KLBG - LIBERTY, TEXAS

DIRECTIONAL ANTENNA

PROOF OF PERFORMANCE REPORT

1050 KC DA-D 250 WATTS

Merl Saxon
Consulting Radio Engineer
Lufkin, Texas

1.8

PROOF OF PERFORMANCE REPORT

RADIO STATION KLBG

LIBERTY, TEXAS

1050 KC DA-D 250 WATTS

Licensee:

J. A. Robinson IV and Elmer J. Griffin, Sr.

d/b as Liberty Broadcasting Company

August 1959

Merl Saxon
Consulting Radio Engineer
Lufkin, Texas

COMPENDIUM

Broadcast Application | FEDERAL COMMUNICATIONS COMMISSION | Section II-A

LICENSE APPLICATION ENGINEERING DATA STANDARD BROADCAST

Name of applicant: Liberty Broadcasting Company

Purpose of authorization applied for: *(Check one)* — Answer Paragraphs

- [X] Station license — 1 thru 13
- [X] Direct measurement of power — 2,6,7,8,9,14

1. Facilities authorized in construction permit

Call letters	File No. of construction permit
K L B G	BP-9745

Frequency	Hours of operation	Power in kilowatts	
		Night	Day
1050 Kc.	Day Only	None	0.25

2. Station location

State	City or town
Texas	Liberty

3. Transmitter location

State	County
Texas	Liberty

City or Town	Street Address *(or other identification)*
Near Liberty	HWY #563, 3 mi SE of city limits of Liberty

4. Main studio location

State	County
Texas	Liberty

City or Town	Street and number
Liberty	616 Fannin Street

5. Remote control point location

State	City or town
None	

Street Address *(or other identification)*

6. Transmitter Installed

Make	Type No.	Rated Power
Gates	BC-250-GY	0.25 Kw.

Last radio stage

	Total unmodulated plate current	Plate voltage
Night	---	---
Day	335 Ma.	1.23 Kv.

Operation of last radio frequency amplifier stage: A [ ] B [ ] BC [ ] C [X] D [ ]

Manufacturer's recommended operating efficiency for the last radio frequency amplifier stage in percent.

Is inverse feedback utilized? Yes [ ] No [X]

If "Yes", to what value of feedback power is transmitter adjusted (in db): Audio only

Efficiency of the last radio frequency amplifier stage as now adjusted: 65.7% *(use formula* $\frac{I_p^2}{E_p} \frac{R_h(100)\%}{I_p}$ *)*

7. Operating constants: (If directional system, give current at point of resistance measurement.)

RF common point or antenna current without modulation for night power in amperes	RF common point or antenna current without modulation for day power in amperes
---	2.36

Actual measured antenna or common point resistance (in ohms) at operating frequency	Actual measured antenna or common point reactance (in ohms) at operating frequency
Night -- Day 48.5	Night -- Day 0

Currents, and phases for directional operation

Tower	Phase reading in degrees		Antenna base current		Remote indication of antenna current	
	Night	Day	Night	Day	Night	Day
#1 SW	--	0	--	2.53	--	87.8
#2 NE	--	16	--	2.22	--	75.0

Manufacturer and type of phase monitor used in taking above readings: Nems-Clarke Type 108-E

Describe equipment used for remote indication of antenna currents (phase monitor or other method): Doide rectifier meters in phase monitor.

8. Description of antenna system

(If directional antenna is used, the information requested below should be given for each element of the array. Use separate sheets if necessary. Height figures should not include obstruction lighting.)

Type radiator	Height in feet of complete radiator above base insulator, or above base if grounded.
Vertical, guyed, uniform cross-section	#1-200' #2-200'

Overall height in feet above ground.	If antenna is either top loaded or sectionalized, describe fully as Exhibit No.
#1-208' #2-208'	DNA

Excitation — Series [X] Shunt. [ ]

Geographic coordinates to nearest second.

For directional antenna give coordinates of center of array. For single vertical radiator give tower location.

North latitude	West longitude
30° 00' 04"	94° 45' 32"

If not fully described above, give further details and dimensions including any other antennas mounted on tower and associated isolation circuits as Exhibit No.

Details and dimensions of ground system: (Attach sketch as Exhibit No. if necessary for complete description)

120 equally spaced 234' buried copper radials, except where property lines terminate, and 24' square copper screen about each tower & interconnecting 2" copper strap between towers.

9. Antenna resistance measurement

Attach as Exhibit No. the following: See Engineering Report Attached

a. Qualifications of engineers taking measurements

b. Schematic diagram showing clearly all components of coupling circuits, point of resistance measurement, location of antenna ammeter, connections to and characteristics of all tower lighting isolation circuits, static drains, and any other fixtures, lines, etc., connected to or supported by the antenna, including other antennas and associated circuits.

c. Full description of method used to make measurements.

d. Manufacturer's name of each calibrated instrument used and manufacturer's rated accuracy.

e. Date, accuracy, and by whom each instrument was last calibrated.

f. Table of complete data taken.

g. The graph drawn of 10 to 12 readings in a band 50 to 60 kilocycles wide with the operating frequency near the center.

10. Modulation monitor

Make	Type No.
Gates	MO-2639

11. Frequency monitor

Make	Type No.
Gates	MO-2890

By what method and how often will regular checks of the calibration of the frequency monitor be repeated?

Use facilities of external frequency measuring service periodically.

Give the following data on the checks of the frequency

	Date and time	Name of checking agency or method used	Frequency measured by such agency or method	Monitor reading high or low
1.	8/21/59 - 12:20 AM			- 2.1
2.	8/22/59 - 12:17 AM			+ 1.4
3.	8/22/59 - 12:22 AM			+ 2
4.	8/23/59 - 12:20 AM			+ 1.2

12. Give method of varying power to compensate for variation of line voltage.

Variation of plate loading to final RF amplifier and voltage regulation of this same stage.

13. In what respect, if any does the apparatus constructed differ from that described in the application for construction permit or in the permit?

None

14. Give reason for the change in antenna or common point resistance.

Does not apply

I certify that I am the ~~Technical Director, Chief Engineer or~~ Consulting Engineer for the applicant of the radio station for which this application is submitted and that I have examined the foregoing statement of technical information and that it is true to the best of my knowledge and belief. (This signature may be omitted provided the engineer's original signed report of the data from which the information contained herein has been obtained is attached hereto.)

Merl Saxon

Merl Saxon
Consulting Radio Engineer
Lufkin, Texas

Date August 19, 1959

ENGINEERING STATEMENT

CONCERNING DIRECTIONAL ANTENNA ADJUSTMENT

AND

PROOF OF PERFORMANCE MEASUREMENTS

FOR

RADIO STATION KLBG

LIBERTY, TEXAS

Liberty Broadcasting Company, permittee of Radio Station KLBG, holds a Construction Permit, File No. BP-9745, for operation of Station KLBG daytime only on 1050 kilocycles using 250 watts power into a directional antenna between the hours of local sunrise and local sunset.

The daytime directional array of KLBG consists of two towers of equal height each 200 feet above base insulator. The towers are spaced 525 feet (202^{o}) on a line bearing 40 degrees east of True North. The southwest tower is designated Tower No. 1, and the northeast tower is Tower No. 2. Construction permit specifications call for the No. 2 tower base current ratio to be 0.9 when compared to the current at the base of No. 1 tower with the No. 2 tower current leading the No. 1 tower current in phase relationship by 18^{o}.

Initial measurements on the two towers produced results from which the mutual impedance between the towers was $8.8/\underline{-149^{o}}$. Inserting this value in the computations for the directional operating impedance of each tower, we

arrive at these values when using the tower current ratio that is specified in the Construction Permit:

$$Z_1 = 22.8 - j2$$
$$Z_2 = 18.5 + j2$$

These values of base resistance should produce tower currents of 2.57 amperes for No. 1 and 2.31 amperes for No. 2 tower. The final antenna currents were only a slight bit less than these magnitudes which indicates that the computed antenna resistances were very close.

For daytime directional operation, the phasing circuits for both towers were adjusted in such manner that the terms of the KLBG construction permit would be met in regard to field intensity measurements. The final adjustment for directional operation produced conditions where the base current in Tower No. 1 was 2.53 amperes, and in No. 2 Tower the current was 2.22 amperes, which gives a current ratio of 1:0.878. The current in tower No. 2 leads the current in tower No. 1 by 16.5 degrees as indicated on the phase monitor. Impedance measurements at the common point of input to the phasing circuits were made for directional operation, and the results are tabulated elsewhere in this report. A meter is installed at this point to measure the common point current, which measures 2.36 amperes for 250 watts output. These antenna currents and indicated phase were maintained throughout the taking of field intensity measurements for directional conditions.

A requirement is specified in the KLBG construction permit that a full non-directional proof of performance be made. Therefore, with tower No. 2

isolated, the No. 1 tower was used as the non-directional radiator. Isolation was accomplished by connecting the No. 2 tower to ground through a large inductive reactance. This reactance was adjusted to give a minimum of deflection on the indicating instrument in a field intensity meter which was positioned about 20 feet from the tower being isolated while the other tower was fed some power. The loop antenna of the field meter was orientated so that it would pick up a minimum of radiation from the tower being fed power but with the plane of its loop passing through the tower being isolated. After isolation of the No. 2 tower was effected, the No. 1 tower base impedance was measured as 28 + j4 ohms, and a base current of 2.99 amperes was maintained for 250 watt non-directional measurements.

Before directional adjustments were made on the array, the sampling loop transmission lines were bridged out to determine if they were the same length. The measurements on the two lines were identical for both open and short circuit conditions. Then the antenna currents were established equal in magnitude and the phase set at the specified value of 18^{o} with tower No. 2 leading tower No. 1. A cross-radial was run in the vicinity of monitor point No. 1, and from the results of this cross-radial the phase was adjusted to 16.5^{o} in order that the minimum, or null, would be positioned in its proper place of 3.3 degrees east of True North. After that, the antenna current ratio was adjusted to fill the null to that point where the inverse fields in the specified directions of the construction permit were of the proper magnitude.

Radio frequency bridge measurements were made of the common point of

input to the power dividing network of the antenna system following final adjustment of the array. After all reactance at this point was eliminated, the common point resistance was measured as 48.5 ohms. Applying the 92.5% factor, this resistance becomes 44.8 ohms. The current flow necessary at this common point figures 2.36 amperes for 250 watts, and that is the value maintained during the taking of directional field measurements.

After proper adjustment of the antenna was made for daytime directional operation, sufficient measurements were made of the field intensity produced by the array along nine radials, spaced through 360 degrees. Intensity measurements were made with the field strength meter following the exact procedure outlined in the factory instruction book supplied with the meter. In every instance an attempt was made to locate the measurement point in a clear place well away from fences and overhead lines. Wherever possible, the meter was taken at least 100 feet through fences into clear pastures or fields to get away from the influence of power lines and fences. Several oil fields are located around Liberty with their associated buried and hidden pipe lines, and in some cases measurements were made in their vicinity.

Between 0.1 and 2.0 miles on each radial, measurement points were staked out by a licensed surveyor every tenth mile. Beyond 2 miles and out to approximately 20 miles, these radials were plotted on a Texas Highway Department Map, and points of measurement with distance were taken from this original map. In every case where accessible points were available, field intensity measurements were taken. A few of the surveyed points were omitted due to unaccessible and

flooded terrain. In the case of the 220 degree True radial from the 0.8 mile point on out to 7 miles there was a swamp of undeveloped land under several feet of flood water. This is the area of the Trinity River, and substituted for the missing survey points on this radial are nine points at the 7 mile distance that were located by the surveyor. Again there are several off-set points that help to fill in the long gap that sometimes existed on a radial.

All field intensity measurements, both directional and non-directional, were taken by Merl Saxon, or by Mr. Charles Lawrence under his direct supervision. Measurements were taken with a WX-2C Meter, manufactured by Clarke Instruments Company, Silver Spring, Maryland, and last calibrated by that company December 2, 1958.

One monitor point, on the 220 degree radial, was located at a distance of 7.05 miles instead of within the 4 mile limit specified by the rules because of the flooded Trinity River bottomlands in which there are no roads or trails. To insure the accuracy of this distant monitor point a number of measurements were clustered thereabouts on either side of the point.

After a study of the proof of performance measurements and report of same, it is believed that the KLBG directional antenna system is installed and adjusted in compliance with the specifications of the KLBG construction permit and the rules and regulations of the Federal Communications Commission.

Tabulation of all measurements is made in such way as to afford a convenient way to compare the two sets of measurements with themselves. An explanation of the headings of the tabulations is given here:

Point - Measurement points on all radials were marked as Number 1 for the 0.1 mile distant point and progressing out from the antenna with distance for the numbering system.

Distance - All distances are in miles from the center of the KLBG antenna system and were taken directly off the original point location map used in the proof.

Date - All measurements were made in the months of July and August, 1959, and no column is used for dates. Instead there are indicated the dates of measurements at the bottom of each tabulation.

Time - All times are indicated in 2400 type Central Standard Time.

e(mv/m) - Figures under this heading are the indications of the RCA field intensity meter in millivolts per meter.

Remarks - A brief description of any surrounding objects that may influence the measurement accuracy is given in this column.

There is given here a full and complete description of the KLBG antenna array:

a. Two identical elements are installed as the antenna system. For the non-directional operation, the No. 1 (Southwest) tower was fed with 250 watts power, while the No. 2 (Northeast) tower was isolated.

b. The towers are slender and triangular in cross-section. Both elements are uniform cross-section, series fed and guyed at five elevations.

c. Top loading is not used on either tower.

d. The No. 1 (Southwest) tower extends 200 feet above the base insulator, and the No. (Northeast) tower extends 200 feet above its base insulator.

e. Overall height of each element above ground is 208 feet.

f. Overall height of each element above mean sea level is 230 feet.

g. The directional array elements are located on a line bearing 40 degrees east of True North. No. 2 tower is spaced 525 feet, or 202 degrees, northeast of the No. 1 tower. The current in No. 2 tower leads the current of No. 1 tower in time phasing by 16.5 degrees as indicated by the Clarke Phase Monitor.

h. Ground system consists of 120 - 234 foot equally spaced copper wire radials about each tower except where shortened by property lines. Also at base of each tower is a 24 foot square copper ground screen. The centers of the system are bonded together with 2 inch copper strap and the center of this strap extended into the transmitter.

i. For directional operation the current fed to No. 1 tower was 2.53 amperes, and the current fed to No. 2 tower was 2.22 amperes. In this operation the Common Point resistance was measured as 48.5 ohms. 92.5 per cent of this value is 44.8 ohms. For 250 watt directional operation the common point current is 2.36 amperes.

j. Schematic circuit diagram of the antenna and phasing equipment is shown in another figure in this report. RF ammeters are installed as indicators in the diagram to measure the base current of each

element as well as the current in the common point of input.

k. Each tower has been painted exactly as specified on the KLBG construction permit. These specifications are identical for each tower. Each has four orange and three white sections, terminating with aviation surface orange bands at both top and bottom. The width of each band is approximately one-seventh of the height of the structure. There is installed at the top of each structure one 300 m/m electric code beacon with two 500 watt lamps (PS-40, Code Beacon Type), and both lamps burn simultaneously being equipped with a flashing mechanism that is controlled by a light sensitive device. At the midpoint of each tower are installed two 100 watt red lights that burn continuously.

l. Grounded sampling loops insulated from the tower have been installed on the towers about 22 feet above the base insulator. Each sampling loop feeds its individual three-eights inch RG-11U transmission line. Each transmission line to the phase monitor located in the transmitter building is the same length and is terminated in a load resistor equal to its characteristic impedance. The phase monitor samples the current in the terminating resistor and indicates that the sampling loop current in the Northeast (No. 2) tower leads the current in the sampling loop of the Southwest (No. 1) tower by 16.5 degrees. Also, the phase monitor samples the current flow in the sampling loops by means of a diode rectifier and

a DC meter calibrated to read from 0 to 150 per cent. The phase monitor remote meters were adjusted to read 87.8% for tower No. 1 and 75% for tower No. 2. This yields a ratio of 1:0.855. (KLBG has requested the manufacturer to supply a scale of 0-5 Amperes for each of the loop meters in order that these meters might be used as remote antenna ammeters. They will be adjusted to read the same as the antenna ammeter of the tower they are associated with.)

