AM Station, Operating Hours
Daytime Station
Operation, Hours of
Presunrise Service Authority
Sunrise
Sunset

Section 73.99 of Commission's rules amended (1) to allow additional pre-sunrise use of U.S. Class I-A Clear Channels, (2) to permit post-sunset operation by Class II-D and Class III daytime-only stations, and (3) to permit the use of diurnal curves for interference calculations relating to pre-sunrise and post-sunset operations.
–AM B/C Stations
BC Docket No. 82–538

FCC 83–412

BEFORE THE

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

In the Matter of Hours of Operation of Daytime-Only AM Broadcast Stations	BC Docket No. 82–538 RM-3983

FIRST REPORT AND ORDER

(Adopted: September 9, 1983 Released: September 20, 1983)

BY THE COMMISSION:

INTRODUCTION

1. The Commission has before it the *Notice of Proposed Rule Making and Notice of Inquiry* in this proceeding adopted August 4, 1982.[1] This proceeding was begun in response to petitions for rule making filed by the National Telecommunications and Information Administration ("NTIA") and the National Radio Broadcasters Association ("NRBA"). The focus of the NTIA petition was on the limitations placed on the hours of operation of daytime-only stations.[2] As the NTIA petition pointed out, these stations are licensed

[1] This *Report and Order*, addresses the issues raised in the rule making section of the document. Consideration will be given to the issues raised in the inquiry section of the document at a latter date.

[2] The NRBA petition did not deal with this subject but with the criteria used by the

to operate only during daytime hours, that is, from local sunrise to local sunset. Although in certain instances they may be able to operate with reduced power during pre-sunrise hours, NTIA noted that beginning at 6:00 a. m. local time, a significant number of daytime-only stations are unable to obtain the benefits of pre-sunrise operation. Moreover, none of these daytime-only stations has the authority to operate after local sunset.[3] NTIA believed that the current rules regarding the hours of operation of daytime-only stations impose excessive limitations, and it argued that these limitations can be and should be eased. This position was supported in many of the filings made in response to the NTIA petition. A number of these parties called for a review of this subject so that the Commission could take into account the important changes that have taken place in AM listening patterns. The Commission agreed that the subject warranted exploring, and this proceeding was begun with the goal of relieving current restrictions to the maximum extent possible consistent with sound engineering practice.[4]

Background

2. Before discussing these proposals, it is desirable to provide some background material regarding AM signal propagation in order to place this subject in better perspective. Signals with different frequencies (or wavelengths) in the AM broadcast band[5] have unique characteristics, the most important of which for the present purposes is that they produce different effects during daytime and nighttime hours. During all periods of the day, AM broadcast stations transmit signals that travel in two basic directions. Those signals which travel parallel to the surface of the Earth are referred to as "groundwaves". Those which travel upward, away

Commission in determining the acceptability for filing of applications for AM nighttime operation. NRBA urged the Commission to amend Section 73.37(e) of the rules so that daytime-only stations could obtain nighttime operation without having to meet allocations acceptance criteria. This proposal was included in the *Notice of Inquiry* section of the document.

[3] The subject daytime-only stations are not the only ones affected by these limitations. There also are full-time stations which have different modes of operation during daytime and nighttime hours. Pre-sunrise authority is available to some of these full-time stations, thus enabling them to begin operation with daytime or critical hours antenna systems at 6:00 a.m. local time.

[4] International agreements also place limitations on the hours of operation of daytime-only stations. As discussed later, these agreements must be taken into account in formulating any new rules governing pre-sunrise or post-sunset operation by these stations. The principal agreements are: (1) the 1950 North American Regional Broadcasting Agreement ("NARBA"); (2) the 1967 Exchange of Notes between the United States and Canada; (3) the 1968 United States-Mexican Agreement; and (4) the 1947 Pre-Sunrise Agreement with the Bahama Islands.

[5] Although there are differences in the signal propagation characteristics of the 107 channels in the AM broadcast band (535–1605 kHz), they share in common a capacity to produce high skywave fields at nighttime.

from the station are referred to as "skywaves". Although groundwave signal values vary depending on frequency and ground conductivity, they do not change from day to night. Because of this continuity and the absence of "fading", groundwave signals are relied on to provide "primary" service. Skywave signals behave quite differently. During the day, most of the skywave signals are not reflected back to the earth and have no significant effect on the Earth.[6] At night, however, the ionosphere acts like a mirror, reflecting these signals back to earth, hundreds or even thousands of miles away, where they have the potential for causing serious interference to the signals of other stations. By way of contrast, at these great distances, groundwave signal values would be too low to cause interference problems. Because of the greater skywave potential for interference at night, AM allocations decisions must take into account the difference between daytime and nighttime signal propagation. The change from one propagation condition to the other is a gradual one. The transition from daytime to nighttime conditions can be said to begin two hours before sunset and to continue until two hours after sunset. A similar transition from nighttime to daytime conditions takes place during the period from two hours before sunrise until two hours after sunrise.[7] Although these two transitional periods are equivalent, the changes do not occur at the same rate in the two periods. Reliable diurnal curves are the only way to take these matters into proper account. There is one final complication which the Commission has to take into account in making its allocations and licensing decisions, *viz.*, the Earth's rotation. As the Earth rotates, the areas of daylight and darkness shift constantly. Thus, in examining the impact of one station on another, it is crucial to know if both are subject to the same conditions (of darkness of light) or if one is in darkness when the other is in light.

