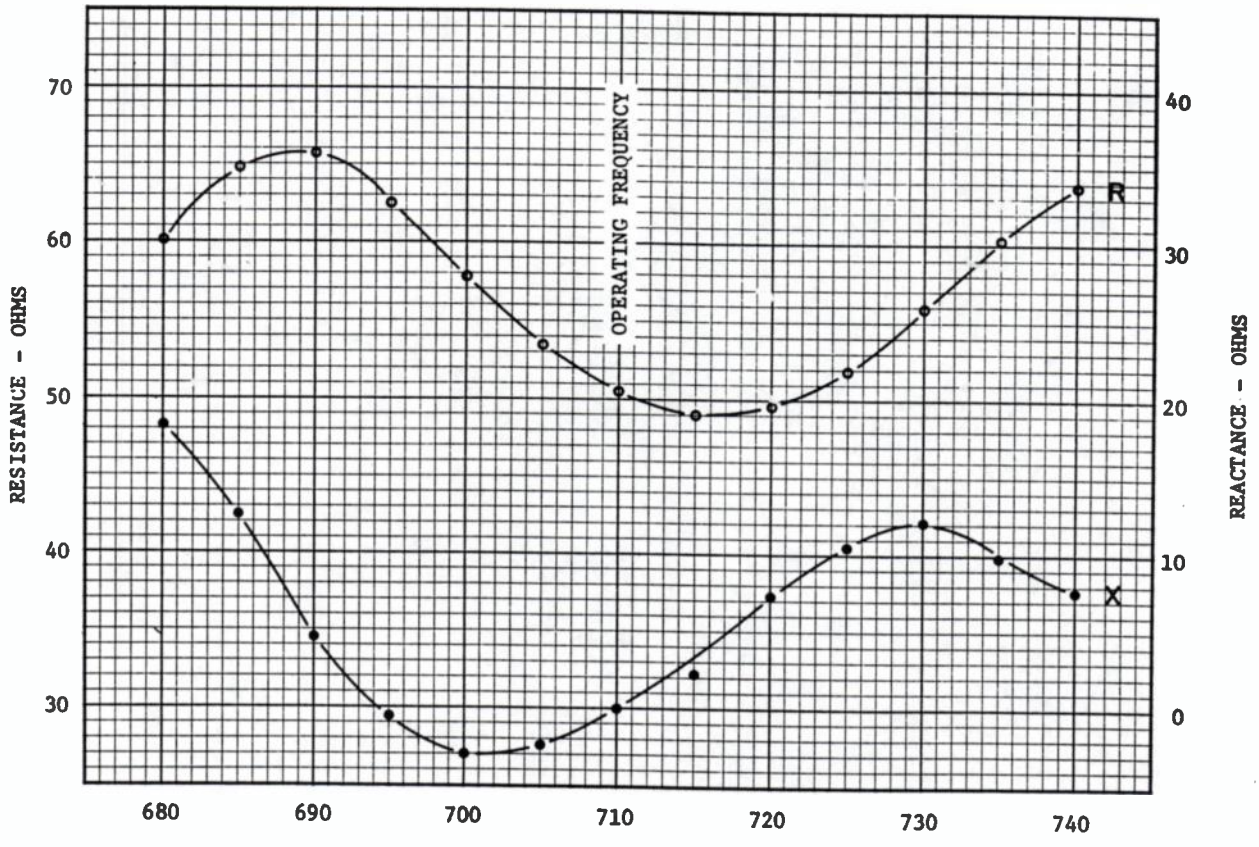



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FIGURE 18B

RADIO STATION KGNC

AMARILLO, TEXAS

COMMON-POINT INPEDANCE FOR NIGHTTIME ARRAY NOVEMBER 26, 1967

| Frequency | Initial Balance | | Final Balance | | Common-Point Impedance | |
|---|---|---|---|---|---|---|
| Kilohertz | $R_0$ | $X_0$ | $R_1$ | $X_1$ | R | X |
| 680 | 0.0 | 535 | 43.0 | 645 | 43.0 | 16.2 |
| 685 | 0.0 | 535 | 48.6 | 642 | 48.6 | 15.6 |
| 690 | 0.0 | 535 | 52.6 | 622 | 52.6 | 12.6 |
| 695 | 0.0 | 535 | 54.3 | 594 | 54.3 | 8.5 |
| 700 | 0.0 | 535 | 54.1 | 569 | 54.1 | 4.9 |
| 705 | 0.0 | 535 | 52.5 | 550 | 52.5 | 2.1 |
| 710 | 0.0 | 535 | 50.5 | 536 | 50.5 | 0.0 |
| 715 | 0.0 | 535 | 47.6 | 533 | 47.6 | -0.3 |
| 720 | 0.0 | 535 | 45.0 | 535 | 45.0 | 0.0 |
| 725 | 0.0 | 535 | 43.3 | 543 | 43.3 | 1.1 |
| 730 | 0.0 | 535 | 42.0 | 554 | 42.0 | 2.6 |
| 735 | 0.0 | 535 | 41.4 | 563 | 41.4 | 3.8 |
| 740 | 0.0 | 535 | 41.0 | 571 | 41.0 | 4.9 |

$$R = R_1 - R_0 \qquad X = \frac{X_1 - X_0}{10f_{(MHz)}}$$

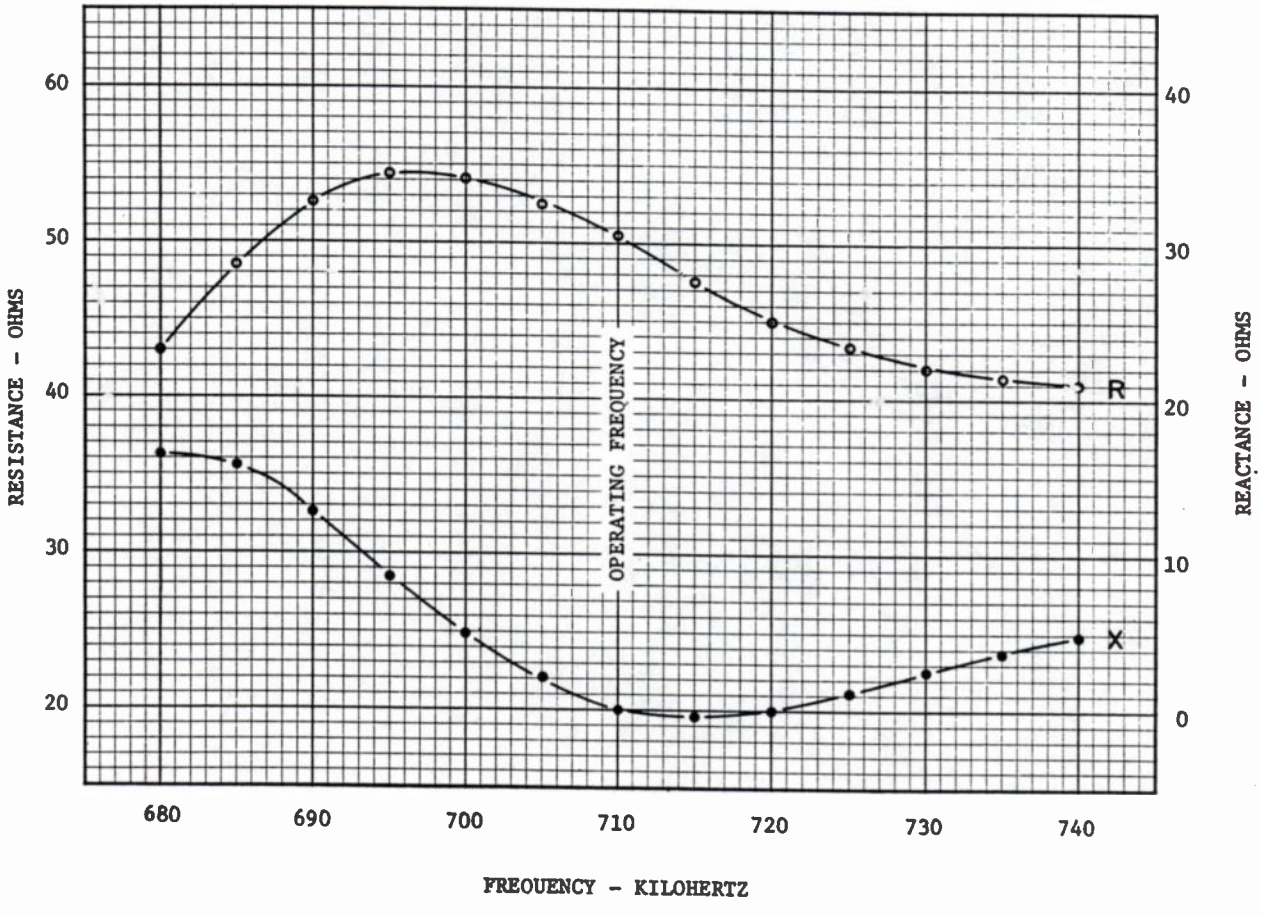


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FIGURE 18C

F.C.C. Form 304
Revised July, 1940

File No. _____

Call letters KWFT

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

APPLICATION FOR (~~Construction Permit~~ / ~~Modification of Construction Permit~~ / Modification of License) FOR AN EXISTING STANDARD BROADCAST STATION 1/

(Submit application and all exhibits, in duplicate, except as otherwise required in this form or the Standards of Good Engineering Practice Concerning Standard Broadcast Stations, to Federal Communications Commission, Washington, D. C. Swear to both copies. If space provided is insufficient attach inserts)

Before executing application see Communications Act of 1934, as amended, Part 1 (Rules of Practice and Procedure), Part 2 (General Rules and Regulations), and Part 3 (Standard Broadcast Rules) of the Commission's Rules and Regulations and the Standards of Good Engineering Practice Concerning Standard Broadcast Stations. All technical terms, such as "normally protected contours" and "objectionable interference", are for convenient reference only and are to be construed as having the same meaning as when used in the Rules and regulations and the Standards. The use of the terms "normally protected contours" and "objectionable interference" shall not be taken as implying any right to protection of such contours or from such interference.

TO THE FEDERAL COMMUNICATIONS COMMISSION:

1. Name of applicant 2/ WICHITA BROADCASTING COMPANY

2. Post-office address: State TEXAS City WICHITA FALLS

Street and number 800 EIGHTH STREET

3. Is this application for--

(a) Authorization to change present location of transmitter of existing station? No If so, what is distance in miles between present location and proposed location of transmitter? XX

(b) Approval of transmitter location and antenna system? No

---

1/ If any information or documents which are already on file with the Commission are required to be filed with the application, proper reference thereto should be made herein, together with a statement that there has been no change therein since date of filing thereof.

2/ If a corporation, state exact corporate name; if a partnership, state the names of all partners, and the name under which the partnership does business; if an unincorporated association, state the name of an executive officer, the office held by him, and the name of the association.

(c) Authorization to change maximum rated carrier power, which necessitates installation of new equipment? No
If so, applicant represents:
(1) That present maximum rated carrier power is 5000 watts.

(2) That proposed maximum rated carrier power is 5000 watts.

(d) Authorization to install new equipment? No If so, indicate (by check mark) what new equipment is to be installed:

(1) New transmitter XX (2) Change in system of modulation XX
(3) Change in type or number of vacuum tubes in last radio stage XX
(4) Change in automatic frequency control equipment XX (5) Other changes (specify) XX

(e) Changes in antenna system NONE REQUIRED

(f) Other changes (specify fully) INCREASE NIGHTTIME POWER FROM 1000 WATTS TO 5000 WATTS USING THE EXISTING DIRECTIONAL ANTENNA

4. Applicant states--

(a) That the estimated costs 3/ of establishing the station facilities are: Transmitter, $ XX Radiating system: (1) Coupling equipment, $ XX : (2) Antenna, $ XX :
(3) Ground equipment, $ XX : Studio (technical), $ XX Studio (other than technical), $ XX
Acquiring land, $ XX Improvements to leased property, $ XX : Engineering fees, $ 1000.00 : Other items (state nature), ATTORNEY $ 500.00
Total, $ 1500.00 that the estimated total annual expense of operation under the proposed plan is $ 70,000.00 and that the estimated total annual revenue under the proposed plan is $ 90,000.00

(b) That there are submitted herewith the detailed facts upon which the estimates in (a) above are predicted BASED UPON THE PAST OPERATION OF KWFT, WE FIND THE AVERAGE MONTHLY OPERATION EXPENSES, EXCLUSIVE OF DEPRECIATION, REPLACEMENT, AND ETC. TO BE APPROXIMATELY $6,000.00 PER MONTH, AND BASED UPON OUR PRESENT INCOME, WE SHOULD HAVE OPERATING PROFIT OF APPROXIMATELY $20,000.00 PER YEAR.

---

3/ If construction is to be performed under a contract for the completed work, the facts as to such contract must be stated in lieu of estimates as to the several items. In any event, the costs shown must be the costs in place and ready for service, including the amounts for labor, supervision, materials, supplies, and freight.

(c) That the proposed construction is to be financed and paid for in the following manner (including specific statements as to the approximate amount to be met and paid for from each source): Existing capital, $ 1500.00 : New capital $ XX : Loans, $ XX : Profits, $ XX : Donations, $ XX : Credit, $ XX : Other sources (specify), XX $ XX .

(d) That there is attached hereto, on Form 706, a detailed balance sheet of the applicant, as at the close of the month preceding the date of the application showing the financial ability of the applicant to construct and operate the station. 1/ SEE EXHIBIT 1 ATTACHED.

5. (a) Do the reports filed by applicant under Sections 1.361 of the Rules of Practice and Procedure and 43.1 of the Rules and Regulations reflect substantially applicant's status with regard to all conditions stated in such reports as of the date this application was executed?

YES

(Answer Yes or No)

(b) If not, submit a separate detailed statement herewith showing changes. (Full report of changes must also be filed on the forms as required by the above rules.)

APPLICANT'S INTERESTS

6. If applicant, or any partner, officer, member of the governing board, director, or principal stockholder has, or has had, any interest of any character whatever in, or any connection with, any of the following, there is submitted herewith a full and complete disclosure of the nature and extent of the interest in or connection with each. (If neither applicant, nor any of said parties, has, or has had, any such interest or connection, so state) NO SUCH INTEREST

(a) Any application pending before the Commission, or which has been denied within 12 months preceding the date of execution of this application? No

(b) Any radio broadcast station? No

1/ See footnote 1/, Page 1.

(c) Any broadcast station the license of which has been revoked or application for renewal of license for which has been denied? No

(d) Is any party named in 6 directly or indirectly controlled by any party with respect to whom any part of 6 applies? No (Yes or No)

If so, state fully

## FACILITIES REQUESTED

7. The class, frequency, power, and hours of operation requested for the proposed station are as follows:

(a) Frequency 620 kilocycles.

(b) Power (night) 5000 watts. (c) Power (day) 5000 watts.

(d) Hours of operation:

(1) Unlimited YES (2) Daytime only XX (3) Limited XX

(4) Sharing with (specify stations) NONE

(5) Other (specify) XX

(e) State number of hours per day proposed station will operate 19

8. (a) Does applicant request the assignment of all or any part of the facilities (i.e., frequency, power, and/or hours of operation) now assigned to any other station or stations? No (Yes or No)

(b) If so, specify the station or stations and state accurately the facilities requested to be withdrawn therefrom XX

TECHNICAL INFORMATION

9. Description of transmitting apparatus proposed to be installed:

(a) Make R.C.A. Mfg. Co. Type No. 5-DX

ALL DETAILS ON FILE F.C.C.

(b) Oscillator: Type of circuit _____ Number, manufacturer's name, and type of tubes _____

Normal plate current, per tube _____ Plate voltage _____

(c) List buffer and intermediate power amplifier stages, by number and type of tubes in each stage _____

(d) Last radio stage: Number, manufacturer's name, and type of tubes _____

Normal night operation for power requested: Plate current, per tube _____

Plate voltage _____ If greater day power than night power is requested, specify the following:

Normal day operation: Plate current, per tube _____

Plate voltage _____

Describe fully the proposed method and procedure of reducing power at sunset _____

(e) Modulator or last audio stage: Number, manufacturer's name, and type of tubes and how operated (Class "A", "A Prime", or "B") _____

Normal plate current, per tube _____ Plate voltage _____

(f) Which radio stage is modulated? _____

(g) What system of modulation is employed (high level, low level, grid bias in last radio stage etc.)? _____

_____

(h) If low-level modulation is employed, give for modulated radio stage:

Number and type of tubes _____

Plate current, per tube _____ Plate voltage _____

(i) The transmitter is designed for what maximum percentage of satisfactory modulation? _____

_____

_____

(j) State name and type number of modulation monitor _____

R.C.A. MODULATION MONITOR TYPE 66-A

_____

(k) Give Federal Communications Commission approval number 1552

(l) Specify manufacturer's name, type, number, and full-scale reading of the following meters:

(1) In last radio stage:

Plate voltmeter _____

Plate ammeter _____

(2) Antenna ammeter _____

(m) Describe the plate power supply for last radio stage _____

_____

Rating: Current _____ Voltage _____

(n) Maximum carrier power output of transmitter for satisfactory operation is _____ watts.

(o) Maximum rated carrier power of transmitter as determined by orders of the Federal Communications Commission is _____ watts.

10. Description of automatic frequency control equipment:

(a) Make R.C.A. Mfg. Co. Type No. UL4292
ALL DETAILS ON FILE F.C.C.

(b) Give manufacturer's name, type of cut, and temperature coefficient in cycles per degree centigrade of the quartz crystal _____

_____

(c) By whom will unit be calibrated? _____

Calibrated frequency: _____ kilocycles at _____ degrees centigrade.

Proposed operating frequency: _____ kilocycles. (Give exact figure, correct to third decimal place at _____ degrees centigrade.)

(d) State guaranteed accuracy of the calibration: _____ cycles.