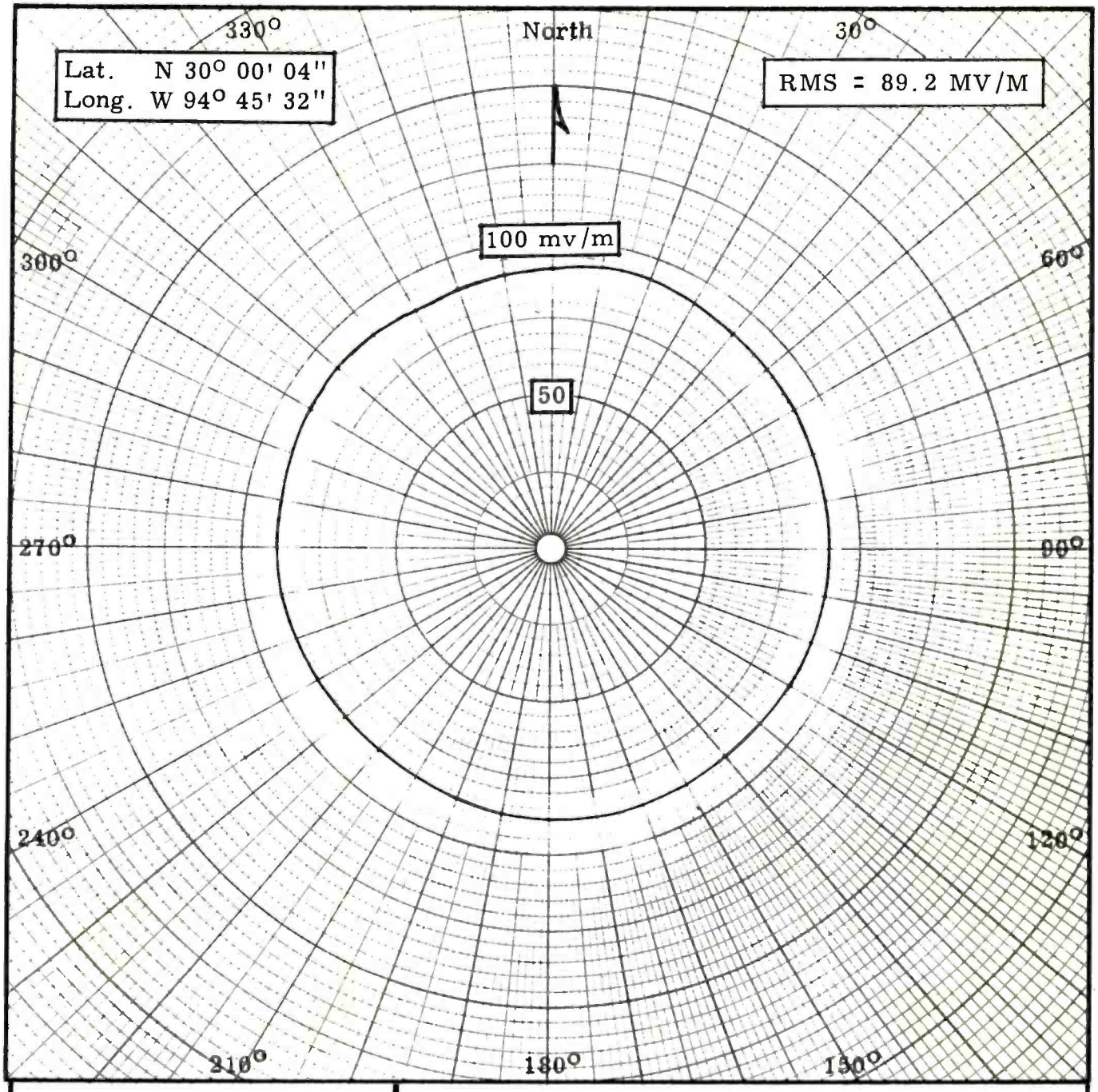
A statement from Mr. Marvin M. Henry, Consulting Engineer and Public Land Surveyor, is included at the back of this report. This statement corrects the original geographical coordinates for the KLBG antenna system from:

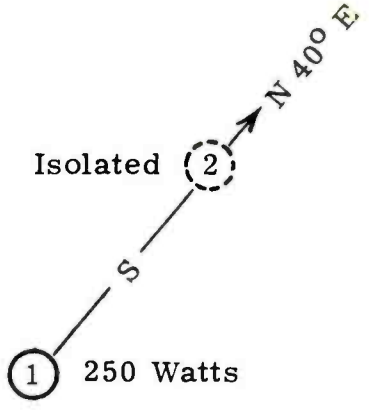
North Latitude 30° 00' 00"
West Longitude 94° 45' 21"

to:

North Latitude 30° 00' 04"
West Longitude 94° 45' 32"

and the modified coordinates are used in all the attached figures and exhibits to show the location of the KLBG antenna system.





G = 77° = 200'
S = 202° = 525'

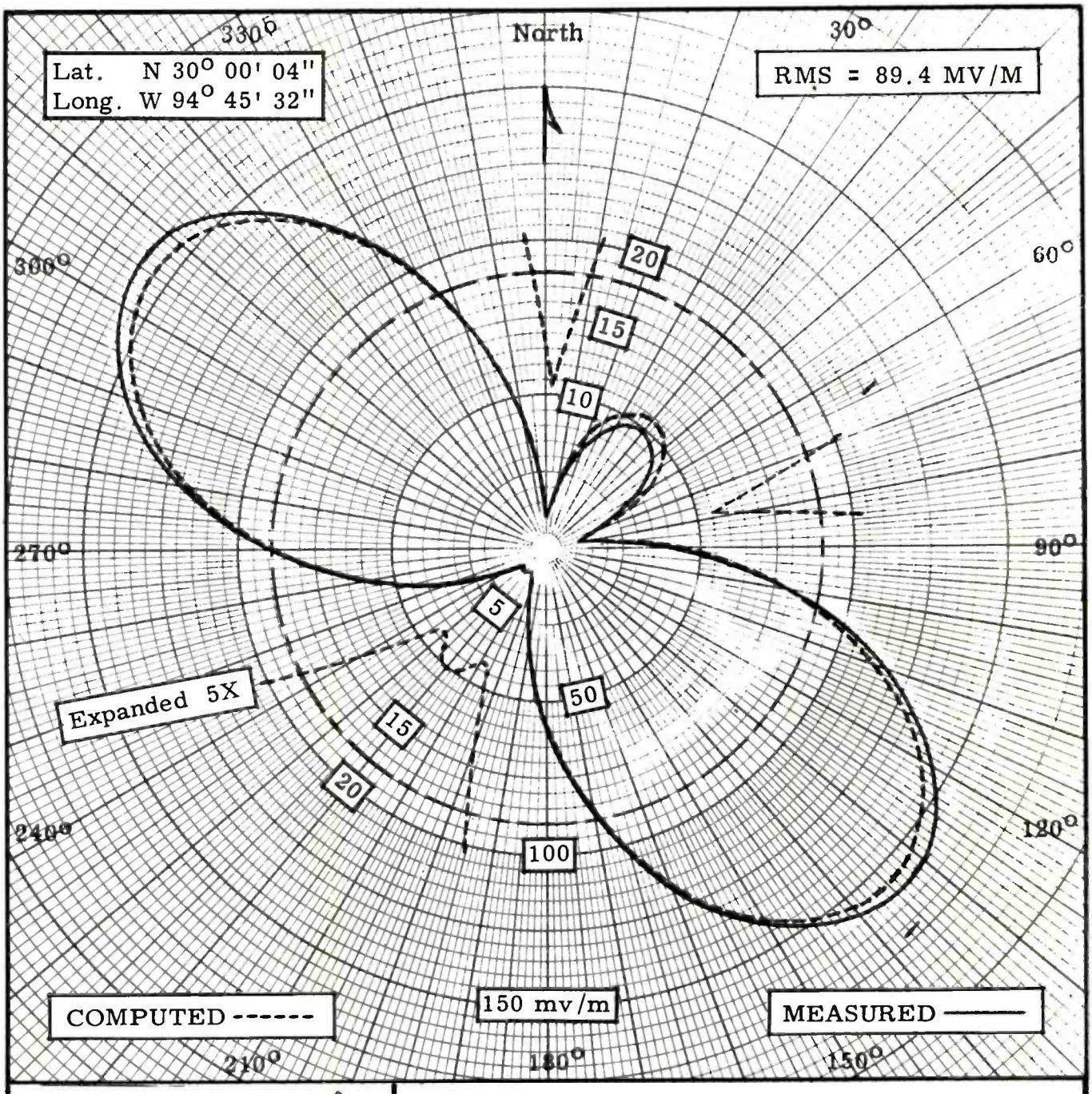
RADIO STATION KLBG
LIBERTY, TEXAS

MEASURED NON-DIRECTIONAL
HORIZONTAL PLANE RADIATION PATTERN
1050 KC ND 250 WATTS

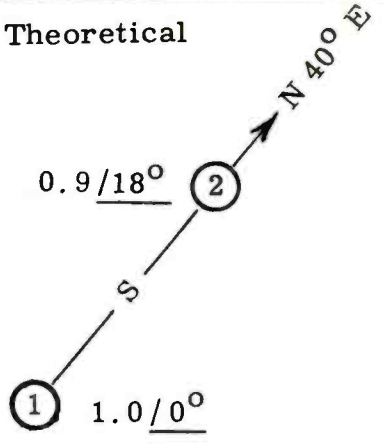
081959-2

FIGURE 2

MERL SAXON
CONSULTING RADIO ENGINEER
LUFKIN, TEXAS



Theoretical



G = 77° = 200'
S = 202° = 525'

RADIO STATION KLBG
LIBERTY, TEXAS

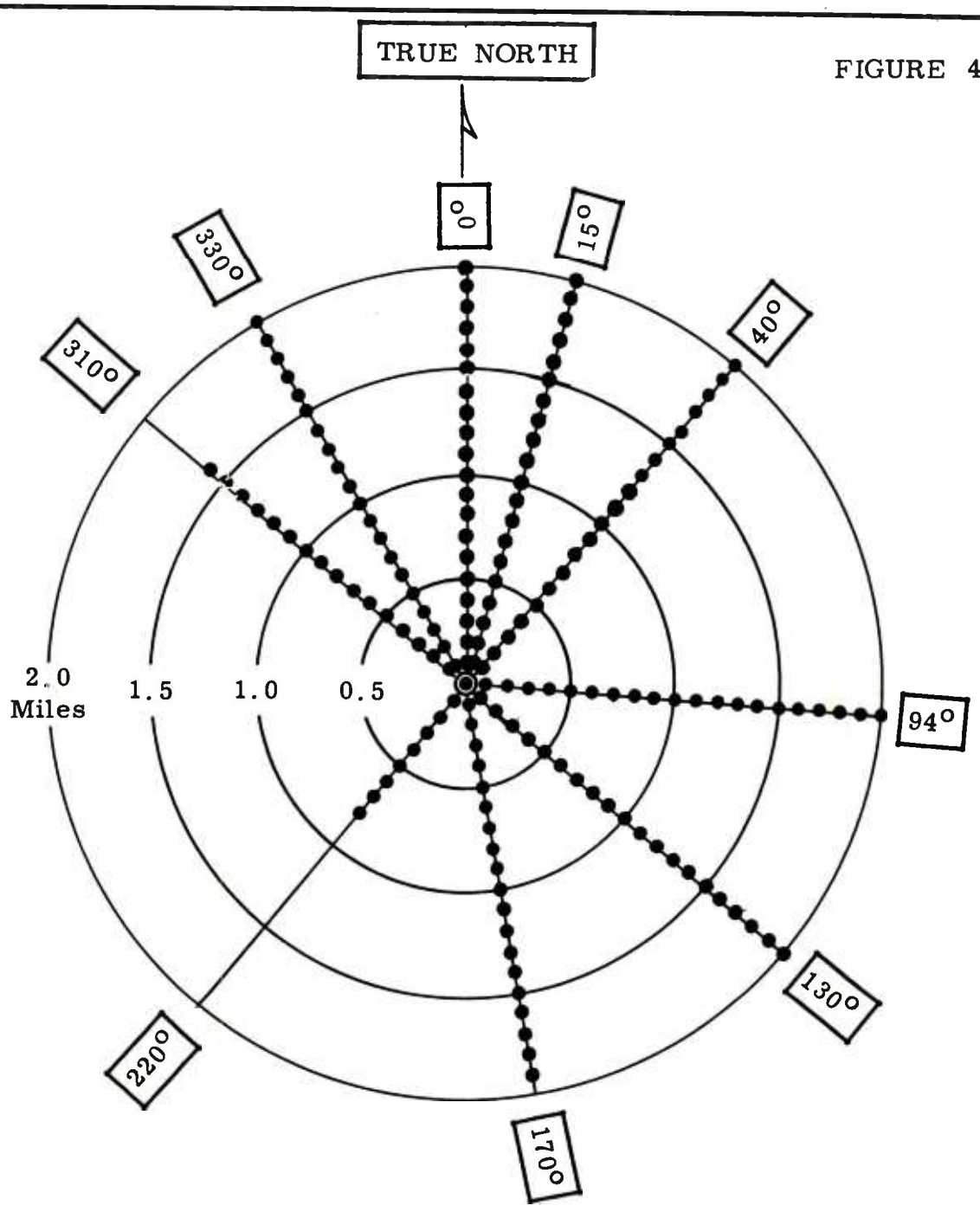
MEASURED DIRECTIONAL
HORIZONTAL PLANE RADIATION PATTERN
1050 KC DA-D 250 WATTS

081959-3

FIGURE 3

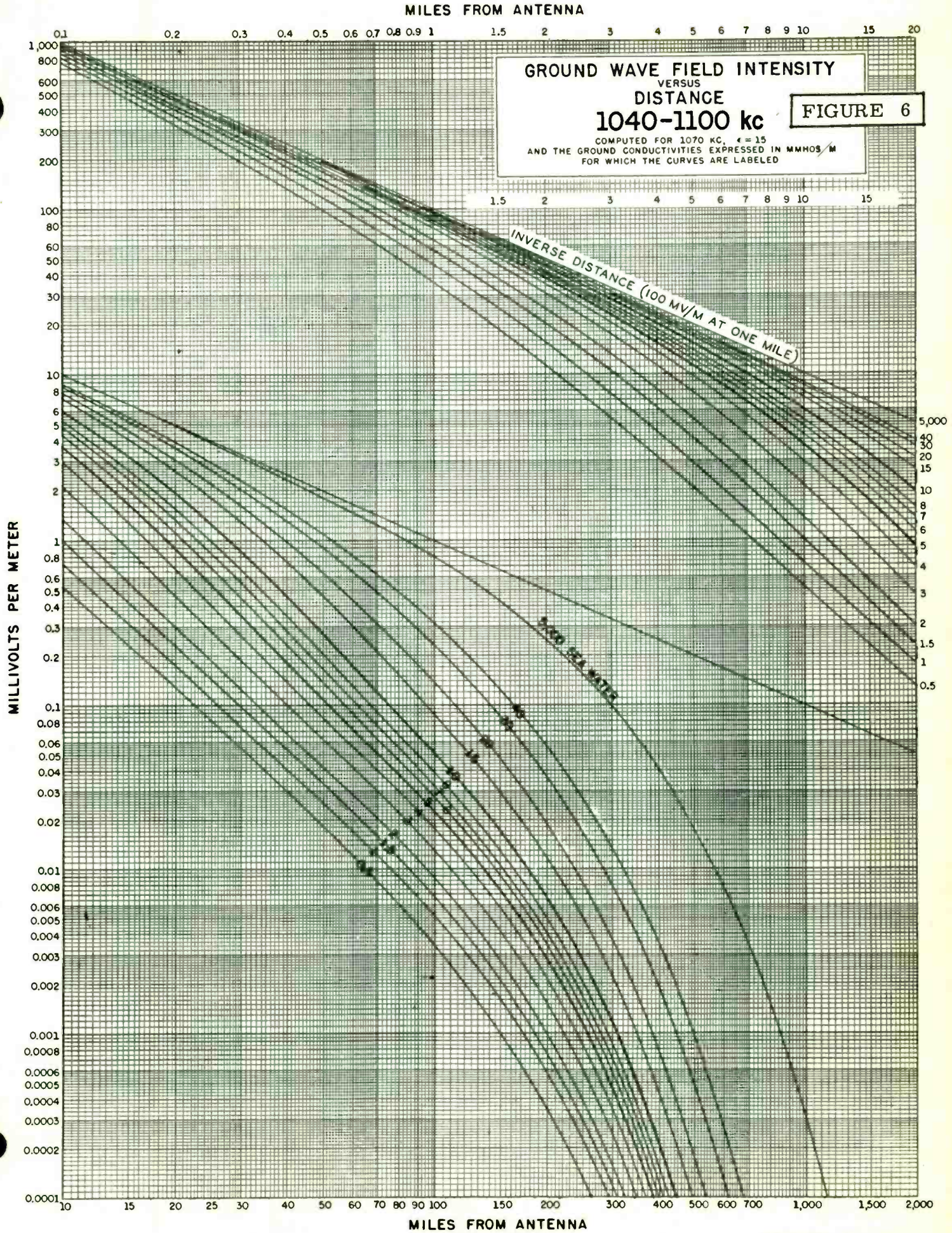
MERL SAXON
CONSULTING RADIO ENGINEER
LUFKIN, TEXAS

FIGURE 4



POINTS ARE NUMBERED FROM INSIDE THE HALF-MILE CIRCLE OUT TO THE TWO-MILE CIRCLE BEGINNING WITH NUMBER 1 FOR EACH RADIAL

MERL SAXON CONSULTING RADIO ENGINEER LUFKIN, TEXAS	RADIO STATION KLBG LIBERTY, TEXAS LOCATION OF CLOSE-IN SURVEY POINTS OF MEASUREMENT