3. As is clear from the above discussion, many stations that were able to operate during the day because their groundwave signals did not cause objectionable interference would cause such interference if they operated with the same facilities at night.[8] Unless this

[6] Some signals are reflected back to earth even during daytime hours. This phenomenon is referred to as "daytime skywave." In certain cases, the potential for interference from daytime skywave signals requires a station to reduce its power during the "critical hours" following sunrise and preceeding sunset.

[7] Although most of the change from one propagation condition to the other takes place during these transitional periods, there are minor shifts during other hours as well. For purposes of the Commission's rules, full daytime conditions are considered to occur two hours after sunrise and full nighttime conditions two hours after sunset.

[8] The degree of this effect varies as a consequence of a number of factors, including the station's power, frequency, directional pattern (if any) and the distances to the other stations on the channel.

difference was taken into account, there would have been vast areas of mutually interfering signals dotted with small islands of service.[9] Clearly, this was an unacceptable allocations approach. On the other hand, the Commission long ago realized that it would have been wasteful to authorize only those stations that could operate on a full-time basis. Because even the most efficient nighttime arrangement would have left an enormous amount of unused space during daytime hours, the Commission concluded that it was necessary to provide the opportunity to operate on a daytime-only basis, even if the station could not be accommodated at night.

4. Recognizing the fact that in many cases daytime operation was the only opportunity for bringing desired AM service, many parties took advantage of the opportunity to obtain daytime-only authorizations. In fact, the demand by these parties was so great that there are now more than 2,400 stations which are licensed for operation only during daytime hours. This is approximately half of the total of U.S. AM stations. While easing current engineering standards governing the granting of nighttime authorizations could give some daytime stations the opportunity for nighttime operation, no feasible change could affect more than a small portion of daytime-only stations. For the remaining stations, any relief would have to come during the pre-sunrise or post-sunset periods.

5. Before 1940, the Commission permitted daytime-only stations to sign on regularly at 6:00 a.m. Since 1940, however, the regular hours of operation for daytime-only stations have been considered to be the hours between local sunrise and local sunset. Each station license contains the specific times of sign-on and sign-off. These times are determined for each month based on the times of local sunrise and sunset as of the fifteenth of the month, with the time being rounded to the nearest quarter-hour.

6. Years ago, the Commission permitted daytime-only AM stations to operate during the pre-sunrise period, and it allowed unlimited-time stations to commence operating using their daytime facilities starting at 4:00 a.m. In both cases, such operations were subject to discontinuance upon complaint by protected stations that objectionable interference was being caused within their protected service areas. Because of the small number of stations then on the air, this did not cause serious problems.

7. By the early 1960's, the number of AM stations broadcasting on the 107 AM channels had exceeded 3,500, of which over 1,500 were daytime-only stations. The substantial increase in the number of daytime-only stations coupled with their extensive use of the early

[9] The two principal ways this was taken into account was through power reductions or directionalization at night so that radiation was sufficiently reduced in order to avoid objectionable interference. In some cases, of course, even these reductions were not sufficient. Where such reduction were inadequate, nighttime operation was not possible.

morning sign-on privilege under the rules adopted in 1940 caused interference conflicts to proliferate to such an extent that the Commission decided to explore the subject again.

8. After considerable study by the Commission, the rule making proceeding in Docket 14419 culminated in a landmark *Report and Order* adopted June 28, 1967 (8 F.C.C. 2d 698) which established the basis for pre-sunrise operations.[10] The Commission focused on providing appropriate pre-sunrise arrangements for Class III stations, but Class II stations which operated on Class I-B Clear Channels were included as well. Since then, the Commission has extended the pre-sunrise rule to cover Class II stations operating on Class I-A Clear Channels.