(e) State number of frequency control oscillators which will be maintained constantly at correct operating temperature and frequency in heat-controlled chambers _____

(f) Is provision made for instantaneous connection of spare frequency control units? _____

(g) Manufacturer's name and type of automatic temperature control _____

_____

(h) State within what limit automatic temperature control will hold the temperature _____ degrees centigrade.

(i) State temperature coefficient of the frequency control units: _____ cycles per degree centigrade.

(j) Is temperature coefficient positive or negative? _____

(k) State manufacturer's name and rated accuracy of: Thermostat _____

_____ Thermometer _____

(l) Attach the circuit diagram of automatic temperature-control system if not already on file with the Commission.

(m) Attach a sketch or drawing of the automatic temperature-control chamber, if not already on file with the Commission.

(n) Describe checking means used for determining if transmitter retains assigned frequency BY CHECKING WITH SEPARATE FREQUENCY MONITOR AND INDEPENDENT COMMERCIAL FREQUENCY CHECKING SERVICE

(o) State name and type number of separate frequency monitor GENERAL RADIO FREQUENCY MONITOR TYPE 475B/681A

(p) Give Federal Communications Commission approval number 1452

11. Applicant states that there are attached hereto copies of an accurate schematic diagram of the fundamental radio and audio circuits of the transmitter proposed, including antenna and ground or counterpoise connections, antenna feed system, and that it indicates the type of tubes. (This diagram should be a blue print or ink drawing, if possible the size of this application.)

12. (a) Type of antenna 4/ DIRECTIONAL ANTENNA - DAY AND NIGHT

(b) Height of vertical load 400 feet. (Height above base insulator or base if grounded.)

(c) Length of flat top (if any) NONE feet.

(d) Give over-all height (in feet) above ground level 405 FEET

(e) Give over-all height (in feet) above mean sea level 1405 FEET

(f) Height (in feet) of building or substructure (distance from ground to base of antenna) 5 FEET

(g) Type (uniform cross section, tapered, etc., guyed or self-supporting) TWO SELF-SUPPORTED, SQUARE, TAPERED, STEEL TOWERS

(h) If not fully described above, give complete details or attach sketch SEE ATTACHED ENGINEERING EXHIBIT

(i) Counterpoise (if used): Type and dimensions NONE

4/ If directional antenna is proposed, complete engineering data thereon, in addition to the information under (a) to (l) inclusive, on each element, shall be submitted in triplicate properly verified by the engineer who designed it. It shall be clearly shown whether directional operation is for day or night or both and if so, whether the same pattern is proposed for both. If not, full information shall be submitted on each pattern.

(j) Antenna ground (if used): How obtained 120 RADIALS, EACH 400 FEET LONG, EQUALLY SPACED ABOUT EACH TOWER AND BURIED 6 TO 8 INCHES
(Number and length of radials and depth buried, etc.)

(k) How is antenna excited (shunt or series)? SERIES

13. From whom will equipment be purchased? (Specify whether new or used NONE REQUIRED If used, where, how long, and what changes have been made or proposed. Attach additional sheets if necessary)

Transmitter R.C.A. MFG. Co. EXISTING

Antenna LEHIGH STRUCTURAL STEEL Co. EXISTING

Studio equipment R.C.A. MFG. Co. EXISTING

Frequency monitor GENERAL RADIO Co. EXISTING

Modulation monitor R.C.A. MFG. Co. EXISTING

Other equipment

14. Proposed location of transmitter: State TEXAS County WICHITA

City or town WICHITA FALLS Street and number APPROX. 2.5 MI. WNW AT RESETTLEMENT ROAD

North latitude: Degrees 33, minutes 55, seconds 07

West longitude: Degrees 98, minutes 32, seconds 37

15. (a) Number of broadcasting stations (by call letters) located within various distances of proposed location of transmitter is as follows:

1 mile NONE 2 miles NONE

3 miles NONE (1 POLICE) 8 miles NONE

(b) Number of nonbroadcasting (commercial or Government) RECEIVING stations located within various distances of proposed location of transmitter is as follows:

1 mile NONE 2 miles NONE 3 miles NONE

16. (a) Name and give location of all AIRPORTS within 10 miles of proposed

location of transmitter

KELL FIELD - 5 MILES NORTH OF WICHITA FALLS

(b) Give distance from proposed location of transmitter to each of such airports

KELL FIELD - 5 MILES NNE OF KWFT PLANT

(c) Name and give distance to any established AIRWAYS within 10 miles of proposed location of transmitter

FT. WORTH - WICHITA FALLS - AMARILLO AIRWAY

5 MILES NNE OF KWFT PLANT

17. Attach in triplicate:

(a) Map or maps having reasonable scales (not less than one-half inch per mile) clearly showing:

(1) Proposed location and present location if existing station;

(2) The character of the surrounding area, particularly the retail business, wholesale business, manufacturing, residential, and unpopulated areas (by symbols, cross-hatching, colored crayons, or other means);

(3) The density and distribution of population;

(4) The heights of all tall buildings or other structures in the vicinity of the antenna, indicating their location and how marked for air navigation;

(5) The location of airports, airways, and other radio stations, including receiving stations, except broadcast or amateur;

(6) The terrain and types of soil.

(b) Aerial photograph or photographs taken of the proposed location of the antenna showing clearly the character of the area within the 250 mv/m contour. (Ordinary photographs will be accepted if they

clearly show the terrain to the 250 mv/m contour and are taken in at least eight directions from the site; North, northeast, east, etc.)

18. (a) Attach triplicate map or maps (same map or maps supplied for section 17 (a) may be used) having reasonable scales showing the following: 5/ 6/

(1) The 250, 25, 5, and 2 mv/m contours and if existing station show the same contours for licensed operation.

(2) If existing station, present normally protected or interference-free contours of the station (whichever includes the least area--all sources of interference must be considered in determining interference-free contours 6/) for both day and night operation.

(3) The normally protected contours of the station as proposed by your application for both night and day operation (without regard to interference from other stations).

(4) The interference-free contours of the station as proposed by your application for both night and day operation (if station would be limited inside the normally protected contours by any other station or stations).

(5) The present normally protected or interference-free contours of other stations to which objectionable interference may be caused by operation of the station as proposed by your application.

(6) The interference-free contours of the stations in (5) above considering the interference resulting from the operation of the station as proposed by your application.

---

5/ See Standards of Good Engineering Practice Concerning Standard Broadcast Stations, Section I.

6/ Maps showing service contours shall exclude the areas which do not receive adequate service due to interference from electrical apparatus. All towns and cities having population in excess of those given in Table II of Section I of the Standards of Good Engineering Practice or other areas not receiving adequate service due to interference from electrical apparatus shall not be included in the tabulation of areas and populations within the service contours. The 1930 Census Minor Civil Division maps should be used in making population counts, subtracting any towns or cities not receiving adequate service and where the contour cuts a minor division, assume uniform distribution of population within division to determine the population included in the contours unless a more accurate count is made.

(b) Attach statement giving the conductivities, effective field intensities, interference fields and other pertinent data used for determining the contours required above.

19. As determined by the 1930 Census: 5/ 7/

(a) State number of persons residing within the contours required by section 18 (a) (1).

| | 250 mv/m | 25 mv/m | 5 mv/m | 2 mv/m |
|---|---|---|---|---|
| Night PROPOSED | 2,208 | 71,604 | 248,485 | 691,805 |
| Day PROPOSED | 2,208 | 71,604 | 248,485 | 691,805 |

(b) State areas and number of persons residing within the contours required by section 18 (a) (2).

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night EXISTING | 3.2 | 6,350 | 167,707 |
| Day EXISTING | 0.5 | 103,000 | 2,096,543 |

(c) State areas and number of persons residing within the contours required by section 18 (a) (3).

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night PROPOSED | 2.5 | 24,000 | 555,383 |
| Day PROPOSED | 0.5 | 103,000 | 2,096,543 |

(d) State areas and number of persons residing within the contours required by section 18 (a) (4). 8/

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night PROPOSED | 3.2 | 17,890 | 434,797 |
| Day PROPOSED | 0.5 | 103,000 | 2,096,543 |

5/ See footnote 5/, page 11.

7/ Supplemental population estimates may be also submitted based upon later census estimates, if considered substantially different from the 1930 Census.

8/ If interference is from more than one station, show totals and attach figures of each station.

(e) State areas and number of persons residing within the contours required by section 18 (a) (5). 9/

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night | | DOES NOT APPLY | |
| Day | | DOES NOT APPLY | |

(f) State areas and number of persons residing within the contours required by section 18 (a) (6). 9/

| | Contour (mv/m) | Areas (sq. mi.) | Persons |
|---|---|---|---|
| Night | | DOES NOT APPLY | |
| Day | | DOES NOT APPLY | |

(g) Attach full explanation of methods used in determining the areas and populations.

20. Proposed location of main studio: State TEXAS County WICHITA

City or town WICHITA FALLS, Street and number 800 EIGHTH STREET

Other studios maintained by station No

## PROPOSED SERVICE

21. (a) Describe fully the character of program service proposed, showing the total average daily time to be devoted to each type of program, the sources of each, and attach as exhibits copies of all contracts or the substance of all understandings covering program service.

SHOWN BY WEEKLY PROGRAM ATTACHED AS EXHIBIT 6

9/ If interference is to more than one station, attach figures for each station.

(b) The following is an analysis of the average number of hours proposed to be devoted monthly to the types of programs indicated including the percentage of the total monthly time during which it is proposed to carry commercial and sustaining programs. (The combined totals should equal 100 percent of the monthly time station is operated.)

| Commercial Programs | | | Sustaining Programs | | |
|---|---|---|---|---|---|
| | Number of hours | Percentage of total monthly hours station operated | | Number of hours | Percentage of total monthly hours station operated |
| (1) Entertainment | 208 | 40% | (1) Entertainment | 171.6 | 33% |
| (2) Educational | 32.2 | 6% | (2) Educational | 52. | 10% |
| (3) Religious | 20.8 | 4% | (3) Religious | 20.8 | 4% |
| (4) Agricultural | | 0 | (4) Agricultural | 15.6 | 3% |
| (5) Fraternal | | 0 | (5) Fraternal | | 0 |
| (6) News | | INCLUDED IN EDUCATIONAL | (6) News | | INCLUDED IN EDUCATIONAL |
| (7) | | | (7) | | |

22. Describe fully any new or additional service not now rendered in the area to be served which will be given by the proposed station or as a result of the construction proposed in the application. Show how the proposed service will differ from service presently rendered in the area.

KWFT PROPOSES TO SERVE A LARGER AREA NIGHTTIME THAN IT IS NOW SERVING BY VIRTUE OF THE INCREASED POWER WITH THE SAME TYPE PROGRAM SERVICE HERETOFORE USED. THE INCREASED AREA (EXCEPT THAT POSITION ADJACENT TO FORT WORTH AND DALLAS) IS NOT NOW RECEIVING A DEPENDABLE RADIO SERVICE FROM ANY RADIO STATION.

23. If any change, set forth fully plans for staffing the station and set forth as fully as possible in Exhibit XX the name, address, citizenship, experience, and salary of each member of station personnel. Show the position and duties of each and the specific part

each will take in carrying out applicant's proposed plan of program service. If none, so state NONE REQUIRED

24. (a) What percentage of the total monthly time will be used for mechanical records (i.e., phonograph records, electrical transcriptions, etc.)? 14% MONTHLY

(b) Does applicant contemplate obtaining programs from a chain? YES
If so, what percentage of the total monthly time will be used for chain programs (i.e., programs both paid and sustaining)? 45% MONTHLY

(c) Has any correspondence been had, or have any negotiations, discussions, or understandings (oral or written) been entered into with respect to chain or network programs? NONE WITH RESPECT TO THIS APPLICATION (Yes or No)
If so, attach as Exhibit 3 a full and detailed description thereof with copies of all correspondence, understandings, and contracts.

(d) Does applicant retain the right to determine at all times what programs shall in the public interest be broadcast? YES (Yes or No)
Attach as Exhibit 4 a statement fully describing this condition, show to what extent applicant will or will not have such right and cite the contract provisions upon which applicant relies in making this statement.

FULL INFORMATION

25. Applicant states that if any further information is necessary for a full disclosure with respect to construction, location, facilities, operation, service, assets, obligations, or otherwise not already fully explained, the following is a complete disclosure with respect thereto

COMPLETE DISCLOSURE IS MADE

26. Applicant states--
That the direct objects to be attained by the construction, changes in construction or modification of license contemplated by the application are as follows: TO INCREASE THE SERVICE AREA OF KWFT NIGHTTIME THROUGHOUT TEXAS AND OKLAHOMA, PARTICULARLY IN THAT PORTION OF THE PROPOSED INCREASED COVERAGE AREA THAT DOES NOT NOW RECEIVE DEPENDABLE RADIO SERVICE FROM ANY OTHER BROADCAST STATION. THE PROPOSED NIGHTTIME INCREASE WILL SERVE APPROXIMATELY 300,000 PEOPLE NOT NOW RECEIVING DEPENDABLE RADIO SERVICE, NIGHTTIME, FROM ANY REGIONAL RADIO STATION.

EXHIBITS IDENTIFIED

27. There are attached hereto the following described and identified exhibits, which have been prepared by applicant (if an individual or partnership) or by or under the direction of the officer or officers of applicant whose respective names and official titles appear opposite the exhibit prepared by each. (List here all exhibits attached to the application.)

| Exhibit No. | Description of information | Name of officer (1) by whom or (2) under whose direction exhibit was prepared (show which) | Official title |
|---|---|---|---|
| 1 | F.C.C. 706 FORM | JOE B. CARRIGAN | PRESIDENT |
| 2 | ENGINEERING EXHIBITS | JOE B. CARRIGAN | PRESIDENT |
| 3 | NETWORK PROGRAMS | JOE B. CARRIGAN | PRESIDENT |
| 4 | CONTROL OF PROGRAMS | JOE B. CARRIGAN | PRESIDENT |
| 5 | AUTHORIZATION OF APPLICATION | DOROTHY DIEBOLD | ASST. SECRETARY |
| 6 | WEEKLY PROGRAM KWFT | JOE B. CARRIGAN | PRESIDENT |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

28. There are listed below the names and addresses of all counsel (legal, engineering, accounting, or persons in any other capacity), together with the name and address of firm, if any, with which connected who prepared or assisted in preparing the application and/or exhibits. (Identify opposite the name of each such person the item number of this application and/or the exhibit which he prepared or assisted in preparing. Where the answer contained in any such item or exhibit involves representations of fact an affidavit must be furnished from the person on whose knowledge the statement is based to the effect that the facts stated are true of his own knowledge, except as to such statements as are therein stated on information and belief, and as to such statements he believes them to be true. Where the statement of information consists of expert opinion such statement must be signed by the attorney, engineer, or accountant. There must also be included in such statement a full description of the qualifications of the expert.) 1/

| Item or Exhibit No. | Description of information | Name and address of the party who prepared or assisted in preparing the Item or Exhibit and name and address of firm with which connected. |
|---|---|---|
| 2 | ENGINEERING EXHIBITS | A. EARL CULLUM, JR.<br>CONSULTING RADIO ENGINEER<br>DALLAS, TEXAS |
| X | LEGAL REPRESENTATION | JOE B. CARRIGAN<br>WICHITA FALLS, TEXAS<br>BRYON G. CARSON<br>WASHINGTON, D.C. |

AUTHORITY OF ANY OTHER REGULATORY AGENCY OBTAINED

29. If any part of the proposal involved in this application is subject to regulation or approval by any other Federal or State body, show here the character and status of such proceeding and submit certified copies of all pleadings filed therewith, together with any orders issued by said body No

1/ See footnote 1/, page 1.

30. If the construction permit is granted, the construction will be commenced ~~within~~ IMMEDIATELY ~~days of the granting thereof~~ and will be completed and the station ready for operation ~~within~~ IMMEDIATELY ~~days thereafter~~.

31. The applicant waives any claim to the use of any particular frequency or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests a construction permit, modification of construction permit or modification of license in accordance with this application.

32. (A) Applicant, if a legal entity other than an individual or partnership, states:

(a) That the making of this application is authorized by RESOLUTION (Resolution or act) of the BOARD OF DIRECTORS AND STOCKHOLDERS (Board of directors or other governing body) adopted at a meeting held at WICHITA FALLS, TEXAS (Place) on JANUARY 13, 1941 (Date)

(b) That there are attached hereto as Exhibits 5 properly certified copies of extracts from the minutes of said meeting affirmatively showing: 1/

(1) That a quorum of members required by the bylaws having authority to act was present.

(2) That the resolution was voted upon favorably by a majority (or the number required by the bylaws) of those present and having authority to vote on the resolution.

(3) That the officer executing this application is authorized to do so.

(B) If application is executed on behalf of applicant by attorney

---

1/ See footnote 1/ on page 1.

there is attached hereto as Exhibit XX cogent evidence of his authority to act. 10/

33. All the statements made in the application and attached exhibits are considered material representations, and all the exhibits are a material part hereof and are incorporated herein as if set out in full in the application.

Dated this 2nd day of March, 19 41.

WICHITA BROADCASTING COMPANY
(Name of applicant) 2/

By John B. Garrigan
PRESIDENT
(Authorized officer or attorney) 10/

(Be sure all necessary information is furnished and all questions are fully answered. If any portions of the application are not applicable, specifically so state, and show reasons therefor. Defective applications may be returned without consideration--Sec. 1.72, Rules of Practice and Procedure.)

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2/ See footnote 2/ on page 1.

10/ Must be executed by applicant if an individual; by one of the partners of applicant, if a partnership; by an officer of applicant, if a corporation or association or by attorney of applicant only under conditions shown in Sec. 1.121, Rules of Practice and Procedure, in which event satisfactory evidence of disability of applicant or his absence from the continental United States, and authority of attorney to act must be submitted with application.