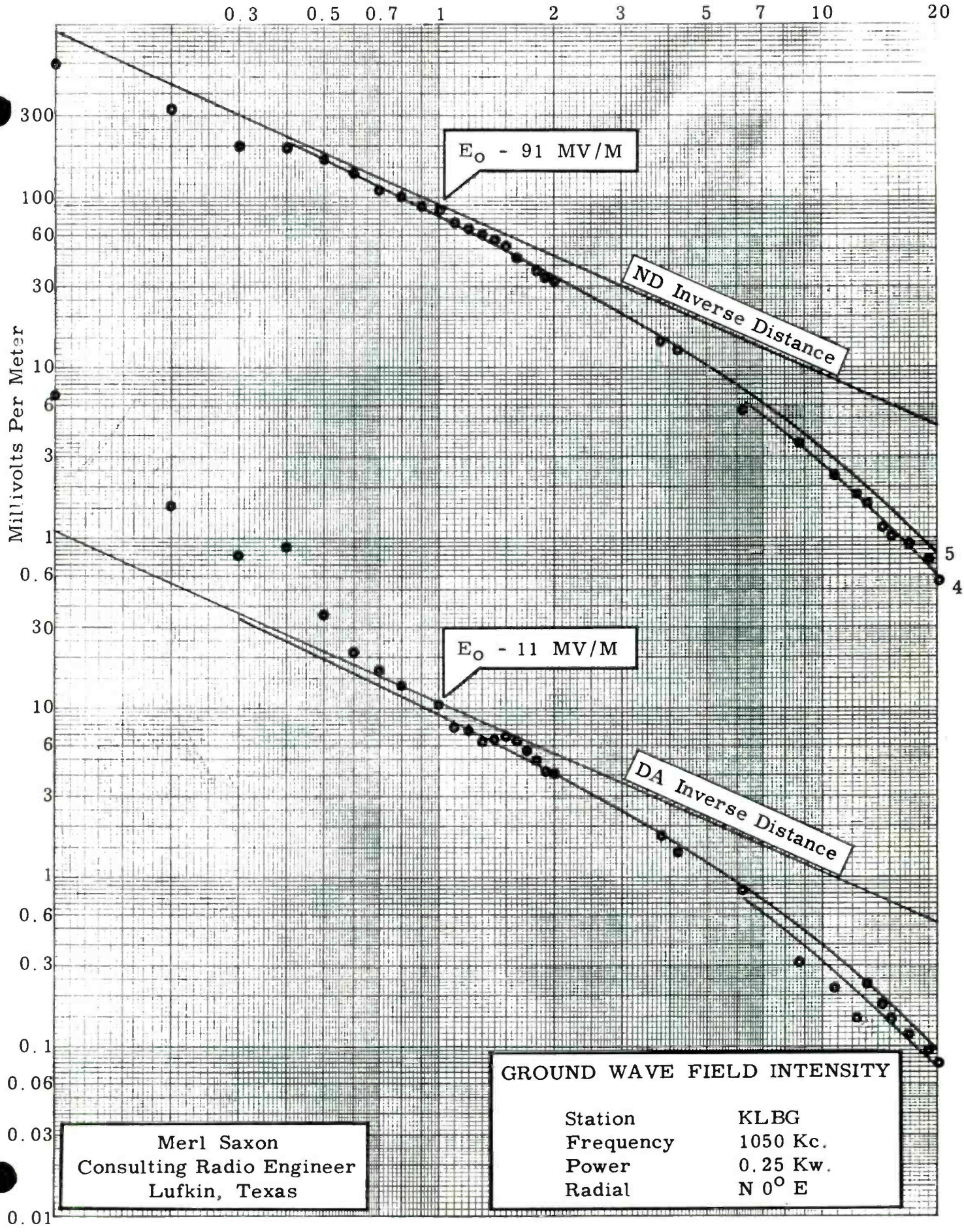
GRAPH 13

081959-6

369781 O—56 (Face p. 28) No. 13

FCC-1954

FIGURE 7A



LOGARITHMIC 359-127G
KEUFFEL & ESSER CO. MADE IN U.S.A.
7 X 2.2 CYCLES

Merl Saxon
Consulting Radio Engineer
Lufkin, Texas

GROUND WAVE FIELD INTENSITY

Station	KLBG
Frequency	1050 Kc.
Power	0.25 Kw.
Radial	N 0° E

FIGURE 7B

RADIO STATION KLBG
LIBERTY, TEXAS
0.25 Kw. 1050 Kc.

RADIAL N 0° E

		Non-DA		DA		
Point	Distance	Time	e(mv/m)	Time	e(mv/m)	Remarks
1	0.1	0837	590	1759	690	Trees
2	0.2	0841	325	1755	155	Clear
3	0.3	0845	198	1747	79	Clear
4	0.4	0850	195	1743	88.5	Clear
5	0.5	0856	165	1739	32.8	Clear
6	0.6	0903	139	1735	21.4	Trees
7	0.7	0908	110	1731	16.8	Timber
8	0.8	0913	100	1726	13.7	Trees
9	0.9	0918	88			Trees
10	1.0	0924	84	1720	10.5	Trees
11	1.1	0928	70.5	1713	7.7	Trees
12	1.2	0932	65	1708	7.4	Trees
13	1.3	0937	60	1659	6.3	Trees
14	1.4	0942	56	1651	6.5	Trees
15	1.5	0947	51.5	1645	6.8	Timber
16	1.6	1001	44	1634	6.4	Swamp
17	1.7			1625	5.6	Swamp
18	1.8	1021	36.9	1615	4.9	Pipe line 50'
19	1.9	1026	33.8	1611	4.2	Trees
20	2.0	1031	32.3	1606	4.1	Trees
21	3.8	1655	14.2	1040	1.75	Clear
22	4.2	1704	12.7	1046	1.4	Trees
23	6.2	1730	5.6	1051	0.835	Clear
24	8.7	1740	3.6	1058	0.314	Clear
25	10.8	1750	2.3	1039	0.22	Clear
26	12.3	1801	1.8	1044	0.148	Clear
27	13.1	1810	1.6	1049	0.232	Clear
28	14.4	1818	1.16	1056	0.178	Clear
29	15.1	1824	1.02	1101	0.146	Fences 50'
30	16.9	1835	0.92	1111	0.119	Clear
31	19.0	1845	0.74	1126	0.094	Line & fence 50'
32	20.4	1855	0.56	1121	0.079	Trees

ND - Points 1-20 taken July 26, 1959 and 21-32 taken July 20, 1959.
DA - Points 1-20 taken July 30, 1959, 21-23 taken August 1, 1959, 24-25 taken August 4, 1959 and 26-32 taken August 1, 1959.

FIGURE 8A

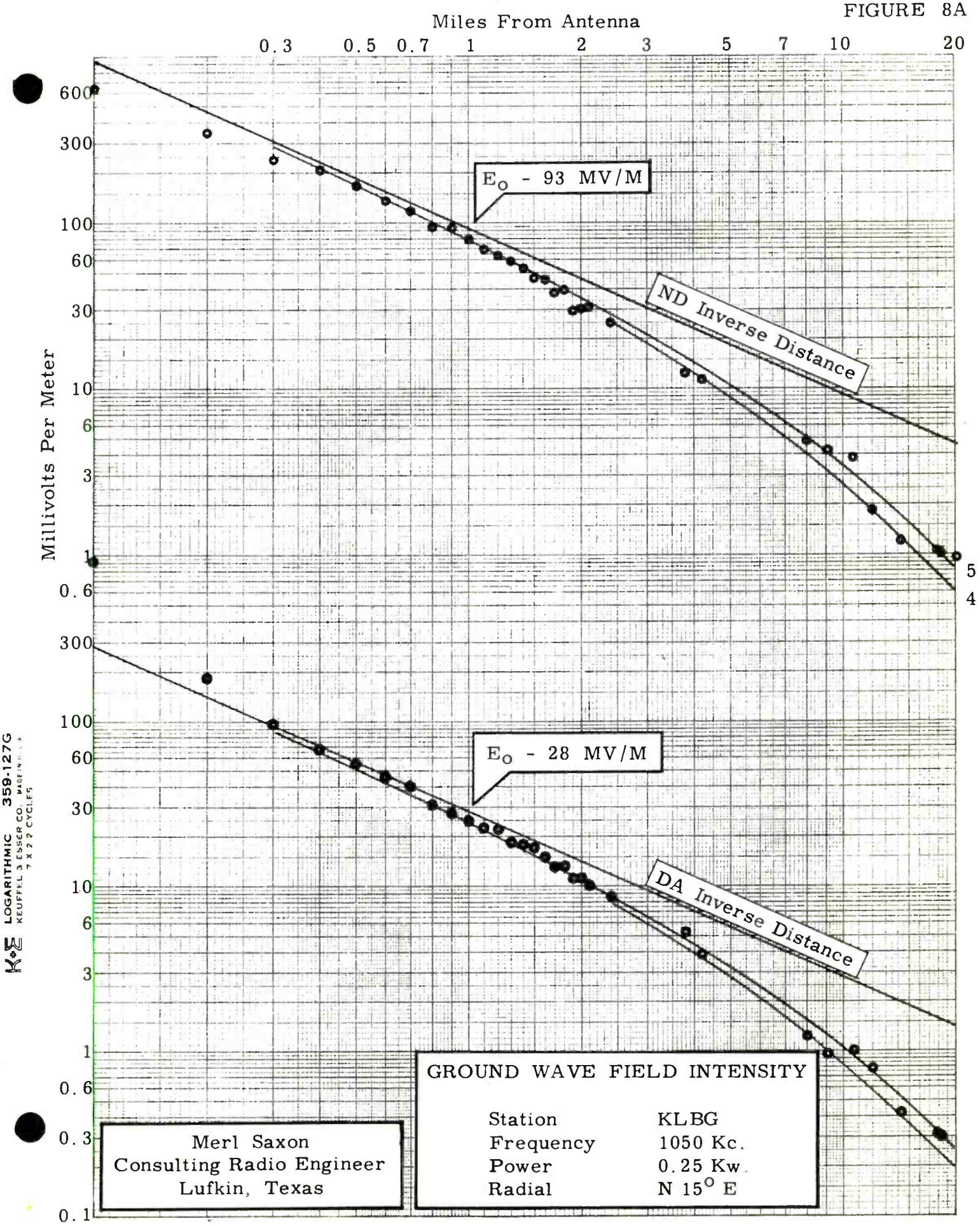

Miles From Antenna
0.3
0.5
0.7
1
2
3
5
7
10
20
Millivolts Per Meter
600
300
100
60
30
10
6
3
1
0.6
300
100
60
30
10
6
3
1
0.6
0.3
0.1
E_o - 93 MV/M
ND Inverse Distance
5
4
E_o - 28 MV/M
DA Inverse Distance
GROUND WAVE FIELD INTENSITY
Station KLBG
Frequency 1050 Kc.
Power 0.25 Kw.
Radial N 15° E
Merl Saxon
Consulting Radio Engineer
Lufkin, Texas
LOGARITHMIC 359-127G
KEUFFEL & ESSER CO.

FIGURE 8B

RADIO STATION KLBG
LIBERTY, TEXAS
0.25 Kw. 1050 Kc.

RADIAL N 15° E

		Non-DA		DA		
Point	Distance	Time	e(mv/m)	Time	e(mv/m)	Remarks
1	0.1	1444	640	0731	920	Fence 10'
2	0.2	1440	346	0735	182	Clear
3	0.3	1433	239	0742	96.5	Fence 15'
4	0.4	1426	207	0747	68	Fence 10'
5	0.5	1420	168	0755	55	Trees
6	0.6	1416	136	0800	46	Trees
7	0.7	1406	118	0814	40	Trees
8	0.8	1358	94	0821	31	Trees
9	0.9	1353	93	0825	27.5	Trees
10	1.0	1349	79	0830	24.8	Trees
11	1.1	1344	69	0834	22.5	Trees
12	1.2	1340	63	0838	22	Trees
13	1.3	1334	58.5	0842	18.2	Trees
14	1.4	1329	53	0845	18	Trees
15	1.5	1324	46.2	0849	17	Trees
16	1.6	1319	45.5	0852	15	Trees
17	1.7	1315	37.7	0856	13	Clear
18	1.8	1310	39.4	0859	13.2	Trees
19	1.9	1306	29.5	0903	11	Clear
20	2.0	1300	30.1	0907	11.1	Trees
21	2.1	1546	30.9	1306	10	Clear
22	2.4	1553	25	1313	8.6	Corn field
23	3.8	1601	12.3	1321	5.25	Clear
24	4.2	1607	11.3	1327	3.85	Trees
25	8.0	1633	4.8	1353	1.21	Clear
26	9.1	1646	4.2	1406	0.95	Clear
27	10.7	1652	3.8	1412	1.0	Clear
28	12.0	1711	1.83	1431	0.78	Clear
29	14.3	1726	1.2	1446	0.42	Trees
30	17.9	1735	1.05	1455	0.313	Clear
31	18.4	1745	1.01	1505	0.3	Trees
32	20.3	1805	0.96			Clear

ND - Points 1-20 taken August 5, 1959 and 21-32 taken July 21, 1959.
DA - Points 1-20 taken August 5, 1959 and 21-31 taken August 1, 1959.

FIGURE 9A

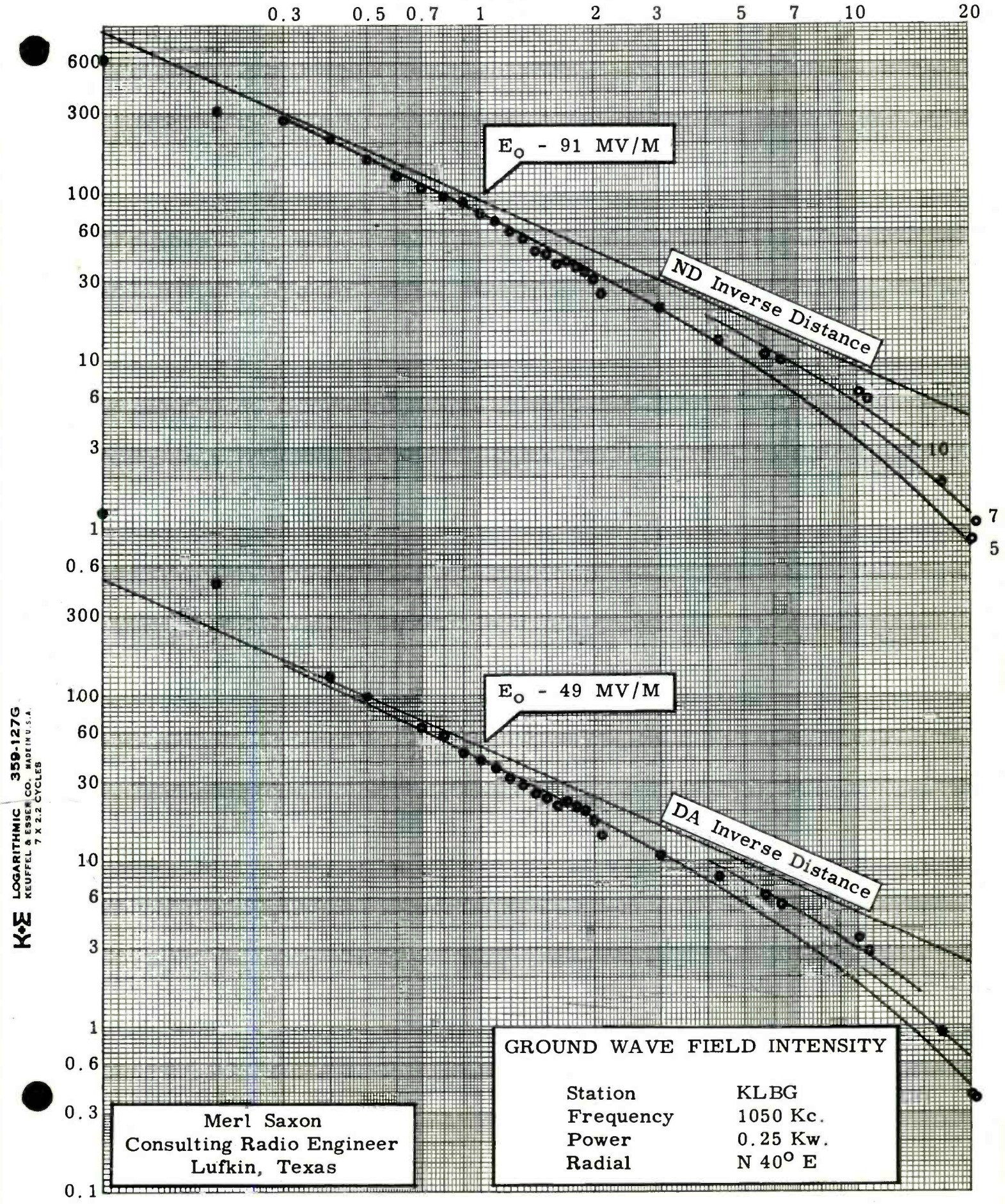

Miles From Antenna
0.3
0.5
0.7
1
2
3
5
7
10
20
600
300
100
60
30
10
6
3
1
0.6
300
100
60
30
10
6
3
1
0.6
0.3
0.1
E_o - 91 MV/M
ND Inverse Distance
10
7
5
E_o - 49 MV/M
DA Inverse Distance
GROUND WAVE FIELD INTENSITY
Station KLBG
Frequency 1050 Kc.
Power 0.25 Kw.
Radial N 40° E
Merl Saxon
Consulting Radio Engineer
Lufkin, Texas
K&E LOGARITHMIC 359-127G
KEUFFEL & ESSER CO. MADE IN U.S.A.
7 X 2.2 CYCLES

