

**FCC Form 340
Application for a Construction Permit for
a Noncommercial Educational FM Station
in Grand Marais, Minnesota**

Minnesota Public Radio

EXHIBIT 3, Page 4

PENDING APPLICATIONS

WGGL (FM), Houghton, MI (FCC File No. BMLD-961108KA and main studio rule waiver request)

KLSE (FM), Rochester, MN (FCC File No. BLED-980504KG)

Translator Station K299AB, Winona, MN (FCC File No. 971126TN)

ITFS Station WHR-754 Mankato, MN (FCC File Nos. BRIF-970203ET and BMPLIF-980127DA)

ITFS Station WHR-751, Duluth, MN (FCC File No. BRIF-970203EU)

ITFS Station WHR-752, Sioux Falls, MN (FCC File No. BMPLIF- 980623DA)

New Station in Austin, MN (FCC File No. BPED-980603MB)

New Translator Station in Worthington, MN (filed 11/10/98; no FCC File No. assigned yet)

Translator Station K280EC, Owatonna, MN (STA request to remain silent)

Translator Station K289AE, Owatonna, MN (STA request to remain silent)

ITFS Station WHR-753, Rochester, MN (FCC File Nos. BMPLIF-980910DZ and BMPLIF-980825DE)

ITFS Station WHR-497, Saint Paul, MN (FCC File No. BMPLIF-980818DN)

KNSW (FM) & KRSW (FM), Worthington, MN (Main Studio rule waiver requests)

WMNN (AM) - (FCC File No. BL-981112AB)

New station in Brainerd, MN (FCC File No. BPED-981113MC)

New station in Fergus Falls, MN, (application filed 11/20/98; FCC file number not assigned yet)

New station in Grand Marais, MN (application filed 12/4/98; FCC file numbers not assigned yet)

An application on FCC Form 340 for a new station in Fergus Falls, MN is being filed simultaneously herewith.

FCC Form 340

**Application for a Construction Permit for
a Noncommercial Educational FM Station
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Minnesota Public Radio

EXHIBIT 4, Page 1

Refers to Section IV

Attached is a copy of a program schedule which closely resembles the program schedule that would be broadcast by the proposed station. This schedule is for the Minnesota Public Radio Regional Network classical music service—currently broadcast over KRSU (FM) in Appleton, MN, KCRB (FM) in Bemidji, MN, KBPR (FM) in Brainerd, MN, KLCD (FM) in Decorah, IA, WSCD (FM) in Duluth, MN, KSJN (FM) in Minneapolis/Saint Paul, MN, KCCM (FM) in Moorhead/Fargo, MN, KLSE (FM) in Rochester, MN, KSJR (FM) in Collegeville, MN, KGAC (FM) in Saint Peter/Mankato, MN, KRSD (FM) in Sioux Falls, SD, KWRV in Sun Valley, ID, WIRR (FM) in Virginia, MN, KRSW (FM) in Worthington, MN and KQMN (FM) in Thief River Falls, MN — for the month of November, 1998. This schedule appears in the program guide contained in *MINNESOTA MONTHLY* magazine, which is sent to listener members of Minnesota Public Radio, and appears on the Minnesota Public Radio website at www.mpr.org.

The schedule contains a stunning array of arts, culture and entertainment programming, representing the best radio being produced in the world—by National Public Radio, by the producers of Public Radio International, by the British Broadcasting Corporation on their World Service, by the Canadian Broadcasting Corporation, by independent producers from all over the US and around the world, and by Minnesota Public Radio's own network staff.

Minnesota Public Radio's staff of music programmers, producers and announcers represents one of the strongest cultural programming groups in broadcasting, works from a huge library of more than 40,000 compact discs, and produces a wide variety of music programs distributed nationally, including broadcasts by the Minnesota Orchestra and St. Paul Chamber Orchestra, holiday and other specials, including the annual live broadcast of the Festival of Lessons and Carols from the Chapel of King's College, Cambridge, and the multiple award-winning series *St. Paul Sunday* and *Pipedreams*. In addition, Minnesota Public Radio produces and distributes *Classical 24/7*, the nation's only live 24-hour satellite classical music service, which is heard on more than 300 public radio stations, including Minnesota Public Radio's classical music service stations.

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Minnesota Public Radio

EXHIBIT 4, Page 2

Refers to Section IV

PROGRAMMING POLICIES AND OBJECTIVES



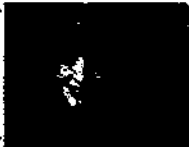



1. To provide the best possible cultural and arts services suitable for a public educational broadcasting station.
2. To reflect the variety and richness of the region, including its political, economic and cultural life, its ethnic diversity, history and its educational accomplishments, by using a full range of radio techniques.
3. To develop strong identification with the region, through feedback techniques, research, outreach programs, remote broadcasts, etc.
4. To make the most efficient use of available network and syndication material.
5. To provide regular information at set times in network programs as part of the service for the audience.
6. To create a forum of ideas, opinion and talent from across the region and nation.
7. To present established and new artists, performers, musicians and writers and their works.
8. To enhance listeners' understanding of the world.