(OVER)

STATE OF TEXAS )
) ss:
COUNTY OF WICHITA )

JOE B. CARRIGAN, being duly (sworn upon his oath, (affirmed according to law,

deposes and says that he is the _____
(If applicant is not an individual, show

PRESIDENT OF WICHITA BROADCASTING COMPANY

official relationship of affiant to applicant)
above-named applicant, and that the facts stated in the foregoing application and all exhibits attached thereto are true of his own knowledge, except as to such statements as are therein stated on information and belief, and as to such statements he believes them to be true. (See Sec. 1.121, Rules of Practice and Procedure.)

Joe B. Carrigan
Affiant

Subscribed and sworn to before me this 2nd day of March, 1941

Jo Grace Payne
Notary Public.

[SEAL]

(Notary public's seal must be affixed where law of jurisdiction requires, otherwise state that law does not require seal.)

My commission expires June 1, 1941.

STATEMENT OF A. EARL CULLUM, JR. IN CONNECTION WITH THE APPLICATION OF WICHITA BROADCASTING COMPANY, WICHITA FALLS, TEXAS, LICENSEE OF RADIO STATION KWFT, FOR MODIFICATION OF LICENSE TO CHANGE THE OPERATING ASSIGNMENT FROM 5000 WATTS DAYTIME 1000 WATTS NIGHTTIME TO 5000 WATTS UNLIMITED TIME ON THE 620 KILOCYCLE CHANNEL.

**********

I, A. Earl Cullum, Jr., am a consulting radio engineer with offices located in Dallas, Texas. I graduated from the Massachusetts Institute of Technology in 1931 with a Bachelor of Science Degree in Communication Engineering. My experience includes almost continuous employment by broadcast stations since 1922. Since 1936 I have maintained an office as a consulting radio engineer. I have been employed by the Wichita Broadcasting Company, licensee of Radio Station KWFT, Wichita Falls, Texas, to make an allocation study of the 620 kilocycle channel and to prepare the necessary engineering exhibit for an application for modification of license to change the operating assignment from 5000 watts daytime 1000 watts nighttime to 5000 watts unlimited time using the existing directive antenna.

## EXISTING OPERATING CONDITIONS

The existing assignment of Radio Station KWFT provides for operation at Wichita Falls, Texas on the 620 kilocycle channel with 5000 watts daytime 1000 watts nighttime using a directive antenna during daytime and nighttime hours. Complete details, including the proof of performance of the existing directive antenna, are on file with the Federal

COMMUNICATIONS COMMISSION, FILE B3-P-2461.

MEASUREMENTS TAKEN ON THE EXISTING OPERATION INDICATE THAT THE SOIL CONDUCTIVITY SURROUNDING THE KWFT PLANT SITE IS QUITE GOOD. THE 250 AND 25 MILLIVOLTS PER METER CONTOURS OF THE EXISTING OPERATION WERE DETERMINED BY AN ANALYSIS OF THE MEASUREMENTS FILED WITH THE FEDERAL COMMUNICATIONS COMMISSION, FILE B3-P-2461. THE MORE DISTANT CONTOURS WERE DETERMINED BY USING THE SOIL CONDUCTIVITY MAP OF THE FEDERAL COMMUNICATIONS COMMISSION.

AN ALLOCATION STUDY HAS BEEN MADE OF THE EXISTING NIGHTTIME CONDITIONS ON THE 620 KILOCYCLE CHANNEL. THE LIMITATIONS TO THE STATIONS WERE CALCULATED USING THE FEDERAL COMMUNICATIONS COMMISSION SECOND HOUR SKY-WAVE CURVES AND A RATIO OF 20 TO 1 FOR DESIRED TO UNDESIRED SIGNAL. THE STUDY SHOWS THE FOLLOWING TO BE EXISTING NIGHTTIME CONDITIONS:

| LIMITATION TO | LIMITATION FROM | DISTANCE MILES | POWER WATTS | UNATTENUATED FIELD | INTERFERENCE LEVEL |
|---|---|---|---|---|---|
| WTMJ | KWFT | 860 | 1000 DA | 82 | 0.80 |
| WROL | KWFT | 845 | 1000 DA | 287 | 2.90 |
| WSUN | KWFT | 1025 | 1000 DA | 87 | 0.52 |
| KTAR | KWFT | 780 | 1000 DA | 82 | 0.99 |
| KGW | KWFT | 1520 | 1000 DA | 294 | 0.59 |
| KWFT | WTMJ | 860 | 5000 DA | 245 | 2.40 |
| KWFT | WROL | 845 | 500 DA | 142 | 1.43 |
| KWFT | WSUN | 1025 | 5000 DA | 200 | 1.20 |
| KWFT | KTAR | 780 | 5000 DA | 170 | 2.07 |
| KWFT | KGW | 1520 | 5000 DA | 270 | 0.55 |
| KWFT | CJRM | 1190 | 1000 | 175 | 0.67 |
| KWFT | RSS | | | | 3.17 |

## PROPOSED OPERATING CONDITIONS

KWFT PROPOSES TO OPERATE WITH 5000 WATTS UNLIMITED TIME USING THE EXISTING DIRECTIVE ANTENNA DURING DAYTIME AND NIGHTTIME HOURS. COMPLETE SPECIFICATIONS OF THE PROPOSED DIRECTIVE ANTENNA ARE ATTACHED. MEASUREMENTS TAKEN ON THE EXISTING OPERATION INDICATES THAT THE SOIL CONDUCTIVITY SURROUNDING THE KWFT PLANT SITE IS QUITE GOOD. THE 250 AND 25 MILLIVOLTS PER METER CONTOURS OF THE PROPOSED OPERATION WERE DETERMINED BY AN ANALYSIS OF THE MEASUREMENTS FILED WITH THE FEDERAL COMMUNICATIONS COMMISSION, FILE B3-P-2461. THE MORE DISTANT CONTOURS WERE DETERMINED BY USING THE SOIL CONDUCTIVITY MAP OF THE FEDERAL COMMUNICATIONS COMMISSION.

AN ALLOCATION STUDY HAS BEEN MADE OF THE PROPOSED NIGHTTIME CONDITIONS ON THE 620 KILOCYCLE CHANNEL. THE LIMITATIONS TO THE STATIONS WERE CALCULATED USING THE FEDERAL COMMUNICATIONS COMMISSION SECOND HOUR SKY-WAVE CURVES AND A RATIO OF 20 TO 1 FOR DESIRED TO UNDESIRED SIGNAL. THE STUDY SHOWS THE FOLLOWING TO BE THE PROPOSED NIGHTTIME CONDITIONS:

| LIMITATION TO | LIMITATION FROM | DISTANCE MILES | POWER WATTS | UNATTENUATED FIELD | INTERFERENCE LEVEL |
|---|---|---|---|---|---|
| WTMJ | KWFT | 860 | 5000 DA | 184 | 1.81 |
| WROL | KWFT | 845 | 5000 DA | 643 | 6.49 |
| WSUN | KWFT | 1025 | 5000 DA | 195 | 1.17 |
| KTAR | KWFT | 730 | 5000 DA | 184 | 2.21 |
| KGW | KWFT | 1520 | 5000 DA | 658 | 1.33 |
| CJRM | KWFT | 1190 | 5000 DA | 655 | 2.53 |

okd now 5.7

| LIMITATION TO | LIMITATION FROM | DISTANCE MILES | POWER WATTS | UNATTENUATED FIELD | INTERFERENCE LEVEL |
|---|---|---|---|---|---|
| KWFT | WTMJ | 860 | 5000 DA | 245 | 2.40 |
| KWFT | WROL | 845 | 500 DA | 142 | 1.43 |
| KWFT | WSUN | 1025 | 5000 DA | 200 | 1.20 |
| KWFT | KTAR | 780 | 5000 DA | 170 | 2.07 |
| KWFT | KGW | 1520 | 5000 DA | 270 | 0.55 |
| KWFT | CJRM | 1190 | 1000 | 175 | 0.67 |
| KWFT | RSS | | | | 3.17 |

## LIST OF EXHIBITS ATTACHED

IN MAKING THE ALLOCATION STUDY, DESIGNING THE DIRECTIVE ANTENNA, AND MAKING A STUDY OF THE COVERAGE FOR EACH CONDITION, A NUMBER OF EXHIBITS WERE PREPARED. ATTACHED WILL BE FOUND THE FOLLOWING EXHIBITS PREPARED BY ME OR UNDER MY DIRECTION:

1. SPECIFICATIONS OF PROPOSED DIRECTIVE ANTENNA FOR RADIO STATION KWFT.
2. DIRECTIVE ANTENNA DESIGN FORMULA.
3. DIRECTIVE ANTENNA CALCULATIONS FOR 5000 WATTS.
4. ANTENNA AND GROUND SYSTEM SPECIFICATIONS.
5. REFERENCES SUPPORTING DIRECTIVE ANTENNA DESIGN FORMULA.
6. (A) DIRECTIVE ANTENNA GROUND-WAVE PATTERN BASED ON THEORETICAL CALCULATIONS AND PROOF OF PERFORMANCE MEASUREMENTS.

6. (B) TABULATION OF DIRECTIVE ANTENNA GROUND-WAVE PATTERN CALCULATIONS.

7. DIRECTIVE ANTENNA SKY-WAVE PATTERNS AND TABULATIONS OF CALCULATIONS.
8. MAP OF NORTH AMERICA SHOWING THE EXISTING ASSIGNMENTS ON THE 620 KILOCYCLE CHANNEL.

9. (A) MAP SHOWING THE 250 MILLIVOLTS PER METER CONTOUR FROM THE DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

9. (B) MAP SHOWING THE 25 MILLIVOLTS PER METER CONTOUR FROM THE DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

9. (C) MAP SHOWING THE 5.0, 2.0 AND 0.5 MILLIVOLTS PER METER CONTOURS FROM THE DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

9. (D) MAP SHOWING THE 2.5 AND 3.2 MILLIVOLTS PER METER CONTOURS FROM THE DIRECTIVE ANTENNA USING 5000 WATTS OF POWER ON 620 KILOCYCLES.

10. (A) MAP SHOWING THE 250 MILLIVOLTS PER METER CONTOUR FROM THE DIRECTIVE ANTENNA USING 1000 WATTS OF POWER ON 620 KILOCYCLES.

10. (B) MAP SHOWING THE 25 MILLIVOLTS PER METER CONTOUR FROM THE DIRECTIVE ANTENNA USING 1000 WATTS OF POWER ON 620 KILOCYCLES.

10. (C) MAP SHOWING THE 5.0 AND 2.0 MILLIVOLTS PER METER CONTOURS FROM THE DIRECTIVE ANTENNA USING 1000 WATTS OF POWER ON 620 KILOCYCLES.

10. (D) MAP SHOWING THE 2.5 AND 3.2 MILLIVOLTS PER METER CONTOURS FROM THE DIRECTIVE ANTENNA USING 1000 WATTS OF POWER ON 620 KILOCYCLES.

11. PHOTOGRAPHS SHOWING THE KWFT PLANT SITE AND THE SURROUNDING AREA.

## POPULATION ANALYSIS OF COVERAGE MAPS

A POPULATION ANALYSIS HAS BEEN PREPARED BASED ON THE CALCULATED COVERAGE MAPS, THE 1930 CENSUS FIGURES, AND THE STANDARDS OF THE FEDERAL COMMUNICATIONS COMMISSION CONCERNING COVERAGE. TOTAL POPULATION FIGURES WERE DETERMINED BY AN ANALYSIS OF POPULATION DISTRIBUTION USING MINOR CIVIL DIVISION MAPS. FROM THE TOTAL POPULATION FIGURES WITHIN EACH CONTOUR THE URBAN AREAS OF 2500 OR GREATER RECEIVING LESS THAN 2.0 MILLIVOLTS PER METER, AND THE URBAN AREAS OF 10,000 OR GREATER RECEIVING LESS THAN 5.0 MILLIVOLTS PER METER WERE SUBTRACTED. THE FOLLOWING IS A TABULATION OF THE COVERAGE FIGURES AS TAKEN FROM EACH POPULATION STUDY:

KWFT - 620 KC - 5000 WATTS DA

| CONTOUR | POPULATION 1930 | SQ. MI. |
|---|---|---|
| WITHIN THE 25 MV/M CONTOUR | 71,604 | |
| WITHIN THE 5.0 MV/M CONTOUR | 248,485 | |
| WITHIN THE 3.2 MV/M CONTOUR | 434,797 | 17,890 |
| WITHIN THE 2.5 MV/M CONTOUR | 555,383 | 24,000 |
| WITHIN THE 2.0 MV/M CONTOUR | 691,805 | |
| WITHIN THE 0.5 MV/M CONTOUR | 2,096,543 | 103,000 |

KWFT - 620 KC - 1000 WATTS DA

| CONTOUR | POPULATION 1930 | SQ. MI. |
|---|---|---|
| WITHIN THE 25 MV/M CONTOUR | 52,093 | |
| WITHIN THE 5.0 MV/M CONTOUR | 117,402 | |
| WITHIN THE 3.2 MV/M CONTOUR | 167,707 | 6,350 |
| WITHIN THE 2.5 MV/M CONTOUR | 230,709 | 8,970 |
| WITHIN THE 2.0 MV/M CONTOUR | 296,096 | |

A POPULATION STUDY OF THE 250 MILLIVOLTS PER METER CONTOURS HAS BEEN MADE BY AN ACTUAL COUNT OF HOUSES EXISTING WITHIN THESE

CONTOURS. IT HAS BEEN ASSUMED THAT 4 PEOPLE RESIDE WITHIN EACH HOUSE. IN VIEW OF THE FACT THAT THIS POPULATION STUDY WAS BASED ON EXISTING CONDITIONS, WE HAVE OBTAINED THE 1940 CENSUS FIGURES FOR THE CITY OF WICHITA FALLS, TEXAS AND WICHITA COUNTY, SO THAT THEY CAN BE USED IN CONNECTION WITH THIS STUDY. THE FOLLOWING IS A TABULATION OF THE COVERAGE FIGURES AS TAKEN FROM EACH POPULATION STUDY:

KWFT - 620 KC - 5000 WATTS DA

| CONTOUR | SOURCE | POPULATION |
|---|---|---|
| WITHIN THE 250 MV/M CONTOUR | COUNT HOUSES | 2,208 |
| WITHIN THE CITY OF WICHITA FALLS | 1940 CENSUS | 45,112 |
| WITHIN THE COUNTY OF WICHITA | 1940 CENSUS | 73,604 |

KWFT - 620 KC - 1000 WATTS DA

| CONTOUR | SOURCE | POPULATION |
|---|---|---|
| WITHIN THE 250 MV/M CONTOUR | COUNT HOUSES | 420 |
| WITHIN THE CITY OF WICHITA FALLS | 1940 CENSUS | 45,112 |
| WITHIN THE COUNTY OF WICHITA | 1940 CENSUS | 73,604 |

FROM THE ABOVE IT WILL BE SEEN THAT THE EXISTING OPERATION PROVIDES COVERAGE DURING DAYTIME HOURS TO APPROXIMATELY 2,096,543 PEOPLE WITHIN THE NORMALLY PROTECTED 0.5 MILLIVOLTS PER METER CONTOUR, AND PROVIDES COVERAGE DURING NIGHTTIME HOURS TO APPROXIMATELY 167,707 PEOPLE WITHIN THE PROTECTED 3.2 MILLIVOLTS PER METER CONTOUR. THE PROPOSED OPERATION WILL PROVIDE COVERAGE DURING DAYTIME HOURS TO APPROXIMATELY 2,096,543 PEOPLE WITHIN THE NORMALLY PROTECTED 0.5 MILLIVOLTS PER METER CONTOUR AND WILL PROVIDE COVERAGE DURING NIGHTTIME

HOURS TO APPROXIMATELY 434,797 PEOPLE WITHIN THE PROTECTED 3.2 MILLIVOLTS PER METER CONTOUR.

IT WILL BE NOTED FROM AN ANALYSIS OF THE POPULATION RESIDING WITHIN THE 250 MILLIVOLTS PER METER CONTOURS THAT THE POPULATION SURROUNDING THE KWFT PLANT HAS INCREASED SINCE THE KWFT PLANT WAS ESTABLISHED IN 1939. THIS INCREASE IN POPULATION IS DUE TO THE HOUSES BUILT IN WICHITA GARDENS, A RESETTLEMENT PROJECT, AND IN WICHITA VALLEY FARMS, AN INDUSTRIAL HOME PROJECT. IT IS MY UNDERSTANDING FROM THE STATION MANAGEMENT THAT KWFT HAS NOT HAD ANY COMPLAINTS FROM THE RESIDENTS OF THE AREA SURROUNDING THE PLANT SITE.

A. EARL CULLUM, JR.

FEBRUARY 25, 1941

STATE OF TEXAS )
) ss
COUNTY OF DALLAS )

A. EARL CULLUM, JR., BEING DULY SWORN, UPON HIS OATH DEPOSES AND SAYS THAT THE FACTS STATED IN THE FOREGOING, TOGETHER WITH ALL EXHIBITS ATTACHED THERETO, ARE TRUE OF HIS OWN KNOWLEDGE, EXCEPT AS TO SUCH STATEMENTS AS THEREIN STATED TO BE ON INFORMATION AND BELIEF, AND AS TO SUCH STATEMENTS HE BELIEVES THEM TO BE TRUE.

A. EARL CULLUM, JR.

SWORN TO AND SUBSCRIBED BEFORE ME THIS 25TH DAY OF FEBRUARY 1941.

NOTARY PUBLIC IN AND FOR
DALLAS COUNTY, TEXAS

MY COMMISSION EXPIRES JUNE 1, 1941.