FIGURE 9B

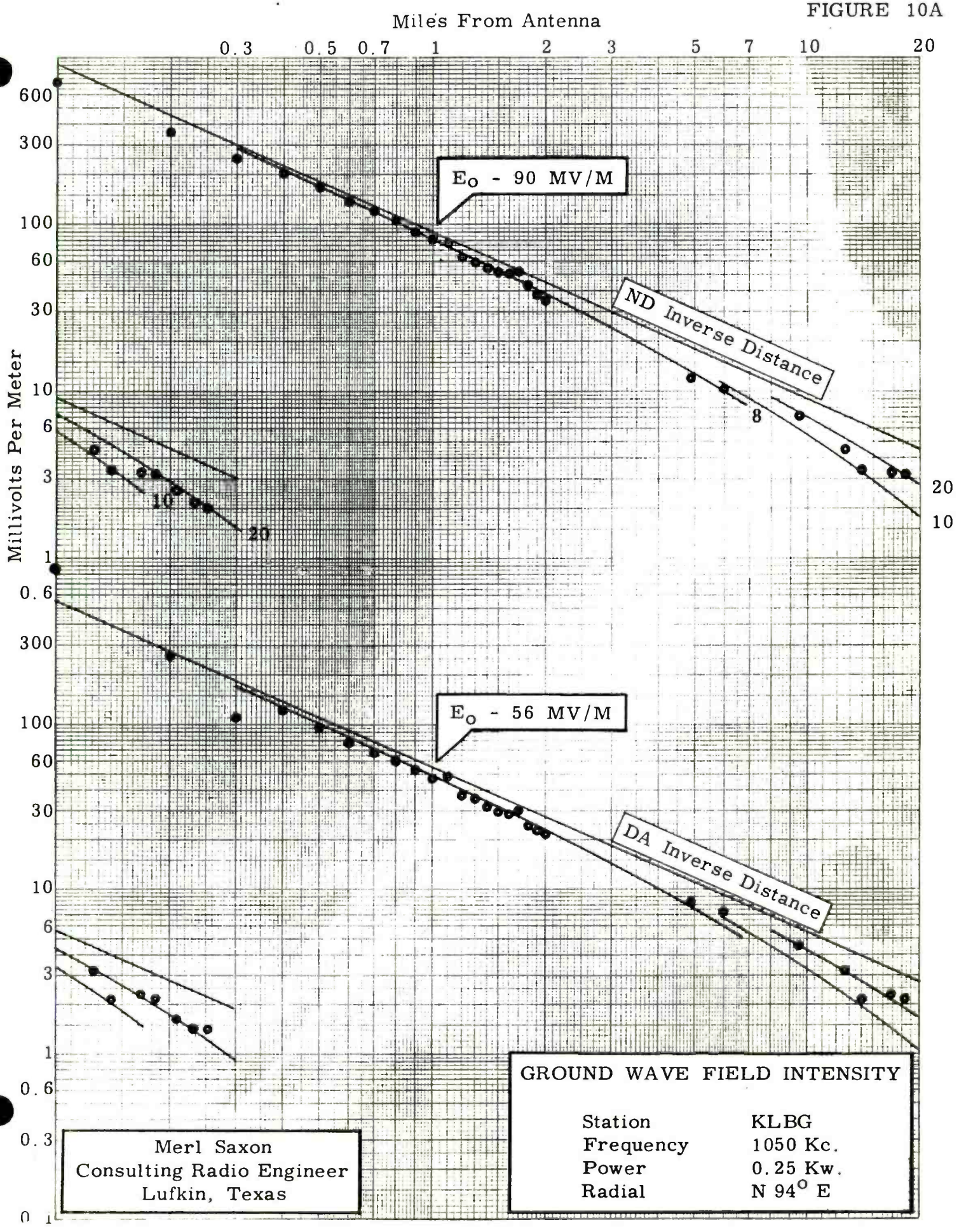
RADIO STATION KLBG
LIBERTY, TEXAS
0.25 Kw. 1050 Kc.

RADIAL N 40° E

		Non-DA		DA		
Point	Distance	Time	e(mv/m)	Time	e(mv/m)	Remarks
1	0.1	1426	630	1541	1220	Clear
2	0.2	1422	310	1548	475	Line 50'
3	0.3	1419	271			Marsh
4	0.4	1338	210	1624	130	Heavy Timber
5	0.5	1333	158	1628	99	Heavy Timber
6	0.6	1328	126			Heavy Timber
7	0.7	1325	107	1633	64	Heavy Timber
8	0.8	1320	96	1643	57	Heavy Timber
9	0.9	1315	88	1650	45	Heavy Timber
10	1.0	1300	75	1659	40.5	Heavy Timber
11	1.1	1255	68	1710	36.5	Heavy Timber
12	1.2	1250	59	1716	31.5	Heavy Timber
13	1.3	1247	53.5	1722	28.8	Heavy Timber
14	1.4	1244	45	1729	25.5	Heavy Timber
15	1.5	1241	43	1734	23.8	Trees
16	1.6	1238	37.5	1738	21.5	Clear
17	1.7	1230	39	1742	22.8	Clear
18	1.8	1225	36	1746	21	Heavy Timber
19	1.9	1220	33.8	1750	20	Heavy Timber
20	2.0	1215	30.2	1755	17.5	Heavy Timber
21	2.1	1232	25	1155	14.3	Clear
22	3.0	1240	20.7	1106	10.9	Clear
23	4.3	1251	13.1	1113	8	Clear
24	5.7	1316	10.8	1123	6.1	Clear
25	6.3	1322	10	1126	5.4	Clear
26	10.1	1336	6.3	1520	3.43	Clear
27	10.7	1348	5.75	1539	2.84	Clear
28	16.8	1101	1.81	1548	0.91	Clear
29	20.5	1026	0.83	1600	0.38	Clear
30	21.0	1036	1.05	1612	0.36	Clear

ND - Points 1-20 taken July 19, 1959, 21-27 taken July 23, 1959 and 28-30 taken July 27, 1959.
DA - Points 1-25 taken July 31, 1959 and 26-30 taken August 1, 1959.

FIGURE 10A



LOGARITHMIC 359-127G
KEUFFEL & ESSER CO. MADE IN U.S.A.
7 X 2.2 CYCLES

Merl Saxon
Consulting Radio Engineer
Lufkin, Texas

GROUND WAVE FIELD INTENSITY

Station	KLBG
Frequency	1050 Kc.
Power	0.25 Kw.
Radial	N 94° E

FIGURE 10B

RADIO STATION KLBG
LIBERTY, TEXAS
0.25 Kw. 1050 Kc.

RADIAL N 94° E

		Non-DA		DA		
Point	Distance	Time	e(mv/m)	Time	e(mv/m)	Remarks
1	0.1	1625	710	1318	870	Clear
2	0.2	1620	359	1323	260	Clear
3	0.3	1616	250	1326	110	Lines 30'
4	0.4	1612	202	1332	122	Marsh
5	0.5	1608	166	1338	96	Marsh
6	0.6	1605	138	1343	77.5	Marsh
7	0.7	1602	120	1347	68	Timber
8	0.8	1559	105	1352	60	Heavy Timber
9	0.9	1555	90	1356	53	Heavy Timber
10	1.0	1551	81	1401	47	Timber
11	1.1	1547	77	1406	48.5	Timber
12	1.2	1543	63	1411	37	Timber
13	1.3	1540	59	1414	35.5	Trees
14	1.4	1535	54.5	1418	31.5	Heavy Timber
15	1.5	1532	51.5	1422	29.5	Heavy Timber
16	1.6	1528	50.5	1425	28.5	Timber
17	1.7	1524	52	1430	30	Timber
18	1.8	1521	43.2	1433	24.2	Trees
19	1.9	1515	37.5	1438	22.7	Clear
20	2.0	1510	35	1442	21.6	Clear
21	4.9	1417	12	0832	8.4	Clear
22	6.0	1430	10.2	0839	7.3	Clear
23	9.5	1450	7.1	1233	4.55	Clear
24	12.6	1512	4.5	1251	3.2	Clear
25	14.0	1525	3.4	1300	2.15	Clear
26	16.8	1552	3.28	1315	2.3	Fences 30'
27	18.3	1615	3.2	0954	2.18	Clear
28	20.9	1154	2.58	1006	1.63	Clear
29	23.2	1207	2.18	1014	1.43	Fences 30'
30	25.2	1220	2.0	1024	1.41	Fences 50'

ND - Points 1-20 taken August 14, 1959, 21-27 taken July 23, 1959 and 28-30 taken July 24, 1959.

DA - Points 1-20 taken August 14, 1959, 21-22 taken August 2, 1959, 23-26 taken August 4, 1959 and 27-30 taken August 2, 1959.

FIGURE 11A

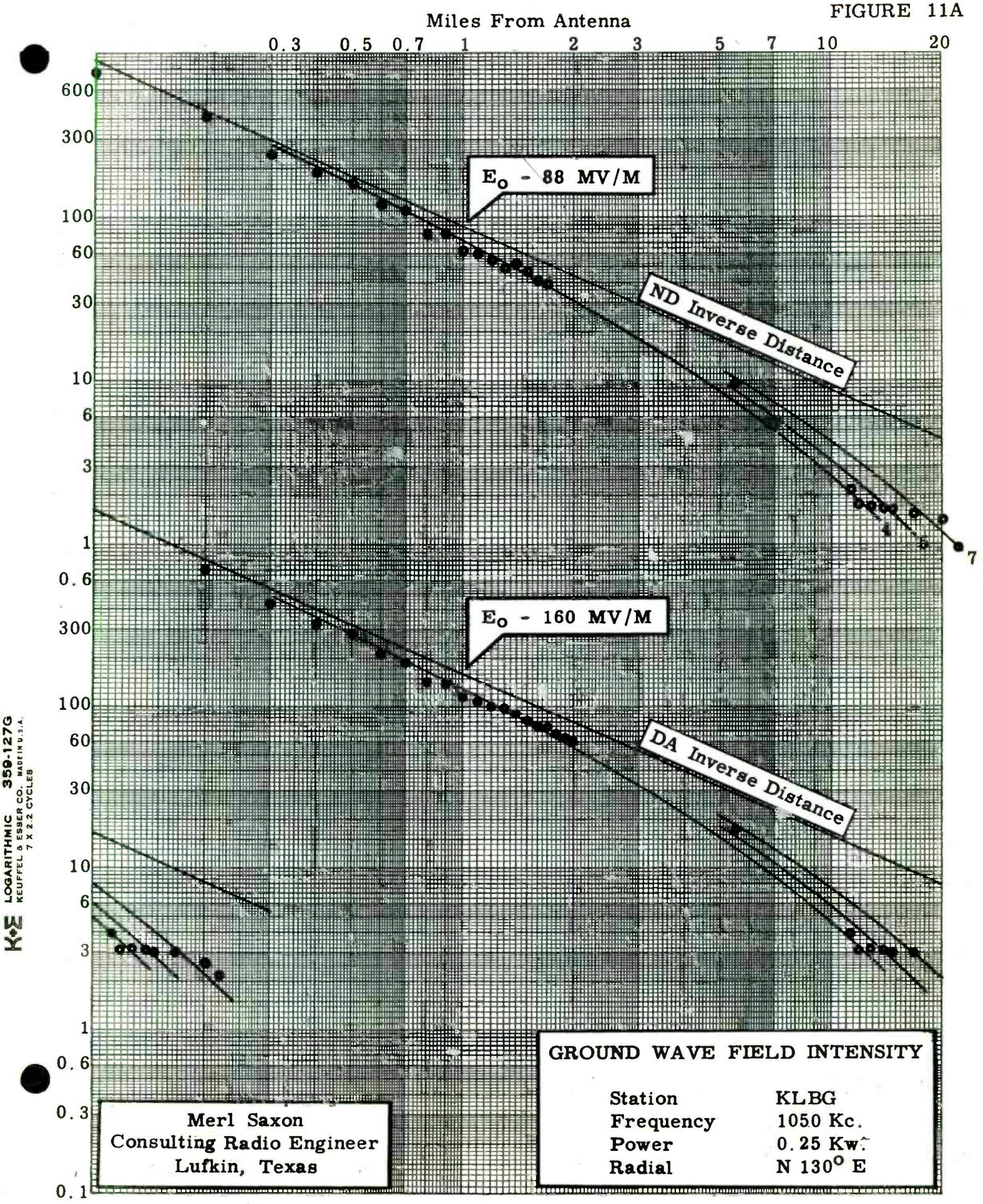

Miles From Antenna
0.3
0.5
0.7
1
2
3
5
7
10
20
600
300
100
60
30
10
6
3
1
0.6
300
100
60
30
10
6
3
1
0.6
0.3
0.1
E_o - 88 MV/M
ND Inverse Distance
E_o - 160 MV/M
DA Inverse Distance
7
LOGARITHMIC 359-127G
KEUFFEL & ESSER CO. MADE IN U.S.A.
7 X 2.2 CYCLES
K+E
GROUND WAVE FIELD INTENSITY
Station KLBG
Frequency 1050 Kc.
Power 0.25 Kw.
Radial N 130° E
Merl Saxon
Consulting Radio Engineer
Lufkin, Texas

FIGURE 11B

RADIO STATION KLBG
LIBERTY, TEXAS
0.25 Kw. 1050 Kc.

RADIAL N 130° E

Point	Distance	Non-DA Time	Non-DA e(mv/m)	DA Time	DA e(mv/m)	Remarks
1	0.1	1300	760			Timber
2	0.2	1304	410	1621	700	Clear
3	0.3	1309	242	1624	430	House 50'
4	0.4	1315	190	1631	325	Trees
5	0.5	1323	161	1637	282	Corn Field
6	0.6	1335	120	1642	211	Clear
7	0.7	1340	110	1646	188	Clear
8	0.8	1345	79	1649	142	Clear
9	0.9	1350	80	1652	139	Clear
10	1.0	1400	62.5	1703	115	Clear
11	1.1	1407	60	1708	107	Fence 100'
12	1.2	1415	55	1713	100	Fence 60'
13	1.3	1420	49	1717	98	Clear
14	1.4	1425	52	1725	90	Trees
15	1.5	1430	46.5	1733	81	Timber
16	1.6	1435	41	1737	75	Clear
17	1.7	1455	39	1741	74	Clear
18	1.8			1744	67	Clear
19	1.9			1748	63	Clear
20	2.0			1751	60	Clear
21	5.5	1246	9.6	1236	17.2	Clear
22	11.3	1315	2.15	1210	3.95	Fence 70'
23	11.9	1324	1.78	1205	3.1	Trees
24	12.8	1333	1.7	1158	3.14	Clear
25	13.9	1340	1.65	1154	3.1	Clear
26	14.7	1349	1.63	1149	3.0	Fence 70'
27	16.8	1357	1.53	1142	3.0	Fences 50'
28	20.2	1433	1.4	1122	2.58	Fences 60'
29	22.0	1421	0.96	1113	2.18	Fences 60'

ND - Points 1-17 taken July 20, 1959, 21-27 taken July 26, 1959 and 28-29 taken July 24, 1959.
DA - Points 1-20 taken August 4, 1959 and 21-29 taken August 2, 1959.

