shepherd communications, inc.

December 2, 1991

TO: Dennis Williams, Chief
FM Branch Audio Services Division
FEDERAL COMMUNICATIONS COMMISSION
1919 "M" Street NW
Washington, D.C. 20554

DEC 0 2 1991

RE: File # 891113ME

CERTIFICATION

On October 22, 1991 The Commission requested that Shepherd Communications, Inc. submit an engineering amendment to the above named application. In this amendment the applicant "must explain what steps will be taken to limit RF exposure to workers and other persons authorized access to the tower."

Enclosed are one original and two copies of the engineering amendment/statement.

Copies of this certification and amendment have been sent to the other applicants, as well, via first class mail on December 2, 1991, to the addresses below:

Family Stations, Inc.
3108 Fulton Avenue, Suite 1
Sacramento, CA 95821

Skyride Unlimited, Inc.
P.O. Box 1092
Shafter, CA 93263

Respectfully submitted,

Jon E. Fugler
President, Shepherd Communications, Inc.

P.O. Box 1000 • Yucaipa, California 92399 • (714) 790-1848

ENGINEERING STATEMENT

The information and data contained within this Engineering Statement were prepared on behalf of Shepherd Communications, Inc., applicant for a new Class B noncommercial, educational FM broadcast station on Channel 215 to serve Shafter, California, FCC file number BPED-891113ME.

I. DISCUSSION

The applicant has proposed to locate its directional antenna system on the existing tower of commercial station KKBB(FM). The KKBB(FM) supporting structure is located on a privately held parcel of land, 2.47 kilometers (1.53 miles) south of the center of Crome, and 11.15 kilometers (6.93 miles) southeast of the center of Shafter, California. The ground elevation of the site is 103.3 meters (339 feet) above mean sea level.

The tower and antenna consist of a 115.1 meter (377.6 feet) guyed, 18-inch face, uniform cross-sectional steel tower. The overall height of the supporting structure is 116.0 meters (380.6 feet) including top-mounted lighting beacon. The KKBB(FM) two-bay antenna is located 111.1 meters (364.5 feet) above ground. This tower also has been proposed for use by KXHA(FM), BPH-880217MN, with a single-bay antenna situated 105.2 meters (345.1 feet) above ground. The applicant's antenna will be located 97.2 meters (318.9 feet) above ground. The transmitting equipment will be housed in the KKBB(FM) existing transmitter building located at the base of the tower.

II. NON-IONIZING RF RADIATION

In accordance with the requirements of the FCC Public Notice dated November 14, 1985, entitled **Environmental Processing Rules For Broadcasting**, the worst-case power density in mW/cm^2 has been calculated using equation four of Section II of the Office of Science & Technology Bulletin No. 65 entitled, **Evaluating Compliance With FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation**. Equation four has been reduced so the constant reflects both the factor 1.64 used to obtain ERP relative to EIRP and the factor 1000 for the number of milliwatts/watt. Further consideration includes the Environmental Protection Agency (EPA) recommendation that a more realistic approximation should include ground reflection by assuming a maximum 1.6-fold increase in field strength or an increase in power density of 1.6^2 (2.56).

Therefore,

$$S_{mW/cm^2} = \frac{0.10496 \cdot (ERP_h + ERP_v)}{\pi \cdot R^2}$$

$$S_{mW/cm^2} = \frac{0.10496 \cdot (97959)}{\pi \cdot 97.2^2}$$

$$S_{mW/cm^2} = 0.346\ mW/cm^2 \quad (346\ \mu W/cm^2)$$

S_{mW/cm^2} = Power Density in milliwatts/centimeter^2

ERP_h = 50,000 watts max, horizontally-polarized ERP

ERP_v = 47,959 watts max, vertically-polarized ERP

R = 97.2 meters from antenna radiation center to tower base

The American National Standards Institute (ANSI) has established a maximum power density exposure limit of 1.0 mW/cm^2 averaged over any six-minute period, for radio frequency radiation in the band from 30 to 300 Megahertz.

In the aforementioned report, reference is made to studies conducted by the EPA in which a mathematical model of antenna behavior was developed to predict the required distance from the antenna radiation center to the bottom of the antenna supporting structure so the ANSI limit will not be exceeded anywhere on the ground. By interpolation of tabulated values in appendix B, table 1 of the report, it was determined that a maximum worst-case distance of 57.2 meters would be required assuming a single dipole element with an effective radiated power of 97.959 kilowatts (the sum of horizontally and vertically polarized power.)

Figure 2 graphically represents the predicted power density two meters above ground as a function of horizontal distance from the base of the KKBB(FM) tower, based on the proposed operation acting alone. The figure shows that the proposed facility will produce a worst-case power density that is well below the standard.

Since the proposed antenna supporting structure is, or will be, in use by two other FM broadcast stations, the effects of nonionizing radiation produced by these facilities have also been taken into account. KKBB(FM) has a pending application on file, BPH-910409IC, to increase its effective radiated power to 6.0 kW at the licensed antenna height. KXHA(FM) has an outstanding construction permit, BPH-880217MN, to operate with an effective radiated power of 3.0 kW. The effects of these stations were considered in the determination of compliance with the nonionizing radiation environmental protection rules.