A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

## SPECIFICATIONS OF PROPOSED ANTENNA FOR RADIO STATION KWFT

| | |
|---|---|
| Frequency | 620 kilocycles |
| Rated power day | 5000 watts - directional |
| Rated power night | 5000 watts - directional |
| Number of towers | 2 towers |
| Make of tower | Lehigh Structural Steel Co. |
| Type of tower | self supported, square, tapered |
| Tower base width | 5% of tower height |
| Tower feed system | series feed |
| Tower height above insulators | 400 feet |
| Tower height above ground | 405 feet |
| Tower height above sea-level | 1405 feet |
| Line of tower | N155.5E referred to true north |
| Tower spacing electrical | 317 degrees |
| Tower spacing physical | 1398 feet |
| Tower current ratio | 0.63 to 1.00 |
| Tower phasing | 44.0 degrees northwest leading |
| Number of ground radials | 120 equally spaced about each tower |
| Length of ground radials | 400 feet |
| Transmission lines | 300 ohm open-wire lines |
| Antenna ammeters | thermal and remote thermal meters |
| Current ratio measurements | current monitor from sampling loops |
| Current phase measurements | phase monitor from sampling loops |
| Location | same as existing location |
| | N. Lat. 33° 55' 07" |
| | W. Long. 98° 32' 37" |

EXHIBIT 1

DIRECTIVE ANTENNA DESIGN FORMULAS:

$$F_1(E) = \sqrt{1 + (M)^2 + 2M \cos (A - KD \cos\Theta \cos\Phi)} \quad (1)$$

$$F_x(E) = \frac{\cos (A \sin\Theta) - \cos A}{(\cos \Theta)(1 - \cos A)} \quad (2)$$

$$K = \frac{1 - \cos A}{\sin A} \quad (3)$$

$$P = (R_1 \times I_1^2) + (R_2 \times I_2^2) \quad (4)$$

$$E = 37.25 \times I \times K \times F_1(E) \times F_x(E) \quad (5)$$

WHERE

- $E$ IS FIELD INTENSITY IN MILLIVOLTS PER METER AT ONE MILE
- $P$ IS ACTUAL RADIATED POWER IN WATTS
- $I_1$ IS CURRENT AT BASE OF ELEMENT 1 OPERATING DIRECTIONAL
- $I_2$ IS CURRENT AT BASE OF ELEMENT 2 OPERATING DIRECTIONAL
- $R_1$ IS RESISTANCE AT BASE OF ELEMENT 1 OPERATING DIRECTIONAL
- $R_2$ IS RESISTANCE AT BASE OF ELEMENT 2 OPERATING DIRECTIONAL
- $M$ IS RATIO BETWEEN THE CURRENTS IN THE ELEMENTS
- $A$ IS PHASE BETWEEN THE CURRENTS IN THE ELEMENTS
- $\hat{A}$ IS HEIGHT OF THE ELEMENTS
- $\Theta$ IS ANGLE FROM HORIZONTAL TO RADIATION VECTOR
- $\Phi$ IS ANGLE FROM LINE OF ELEMENTS OF RADIATION VECTOR
- $KD$ IS ELECTRICAL DISTANCE BETWEEN THE ELEMENTS

EXHIBIT 2

## DIRECTIVE ANTENNA CALCULATIONS FOR 5000 WATTS

RATED POWER 5000 WATTS

TRANSMISSION LOSSES
- TRANSMISSION LINES
- PHASING EQUIPMENT
- COUPLING TRANSMISSION LINES TO ANTENNA
- CURRENT AND PHASE METER LOSSES
- GROUND RESISTANCE LOSSES

TOTAL PROBABLE LOSSES 4.0 %

ACTUAL RADIATED POWER EXPECTED IS (5410) x (1.00 - 0.04)

| | | | |
|---|---|---|---|
| THEN | P | 5190 WATTS | GIVEN |
| | $R_1$ | 30.8 OHMS | (6) |
| | $R_2$ | 42.0 OHMS | (6) |
| | M | 0.63 | GIVEN |
| | A | 44 DEGREES | GIVEN |
| | KD | 317 DEGREES | GIVEN |
| | A | 92 DEGREES | GIVEN |

SOLVING THE DIRECTIVE ANTENNA FORMULAS

VECTOR CURRENT I IS 10.45 (4)

FORM FACTOR K IS 1.02 (3)

FIELD INTENSITY AT ONE MILE IN ANY DIRECTION E IS $397 \times F_1(E) \times F_X(E)$ (5)

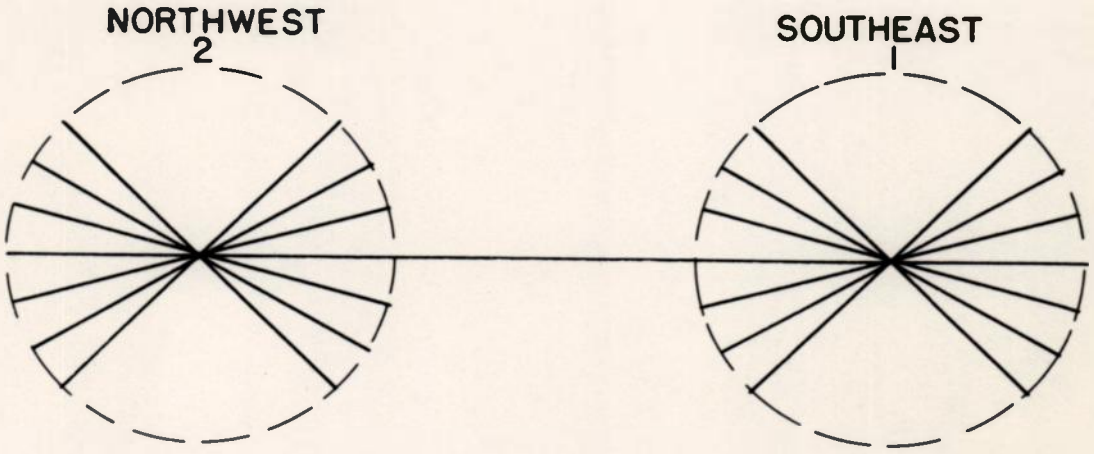
VARIOUS VALUES WERE THEN ASSIGNED TO $\Theta$ AND $\Phi$ AND THE CORRESPONDING VALUES OF $F_1(E)$, $F_X(E)$ AND E DETERMINED. THE RESULTS OF EACH OF THESE CALCULATIONS ARE LISTED ON EACH OF THE ATTACHED EXHIBITS.

AFTER THE HORIZONTAL RADIATION PATTERN WAS PLOTTED AND PLANIMETERED, THE R.M.S. VALUE OF THE HORIZONTAL FIELD WAS FOUND TO BE 480 MV/M UNATTENUATED AT ONE MILE FROM THE ANTENNA.

EXHIBIT 3

ANTENNA AND GROUND SYSTEM SPECIFICATIONS:

ARRANGEMENT OF TOWERS:




UNIT VECTORS:

| | | |
|---|---|---|
| CURRENT RATIO | 0.63 | 1.00 |
| PHASE RATIO | +44.0 | 0.0 |
| BASE RESISTANCE | 42.0 | 30.8 |
| BASE REACTANCE | +36.1 | +23.6 |
| VECTOR CURRENT | 6.59 | 10.45 |
| BASE CURRENT | 5.80 | 10.35 |

EXHIBIT 4

REFERENCES - ACCORDING TO LINE NUMBER

(1) I.R.E. JANUARY, 1937 PAGE 99 (60)

(2) I.R.E. JANUARY, 1936 PAGE 51 (5)

(3) I.R.E. JANUARY, 1936 PAGE 52 (6)

(4) I.R.E. JANUARY, 1937 PAGE 102 (72)

(5) I.R.E. JANUARY, 1937 PAGE 102 (75)

(6) I.R.E. JANUARY, 1937 PAGE 102 (71)

EXHIBIT 5

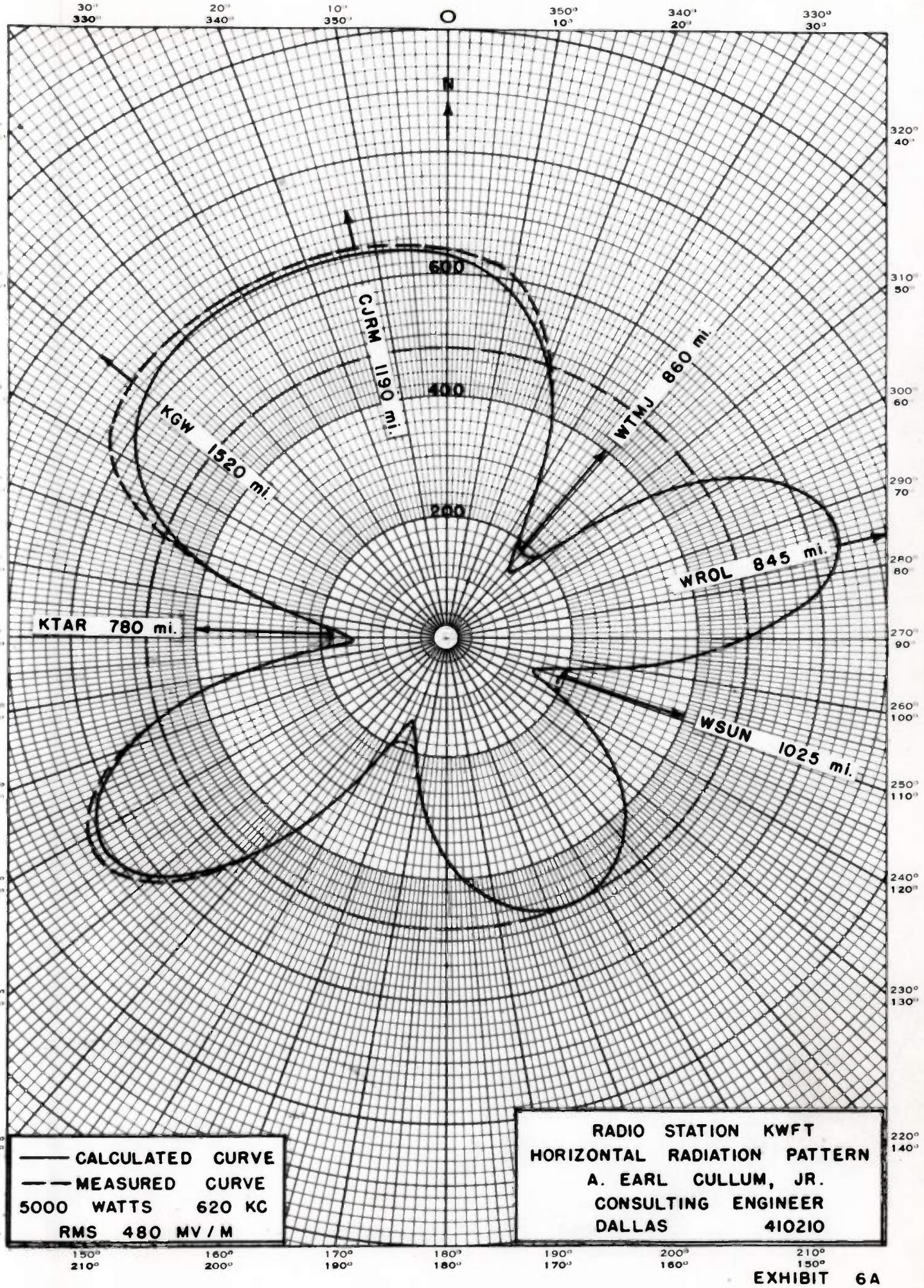

N
600
400
200
CJRM 1190 mi.
KGW 1520 mi.
WTMJ 860 mi.
WROL 845 mi.
KTAR 780 mi.
WSUN 1025 mi.
—— CALCULATED CURVE
—— MEASURED CURVE
5000 WATTS 620 KC
RMS 480 MV/M
RADIO STATION KWFT
HORIZONTAL RADIATION PATTERN
A. EARL CULLUM, JR.
CONSULTING ENGINEER
DALLAS 410210

EXHIBIT 6A

A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## HORIZONTAL RADIATION PATTERN

| BEARINGS | Φ | $r_1(E)$ | $E_{5000}$ |
|---|---|---|---|
| 155.5 - 155.5 | 0 | 1.210 | 480 |
| 145.5 - 165.5 | 10 | 1.164 | 462 |
| 135.5 - 175.5 | 20 | 1.027 | 407 |
| 125.5 - 185.5 | 30 | 0.772 | 306 |
| 115.5 - 195.5 | 40 | 0.458 | 182 |
| 105.5 - 205.5 | 50 | 0.465 | 184 |
| 095.5 - 215.5 | 60 | 0.935 | 371 |
| 085.5 - 225.5 | 70 | 1.394 | 553 |
| 075.5 - 235.5 | 80 | 1.622 | 644 |
| 065.5 - 245.5 | 90 | 1.518 | 602 |
| 055.5 - 255.5 | 100 | 1.094 | 434 |
| 045.5 - 265.5 | 110 | 0.426 | 169 |
| 035.5 - 275.5 | 120 | 0.483 | 192 |
| 025.5 - 285.5 | 130 | 0.957 | 380 |
| 015.5 - 295.5 | 140 | 1.330 | 528 |
| 005.5 - 305.5 | 150 | 1.530 | 607 |
| 355.5 - 315.5 | 160 | 1.610 | 639 |
| 345.5 - 325.5 | 170 | 1.630 | 647 |
| 335.5 - 335.5 | 180 | 1.630 | 647 |

EXHIBIT 6B

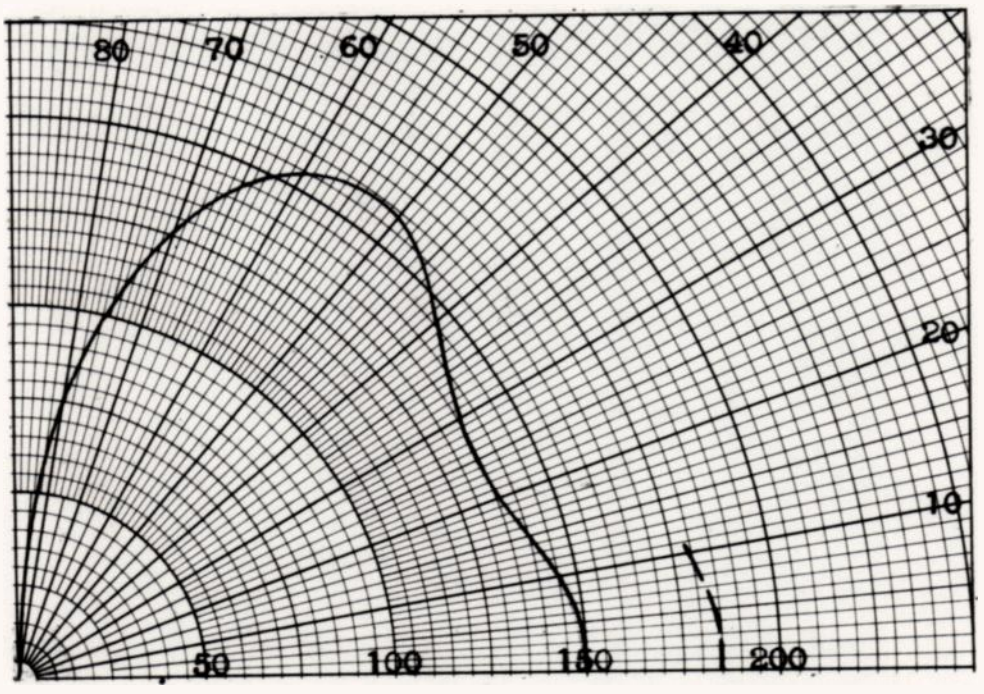
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 39 E

## THROUGH NULL TOWARD MILWAUKEE, WISCONSIN




P 5000 Φ 116.5

| θ | $F_1(E)$ | $F_x(E)$ | $E_{5000}$ |
|---|---|---|---|
| 00 | 0.378 | 1.000 | 150 |
| 10 | 0.374 | 0.978 | 145 |
| 20 | 0.374 | 0.914 | 136 |
| 30 | 0.415 | 0.816 | 136 |
| 40 | 0.531 | 0.694 | 146 |
| 50 | 0.713 | 0.560 | 158 |
| 60 | 0.935 | 0.416 | 154 |
| 70 | 1.160 | 0.275 | 127 |
| 80 | 1.362 | 0.140 | 76 |
| 90 | -.--- | 0.000 | 0 |

θ WTMS APPROX. 5.8 DEGREES WITH DISTANCE 860 MILES.

