

COHEN, DIPPELL AND EVERIST, P. C.

**ENGINEERING STATEMENT
RE PETITION TO DENY APPLICATION OF
FOUR JACKS BROADCASTING, INC.
FCC FILE NO. BPCT-910903KE
ON BEHALF OF
SCRIPPS HOWARD BROADCASTING COMPANY**

JANUARY 1992

COHEN, DIPPELL AND EVERIST, P.C.
CONSULTING ENGINEERS
RADIO AND TELEVISION
WASHINGTON, D.C.

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington)
) ss
District of Columbia)

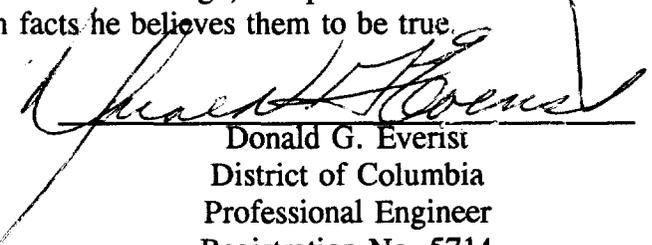
Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is Secretary-Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1300 L Street, N.W., Suite 1100, Washington, D.C. 20005;

That his qualifications are a matter of record in the Federal Communications Commission;

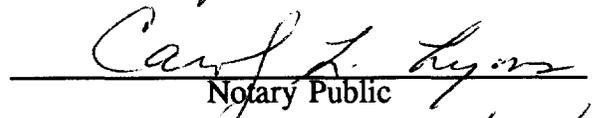
That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.



Donald G. Everist
District of Columbia
Professional Engineer
Registration No. 5714

Subscribed and sworn to before me this 24th day of January, 1992.



Notary Public

My Commission Expires: 2/28/93

This engineering statement has been prepared on behalf of Scripps Howard Broadcasting Company ("Scripps"), licensee of WMAR-TV, Channel 2, Baltimore, Maryland in support of its petition to deny the application filed by Four Jacks Broadcasting, Inc. ("FJB"), FCC File No. BPCT-910903KE. The FJB application seeks a construction permit for a new television station to serve Baltimore, Maryland on Channel 2+ (54-60 MHz) with an effective radiated power (ERP) of 100 kW (H&V) and 267 meters antenna height above average terrain. FJB proposes operation from an existing tower currently utilized by WPOC(FM) located at the geographic coordinates:

North Latitude: 39° 17' 13"

West Longitude: 76° 45' 16"

The FJB application is incomplete in several important aspects and demonstrates that the FJB application should be returned since it has not provided an adequate technical presentation for full FCC evaluation.

Protection to FCC Monitoring Station

The FJB application did not address Section 73.1030 of the FCC Rules with reference to protection to the FCC monitoring station near Laurel, Maryland. The attached analysis (Table 1) demonstrates that the FJB application will provide a signal in excess of that permitted in the FCC Rules. Performing the direct-wave calculation, the visual signal will be 103.5 dBu and the aural signal will be 93.5 dBu^{1/}. Each is well above the 80 dBu limit. Further, since the FJB application is silent regarding this very important matter it apparently failed to seek

^{1/}Assuming aural power is at 10% of the peak visual power.

advance consultation with the FCC regarding monitoring station protection. Further as disclosed by the FJB application if WPOC is forced to reduce its antenna height above average terrain from 860 feet (262.1 meters) to 767 feet (223.8 meters), a compensating increase in effective radiated power from 16 kW to approximately 23 kW will be required to maintain the full Class B distance to the predicted 60 dBu (1 mV/m) coverage contour. The resultant 1.6 dB increase in direct-wave field at the FCC monitoring station per Section 73.1030(c) of the FCC Rules was not addressed by FJB.

Protection to the monitoring station is important, and the FJB application is deficient.

