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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

April 21, 1995

Mr. William F. Caton
Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

DOCKET FILE COPY ORIGINAL

Re: MM Docket No. 95-17

In the Matter of

Amendment of Parts 73 and 74
of the Commission's Rules
To More Effectively Protect
Radio Astronomy Activity
On Channel 37

Dear Mr. Caton:

Transmitted herewith by the National Academy of Sciences, through the Committee on Radio Frequencies of the National Research Council, are an original and nine (9) copies of its reply comments in the above-referenced proceedings.

If additional information is required concerning this matter, please communicate with this office.

Sincerely yours,

Robert L. Riemer
Senior Program Officer

Enc.

cc: Members of CORF
Mr. Paul J. Feldman, Esq.
Dr. Donald C. Shapero

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of)
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To More Effectively Protect) MM Docket No. 95-17
Radio Astronomy Activity)
On Channel 37)

REPLY COMMENTS OF THE
NATIONAL ACADEMY OF SCIENCES'
COMMITTEE ON RADIO FREQUENCIES

The National Academy of Sciences, through the National Research Council's Committee on Radio Frequencies (hereinafter, "CORF"), hereby submits its Reply Comments in the above-captioned proceeding. CORF represents the interests of the Radio Astronomy Service, the Earth-Exploration Satellite Service, the Space Research Service, and other users of the radio spectrum engaged in scientific research. In these Reply Comments, CORF shows that the record in this proceeding supports CORF's original proposal of protection based on minimum-distance separation as required under Footnote US74. In limited circumstances, however, a broadcaster could be allowed to file a petition for waiver of the minimum-distance separation rules if the broadcaster showed compliance with a 64 dBu field strength requirement. The record also supports deletion of Channel 38 at Hilo, Hawaii, from the TV Table of Allotments.

I. The Record Supports Use of Minimum-Distance Separations.

In its Petition for Rulemaking, CORF had proposed that the rule provision containing the radio astronomy ("RA") sites to be protected explicitly restate the adjacent-channel minimum-distance separation requirement set forth in Section 73.610(c)(1) of 87.7 kilometers (54.5 miles). CORF's proposal was based on the premise that under footnote US74, RA sites are entitled to the same sort of protection from adjacent channel interference as that afforded to UHF stations. The Notice of Proposed Rulemaking did not specifically address CORF's arguments, but rather stated that it "disagrees" with CORF's construction of the rules. The Notice stated (at para. 4) that instead, the Commission believes that RA facilities are not entitled to any protections "other than what results from regulatory limitations on TV station facilities and out-of-band emissions." However, in the "Regulatory Flexibility Analysis" of the document, the Commission stated that the language of US74 "is not sufficiently clear to precisely establish the protection that radio astronomy facilities should be afforded."

In response, CORF's Comments demonstrated first that the minimum-distance separation requirement established in Section 73.610 of the Commission's rules is clearly a "technical standard" as referred to in US74. It is a requirement imposed on television facilities, as opposed to a rule regarding the content of programming, structural regulation regarding ownership, or procedural rules for applications or hearings. Next, CORF noted that even if, arguendo, minimum-distance separations are not "technical standards," US74 provides that RA facilities are to be protected by requiring TV facilities to follow "criteria

applicable to the [TV] service . . ." and that the minimum-distance separation rules applicable to TV facilities must at least be "criteria applicable" to the TV service. Accordingly, the Commission is obligated under US74 to give RA facilities the same protection accorded TV facilities, i.e., the minimum-distance separation required under Section 73.610(c).

CORF also demonstrated that regardless of the interpretation of US74, use of a minimum-distance separation standard is in the public interest. It is a more efficient method, since evaluation of compliance is a simple go/no-go matter. It is a more effective method of protecting RA facilities, because although distances cannot be easily changed, field strengths can vary regularly, based on atmospheric and other conditions.

The record in this proceeding supports the CORF position. While Cornell University supported CORF's analysis of US74, no other commenter supported the assertion in the Notice that the language of US74 is "insufficiently clear" to establish the protection that RA facilities should be afforded. Indeed, that position cannot be supported.

The only criticism of the use of minimum-distances came in one brief sentence in three sets of comments. Cohen, Dippell and Everist ("CDE") stated that "CDE agrees with the Commission that a signal level restriction at the astronomy sites would be less burdensome and provide more flexibility to the broadcasters...." CDE Comments at page 2. S&E Network Inc. ("S&E") merely stated that it "agrees with the FCC's proposed rejection of an approach to protect radio astronomy sites that is based on minimum distance separation requirements." S&E Comments at page 2. Lastly, the Association of Federal Communications Consulting Engineers ("AFCCE") stated that it "concur[s] with the Commission

proposal to use a field strength limit . . . instead of a minimum distance separation." AFCCE Comments at page 2. These three sentences hardly form the basis for ignoring the mandates of footnote US74.¹ Furthermore, they do not outweigh the public interest factors set forth in Section III of CORF's Comments.