EXHIBIT 7A

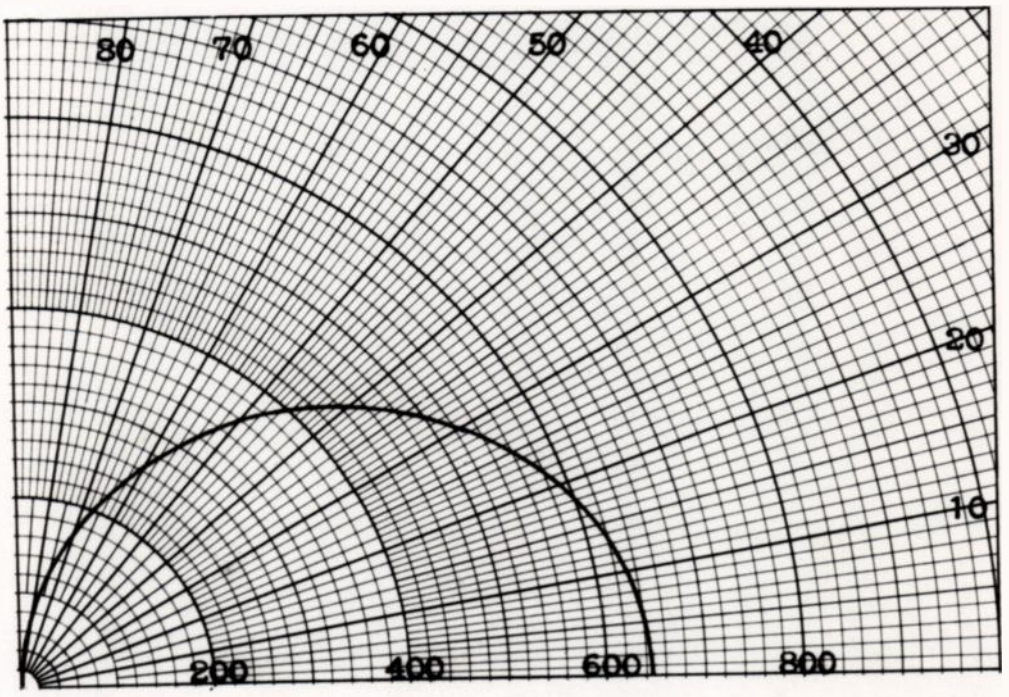
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANES N 73.5 E AND N 237.5 E

## THROUGH NARROW MAXIMUM




P 5000 Φ 82

| Θ | $F_1(E)$ | $F_x(E)$ | $E_{5000}$ |
|---|---|---|---|
| 00 | 1.630 | 1.000 | 647 |
| 10 | 1.630 | 0.978 | 632 |
| 20 | 1.629 | 0.914 | 591 |
| 30 | 1.628 | 0.816 | 527 |
| 40 | 1.625 | 0.694 | 447 |
| 50 | 1.616 | 0.560 | 359 |
| 60 | 1.604 | 0.416 | 265 |
| 70 | 1.582 | 0.275 | 173 |
| 80 | 1.555 | 0.140 | 87 |
| 90 | -.--- | 0.000 | 0 |

EXHIBIT 7B

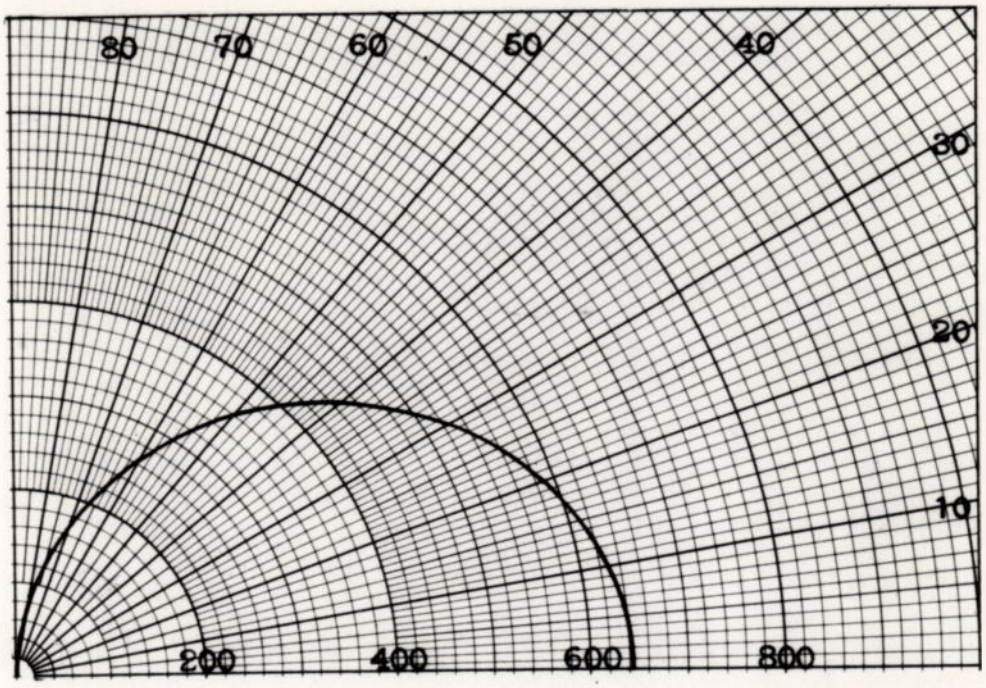
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 76 E

## TOWARD KNOXVILLE, TENNESSEE




P 5000 Φ 79.5

| Θ | $F_1(E)$ | $F_x(E)$ | $E_{5000}$ |
|---|---|---|---|
| 00 | 1.620 | 1.000 | 643 |
| 10 | 1.621 | 0.978 | 629 |
| 20 | 1.622 | 0.914 | 589 |
| 30 | 1.629 | 0.816 | 527 |
| 40 | 1.630 | 0.694 | 448 |
| 50 | 1.628 | 0.560 | 361 |
| 60 | 1.619 | 0.416 | 267 |
| 70 | 1.596 | 0.275 | 174 |
| 80 | 1.562 | 0.140 | 87 |
| 90 | -.--- | 0.000 | 0 |

Θ WROL APPROX. 6.0 DEGREES WITH DISTANCE 845 MILES.

EXHIBIT 7C

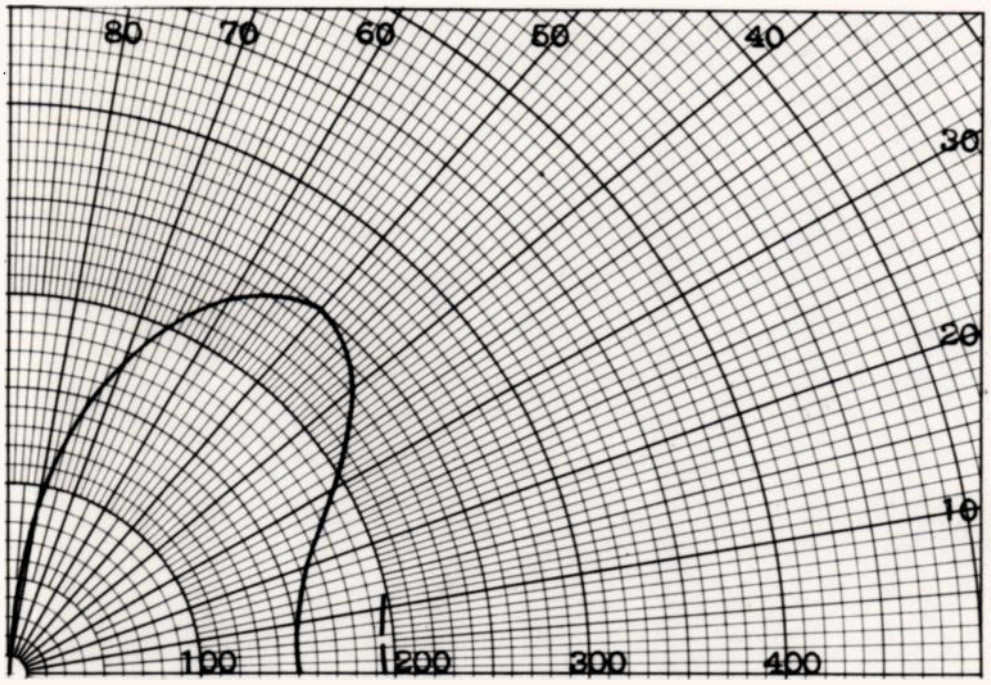
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 109 E

## THROUGH NULL TOWARD ST. PETERSBURG, FLORIDA




P 5000 Φ 46.5

| Θ | $F_1(E)$ | $F_x(E)$ | $E_{5000}$ |
|---|---|---|---|
| 00 | 0.380 | 1.000 | 151 |
| 10 | 0.391 | 0.978 | 152 |
| 20 | 0.453 | 0.914 | 164 |
| 30 | 0.605 | 0.816 | 194 |
| 40 | 0.842 | 0.694 | 232 |
| 50 | 1.125 | 0.560 | 250 |
| 60 | 1.390 | 0.416 | 229 |
| 70 | 1.576 | 0.275 | 172 |
| 80 | 1.628 | 0.140 | 91 |
| 90 | -.--- | 0.000 | 0 |

Θ WSUN APPROX. 3.8 DEGREES WITH DISTANCE 1025 MILES.

EXHIBIT 7D

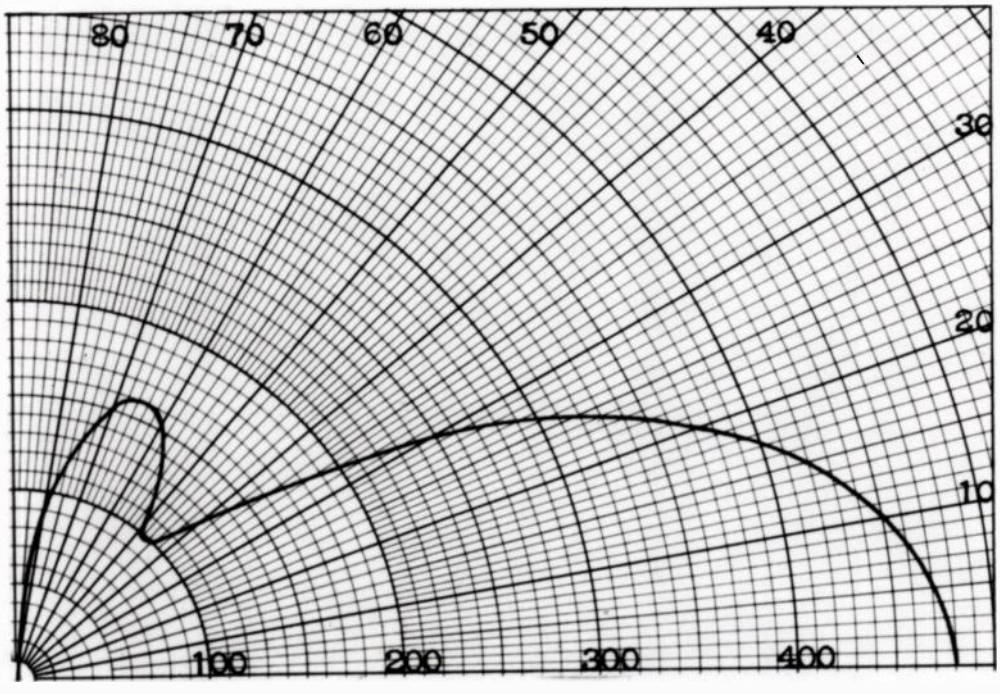
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 155.5 E

## THROUGH SMALL MAXIMUM




P 5000 Φ 00

| Θ | $F_1(E)$ | $F_x(E)$ | $E_{5000}$ |
|---|---|---|---|
| 00 | 1.210 | 1.000 | 480 |
| 10 | 1.164 | 0.978 | 452 |
| 20 | 1.027 | 0.914 | 373 |
| 30 | 0.772 | 0.816 | 250 |
| 40 | 0.458 | 0.694 | 126 |
| 50 | 0.465 | 0.560 | 103 |
| 60 | 0.935 | 0.416 | 154 |
| 70 | 1.394 | 0.275 | 152 |
| 80 | 1.622 | 0.140 | 91 |
| 90 | -.--- | 0.000 | 0 |

EXHIBIT 7E

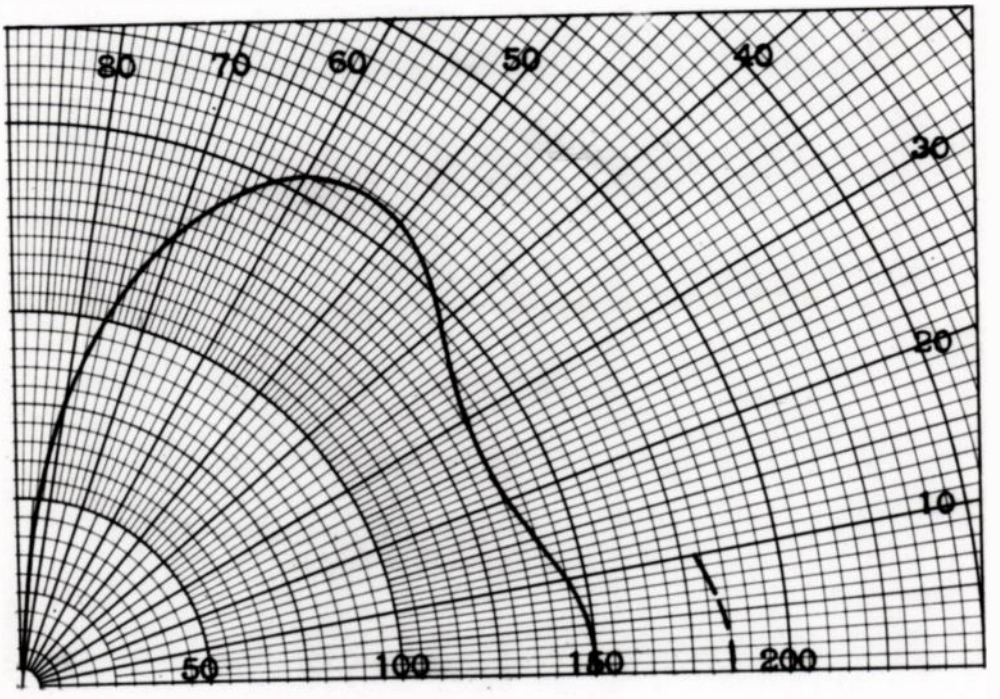
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 272 E

## THROUGH NULL TOWARD PHOENIX, ARIZONA




P 5000 Φ 116.5

| Θ | $F_1(E)$ | $F_x(E)$ | $E_{5000}$ |
|---|---|---|---|
| 00 | 0.378 | 1.000 | 150 |
| 10 | 0.374 | 0.978 | 145 |
| 20 | 0.374 | 0.914 | 136 |
| 30 | 0.415 | 0.816 | 136 |
| 40 | 0.531 | 0.694 | 146 |
| 50 | 0.713 | 0.560 | 158 |
| 60 | 0.935 | 0.416 | 154 |
| 70 | 1.160 | 0.275 | 127 |
| 80 | 1.362 | 0.140 | 76 |
| 90 | -.--- | 0.000 | 0 |

Θ KTAR APPROX. 7.0 DEGREES WITH DISTANCE 780 MILES.

EXHIBIT 7F

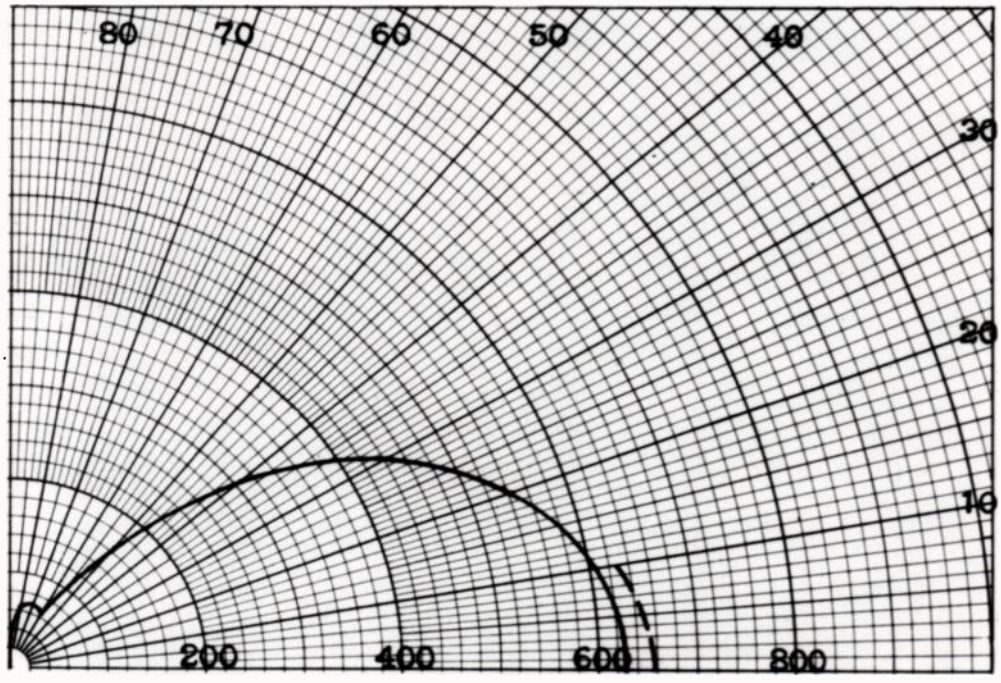
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 310 E

## TOWARD PORTLAND, OREGON




P 5000 Φ 154.5

| Θ | $F_1(E)$ | $F_x(E)$ | $E_{5000}$ |
|---|---|---|---|
| 00 | 1.585 | 1.000 | 629 |
| 10 | 1.560 | 0.978 | 605 |
| 20 | 1.502 | 0.914 | 545 |
| 30 | 1.368 | 0.816 | 443 |
| 40 | 1.116 | 0.694 | 307 |
| 50 | 0.740 | 0.560 | 164 |
| 60 | 0.383 | 0.416 | 63 |
| 70 | 0.636 | 0.275 | 69 |
| 80 | 1.147 | 0.140 | 64 |
| 90 | -.--- | 0.000 | 0 |

Θ KGW APPROX. 0.0 DEGREES WITH DISTANCE 1520 MILES.