Prepared by
Mitzi T Gramling

Classical Music Schedule)))

KSNJ 99.5fm Minneapolis/St. Paul

KRSU 91.3fm Appleton • KCRB 88.5fm Bemidji • KBPR 90.7fm Brainerd • KLCD 89.5fm Decorah, IA • WSCD 92.9fm Duluth/Superior
 KCCM 91.1fm Fargo/Moorhead • KLSE 91.7fm Rochester/Austin/Winona • KSJR 90.1fm St. Cloud/Collegeville • KGAC 88.5fm St. Peter/Mankato
 KRSD 88.1fm Sioux Falls, SD • KWRV 91.9fm Sun Valley, ID • KQMN 91.5fm Thief River Falls • WIRR 90.9fm Virginia/Hibbing
 KRSW 88.3fm Worthington/Marshall

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
5 AM	Music Through the Night* with Jeff Esworthy and Brandi Parisi							5 AM
6 AM								6 AM
7 AM			The Morning Show with Dale Connelly and Jim Ed Poole				Classical Music with Brian Newhouse	7 AM
8 AM							Classical Music with Brian Newhouse	8 AM
9 AM							Classical Music with Brian Newhouse	9 AM
10 AM							Saint Paul Sunday* with Bill McLaughlin	10 AM
11 AM			Classical Music with Lynae Warfel-Hoff				Classical Music	11 AM
NOON							Classical Music	NOON
1 PM							Classical Music	1 PM
2 PM			Classical Music with Julie Amacher				Classical Music with Arthur Hoehn	2 PM
3 PM							Saint Paul Chamber Orchestra	3 PM
4 PM							Classical Music with John Zech	4 PM
5 PM			Classical Music with John Birge				Classical Music with John Zech	5 PM
6 PM							A Prairie Home Companion* with Garrison Keillor	6 PM
7 PM							The Opera with Silvester Yicic	7 PM
8 PM			Evening Classics (featuring the "Classic du Jour") with Louise Vahle and Arthur Hoehn				THE JAZZ IMAGE™ with Leigh Kamman	8 PM
9 PM					Minnesota Orchestra		THE JAZZ IMAGE™ with Leigh Kamman	9 PM
10 PM			Classical Music with Bob Christianson				Pipedreams* with Michael Barone	10 PM
11 PM					Classical Music		Classical Music with Louise Vahle	11 PM
12 AM							Music from the Hearts of Space	12 AM
1 AM							Music from the Hearts of Space	1 AM
2 AM			Music Through the Night* Weeknights with Jeff Esworthy Weekends with Brandi Parisi				Music from the Hearts of Space	2 AM
3 AM							Music from the Hearts of Space	3 AM
4 AM							Music from the Hearts of Space	4 AM
5 AM							Music from the Hearts of Space	5 AM

Schedule subject to change. Local station schedules may vary.

SECTION V-B - FM BROADCAST ENGINEERING DATA

FOR COMMISSION USE ONLY

File No. _____
 SSB Referral Date _____
 Referred By _____

Name of Applicant **Minnesota Public Radio**

Call Letters (if issued)
 TBA

Is this application being filed in response to an application filing window? Yes No
 If Yes, specify closing date: _____

Purpose of Application: (check appropriate boxes)

- | | |
|---|--|
| <input checked="" type="checkbox"/> Construct a new (main) facility | <input type="checkbox"/> Construct a new auxiliary backup facility |
| <input type="checkbox"/> See Ex #E1, Engineering Statement
Modify existing construction permit for main facility | <input type="checkbox"/> Modify existing construction permit for auxiliary backup facility |
| <input type="checkbox"/> Modify licensed main facility | <input type="checkbox"/> Modify licensed auxiliary backup facility |

If purpose is to modify, indicate below the nature of change(s) and specify the file number(s) of the authorizations affected.