AFCCE moved from preferring the use of predicted field strengths to suggesting that the use of such a method supports Channel 37 allotments for TV in certain areas of the United States. AFCCE Comments at page 3. Such a proposal, however, is precluded by Footnote US246.²

In sum, the record demonstrates that the use of minimum-distance separation is mandated under Footnote US74 and is in the public interest. Use of distance separations is an efficient and effective method for protecting RA facilities and should present little burden on broadcasters. As the Commission stated in the Notice, very few broadcast stations are affected by these rules.³

¹Almost everything else in the CDE, S&E, and AFCCE comments discussed the advantages of using Tech Note 101 rather than the method of calculating predicted field strengths proposed by the Commission. However, discussion of the use of one predictive method over another does not provide a record against the use of minimum-distance separations.

²AFCCE calls for radio astronomers to demonstrate the need for protection in the Channel 37 band. Footnote US246's prohibition on the use of Channel 37 for other services is obviously based on an extensive record of the need to protect RA facilities. Furthermore, nothing in the AFCCE Comments specifically demonstrates the necessity of Channel 37 TV allotments. No other commenters call for such allotments.

³For the same reasons, while CORF supports the Commission's proposal to require that petitions for rulemaking seeking Channel 36 or 38 allotments protect RA facilities (Notice at para. 14), that protection should come from a minimum-distance separation of

However, to provide for a case where compliance would present a substantial burden on an individual broadcaster, CORF would support a policy allowing broadcasters to file a petition for waiver of the minimum-distance separation, based on a showing of compliance with a maximum field strength of 64 dBu at the RA site in question. However, as discussed below, the predicted field strength must be properly calculated. Proper calculations could include use of Tech Note 101.

II. The Use of Minimum Field Strength Predictions
in Waiver Requests Is Appropriate,
if Such Predictions Are Calculated Properly.

In the few cases where a broadcaster is substantially burdened by the application of the minimum-distance separation rules, use of predicted field strengths would be appropriate. Such predictions must be properly calculated, however.

First, the maximum level should be 64 dBu, as proposed in the Notice. As the Commission noted therein, the 64 dBu level is more consistent than 72 dBu with the power and antenna height at which UHF stations actually operate. Furthermore, CORF agrees that the more conservative field strength level is necessary to take into account the tendency of directional antennas to produce a different radiation pattern out of band (on Channel 37) than in band (on Channel 36 or 38). While the CDE, S&E, and AFCCE Comments stated a preference for a 72 dBu level, they provided no

87.7 kilometers, unless the petitioner can show that compliance would be an extraordinary burden. In such cases, petitioners should be required to demonstrate that their proposed facilities will produce no greater than a 64 dBu field strength at the RA facility at issue.

evidence to contradict the principles used by the Commission to arrive at the 64 dBu level.

For example, AFCCE stated only that it "finds no basis for [the Commission's] claim." AFCCE Comments at page 2. And while S&E would prefer a 72 dBu level, its use of a directional antenna and the fact that its facilities are currently below the maximum allowed for UHF stations confirms the principles used by the Commission to arrive at the 64 dBu level. While S&E noted that under the Commission's proposal, its Station WJWN would be granted a waiver to produce a 67 dBu field strength at the Arecibo Observatory, it expressed concern that it may not be allowed to increase power in the direction of its city of license, San Sebastian. While CORF understands S&E's concerns, it notes that San Sebastian is already well within the Station's predicted Grade A contour. See Exhibit 1, attached hereto.

The Comments of CDE, S&E, and AFCCE support the use of Tech Note 101 in calculating predicted field strengths. While CORF supports the use of predicted field strengths only in petitions for waiver of the minimum-distance requirements, in connection with such petitions certain terrain features may make the use of Tech Note 101 appropriate. CORF supports the use of Tech Note 101 in those circumstances. Calculations using Tech Note 101 must be performed correctly, however. In particular, the correct altitudes above mean sea level (AMSL) of radio telescopes should be used. If the Commission enacts a rule allowing for petitions for waiver of the minimum-distance requirement, the following heights should be included therein:

