DAYTIME SKYWAVE, DOCKET NO. 8333:

Report and order amending standard broadcast (AM) rules.

Daytime skywave interference.—Considered.

Restriction on radiation during 2 hours following sunrise and 2 hours preceding sunset.—Adopted.

No new limited-time station licensing.—Adopted.

No effect on existing licenses.—Adopted.

BEFORE THE

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON 25, D.C.

In the Matter of PROMULGATION OF RULES AND REGULATIONS AND STANDARDS OF GOOD ENGINEERING PRACTICE CONCERNING DAYTIME SKYWAVE TRANSMISSIONS OF STANDARD BROADCAST STATIONS.	Docket No. 8333

REPORT AND ORDER

(Adopted September 18, 1959)

BY THE COMMISSION: COMMISSIONER LEE CONCURRING IN THE RESULT AND ISSUING A STATEMENT; COMMISSIONER CRAVEN ABSENT.

1. This proceeding was instituted by a notice of proposed rulemaking adopted May 8, 1947, "to receive evidence concerning the existence and extent of daytime skywave transmissions of standard broadcast stations and to promulgate whatever rules and regulations may be necessary." The purpose, then, of this proceeding is to determine—

(1) the existence and extent of skywave transmissions of standard broadcast stations during daylight hours;

(2) whether, in light of the Commission's basic allocation policies, stations receive an adequate degree of protection from such interference as may be caused by daytime skywave transmissions;

(3) if they do not, whether the Commission's rules should be revised to accord additional protection from such interference.

In March 1954 a proposed report and order herein was adopted, announcing certain tentative conclusions which are referred to below. (See FCC 54–333, 10 Pike and Fischer R.R. 1541.)

2. Section 303(f) of the act provides, inter alia, that the Commission shall "make such regulations not inconsistent with law as it may deem necessary to prevent interference between stations." By this section, the Commission is delegated the authority to determine the extent to which stations shall be protected against interference, and, concomitantly the authority to determine the extent to which

interference between stations shall be permitted to exist. This broad delegation leaves within our discretion (subject to the always-present criterion of the public interest) both the determination of what degree of interference shall be considered excessive, and the methods by which such excessive interference shall be avoided.[1]

3. The present proceeding is concerned with the standard broadcast (AM) band, from 540 kc. to 1600 kc. Whenever two or more standard broadcast stations operate simultaneously on the same or closely adjacent frequencies, each interferes to some extent with reception of the other. The extent of such interference—which may be so slight as to be undetectable at any point where either of the stations renders a usable signal, or may be so great as to virtually destroy the service areas of both stations—depends on many factors, among the principal ones being the distance between the stations, their respective radiated power, and, of particular significance here, *the time of day*. Other factors playing a part in the extent of AM service and interference are the frequency involved, the time of year, the position of the year in the sunspot cycle, ground conductivity along the transmission path, atmospheric and manmade noise, and others. With the existence of these many factors, some of them variable, it obviously has never been and is not now possible for the Commission to make assignments of AM stations on a case-to-case basis which will insure against any interference in any circumstances. Rather, such assignments are made, as they must be, on the basis of certain overall rules and standards, representing to some extent a statistical approach to the problem, taking into account for each situation some of the variables (e.g., power and station separations) and averaging out others in order to achieve the balance which must be struck between protection against destructive interference and the assignment of a number of stations large enough to afford optimum radio service to the Nation. An example of the overall standards applied is the 20-to-1 ratio established for the determination of that degree of cochannel interference which is regarded as objectionable. By this standard, it is determined that where two stations operating on the same frequency are involved, objectionable interference from station A exists at any point within the service area of station B where station A's signal is of an intensity one-twentieth or more of the strength of station B's signal at that point.

4. The 20-to-1 ratio for cochannel interference embodies one of the fundamental limiting principles which we must always take into account in AM assignments and allocations—that signals from a particular station are potential sources of objectionable interference over an area much greater than that within which they provide useful service. A second fundamental principle is that involved particularly in the present proceeding—the difference between nighttime and daytime propagation conditions with respect to the standard broadcast frequencies. This is a phenomenon familiar to all radio listeners, resulting from reflection of skywave signals at night from the ionized

[1] The material which was for many years contained in the Commission's "Standards of Good Engineering Practice Concerning Standard Broadcast Stations" was in 1955 incorporated into part 3 of our rules, as secs. 3.181 to 3.190 thereof.

layer in the upper atmosphere known as the ionosphere. All AM stations radiate both skywave and groundwave signals, at all hours; but during the middle daytime hours these skywave radiations are not reflected in any substantial quantity, and during this portion of the day both skywave service and skywave interference are, in general, negligible. But during nighttime hours the skywave radiations are reflected from the ionosphere, thereby creating the possibility of one station's rendering service, via skywave, at a much greater distance than it can through its groundwave signal, and at the same time vastly complicating the interference problem because of the still greater distance over which these skywave signals may cause interference to the signals of stations on the same and closely adjacent frequencies. Because of the difference between daytime and nighttime propagation conditions, it has been necessary to evolve different allocation structures for daytime and nighttime broadcasting in the AM band, with many more stations operating during the day than at night.

5. It was recognized years ago that the transition from daytime to nighttime propagation conditions, and vice versa, is not an instantaneous process, but takes place over periods of time from roughly 2 hours before sunset until about 2 hours after sunset, and again from roughly 2 hours before sunrise until some 2 hours after sunrise. During the period of about 4 hours around sunset, skywave transmission conditions are building up until full nighttime conditions prevail; during the same period around sunrise, skywave transmission is declining, until at about 2 hours after sunrise it reaches a point where it becomes of little practical significance. However, in this case as elsewhere it was necessary to arrive at a single standard to be applied to all situations, representing an averaging of conditions, and thus to fix particular points in time which would be considered the dividing points between daytime and nighttime conditions. It was determined that the hours of sunrise and sunset, respectively, should be used for this purpose. Accordingly, the 1938–39 rules adopted these hours as limitations upon the operation of daytime stations. Class II stations operating on clear channels are required to cease operation or operate under nighttime restrictions beginning either at local sunset (for daytime class II stations) or sunset at the location of the dominant class I station where located west of the class II station (for limited-time class II stations).