The nonionizing radiation from each of these stations were computed and added to the contribution from the proposed operation. Figure 1 illustrates the resultant individual and composite power densities of these signals in $\mu W/cm^2$. In no case does the total radiation from the three stations exceed the acceptable limits near the ground about the tower. The effective radiated power levels of KKBB(FM) and KXHA(FM) were doubled to account for circularly-polarized radiation. The vertical radiation characteristics of the KKBB(FM) λ-spaced two-bay antenna and the Shepherd Communications proposed $\lambda/2$-spaced six-bay antenna, were used to produce the graph of figure 1.

Protection to station workers and the general public will be accomplished in two ways. First, the entire transmitter building and antenna supporting structures will be surrounded with a chain link fence and locked gate that discourages casual public access to the broadcast facilities. Furthermore, to warn the public of possible radio frequency radiation danger, Shepherd Communications will liberally mark the area around the facility with warning signs that comply with the ANSI standard C95.2-1982 Radio Frequency Radiation Hazard Warning Symbol.

Second, when maintenance is to be performed on the supporting structure or any of the antennas, operation of the station will cease until such work has been completed and the workers are no longer on the tower.

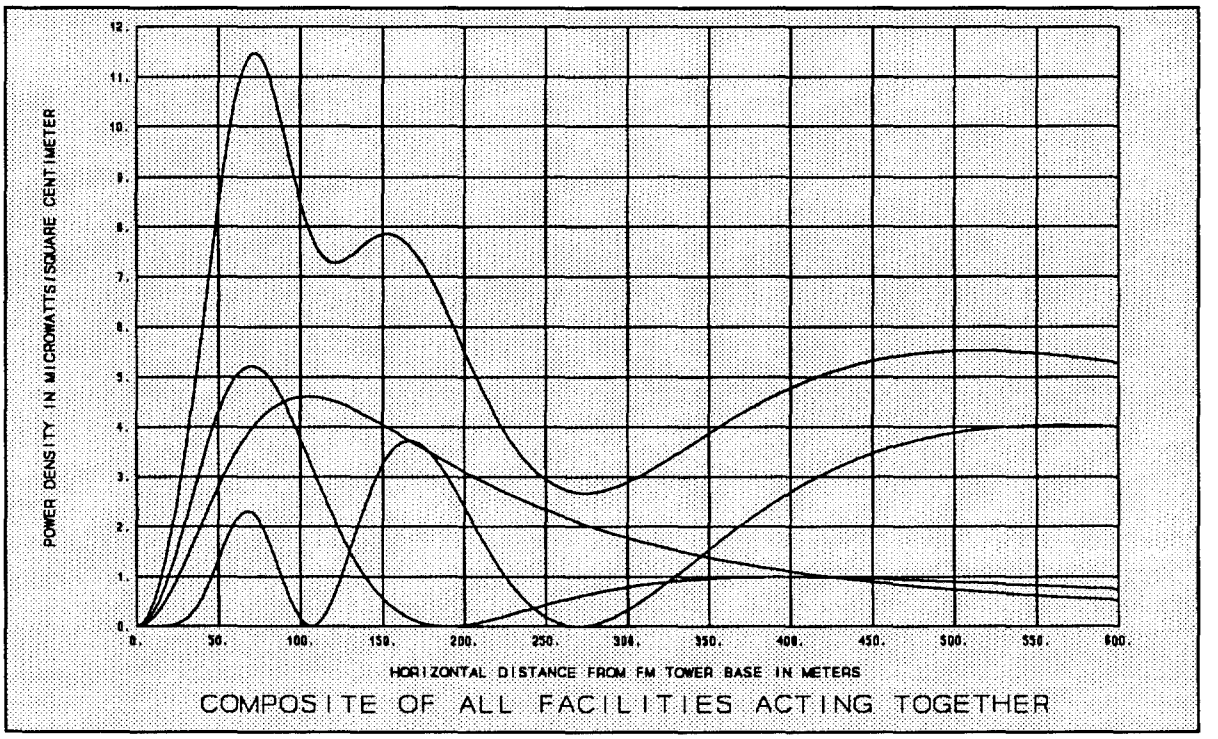

Figure 1

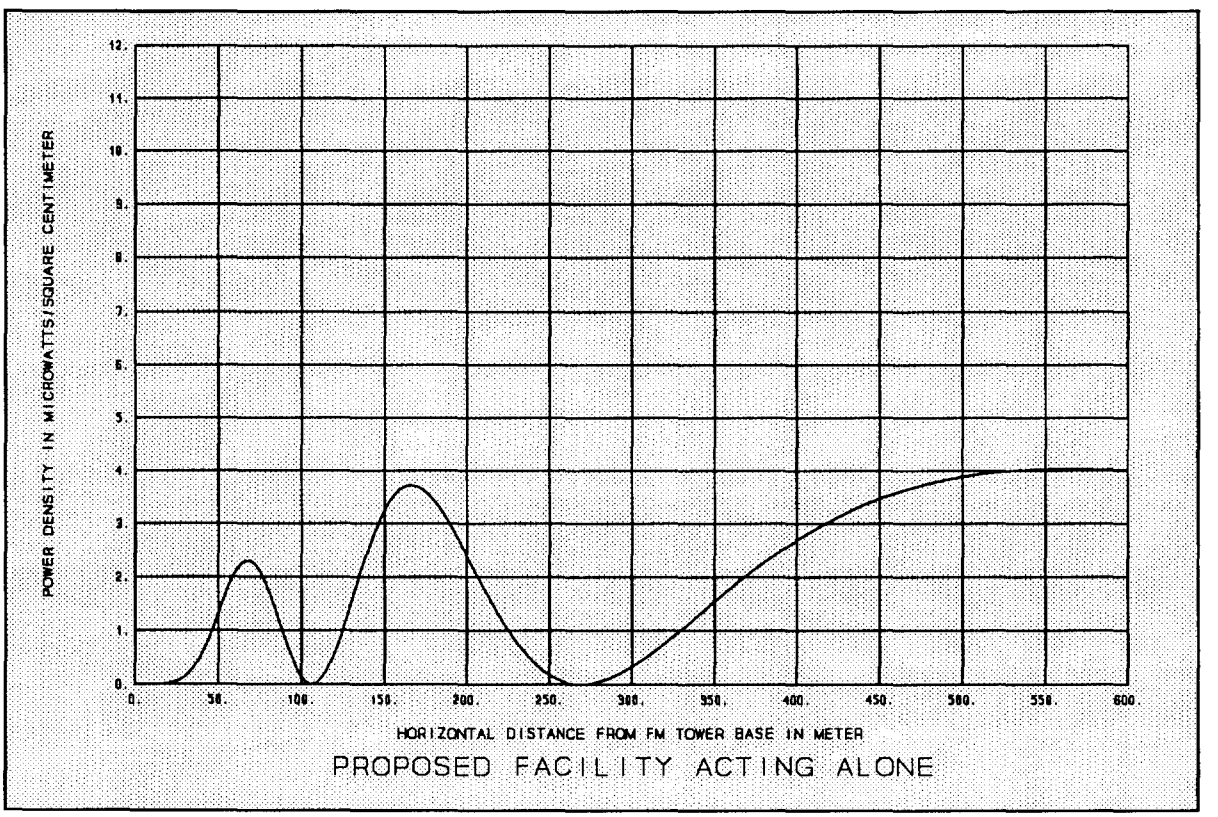

Figure 2

III. CONCLUSIONS

- No underground cable or waveguide is proposed.

- Human exposure to radio frequency radiation will not exceed the maximum level established by the American National Standards Institute (ANSI) based on predictions employing the vertical radiation characteristics of the proposed $\lambda/2$-spaced six-element antenna.

- The property has not been officially designated as wilderness area, nor to the applicant's knowledge is it under consideration for such designation.

- The applicant will comply with environmental requirements of local, state and federal governmental agencies.

- The site is not located in a floodplain.

- The site has not been locally or nationally recognized for its special scenic or recreational value.

- The site is not located in an officially designated wildlife preserve, nor to the applicant's knowledge is it pending consideration for such designation.