9. Section 73.99 of the Commission's rules governs pre-sunrise operation by both daytime-only as well as full-time stations which operate with different day and night facilities. Different regulations apply to the various categories of stations involved depending on such matters as the class of station, hours of operation and the frequency on which they operate. Under the provisions of Section 73.99, pre-sunrise authority is available to two groups of stations. The first group consists of Class III stations operating on Regional channels. The second group consists of Class II stations which operate on clear channels and provide protection to the dominant Class I stations on these channels.[11]

10. Generally, Class III stations are able to obtain pre-sunrise authority to begin operation with their daytime antenna systems starting at 6:00 a.m. local time at a maximum power of 500 watts, reduced where necessary to provide full treaty protection to co-channel foreign stations. For Class II stations, the restrictions applied to pre-sunrise operations vary according to several circumstances. In the case of those assigned to the seven Clear channels on which Canada is accorded Class I-A priority under NARBA, pre-sunrise operation generally is not permitted. For those operating on the Mexican Class I-A Clear Channels, interference calculations are required pursuant to Section 73.99(d)(2). For Class II stations operating on the Bahamian Class I-A Clear Channel, Section 73.99 specifies that the Commission will determine the power and hours of operation that are consistent with international agreement. Also, operation on foreign Class I-B Clear Channels is permitted.

[10] In addition to establishing the domestic conditions for pre-sunrise operations by daytime-only stations, Section 73.99 incorporates limitations found in agreements between the United States and neighboring countries.

[11] There are three categories of Class II stations. Although all operate on Clear Channels, there are differences in the facilities which are available to the full-time categories of Class II-A and Class II-B stations, and there are Class II-D stations which operate on these channels only during daytime hours. This proceeding includes consideration of changes in the requirements governing pre-sunrise operations by all three of these groups of stations.

11. Class II stations generally are eligible to apply for authority to operate pre-sunrise with a maximum power of 500 watts, reduced, where necessary, to provide the requisite protection to domestic and foreign stations. However, Class II stations located east of co-channel U.S. Class I-A stations are not permitted to operate during the pre-sunrise period. Those west of a co-channel Class I-A station may commence operating at the time of sunrise at the Class I-A station. Those within the 0.5 mV/m 50% skywave contour of co-channel Class I-B stations to their east may sign on at sunrise at the easterly Class I-B station, but they must protect the Class I-B station to the west. Class II stations operating on United States Class I-B Clear Channels but not within the latter's 0.5 mV/m 50% skywave contours, may sign on at 6:00 a.m., so long as this does not cause interference to the Class I-B stations.

12. The Commission's rules do not make any provision for the authorization of post-sunset operation with daytime facilities. Thus, with the exception of those stations able to obtain pre-sunrise service authorizations pursuant to Section 73.99 of the Commission's rules, operation with daytime facilities is limited to daytime hours. Notwithstanding the limitations on their licenses and in the Commission's rules, AM stations are permitted to use their daytime facilities during nighttime hours to broadcast emergency information. Such operations are governed by Section 73.1250 of the Commission's rules and, in particular, by paragraph (f) of that rule. Under this provision, daytime facilities may be used to broadcast emergency information when necessary to protect the safety of life and property, provided that regular, unlimited-time service is non-existent or inadequate. This response to emergency situations is not limited to pre-sunrise hours but is permissible whenever the emergency arises and the terms of Section 73.1250 are met. Although this rule provides a way for these stations to respond to the need for the broadcast of emergency information, it does not offer any means that could be used to respond to the day-to-day need for service during important hours of the day. Addressing that need is the key focus of this proceeding.

Overview of the Notice of Proposed Rulemaking

13. Although it was unrealistic to expect complete relief from the problems affecting daytime-only AM stations, the Commission did believe that it might be able to relieve many of the current restrictions. To this end it invited comments on the desirability of a series of changes in existing rules. Two of the proposed changes involved relieving current restrictions on pre-sunrise operations; two

concerned the authorization of post-sunset operation and the final proposed change dealt with the use of diurnal curves[12] for both pre-sunrise and post-sunset interference calculations. The specific proposals were as follows:

(1) Permit pre-sunrise operation by Class II stations located east of co-channel Class I-A stations;

(2) Permit Class II stations located outside the 0.5 mV/m 50% skywave contour of co-channel Class I-A stations located to the east of them to begin pre-sunrise operation at 6:00 a. m. local time;[13]

(3) Permit Class II-D (Daytime) stations located outside the 0.5 mV/m 50% skywave contour of co-channel Class I stations to operate past sunset until 6:00 p.m. local time, with a maximum power of 500 watts;[14]

(4) Permit Class III daytime-only stations to operate past sunset until 6 p.m. local time, without protecting other Class III stations, using 500 watts power; and

(5) Adopt the use of diurnal curves for calculating protection requirements for both pre-sunrise and post-sunset periods.

14. *Pre-Sunrise Operation*—The pre-sunrise proposals were designed to explore removing some of the current restrictions on such operations contained in Section 73.99. In particular, the restrictions affect Class II daytime or unlimited-time stations on U.S. Class I-A Clear Channels. These Class II stations have to provide greater protection to the dominant Class I-A stations on the channel than has to be provided to the dominant U.S. Class I-B stations on their channels. Moreover, Section 73.99(a)(i) actually precludes pre-sunrise operation of the Class II station if it is located to the east of the dominant[15] co-channel Class I-A station. The original premise for this limitation was that Class I-A stations were designed to have exclusive use of their channels at night. Now that this exclusivity has come to an end, the Commission proposed to amend Section 73.99 to allow pre-sunrise operation so long as appropriate protection to the Class I-A station was provided.

