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**ENGINEERING EXHIBIT EE:**

**MORTENSON BROADCASTING CO. OF TEXAS, INC.  
AM BROADCAST STATION  
KTNO, 1440 KHZ, UNIVERSITY PARK, TEXAS**

<b>LICENSED:</b>	<b>0.35 KW-N/15 KW-D</b>	<b>DA-2</b>	<b>U</b>
<b>PROPOSED:</b>	<b>0.35 KW-N/50 KW-D</b>	<b>DA-2</b>	<b>U</b>

**7 June 2005**

**FCC FACILITY ID NUMBER 34562**

**ENGINEERING EXHIBIT  
IN SUPPORT OF  
AN APPLICATION FOR CONSTRUCTION PERMIT TO:  
INCREASE DAYTIME OPERATING POWER  
OF AN EXISTING CLASS B AM BROADCAST STATION**



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## **DECLARATION**

I, Alan E. Gearing, declare and state that I am a graduate electrical engineer with a Bachelor of Science degree in Electrical Engineering from SUNY University at Buffalo, that I am a registered professional engineer in the District of Columbia (since 1979), and that I have provided engineering services in the area of telecommunications since 1973. My qualifications as an expert in radio engineering are a matter of record with the Federal Communications Commission. I am a senior engineer with the firm of Mullaney Engineering, Inc., consulting radio telecommunications engineers with offices in Gaithersburg, Maryland.

The firm of Mullaney Engineering, Inc., has been retained by MORTENSON BROADCASTING CO. OF TEXAS, INC. to prepare the instant engineering exhibit in support of *an Application for Construction Permit to increase daytime operating power* for existing Class B AM broadcast station KTNO, UNIVERSITY PARK, TEXAS (FCC FACILITY ID NUMBER 34562).

All facts contained herein are true of my own knowledge except those stated to be on information and belief, and as to those facts, I believe them to be true. I declare under penalty of perjury that the foregoing is true and correct.



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Alan E. Gearing, P.E.  
District of Columbia Number 7406

Executed on the 7<sup>th</sup> day of June 2005

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**7 June 2005**

**NARRATIVE STATEMENT:**

**I. GENERAL:**

This engineering statement, and the instant engineering exhibit of which it is part, have been prepared on behalf of MORTENSON BROADCASTING CO. OF TEXAS, INC. (hereinafter "Mortenson"), licensee of AM broadcast Station KTNO - currently licensed to serve University Park, Texas [FCC FACILITY ID NUMBER 34562]. KTNO is a Class B station currently authorized to operate on the frequency of 1440 kHz with daytime power of 15 kilowatts and nighttime power of 0.35 kilowatts. A directional antenna consisting of a total of five towers is employed. Four towers are used for each pattern (day & night), with three towers common to both patterns.

By means of instant application Mortenson **proposes to increase KTNO's daytime operating power to 25 kW. The existing directional antenna array will be employed, with modified parameters. No changes are proposed in the licensed KTNO nighttime operation.** The changes specified herein constitute a **minor change**<sup>1</sup> relative to KTNO's existing licensed operation [See BL-20040827ACM]

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<sup>1</sup> As defined in §73.3571 of the FCC Rules as revised by the *First Report & Order* in MM Docket No. 98-93; adopted March 23, 1999; released March 30, 1999

and **do not** result in any prohibited contour overlap or cause prohibited interference with respect to any other known prior filed application or existing station.

The KTNO facilities proposed herein will be built to comply with the *FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*. Furthermore, since no new tower construction is involved, the instant proposal is believed to be **categorically excluded from environmental processing - including Section 106 review** - pursuant to the provisions of §1.1306 of the Commission's Rules. A more detailed discussion of environmental factors is included under the heading Environmental Considerations below.

Information requested by exhibits in response to questions on Section III-A of FCC Form 301 [September 2004 edition] is incorporated in the following paragraphs, figures, and tables.

## II. ENGINEERING DISCUSSION:

### A. KTNO Transmitter/Antenna Location:

Will employ the same transmitter/antenna site as authorized in BL-20040827ACM. The site is located on the north side of Bruton Road in the City of Dallas, approximately 450 meters ( $\approx 1500'$ ) east of the intersection with 2<sup>nd</sup> Avenue and US Highway 175. The geographic coordinates (NAD 27) of the center of the KTNO antenna array are:

Latitude: 32° 45' 01.8"  
Longitude: 96° 43' 22.0"

Since this is an existing site, a map and aerial photograph of the site are not being submitted herein.