- The property is not listed in the National Register of Historic Places, nor to the applicant's knowledge is it eligible for listing.

- The proposed facilities will not affect threatened or endangered species or designated critical habitats as determined by the Secretary of the Interior pursuant to the Endangered Species Act of 1973.

- The proposed facilities will not affect any known Indian religious sites.

- Construction of the proposed facilities will not involve significant changes to surface features.

Therefore, it is concluded that the proposed operation will not significantly affect the quality of the human environment and that an environmental assessment as described in Part 1, Subpart I, of the Commission's Rules is not required. Furthermore, the proposed facility is not classified as having a significant impact upon the environment as defined in §1.1305 and §1.1307 of the Commission's Rules and Regulations.

Lawrence L. Morton, P.E.
Consulting Telecommunications Engineer
November 18, 1991

AFFIDAVIT

State of California)
) **ss:**
County of Orange)

Lawrence L. Morton, being first duly sworn upon oath, deposes and says:

- That he is a qualified engineer,
- That he is a Registered Professional Engineer in the State of California,
- That he is a member of the Association of Federal Communications Consulting Engineers,
- That his qualifications are a matter of record with the Federal Communications Commission,
- That he has prepared many broadcast applications and engineering exhibits that have been filed with and granted by the Federal Communications Commission,
- That he has carried out such engineering work and that the results thereof are attached hereto and form part of this affidavit, and
- That the foregoing statement and the report regarding the aforementioned engineering work are true and correct of his own knowledge.

Date: November 18, 1991

Lawrence L. Morton, P.E.

On November 18, 1991, before me, Nancy A. Chase, a Notary Public, in and for the State of California, personally appeared Lawrence L. Morton known to me to be the person whose name is subscribed to the within instrument, and acknowledged to me that he executed the same.

My Commission expires 11/30/94

Notary Public

OFFICIAL SEAL
NANCY A. CHASE
Notary Public California
ORANGE COUNTY
My Comm. Expires Nov. 30, 199