The same restrictions apply after local sunset in the case of class III stations operating on regional channels, which after that time are required to operate under nighttime restrictions in order to protect each other. With respect to nighttime assignments, the degree of skywave service and interference is determined by skywave curves (figs. 1 and 2 of sec. 3.190 of the rules) giving average skywave values. These curves were derived by an analysis of extensive skywave measurement data. It was recognized that skywave signals, because of their reflected nature, are of great variability and subject to wide fluctuations in strength. For this reason, the more uncertain skywave service was denominated "secondary" in our rules, as compared to the steadier, more reliable groundwave "primary service," and, for both skywave service and skywave interference, signal strength is

expressed in terms of percentage of time a particular signal-intensity level is exceeded—50 percent of the time for skywave service, 10 percent of the time for skywave interference.

Allocation Policies

6. As mentioned, the allocation of AM stations represents a balance between protection against interference and the provision of opportunity for an adequate number of stations. The rules and policies to be applied in this process of course must be based on objectives which represent what is to be desired if radio service is to be of maximum use to the Nation. Our objectives, as we have stated many times, are—

(1) To provide some service to all listeners;
(2) To provide as many choices of service to as many listeners as possible;
(3) To provide service of local origin to as many listeners as possible.

Since broadcast frequencies are very limited in number, these objectives are to some extent inconsistent in that not all of them can be fully realized, and to the extent that each is realized, there is a corresponding reduction of the possibilities for fullest achievement of the others. Accordingly, the Commission has recognized that an optimum allocation pattern for one frequency does not necessarily represent the best pattern for other frequencies, and has assigned different frequencies for use by different classes of stations. Some 45 frequencies are assigned for use primarily by dominant *Class I–A* or *Class I–B clear-channel* stations, designed to operate with adequate power and to provide service—both groundwave and (at night) skywave—over large areas and at great distances, being protected against interference to the degree necessary to achieve this objective. In dealing with these frequencies, the objective listed first above—provision of service to all listeners—was predominant; the other objectives were subordinated to it. The class I stations on these clear channels are protected to their 0.1-mv./m. groundwave contours against daytime cochannel interference. With respect to skywave service rendered at night, class I–A stations are the only stations permitted to operate in the United States on clear channels specified for class I–A operation, and so render skywave service free from cochannel interference wherever they may be received; class I–B stations are protected at night to their 0.5-mv./m. 50-percent time skywave contours against cochannel interference. Since the provision of skywave service requires adequate freedom from interference, only class I stations are capable of rendering skywave service. But nighttime operation by stations of other classes of course entails skywave interference to groundwave service, interference which is substantial unless steps are taken to minimize it.

7. With respect to other frequencies, these are designated as regional or local, and assigned for use by class III and class IV stations, respectively, stations operating generally with lower power. In the allocation pattern worked out for these frequencies, the provision of

long-range service has to some extent been subordinated to the other two objectives—assignment of multiple facilities, and assignment of stations in as many communities as possible.

8. As mentioned, the primary allocation objective to be followed in the allocation of stations on clear channels is the provision of widespread service, free from destructive interference. During nighttime hours, because of the intense skywave propagation then prevailing, no large number of stations can be permitted to operate on one of these channels, if the wide area service for which these frequencies are assigned is to be rendered satisfactorily by the dominant stations which must be relied upon to render it. Therefore, under our long-standing allocation rules, on some of these channels no station other than the dominant (class I–A) station is permitted to operate at night, so that the I–A station can render service, interference free, wherever it can be received. On the remainder of the clear channels, the dominant (class I–B) stations are protected as described above, and the relatively small number of secondary (class II) stations permitted to operate on these channels at night are required to operate directionally and/or with reduced power so as to protect the class I stations. In the daytime, on the other hand, since skywave transmission is relatively inefficient, it is possible to assign a substantially larger number of stations on these channels. Additional class II assignments for daytime operation can be made without causing destructive interference to the class I stations or to each other, and by their operation provide additional service on these channels and additional local outlets for a large number of communities. Such additional daytime class II assignments are appropriate if optimum use is to be made of these frequencies, and the Commission has over the years made a large number of them. Similarly, on the regional channels many class III stations have been assigned either to operate daytime only or to operate nighttime with directional antennas and/or lower power.

9. Essentially, the question presented for decision in the present Daytime Skywave proceeding is whether our decision [in 1938–1939] to assign stations on the basis of daytime conditions from sunrise to sunset, is sound as a basis for AM allocations, or whether, in the light of later developments and new understanding, skywave transmission is of such significance during the hours immediately before sunset and after sunrise that this condition should be taken into account, and some stations required to afford protection to other stations during these hours.

The History of the Proceeding

10. The decision reached in 1938–39 was made after the accumulation of a large amount of data and thorough study thereof. Since then, there has been a notable increase in the number of stations and also the accumulation of additional data and the development of new techniques for using it, leading to a better understanding of propagation phenomena. In 1947, affidavits were filed with the Commission by various clear-channel stations alleging that extensive interference

was being caused to the service areas of these stations during daylight hours, from class II stations whose signals were being reflected from the ionosphere so as to create skywave intereference. These assertions were the basis of appeals to the U.S. Court of Appeals for the District of Columbia, which in one case, on the basis of the claims, stayed the effectiveness of a construction permit issued by the Commission. In the light of these complaints and the increase in knowledge, the Commission recognized the need for a reevaluation of the problems arising during these transitional hours. Accordingly, in May 1947 the notice of proposed rulemaking in this proceeding was adopted. Hearings were held before a Board of Commissioners in June 1947. In December 1947 the Commission consolidated this matter with the clear-channel proceeding (docket 6741) and oral argument was held before the Commission in both proceedings. In August 1953 the Commission severed the present proceeding from docket 6741.

