EXHIBIT E
ENGINEERING STATEMENT
IN SUPPORT OF AN APPLICATION
FOR INCREASED FACILITIES
WTPA-FM 24kW 670 FT. 104.1 MHz
NEWHOUSE BROADCASTING CORPORATION
HARRISBURG, PENNSYLVANIA

INDEX

Lohnes and Culver

Washington, D. C.

January, 1978

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INTRODUCTION

Newhouse Broadcasting Corporation, licensee of broadcast station WTPA-FM, Harrisburg, Pennsylvania, presently operates with reduced effective radiated power due to existing short mileage separations. This engineering statement, together with Section V-B of FCC Form 301, to which it is attached as Exhibit E, supplies complete engineering and technical data in support of an application for increased facilities at WTPA-FM in accordance with recently enacted agreements between all of the licensees of the short spaced operations. All calculations, graphs, contours and other technical data contained in or attached to this statement have been determined in accordance with the existing rules of the Federal Communications Commission unless specifically stated otherwise herein.

PROPOSED FACILITIES

The application of Newhouse Broadcasting Corporation still proposes an operation on FM Channel 282 - 104.1 MHz at Harrisburg, Pennsylvania, at the existing WTPA-FM antenna site. The effective radiated power will, however, be increased to 24 kW at the present antenna height of 670 feet above the average terrain within 2 to 10 miles of the site. This power and height is the equivalent of 50 kW at 500 feet above average terrain, as determined from Figure 3 of Section 73.333

of the rules. WTPA-FM and four other FM broadcast stations, WXTR-FM, WDJQ, WXKW and WRCP-FM, are presently short spaced and WTPA-FM would be limited in power, as specified in Section 73.213 of the rules. However, mutual agreements exist between WTPA-FM and all of the other FM stations, which provide for an increase in the facilities of each to the maximum permitted by Section 73.211(b) of the rules of the Commission and an engineering statement with respect to the agreements to increase facilities was prepared on behalf of the FM stations by this office in April, 1977 for filing with the Commission. This application, therefore, proposes implementation of the present agreements by WTPA-FM.

PROPOSED TRANSMITTER AND RADIATED POWER

The only changes proposed for the operation of WTPA-FM will be to replace the existing 5 kW transmitter and 1-5/8 inch flexible transmission line with a 10 kW transmitter and 180 feet of 3-1/8 inch rigid transmission line, which has an efficiency of 96% at 104.1 MHz. The transmitter will be operated at the reduced power of 7.81 kW so that after taking into account the power loss in the new transmission line and the power gain in the existing antenna system, the effective radiated power will be 24 kW in both the horizontal and vertical planes of radiation.

ELEVATION AND CONTOUR DATA

The elevation data contained in Figure 1 attached to this statement was taken from information presently in the WTPA-FM file at the Federal Communications Commission. Therefore, no new topographic maps or terrain profile graphs are included in this application.

The contour data of Figure 1 was determined in accordance with the normal prediction methods of the Commission, as contained in Section 73.313 of the rules. The 70 dbu (3.16 mV/m) and 60 dbu (1.0 mV/m) contours have been plotted from that data and are shown on the contour map attached to this statement as Figure 2.

POPULATION AND AREA DATA

An analysis of the population residing within the 60 dbu (1 mV/m) contour shown on the map of Figure 2 has been made and the results are shown on the tabulation appearing on that figure. The population residing within the area was determined by transferring the contour to minor civil division census maps and carrying out a population analysis using the 1970 census figures for the United States.

The land area shown on the tabulation appearing on Figure 2 was determined by measuring the map area within the predicted 60 dbu contour with a planimeter and converting the map area in square inches into land area in square miles by multiplying by a factor based upon the scale of the map. From the map and the tabulation of land area, attached, it can be seen that the proposed changes result in a 34% increase over the present 60 dbu contour land area, as shown on the 60 dbu contour map presently on file at the FCC and thus is a minor change, as specified by the Commission.