- | | |
|---|--|
| <input type="checkbox"/> Antenna supporting structure height | <input type="checkbox"/> Effective radiated power |
| <input type="checkbox"/> Antenna height above average terrain | <input type="checkbox"/> Frequency |
| <input type="checkbox"/> Antenna location | <input type="checkbox"/> Class |
| <input type="checkbox"/> Main Studio location per 47 C.F.R. Section 73.1125(b)(2) | <input type="checkbox"/> One-Step processing |
| <input type="checkbox"/> Directional Antenna | <input type="checkbox"/> Other (summarize briefly) |

File Number(s) _____

1. Allocation:

Channel No.	Principal community to be served:		
	County	City or Town	State
204	Cook	Grand Marais	MN

- Class (check only one box below)
- | | | | |
|---------------------------------------|-----------------------------|----------------------------|-----------------------------|
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> B1 | <input type="checkbox"/> B | <input type="checkbox"/> C3 |
| <input type="checkbox"/> C2 | <input type="checkbox"/> C1 | <input type="checkbox"/> C | |

2. Exact location of antenna.

(a) Specify address, city, county and state. If no address, specify distance and bearing relative to the nearest town or landmark. **3.2 km N. of Grand Marais, Cook County, Minnesota**

(b) Geographical coordinates (to nearest second). If mounted on element of an AM array, specify coordinates of center of array. Otherwise, specify tower location. Specify South Latitude and East Longitude where applicable; otherwise, North Latitude or West Longitude will be presumed. (The Commission requires coordinates based on NAD 27.)

Latitude	47 °	46 ·	13 ·	Longitude	90 °	21 ·	06 ·
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Section V-B - FM BROADCAST ENGINEERING DATA (Page 2)

3. Will the antenna be mounted on an antenna structure which has been registered with the Commission? Yes No

If Yes, provide the seven digit registration number and proceed to item 8.

1024265

4. Has the owner of the antenna structure filed an application for registration with the Commission? Yes No

If yes, provide the date FCC Form 854 was filed and proceed to item 8.

5. Applicant certifies that antenna structure meets 6.10 meter (20 feet) exception rule and therefore does not require registration. In other words, the overall height of the entire structure is not more than 6.10 meters (20 feet) above the ground or the antenna does not extend more than 6.10 meters (20 feet) above a man-made structure (structure built for a purpose other than mounting an antenna, i.e., building, water tank, silo, fire tower, etc.). Yes No

If yes, skip items 6 and 7.

6. Antenna structure will be shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features of equal or greater height, and would be located in the congested area of a city, town or settlement where it is evident beyond all reasonable doubt that the structure is so shielded that it will not adversely affect safety in air navigation. Yes No

If yes, submit as an Exhibit a detailed explanation and/or diagram to support your claim and skip to item 8.

Exhibit No. _____

7. Antenna structure does not meet FAA notification criteria as defined under 47 C.F.R. Section 17.7 and therefore does not require registration. Yes No

8. Is the supporting structure the same as that of another station(s) or proposed in another pending application(s)? Yes No

If Yes, give call letter(s) or file number(s) or both. MPR Channel 209 to be filed.

If proposal involves a change in height of an existing structure, specify existing height above ground level including antenna, all other appurtenances, and lighting, if any.

9. Does the application propose to correct previous site coordinates? Yes No
If Yes, list old coordinates.

Latitude	o	.	.	.	Longitude	o	.	.	.
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10. Has the FAA been notified of the proposed construction? Yes No

If Yes, give date and office where notice was filed and attach as an Exhibit a copy of FAA determination, if available.

Exhibit No. N/A

Date _____ Office where filed _____

11. List all landing areas within 8 km of antenna site. Specify distance and bearing from structure to nearest point of the nearest runway.

	Landing Area	Distance (km)	Bearing (degrees True)
(a)	<u>Devils Track Municipal</u>	<u>6.7</u>	<u>341.9</u>
(b)	_____	_____	_____

Section V-B - FM BROADCAST ENGINEERING DATA (Page 3)

12. (a) Elevation: (to the nearest meter)

- (1) Of the site above mean sea level; 457 meters
- (2) Of the top of supporting structure above ground (including antenna, all other appurtenances, and lighting, if any); and 91 meters
- (3) Of the top of supporting structure above mean sea level [(a)(1) + (a)(2)]. 549* meters

(b) Height of radiation center: (to the nearest meter) H = Horizontal; V = Vertical

- (1) Above ground; 82 meters (H)
82 meters (V)
- (2) Above mean sea level [(a)(1) + (b)(1)]; and 540* meters (H)
540* meters (V)
 *Figure from Vertical Sketch to avoid rounding error.
- (3) Above average terrain. 187 meters (H)
187 meters (V)

13. Attach as an Exhibit sketch(es) of the supporting structure, labeling all elevations required in Question 12 above, except item 12(b)(3). If mounted on an AM directional array element, specify heights and orientations of all array towers, as well as location of FM radiator.

Exhibit No.
E2

14. Effective Radiated Power:

(a) ERP in the horizontal plane 6 kw (H*) 6 kw (V*)

Is beam tilt proposed?

