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ENGINEERING EXHIBIT EE:

**MORTENSON BROADCASTING COMPANY
AM BROADCAST STATION WNSG
1240 KHZ, NASHVILLE, TENNESSEE**

**LICENSED: 1.0 KW ND U
PROPOSED: 1.0 KW ND U**

14 March 2005

FCC FACILITY NUMBER 16898

**ENGINEERING EXHIBIT
IN SUPPORT OF
AN APPLICATION FOR CONSTRUCTION PERMIT TO
CHANGE TRANSMITTER/ANTENNA LOCATION AND
CHANGE RADIATOR HEIGHT
OF EXISTING CLASS C 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 areas of broadcasting and radio communications 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 broadcast and radio communications engineers with offices in Gaithersburg, Maryland.

The firm of Mullaney Engineering, Inc., has been retained by MORTENSON BROADCASTING COMPANY to prepare the instant engineering exhibit and Section III-A of FCC Form 301 in support of *an Application for Construction Permit to: change transmitter/antenna location and change radiator height* for existing Class C AM broadcast station WNSG, licensed to NASHVILLE, TENNESSEE [FCC FACILITY ID NUMBER 16898]

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.



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

Executed on the 14th day of March 2005

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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 COMPANY (hereinafter "MBC"), licensee of AM Broadcast Station WNSG, NASHVILLE, TENNESSEE [FCC FACILITY ID NUMBER 16898]. WNSG is a Class C station licensed to operate on the frequency of 1240 kHz with fulltime power of 1,000 watts, employing a non-directional antenna.

WNSG currently operates from a tower owned by Citadel Broadcasting Company (hereinafter "Citadel"). Citadel has informed MBC that it must vacate its current site as Citadel intends to sell the site. MBC therefore **proposes to diplex the WNSG operation on the existing tower currently employed by AM broadcast station WNAH, 1360 kHz, Nashville, Tennessee.**

The changes proposed herein fall within the definition of a minor change as given in the current version of §73.3571 of the FCC Rules. Except with respect to principal community coverage requirements [§73.24(i)] **for which a waiver is**

requested, the proposed operation of WNSG is believed to be completely in compliance with all pertinent FCC rules and policies, as well as all international treaty requirements. Full discussion and justifications for the waiver requested are contained in the paragraphs below.

The proposed WNSG facilities will be built to comply with the *FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields* and the instant proposal is categorically excluded from environmental processing pursuant to the provisions of Section 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 version] are incorporated in the following paragraphs, figures, and tables.

II. ENGINEERING DISCUSSION:

A. WNSG Transmitter/Antenna Location:

MBC proposes to diplex the WNSG operation on the existing tower employed by AM broadcast station WNAH, 1360 kHz, Nashville, Tennessee. While preparing the instant application, it was discovered that the notified geographic coordinates for the WNAH tower were incorrect. In conjunction with the instant application, the WNAH tower coordinates are being corrected. The Federal Aviation Administration is being notified of the coordinate correction. Once a new Determination of No Hazard has been received, the WNAH tower will be registered with the FCC. [The appropriate application(s) to correct the coordinate information on file for WNAH will also be filed once the tower registration has been updated.]

The WNAH tower is located on the western side of Lotta Avenue, approximately 44 meters (145') north of the intersection with Richardson Avenue. The proposed site is 4.0 km (2.5 mi.) at a bearing of 355.4 degrees True from the licensed WNSG site. Figure 1 is a full-scale reproduction of a portion of the USGS 7.5 minute series topographic quadrangle map showing the location of the proposed WNSG site. The corrected geographic coordinates [NAD 27 reference] of the proposed antenna location are:

Latitude: 36° 11' 32.9" (rounded to 33")
Longitude: 86° 46' 28.6" (rounded to 29")

Figure 2 herein is an aerial photograph showing the proposed WNSG site and the surrounding area.

Except for the collocated operation of WNAH, there are no known radio facilities located within the general vicinity of the proposed site. Table 1 is a list other broadcast stations and towers within ten kilometers of the proposed site. The list has entries for four existing stations and three proposed FM translators with distances of 3.2 kilometers or less from the proposed antenna location.