AERONAUTICAL CONSIDERATIONS

Since there will be no changes in the over-all height or radiating element of the WTPA-FM antenna structure from that presently authorized, Section V-G

of FCC Form 301 is not being filed. With no change in over-all height there will be no increase in hazards to air navigation due to the proposed modification of the WTPA-FM facilities. FAA Form 7460-1 is, therefore, not being filed with the regional office of the FAA.

Respectfully submitted,

LOHNES AND CULVER

By Robert D. Culver
Robert D. Culver
Engineer in Training
District of Columbia, No. 1193

January, 1978

District of Columbia)
) ss:
City of Washington)

ROBERT D. CULVER, after being duly sworn, on oath deposes and says that he is a radio engineer, a partner in the firm of Lohnes and Culver, Washington, D. C.;

That he is a graduate of the University of Maryland, School of Engineering, holding the degree of Bachelor of Science in Electrical Engineering awarded by that Institution in 1971, that he is certified as an Engineer-in-Training, Certificate No. 1193, in the District of Columbia;

That he has been engaged since 1966 in the practice of radio engineering with the firm of Lohnes and Culver, has made numerous field intensity measurements and proof of performance tests on AM, FM and TV broadcast stations, has participated in the design and adjustment of directional antenna systems, has carried out allocation studies involving the AM, FM and TV spectrum, and has submitted engineering reports and statements to the Federal Communications Commission on previous occasions;

That the measurements, calculations and exhibits contained in the attached engineering report and/or statement, or attached thereto, were made by him personally or under his personal supervision and direction, he has personally examined and verified same;

That all of the facts and data included in or attached to the foregoing engineering report and/or statement are true and correct of deponent's personal knowledge unless otherwise stated therein, and any statements shown as being made on information and belief are believed by deponent to be true and correct as therein appearing.

Robert D Culver
Robert D. Culver
Engineer in Training
District of Columbia, No. 1193

Sworn to and subscribed before me, this the 24th day of January,

A. D., 1978.

Jerry Hoover
(Notary Public)

My Commission expires April 14, 1978

FIGURE 1
ELEVATION AND CONTOUR DATA
WTPA-FM CH. 281-104.1 MHz 24kW 670 FT.
NEWHOUSE BROADCASTING CORPORATION
HARRISBURG, PENNSYLVANIA

Radial and Bearing (Degrees)		Average Elevation 2 - 10 Miles (Feet AMSL)	Effective Antenna Height (Feet)	Effective Radiated Power (kw)	Distance to Predicted Contours 70 dbu (Miles)	60 dbu (Miles)
A	0	549	631	24	19	31
B	45	665	515	24	17.5	29
C	90	477	703	24	20.5	32.5
D	135	345	835	24	22	34.5
E	180	428	752	24	21	33
F	225	447	733	24	20.5	33
G	270	675	505	24	17.5	29
H	315	529	651	24	19.5	32

Height of radiation center above mean sea level	1180	feet
Height of average terrain above mean sea level	514	feet
Height of radiation center above average terrain	666	feet *