There are no known radio stations within the general vicinity of the site. Table 1 is a list of other broadcast stations and towers within ten kilometers of the KTNO site. The table shows that there are three AM stations located within 3.2 kilometers of the site. KGGR and KSKY are nondirectional stations (the KSKY entry is for that station's auxiliary antenna site), so the pertinent distance is 0.8 km. With separations of 3.2 km and 2.7 km respectively, no adverse interaction is expected between the proposed KTNO operation and either KGGR or KSKY.

The remaining AM station of concern is KRVA, 1600 kHz, Cockrell Hill, TX. The KRVA site is located 1.6 km ( $\approx$  1 mile) to the southeast of the KTNO site specified herein. KRVA employs a 5 kW, two tower directional array during daytime hours and a 930 watt, four tower array nighttime. There is also a pending application, BP-20050127AIX, to increase KRVA's daytime operating power to 25 kW. The tightest suppression for both the KRVA daytime (licensed and proposed) and nighttime patterns is around 80-90 mV/m @ km. Given the relative frequencies, powers and directional patterns involved, it is anticipated that with appropriate filtering installed as necessary these two stations will be able to continue to successfully coexist without any significant adverse interaction. Mortenson will cooperate fully with the licensee of KRVA<sup>2</sup> to install whatever filtering and detuning networks are found to be required.

A computerized analysis of the population contained within the proposed daytime blanketing area indicates that there are 6,175 persons living within the proposed 1000 mV/m contour and 1,286,474 persons living within the proposed 25 mV/m contour. The population within the proposed daytime 1000 mV/m contour is approximately 0.5% of that within the proposed daytime 25 mV/m

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<sup>2</sup> Mortenson is currently the licensee of station KRVA

contour, well below the 1.0% criteria specified in §73.24(g). Mortenson will fully comply with the provisions of §73.88 concerning responding to reports of blanketing interference. The location of the proposed daytime blanketing contour is shown on the map of Figure 2-A, herein.

**B. Proposed Directional Antenna System:**

Mortenson proposes to employ the existing five element directional antenna array authorized in BL-20040827ACM. The proposed 50 kW daytime KTNO directional pattern will employ all five towers (only four towers are used for the authorized KTNO nighttime operation, which is not being modified). Each array element is a grounded, uniform cross-section, guyed, steel tower. A symmetrical three-wire folded unipole feed system is employed on each tower.

Since the towers are existing and no changes are proposed in the towers or ground system, neither a vertical sketch of the towers nor a plat of the proposed site is not being submitted herein. The towers have been found by the FAA not to be hazards to air navigation and each tower has been registered with the FCC.

Figures 1-A through 1-C furnish salient information regarding the proposed daytime directional antenna system. A computer program utilizing the theoretical formulae modified in accordance with the Commission's Rules has been used to determine the final values of fields, RMS, RSS, etc. (General design formulae and sample calculations are not being provided herein but will be made available upon request by the Commission.) Theoretical RMS value for the proposed KTNO 25 kW daytime pattern is 2393 mV/m. This value equates to 338 mV/m/kW @ km, meeting the minimum efficiency requirement of 282 mV/m/kW @ km specified in §73.189.



**C. Principal Community Coverage:**

Figure 2-B, herein, is a map showing the location of the existing, authorized, and proposed KTNO daytime 5.0 mV/m contours, while Figures 2-C and 2-D depict the 2.0 mV/m and 0.5 mV/m contours, respectively. From the map of Figure 6-B it is clearly evident that the principal community to be served (UNIVERSITY PARK, TEXAS) is well within the proposed daytime 5 mV/m contour.

**D. Daytime Allocation Study:**

Table 2 is a tabulation of stations pertinent to the operation of Station KTNO on 1440 kHz as proposed herein. Figures 3-A through 3-C are appropriately scaled maps showing applicable allocation contours for KTNO and the more critical stations from Table 1. Sheet 1 of Figure 3-A shows the overall co-channel allocation situation. Because of the large area covered, this map is not a full-scale reproduction of the FCC's Figure M-3 ground conductivity map. If requested by the Commission, a showing using a full-scale M-3 map will be provided. Sheet 2 of Figure 3-A is an expanded scale showing detailing the lack of prohibited contour overlap between the proposed KTNO operation and cochannel stations KETX and KELG. Figure 3-B shows the first adjacent channel allocation situation and Figure 3-C shows the second adjacent channel allocation situation. In order to show in more detail the relative locations (**and the absence of any overlap**) of the proposed KTNO and KTFW 5 mV/m contours, Figure 3-C does not employ the FCC's Figure M-3 map. A showing using a full-scale M-3 map will be provided upon request. There are no third adjacent channel stations close enough to warrant mapping.