FIGURE 12A

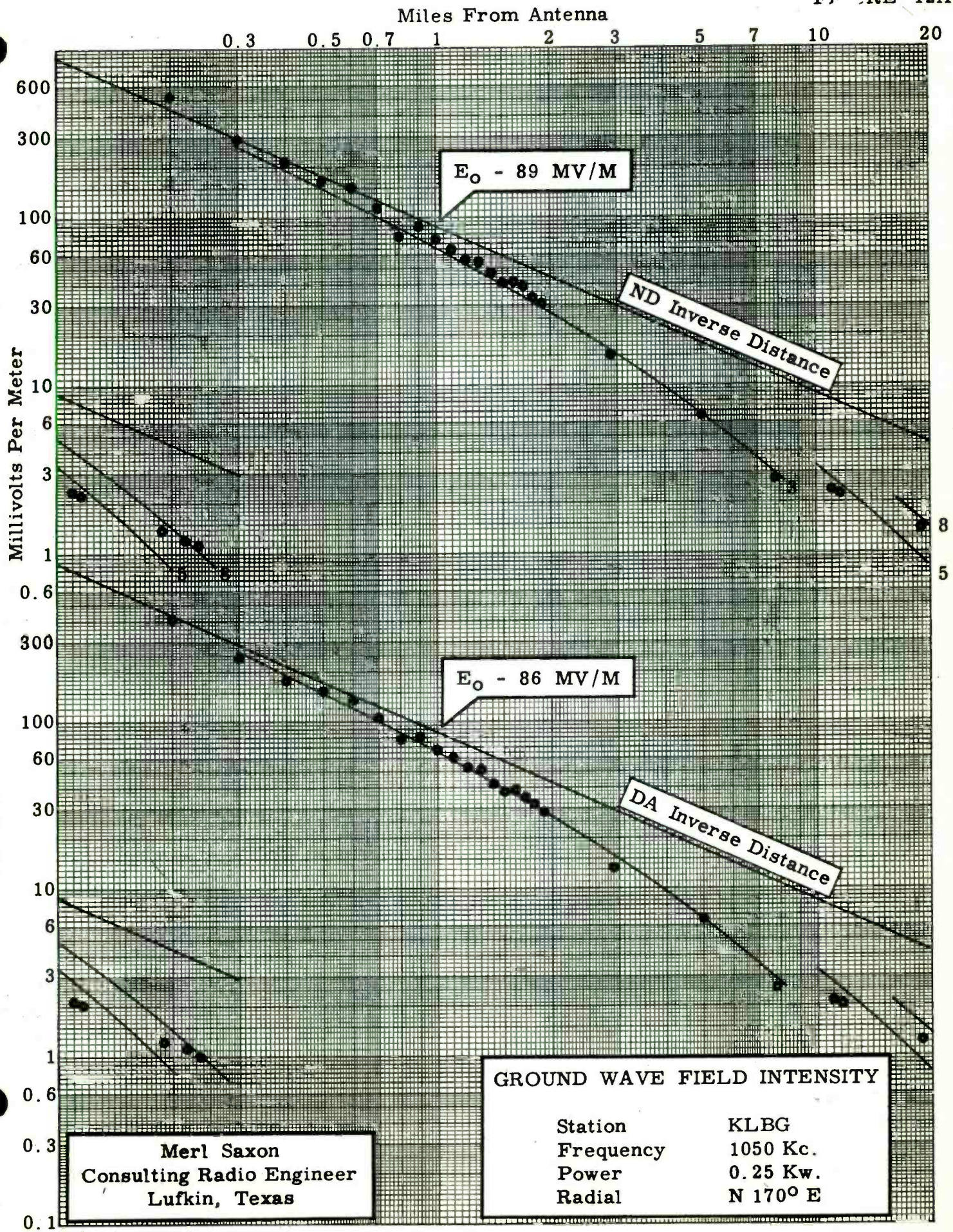

Miles From Antenna
0.3
0.5
0.7
1
2
3
5
7
10
20
Millivolts Per Meter
600
300
100
60
30
10
6
3
1
0.6
300
100
60
30
10
6
3
1
0.6
0.3
0.1
E_o - 89 MV/M
ND Inverse Distance
E_o - 86 MV/M
DA Inverse Distance
8
5
LOGARITHMIC 359-127G
KEUFFEL & ESSER CO. MADE IN U.S.A.
7 X 2.2 CYCLES
K+E
Merl Saxon
Consulting Radio Engineer
Lufkin, Texas
GROUND WAVE FIELD INTENSITY
Station KLBG
Frequency 1050 Kc.
Power 0.25 Kw.
Radial N 170° E

FIGURE 12B

RADIO STATION KLBG
LIBERTY, TEXAS
0.25 Kw. 1050 Kc.

RADIAL N 170° E

		Non-DA		DA		
Point	Distance	Time	e(mv/m)	Time	e(mv/m)	Remarks
1	0.1	0759	1400	1141	1120	Trees
2	0.2	0803	521	1136	412	Trees
3	0.3	0807	290	1130	240	Clear
4	0.4	0811	213	1126	179	Clear
5	0.5	0819	162	1121	152	Marsh
6	0.6	0824	150	1116	135	Clear
7	0.7	0828	112	1112	104	Trees
8	0.8	0832	76	1107	78	Fences 60'
9	0.9	0836	88	1102	80	Lines 125'
10	1.0	0839	73.5	1057	67	Timber
11	1.1	0845	64	1050	60	Timber
12	1.2	0849	56	1045	52.5	Trees
13	1.3	0853	54	1038	51	Marsh
14	1.4	0858	46.5	1034	42	Fence 30'
15	1.5	0907	40.5	1028	37.6	Marsh
16	1.6	0913	41	1022	38.3	Fence 25'
17	1.7	0917	39	1018	34.9	Heavy Timber
18	1.8	0921	33	1014	31.8	Timber
19	1.9	0925	30.5	1009	28.6	Pipeline 125'
20	2.0					Flooded
21	2.9	1455	15	1252	13.2	Fences 50'
22	5.0	1512	6.6	1313	6.55	Clear
23	7.8	1528	2.75	1323	2.55	Clear
24	11.0	1542	2.36	1335	2.13	Clear
25	11.6	1552	2.21	1349	2.02	Clear
26	18.9	1615	1.38	1408	1.22	Clear
27	21.7	1623	1.2	1419	1.11	Clear
28	23.5	1628	1.12	1423	1.0	Clear

ND - Points 1-20 taken August 14, 1959 and 21-28 taken July 27, 1959.
DA - Points 1-20 taken August 14, 1959 and 21-28 taken August 2, 1959.

FIGURE 13A

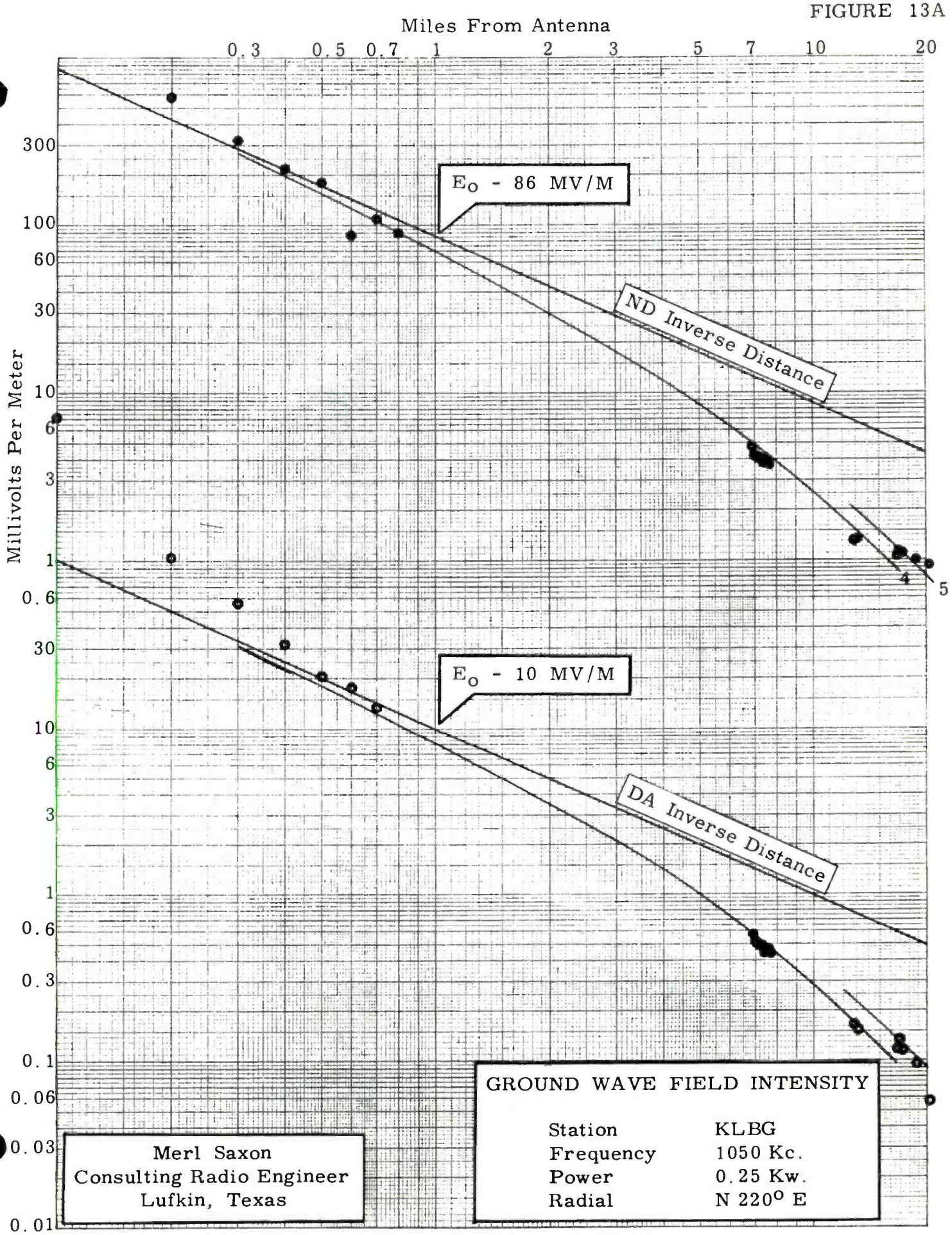

Miles From Antenna
0.3
0.5
0.7
1
2
3
5
7
10
20
Millivolts Per Meter
300
100
60
30
10
6
3
1
0.6
30
10
6
3
1
0.6
0.3
0.1
0.06
0.03
0.01
E_o - 86 MV/M
ND Inverse Distance
4
5
E_o - 10 MV/M
DA Inverse Distance
LOGARITHMIC 359-127G
KEUFFEL & ESSER CO. MADE IN U.S.A.
7 X 2 2 CYCLES
Merl Saxon
Consulting Radio Engineer
Lufkin, Texas
GROUND WAVE FIELD INTENSITY
Station KLBG
Frequency 1050 Kc.
Power 0.25 Kw.
Radial N 220° E

FIGURE 13B

RADIO STATION KLBG
LIBERTY, TEXAS
0.25 Kw. 1050 Kc.

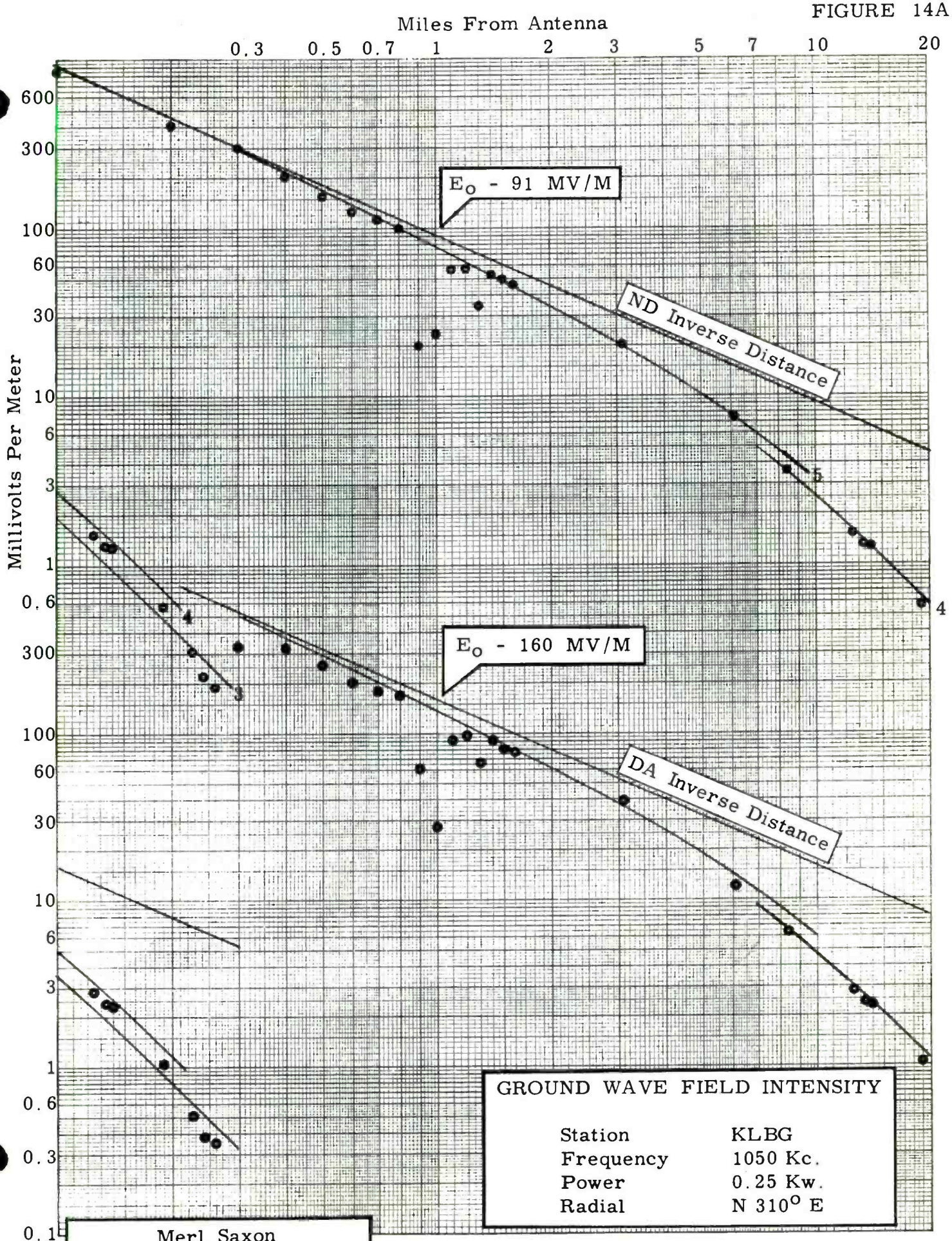
RADIAL N 220° E

		Non-DA		DA		
Point	Distance	Time	e(mv/m)	Time	e(mv/m)	Remarks
1	0.1	1558	2000	1434	710	Clear
2	0.2	1601	580	1442	104	Timber
3	0.3	1605	320	1448	56	Timber
4	0.4	1610	218	1454	32	Timber
5	0.5	1618	180	1459	20.5	Clear
6	0.6	1622	87	1503	17.9	Power line 40'
7	0.7	1645	109	1508	13.6	Marsh
8	0.8	1650	90	1515		Fence 50'
	(Points 9 through 20 fell in a flooded river bottom and points 21 through 29 are substituted instead since they were surveyed also.)					
21	6.9	1557	4.75	0935	0.57	Timber
22	7.0	1601	4.2	0930	0.52	Trees
23	7.1	1608	4.16	0944	0.5	Trees
24	7.2	1612	4.06	0947	0.49	Trees
25	7.3	1617	3.98	0950	0.49	Timber
26	7.4	1624	3.77	0955	0.44	Timber
27	7.5	1630	4.01	1000	0.46	Timber
28	7.6	1635	3.85	1005	0.46	Timber
29	7.7	1639	3.7	1010	0.44	Fence 20'
30	12.8	1603	1.3	1700	0.164	Clear
31	13.1	1558	1.32	1608	0.152	Oilfield
32	16.7	1547	1.05	1615	0.118	Highway 20'
33	16.9	1528	1.12	1620	0.132	Clear
34	17.3	1531	1.1	1624	0.115	Clear
35	18.8	1520	1.0	1632	0.095	Clear
36	20.6	1453	0.93	1644	0.057	Clear

ND - Points 1-8 taken July 18, 1959, 21-29 taken August 5, 1959 and 30-36 taken July 26, 1959.

DA - Points 1-7 taken July 31, 1959, 21-29 taken July 31, 1959 and 30-36 taken August 2, 1959.

FIGURE 14A



GROUND WAVE FIELD INTENSITY

Station	KLBG
Frequency	1050 Kc.
Power	0.25 Kw.
Radial	N 310° E

Merl Saxon
Consulting Radio Engineer
Lufkin, Texas

K&E LOGARITHMIC 359-127G
KEUFFEL & ESSER CO. MADE IN U.S.A.
3 X 2 CYCLES

FIGURE 14B

RADIO STATION KLBG
LIBERTY, TEXAS
0.25 Kw. 1050 Kc.