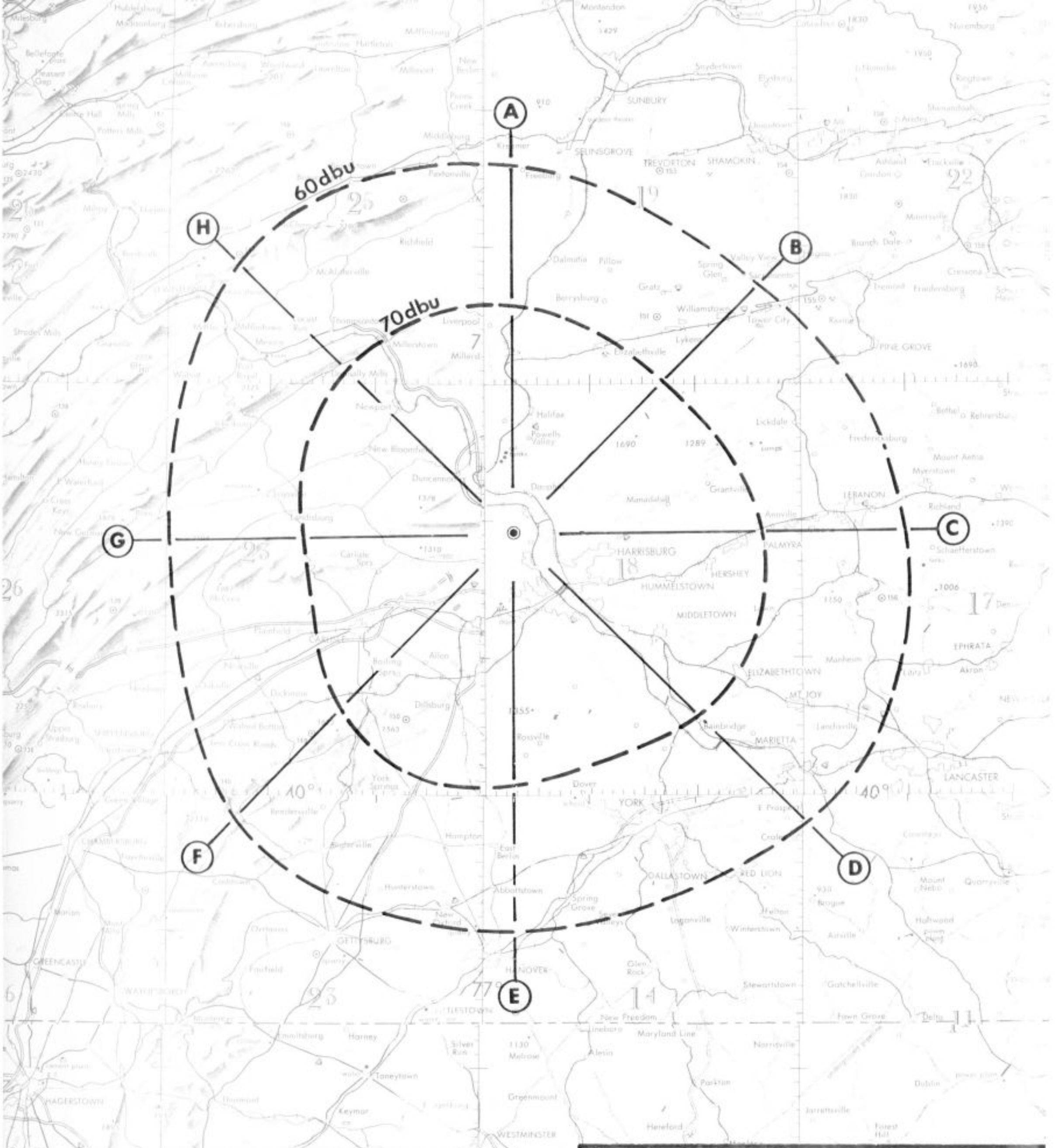
*License value 670 feet

Prepared by

Lohnes and Culver

Washington, D. C.

January, 1978



CONTOUR	POPULATION (1970 Census)	AREA (Sq. Mi.)
60 dbu	825,000	3,150

FIGURE 2
PREDICTED CONTOURS
WTPA-FM 24kW 670 FT. 104.1 MHz
NEWHOUSE BROADCASTING CORPORATION
HARRISBURG, PENNSYLVANIA

Prepared by
Lohnes and Culver Washington, D. C.
January, 1978

FCC Form 301 | **FEDERAL COMMUNICATIONS COMMISSION** | Section V-B

FM BROADCAST ENGINEERING DATA

Name of applicant: Newhouse Broadcasting Corporation

1. Purpose of authorization applied for: (Indicate by check mark)

(If application is for a new station or for any of the changes numbered B through E, complete all paragraphs of this form: if change F is of a character which will change coverage or increase the overall height of the antenna structure more than 20 feet, answer all paragraphs, otherwise complete only paragraphs 2 and 9 and the appropriate other paragraphs; for changes G through I, complete only paragraph 2 and the appropriate other paragraphs; for change J, complete only paragraphs 2 and 5.)

