Before the
Federal Communications Commission
Washington, D.C. 20554

MM Docket No. 88-510

In the Matter of

Improved Methods for Calculating
Groundwave Field Strength in the
AM Broadcast Band

REPORT AND ORDER
(Proceeding Terminated)

Adopted: April 12, 1990; Released: July 18, 1990

By the Commission:

INTRODUCTION

1. The Commission has decided to replace its current AM broadcast band groundwave propagation curves with a new set of curves. Over a significant range of distances, the current curves are a result of "curve fitting" that estimated values between the curve segments that could be calculated. A 1986 computer program allowed mathematical calculation of predicted groundwave field strengths at all distances. The new curves are derived from data generated by that computer program. While the new curves are more accurate than the old curves, we will not make the change effective until related changes in technical assignment criteria are adopted.

BACKGROUND

2. The *Notice of Proposed Rule Making* (" *Notice* ") proposed replacing the existing AM groundwave propagation curves with a new, more accurate set of curves for depicting groundwave service and interference.[1] In addition, the *Notice* raised the matter of improving the FCC ground conductivity map, Figure M3, but proposed no revision because adequate funds were not available to pursue this extensive project. The "Kirke method," which is the procedure currently specified in our rules for calculating groundwave field strength over paths containing more than one ground conductivity value, was also discussed. Finally, we requested comments on whether the proposed changes should be implemented in a "piece meal" fashion or coordinated with action in related proceedings to change other AM technical assignment criteria.

3. To put this proceeding in context, it is one of several that are outgrowths of the MM Docket No. 87-267 *Notice of Inquiry* (" *Inquiry* ").[2] The *Inquiry* is the Commission's comprehensive review of AM broadcast assignment criteria and other technical standards. It followed comments filed on a 1986 Mass Media Bureau Report on the Status of the AM Broadcast Rules (RM-5532). Through the *Inquiry* and the Region 2 Administrative Radio Conference, the AM broadcast industry has reached general agreement on many of the new technical approaches needed for AM improvement, including the revised groundwave propagation curves considered in this proceeding.

COMMENT SUMMARY

4. Ten parties filed comments and five parties filed reply comments. [3] There is unanimous support in the comments for adopting the proposed new groundwave propagation curves. Several commenters request that the Commission continue allowing field strength measurements to be made in lieu of the calculations using the curves. Three parties make suggestions regarding the physical characteristics of the graphs on which the curves are plotted.[4]

5. Comments vary on the importance of improving the Figure M3 ground conductivity map. NAB argues that it is less important than adopting the new curves. Cox urges the Commission to proceed cautiously, starting with thorough data collection. WGN, CBS and especially ABES and Nolte indicate that revision of Figure M3 is a significant task that merits immediate, high-priority Commission attention. ABES suggests that when we adopt new curves, we should keep this Docket open to expedite Figure M3 revision. Nolte suggests that the Commission require conductivity information to be submitted in applications in order to begin building a data base for Figure M3 revision.

6. Generally, retaining the "Kirke method" was supported by the comments that addressed it. Lahm suggests that when resources are available, the Commission should conduct a study to find an improved methodology.

7. The consensus of comments favored coordinated implementation with the other related AM improvement proceedings. Those supporting this approach included WGN, Clear, Empire, Cox, du Treil, NAB, Fisher, Outlet, and Pilot. NAB also suggested that we need to revise the first adjacent channel protection ratio at the same time as the current proposals are implemented. Outlet contends that implementation should occur only after international agreements are ratified. A few commenters did not agree. ABES takes the position that groundwave changes don't need to wait for resolution of skywave issues. Lahm suggests limited interim uses of the new curves, but urges the Commission to allow six months before use of the new curves is required. A few other miscellaneous implementation matters were raised in comments.[5]

DISCUSSION

8. In light of the comments, we are adopting the proposed change in the groundwave propagation curves. We find that the new curves more accurately reflect groundwave signal coverage than the existing curves and should lead to better prediction of when objectionable interference does or does not exist.