RADIAL N 310° E

		Non-DA		DA		
Point	Distance	Time	e(mv/m)	Time	e(mv/m)	Remarks
1	0.1	1713	850	1457	1220	Trees
2	0.2	1716	405	1501	655	Clear
3	0.3	1720	300	1510	334	Swamp
4	0.4	1730	202	1514	330	Timber
5	0.5	1733	155	1519	258	Timber
6	0.6	1737	126	1522	201	Timber
7	0.7	1742	113	1526	180	Clear
8	0.8	1746	100	1531	170	Clear
9	0.9	1750	20	1535	61	Under line
10	1.0	1800	23.5	1539	27.5	Under line
11	1.1	1804	57	1544	91	Clear
12	1.2	1808	57.5	1548	98	Clear
13	1.3	1812	34.5	1552	66	Line & fence 20'
14	1.4	1815	53	1556	91	Trees
15	1.5	1818	50	1601	80	Clear
16	1.6	1823	46	1610	77	Trees
17						
18	(Points 17 through 20 fell in a submerged swamp)					
19						
20						
21	3.1	1005	20.9	0942	39.3	Oilfield
22	6.1	1015	7.5	1727	12	Clear
23	8.4	1106	3.6	1744	6.4	Clear
24	12.5	1121	1.52	1757	2.83	Clear
25	13.4	1128	1.3	1805	2.4	Clear
26	14.0	1134	1.28	1811	2.3	Clear
27	19.0	1152	0.57	1613	1.04	Trees
28	22.6	1247	0.31	1644	0.51	Trees
29	24.2	1316	0.22	1707	0.38	Trees
30	26.0	1322	0.19	1713	0.35	Fence & line 100'

ND - Points 1-16 taken July 19, 1959 and 21-30 taken July 21, 1959.
DA - Points 1-16 taken August 4, 1959, 21 taken August 4, 1959, 22-26 taken August 2, 1959 and 27-30 taken August 3, 1959.

FIGURE 15A

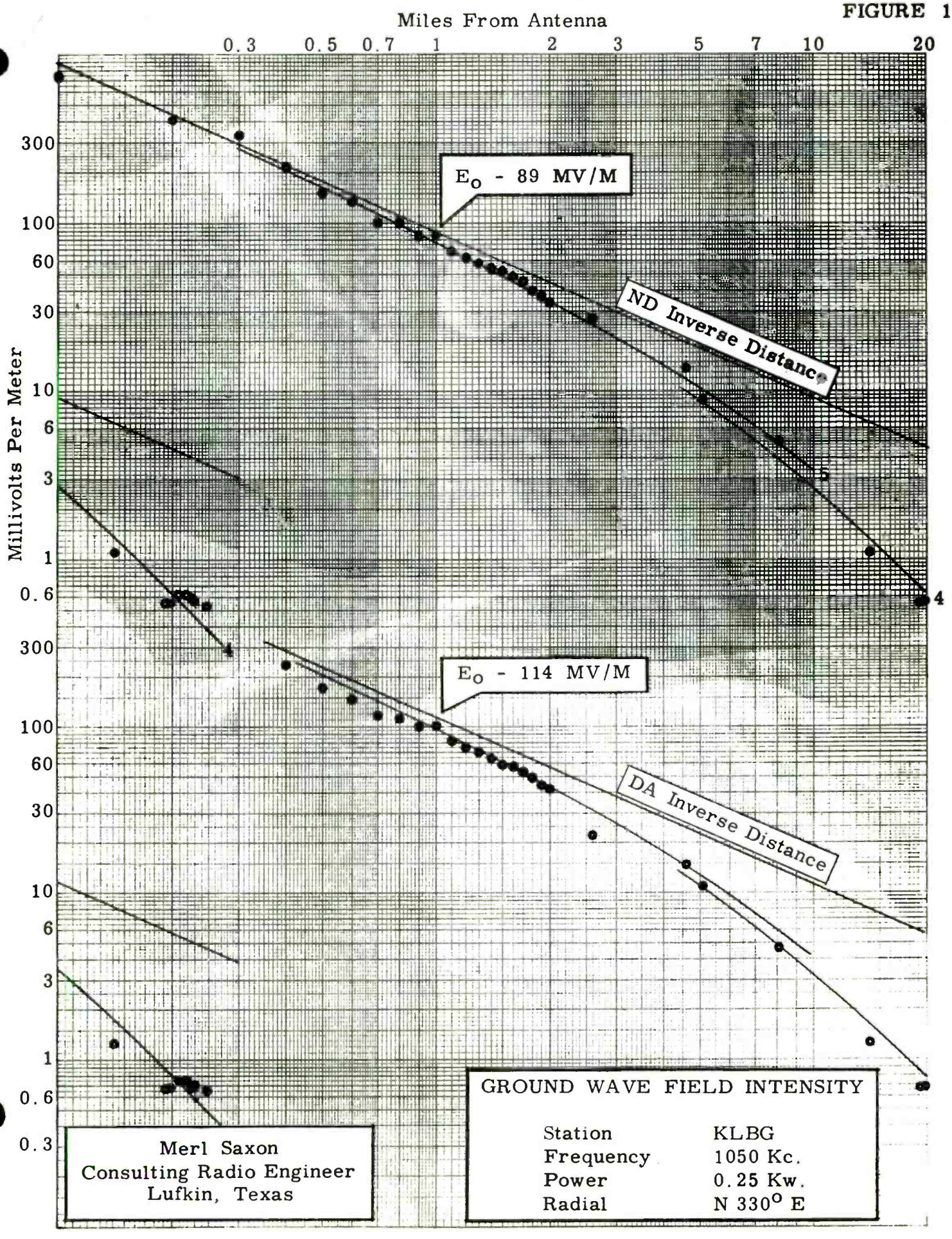

Miles From Antenna
0.3
0.5
0.7
1
2
3
5
7
10
20
Millivolts Per Meter
300
100
60
30
10
6
3
1
0.6
0.3
E_o - 89 MV/M
ND Inverse Distance
5
4
E_o - 114 MV/M
DA Inverse Distance
LOGARITHMIC 359-127G
KEUFFEL & ESSER CO. MADE IN U.S.A.
7 X 2.2 CYCLES
Merl Saxon
Consulting Radio Engineer
Lufkin, Texas
GROUND WAVE FIELD INTENSITY
Station KLBG
Frequency 1050 Kc.
Power 0.25 Kw.
Radial N 330° E

FIGURE 15B

RADIO STATION KLBG
LIBERTY, TEXAS
0.25 Kw. 1050 Kc.

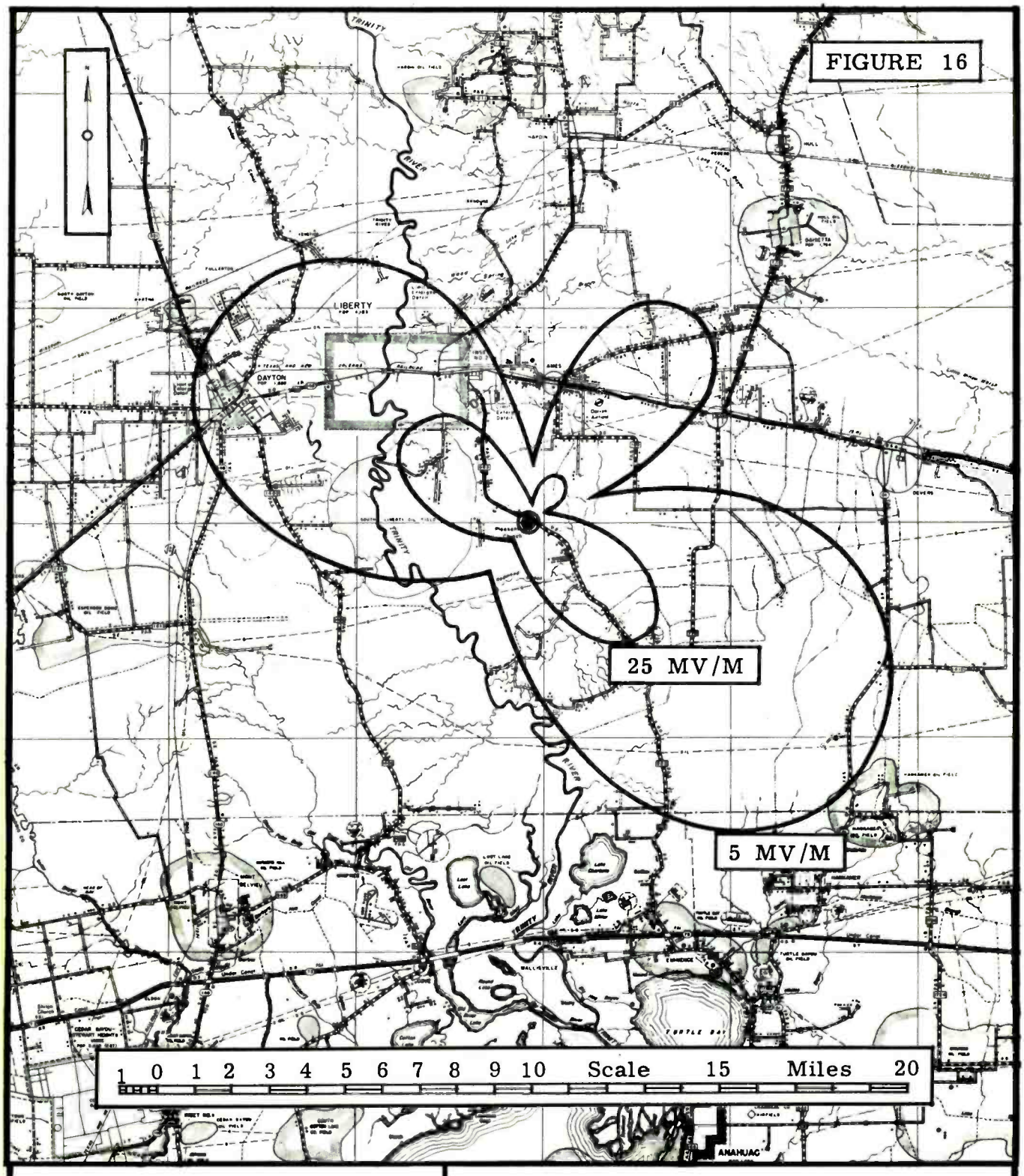
RADIAL N 330° E

Point	Distance	Non-DA Time	Non-DA e(mv/m)	DA Time	DA e(mv/m)	Remarks
1	0.1	1828	730	1436	980	Trees
2	0.2	1825	404	1439	502	Clear
3	0.3	1821	331	1442	345	Clear
4	0.4	1817	212	1446	237	Line 15'
5	0.5	1812	150	1451	171	Clear
6	0.6	1808	133	1455	148	Brush
7	0.7	1804	100	1459	118	Timber
8	0.8	1800	100	1502	112	Trees
9	0.9	1757	84	1506	100	Marsh
10	1.0	1754	85	1509	101	Fence 100'
11	1.1	1749	68	1515	82	Trees
12	1.2	1746	62	1518	75	Clear
13	1.3	1743	58	1521	70	Trees
14	1.4	1739	54	1524	64.5	Trees
15	1.5	1736	52	1527	58.5	Fence 25'
16	1.6	1732	48	1530	57	Trees
17	1.7	1729	45	1533	53.5	Clear
18	1.8	1726	39.9	1536	49	Trees
19	1.9	1722	36.6	1539	44	Trees
20	2.0	1718	34	1542	42	Trees
21	2.6	0913	27.1	1018	22.1	Clear
22	4.6	0857	13.8	1005	14.7	Lines 60'
23	5.1	0851	8.9	0958	10.9	Lines 50'
24	8.1	1900	4.99	1148	4.65	Fences 100'
25	14.1	1845	1.1	1132	1.26	Clear
26	19.2	1828	0.55	1814	0.67	Clear
27	19.8	1824	0.56	1809	0.68	Clear
28	20.9	1818	0.62	1802	0.75	Fences 30'
29	21.8	1809	0.62	1755	0.75	Clear
30	22.5	1805	0.59	1750	0.68	Clear
31	22.8	1801	0.565	1745	0.7	Lines 50'
32	24.7	1755	0.53	1737	0.65	Clear

ND - Points 1-20 taken August 13, 1959, 21-23 taken July 27, 1959 and 24-32 taken July 26, 1959

DA - Points 1-20 taken August 13, 1959, 21-23 taken August 5, 1959, 24-25 taken August 4, 1959 and 26-32 taken August 3, 1959.

FIGURE 16



MERL SAXON
CONSULTING RADIO ENGINEER
LUFKIN, TEXAS

MEASURED FIELD INTENSITY CONTOURS

RADIO STATION KLBG
LIBERTY, TEXAS
1050 KC DA-D 250 WATTS

081959-16

RADIO STATION KLBG
LIBERTY, TEXAS
1050 KC DA-D 250 WATTS

TABULATION OF UNATTENUATED FIELDS IN THE DIRECTION OF EACH RADIAL

Radial & Azimuth	Measured Non-Directional mv/m	Measured Directional mv/m	Computed Directional mv/m
N 0° E	91	11	13.07
N 15° E	93	28	27.00
N 40° E	91	49	53.92
N 94° E	90	56	57.00
N 130° E	88	160	153.95
N 170° E	89	86	87.70
N 220° E	86	10	10.08
N 310° E	91	160	153.95
N 330° E	89	114	113.13

METER INDICATIONS FOR AUTHORIZED OPERATION

Meter Position	Make	Type	Scale	Normal Operation DA	Normal Operation ND
Final Plate Voltage	W'house	RX-25	0-2.5 Kv.	1.23	1.23
Final Plate Current	W'house	RX-25	0-500 Ma.	335	322
Common Point	Weston	425	0-5 Amp.	2.36	--
SW Tower No. 1	Weston	425	0-5 Amp.	2.53	2.99
NE Tower No. 2	Weston	425	0-5 Amp.	2.22	--
Sampling Loop No. 1	No Name	--	0-150%	87.8	--
Sampling Loop No. 2	No Name	--	0-150%	75.0	--
Common Point Tank	Weston	425	0-8 Amp.	3.15	--
Phase Monitor	Nems-Clarke	108-E	0-360°	2 leads 1 +16.5°	

MAXIMUM PERMISSIBLE FIELD INTENSITY CALCULATION FOR KLBG MONITOR POINTS IN ORDER THAT THE SPECIFIED UNATTENUATED FIELDS OF THE CONSTRUCTION PERMIT WILL NOT BE EXCEEDED DURING DIRECTIONAL ANTENNA OPERATION

	N 0° E	N 40° E	N 220° E
MEASURED FIELD INTENSITY (MV/M)	1.75	10.9	0.51
UNATTENUATED FIELD DETERMINED FROM MEASUREMENTS ON EACH RADIAL	11.0	49.0	10.0
SPECIFIED UNATTENUATED FIELD (MV/M)	13.72	56.61	10.58
MAXIMUM FIELD INTENSITY PERMITTED AT MONITOR POINT BEFORE MEOV IS EXCEEDED (*)	2.18	12.6	0.54

$$(*)\ \text{Max. field permitted} = \frac{\text{Specified unattenuated field}}{\text{Measured unattenuated field}} \times (\text{Monitor Point measured field intensity})$$

FIGURE 19

DESCRIPTION OF THREE OFFICIAL MONITOR POINTS

RADIO STATION KLBG
LIBERTY, TEXAS

RADIAL N 0° E

To reach this point proceed 0.25 mile East from transmitter building on a private road to Farm Road 563; thence to the left (North) 4.6 miles on Farm Road 563 to its intersection with U.S. Highway 90; thence right (East) on U.S. Highway 90 for 1.5 miles to the monitor point. The point is 150 feet south of a 2 x 4 inch stake of wood in the fence line on the south side of Highway 90 in an open field. When KLBG is operating with 250 watts into its directional antenna system, the field intensity measured at this point should not exceed 2.18 millivolts per meter in order that the radiation in this direction will not exceed the maximum expected operating value of 13.72 millivolts per meter inverse distance field intensity. Distance to the point is 3.8 miles.