Yes No

If Yes, specify maximum ERP in the plane of the tilted beam, and attach as an Exhibit a vertical elevation plot of radiated field.

Exhibit No.
N/A

 kw (H*) kw (V*)

*Polarization

15. Is a directional antenna proposed?

Yes No

If Yes, attach as an Exhibit a statement with all data specified in 47 C.F.R. Section 73.316, including plot(s), and tabulations of horizontally and vertically polarized radiated components in terms of relative field.

Exhibit No.
N/A

16. Will the main studio be located within the 70 dBu or 3.16 mV/m contour?

Yes No

If No, attach as justification an Exhibit pursuant to 47 C.F.R. Section 73.1125.

Exhibit No.
E3

17. Are there: (a) within 60 meters of the proposed antenna, any proposed or authorized FM or TV transmitters, or any nonbroadcast (*except citizens band or amateur*) radio stations; or (b) within the blanketing contour, any established commercial or government receiving stations, cable head-end facilities, or populated areas; or (c) within ten (10) kilometers of the proposed antenna, any protected or authorized FM or TV transmitters which may produce receiver-induced intermodulation interference? Yes No

If Yes, attach as an Exhibit a description of any expected, undesired effects of operations and remedial steps to be pursued if necessary, and a statement accepting full responsibility for the elimination of any objectionable interference (including that caused by receiver-induced or other types of modulation) to facilities in existence or authorized or to radio receivers in use prior to grant of this application. (See 47 C.F.R. Section 73.315(b), 73.316(d) and 73.318.)

Exhibit No.
E4

18. Attach as an Exhibit a 7.5 minute series U.S. Geological Survey topographic quadrangle map that shows clearly, legibly, and accurately, the location of the proposed transmitting antenna. This map must comply with the requirements set forth in Instruction D for Section V. Further, the map must clearly and legibly display the original printed contour lines and data as well as latitude and longitude markings, and must bear a scale of distance in kilometers.

Exhibit No.
E5

19. Attach as an Exhibit (name the source) a map which shows clearly, legibly, and accurately, and with the original printed latitude and longitude markings and a scale of distance in kilometers:

Exhibit No.
E6

- (a) The proposed transmitter location, and the radials along with profile graphs have been prepared;
- (b) The 1 mV/m predicted contour and, for noncommercial educational applicants applying on a commercial channel, the 3.16 mv/m contour; and
- (c) The legal boundaries of the principal community to which the station is or will be licensed.

20. Specify area in square kilometers (1 sq. mi. = 2.59 sq. km.) and population (latest census) within the predicted 1 mv/m contour.

Land Area 928 sq. km. Population 2,632

21. Attach as an Exhibit a map (*Sectional Aeronautical charts where obtainable*) showing the present and proposed 1 mv/m (60 dbu) contours.

Enter the following from Exhibit above:

Gain Area	<u>N/A</u>	sq. km.
Loss Area	<u> </u>	sq. km.
Present Area	<u> </u>	sq. km.

Percent change (gain area plus loss area as divided by present area times 100%) 100% New station

If 50% or more, this constitutes a major change. Indicate in question 2(c), Section 1, accordingly. See 47 C.F.R. Section 73.3573(a)(1).

Section V-B - FM BROADCAST ENGINEERING DATA (Page 5)

22. For an application involving an auxiliary backup facility only, attach as an Exhibit a map (*Sectional Aeronautical Chart or equivalent*) which shows clearly, legibly, and accurately, and with latitude and longitude markings and a scale of distance in kilometers:

Exhibit No.
N/A

- (a) the proposed auxiliary 1 mv/m contour; and
- (b) the 1 mv/m contour of the licensed main facility for which the applied-for facility will be auxiliary. Also specify the file number of the license. See 47 C.F.R. Section 73.1675.

File No. _____

23. Terrain and coverage data (*to be calculated in accordance with 47 C.F.R. Section 73.313*)

Source of terrain data: (*check only one box below*)

- Linearly interpolated 30-second database
- 7.5 minute topographic map

(Source: _____)

- Linearly interpolated 3-second database
- Other (summarize)

V-Soft ROM

Are more than eight radials being used to calculate HAAT?

Yes No

If Yes, specify how many radials are being used. Please note the radials must be evenly spaced and start with the 0 degree radial. 36

Radial bearing (degrees True)	Height of radiation center above average elevation of radial from 3 to 16 km (meters)	Predicted Distances to the 1 mV/m contour (kilometers)	If operating on Commercial Channel 3.16 mv/m contour (kilometers)
0	*	*	*
45	*See Ex #E1, Pg #4	*	*
90	*	*	*
135			
180			
225			
270			
315			

Allocation Studies
(See Subpart C of 47 C.F.R. Part 73)

24. Is the proposed antenna location within 320 kilometers (199 miles) of the common border between the United States and Mexico?