9. We also considered the suggested changes in the horizontal and vertical scales, but conclude that the current format offers the best compromise between ease of distinguishing values and range of values included. As proposed, we are also amending the language in §73.184 pertaining to Figure 20 to refer to metric units. In addition, we were surprised by the concern expressed in some comments that the proposal may have prohibited field

strength measurements in lieu of calculations. We did not intend to alter that provision of §73.183 and it is not being changed.

10. We continue to believe that updating Figure M3 is a beneficial project that we should pursue. However, current funding and staffing levels do not allow it at this time and we find no benefit to keeping this proceeding open until Figure M3 revision can be undertaken. Such revision will undoubtably require additional notice and comment before changes can be adopted. We will act on this matter in a future Rule Making proceeding.

11. As we pointed out in the *Notice*, the Commission's rules currently specify a procedure for calculating groundwave field strengths over paths containing more than one ground conductivity value. This procedure is referred to as the equivalent distance method or "Kirke method." The information submitted in comments did not convince us that there is likely to be an alternative that is appreciably more accurate. Therefore, we believe our resources are better spent in other areas and we do not intend to pursue further at this time the possibility of using an alternative method.

12. We do not agree with the suggestion of NAB that the new groundwave model should be modified by some subjectively applied "safety factor." The model is being adopted because it is the most accurate method of predicting groundwave field strength available. If, after considering the net effect of all the technical changes proposed in the AM improvement proceedings, we discover that some stations will be adversely affected, arguments can then be made on a policy (rather than an engineering) basis that the protection standards should be altered.

13. The implementation date for the new curves will be established in the AM improvement proceeding in which we consider related assignment criteria. We find that Lahm's recommendation for limited uses in the interim would create administrative confusion. Canadian and Mexican negotiations and du Triel's 3-digit accuracy proposals are more appropriately considered in the assignment criteria Rule Making. All we adopt today is a propagation model with improved accuracy over the current model. The implementation details associated with the model's use, along with protection standards and other related matters, will be considered in conjunction with the *Notice of Proposed Rule Making* adopted today in the AM improvement proceeding, MM Docket No. 87-267.

14. Currently, Section 73.184 does not contain the actual groundwave propagation curves, but is instead followed by a note that these graphs are available by contacting the Commission. Thus, adopting new curves does not require Section 73.184 or the following note to be changed. Instead, we will prepare and make available sets of the new curves in the near future. Until implementation, the new curves will be labeled "Curves adopted April, 1990 are not in effect pending further action of the FCC." We fully expect that they will be available in this form for at least six months before they become effective, as Lahm requests. The individual data points which define field strength at various distances and which form the basis of the curves also will be made available.

CONCLUSION

15. After consideration of the record developed in this proceeding, we conclude that adoption of the proposed changes is in the public interest. The new groundwave model produces more accurate field strength predictions, allowing more confidence in service and interference determinations. Consistent with the discussion in paragraphs 13 and 14, *supra*, the model will not become effective at this time. In the AM improvement proceeding, MM Docket No. 87-267, we propose additional rules to integrate the new groundwave model with related AM technical and assignment standards. Thus, parties to this proceeding have an opportunity to comment on the final intended effect of all of our recent AM improvement actions, including any implementation refinements of the groundwave model.

FINAL REGULATORY FLEXIBILITY ANALYSIS

16. Pursuant to the Regulatory Flexibility Act of 1980, the Commission's final analysis is as follows:

I. Need and Purpose of this Action:

The Commission is replacing the AM groundwave propagation curves with a new model based on recent scientific analysis of groundwave measurement data and theory. Use of the new method will provide a more accurate depiction of service and interference relationships between AM broadcast stations.

II. Summary of Issues Raised by the Public Comments in Response to the Initial Regulatory Flexibility Analysis:

No commenters addressed the Initial Regulatory Flexibility Analysis.