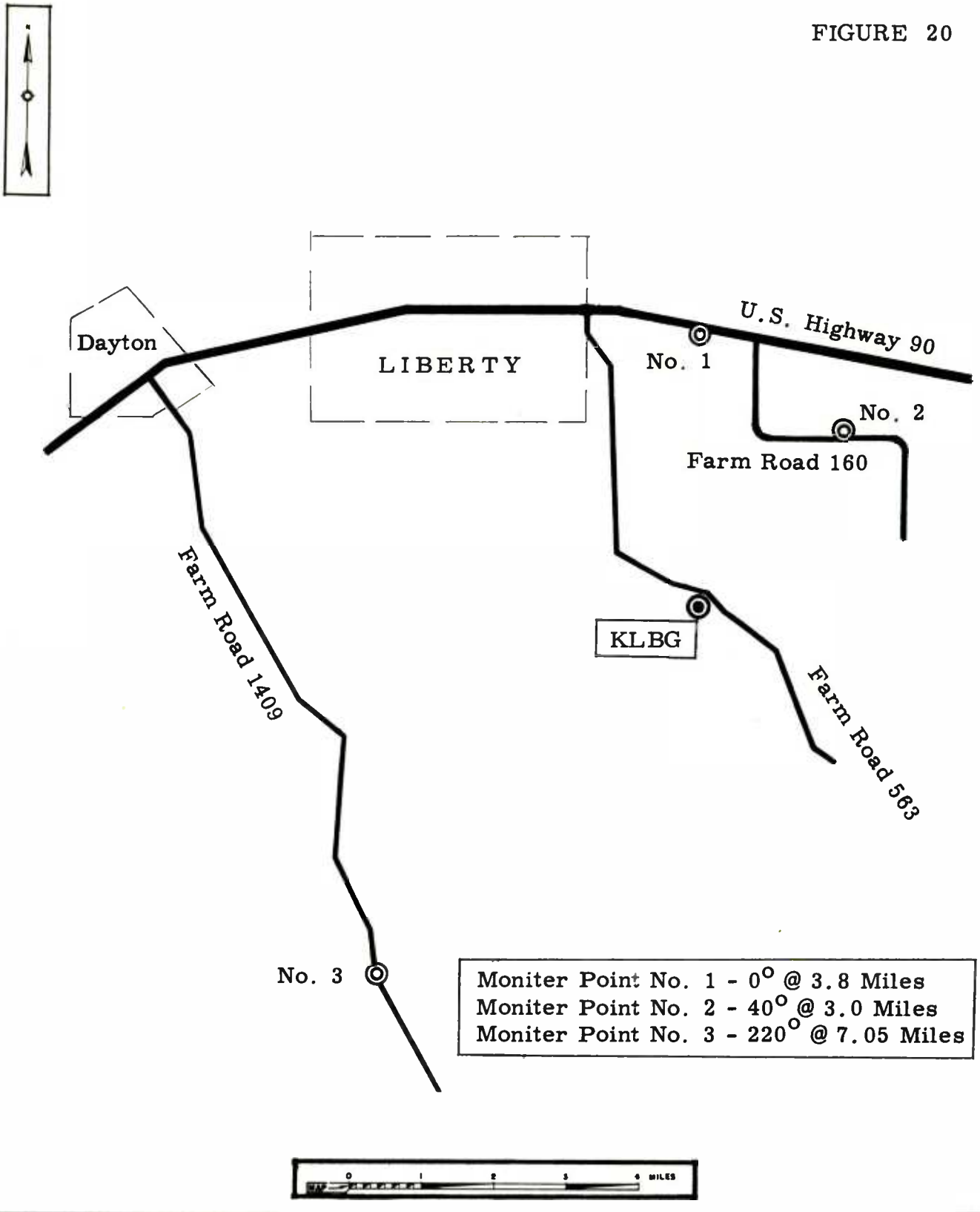
RADIAL N 40° E

To reach this point proceed 0.25 mile East from transmitter building on a private road to Farm Road 563; thence to the left (North) 4.6 miles on Farm Road 563 to its intersection with U.S. Highway 90; thence right (East) on U.S. Highway 90 for 2.4 miles to Ames where Highway 90 intersects Farm Road 160; thence right (South) on Farm Road 160 for 2.5 miles to the monitor point. The point is 100 feet north of Farm Road 160 and a 2 x 4 inch wood stake in the fence line on the north side of the road. The wood stake is approximately 150 feet beyond (East) of a small concrete bridge over a creek that crosses Farm Road 160. When KLBG is operating with 250 watts into its directional antenna system, the field intensity measured at this point should not exceed 12.6 millivolts per meter in order that the radiation in this direction will not exceed the maximum expected operating value of 56.61 millivolts per meter inverse distance field intensity. Distance to the point is 3.0 miles.

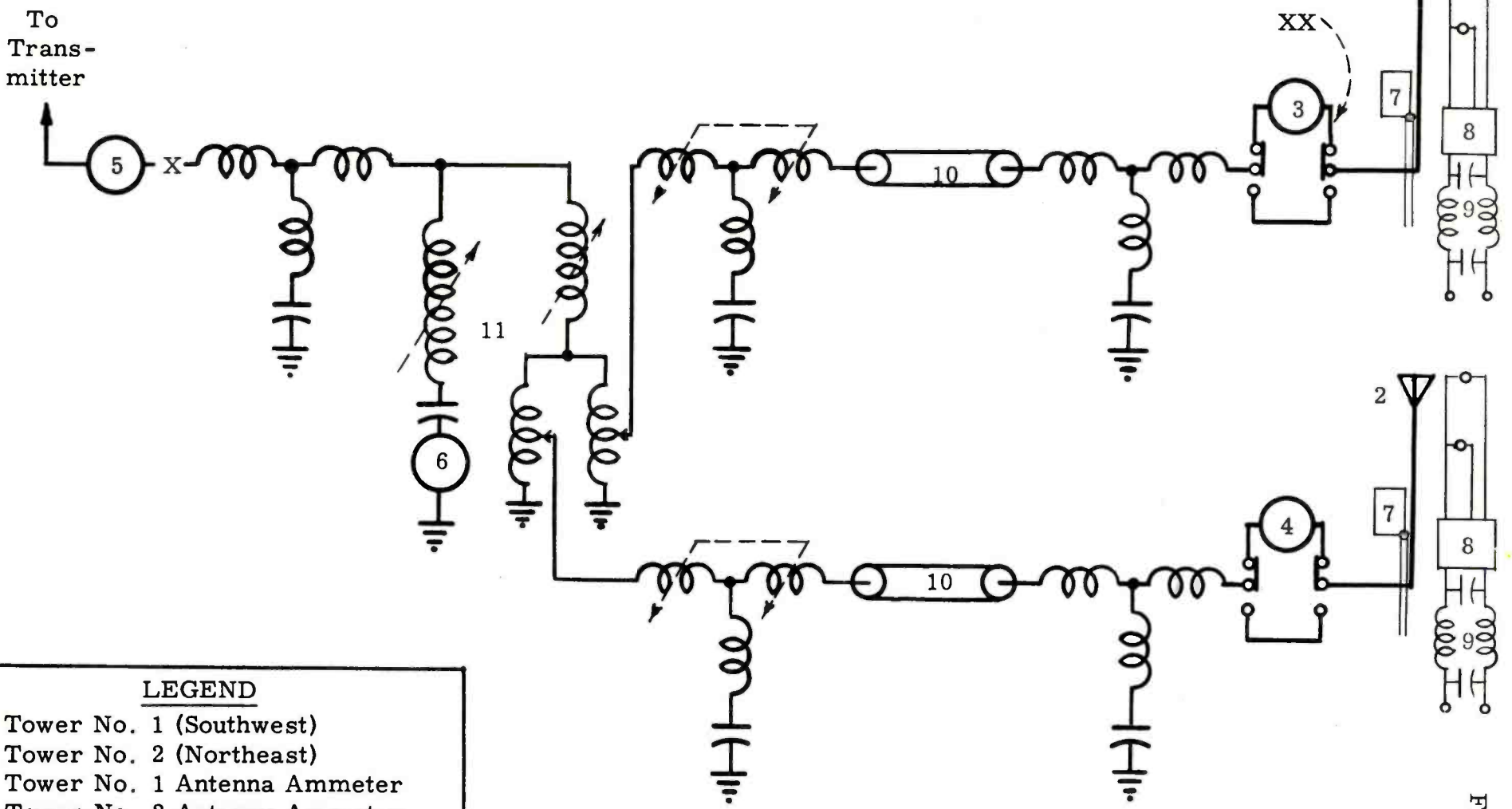
RADIAL N 220° E

To reach this point proceed 0.25 mile East from transmitter building on a private road to Farm Road 563; thence to the left (North) 4.6 miles on Farm Road 563 to its intersection with U.S. Highway 90; thence left (West) on U.S. Highway 90 for 6.3 miles to Dayton where Highway 90 intersects Farm Road 1409; thence left (South) on Farm Road 1409 for 9.6 miles to a 2 x 4 wood stake on the fence line on the east side of the road. The point is in the center of the road approximately 150 feet north of a creek bridge. When KLBG is operating with 250 watts into its directional antenna system, the field intensity measured at this point should not exceed 0.54 millivolts per meter in order that the radiation in this direction will not exceed the maximum expected operating value of 10.58 millivolts per meter inverse distance field intensity. Distance to the point is 7.05 miles.

FIGURE 20



MERL SAXON CONSULTING RADIO ENGINEER LUFKIN, TEXAS	MONITER POINT LOCATION MAP RADIO STATION KLBG LIBERTY, TEXAS



LEGEND

1 - Tower No. 1 (Southwest)
2 - Tower No. 2 (Northeast)
3 - Tower No. 1 Antenna Ammeter
4 - Tower No. 2 Antenna Ammeter
5 - Common Point Ammeter
6 - Tank Circuit Ammeter
7 - Current Sampling Loops
8 - Tower Light Flasher Unit
9 - Tower Lighting Choke Coils
10 - 51.5 Ohm Transmission Lines
11 - Power Dividing Network
X - DA Resistance Measurement Point
XX - ND Resistance Measurement Point

081959-21

Merl Saxon
Consulting Radio Engineer
Lufkin, Texas

ANTENNA SCHEMATIC DIAGRAM
With Ohm's Law Phasor
RADIO STATION KLBG
LIBERTY, TEXAS

FIGURE 21

FULL DESCRIPTION OF METHOD USED TO MAKE MEASUREMENTS OF KLBG NON-DIRECTIONAL ANTENNA BASE IMPEDANCE

For the non-directional proof of performance operation Radio Station KLBG used the Southwest No. 1 tower with the Northeast No. 2 tower isolated. This tower was isolated by use of an inductance coil connected from the base of the tower to ground. The coil reactance was adjusted to produce a minimum deflection on a field intensity meter placed about 20 feet from the tower being isolated and positioned so that it would pick up a minimum of radiation from the other tower being fed power but with the plane of the field meter loop including the tower being isolated. A check of this method was made by an observation of the loop current meter indication in the phase monitor for the isolated tower. Only a very small deflection of this meter was noted when the tower was isolated and when the other tower was fed power.

This No. 1 tower is approximately 0.214 wavelength in height and has a uniform cross-section measuring about 15 inches on a side. It is guyed at four points vertically and every 120 degrees horizontally. The antenna is fed by a concentric transmission line that terminates in a matching network located inside a weatherproof housing beside the tower base. Tower lighting equipment is connected through lighting radio frequency choke coils located inside this same weatherproof housing.

For antenna measurements the lead running directly from antenna ammeter to tower was removed from the meter terminal and connected to the radio frequency bridge with as short lead as possible. A signal generator producing each desired frequency was fed into the bridge, and measurements were made of the antenna every 5 kilocycles from 1020 to 1080 kilocycles inclusive. Null indication for the radio frequency bridge was taken from a Model BC-946-B Colonial Radio Corporation receiver. The bridge was operated exactly as prescribed in the manufacturer's instruction manual. The bridge indications of both resistance and reactance are recorded for each condition of balance. From these data the graph was constructed, and where the smooth curve of resistance intersects the operating frequency the "Antenna Resistance" is found. This value is shown on the graph.

The radio frequency bridge calibration was checked for accuracy prior to measurements of the antenna by the measuring of known standards of resistance. The radio frequency signal generator dial calibration was checked first by comparing its output frequency with that of neighboring broadcast stations and correction made by means of a corrector dial.

FULL DESCRIPTION OF METHOD USED TO MAKE MEASUREMENTS OF KLBG DIRECTIONAL ANTENNA COMMON POINT IMPEDANCE

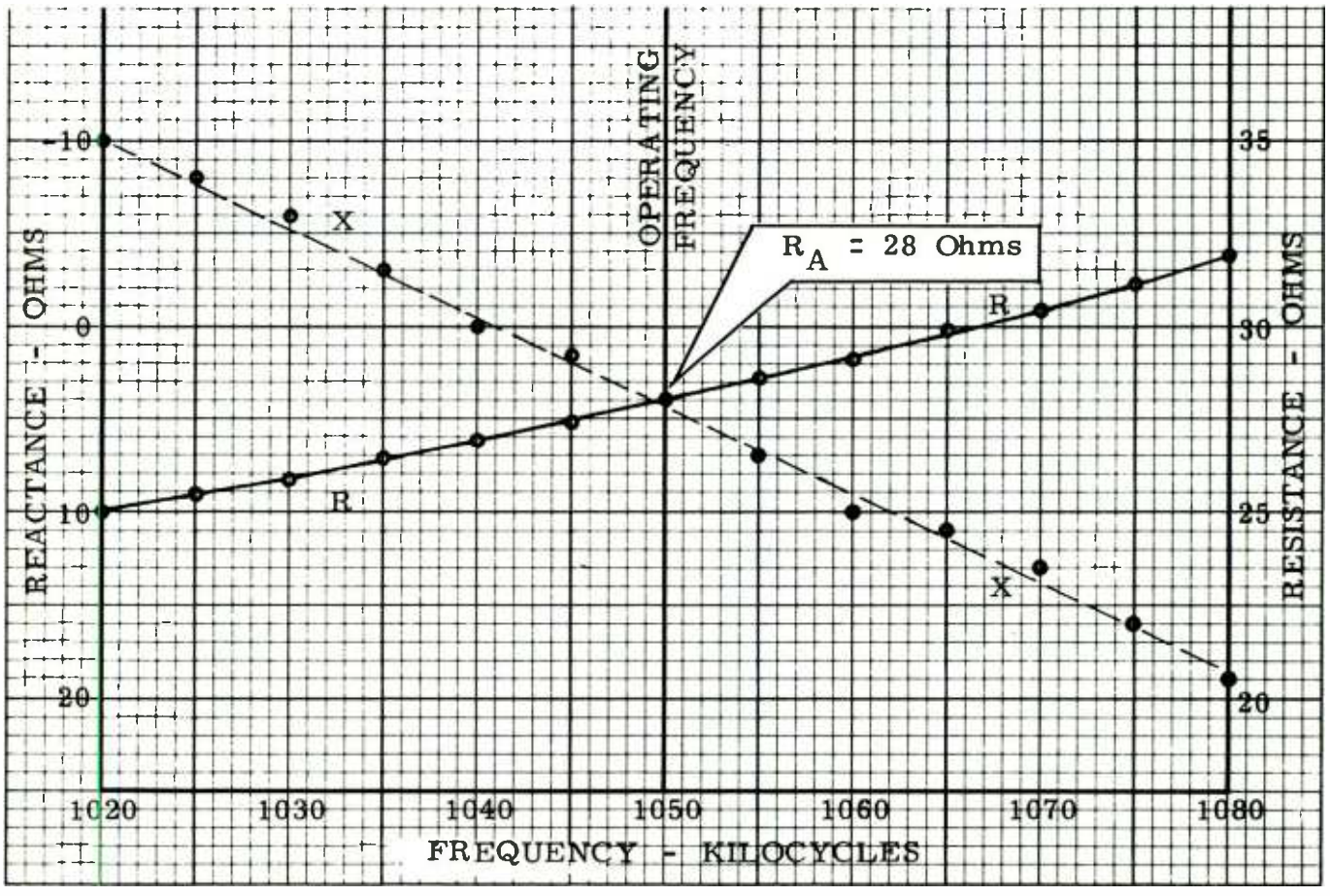
For directional operation Radio Station KLBG uses two towers each fed by a transmission line from a cabinet containing the phasing and dividing networks and located in the transmitter room. This phasing network is fed by a single transmission line from the transmitter. At the phasing network termination of this single transmission line is an RF ammeter measuring the line current. This meter is designated the "Common Point Meter" and is shown in the schematic diagram beside the "X" which is the point of measurement of the common point resistance.

Common Point measurements were made by removing the lead from the common point meter that runs to the phasing and dividing networks and connecting this lead to the radio frequency bridge with as short lead as was possible. A signal generator producing each desired frequency was fed into the bridge, and measurements were made of the Common Point every 5 kilocycles from 1020 to 1080 kilocycles inclusive. Null indications for the radio frequency bridge were taken from a Model BC-946-B Colonial Radio Corporation receiver. The bridge was operated exactly as prescribed in the manufacturer's instruction manual. The bridge indications of both resistance and reactance are recorded for each condition of balance. From these data the graph was constructed, and where the smooth curve of resistance intersects the operating frequency the "Common Point Resistance" is found. This value is shown on the graph.