Yes No

If Yes, attach as an Exhibit a showing of compliance with all provisions of the Agreement between the United States of America and the United Mexican States concerning Frequency Modulation Broadcasting in the 88 to 108 MHz band.

Exhibit No.
N/A

Section V-B - FM BROADCAST ENGINEERING DATA (Page 6)

25. Is the proposed antenna location within 320 kilometers of the common border between the United States and Canada? Yes No

If Yes, attach as an Exhibit a showing of compliance with all provisions of the Working Agreement for Allocation of FM Broadcasting Stations on Channels 201-300 under the Canada-United States FM Agreement of 1947.

Exhibit No.
E7

26. If the proposed operation is for a full service or Class D facility for a channel in the range from Channel 201 through 220 (88.1 through 91.9 MHz), or if this proposed operation is for a Class D station in the range from Channel 221 through 300 (92.1 through 107.9 MHz), attach as an Exhibit a complete allocation study to establish the lack of prohibited overlap of contours with other U.S. stations. The allocation study should include the following:

Exhibit No.
E7

- (a) The normally protected interference-free and the interfering contours for the proposed operation along all azimuths;
- (b) Complete normally protected interference-free contours of all other proposals and existing stations to which objectionable interference would be caused;
- (c) Interfering contours over pertinent arcs of all other proposals and existing stations from which objectionable interference would be received;
- (d) Normally protected and interfering contours over pertinent arcs, of all other proposals and existing stations, which require study to show the absence of objectionable interference;
- (e) Plot of the transmitter location of each station or proposal requiring investigation, with identifying call letters, file numbers and operating or proposed facilities;
- (f) When necessary to show more detail, an additional allocation study will be attached utilizing a map with a larger scale to clearly show interference or absence thereof;
- (g) A scale of kilometers and properly labeled longitude and latitude lines, shown across the entire Exhibit(s). Sufficient lines should be shown so that the location of the sites may be verified; and
- (h) The name of the map(s) used in the Exhibit(s).

27. With regard to any stations separated by 53 or 54 channels (10.6 or 10.8 MHz), attach as an Exhibit information required in 1/ (separation requirements involving intermediate frequency (i.f.) interference).

Exhibit No.
E7

28. (a) Is the proposed operation on Channel 218, 219 or 220? Yes No
- (b) If the answer to (a) is Yes, does the proposed operation satisfy the requirements of 47 C.F.R. Section 73.207? Yes No N/A

- (c) If the answer to (b) is Yes, attach as an Exhibit information required in 1/ regarding separation requirements with respect to stations on Channels 221, 222 and 223.

Exhibit No.
N/A

- (d) If the answer to (b) is No, attach as an Exhibit a statement describing the short spacing(s) and how it or they arose.

Exhibit No.
N/A

1/ A showing that the proposed operation meets the minimum distance separation requirements of 47 C.F.R. Section 73.507. Include existing stations, proposed stations, and cities which appear in the Table of Allotments; the location and geographic coordinates of each antenna, proposed antenna or reference point, as appropriate; and distance to each from proposed antenna

Section V-B - FM BROADCAST ENGINEERING DATA (Page 7)

(e) If authorization pursuant to 47 C.F.R. Section 73.215 is requested, attach as an Exhibit a complete engineering study to establish the lack of prohibited overlap of contours involving affected stations. The engineering study must include the following:

Exhibit No.
N/A

- (1) Protected and interfering contours, in all directions (360 degrees), for the proposed operation;
- (2) Protected and interfering contours, over pertinent arcs, of all short-spaced assignments, applications and allotments, including a plot showing each transmitter location, with identifying call letters or file numbers, and indication of whether facility is operating or proposed. For vacant allotments, use the reference coordinates as transmitter location;
- (3) When necessary to show more detail, an additional allocation study utilizing a map with a larger scale to clearly show prohibited overlap will not occur;
- (4) A scale of kilometers and properly labeled longitude and latitude lines, shown across the entire Exhibit(s) (Sufficient lines should be shown so that the location of the sites may be verified.); and
- (5) The official title(s) of the map(s) used in the Exhibit(s).

29. Is the proposed station for a channel in the range from Channel 201 to 220 (88.1 through 91.9 MHz) and the proposed antenna location within the distance to an affected TV Channel 6 station(s) as defined in 47 C.F.R. Section 73.525?

Yes No

If Yes, attach as an Exhibit either a TV Channel 6 agreement letter dated and signed by both parties or a map and an engineering statement with calculations demonstrating compliance with 47 C.F.R. Section 73.525 for each affected TV Channel 6 station.

