

TECHNICAL EXHIBIT  
APPLICATION FOR AUXILIARY FM CONSTRUCTION PERMIT  
RADIO STATION WBEZ(FM) AUXILIARY  
CHICAGO, ILLINOIS  
CH 218B 5.6 KW 425 M

Technical Narrative

The technical exhibit of which this narrative is part was prepared on behalf of radio station WBEZ(FM) on Channel 218B assigned to Chicago, Illinois. WBEZ(FM) is applying for a construction permit for an auxiliary facility with an effective radiated power of 5.6 kilowatts and an antenna height above average terrain of 425 meters.

It is proposed to locate the WBEZ(FM) auxiliary facility on the master FM antenna located atop of the John Hancock Center building. The new proposed master FM antenna will operate from the John Hancock Center's east tower with a radiation center of 606 meters above mean sea level and 425 meters above ground level.

The distance to the proposed FCC predicted 60 dbu coverage contour will be equivalent to the main station's existing contour in compliance with Section 73.1675(a)(1).

Proposed Transmitter Location

The proposed auxiliary transmitting facility will consist of a master FM antenna mounted on the John Hancock Center's east tower. The location is uniquely described by the following geographic coordinates, which were obtained from the Commission's Tower Registration Database:

41° 53' 56" North Latitude  
87° 37' 23" West Longitude

A map showing the transmitter location is included herein as Figure 1. A sketch showing the proposed antenna on the John Hancock Center is shown on Figure 2.

Non-Adverse Impact on WXRT(FM) Directional FM Antenna

The proposed Master FM antenna will be located on the same supporting structure as radio station WXRT(FM) on Channel 226B assigned to Chicago, Illinois. WXRT(FM) operates with an ERI Directional FM antenna, also the manufacturer of the new Master FM antenna. Appendix A contains a statement that "ERI will guarantee the pattern measurement results [of WXRT] will demonstrate that the WXRT pattern will be unchanged by the proposed changes to the structure."

Coverage Contour

The predicted 60 dBu coverage contour for the proposed operation were calculated in accordance with the provisions of Section 73.313. In accordance with current FCC practice, the distances to the contours were calculated

without consideration given to terrain roughness correction factors.

The average terrain elevations from 3 to 16 kilometers along eight radials evenly spaced at 45-degree intervals were obtained from a past application for construction permit.<sup>1</sup> The terrain elevations were then used in combination with the effective radiated power for determining the distances to coverage contours.

Figure 3 is a map showing the predicted 60 dBu coverage contours of the proposed facility and existing licensed main facility.

#### Radiofrequency Electromagnetic Field Considerations

The proposed facility has been evaluated in terms of potential radiofrequency electromagnetic field exposure at ground level in accordance with OET Bulletin No. 65, *Evaluating Compliance with FCC Specified Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*.<sup>2</sup> The power density at the base of the tower was calculated using the appropriate procedure contained in Section 2, Supplement A, *Additional Information for Radio and Television Broadcast Stations*, of the Bulletin.

The predicted electromagnetic field exposure at the nearest rooftop level is calculated below. Since the new master FM antenna will be located at a higher elevation and the effective radiated power for each station is being decreased, it can be logically inferred that the

---

<sup>1</sup> See WLUP-FM application for Construction Permit for the John Hancock Center.

<sup>2</sup> OET Bulletin 65, Second Edition 97-01, August, 1997.

electromagnetic impact at rooftop level from the proposed auxiliary facility will be less than the present main facility.

For the calculation, a conservative assumed downward vertical factor of 0.5 (this value is greater than that usually achieved) was employed with a combined (horizontal and vertical polarization) effective radiated power of 8 kilowatts. The nearest rooftop level from the proposed radiation center is located 78 meters (255 feet) below the antenna. This area is identified as the *Antenna Grid* area shown on Figure 2. It is calculated that the power density would not exceed 0.01 mW/cm<sup>2</sup> at this level. This is less than five percent of the Commission's guideline value in a controlled environment for a FM radio station.<sup>3</sup>

As stated in the Communication's Site Management, Inc. Compliance Statement, the John Hancock Center rooftops (both lower and penthouse) are restricted areas.<sup>4</sup> No members of the general public are allowed in these rooftop areas. Hence, these areas can be considered as controlled environments.