The 1954 Report and Order, and Subsequent Developments

11. On March 11, 1954, we adopted herein a proposed report and order and notice of proposed rulemaking. Therein, we described at length the background and history of this matter, and announced certain tentative conclusions. These may be summarized as follows: (1) the record shows that skywave transmission during the transitional hours before sunset and after sunrise is of significant amount, and hence class II stations cause considerable interference in some cases during these hours to class I stations operating on the same frequency (the case of station WCKY, Cincinnati, was noted particularly); (2) it is appropriate to consider correcting limitations only with respect to protection of class I stations, since the record compiled herein dealt chiefly with interference to such stations and since, furthermore, the reason compelling the readjustment is the necessity of affording some service to all areas and population. This is a primary objective in the allocation of class I stations which are not intended to be subjected to extensive interference, whereas in allocation of other classes of stations other objectives are of more importance and interference is tolerated to a greater extent; (3) class I stations should be protected on the basis of conditions *as of sunset minus 2 hours*, further limitation on class II stations being too restrictive and this one representing a reasonable balance; (4) such limitation should be confined to the period of 2 hours before sunset and 2 hours after sunrise, and not extended through the remainder of the daylight period, because any additional protection during these hours is needless and unwarranted; (5) the protection of class I stations against skywave interference during these daylight hours, which is in addition to whatever protection is afforded by our present rules concerning groundwave service and interference, should be limited to protection from *cochannel* skywave interference, since any adjacent-channel interference at sunset minus 2 hours is so slight as not to require any protection rule; (6) with respect to all hours of the day other than the 2 hours before sunset and 2 hours after sunrise, existing rules would apply to assignment and the determination of inter-

ference, including use of the existing skywave curves for determination of nighttime radiations.

12. To implement these conclusions, we proposed the adoption of certain curves and a table (see report and order of March 11, 1954, app. II), from which there could be computed the maximum permissible radiation from a class II station, on a given frequency and at a given distance and azimuth from the 0.1-mv./m. groundwave contour of the cochannel class I station, in the direction of that station, during the 2 hours before sunset and 2 hours after sunrise. The computation process involved determining from two sets of curves two figures of millivolts per meter (varying with distance from the class I station's 0.1-mv./m. contour and azimuth between the stations), multiplying each of these figures by a constant given for each frequency, and adding the sum of the two products thus obtained, to get the permissible radiation for the class II station at the given distance and azimuth and on the given frequency. Through the use of these curves, the effect of frequency is taken into account in each individual case. We noted that the record shows that skywave transmission and interference are substantially greater at higher frequencies; therefore, in order to equalize interference conditions across the band (which is desirable especially because class I stations on the higher clear channels are limited in their groundwave service because of poorer groundwave propagation) more restriction on class II stations is required in the higher frequencies than on the lower channels.

13. Our proposed report and order contained other proposals, relating to termination of the operation by limited-time class II stations located east of the dominant class I station during the "bonus hours" between local sunset at the location of the class II station and sunset at the location of the class I station, and relating to a partial lifting of the "freeze" on the processing of applications for facilities on clear channels. With respect to the scope of our proposed revisions, in the report and order itself it was proposed only to apply them to future authorizations; the question of the applicability of the proposed restrictions to *presently existing* stations was made the subject of a notice of further proposed rulemaking issued at the same time. Lastly, we decided that instead of issuing the report and order in final form, we would issue it as a proposal, with comments thereon to be received and oral argument held.

14. Oral argument on the proposals for prospective assignments was held on July 15, 1954. On January 26, 1955, the Commission adopted a notice stating that—

> * * * the Commission is of the present view that the proposal of the Commission upon which oral argument was held would appear to present a more equitable basis for a change in the Commission's rules than any of the counterproposals submitted in the proceeding. Upon such review, however, we are not convinced that we should make final our judgment in this respect without the benefit of the comments which are to be submitted in the portion of this proceeding raising the question of the application of any rules that may be adopted to existing stations as well as to prospective applications * * *.

Comments and reply comments were received until May 1, 1955.

15. Only two parties to the proceeding supported adoption of the proposed report and order. All of the others opposed it on various

grounds. There was attack on the conclusions reached as to the existence and effect of skywave transmission during the transitional hours involved, including assertions that the data used as a basis were inadequate and/or not properly analyzed, that the extrapolation employed with respect to time of day and as to distance was not proper, that no consideration was given to finite ground conductivity, and that groundwave values used were based on soil conductivity values since superseded by a new soil conductivity map. It was also asserted that no adequate studies of areas and populations which would be affected by the proposed rules had been made. Some parties urged that the protection proposed is not sufficient, for example, that conditions at sunset or sunset minus 1 hour should be considered as the basis instead of conditions at sunset minus 2 hours. Many class II and class III stations urged that their operations should also be protected. Other parties urged that too much protection would be afforded; one aspect of this attack was upon the concept of affording protection to a class I station's 0.1-mv./m. groundwave contour, and it was argued that fading, noise, etc., make service out as far as that contour of little value in any event. It was also argued that daytime protection standards should be worked out and applied to particular situations, where necessary, on a case-to-case basis. It was also urged that our judgment involved policy considerations which should not be decided out of the context of the clear-channel proceeding. There was also attack on the report and order on procedural grounds—lack of sufficient notice with respect to the proposed changes; that the proposed changes in the introduction to the standards were "major" and "substantive" rather than "minor" or "editorial," and therefore required a separate rulemaking proceeding; that parties could not comment on the proposed rules without knowing whether or not they would be retroactive so as to affect their operations; and that the proceeding as pursued amounted to a modification of existing license without the required procedures.