Antenna Height

The FJB application states that the Federal Aviation Administration ("FAA") was not notified of its proposal since the overall height of the existing tower will not be altered. However, research in this matter (see attached affidavit by Mr. Hall) indicates that the existing tower has an overall height including beacon of 666 feet (203 meters) AGL and 1209 feet (368.5 meters) AGL. This tower previously supported the licensed WBFF-TV Channel 45 pylon antenna with an authorized overall structure height of 1249 feet AMSL. Subsequently WBFF-

Environmental Concerns

FJB proposes to co-locate its facility with WPOC(FM), Baltimore, Maryland. Currently, WPOC(FM) is authorized to operate with a center of radiation of 1191 feet AMSL (363 meters). FJB proposes to operate with a center of radiation of 1191 feet AMSL (363 meters).

To accommodate the physically longer top-mounted Channel 2 antenna^{2/}, a portion of the tower top will need to be removed, in order to remain within the previously authorized tower height of 1249 feet AMSL. This will require moving the WPOC(FM) and other antenna users now located at or near the tower top.

The FJB application does not address the addition of its proposed "superturnstile" TV antenna (Type number not included in application^{3/}) and transmission line as it relates to the additional weight to the tower, increased windloading, or whether the guy wires and tower will be subject to beyond design stress of the tower. We are not aware that any structural analysis of the tower has been performed by FJB, therefore, it is not certain in view of the changes indicated in the application whether this tower can be used without significant structural modification or replacement. In order to support the increased weight and windloading, it appears that the tower will need to be structurally modified or a new replacement tower constructed. In addition, new or modified guy anchors and a new tower foundation may be

^{2/}As noted above, the structure supported the 46 feet (14.0 meters) UHF Channel 45 TV antenna atop the 663 foot structure.

^{3/}It is believed since this site is jointly utilized with other licensees it is mandatory that the antenna type and model number to be furnished. This is necessary so that other important FCC evaluations can be performed. These include evaluation of compliance with radio frequency radiation requirements in Section 1.1307(b) of the FCC Rules and complete the analysis required in Section V-C, Q.14 of FCC Form 301 regarding Section 73.685 of the FCC Rules.

required. Due to the required ground surface changes that would result to the environment, Section 1.1307(a)(7) of the FCC Rules and Regulations needs to be fully addressed by FJB.

Further, the proposed FJB operation raises serious concerns with respect to the required protection to workers as specified by the FCC Public Notice dated January 28, 1986. With the addition of the proposed Channel 2 operation at the site which already accommodates other multiple users, FJB has not disclosed how this protection will be met or what precautions will be undertaken. Therefore, it has not fully addressed Section 1.1307(b) of the FCC Rules.

FCC Form 301, Section V-C, Q.14

In the attached report by Vlissides Enterprises, Inc., the photograph depicts users other than WPOC(FM) that operate from the site. The FJB application has not disclosed these other

adequate showing of the overall effect if any of the result of locating the proposed Channel 2 operation at this site. Similarly, the interaction of Channel 2 with the auxiliary user frequencies was not addressed.

TABLE 1
FCC MONITORING STATION PROTECTION
LAUREL, MARYLAND
JANUARY 1991

Predicted Channel 2 television field strength values at the protected FCC field office at Laurel, Maryland per Section 73.1030(c) of the FCC Rules.

Four Jacks Broadcasting, Inc. Proposed Channel 2 Operation:

<u>FJB Coordinates</u>	to	<u>FCC Monitoring Station</u>
N 39° 17' 13" - W 76° 45' 16" per application		N 39° 09' 54" - W 76° 49' 17" per 0.121(c) of the FCC Rules
Four Jacks Site to Field Office:		14.72 km, N 203.1°E
Predicted Unattenuated or "Direct-Wave" Field: and		103.5 dBu (visual); 150 mV/m 93.5 dBu (aural); 47 mV/m

PHILIP K. CROSS
JOHN F. ETZEL
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GERHOLD, CROSS & ETZEL
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823-4470

EMERITUS
PAUL G. DOLLENBERG
FRED H. DOLLENBERG
CARL L. GERHOLD

January 20, 1992

I, Donald R. Hall, being duly sworn upon my oath, depose and state that:

I am a Registered Property Line Surveyor in the State of Maryland and employed with the firm of Gerhold, Cross and Etzel of Towson, Maryland.