A radiofrequency electromagnetic field measurement survey will be undertaken after construction and operation of the new FM antenna. This survey will ensure that the electromagnetic emissions from the new master FM antenna

---

<sup>3</sup> The FCC maximum guideline for a FM broadcast station in an controlled environment is 1.0 mW/cm<sup>2</sup>.

<sup>4</sup> Communication's Site Management, Compliance Statement, ANSI Radio Frequency Protection Guides, Rooftop Communications Areas at the John Hancock Center, Chicago, Illinois, Summer, 1996. Obtained from WUSN-FM's license renewal application, FCC File Number: 960731L7.

system are below the Commission's guideline values at the rooftop areas.<sup>5</sup>

When it becomes necessary for workers to ascend the John Hancock Center towers, appropriate measures, such as reduction or shut down of power if necessary, shall be taken to ensure that the human exposure to radiofrequency radiation will not exceed the FCC guidelines. WBEZ(FM) will also coordinate with the other co-located users of the towers to reduce or shut down power when workers representing any station ascend the tower.

Charles A. Cooper

September 24, 2002

du Treil, Lundin & Rackley, Inc.  
201 Fletcher Avenue  
Sarasota, Florida 34237  
941.329.6000

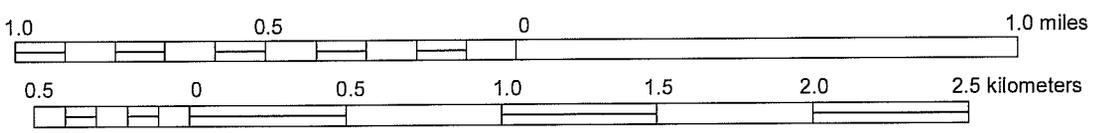
---

<sup>5</sup> This survey can be included within the application for license, but the station wishes that automatic program test authority be provided if the Commission requires such a survey.



**CHICAGO LOOP, ILLINOIS**  
 N4152.5--W8737.517.5  
 PHOTOINSPECTED 1978  
**1963**  
 PHOTOREVISED 1972  
 AMS 3467 I NW-SERIES V863

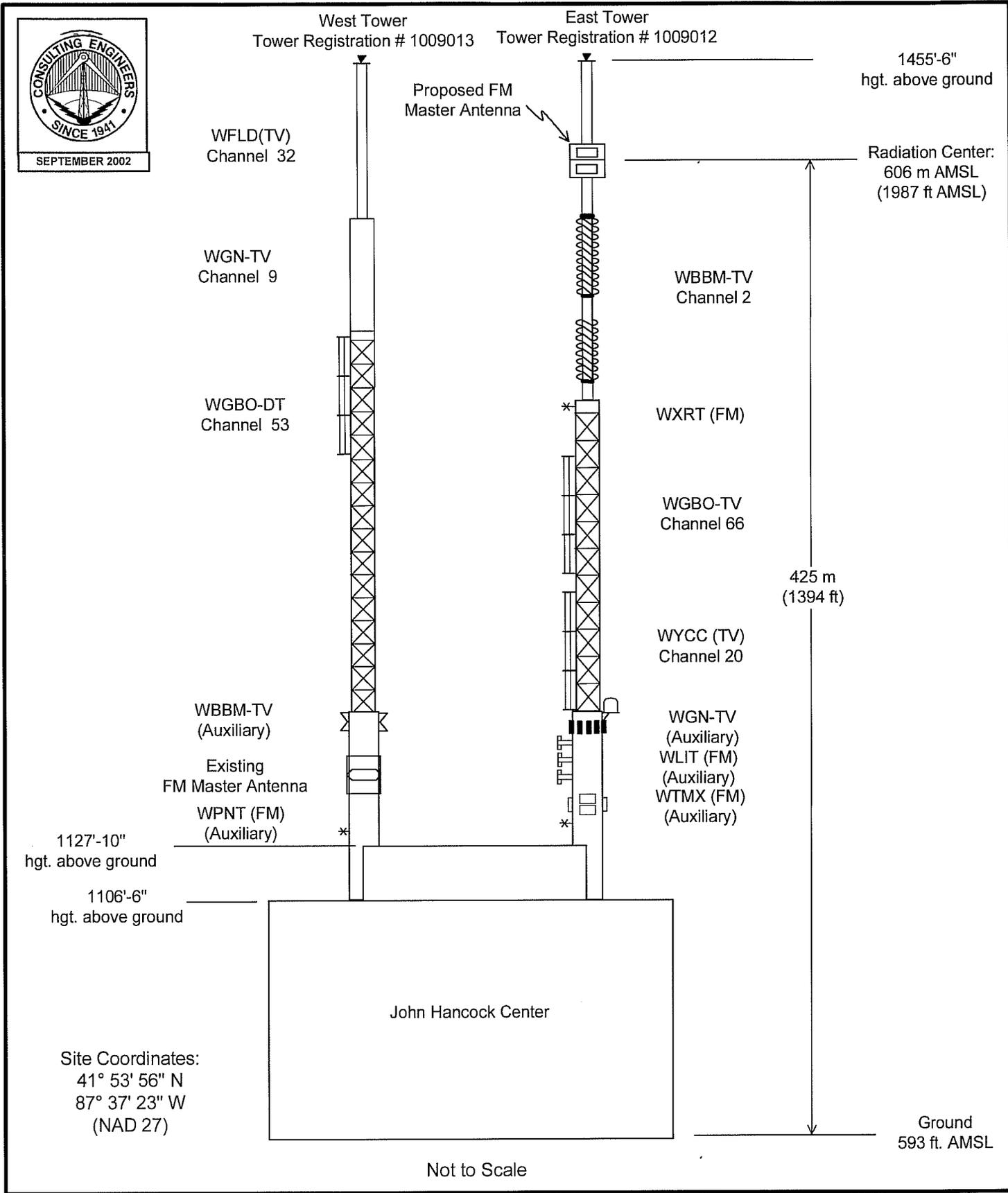
Proposed Site:  
 41° 53' 56"N  
 87° 37' 23"W