DECISION

16. Upon review of our 1954 action and the comments concerning it, we affirm the basic conclusions therein reached. With respect to the adequacy of the record and the analysis to support our conclusions, we believe the showing is sufficient and probative. As we pointed out in the proposed report and order (par. 21), a Commission witness introduced evidence of 6 years of recordings made on 17 transmission paths involving clear-channel stations, from which curves have been derived. These curves indicate the existence of skywave transmission and interference during the transitional hours before sunset and after sunrise, and afford a reasonably accurate and suitable tool for determining the extent thereof, on an average basis. We dealt with certain objections to the statistical treatment used (footnote 12). In paragraph 22 we referred to two specific examples of the extent of interference during these periods, interference suffered by clear-channel stations WCKY (Cincinnati) and KOA (Denver) from class II stations in Philadelphia and in Clayton, Mo.,

respectively. These examples illustrate the problem. In footnote 16 of that document we set forth the method of extrapolation used with respect to distances of over 1,000 miles and frequencies higher than 1500 kc. We affirm our proposed report and order in these respects.

17. As to the degree of protection to be afforded, we are convinced that the concept which we tentatively adopted in our 1954 decision is correct, and that the 0.1-mv./m. groundwave contours of class I stations should be protected against that degree of cochannel daytime skywave interference which would otherwise exist at sunset minus 2 hours. It is, of course, possible to consider other alternatives, in either direction, ranging from protection of the 0.1-mv./m. contour at sunset, on the one hand, to no protection at all on the other. It does not appear that any of these other alternatives is to be preferred, keeping in mind the necessity of reaching an appropriate balance between the objectives of sufficient protection and provision for adequate service by a sufficient number of stations during daytime hours. It is apparent that this degree of protection, based as it is on conditions as of sunset minus 2 hours, involves relatively minor limitations upon class II stations. These restrictions are the least which we can appropriately impose if the service of clear-channel class I stations—whose function and purpose is to provide widespread service to large areas and populations, in furtherance of our objective of bringing some service to all—is not to be seriously disrupted by the great number of daytime operations for which applications are now on file and may be expected in the future. For reasons stated in our earlier decision and repeated above herein (par. 11), we do not extend this protection to other classes of stations, nor do we adopt any restrictions designed to afford protection against adjacent-channel daytime skywave interference.

18. As to the method by which the appropriate protection standard would be applied in each case and the resulting restriction determined, in our proposed report and order (par. 29) we proposed to adopt permissible-radiation curves, from which the maximum radiation permitted for a class II station in the direction of a cochannel class I station, on a given frequency, at a given azimuth from the class I station, and at a given distance from the class I station's 0.1-mv./m. groundwave contour, could be determined. These curves and the accompanying tables were set forth in appendix II of the proposed report and order. It has been argued that the computational process involved in the use of these curves—which involves obtaining values from two of the three charts, multiplying each of the two values thus obtained by a constant for the particular frequency, and adding the sum of the two resulting products—is too complex. This argument must be rejected, because we know of no simpler means which can be employed with anything like the same degree of accuracy, and the process does not appear unduly burdensome. Therefore we adopt the material which was set forth in appendix II of the earlier proposed report and order, and is set forth again in appendix I of the present report and order.

19. In the 1954 proposed report and order, we proposed to apply these restrictions to the transitional periods of 2 hours before sunset

and 2 hours after sunrise. In this connection we rejected (par. 28) the concept that the limiting curves should be made applicable to the entire daytime period, holding that protection against daytime skywave interference during the middle daytime hours is unwarranted. We adhere to this determination. Accordingly, the permissible radiation curves adopted herein are applicable during the transitional periods of 2 hours before sunset and 2 hours after local sunrise.

Scope of Application of the Restrictions

20. In our earlier proposed report and order, we proposed to apply the restrictions outlined to applications for new or changed class II facilities; we left open the question of whether they should be applied likewise to existing class II stations, issuing at the same time a notice of further proposed rulemaking on that subject. In that notice we enumerated four classes of existing stations—daytime-only class II, limited-time class II, unlimited-time class II, and class I–B stations located to the east of other cochannel I–B stations and beginning nighttime operation at the hour of sunset at the western class I–B station. We expressed the tentative conclusion that as to existing daytime-only and limited-time stations, it was not desirable to apply the proposed restrictions to them. We did not express any tentative conclusion as to the other two classes of stations involved, and left the whole question open in the further rulemaking.

21. We adhere to the conclusion previously reached tentatively, and also conclude that the same considerations apply to the other two classes of stations mentioned. The existing stations involved (daytime, limited-time, and unlimited-time class II stations, and the easternmost of cochannel class I–B stations) now render significant service, during the hours involved, to which listeners have become accustomed and come to rely upon. While, as mentioned, use of clear channels by class II stations is essentially a secondary use, the stations which have been so operating have come to form a significant part of standard broadcast service. A fortiori, the same principle applies to the I–B stations involved. We must also take into account the undoubted value of adequate service of local origin. It is to be noted that the contentions made herein by those parties urging restrictions against daytime skywave interference have for the most part emphasized the effect of such interference from *proposed* or *future* operations, rather than from the smaller number of presently authorized class II stations. The radiation restrictions adopted herein are intended primarily to guard against the more severe instances of *additional* skywave interference which could result from additional or changed class II stations on the clear channels. Therefore the rule we adopt herein applies only to new or changed facilities to be authorized in the future. It should also be noted that the new rule is limited in scope so that the protection afforded by it (apart from the protection afforded by other rules and policies) extends only to U.S. class I stations.[2]

[2] Daytime skywave interference may also exist between cochannel I–B stations. It is conceivable that, under some circumstances, consideration should be given to mutual protection between such stations in order to alleviate such interference. But since we conclude herein that no existing stations should be affected, it will be appropriate to decide the question of daytime skywave protection in such circumstances if and when it arises.