Exhibit No.
E8

30. Is the proposed station for a channel in the range from Channel 221 to 300 (92.1 through 107.9 MHz)?

Yes No

If Yes, attach as an Exhibit information required in 1/. (Except for Class D (secondary) proposals.)

Exhibit No.
N/A

31. Environmental Statement. (See 47 C.F.R. Section 1.1301 et seq.)

(a) Would a Commission grant of this application come within 47 C.F.R. Section 1.1307, such that it may have a significant environmental impact?

Yes No

If you answer Yes, submit as an Exhibit an Environmental Assessment required by 47 C.F.R. Section 1.1311.

Exhibit No.
N/A

(b) If No, explain briefly why not.

Existing authorized tower.

(c) Pursuant to OST/OET Bulletin No. 65, the applicant must explain in an Exhibit what steps will be taken to limit the RF radiation exposure to the public and to persons authorized access to the tower site. In addition, where there are multiple contributors to radiofrequency radiation, you must certify that the established RF radiation exposure procedures will be coordinated with all stations.

See Ex #E9 for RF hazard statement.

CERTIFICATION

I certify that I have prepared this Section of this application on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

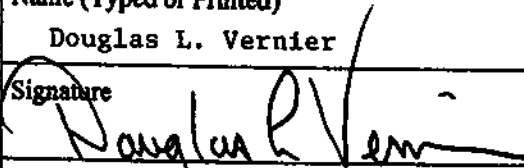
Name (Typed or Printed) Douglas L. Vernier	Relationship to Applicant (e.g., Consulting Engineer) Technical Consultant
Signature 	Address (include ZIP Code) 1600 Picturesque Dr., Cedar Falls, IA 50613
Date November 24, 1998	Telephone No. (include Area Code) 319 266-8402

EXHIBIT #E1
ENGINEERING STATEMENT

Concerning the Application of
Minnesota Public Radio
To Construct a New Non-Commercial Educational Radio Station
To Serve Grand Marais, Minnesota

November 1998

Channel 204 A

6.0 kW H & V

This engineering statement supports the application filed by Minnesota Public Radio to build a new non-commercial educational FM radio station to serve Grand Marais, Minnesota and the surrounding area.

Under this proposal, a type approved, FM transmitter generates an output power of 3.49 kilowatts. The power is fed through a T-combiner assembly having an approximate efficiency of 97.2 percent. The Andrew HJ7-50A, 50-ohm air Heliac transmission line, has an efficiency for its 83 meter length of 88.5 percent. Therefore, the proposed 4-bay, circularly polarized antenna has at its input 3.0 kilowatts of power. The proposed antenna has a maximum power gain of 2.0 resulting in a maximum effective radiated power of 6.0 kW.

Tower Vertical Sketch:

Exhibit #E2 is a vertical sketch of the existing authorized tower showing the authorized 91.4 meter tower and the proposed side mounted 4-bay circularly polarized antenna.

Studio Exhibit:

Exhibit #E3 is a studio exhibit which requests waiver of the main studio rule, (Sec 73.1125.)

Inter-modulation and blanketing:

Exhibit #E4 is an exhibit describing the possible effects of inter-modulation and blanketing.

Site Map:

Exhibit #E5 is full scale section of a 1:24,000 scale U.S. Geological Survey topographic quadrangle map (Grand Marais Quadrangle) showing the exact transmitter location.

Coverage Map

Exhibit #E6 is a map of the proposed 1 mV/m (60 dBu) signal contour. Grand Marais, Minnesota, the city of licensee, is shown to be fully encompassed by the proposed 60 dBu city service contour. The coverage map was computer generated using U.S. Geological Survey Digital Line Graph data, which was originally digitized from 1:2,000,000 scale maps. Three hundred and sixty evenly spaced radials were used to plot the 60 dBu contour. The area within the proposed one mV/m contour amount 4,206 square kilometers. This figure was determined using numerical calculus. The distance to the one mV/m signal contour along each of 360 evenly spaced radial azimuths was squared and then the average of the sum of these distances was calculated. The resulting average radius squared was then multiplied by π to determine the area within the contour: The population within the 60 dBu service contour was determined to be 2,632 people through the use of a computer program which extracts a population count based on population centroids defined by U.S. Census 1990 (PL-94-171) digital census data. This program draws data from the following summary level: State-County-Voting District/Remainder-County Subdivision, Place/Remainder-Census Tract/Block Numbering Area-Block Group.