EXHIBIT 7G

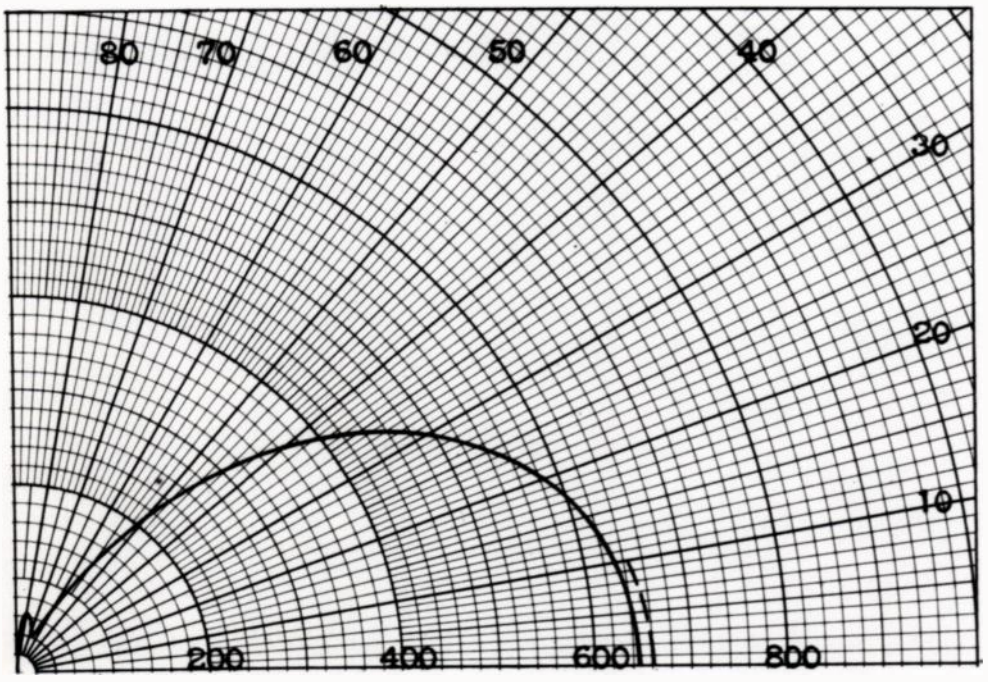
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 335.5 E

## THROUGH LARGE MAXIMUM




P 5000 Φ 180

| Θ | $F_1(E)$ | $F_x(E)$ | $E_{5000}$ |
|---|---|---|---|
| 00 | 1.630 | 1.000 | 647 |
| 10 | 1.630 | 0.978 | 632 |
| 20 | 1.610 | 0.914 | 585 |
| 30 | 1.530 | 0.816 | 495 |
| 40 | 1.330 | 0.694 | 366 |
| 50 | 0.957 | 0.560 | 212 |
| 60 | 0.483 | 0.416 | 80 |
| 70 | 0.426 | 0.275 | 46 |
| 80 | 1.094 | 0.140 | 61 |
| 90 | -.--- | 0.000 | 0 |

EXHIBIT 7H

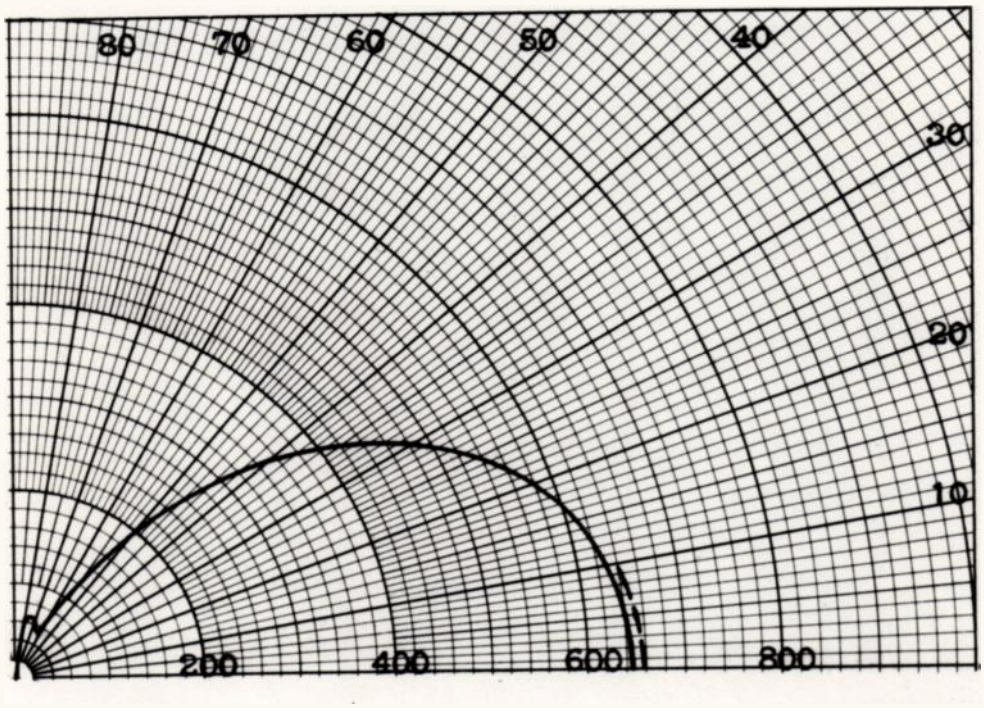
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

# KWFT DIRECTIVE ARRAY

## VERTICAL RADIATION PATTERN

## IN PLANE N 347 E

## TOWARD REGINA, SASKATCHEWAN




P 5000 Φ 168.5

| Θ | $F_1(E)$ | $F_X(E)$ | $E_{5000}$ |
|---|---|---|---|
| 00 | 1.628 | 1.000 | 646 |
| 10 | 1.624 | 0.978 | 630 |
| 20 | 1.595 | 0.914 | 579 |
| 30 | 1.496 | 0.816 | 485 |
| 40 | 1.288 | 0.694 | 354 |
| 50 | 0.909 | 0.560 | 202 |
| 60 | 0.453 | 0.416 | 75 |
| 70 | 0.553 | 0.275 | 60 |
| 80 | 1.106 | 0.140 | 62 |
| 90 | -.--- | 0.000 | 0 |

Θ CJRM APPROX. 2.0 DEGREES WITH DISTANCE 1190 MILES.

EXHIBIT 71

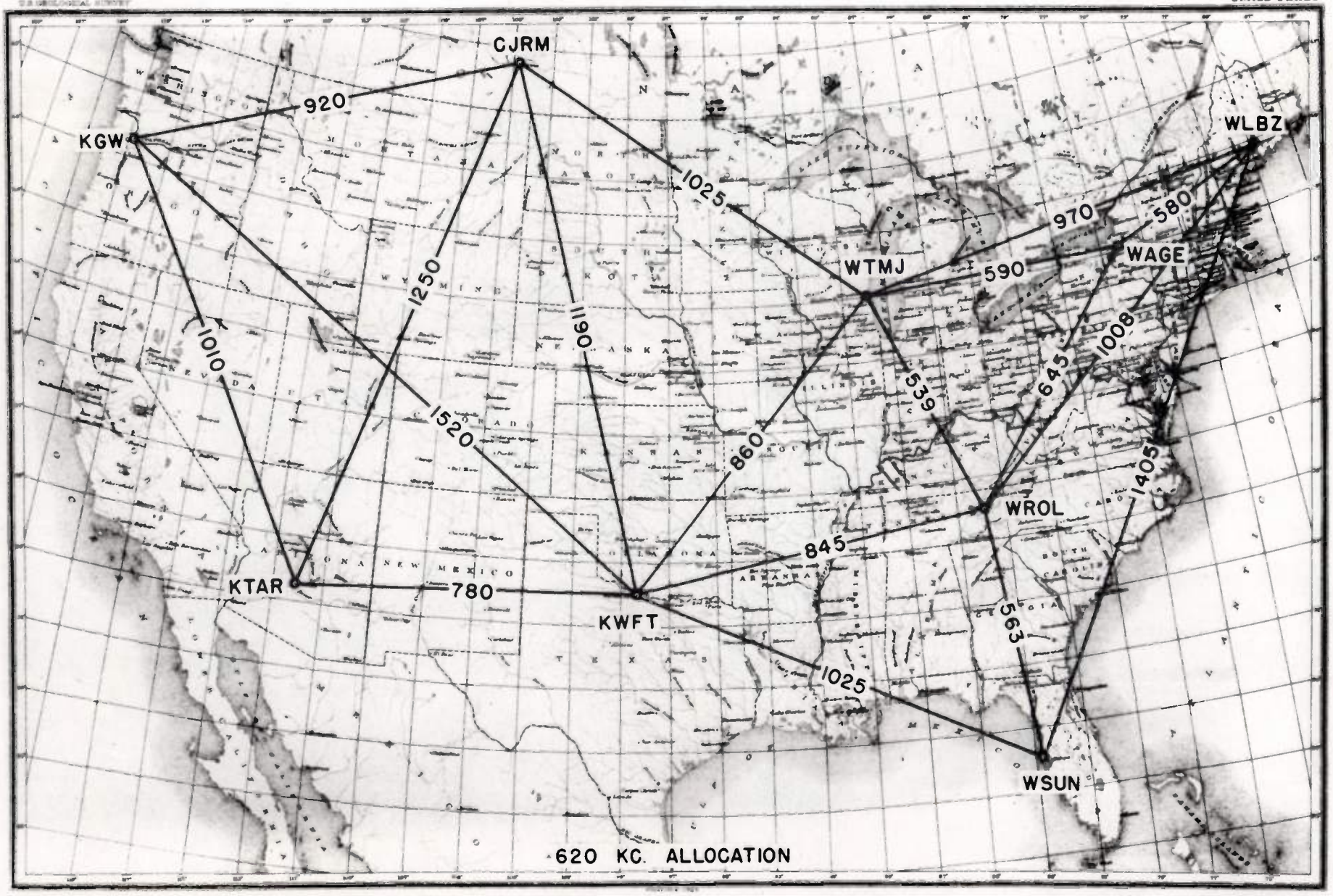
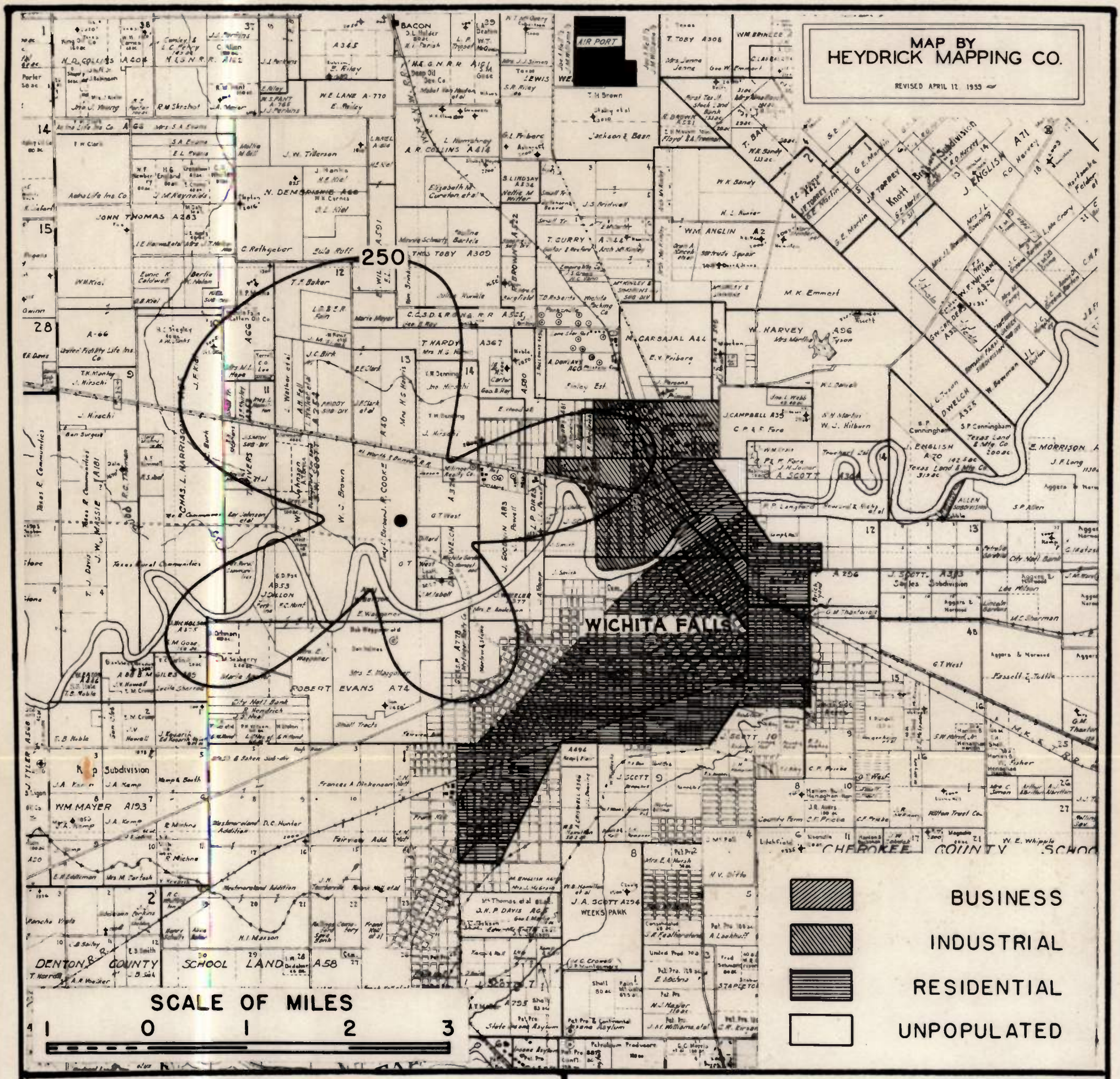
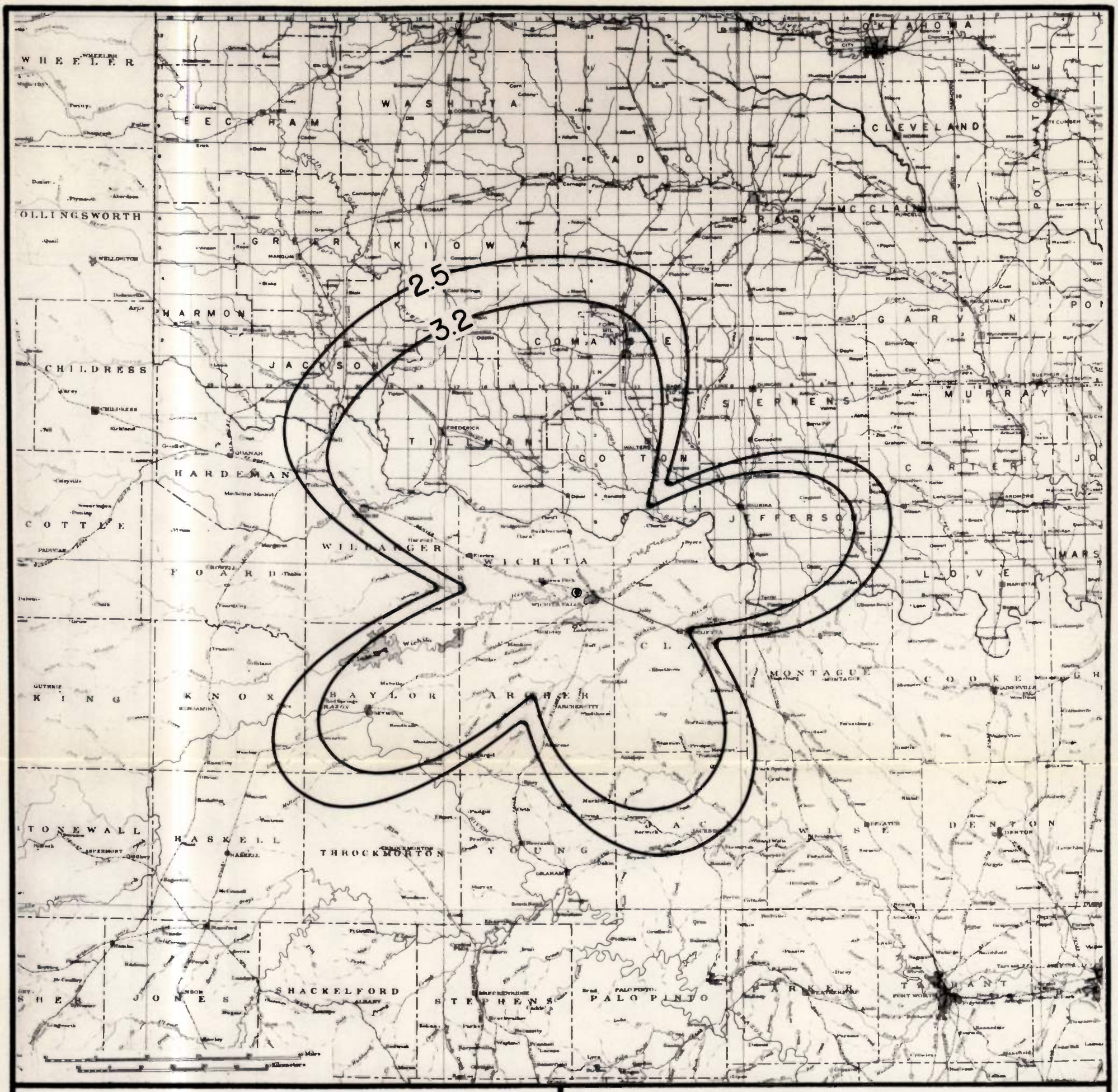

CJRM
920
KGW
1025
WLBZ
970
580
WAGE
WTMJ
590
1250
1190
1010
1008
645
539
1520
860
1405
WROL
845
KTAR
780
KWFT
563
1025
WSUN
620 KC. ALLOCATION