[12] "Diurnal", meaning "daily", here refers to the effects on signal propagation characteristics that accompany the change from daytime to nighttime conditions or vice versa.

[13] Section 73.99(b)(3) of the Commission's rules currently permits pre-sunrise operation by these stations, but such operation cannot begin until sunrise at the Class I station to the east if that occurs after 6:00 a.m.

[14] Those inside the 0.5 mV/m 50% skywave contour of Class I stations located to the west of the daytime-only station would have to cease operations at 6:00 p.m. local time or sunset at the Class I station, whichever is earlier. Protection to co-channel Class I stations would be required, using diurnal curves, but the Class II-D stations would not be required to provide post-sunset protection to other Class II stations, nor would they be entitled to post-sunset protection from other stations.

[15] Originally, pre-sunrise authority was not available to these stations at all regardless of their respective locations. However, this aspect of the rule was eased by the *Report and Order* in Docket Nos. 17562 *et al.*, (18 F.C.C. 2d 705, 1969). Because more than one rule making proceeding was involved, that decision also carries the designation of "*Second Report and Order* in Docket No. 18023".

15. In addition, Class II stations to the west of the Class I-A station also faced a limitation, albeit a lesser one. They could not begin pre-sunrise operation until sunrise at the Class I-A station east of them. Depending on the time of year and the east-west distance between the stations, this limitation could have a small or large impact on the pre-sunrise operation. Instead of the current limitation, the Commission proposed to allow all Class II stations outside the 0.5 mV/m 50% skywave contour of co-channel Class I-A stations to begin pre-sunrise operation at 6:00 a.m. local time so long as no interference were caused to the 0.5 mV/m 50% contour of the dominant station. If adopted, these changes would end up treating Class II stations on Class I-A channels in a manner consistent with their treatment on Class I-B channels.

16. *Post Sunset Operation* —The Commission's current rules make no provision for post-sunset operation. With this in mind, the Commission decided to explore the possibility of providing post-sunset relief for daytime-only stations by adopting an approach that paralleled the one employed during the pre-sunrise period. Under this proposal, Class II-D (daytime) and Class III daytime stations would be allowed to operate until 6:00 p.m. local time with a maximum of 500 watts power. Protection to co-channel Class II or Class III stations would not be required, but Class II stations would be required to accord protection to the dominant Class I station on their channel. This would mean that Class II-D stations located outside the 0.5 mV/m 50% skywave contour of the dominant Class I-A or Class I-B station would be permitted to obtain post-sunset authority enabling the station to operate from sunset until 6:00 p.m. local time. Other Class II-D stations could operate (with daytime or critical hours facilities) from sunset until 6:00 p.m. local time or sunset at the nearest Class I station located west of the Class II station, whichever is earlier. In so doing the Class II-D station would have to provide protection to the 0.5 mV/m 50% skywave contour of Class I stations to the east of the Class II station. Finally, the Commission sought comments on providing similar relief to full-time Class II stations so that they could operate with daytime mode and 500 watts power.[16]

17. *Diurnal Curves* —In addition to the proposed changes in the rules directly affecting hours of operation, the Commission invited comments on the use of diurnal curves in making the calculations that would be involved in determining whether interference would

[16] Various Class II full-time stations operate with different modes day and night and critical hours where required. Typically, these stations operate with greater power during the day, often without having to employ a directional antenna pattern. At night, power is reduced and the station is forced to directionalize. Thus, the proposal would be advantageous to full-time Class II stations by allowing them to use their non-directional daytime pattern, albeit limited to 500 watts power or such lesser figure as is necessary in order to avoid interference.

be caused during the pre-sunrise and post-sunset operating periods. Diurnal curves depict the changing propagation conditions that obtain as night changes into day and as day changes into night. In this regard, it is important to recognize that the rate of increase in skywave propagation as dusk approaches is not the same as the rate of reduction as dawn approaches. Thus, two entirely different sets of curves would be required to depict the propagation conditions obtaining during the particular segment of the two hour periods immediately before and after sunrise and sunset.

18. The diurnal curve proposal originated from a suggestion made by NTIA in its petition where it urged the adoption of the curves contained in CCIR Recommendation 435–3.[17] Sections 73.187 and 73.190 rules already contain a provision used in computing daytime skywave intereference to Class I stations. The use of diurnal curves in connection with pre-sunrise operations previously was rejected by the Commission in Docket 14419 as unnecessary for the pre-sunrise rules being adopted. However, in light of the proposals for extended hours of operation, particularly during the post-sunset period, the Commission believed that diurnal curves could perform a useful service, and two sets of curves (one each for sunrise and sunset) were proposed. Although based on earlier curves considered by the Commission, the newly proposed curves had been refined and made more accurate. As proposed by the Commission, the curves would be used by Class II-D and Class III daytime stations in determining permissible power during the proposed post-sunset operating period and would be used as appropriate during the pre-sunrise period as well. Although there are changes in permissible power during the year, the Commission did not believe that it was feasible to have different operating power for each month of the year. Instead, use of a "worst case" approach was proposed, with that power being applied year-round.