Kitt Peak, AZ	1946 meters AMSL
Owens Valley, CA	1237
Mauna Kea, HI	3751
North Liberty, IA	272
Hancock, NH	340
Los Alamos, NM	1997
Pie Town, NM	2402
Socorro, NM	2155
Arecibo, PR	383
Fort Davis, TX	1646
Saint Croix, VI	46
Brewster, WA	286

Lastly, CDE raised interesting questions regarding the calculation of out-of-band emissions from digital Advanced Televisions Systems ("ATV"). CDE stated that:

[s]ince the grand alliance ATV system is purely digital, the effect of out-of-band emissions from Channel 36 and Channel 38 ATV operations to radio astronomy systems needs to be further explored in this rule making. CDE has observed spectrum analyzer plots of in-band signal levels and out-of-band emissions and finds that out-of-band radiation levels are typically 35 dB to 40 dB below the in-band signal levels. Accordingly, CDE believes that the Commission should fully explore appropriate maximum undesired Channel 36 and 38 ATV service signal levels at the radio astronomy reference sites. CDE expects that the permissible ATV field strength will be substantially lower than the 64 dBu value proposed for NTSC television operations.

In other words, CDE is stating that it does not expect ATV stations to meet the 60 dB out-of-band emission requirement established by the FCC for NTSC signals and that they will miss it by a factor of 20 to 25 dB. The NTSC signal has a spike 3.58 MHz away from the video carrier, with the rest of the out-of-band emissions dropping off rapidly around that spike. The ATV signal is much flatter and fills the neighboring band with

perhaps a 10 dB slope across the 6 MHz. While radio astronomers can work around the spike in the NTSC signal, this may not be the case with ATV out-of-band emissions.

CORF is grateful to CDE for raising this issue and for its honest analysis of the scope of out-of-band emissions for ATV. The result, however, suggests that the Commission should be especially mindful to protect radio astronomy sites when allotting Channels 36 and 38 for ATV.

III. Comments on Other Matters.

As was noted in CORF's original Comments in this proceeding, because the National Radio Astronomy Observatory ("NRAO") facilities at Green Bank, West Virginia, receive greater protection under the Commission's "quiet zone" rules (Sections 73.1030(a) and 74.12) than they would under Section 73.610, and because such additional protection is necessary, CORF recommends that the Green Bank site be removed from the list proposed in Section 73.613(b), so as to prevent confusion regarding the level of protection given that site. NRAO filed Comments consistent with that recommendation, and CORF hereby reiterates its support for special protection of Green Bank and for the modification of proposed Section 73.613 to refer to Green Bank's protection under Sections 73.1030(a) and 74.12. CORF also supports NRAO's suggestion to correct some of the listed coordinates of RA facilities.⁴

⁴The NRAO corrections did not mention the Arecibo Observatory. Arecibo's coordinates (18° 20' 46" North latitude and 66° 45' 11" West longitude) were correctly cited in the Notice and they should be included in Section 73.613(b).

In its Comments, CORF supported the proposed deletion of the Channel 38 allocation at Hilo, Hawaii. No other commenter addressed this issue, and CORF asserts that the record in this proceeding, including CORF's Petition for Rulemaking, supports such a deletion.

Lastly, the Notice sought comments on whether the Commission should require notification to radio astronomers by applicants for new or modified Channel 36 or 38 facilities proposed within 87.7 kilometers of an RA site listed in Section 73.613. CORF proposed that notification to the Electromagnetic Spectrum Manager of the National Science Foundation would serve the public interest since such notification is likely to result in discussions leading to a mutually acceptable resolution, limiting the burden on the Commission. The notification requirement would not place a substantial burden on broadcast applicants. The notification requirement was also supported by NRAO. The only other party to comment on the issue was CDE, who opposed the proposal. However, nothing in CDE's Comments demonstrated that the requirement would be particularly burdensome for broadcasters or that it precluded beneficial discussions between radio astronomers and broadcasters. CORF asserts that the record supports the notification requirement.

IV. Conclusion.

CORF is pleased that the Commission and all commenters in this proceeding have recognized the need to increase protection to radio astronomy facilities doing research at 608-614 MHz, the allocation to the Radio Astronomy Service at Channel 37. However, CORF asserts that the record in this proceeding demonstrates that the use of minimum-distance separations set

forth in Section 73.610 is mandated under Footnote US74. Furthermore, such protection is the best public policy, in light of the limited burden it places on broadcasters, and the more efficient and effective protection it would provide to RA facilities. Such facilities, supported by a substantial federal investment, perform critical scientific research that cannot be easily duplicated elsewhere.