EXHIBIT 8



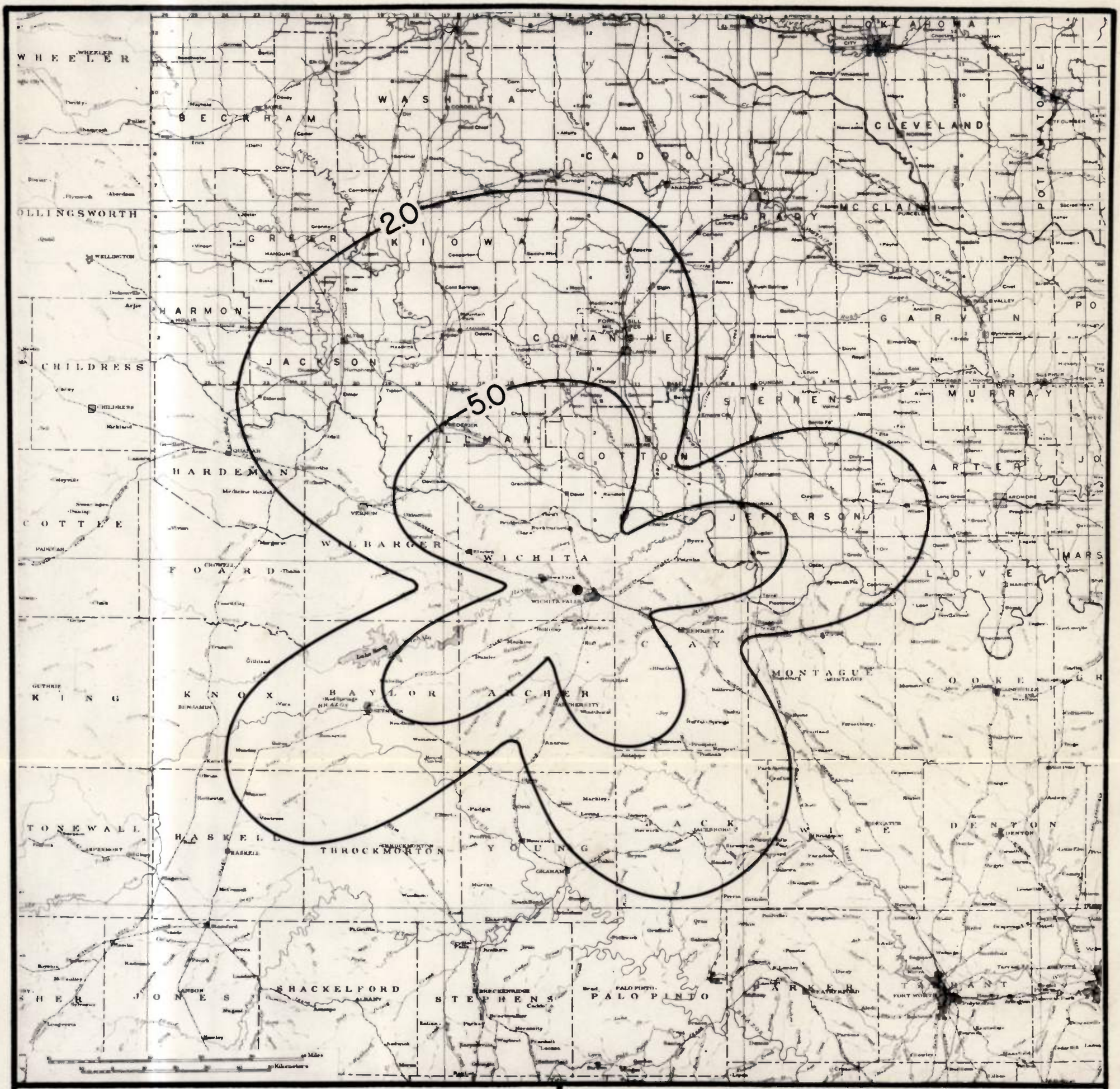

WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM, JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
PROPOSED OPERATION
620 KC. 5000 WATTS—DA.
EXHIBIT NUMBER 9A



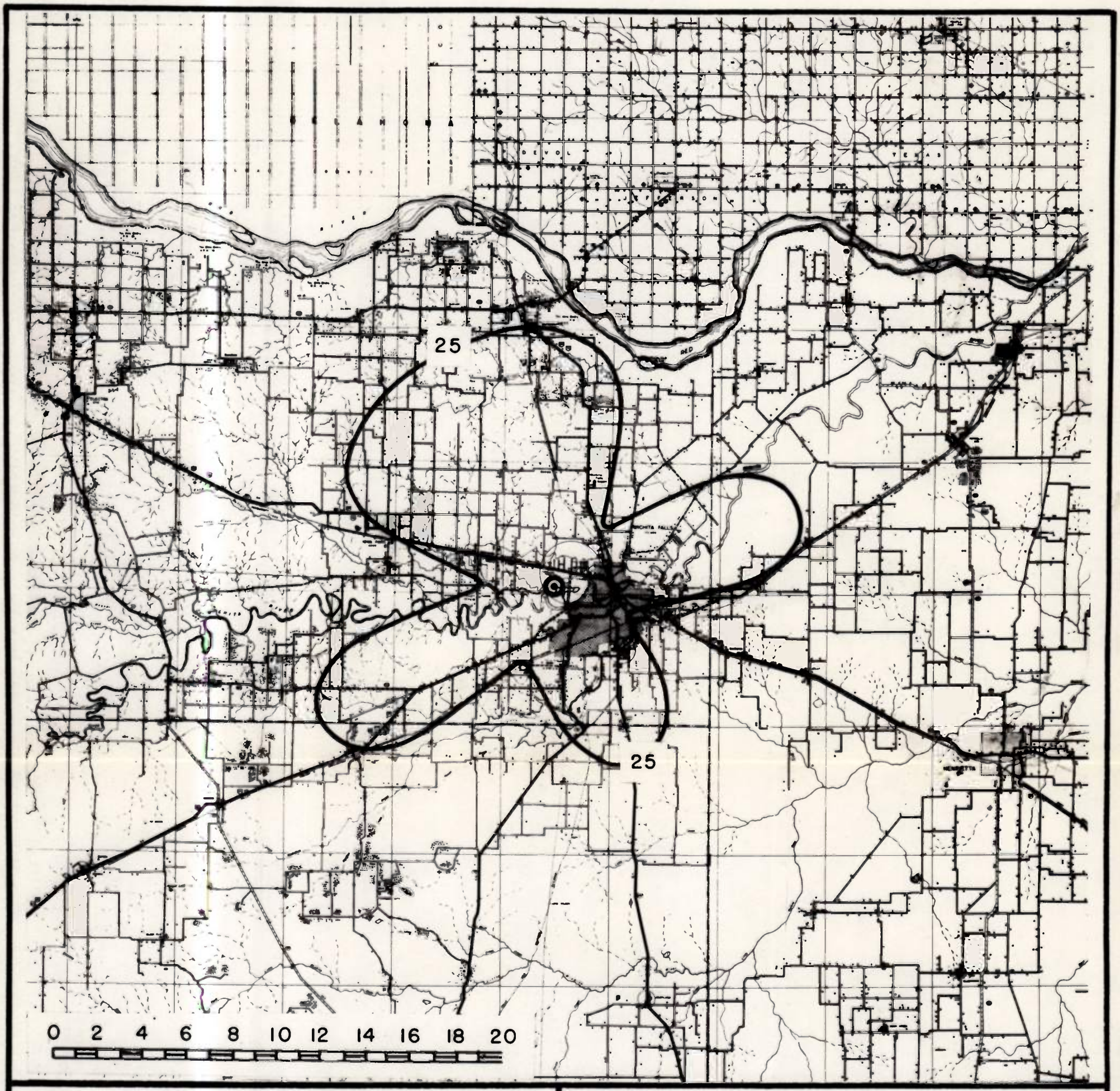

WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM, JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
EXISTING OPERATION
620 KC. 1000 WATTS-DA.
EXHIBIT NUMBER 10D



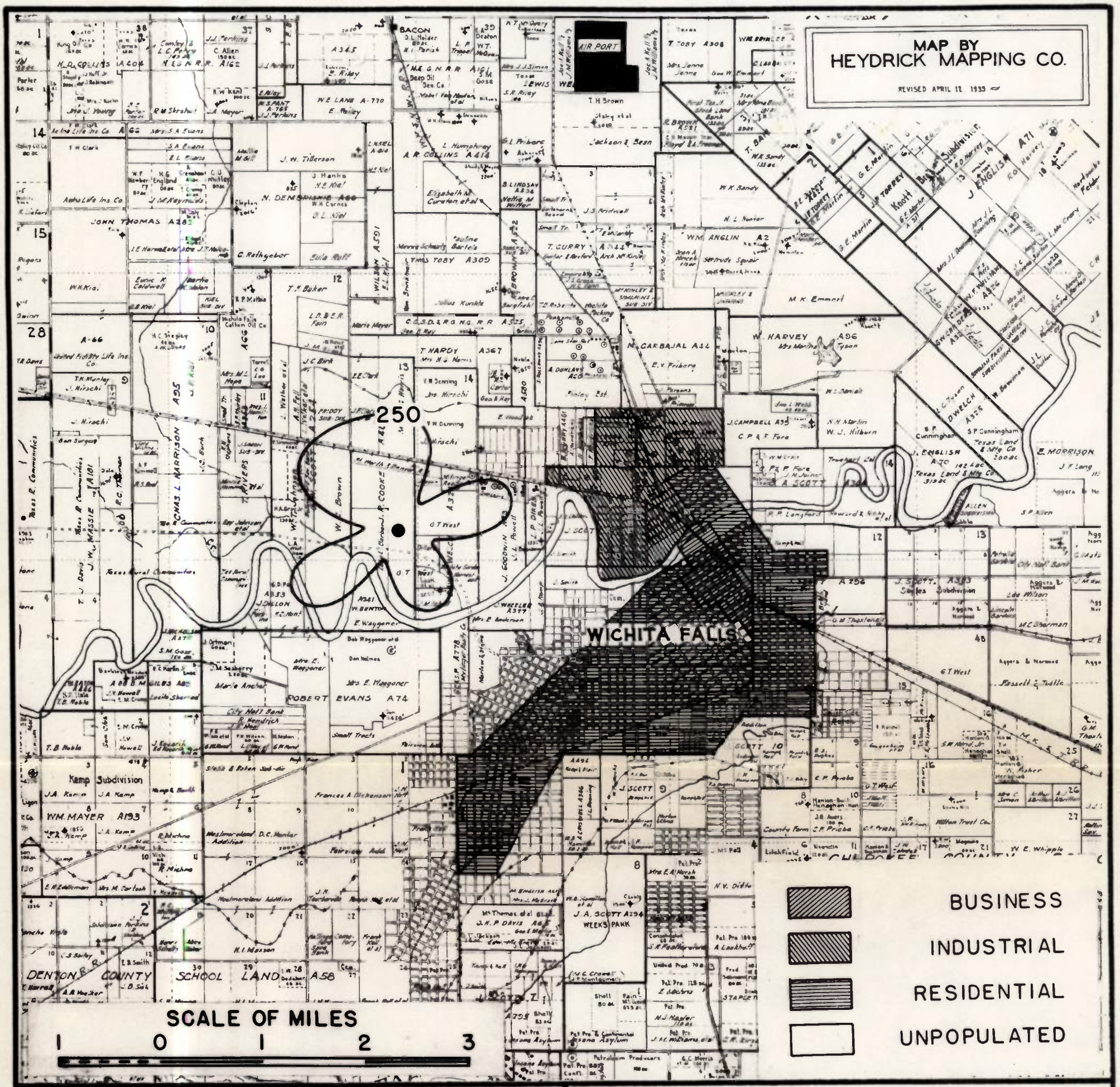

WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM, JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
EXISTING OPERATION
620 KC. 1000 WATTS-DA.
EXHIBIT NUMBER 10C



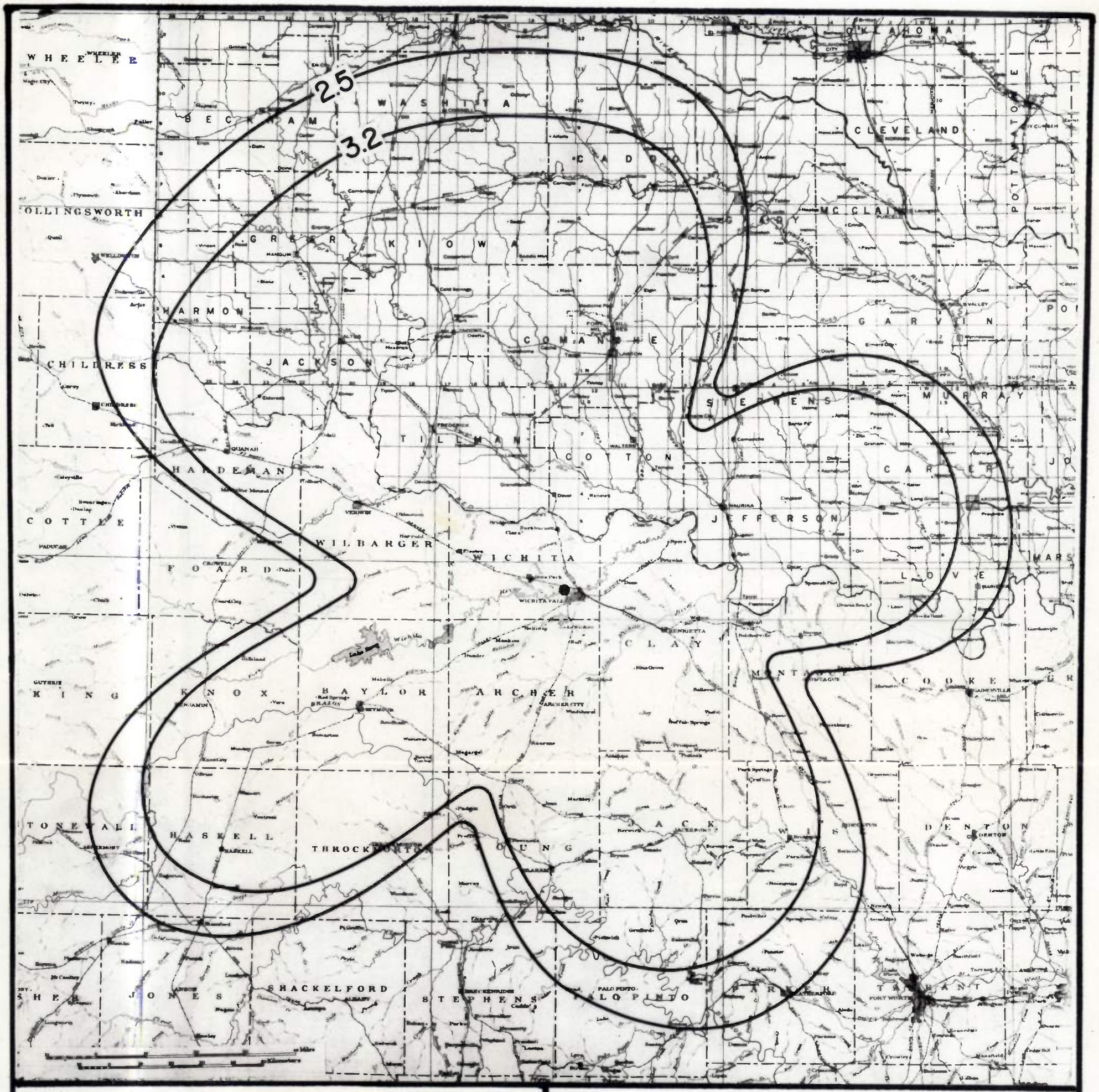

WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM, JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
EXISTING OPERATION
620 KC. 1000 WATTS-DA.
EXHIBIT NUMBER 10B



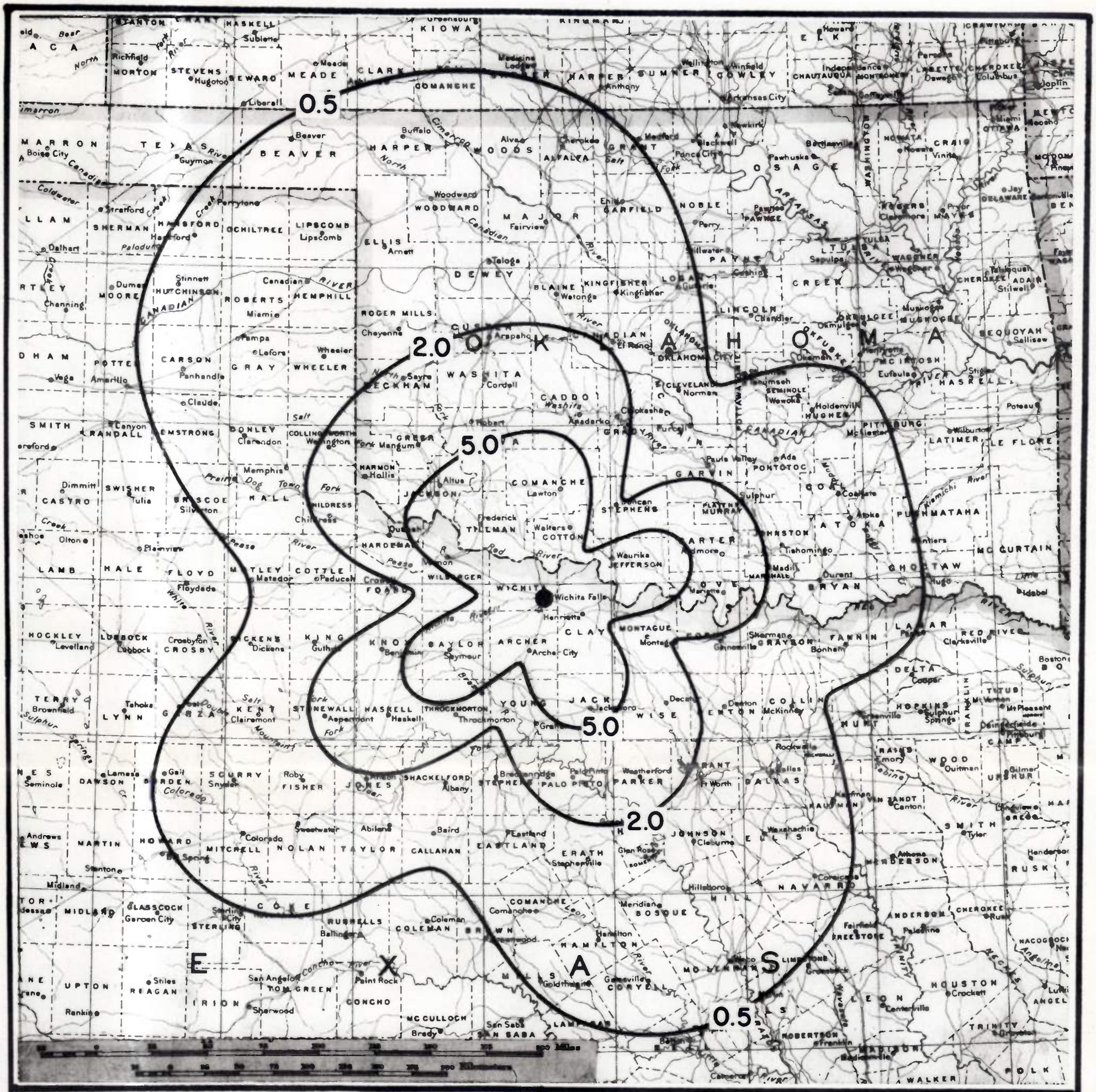

WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM, JR.
RADIO ENGINEERING CONSULTANT