22. In our 1954 decision we emphasized that any determination reached in this proceeding was subject to whatever decisions might ultimately be reached in the clear-channel proceeding (docket No. 6741). As a general principle, this caveat still applies; this is one reason why we have maintained a "freeze" on certain classes of applications for facilities on clear channels. But that proceeding has been recently under active consideration and study, and it is possible at this point to make certain tentative judgments therein, as a result of which we can limit the classes of applications on which action must continue to be deferred. We noted in our 1954 decision herein (par. 34) that the clear channels allocated for class I–A operations are much more deeply involved in docket 6741 than are the class I–B clear channels. In the further notice of proposed rulemaking issued in docket 6741 on April 15, 1958 (FCC 58–350), we concluded that there should be no change in the pattern of assignments on the I–B channels. We are today adopting another further notice in that proceeding, limited to possible assignments on the I–A channels. These developments make appropriate at this time certain changes in the scope of the "freeze" in two directions: (1) removing from the freeze those I–B frequencies which can have no relation, direct or indirect, to possible changes in the I–A structure; and (2) changing the classes of applications covered by the freeze so as to reflect the impingement of such applications on the possible "clear channel" assignments rather than merely their daytime skywave effects. Accordingly, we are adopting simultaneously herewith an order (FCC 59–971) amending section 1.351 of our rules so as to: (1) make the "freeze" apply pending a decision in docket 6741; (2) remove from the freeze the frequencies 1500, 1510, 1520, 1530, 1540, and 1560 kc.;[3] and (3) extend the freeze, in the case of applications for changes in existing facilities, to any proposal which would increase radiation or change station location.

"Bonus" Hours of Limited-Time Stations

23. There remains one further matter. In our 1954 proposed report and order, we tentatively concluded (par. 32) that both as to existing and as to proposed limited-time class II stations, these stations which are located east of the dominant class I station and are therefore under our present rules permitted to operate after their own local sunset time until the hour of sunset at the location of the class I station, should be required to cease operation during these "bonus hours" and sign off at local sunset. We pointed out that during this "bonus" period the transmission path from the class II station to the class I station is largely one on which nighttime propagation conditions prevail, and therefore the resulting interference is substantial and should be eliminated. The present rules also permit existing class II stations to operate during nighttime hours, if any, not used by the dominant class I station or stations on the channel. In the main, however, the class I stations operate throughout the nighttime hours, and thus the latter provision, in itself, is not particularly significant.

[3] The frequencies 940 kc. and 1550 kc. are of course no longer under the "freeze," having been removed by order of July 28, 1958, amending sec. 1.351.

24. Upon review of this matter, we are persuaded that as to existing limited-time stations this decision should not be adopted. The considerations mentioned above, concerning the value of existing service by daytime and limited-time stations, applies equally in these situations. Accordingly, we adopt no change in the rules with respect to existing limited-time stations. The question remains as to whether any new assignment of stations on this basis should be made. We are of the view that no further assignments of this character are warranted. We pointed out in the proposed report and order the extreme nature of the interference which may result from operation during these hours by the class II station (pars. 22 and 32, referring to the Denver-Clayton (Mo.) situation). This becomes apparent when it is realized that at a moment just before sunset at the location of the class I station, it may be considerably after sunset at the location of the class II station, and nighttime conditions prevail at that point and over much of the transmission path to the west. While to a certain extent the effect of this interference would be lessened because new class II facilities would be operating during these hours with facilities limited in accordance with the rule adopted herein, nonetheless the interference would be severe. Accordingly, it appears that we would not be justified in authorizing new stations on this basis and thus, except as to the stations now licensed, we are removing the provisions of the rules for the licensing of limited-time stations, the provisions for the licensing of the several other classes of stations being adequate in this respect.

25. In view of the foregoing, we are amending sections 3.23(b) and 3.24(b) of our rules, adding new sections 3.38 and 3.187, and adding three charts to section 3.190, to effectuate the conclusions discussed above. These changes are set forth in the appendix hereto. Section 3.38 will state in substance that there will be no further limited-time authorizations. Section 3.187 will provide in substance that no authorization for new or changed class II facilities will be granted if, during the 4 transitional hours, the radiation of the proposed station, in any direction toward the 0.1-mv./m. contour of a cochannel U.S. class I station, will exceed the values obtained by the use of that section. Section 3.187 will contain the table, and section 3.190 will contain (in addition to the material presently therein) the three charts, previously set forth in appendix II of our 1954 proposed report and order, and set forth in the appendix hereof.

26. In our proposed report and order of March 1954, we had proposed amendment of section 3.7 (definition of "nighttime") and revision of the introduction to the Standards of Good Engineering Practice (since then codified as sec. 3.181). Neither proposed amendment being necessary to the action taken herein, they are not adopted herein.

ORDER

27. In view of the foregoing, *It is ordered*—

(1) That, effective October 30, 1959, part 3 of the Commission's rules is amended as set forth in the appendix hereto; and

(2) That this proceeding *Is terminated.*

CONCURRING STATEMENT OF COMMISSIONER ROBERT E. LEE

(Docket 8333)

I concur in the action taken by the Commission in finalizing this proceeding. However, I am of the view that the allocation rules proposed in 1954 as they apply to restrictions in the radiation of class I stations should have been made final.

The Commission in 1954 proposed to limit the extent of interference which could be caused to class I stations by placing a limit on radiation which would be directed toward their service areas by cochannel class II stations and by other cochannel class I stations. The decision adopted today places a restriction on class II operations without a corresponding restriction on such class I stations. If we are to protect the service areas of each class I station from interference, I cannot find the logic in permitting interference from an equally objectionable and perhaps dominant source—the class I station sharing the channel.