CORF recognizes that in a limited number of cases, compliance with minimum-distance separations might place a substantial burden on a particular broadcaster, and in such a case, that broadcaster should be allowed to demonstrate that its proposal would produce no more than 64 dBu field strength at the RA site. Use of Tech Note 101 would be appropriate in certain circumstances.

Respectfully submitted,
NATIONAL ACADEMY OF SCIENCES'
COMMITTEE ON RADIO FREQUENCIES

By: Bruce Alberts
Bruce Alberts
President

April 21, 1995

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Puerto Rico—San Sebastian

WJWN-TV

Ch. 38

Network Service: None, Independent.

General: Tele 38 Inc., Box 4522, San Juan, PR 00936.

Studio: Military Road, San Sebastian, PR 00901.

Telephone: 809-765-1810.

Technical Facilities: Channel No. 38 (61.4-62.0 MHz). Authorized power: 85.9-kw max. visual, 8.6-kw max. aural. Antenna: 1088-ft. above av. terrain, 81-ft. above ground, 1295-ft. above sea level.

Latitude	18°	19'	06"
Longitude	67°	10'	42"

Transmitter: Atalaya Peak, 3.2-mi. NW of Anasco, Aguada.

Ownership: Tele 38 Inc.

Began Operation: January 1, 1967.

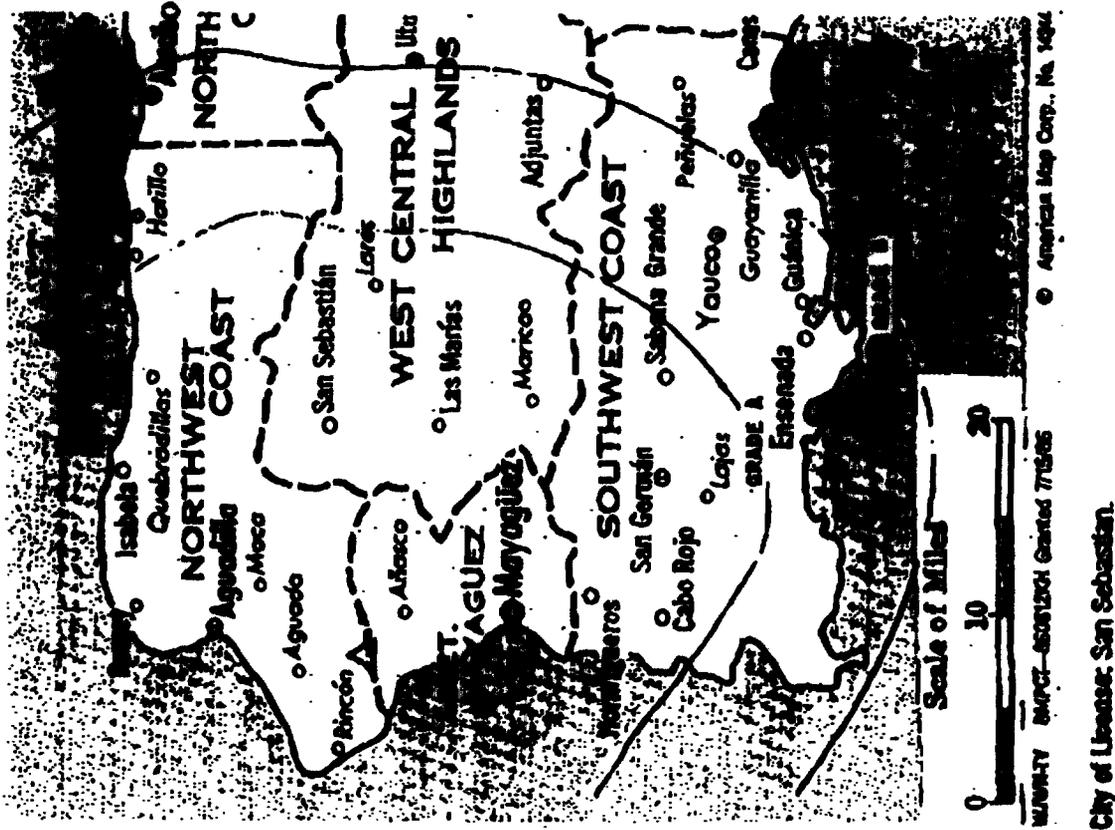
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Haydee Diaz, President.

Notes: On request.



CERTIFICATE OF SERVICE

I, Robert L. Riemer, hereby certify that copies of the foregoing "Reply Comments" were filed with the Federal Communications Commission on April 21, 1995, and copies served on that same day by first class U.S. mail, postage paid, to the following:

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