III. Significant Alternatives Considered and Rejected:

There are no alternatives to the action taken here that would accomplish the stated purpose.

17. The Secretary shall send a copy of this *Report and Order*, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration in accordance with paragraph 603(a) of the Regulatory Flexibility Act (Pub. L. No. 96-354, 94 Stat. 1164, 5 U.S.C. Section 601 *et seq.*, (1981)).

PAPERWORK REDUCTION ACT STATEMENT

18. The rule changes adopted here have been analyzed with respect to the Paperwork Reduction Act of 1980 and found to contain no new or modified form, information collection, and/or record keeping, labeling, disclosure, or record retention requirements; and will not increase or decrease the burden hours on the public.

ORDERING CLAUSES

19. Accordingly, IT IS ORDERED That pursuant to the authority contained in Sections 4(i) and 303(r) of the Communications Act of 1934, as amended, the groundwave field strength prediction model described by the Graphs 1 to 19, and 20 that are available pursuant to the note following §73.184(f) IS ADOPTED. The effective date of this change will be established by further Commission action in related AM improvement proceedings. For the complete text of this revised CFR Section, *See* the

Notice of Proposed Rule Making in MM Docket 87-267, FCC 90-136 at 55 FR _____ . IT IS FURTHER ORDERED that this proceeding IS TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION

Donna R. Searcy
Secretary

FOOTNOTES

[1] *See Notice of Proposed Rule Making* in MM Docket 88-510, 3 FCC Rcd 6577 (1988).

[2] *See Notice of Inquiry* in MM Docket 87-267, 2 FCC Rcd 5014 (1987).

[3] Comments were filed by Robert A. Jones, P.E. (Jones), WGN Continental Broadcasting Company (WGN), Clear Channel Broadcasting Service (Clear), Empire Radio Partners, Ltd. (Empire), CBS, Inc. (CBS), Association for Broadcast Engineering Standards, Inc. (ABES), Cox Enterprises, Inc. (Cox), National Association of Broadcasters (NAB), du Treil, Lundin & Rackley, Inc. (du Treil), and Karl D. Lahm, P.E. (Lahm). Reply comments were filed by Fisher Broadcasting, Inc. (Fisher), Jefferson Pilot Broadcasting Company (Pilot), Nolte Communications, Inc. (Nolte), and Clear. In addition, the submission of Outlet Broadcasting, Inc. (Outlet) was labelled comments, but clearly was intended to be reply comments, and will be treated as such.

[4] Lahm suggests changing the horizontal scale to range from 0.5 to 50 kilometers (km) for the upper curves and from 50 to 5000 km for the lower curves, claiming this would eliminate the hard to read, seldom used 0.1 to 0.5 km section and expand the remaining portion, making the curves easier to use. He also proposes using graph paper with a less dense grid structure to facilitate curve reading and data plotting. Nolte opposes Lahm's suggestions and instead offers that the vertical scale should be extended at least to 2000 mV/m because measurement data of some high power stations plot off the current scale. Nolte also suggests that the curves be reprinted in two contrasting shades of black. Jones wants the existing scales to be retained so that NAB printed graph paper can still be used.

[5] Lahm requests that the Commission generate and make available new data tables that are compatible with its GWAVE computer program. He also suggests that we urge Canada and Mexico to adopt the new curves and supports the conversion of Graph 20 of §73.184 to metric as was suggested in the *Notice*. Du Treil supports making Graph 20 metric and also suggests a requirement that all calculations be expressed to no more than three significant digits. NAB suggests the use of a "safety factor" when implementing new curves. Nolte agrees with du Treil on 3 digit accuracy, but disagrees with NAB on a safety factor. Nolte argues that the new prediction method must improve accuracy or it isn't useful, and that a safety factor would make the prediction less accurate. Finally, Outlet suggests that the computer program for predictions would be most useful if it is compatible with personal computers.