A. ☐ Construct a new station
B. ☒ Change effective radiated power
C. ☐ Change antenna height above average terrain
D. ☐ Change transmitter location
E. ☐ Change frequency
F. ☐ Change antenna system
G. ☒ Change transmitter
H. ☐ Install auxiliary or alternate main transmitter
I. ☒ Other changes (specify)
J. ☐ Change studio location

If this is not for a new station, summarize briefly the nature of the changes proposed.

Install new transmitter and transmission line and increase effective radiated power

2. Facilities requested

Frequency: 104.1 Mc/s. | Channel No.: 281

Effective Radiated Power: Horizontal 24 kw; Vertical 24 kw

Antenna height above average terrain: Horizontal 670 feet; Vertical 670 feet

3. Station location: No change

State: Pennsylvania | City or town: Harrisburg

4. Transmitter location (principal community): No change

State: Pennsylvania | County: Cumberland

City or town: East Pennsboro Township | Street Address (or other identification): W. of R. 11 and 15 N. of Rt. 944

5. Main studio location: No change

State: Pennsylvania | County: Dauphin

City or town: Harrisburg | Street address: 3235 Hoffman

6. Remote control point location: No change

State: None Proposed | City or town:

Street Address (or other identification):

7. Transmitter

Make	Type No.	Rated Power
RCA	BTF 10E-1	10 kw

(If the above transmitter has not been accepted for licensing by the F.C.C., attach as Exhibit No. a complete showing of transmitter details. Showing should include schematic diagram and full details of frequency control. If changes are to be made in licensed transmitter include schematic diagram and give full details of change.)

8. Modulation monitor: No change

Make: On file | Type No.:

9.(a) Antenna structure: No change

Is the proposed construction in the immediate vicinity or does it serve to modify the construction of any standard broadcast station, FM broadcast station, television broadcast station, or other class of radio station? YES ☒ NO ☐

If "Yes", attach as Exhibit No. complete engineering data thereon.

On file

Submit as Exhibit No. a vertical plan sketch for the proposed total structure (including supporting building if any) giving heights above ground in feet for all significant features.

On file

Overall height in feet above ground. (Without obstruction lighting)	Overall height in feet above mean sea level. (Without obstruction lighting)
176	1256
Overall height in feet above ground. (With obstruction lighting)	**Overall height in feet above mean sea level. (With obstruction lighting)**
180	1260

Height of antenna radiation center in feet above mean level.
Horizontal / Vertical: 1180

Geographical coordinates of antenna (to nearest second)
North latitude 40° 18' 57" | West longitude 76° 57' 02"

(b) Antenna data: No change

Make	Type No. or description
RCA	BFC-6

No. of sections	Antenna power gain
Horizontal 6	Horizontal 3.2
Vertical 6	Vertical 3.2

If directional antenna is proposed, give full details including horizontal and vertical plane radiation patterns, as Exhibit No.

Is electrical or mechanical beam tilting proposed? YES ☐ NO ☐
If so, describe fully in Exhibit No. including horizontal and pertinent vertical radiation patterns.

Will antenna be altered to provide null fill-in? YES ☐ NO ☐

If yes, describe fully in Exhibit No.