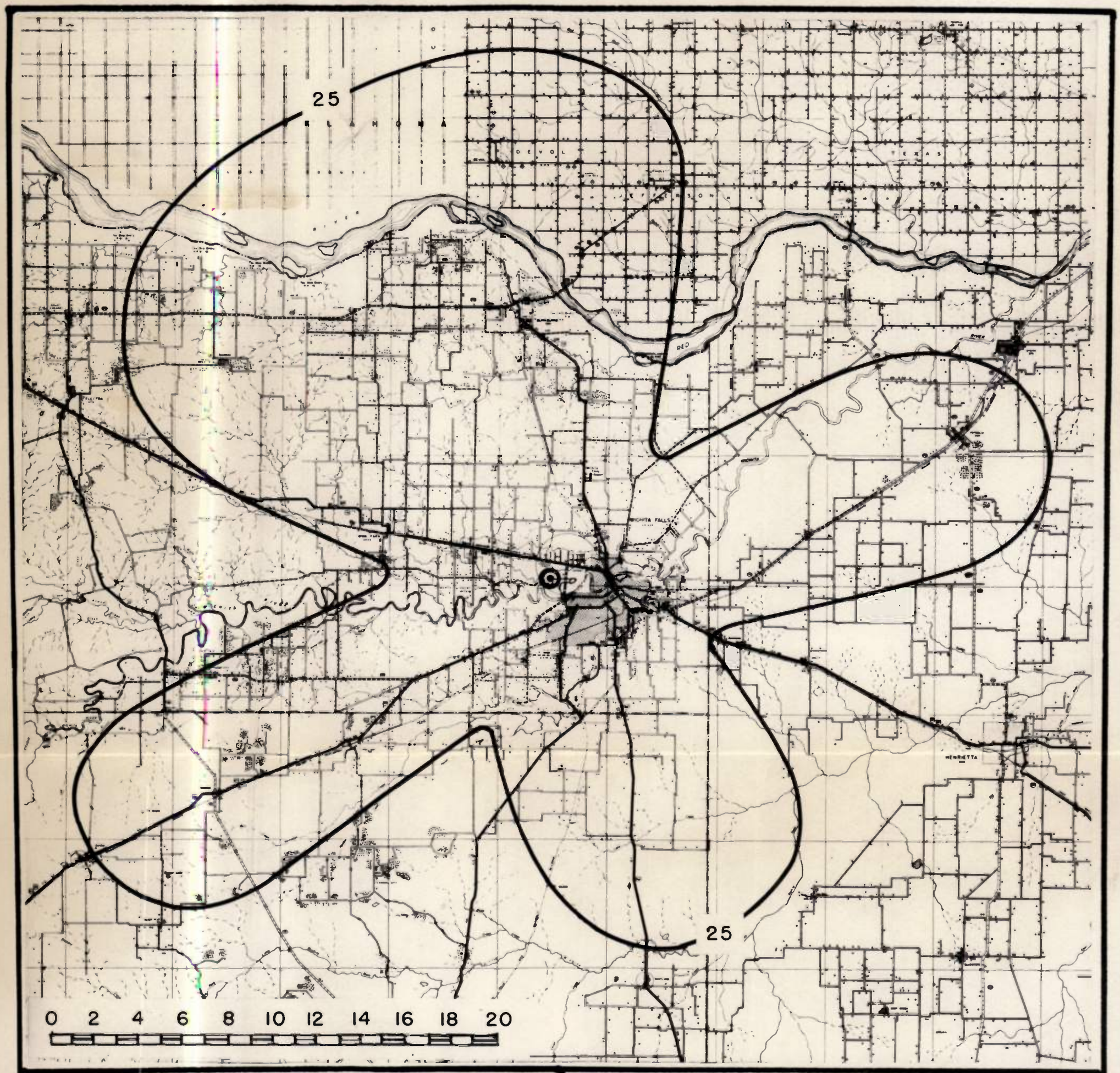
RADIO STATION KWFT
EXISTING OPERATION
620 KC. 1000 WATTS—DA.
EXHIBIT NUMBER 10A




WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM, JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
PROPOSED OPERATION
620 KC. 5000 WATTS—DA.
EXHIBIT NUMBER 9D

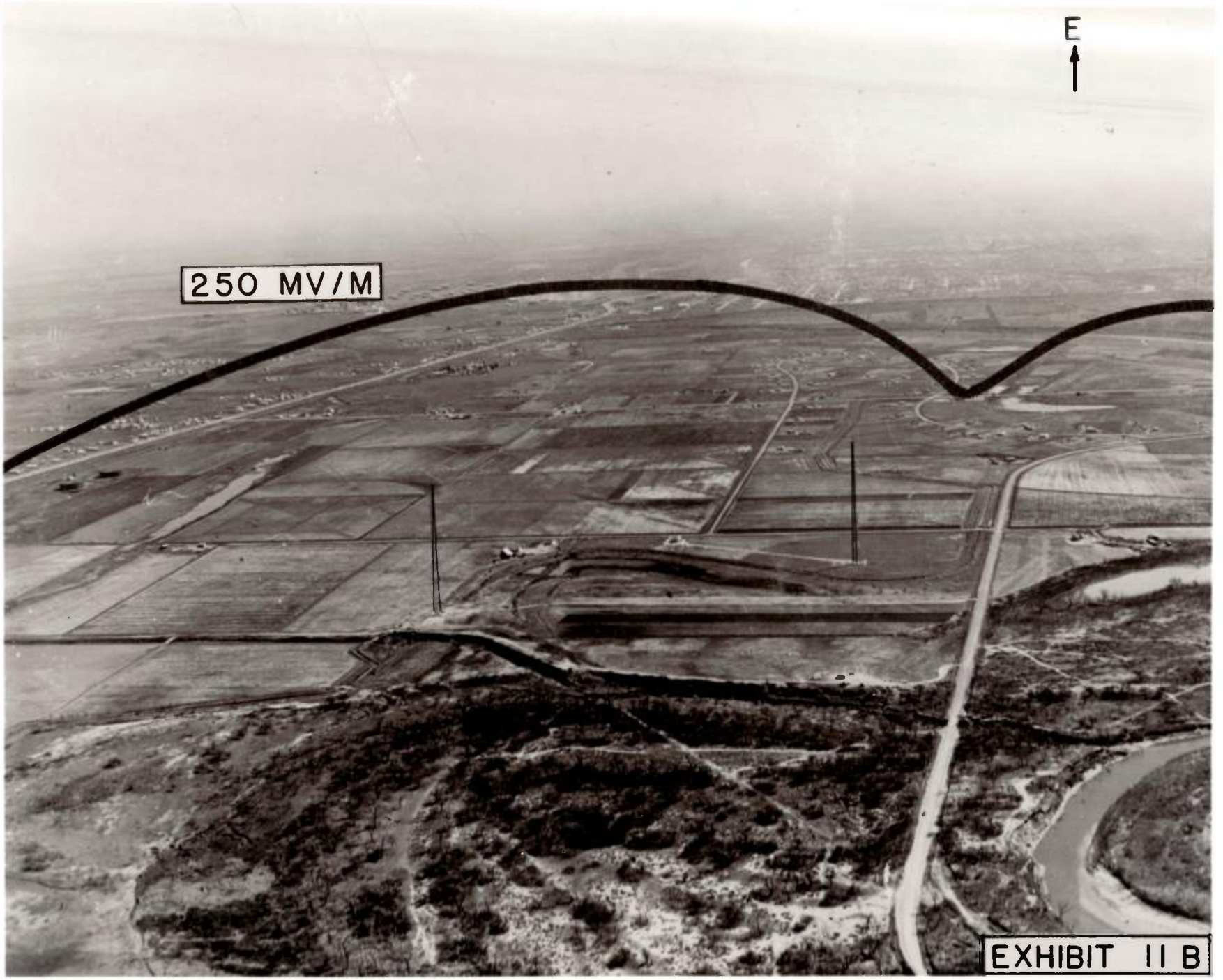

0.5
2.0
5.0
5.0
2.0
0.5
OKLAHOMA
TEXAS
Wichita Falls
Lawton
Altus
Vernon
Archer City
Henrietta
Seymour
Throckmorton
Graham
Jacksboro
Decatur
Denton
McKinney
Sherman
Gainesville
Bonham
Clarksville
Red River
Fort Worth
Weatherford
Mineral Wells
Palo Pinto
Breckenridge
Albany
Abilene
Sweetwater
Colorado
Big Spring
Midland
Odessa
Stanton
Lamesa
Seminole
Andrews
Snyder
Roby
Anson
Haskell
Aspermont
Stonewall
Knox City
Benjamin
Quanah
Childress
Memphis
Clarendon
Wellington
Shamrock
Pampa
Borger
Dumas
Dalhart
Perryton
Stratford
Hereford
Vega
Amarillo
Canyon
Plainview
Olton
Lubbock
Levelland
Brownfield
Tahoka
Floydada
Matador
Paducah
Crosbyton
Dickens
Guthrie
Seymour
Throckmorton
Jacksboro
Graham
Newcastle
Throckmorton
Albany
Baird
Eastland
Cisco
Ranger
Stephenville
Glen Rose
Comanche
Hamilton
Meridian
Hillsboro
Waxahachie
Cleburne
Corsicana
Athens
Tyler
Henderson
Canton
Quitman
Mineola
Gilmer
Pittsburg
Mt Pleasant
Sulphur Springs
Paris
Clarksville
Texarkana
Boston
Cooper
Sulphur
Ardmore
Madill
Durant
Hugo
Idabel
Tishomingo
Coalgate
Ada
Pontotoc
Sulphur
Duncan
Walters
Frederick
Altus
Vernon
Quanah
Childress
Paducah
Matador
Floydada
Plainview
Olton
Lubbock
Levelland
Brownfield
Tahoka
Lamesa
Seminole
Andrews
Midland
Odessa
Stanton
Big Spring
Sweetwater
Colorado
Abilene

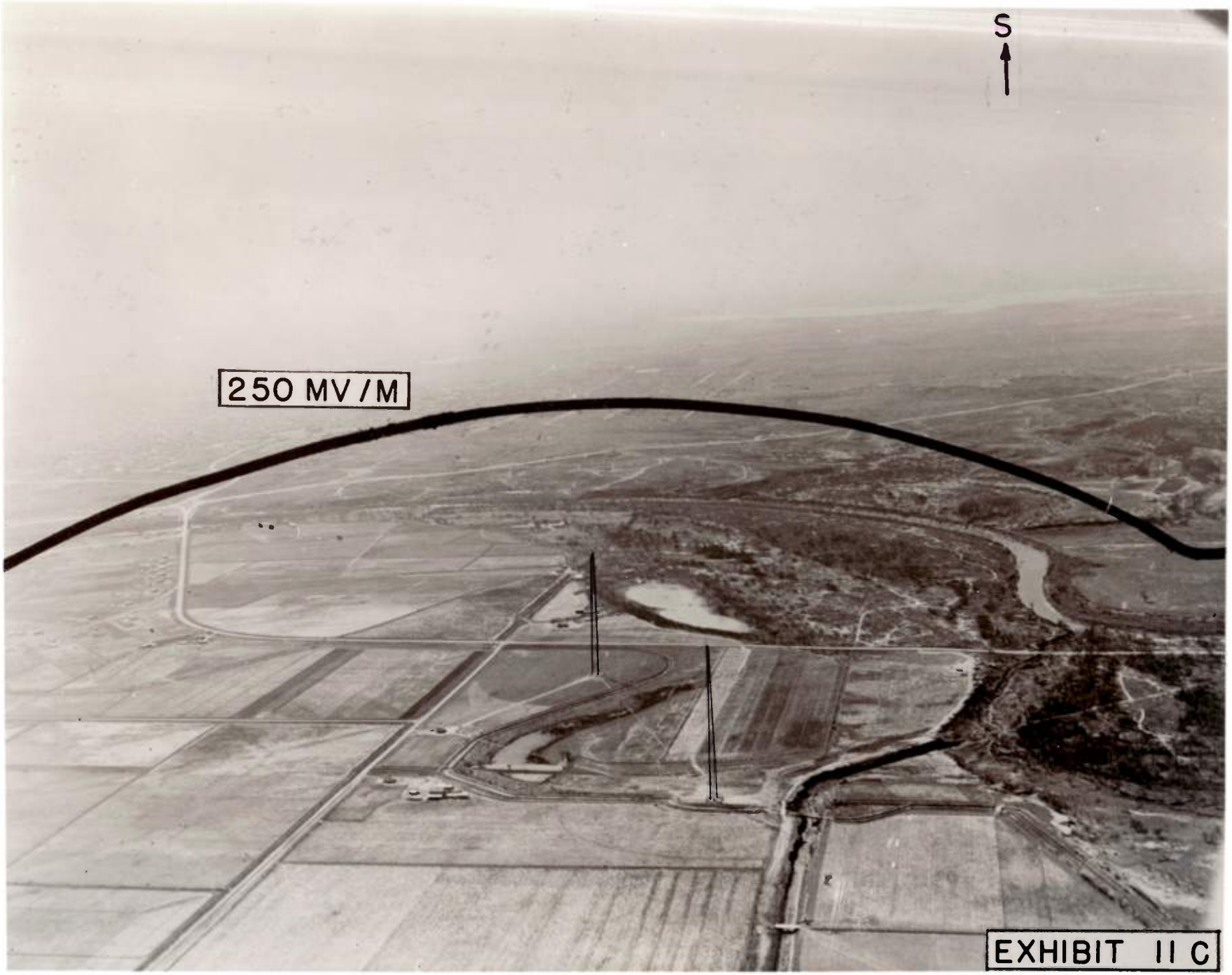


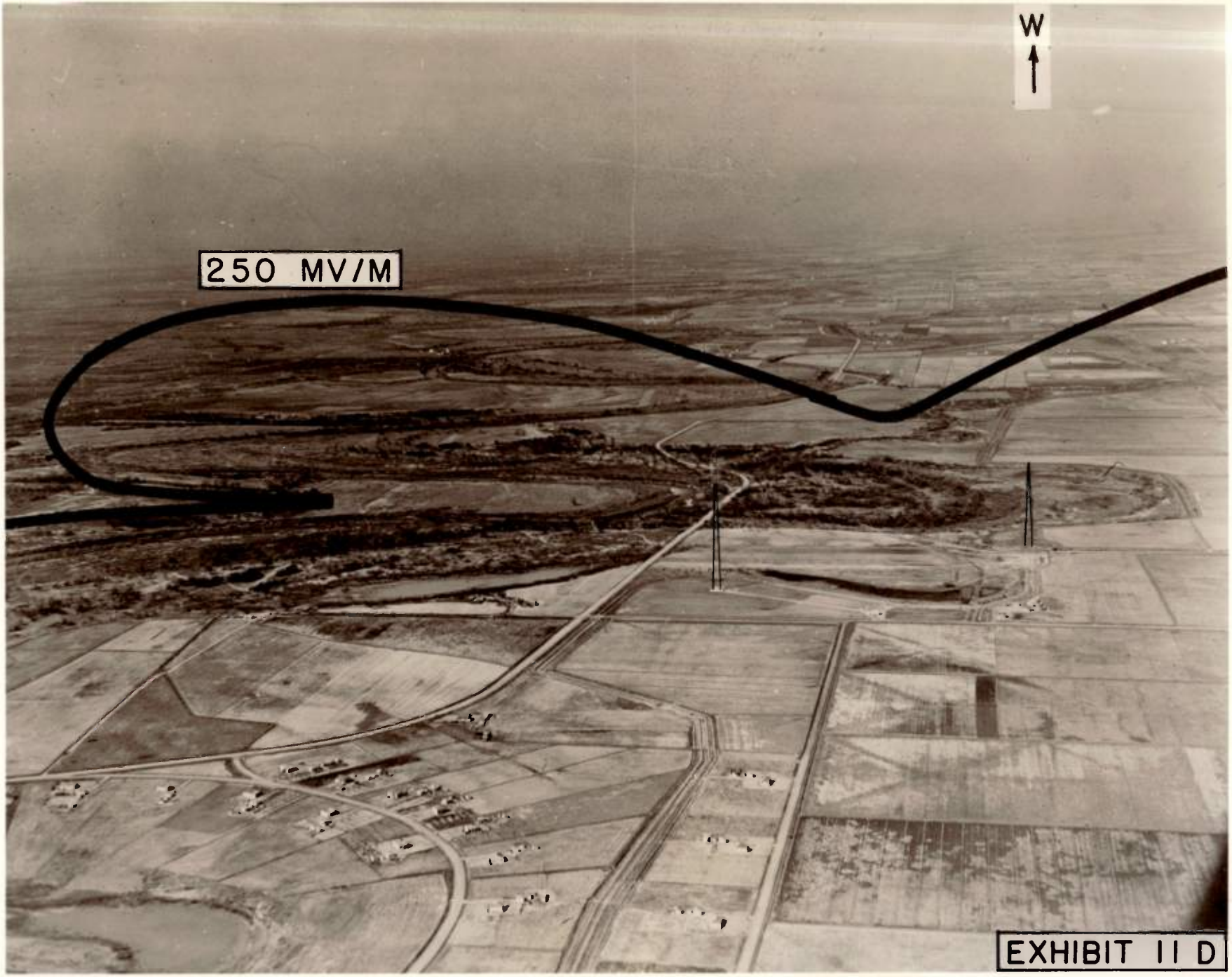

WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM, JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
PROPOSED OPERATION
620 KC. 5000 WATTS—DA.
EXHIBIT NUMBER 9B

N
250 MV/M
EXHIBIT II A


E
250 MV/M
EXHIBIT 11 B


S
250 MV/M
EXHIBIT II C


W
250 MV/M
EXHIBIT 11 D