Moreover, the Commission, while it grandfathered presently licensed class II limited-time stations in their operation past local sunset, refused to consider any new limited-time stations and voided the rule providing for such operations. I am sure that a far greater present and potential source of interference is the present and future operations of class I–B stations which do not utilize the normal means of protecting the other class I–B station with which they share the particular frequency but operate with their daytime facilities several hours past local sunset.

Here again the Commission is inconsistent in that it specifically prohibits such future class II station operations but leaves the door wide open for class I stations to interfere with each other.

Our present allocation policies, while affording greater protection to class I stations than given to class II stations, should not be construed to permit one class of station to cause interference that another class of stations is prevented from causing.

Clearly if the public interest requires the adoption of allocation rules designed to give protection to the service areas of stations which are designed to give broad area coverage, that same public interest requires the adoption of allocation rules protecting these same service areas from a source of interference of far greater potential magnitude—the class I stations which share the I–B channels.

APPENDIX

§ 3.23 [amendment]:

1. Section 3.23(b) is amended to read as follows:

(b) Limited time is applicable to class II (secondary) stations operating on a clear channel with facilities authorized before October 30, 1959. It permits operation of the secondary station during daytime, and until local sunset if located west of the dominant station on the channel, or if located east thereof, until sunset at the dominant station, and in addition during night hours, if any, not used by the dominant station or stations on the channel.

§ 3.24 [amendment]:

2. Section 3.24 is amended by the deletion of paragraph (h) thereof and the addition of the following paragraphs (h) and (i):

(h) That, in the case of an application for a class II station, the proposed station would radiate, during 2 hours following local sunrise and 2 hours preceding local sunset, in any direction toward the 0.1-mv./m. groundwave contour of a cochannel U.S. class I station, no more than the maximum radiation values permitted under the provisions of § 3.187.

(i) That the public interest, convenience, and necessity will be served through the operation under the proposed assignment.

3. The following new section 3.38 is added:

§ 3.38 *Limited-Time Authorizations.*

No authorization for new class II limited-time facilities will be granted. No authorization for modification of existing class II limited-time facilities will be granted for a change in frequency, an increase in power, a change in antenna radiation pattern, or a change in station location.

4. The following new section 3.187 is added:

§ 3.187 *Limitation on Daytime Radiation.*

(a) No authorization for new or changed class II facilities will be granted if the proposed class II station would radiate, during 2 hours following local sunrise and 2 hours preceding local sunset, in any direction toward the 0.1-mv./m. groundwave contour of a cochannel U.S. class I station, values in excess of those obtained as provided in paragraph (b) of this section.

(b) To obtain the maximum permissible radiation for a class II station on a given frequency (f_{kc}) from 640 kc. through 990 kc., multiply the radiation value obtained for the given distance and azimuth from the 500-kc. chart (fig. 9 of § 3.190) by the appropriate interpolation factor shown in the K_{500} column of paragraph (c) of this section; and multiply the radiation value obtained for the given distance and azimuth from the 1000-kc. chart (fig. 10 of § 3.190) by the appropriate interpolation factor shown in the K_{1000} column of paragraph (c) of this section. Add the two products thus obtained; the result is the maximum radiation value applicable to the class II station in the pertinent directions. For frequencies from 1010 kc. to 1580 kc., obtain in a similar manner the proper radiation values from the 1000-kc. and 1600-kc. charts (figs. 10 and 11 of § 3.190), multiply each of these values by the appropriate interpolation factor in the K'_{1000} and K'_{1600} columns in paragraph (c) of this section, and add the products.

(c) Interpolation factors.

(1) Frequencies below 1000 kc.			(2) Frequencies above 1000 kc.		
f_{kc}	K_{500}	K_{1000}	f'_{kc}	K'_{1000}	K'_{1600}
640	0.720	0.280	1010	0.983	0.017
650	.700	.300	1020	.967	.033
660	.680	.320	1030	.950	.050
670	.660	.340	1040	.933	.067
680	.640	.360	1050	.917	.083
690	.620	.380	1060	.900	.100
700	.600	.400	1070	.883	.117
710	.580	.420	1080	.867	.133
720	.560	.440	1090	.850	.150
730	.540	.460	1100	.833	.167
740	.520	.480	1110	.817	.183
750	.500	.500	1120	.800	.200
760	.480	.520	1130	.783	.217
770	.460	.540	1140	.767	.233
780	.440	.560	1160	.733	.267
800	.400	.600	1170	.717	.283
810	.380	.620	1180	.700	.300
820	.360	.640	1190	.683	.317
830	.340	.660	1200	.667	.333
840	.320	.680	1210	.650	.350
850	.300	.700	1220	.633	.367
860	.280	.720	1500	.167	.833
870	.260	.740	1510	.150	.850
880	.240	.760	1520	.133	.867
890	.220	.780	1530	.117	.883
900	.200	.800	1540	.100	.900
940	.120	.880	1550	.083	.917
990	.020	.980	1560	.067	.933
			1570	.050	.950
			1580	.033	.967

5. Section 3.190 is revised by adding new figures 9, 10, and 11 and by amending the text to read as follows:

§ 3.190 *Engineering Charts.*

This section consists of the following figures 1, 2, R3, 5, 6, 6a, 7, 8, 9, 10, and 11.