DISCUSSION

19. After careful review of the entire record of this proceeding, the Commission has concluded that important relief from current restrictions on hours of operation can be provided consistent with sound engineering practice.[18] First of all, some of the Class II

[17] The diurnal curves recommended by CCIR, the International Radio Consultative Committee, are normalized with respect to the reference hour at Midnight, whereas the curves proposed by the Commission are normalized with respect to the second hour past sunset (SS+2). Additionally, the curves proposed by the Commission are further refined, for example, by taking into account the effects of frequency.

[18] In addition to reviewing the filings in this proceeding, the Commission made extensive use of its computer capacity to examine the impact of the various proposals so that their respective gains and losses could be compared. A Summary of the Comments is contained in Appendix 3 and a list of the parties filing them is found in Appendix 4. In the discussion below, particular reference is made to

stations now excluded from pre-sunrise operation with daytime antenna systems will be able to conduct such operations. Second, Class II and Class III daytime-only stations will be able to operate during the post-sunset transitional period (which extends until two hours after sunset) subject to limitations designed to avoid interference. Finally, diurnal curves are adopted for use in making pertinent interference calculations. Because the use of diurnal curves is central to several of the changes being adopted, we will turn first to that subject. After that discussion, we shall turn to a consideration of the groups of stations affected by our actions, first the Class III stations and then the Class II.

20. *Diurnal Curves* —From our review of the record it is clear that diurnal curves should be used in making pertinent interference calculations under the protection standards being adopted. The curves offer the clear advantage of more accurately depicting the conditions that prevail during the transitional periods. In this regard, CCBS took exception to the Commission's proposal not to use diurnal factors greater than one.[19] It proposed that diurnal factors greater than one should be used for those portions of the two hour period preceeding sunrise when the factor exceeds one. This suggestion fails to recognize that the propagation curves which are contained in Section 73.190 of the Commission's rules represent average conditions existing during the second hour following sunset (SS+2), which is used as the reference hour. The Commission's rules have relied upon these curves to determine interference throughout the nighttime hours. Not only is CCBS's argument inconsistent with long established practice, it would lead to providing greater protection during transitional hours than is now provided during full nighttime hours. We see no justification for such a result and are, therefore, adopting diurnal curves that have been redrafted to show no diurnal factor greater than one.

21. Finally, in adopting the diurnal curves the Commission has recognized the need to facilitate calculations by use of computer programs. Thus, polynomial equations have been developed for each diurnal curve, and the polynomial with a table of constants is being included in the rules. Although the curves themselves are included for reference purposes, the rules have been written to make calculations using the equations controlling. By so doing, ambiguities and questions of accuracy in reading the curves can be eliminated.

22. *Regional Channels* —The Commission did not propose

several of the filings, namely those of the Daytime Broadcasters Association ("DBA"), the Clear Channel Broadcasting Service ("CCBS"), the Association for Broadcast Engineering Standards ("ABES"), and Cox Communications, Inc., ("Cox").

[19] The diurnal factor of one is the level of skywave propagation used for calculations under full nighttime conditions. Thus, a factor greater than one would represent a value in excess of this level.

changes in the rules concerning pre-sunrise operation by Class III stations and none are included here. The thrust of our *Notice* affecting Class III daytime-only stations dealt with the matter of post-sunset operation by these stations. Class III daytime-only stations represent the largest single category of daytime-only stations that would stand to benefit from rules permitting post-sunset operation. In fact, nearly 1300 of the daytime-only stations (more than 50% of the total) operate on the Regional Channels. As proposed in the *Notice*, these stations would be able to operate during the post-sunset period (until 6:00 p.m.) with 500 watts power; and they would not have to provide interference protection to full-time Class III stations.

23. DBA believed that the Commission's proposal did not provide sufficient relief for the problems faced by daytime-only stations. It argued in favor of permitting post-sunset operation to continue until two hours past sunset, except in cases where there was a showing by a full-time station that such operation would unduly interfere with its broadcast signal. DBA also recommended that daytime-only stations be permitted to operate with power in excess of 500 watts if the protection standards were met. However, DBA did not include any studies to demonstrate the nature of the public benefits it expected to flow from following its recommendations, nor did it submit any interference studies to show gains versus losses which would occur if its recommendations were adopted. Without such support we are unable to conclude that such an approach would serve the public interest. Moreover, as discussed below, even the Commission's own proposal poses serious problems in this regard as has been shown by Commission studies regarding the effects of post-sunset operation. Thus, some modification is necessary in order to avoid excessive loss of service. With this in mind, there is no choice but to reject the DBA proposals.