The radio frequency bridge calibration was checked for accuracy prior to measurements of the common point by the measuring of known standards of resistance. The radio frequency signal generator dial calibration was checked first by comparing its output frequency with that of neighboring broadcast stations and correction made by means of a corrector dial.

NON-DIRECTIONAL ANTENNA IMPEDANCE MEASUREMENTS
RADIO STATION KLBG LIBERTY, TEXAS

Frequency Kilocycles	Antenna Resistance	Antenna Reactance
1020	25.0	-10
1025	25.4	-8
1030	25.8	-6
1035	26.4	-3
1040	26.9	0
1045	27.4	1.5
1050	28.0	4
1055	28.6	7
1060	29.1	10
1065	29.9	11
1070	30.4	13
1075	31.1	16
1080	31.9	19

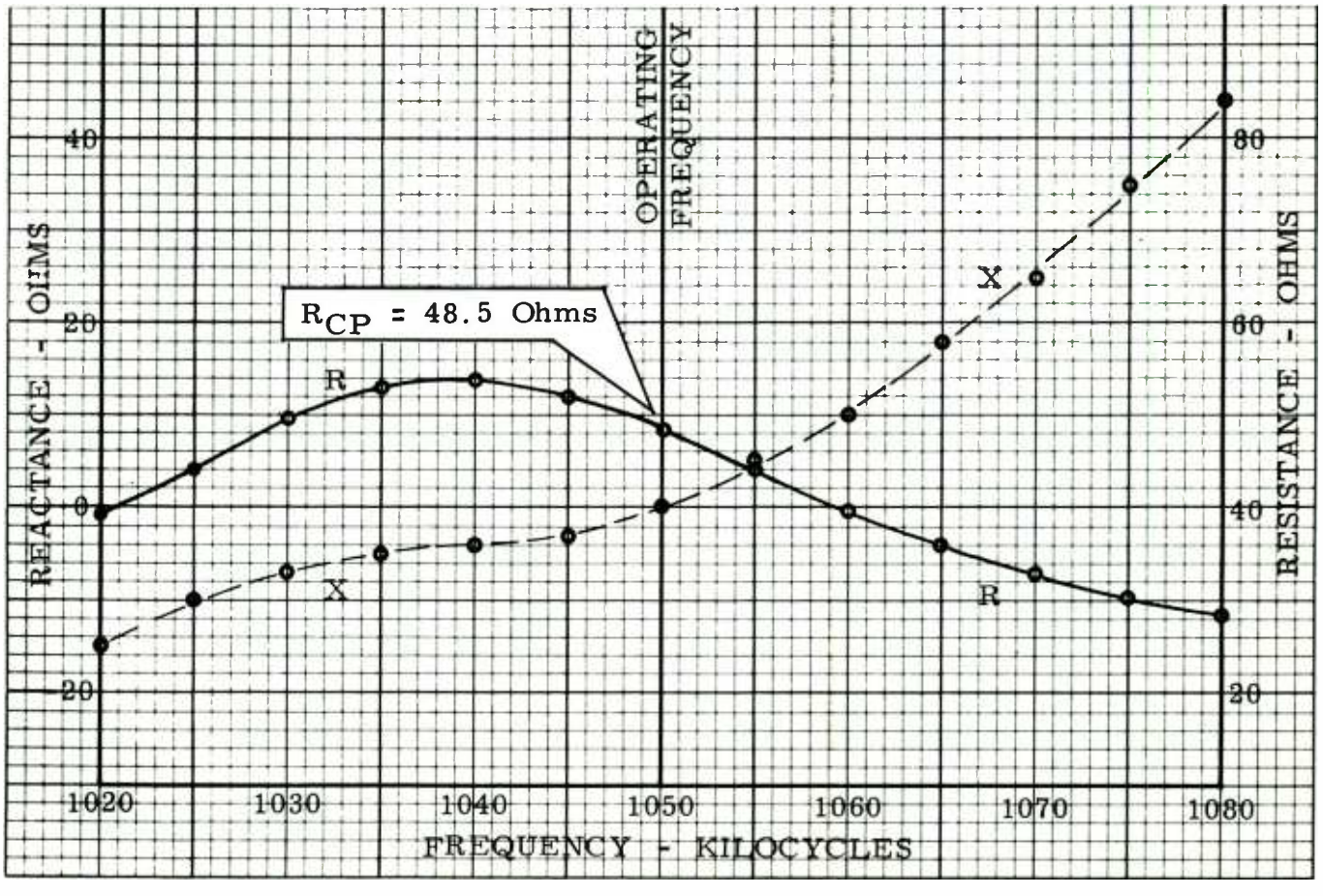


Measurements made July 15, 1959

081959-24

DIRECTIONAL COMMON POINT IMPEDANCE MEASUREMENTS
RADIO STATION KLBG LIBERTY, TEXAS

Frequency Kilocycles	Common Point Resistance	Common Point Reactance
1020	39.2	-15
1025	44	-10
1030	49.6	-7
1035	53	-5
1040	53.8	-4
1045	52	-3
1050	48.5	0
1055	44	5
1060	39.5	10
1065	36	18
1070	32.9	25
1075	30.3	35
1080	28.4	44



Measurements made August 4, 1959

FIGURE 26

DATA ON IMPEDANCE MEASURING EQUIPMENT

Manufacturer's name and rated accuracy of each calibrated instrument

Instrument	Manufacturer	Rated Accuracy
Radio Frequency Signal Generator, Model 846	Merl Saxon	0.01%
Radio Frequency Bridge Type 916-A, Serial 1211	General Radio Co.	1%
Radio Receiver	Colonial Radio Corp.	Null Indicator

Date, accuracy and by whom each instrument was last calibrated

Instrument	Date	Accuracy	By Whom
Radio Frequency Signal Generator, Model 846	7-15-59	0.01%	Merl Saxon
Radio Frequency Bridge Type 916-A, Serial 1211	7-15-59	1%	Merl Saxon

FIGURE 27

QUALIFICATIONS OF ENGINEER TAKING MEASUREMENTS

Merl Saxon is a consulting radio engineer with offices located at 622 Hoskins Street, Lufkin, Texas, and is engaged in the work of broadcast allocations and general radio engineering. His qualifications as an engineer are a matter of record with the Federal Communications Commission. He was employed for over six years by that Commission as a Radio Engineer in the Engineering Department at its Dallas office. In 1932 he graduated from Texas A & M College with the degree of Bachelor of Science in Electrical Engineering. Since then he has held positions on the staffs of several radio broadcast stations. He is associated with the Institute of Radio Engineers in the grade of Senior Member, and he is a registered professional engineer in the state of Texas.

STATE OF TEXAS |
| SS
COUNTY OF ANGELINA |

MERL SAXON, being first duly sworn upon his oath, deposes and says:

1. That he is a consulting radio engineer with offices located at 622 Hoskins Street, Lufkin, Texas;

2. That his qualifications as an engineer are a matter of record with the Federal Communications Commission having been employed for six years by that Commission as a Radio Engineer;

3. That he has been retained by the applicant, LIBERTY BROADCASTING COMPANY, to tune up and adjust the KLBG directional antenna system and make such field intensity measurements of Station KLBG as are required for a proof of performance report of which this statement is a part;

4. That in his belief, the KLBG directional antenna system, as installed and adjusted, fully complies with the KLBG Construction Permit;

5. That all statements and representations of fact contained in the engineering portion of this KLBG Application For License are true and correct of his own knowledge and belief.

Merl Saxon

Subscribed and sworn to before me
this 20th day of August, 1959.

Notary Public in and for
Angelina County, Texas

My commission expires June 1, 1961.

STATE OF TEXAS |
| SS
COUNTY OF ANGELINA |

I, Charles Edward Lawrence, have been employed by Merl Saxon, consulting radio engineer, since September, 1956. Before taking any field intensity measurements I was thoroughly instructed in the principles and operation of the field intensity meter. I completely understand its calibration and operation.

I am enrolled in the Electrical Engineering Department of the Texas A & M College and have 60 hours toward a degree in this department.

I further attest and affirm that the field intensity measurements taken by me are true of my own knowledge and to the best of my knowledge and ability are certified as factual.

Charles Edward Lawrence

Charles Edward Lawrence

Subscribed and sworn to before me
this 20th day of August, 1959.

Notary Public in and for
Angelina County, Texas

My commission expires June 1, 1961.

August 17,1959

Mr. Merl Saxton,
Consulting Radio Engineer,
Lufkin, Texas.

Dear Mr. Saxton;

With reference to the application of the Liberty Broadcasting Company to the F.C.C.and the Engineering E.E. dated July 25, 1957 by John H. Mullaney, Consulting Radio Engineer, please be advised that the North Latitude should be 30° 0' 04", and the West Longitude should be 94° 45' 32", instead of as shown on the above engineering exhibit.

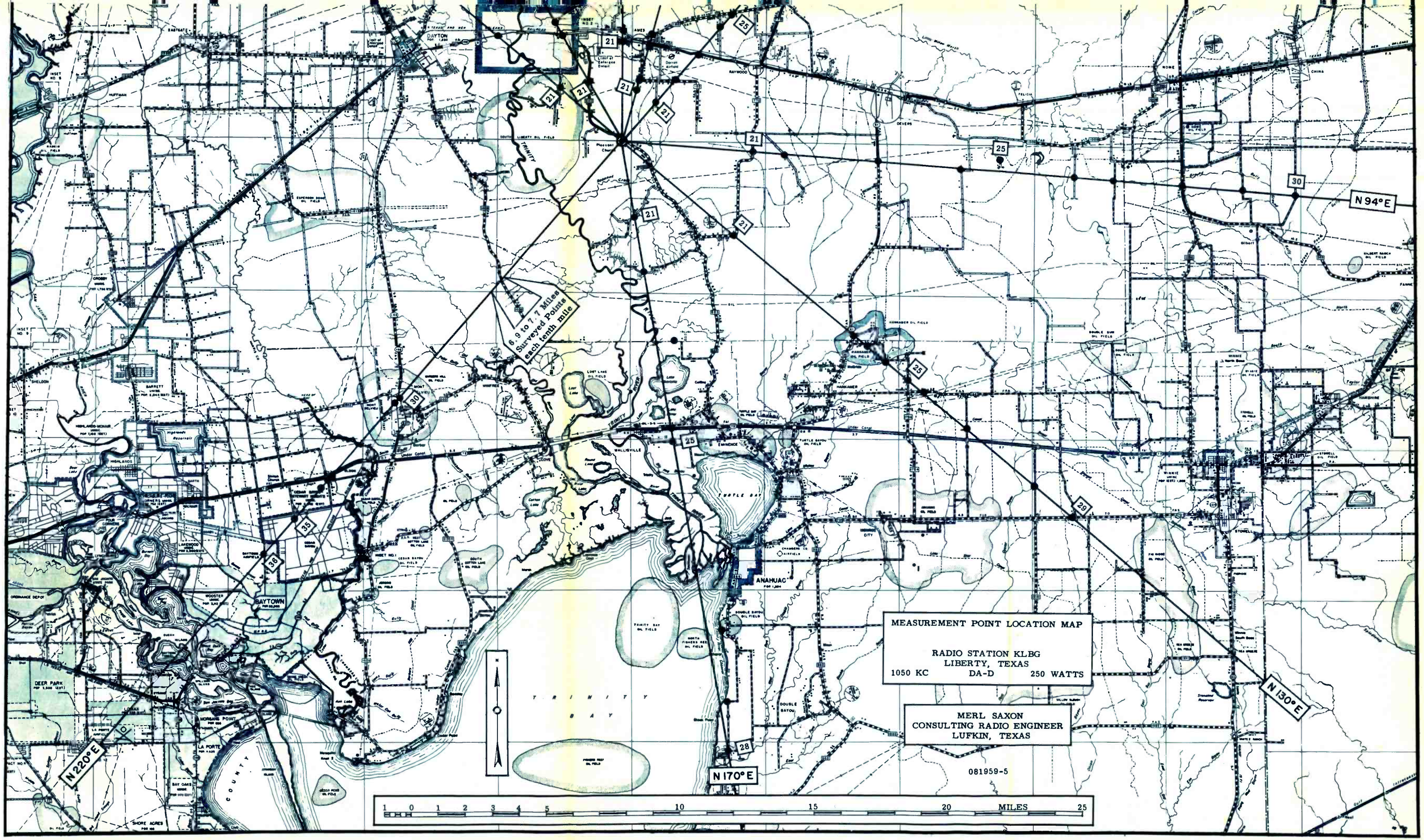
These graphic co-ordinates were obtained from measurements in the file being superimposed on a map by the United States Department of Interior Geographic Survey, the Liberty Quadrangle, 15" Series (Topographic).

I feel sure it will be your desire to submit the correct geographicco-ordinates with this report.

Yours very truly,

MARVIN M. HENRY

MMH/r


6.9 to 7.7 Miles
Surveyed Points
Each tenth mile
N 94°E
N 130°E
N 170°E
N 220°E
MEASUREMENT POINT LOCATION MAP
RADIO STATION KLBG
LIBERTY, TEXAS
1050 KC DA-D 250 WATTS
MERL SAXON
CONSULTING RADIO ENGINEER
LUFKIN, TEXAS
081959-5
TRINITY BAY
ANAHUAC
BAYTOWN
DAYTON
LIBERTY
1 0 1 2 3 4 5 10 15 20 MILES 25

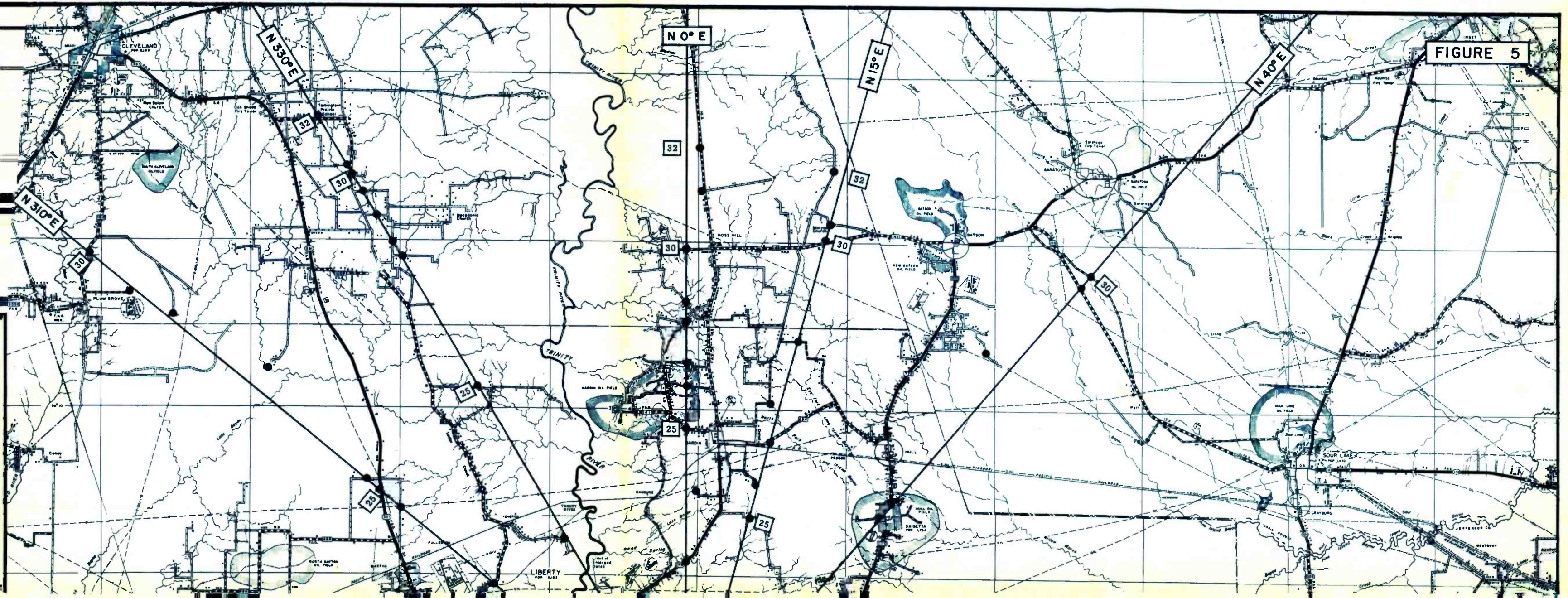


FIGURE 5
N 330° E
N 0° E
N 15° E
N 40° E
N 310° E
CLEVELAND
TRINITY RIVER
TRINITY
LIBERTY
PLUM GROVE
HARDIN OIL FIELD
SOUR LAKE
SOUR LAKE OIL FIELD
DAISETTA
BATSON
BATSON OIL FIELD
SARATOGA
SARATOGA OIL FIELD
HULL
MOSS HILL
SOUTH DAYTON OIL FIELD
SOUTH CLEVELAND OIL FIELD
NEW BATSON OIL FIELD
32
30
25