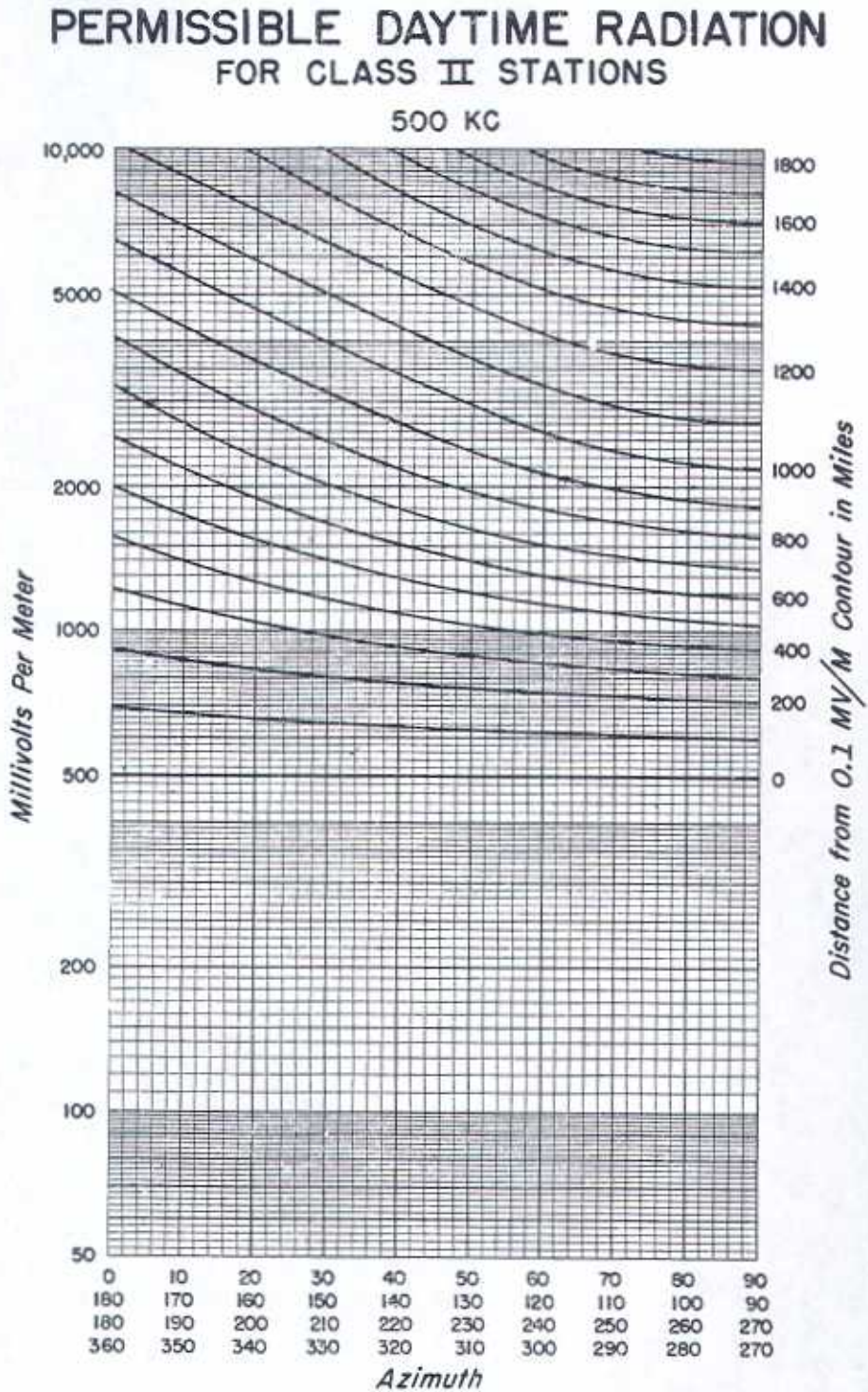
PERMISSIBLE DAYTIME RADIATION
FOR CLASS II STATIONS
500 KC
Millivolts Per Meter
10,000
5000
2000
1000
500
200
100
50
Distance from 0.1 MV/M Contour in Miles
1800
1600
1400
1200
1000
800
600
400
200
0
0 10 20 30 40 50 60 70 80 90
180 170 160 150 140 130 120 110 100 90
180 190 200 210 220 230 240 250 260 270
360 350 340 330 320 310 300 290 280 270
Azimuth