These maps show that there is **no** prohibited contour overlap between the proposed KTNO operation and any other station.

**E. Conductivities and Unattenuated Field Strengths:**

The FCC Conductivity Map, Figure M-3, was used to establish the effective conductivities for all stations in the absence of measurement data. Field strength measurements have been employed for both the licensed and proposed KTNO operations as well as for stations KROO, KEES, KPUR, KNET, and KTFW

Field strength measurements to establish actual conductivity values for the proposed KTNO operation consists of a combination of measurements taken from the KTNO site as well as measurements taken from nearby station KRVA just 1.6 km (1.0 mile) from the KTNO site. In compliance with the Commission's policy of permitting measured conductivity values to be used within 2 miles of the site that was actually measured the data for KRVA have be applied to the proposed KTNO operation. The results of additional measurements taken from the KTNO site are submitted as Appendices A & B herein. Appendices C-F provide the measurement results on stations KROO and KEES. Measurements on stations KPUR, KNET & KTFW have been previously submitted to the Commission and are not being resubmitted herein. Table 3 provides a summary of the measured ground conductivities employed for each station as well as the location where the measurement data can be found in the FCC's files.

A further explanation is warranted regarding how some of the measurement data for KTNO was applied. In instances where adjacent measured radials are spaced less than 20 degrees, where measurements on one radial extend to a greater distance, the measurements for this radial were applied over the entire  $\pm 10$ -degree arc at distances beyond which measurements were made on the shorter radial. For example, measurements on the 6-degree radial extended to a distance of 72.9 km while measurements on the 11-degree radial extended only 33.5 km. For distances beyond 33.5 km, the 6-degree radial measurements were

applied over an arc extending to 16 degrees and the 11-degree measurements were applied only over the arc of 16-degrees to 19.25-degrees (beyond 19.25 degrees the measurement data from the 27.5-degree radial were applied as under normal FCC procedures.) The method employed is believed to be correct and consistent with past FCC practice.

Where applicable, the equivalent distance method was used to establish the distances to contours.

The FCC's AM station database has been used to obtain parameters of all stations considered in the allocation studies except for the proposed KTNO operation which is specified herein.

As the latest version of FCC Form 301 [March 2001] no longer specifically refers to a tabulation of supporting data employed in generating groundwave contour locations depicted in coverage and allocation showings, such data are not being submitted herein, but will be supplied to the Commission upon request.

**F. Environmental Considerations:**

The applicant believes its proposal will not significantly affect the environment for the following reasons.

The instant proposal does not involve the construction of any new towers. Since no new tower construction is involved and no changes are proposed in the existing towers, the instant proposal is believed to also be exempt from Section 106 review. Furthermore, operation of the proposed facility will not involve the exposure of workers or the general public to levels of radio frequency electromagnetic fields exceeding guidelines adopted by the Federal Communications Commission. [The current FCC guidelines are based upon

criteria contained in the National Council of Radiation Protection and Measurements (NCRP) Report No.86 (1986) and ANSI/IEEE C95.1-1992.]

With regard to the last item, each tower is surrounded by a gated fence, at least seven feet tall. The fences vary between two and three meters from any point on the tower or feed line, depending on the maximum power being delivered to that tower under the licensed daytime and nighttime arrays. Since the "worst case" distance from Section 1 of Supplement A to OET Bulletin No. 65 (Edition 97-01) assuming a 50 kW, 1440 kHz, AM station with antenna towers of approximately 0.25 wavelength to 0.35 wavelength in height is four meters, measurements will be made for the proposed 50 kW operation and the fenced in area expanded as necessary to ensure that any area exceeding the MPE limit values will be within the fence. The fence gates are kept locked and appropriate warning signs posted on each face of the fences. Procedures are in place to protect workers requiring access to the tower inside the fenced area, including reduction of power or cessation of operation, to comply with germane exposure guidelines.

### III. SUMMARY:

Mortenson proposes to modify the operation of AM broadcast station KTNO to increase daytime operating power to 25 kW, employing the existing directional array but with modified parameters. The station will continue to operate on a frequency of 1440 kHz and will continue to serve its principal community of University Park, Texas. Also, no changes are proposed in KTNO's licensed nighttime operation. The technical modifications proposed herein constitute a minor change relative to KTNO's licensed operation.

Based upon the technical specifications contained in available station facility databases and engineering analysis carried out during the design of the directional antenna system proposed herein, the undersigned believes that the proposed

operation: 1) would not result in prohibited contour overlap; 2) would not create or receive prohibited interference; 3) would not have any significant impact on the environment; and 4) is fully in compliance with all Commission's rules and applicable international agreements.



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Alan E. Gearing, P.E.