Thirty-six evenly spaced radials were used to determine the antenna height above average terrain. The N.G.D.C. 03 arc-second terrain database was used to determine the radial elevations at .1 kilometer increments from 3 to 16 kilometers. The elevation points were averaged using the required four-point interpolation method and then the average was employed to project antenna heights above average terrain and the consequent distances to signal contours along the pertinent radials. (See a tabular listing of these contour distances on page #4 of this exhibit.)

Allocation Study:

Exhibit #E7, is a single channel, contour to contour, allocation study showing that interference is neither caused nor received by an FM radio station, application for facilities or construction permit. There are no I.F. relationships. The proposal is within 320 kilometers of the U.S. border with Canada, however all Working Agreement minimum separation spacings have be met or exceeded.

Channel-Six Television Protection:

Exhibit #E8 is a map of the 47 dBu, Grade B, protected signal contours of KBRJ, Superior, Wisconsin. The map also contains a plot of the proposed facility's, worst case,

section 73.599, Figure #1, 62.3 dBu F(50-10) interference signal contour (6 dB receiving antenna directivity credit used) using the mixed polarization study power of 6.15 kW (6.0 + 40/6.0). Page #2 of this exhibit is a close-up of the interference area with an overlay of the population centroids from the 1990 US Census group block data (PL-94-171). It can be observed that there is only a single centroid located within the predicted interference area. This centroid represents a total of 3 people. Since this amount is less than the 3000 maximum allowed under the rules, this proposal meets the Commission's rules and regulations regarding protection to channel-six TV. Pages #3 - 4 are tabular printouts of the predicted distances to the relevant contours used in the study.

R.F. Hazard compliance:

Exhibit #E9 shows compliance with the Commission's R.F. emission's standards.

Page #5 of this exhibit (Ex. # E1) is a declaration made by the preparer, Doug Vernier, attesting to his qualifications.

Doug Vernier, Telecommunications Consultants
 Minnesota Public Radio - CH 204 - Grand Marais, MN
 ERP = 6 kW
 Channel = 204

Azimuth Deg.T.	Ave. Elev. 3 to 16 km Meters AMSL	Effective Antenna Height Meters AAT	ERP (dBk)	F(50-50) Distance to 60 dBu Contour km
0	543.1	-3.6	7.782	15.75
10	541.5	-2.0	7.782	15.75
20	517.7	21.8	7.782	15.75
30	511.8	27.7	7.782	15.75
40	499.7	39.8	7.782	18.23
50	485.6	53.9	7.782	21.37
60	458.4	81.1	7.782	25.64
70	379.5	160.0	7.782	35.20
80	259.9	279.6	7.782	44.20
90	209.6	329.9	7.782	47.32
100	193.3	346.2	7.782	48.35
110	185.5	354.0	7.782	48.83
120	183.3	356.2	7.782	48.97
130	183.0	356.5	7.782	48.99
140	183.0	356.5	7.782	48.99
150	183.0	356.5	7.782	48.99
160	183.0	356.5	7.782	48.99
170	183.0	356.5	7.782	48.99
180	183.1	356.4	7.782	48.98
190	183.2	356.3	7.782	48.97
200	183.8	355.7	7.782	48.94
210	185.3	354.2	7.782	48.85
220	190.1	349.4	7.782	48.55
230	200.6	338.9	7.782	47.89
240	250.4	289.1	7.782	44.79
250	366.9	172.6	7.782	36.51
260	440.2	99.3	7.782	28.20
270	469.3	70.2	7.782	24.01
280	482.0	57.5	7.782	22.04
290	493.5	46.0	7.782	19.70
300	508.2	31.3	7.782	16.08
310	522.0	17.5	7.782	15.75
320	527.5	12.0	7.782	15.75
330	531.5	8.0	7.782	15.75
340	539.8	-.3	7.782	15.75
350	542.2	-2.7	7.782	15.75
Ave. =	352.3 M	187.2 M		

Antenna Radiation Center AMSL =539.5 M
 NGDC 03 Arc Sec.

Geographic Coordinates:

N. Lat. 47 46 13
 W. Lng. 90 21 06

Declaration:

I, Doug Vernier, declare that I have received training as an engineer from the University of Michigan School of Engineering. That, I have received degrees from the University in the field of Broadcast Telecommunications. That, I have been active in broadcast consulting for over 25 years;

That, I have held a Federal Communications Commission First Class Radiotelephone License continually since 1964. In 1985, this license was reissued by the Commission as a lifetime General Radiotelephone license no. PG-16-16464;

That, I am certified as a Professional Broadcast Engineer (#50258) by the Society of Broadcast Engineers, Indianapolis, Indiana. (Re-certified 11/95.)