24. Although most of the commenting parties generally supported the concept of post-sunset operation by Class III daytime-only stations, many said that it was important to provide interference protection to full-time stations. In fact, some parties such as ABES asserted that adoption of the Commission's proposal which does not include such protection could result in massive new interference to existing nighttime primary services. Moreover, many listeners to these stations are said to rely on such service to provide vital information and entertainment services. Thus, the Commission is urged to require daytime-only stations operating during the post-sunset period to directionalize or reduce power sufficiently to provide protection to full-time stations.

25. The Commission's staff has performed extensive additional analysis of the proposal to permit daytime-only stations to operate with 500 watts until 6:00 p.m. without regard to co-channel protection. These studies were performed on 600 kHz and 1380 kHz

because they were believed to be representative Regional Channels to use in examining operations at opposite ends of the AM broadcast band. The results of these studies are shown in Appendix 1, Figures 1–2. From this analysis it is clear that the original proposal carries with it the potential for causing very substantial interference to existing primary sevices. This can be seen especially during the months of December and January, when the daytime only stations would be operating the longest period of time past sunset. The studies show that a number of full-time stations would receive significant interference resulting in substantial loss of primary service. For example, it is estimated that WMT, Cedar Rapids, Iowa, and WREC, Memphis, Tennessee, would lose 4,859.12 square miles and 9,711.40 square miles of service, respectively. Overall it is further estimated that on these two channels alone, 25,766.48 square miles of service would be lost by full-time stations, whereas only 4,493.34 square miles of service would be provided by the daytime-only stations operating post-sunset.

26. Even more important than the loss itself is where it would take place. Often, it could lead to the loss of the only local service available to listeners. Moreover in many cases the service to be provided by the daytime-only station would not provide a substitute for the areas of service that are lost by the full-time station. Multiplying these findings by the overall number of Regional Channels leads us to conclude that our initial proposal for across the board 500 watts post-sunset operation by daytime-only stations would result in unacceptable levels of interference and attendant losses of primary service to local communities and surrounding rural areas.

27. This concern about the impact of the original proposal led us to explore other alternatives, including the recommendation made by several commenting parties that full-time stations receive full protection. In order to study the benefits and effects of such an approach the Commission computed the maximum operating power for each of the daytimers on 600 kHz and 1380 kHz that would fully protect co-channel full-time stations. The results of these studies are shown in Appendix 1, Figure 3. In performing these studies it was assumed that each daytime-only station would be operating until 2 hours past sunset at its location. Moreover, in making the interference calculations diurnal factors for the path mid-points were used.

28. In examining the service areas available to the stations using the particular power level required to avoid interference, it should be understood that the estimated service areas shown in the Appendix represent the "worst case" service that would be provided at 2 hours past sunset. Service at other times would be notably better immediately after sunset when received interference is at a minimum. From that point until two hours after sunset the service areas

would steadily decrease until the "worst case" condition is reached 2 hours past sunset.

29. As a practical matter, it is expected that the daytime-only stations would provide some degree of additional "useful" service greater than that recognized by the Commission's rules. The Commission has no technical standards to describe such additional "useful" service, but it would not be unreasonable to expect that service would be provided out to the groundwave contour limited by interfering signals calculated using 50% propagation curves rather than 10% curves as is the Commission standard. As a point of interest, use of 50% curves for calculating interference is the standard in most of the countries in the western hemisphere. An RSS limit based upon 50% curves is approximately 8 dB less than a limit based upon 10% curves (e.g., a 15 mV/m RSS limit calculated using 10% curves equates approximately to 6 mV/m using 50% curves). Such additional service beyond that predicted by the FCC rules is subject to greater interference, but if the daytimer is providing important information or programming of particular interest to listeners, such interference might be tolerated by listeners.

30. The results of our studies have led us to conclude that daytime-only stations will be able to provide meaningful service to their communities when operating with power reduced sufficiently to provide full protection to co-channel full-time stations. To exemplify this, we have included Figures 4 and 5 in Appendix One showing typical service that would be provided by KZUL, Parker, Arizona and WRAB, Arab, Alabama, at 1 hour and 2 hours post-sunset. These exhibits show that even with the considerable reductions in power required for these two stations, they will be able to provide significant coverage. Because operation with 500 watts is not a prerequisite to effective coverage, there is all the more reason to adopt a system that takes the serious interference potential into account. Under the approach we are adopting, proper attention can be paid to both concerns: the need for extended hours of operation and the need to avoid the loss of existing services. Accordingly, we are adopting rules that will require full protection of full-time stations.[20] For this purpose the existing nighttime RSS limit of the full-time station, together with the 50% exclusion rule, will be used

[20] Although protection would be offered to full-time stations on these channels, the new rules do not contemplate protection for the daytime-only stations operating on these channels during the post-sunset period. If the daytime stations all operated with the same power level of 500 watts, there would be a balance in their impact on one another. However, in light of the fact that many of the daytime-only stations on these channels will have to reduce power below 500 watts, we believe that it is inappropriate to permit other daytime-only stations to use power in excess of 500 watts as has been suggested. Adopting such an approach could result in increased interference to stations operating at reduced levels, thereby depriving them of the very benefits the rule was designed to provide.

in determining permissible power for the daytimer during post-sunset hours.