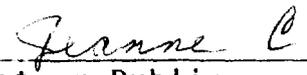
That on December 30, 1991, I performed the following determination of the tower located at 1200 N. Rolling Road, Catonsville, Maryland, for the purpose of establishing the overall height of the tower (including lighting). My work concluded that the tower is 666 feet (203 meters) above the top of the concrete pier in height with an elevation at the top of the lighting of 1209 feet (368.5 meters) above mean sea level (Baltimore County datum). The elevation at the top of the one to two foot high concrete pier is 543 feet (165.5 meters). All elevations and heights stated herein are within one foot (more or less). All elevations are based on Baltimore County Control Monuments No. X-7798 (elevation 518.18 feet) and No. 12138 (elevation 527.58 feet).

I certify these facts stated are true of my own knowledge, except such facts as are stated to be on information and belief, and as to such facts, I believe them to be true.



Donald R. Hall
Property Line Surveyor
Md. Reg. No. 221

Subscribed and sworn to before me this 23RD day of January, 1992.



Jeanne C. Etzel
Notary Public



My Commission expires: August 1, 1992

DISTRICT OF COLUMBIA) ss

AFFIDAVIT OF MICHAEL L. MOORE

I, Michael L. Moore, have been retained by Scripps Howard Broadcasting Company. I am an Airspace and Procedures Specialist and I was formerly employed by the Federal Aviation Administration for twenty-two years. For the past nine (9) years, I have been routinely employed as an independent aeronautical consultant. I am familiar with the provisions of the Federal Regulations, Part 77, Objects Affecting Navigable Airspace, FAA Handbook 8260.3B, Terminal Instrument Procedures (TERPS) and FAA Handbook 7400.2C, Procedures for Handling Airspace Matters.

I have reviewed the application of Four Jacks Broadcasting, Inc. for a new television (TV) station, Channel 2, in Baltimore, Maryland, as prepared and supported by the Carl T. Jones Corporation dated August 29, 1991.

Based upon my evaluation:

1. The proposed Channel 2 antenna support structure, currently supporting the WPOC(FM) antenna is located directly under the primary ILS approach areas for both the ILS Rwy 15L and ILS 15R precision approach procedures to the BWI Airport. It lies within close proximity to the Glide Path Intercept Points (GPIP) for both Approach procedures. It lies only 1295 feet below the nominal (3.0°) glide slope for the

ILS Rwy 15L approach and only 192 feet below the associated obstacle clearance surface (34:1). Also, it lies only 358 feet from the runway 15L centerline extended.

2. The proposed alteration to the existing WPOC(FM) supporting structure is NOT physically SHIELDED by the neighboring 1505-foot AMSL antenna tower as would be permitted by the exceptions listed in FAR Part 77.15. This is because:
 - a. The proposed tower is not located within 500 feet of the taller 1505-foot tower, and
 - b. It is not shielded on 3 sides, and
 - c. It is not located within the shadow of the 1505-foot tower. Instead, it is located on the airport side of the tower. The shadow of the 1505-foot tower projects in the opposite direction, away from the airport.

The obstruction standards of FAR 77, Subpart C, relate to physical obstructions and do not rule out the requirement to give Notice to the FAA when potential electromagnetic interference is an issue.

The FAA has published its proposed changes to the Part 77 rules. The comment period for this proposed change closed on December 31, 1990. The FAA is now in the adoption phase of the FAR 77 proposal. The proposed rules emphasize and strengthen the requirement for Electromagnetic Interference (EMI) evaluations. It is expected that the FAA and the FCC will develop a common electromagnetic evaluation process.

If Notice of the proponent's change in electromagnetic operation of the WPOC support structure were to be given to the FAA as required by FAR 77, the FAA would evaluate the EMI effect of the Channel 2 frequency on their navigation facilities and, in addition, would evaluate the increase in the overall height of the structure as a physical obstruction to navigation^{1/}.

Such an EMI evaluation will include, but will not be limited to:

- a. The introduction of new equipment and a new radio frequency (VHF Channel 2) certainly requires Notice to the FAA in accordance with the following regulations and directive (in part):
 1. FAR Part 77.5(a) and (b) require Notice for alterations of "equipment or materials used therein." This requirement continues in FAR Subpart 77.11(a) and (b).