That, my qualifications are a matter of record with the Federal Communications Commission;

That, I have been retained by Minnesota Public Radio of Saint Paul, Minnesota, and as such have prepared the engineering showings appended hereto;

That, a portion of the exhibits contained herein were prepared under my supervision by Kate Michler, Associate;

That, I have prepared these engineering showings, the technical information contained in same and the facts stated within are true of my knowledge;


That, under penalty of perjury, I declare that the foregoing is correct.



Douglas L. Vernier

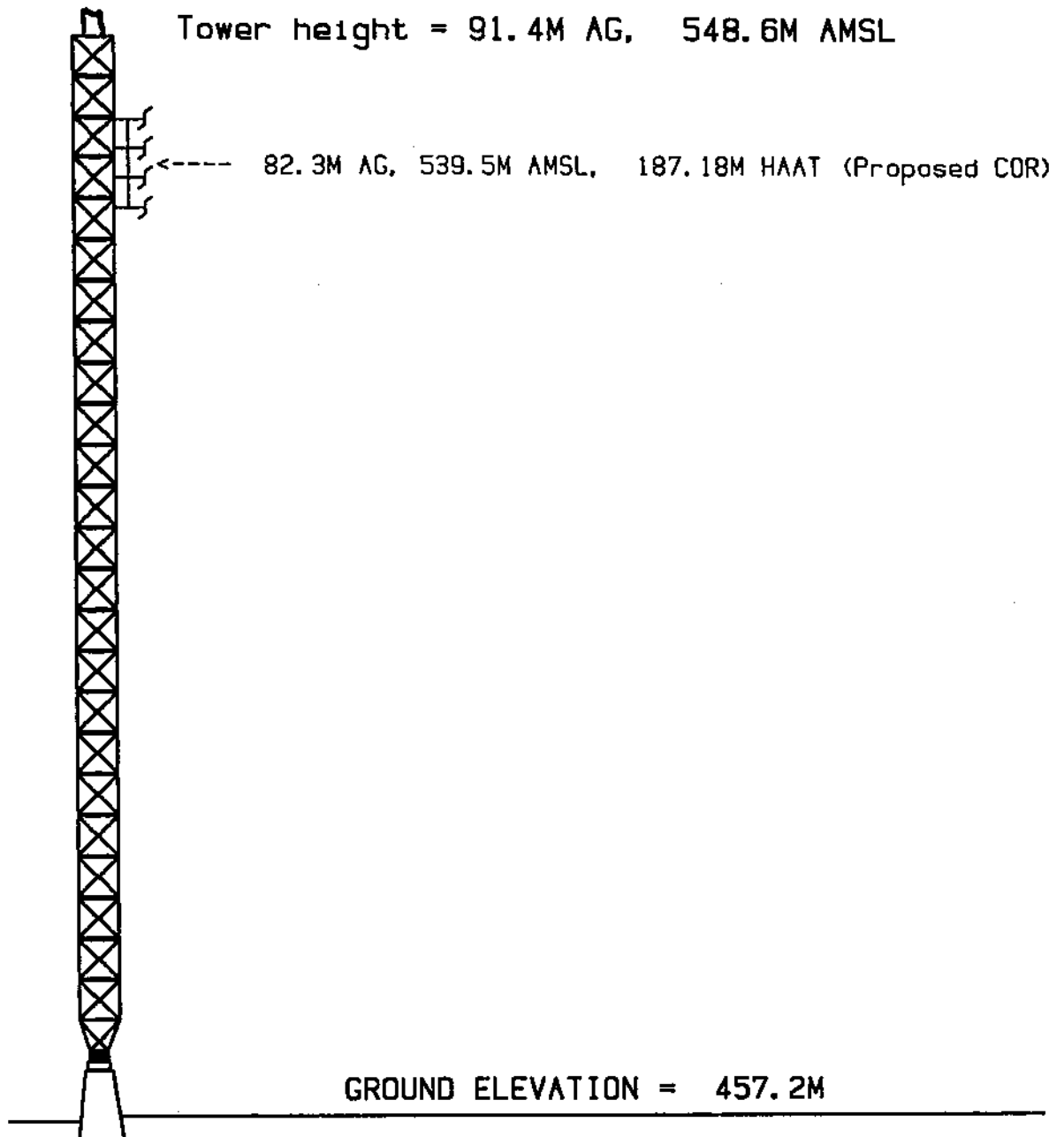
Executed on November 23, 1998

Subscribed and sworn before me this 23rd day of November, 1998.



Notary Public in and for the State of Iowa

My Commission Expires August 10, 2001



VERTICAL SKETCH

N. Lat. 47 46 13
 W. Lng. 90 21 06

 (Not to Scale)

EXHIBIT #E2

CH204 6kW HAAT 187.18M
 Minnesota Public Radio
 Grand Marais

 Nov ' 98

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