31. Use of full protection standards offers the opportunity to provide additional relief to the daytime-only stations. Under the original proposal, post-sunset operation was to extend from sunset until 6:00 p.m. During some times of the year, sunset occurs after 6:00 p.m. local time so that the station would have received no benefit from the rule during those months of the year. In other months, the period from sunset to 6:00 p.m. would be quite short, so the station would receive only minimal benefit. Such a restriction made sense if the effects of interference were not to be taken into account. Now that we have decided to accord full interference protection to full-time stations, we see no reasonable basis for denying daytime-only stations the opportunity to further serve the public by extending their operation until 2 hours past sunset throughout the year.

32. Although we have received several other suggestions in regard to extended hours for Class III stations, we do not believe that they warrant adoption. NAB has suggested that daytimers be permitted to apply for and use directional antennas specifically designed to provide protection during the period of extended hours. We do not think that this would be practical because extended hours must be considered a secondary type of operation, one which is not protected and which is subject to modification to eliminate objectionable interference. Furthermore, it is anticipated that the power daytime-only stations use during extended hours operations will have to be recalculated periodically to reflect the necessary adjustments in power needed to protect newly authorized full-time stations and other changes occurring on the channel.

33. With regard to the suggestion that was made by several commenting parties that post-sunset power be calculated for consecutive 15 minute or 30 minute periods and that stations be permitted to readjust their power for each of these periods, we do not think that this is feasible. This increases both the technical and operational complexity during extended hours and increases the potential that objectionable interference could be caused either by technical malfunction, misadjustment, or operator error. Also, the rules for Class III stations will be made based on calculations reflecting the most restrictive time of the year when it is 2 hours past sunset at the daytime-only station site, and this power will be used throughout the year.[21] Finally, the calculations will take into account the diurnal factors determined at the path mid-points.

34. *Class II-D Station*—We next turn to our proposals concern-

[21] Our studies have shown that variations in the permissible power from month to month is not significant. Thus, use of the most restrictive month has the advantages of simplicity and certainty while at the same time avoiding any significant impact on daytime-only stations.

ing extended hours of operation by Class II-D (daytime) stations on the Clear addition to the proposals in our Notice, the Commission received other suggestions, arguing in favor of greater or lesser protection for Clear Channel stations than had been proposed.

35. DBA proposes that the FCC should simply allow all daytime-only stations to operate from two hours before sunrise until two hours past sunset. However, DBA did not submit any technical data to support its proposal. Moreover, the system DBA advocated would cause the loss of very important signals to a large audience in many parts of the country. In good measure, these are people who are unable to receive primary service from any station and thus must depend on the skywave service provided by Clear Channel stations. We cannot ignore such an impact, nor in the absence of any data on the point, can we conclude that the impact would be otherwise.

36. DBA also suggested several alternatives concerning the degree of protection to be provided skywave service. It is clear from the nature of the DBA proposals that they would have the effect of seriously degrading the nighttime skywave service of Class I stations. Because of this impact, we do not believe that these proposals merit further consideration or detailed discussion. In this regard it is instructive to note the Commission's *Report and Order* in Docket 20642.[22] In that proceeding, after many years of study which included many of the same issues now being raised by DBA concerning the need for and protection of nighttime skywave service provided by Class I stations, the Commission reached a carefully balanced decision that preserved nighttime skywave service of Class I-A stations out to the 0.5 mV/m 50% skywave contour. Since DBA did not include in its comments any supporting data that would lead us to believe that the basis of our decision in Docket No. 20642 has changed in the short time since our decision was reached, we are still persuaded that the public interest continues to require protection to the 0.5 mV/m 50% skywave contours of Class I stations.

37. On the other side of the issue, CCBS, among others, expressed concern about the cumulative effects of multiple interfering signals at the 0.5 mV/m 50% contour, even if each individual signal is adjusted to protect the contour in accordance with Section 73.182 of the FCC rules. Therefore, it recommended that multiple interfering signals be combined using the root-sum-square principle (RSS) and that the RSS would not be permitted to exceed 0.5 mV/m at the protected contour.[23] Multimedia noted that the same situation

[22] 78 F.C.C. 2d 1345 (1980); reconsideration granted in part, denied in part, 83 F.C.C. 2d 216 (1980); affirmed *sub nom. Loyola University v. F.C.C.*, 670 F. 2d. 1222 (D. C. Cir.) (1982).