^{1/} On November 25, 1991, Nationwide Communications Inc. licensee of WPOC(FM) notified the FAA that the tower height had been reduced (see attached exhibit abstracted from the filing dated November 27, 1991).

2. Numerous FAR Part 77 Notice requirements, as well as the requirements in FAA Handbook 7400.2C, continuously refer to the "effect of construction or alteration on operational procedures" and the "operational effect on air navigation facilities". Accordingly, the requirements of these documents are not limited to simply the physical effect of obstructions to navigation but also the electromagnetic effect of placing a new TV Channel 2 directly under the ILS approach paths at the BWI Airport. Such an alteration must be regarded as having an adverse effect on operational procedures at BWI unless the FAA determines otherwise by means of a study.
- b. If the WPOC(FM) antenna system is modified to accommodate the proposed Channel 2 operation, then WPOC(FM) will also be subject to an FAA EMI evaluation.

For all of the above-stated reasons, it is clear to me that the Four Jacks application requires an aeronautical study by the FAA.



Michael L. Moore

Subscribed and sworn to before me this 27th day of January, 1992.



Notary Public

My commission expires: _____

NADINE R. McLACHLAN
NOTARY PUBLIC DISTRICT OF COLUMBIA
My Commission Expires October 31, 1993

COMPUTER STRUCTURAL ANALYSIS
& ENGINEERING EVALUATION
OF THE
666 FT. GUYED TOWER
CATONSVILLE, MARYLAND
REVISED
JANUARY 1992

FOR
SCRIPPS HOWARD BROADCASTING COMPANY

BY
VLISSIDES ENTERPRISES, INC.
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SECTION A

INTRODUCTION

The subject structure is a 666 ft. guyed tower located in Catonsville, Maryland (Coordinates: 39° 17' 13"; 76° 45' 16"). The tower has a triangular cross-section with a face width of 4 ft. It is supported on a hinged base with seven guy levels of three guys each. The tower was designed and manufactured by Utility Tower Company in 1969.

The purpose of this analysis is to investigate the structural capability of the tower to support the Channel 2 TV antenna on top and its two 3-1/8" transmission lines, in addition to the existing antennas and transmission lines.

The following assumptions have been made regarding the major characteristics of the structural system employed in the design of the subject tower:

- a) Section panels were assumed to be approximately 5 ft. in height.
- b) The tower span lengths were estimated to be 93.5 ft., 95.2 ft., 95.2 ft., 95.2 ft., 94.5 ft., 95.2 ft. and 94.4 ft. for Spans #1 through #7 respectively.
- c) The inner and outer guy anchors were estimated to be at 262 ft. and 402 ft. distances from the tower respectively.
- d) The guy cables are E.H.S. cables with estimated diameters of 5/8", 5/8", 3/4", 5/8", 3/4", 7/8" and 1" for guy levels #1 through #7 respectively.

- e) The tower legs were assumed to be of 3.5" O.D. with 0.300" wall thickness in the bottom 500 ft. of the tower and 0.216" wall thickness from 500 ft. to top.
- f) All the diagonal members were assumed to be solid rods of 5/8" diameter.
- g) All the horizontal girts were assumed to be solid rods of 1" in diameter.
- h) All the tower members were assumed made of 50,000 psi minimum yield strength steel.
- i) The tower sections are of all welded construction and are bolted together through round splice plates on each leg.
- j) The tower color banding is in accordance with the FAA Advisory Circular 70/7460-1H for towers under 700 ft. height.

The overall structural system of the tower resists the guy reactions, the wind loads and bending moments by having the legs in tension or compression; the diagonals in tension; and the girts in compression. The structural integrity of the tower depends mainly on the buckling load capacity of the legs and girts and the tension load capacity of the diagonals and guy cables.

The subject tower was analyzed under a 75 mph basic wind velocity (no ice) in accordance with the EIA/TIA Standard 222-E. The computed wind pressure was applied to all tower members, antennas and ancillary items (transmission lines, ladder, conduits, etc.). No ice loading was considered in this analysis.