**PROPOSED AUXILIARY TRANSMITTER LOCATION**

RADIO STATION WBEZ(FM)  
 CHICAGO, ILLINOIS  
 CH 218B 5.6 KW 425 M

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

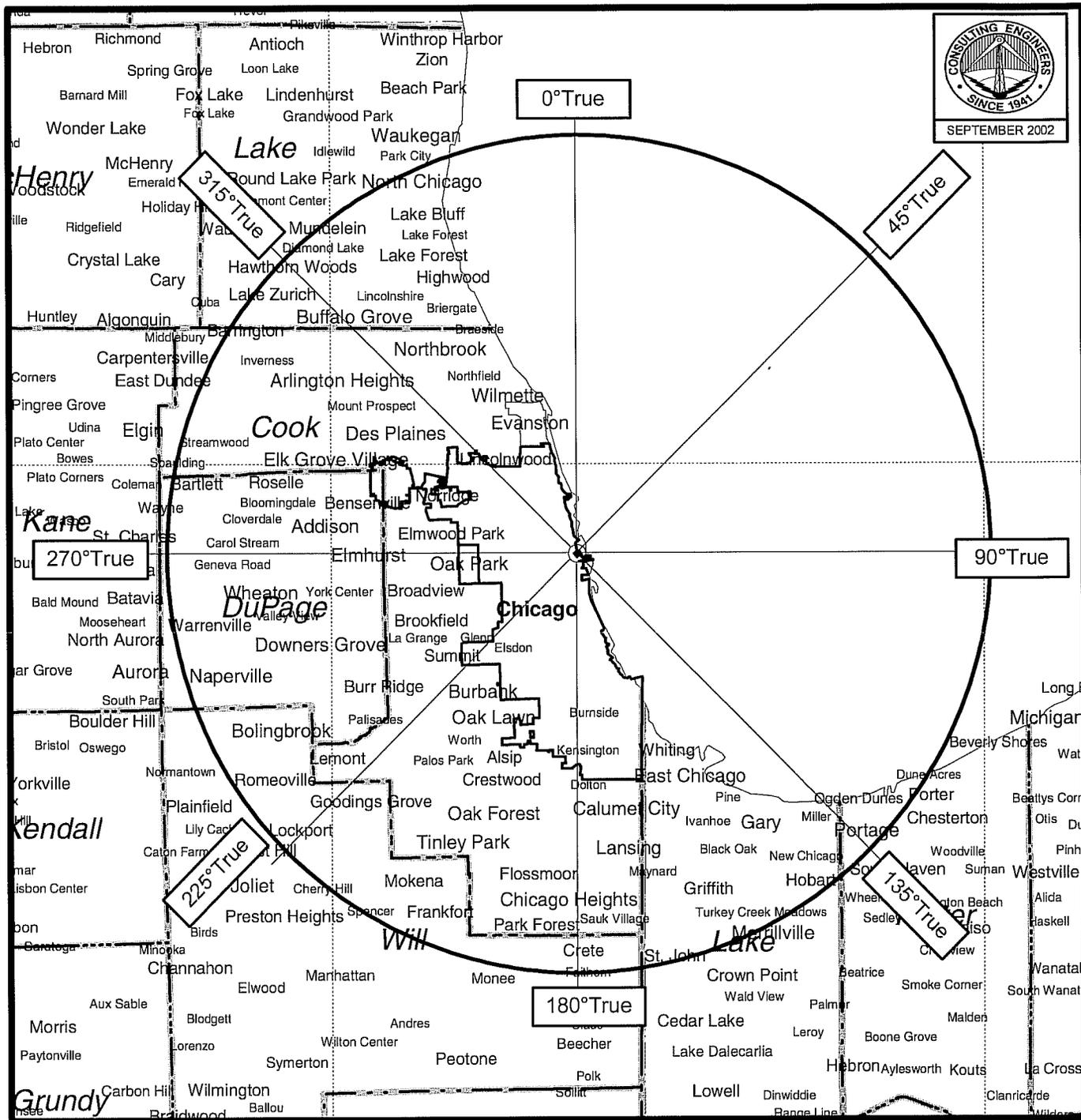


**PROPOSED AUXILIARY ANTENNA SKETCH**

RADIO STATION WBEZ(FM)

CHICAGO, ILLINOIS

CH 218B 5.6 KW 425 M



**FCC PREDICTED 60 DBU COVERAGE CONTOURS  
(MAIN AND PROPOSED AUXILIARY)**

RADIO STATION WBEZ(FM)  
CHICAGO, ILLINIOS  
CH 218B 5.6 KW 425 M

du Treil, Lundin & Rackley, Inc., Sarasota, Florida

APPENDIX A

ANTENNA MANUFACTURER STATEMENT REGARDING IMPACT  
TO CO-LOCATED WXRT(FM)



**Electronics Research, Inc.**

7777 Gardner Road ▪ Chandler, Indiana 47610 ▪ (812) 925-6000 ▪ Fax: (812) 925-4030 ▪ www.ERInc.com

Memo From R. Rose (Feb.27, 01)  
Project: Hancock Center Quote  
Subject: proposed clause dealing with WXRT

#### Consideration for WXRT directional antenna

WXRT's directional antenna currently occupies a position on the East Mast. This antenna was originally manufactured by ERI. As planned the new Master FM antenna will be located just above WXRT's antenna on the East Mast. It is also intended to redesign and provide a new support structure for the Master FM Antenna system. The non-adverse impact this new structure will have on WXRT antenna will be of the utmost importance to ERI.

Included within ERI Quote are provisions to model WXRT's antenna. Allowances are provided for the customers to witness the full scale Antenna mockup and discuss modeling results. ERI feels certain that a coverage pattern for WXRT is obtainable that is for all practical purposes identical to WXRT's current pattern. ERI will guarantee the pattern measurement results will demonstrate that the WXRT pattern will be unchanged by the proposed changes to the structure. The changes will include the addition and removal of feed lines as required by the antenna modifications. The ERI procedure for the pattern measurement will be as follows:

Step 1: ERI will build and test a full-scale model of the existing WXRT antenna and it's mounting structure.

Step 2: ERI will add the proposed modifications to the test and repeat the measurements.

Step 3: ERI will compare the before and after measurements to verify that no adverse change in the WXRT coverage will occur. The measurement guarantee will be made to be within the range accuracy of +/- 2 db.