10. Transmission line proposed to supply power to the antenna from the transmitter

Make	Type No.	Description
RCA	MI-19089	Coaxial

Size (nominal transverse dimension) in inches	Length in feet	Rated efficiency in percent for this length
3-1/8	180	96

11. Proposed operation

Transmitter power output in kilowatts	Power dissipation within transmission line in kilowatts
7.81	0.31

Antenna input power in kilowatts	Effective radiated power in kilowatts (Must be same as shown in Para. 2)
7.5	Horizontal 24 Vertical 24

12. Will the studios, microphones, and other equipment proposed for transmission of programs be designed for compliance with the FM Technical Standards? Yes ☐ No ☐

No change

13. If this application is for modification of construction permit state briefly as Exhibit No. the present status of construction and indicate when it is expected that construction will be completed.

14. Attach as Exhibit No. E map(s) (Sectional Aeronautical Charts where obtainable) of the area proposed to be served and shown drawn thereon:

(a) Proposed transmitter location and the radials along which the profile graphs have been prepared;
(b) The 3.16 ,v/m and the 1 mv/m contours predicted;
(c) On the map(s) showing the 3.16 mV/m contour, clearly indicate the legal boundaries of the principal community proposed to be served. Submit a statement identifying the source relied upon for the placement of the boundaries;
(d) Scale of miles.

Areas and population: (latest census.)

Area (sq. mi.) within 1 mv/m contour	Population within 1 mv/m contour
See Exhibit E	

15. (a) Attach as Exhibit No. a map(s) (topographic where obtainable, such as U. S. Geological Survey quadrangles) for the area within 15 miles of the proposed transmitter location and shown drawn thereon the following data:

1. Proposed transmitter location—accurately plotted;
2. Transmitter location and call letters of all radio stations (except amateur) and the location of established commercial and government receiving stations within 2 miles of the proposed transmitter location;
3. Proposed location of main studio;
4. Character of the area within 2 miles of proposed transmitter location, suitably designated as to residential, business, industrial, and rural nature;
5. At least eight radials each extending to a distance of ten or more miles from the proposed transmitter location, one or more of which must extend through the principal city or cities to be served.
6. If the proposed transmitter location is outside the boundaries of the principal community proposed to be served, the topography of the intervening area must be clearly shown.

On file

b. Attach as Exhibit No. profile graphs for the radials in (a)(5) above. Each graph shall show the elevation of the antenna radiation center. Identify each graph by its bearing from the proposed transmitter location. Direction true north shall be zero azimuth and angles measure clockwise. Show source of topographical data on each.

On file

16. From the profile graphs in 15(b), for the eight mile distance between two and ten miles from the proposed transmitter location, and in accordance with the procedure prescribed in Section 73.313 of the Commission Rules, supply the following tabulation of data:

Radial bearing (degrees true)	Average elevation of radial (2-10 mi.) in feet above mean sea level	Height in feet of antenna radiation center above average elevation of radial 2-10 mi.)	Predicted distance in miles to the 3.16mv/m contour	Predicted distance in miles to the 1mv/m con-
0°	feet	feet	mi.	mi.
45				
90				
135		SEE EXHIBIT E		
180				
225				
270				
315				
(*)				

feet (horizontal)

Average

Antenna height above average terrain feet (vertical)
(Average of above listed heights -- must be identical with Paragraph 2)

*Radial over principal community if not included above. Do not include in Average.

17. **Environmental** statement. See Part 1, Subpart I of the rules.

Would a Commission grant of this application be a major action as defined by Section 1.1305 of the Commission's rules?

YES ☐ If yes, submit as Exhibit No. a narrative statement in accordance with Section 1.1311 of the rules.

NO ☒ If no, explain briefly

Change in effective radiated power only, no change in supporting structure

I certify that I represent the applicant in the capacity indicated below and that I have examined the foregoing statement of technical information and that it is true to the best of my knowledge and belief.

January 24, 1978
Date

Signature Robert D. Culver
(Check appropriate box below)

Address 1156 - 15th Street, N. W. - Suite 606
(Include Zip Code)
Washington, D. C. 20005

Telephone No. 202-296-2722
(Include Area Code)

☐ Technical Director

☐ Registered Professional Engineer

☐ Chief Operator

☒ Consultant

☐ Other *(specify)*