ORGANIZATION OF ANALYSIS

1. The following rigorous computer analysis was performed where the tower was analyzed with the use of a high capacity proprietary program, on a Digital VAX-11/730 computer, as beam-column on elastic supports. All secondary effects such as external moments produced by the guys at each level and those produced by beam-column action were taken into consideration. In addition, thermal gradients, wind escalation, wind thrusts on the tower and appurtenances, gravity loads, as well as drag and lift wind forces on the guys, were solved simultaneously by the computer program using the finite element method. The tower was analyzed with the wind direction normal to a tower face (Wind A); normal to a tower apex (Wind B); and parallel to a tower face (Wind C).

- a) Case 2. Tower in its assumed configuration under a 75 mph basic wind velocity and no ice, in accordance with EIA/TIA Standard 222-E specifications and the following antenna and transmission line loading:

<u>Antenna</u>	<u>Elev. (Ft.)</u>	<u>Transmission Line</u>
Yagi	29 ft.	7/8" Heliac
Whip	98 ft.	7/8" Heliac
Whip	119 ft.	7/8" Heliac
3-Bay Communication	180 ft.	1-5/8" Heliac
8-Element	190 ft.	1-5/8" Heliac
4' Dish w/Radome	230 ft.	1-5/8" Heliac
Whip	289 ft.	7/8" Heliac
Whip	363 ft.	7/8" Heliac
Whip	375 ft.	7/8" Heliac
Whip	393 ft.	7/8" Heliac
Whip	402 ft.	7/8" Heliac
Whip	403 ft.	7/8" Heliac

Whip	486 ft.	7/8" Heliac
Whip	501 ft.	7/8" Heliac
Whip	511 ft.	7/8" Heliac
Whip	523 ft.	7/8" Heliac
Whip	537 ft.	7/8" Heliac
Long Whip	549 ft.	1-5/8" Heliac
	to	
	629 ft.	
2-Bay FM	645 ft.	3" Heliac
Whip	650 ft.	7/8" Heliac
	Top	1" Conduit
Alan Dick	Top	(2) 3-1/8" Rigid
Superturnstile		Coax
Channel 2		

The type, size, location and number of antennas and transmission lines were taken from sketch of tower prepared by Gerhold, Cross & Etzel, Professional Land Surveyors, Dated 1/20/92. The type of Channel 2 antenna and its transmission lines were assumed.

2. For all computer runs the results are given as follow:

- a) Tower loads, kips.
- b) Guy weights, kips.
- c) Guy unstressed length, feet.
- d) Guy forces and reactions, kips.
- e) Spring constants for wind and normal to wind directions.

- f) Column buckling evaluation parameter for the tower shaft between guy levels.
- g) Tower deflections with the tower bending in two directions (if unsymmetrical loads exist) at each tower shaft panel point.
- h) Tower reactions, moments and vertical loads for the wind and normal to wind directions.
- i) Shears and forces (tension or compression) in all tower structural members.

3. Allowable Member Loads & Guy Cable Safety Factors:

- a) Allowable Member Loads: For towers less than 700

FINDINGS & EVALUATION

A structural study of the assumed tower geometry, member sizes and the computer analysis of Case 2 indicates the following:

1. Under Case 2. Tower in its assumed configuration and antenna and transmission line loading as described in the Organization of Analysis Section of this Report, under a 75 mph basic wind velocity and no ice in accordance with EIA/TIA Standard 222-E.
 - a) The tower legs are overstressed in 60% of the tower by as much as 84%.
 - b) The deflection at the top of the tower is too excessive compared to the rest of the tower. This results in uneven distribution of bending moments in the tower and large overstresses in the tower legs.
2. It is my engineering opinion that, due to the large overstresses calculated in the tower legs, the subject tower is not adequately designed to support the Channel 2 antenna and its transmission lines as described in the Organization of Analysis Section of this Report. Therefore, I strongly recommend that the subject tower must not be used for the installation of the Channel 2 Antenna.
3. The Findings presented in this section are based on the assumed tower geometry, member sizes and properties, guy cable sizes, and the antenna and transmission line loading described herein.