FIGURE 9

PERMISSIBLE DAYTIME RADIATION
FOR CLASS II STATIONS

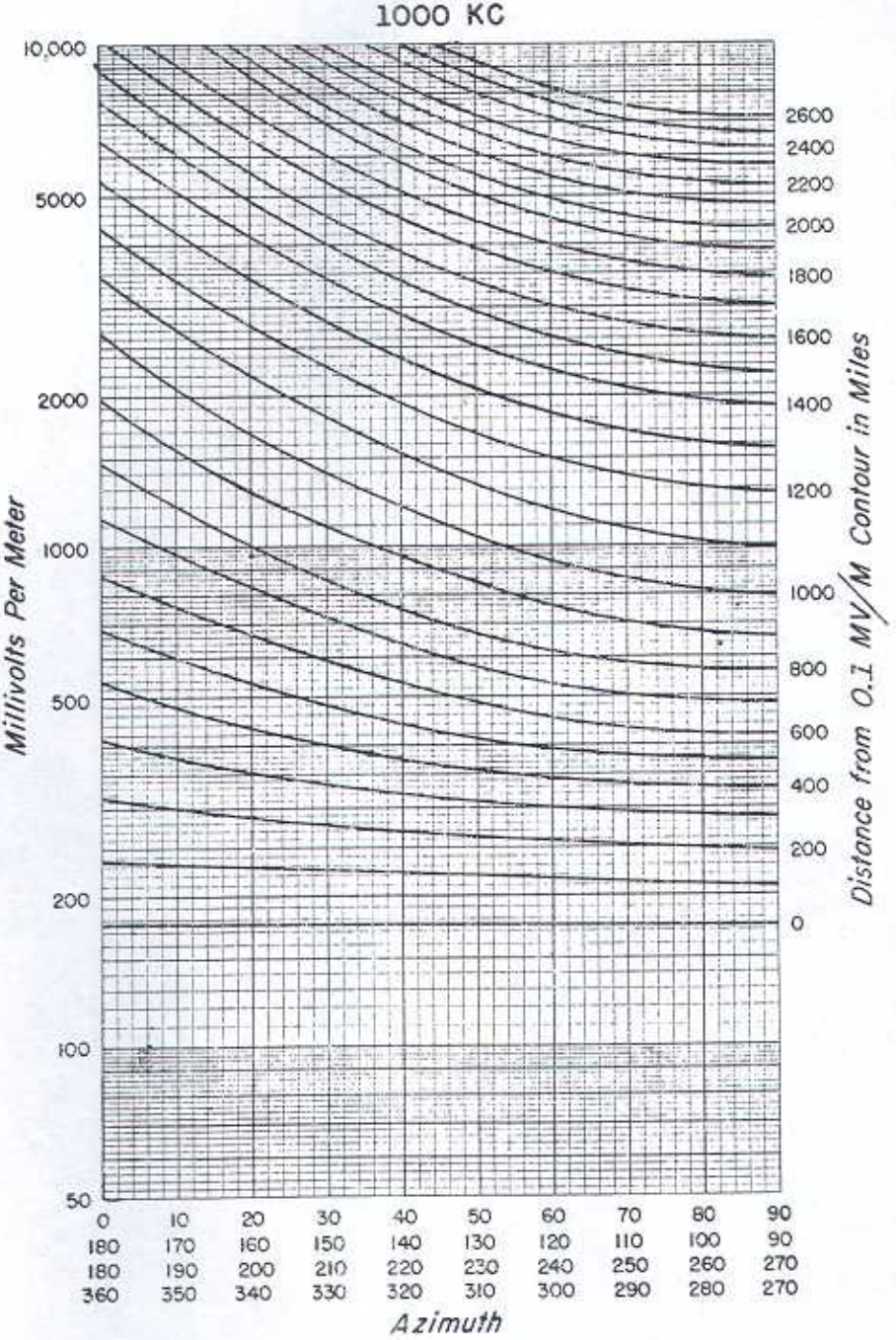

FIGURE 10

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PERMISSIBLE DAYTIME RADIATION
FOR CLASS II STATIONS

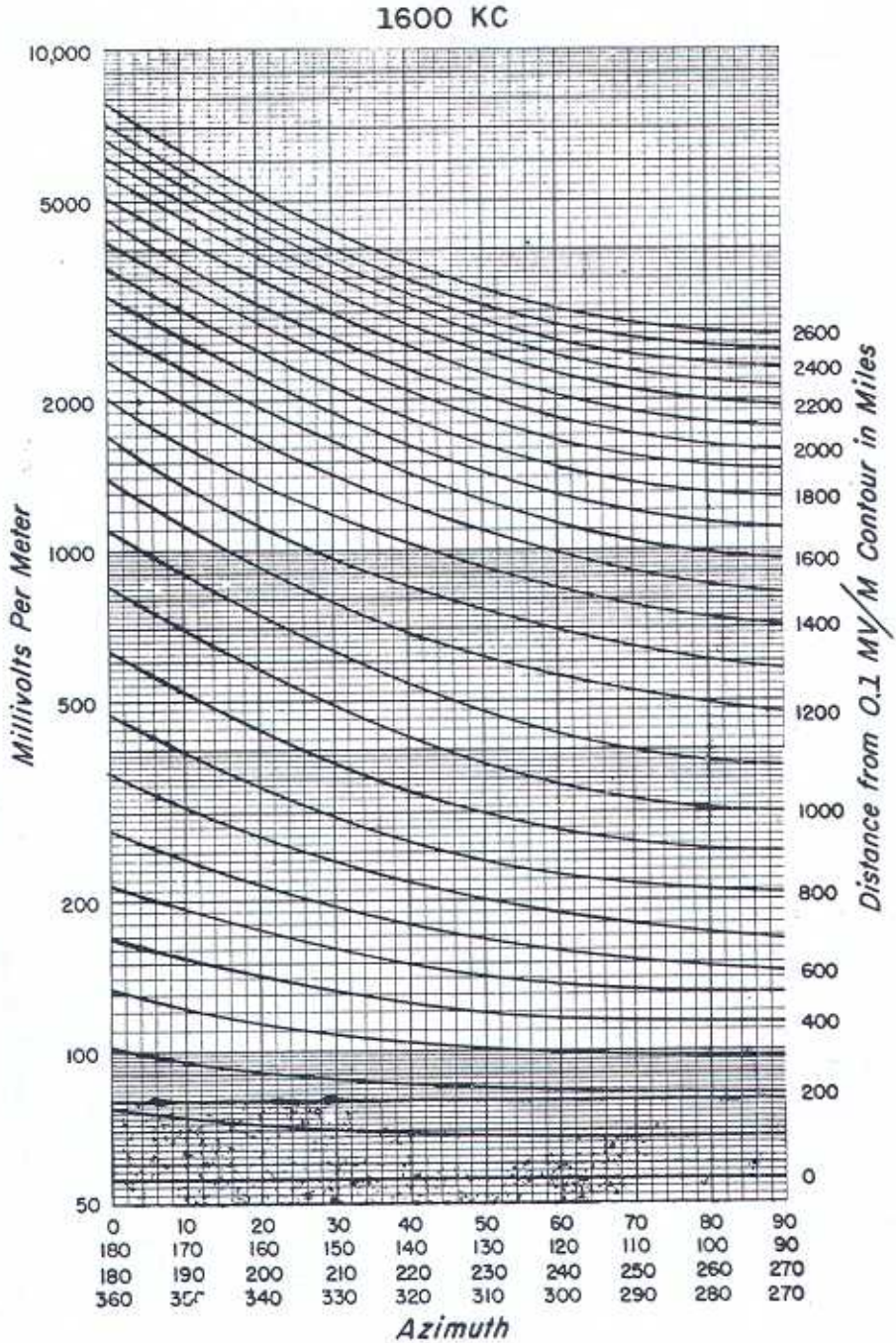

FIGURE 11