The one AM station listed, WVOL (LIC), 1470 kHz, Berry Hill, TN, is located 1.0 km (0.6 mi.) distant. WVOL operates with a daytime power of 5 kW into a 2-tower directional antenna and a nighttime power of 1 kW into a 6-tower directional antenna. Since the tower proposed for use by WNSG is existing and since no physical change in the tower is proposed, no adverse interaction between WVOL and WNSG is expected. MBC will install whatever additional filtering and detuning networks are found to be required.

Likewise, with appropriate filtering there is not expected to be any problems with WNAH on 1360 kHz and WNSG on 1240 kHz sharing the same radiator.

As for the non-AM facilities listed, because of the differences in frequency and the amount of physical separation, no adverse interaction with any of these stations is expected. [Note: Since the WNSG proposal is for nondirectional operation, the pertinent distance pursuant to §73.1692 is actually 0.8 km. Since the list of Table 1 shows no stations (other than collocated WNAH) within 0.8 km of the proposed site, no further discussion of nearby stations is warranted.]

A computerized analysis of the population contained within the proposed blanketing area indicates that there are only 86 persons living within the proposed 1000 mV/m contour [based on 2000 US Census]. This number is well below the 300 person threshold specified in §73.24(g) of the FCC rules. MBC will fully comply with the provisions of §73.88 concerning responding to reports of blanketing interference. Figure 5-A herein is a map showing the location of the 1 V/m blanketing contour.

B. Proposed Antenna:

The existing WNAH radiator proposed for use by WNSG is a base-insulated, guyed, uniform cross-section, steel tower. Its overall height above ground is 61.9 meters (203'). The effective electrical length of the tower will be 61.0 meters (203'), which at WNSG's operating frequency of 1240 kHz is equivalent to 90.8 electrical degrees. Figure 3, herein, is a vertical plan sketch of the proposed WNSG/WNAH radiator.

The antenna ground system consists of 120 buried copper wire radials evenly spaced about the tower. Each radial is nominally 61 meters (200') in length except where foreshortened at the property boundaries to the east and west. An additional 120 radials, each nominally 6.1 meters (20') in length, are interspersed between the longer radials. Based upon the notified efficiency of the antenna installation at WNAH's operating frequency of 1360 kHz, i.e. 305.8 mV/m/kW @ km, it was determined that the ground system has an effective radius of 50 meters (164'). At WNSG's operating frequency of 1240 kHz, this is equivalent to an effective electrical length of 74.5 degrees. Figure 4 is a site plat showing the proposed ground system layout and the proposed tower location relative to the site boundaries.

A computer program based on Figure 8 of §73.190 of the FCC Rules, and incorporating standard correction factors for ground systems having radials shorter than one-quarter wavelength, was used to calculate the predicted efficiency of the proposed antenna structure at 1240 kHz. The theoretical efficiency of the proposed antenna system thus determined is 293.4 mV/m at one kilometer for one kilowatt, in compliance with the minimum requirements of §73.189 of the FCC Rules.

C. Principal Community Coverage:

Figure 5-B, herein, is a map showing the location of the licensed and proposed WNSG 5.0 mV/m contours. Figure 5-C, herein, is a map showing the location of the licensed and proposed WNSG 2.0 mV/m and 0.5 mV/m contours. Figure 5-D shows the licensed and proposed WNSG 26.9 mV/m 50% RSS night limit contours.

From Figure 5-B it is evident that the principal community to be served (NASHVILLE, TENNESSEE) is not provided with the level of daytime coverage required by a strict reading of §73.24(i). In fact, the licensed WNSG facility does not provide 100% coverage to Nashville. From the map of Figure 5-B it is evident that in order to achieve even 80% coverage of Nashville, that a central city transmitter/antenna site would be required. The Commission is well aware, however, how difficult it has become to secure a broadcast transmitter/antenna site, especially one for an AM broadcast station, in heavily populated areas. The instant proposal, which specifies duplexing on an existing tower, is believed to be the best location available. In addition, co-use of an existing installation is desirable from an environmental standpoint. Also, note that on Figure 5-B is shown the existing authorized 5 mV/m contour for AM station WNAH, with which WNSG proposes to collocate. From the map it is readily evident that the proposed WNSG 5 mV/m contour **will cover more** of Nashville than does the authorized WNAH contour. MBC therefore respectfully requests a waiver of the provisions of §73.24(i) with respect to daytime coverage of Nashville.

As to coverage of Nashville during nighttime hours, Figure 5-D shows that even WNSG's licensed operation does not provide the specified 80% coverage of Nashville with its 50% RSS night limit contour. It is also readily evident from the map of Figure 5-D that 80% coverage of Nashville would not be possible from any transmitter/antenna location. AS noted above, the proposed WNSG site is believed to be the best available and is desirable from an environmental standpoint. MBC respectfully requests waiver of the provisions of §73.24(i) relative to principal community coverage by the proposed WNSG 50% RSS nighttime interference free contour.

D. Daytime Allocation Study:

Table 2 is a tabulation of stations pertinent to the operation of Station WNSG on 1240 kHz at Nashville. Figures 6-A through 6-C are appropriately scaled maps¹ showing applicable allocation contours for WNSG and the more critical stations from Table 2. Figure 6-A shows the cochannel allocation situation, Figure 6-B shows the first adjacent channel allocation situation, and Figure 6-C shows the second and third adjacent channel allocation situation. [NOTE: There are no third adjacent channel stations close enough to warrant mapping.]

Daytime allocation studies involving Class C stations are typically carried out based on the assumption of 250-watt, non-directional operation by all Class C stations for interference received, while for interference caused other Class C stations are assumed to be operating at full licensed power (see §73.37(b)). The analysis shown in Table 2 and the contours shown on Figure 6-A employ this assumption. The last two columns of Table 2 show the clearance (black, positive numbers) or the amount of contour overlap (red, negative numbers). Comparison of the licensed and proposed analysis shows that the amount of both caused and received overlap has been reduced with respect to both stations that involve normally prohibited contour overlap with WNSG. This is confirmed by study of the contours shown on the maps of Figure 6. The instant proposal is therefore believed to be totally in compliance with the contour overlap requirements of the FCC rules [§§73.37 & 73.182].

¹ It is the undersigned's understanding that for electronic filing, the Commission no longer requires that allocation studies be submitted on full-scale reproductions of the FCC's M-3 map. However, if requested by the Commission a showing using a full-scale M-3 map will be provided

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. No measurement data was readily available for any station. 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 study except for the proposed WNSG operation which is specified herein.

As the latest version of FCC Form 301 [September 2004] 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. Nighttime Allocation Study:

Section 73.182(a)(3) of the FCC Rules states: "On local channels the separation required for the daytime protection shall also determine the nighttime separation." Hence, no separate nighttime allocation analysis has been conducted. [Nashville is not located close enough to either the Canadian or Mexican border to trigger any special requirements concerning Class C nighttime allocations.]

The proposed WNSG 50% RSS night limit was determined to be 26.9 mV/m and its 25% RSS night limit was determined to be 38.9 mV/m. Table 3 provides calculation details of the WNSG RSS limits.

G. Environmental Considerations:

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

The proposal does not meet any of the criteria specified in Section 1.1307 of the FCC Rules. More specifically, the proposed facilities are not known to fall within any of the categories enumerated in Sections 1.1307(a)(1)-(7) and will not involve the use of high intensity white lights. 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, the proposed tower will be surrounded by a gated fence, at least seven feet tall. The fence will not be less than two meters from any point on the tower or feed line. This is the “worst case” distance from Section 1 of Supplement A to OET Bulletin No. 65 (Edition 97-01) assuming: a 1.0 KW, 1240 kHz, AM station plus a 1.0 kW, 1360 kHz, AM station both with antenna tower between 0.25 & 0.5 wavelength in height. The fence gate will be kept locked and appropriate warning signs posted on each face of the fence. Procedures will be adopted 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:

MBC proposes to continue operating Class C AM station WNSG at NASHVILLE, TENNESSEE, but with its transmitter/antenna diplexed on the existing tower of AM broadcast station WNAH. Operation of WNSG will continue to be on 1240 kHz with fulltime nondirectional power of 1.0 kW.

The proposed changes and would not have any significant impact on the environment. Except with respect to principal community coverage requirements [§73.24(i)], **for which a waiver has been requested and for which supporting documentation has been provided**, the proposed operation of WNSG is believed to be completely in compliance with all pertinent FCC rules and policies, as well as all international treaty requirements.



Alan E. Gearing, P.E.