[23] Section 73.182 of the rules does not provide for application of the RSS rule at the skywave contour of Class I stations. Rather, the rules restrict each interfering signal to a maximum of 25 uV/m. Thus, the rules now permit interference to be caused which exceeds an RSS of 0.5 mV/m at the protected contour.

exists under the current rules for pre-sunrise operation, but it thought the impact was less there because the use of full nighttime protection principles provides an extra margin of safety. While Multimedia asserted that similar considerations apply also to full-time Class II stations, it acknowledged that there could only be a relatively few full-time Class II stations that could be accommodated on each channel.

38. In considering whether to use the RSS in calculating interference to the skywave contour, it is enlightening to review the manner in which the skywave contour of a Class I station develops in intensity during the transitional period.[24] For illustrative purposes, we have calculated the extent of the 50% skywave contours for Stations KOA, Denver, Colorado, along several azimuths and for different times of the day during the transitional period beginning at sunset (SS) at its transmitter site and ending at sunset plus 2 hours (SS+2). Curves resulting from these calculations are shown in Figures 6 through 8 of Appendix 1. As can be seen, the 0.5 mV/m 50% contour does not exist at sunset. It gradually builds up, increasing its reach, until at SS+2 the contours on eastern azimuths essentially will be fully developed and their full nighttime predicted distances reached.

39. In recognition of the phenomenon described above, NTIA proposed that determination of permissible power for Class II-D stations should take into account the actual location of the 0.5 mV/m 50% contour at a particular point in time. Through use of computerized techniques this would not be an impossible task. Nonetheless, it is too complex and impracticable to implement. It would be necessary to perform multiple power adjustments throughout the transitional period to reflect the fact that the 0.5 mV/m 50% contour is expanding outward. Earlier in this *Report and Order* we expressed our concern about permitting the use of multiple power levels during the transition period for Regional stations, and that concern applies in this instance as well.

40. We are, therefore, adopting rules which assume that the 0.5 mV/m 50% contour of a Class I station is fully developed after sunset occurs at the Class I transmitter site. We recognize that there is a greater potential for cumulative interference when daytimers are operating post-sunset along with authorized full-time operations. This is so because during such periods there are a greater number of potential interfering sources on the channel than would be normally accomodated during the nighttime hours. Thus, we believe there is a need to provide a margin of safety in protecting the skywave service of the Class I stations during periods of post-sunset operation.

[24] In this regard it should be noted that the diurnal curves which we are adopting could be used in the calculation of 50% skywave signals of Class I stations during the transitional period.

Daytime-only stations will be required to protect the location of this contour, thereby providing a margin of safety in protection of the actual 0.5 mV/m contour as it develops during the transitional period. By the time the protected skywave contour of the Class I station is fully developed, daytime-only stations having the greatest potential for causing interference will already be off the air. Where a 0.5 mV/m 50% signal is not produced, e.g. in the null of some directional antennas, the 0.5 mV/m groundwave contour will be protected on the same basis. We believe that these rules sufficiently provide for protection of the Class I's nighttime service and find no need to further consider use of the RSS in calculating permissible interference to skywave contours.

41. Cox objected to any extended hours of operation by daytime-only stations located within the protected skywave contour of a Class I station. We do not see merit in this objection as long as it is still daytime at the dominant station. Sections 73.7 and 73.182 of the rules make it clear that nighttime is the period between the hours of sunset and sunrise and secondary service is provided during nighttime at which time protection is provided to the 0.5 mV/m 50% skywave contour. Therefore, until sunset occurs at the dominant station, it is deemed to be providing daytime, not nighttime service. If daytime-only stations east of the dominant station and within the protected nighttime skywave contour are permitted to operate until sunset at the dominant station, the issue becomes one concerning the degree of protection to be given the daytime contour of the dominant station. This is an issue that was of concern to several commenting parties and it is discussed in detail below.

42. The Commission recognized in adopting Section 73.187 of the rules that full protection would not be provided to the daytime contours of Class I stations during the critical hours.[25] In fact, in its *Proposed Report and Order Notice of Further Rule Making and Order* in Docket 8333, 10 R.R. 1541 (1954), the Commission stated: "We are aware that such a rule condones a considerable amount of interference in the transitional periods but believe that this interference should be tolerated in view of the overall objectives."

43. To exemplify permissible interference that is already being caused to the 0.1 mV/m groundwave contours of Class I stations, Figure 9 in Appendix 1 was prepared using KOA, Denver, Colorado, as the subject station. The levels of interference shown for each station was that occurring at the particular point on KOA's contour that receives the greatest interference from that station. From this it can be seen that interfering limits approaching 1 mV/m are not atypical when it is at sunset at the Class II station.

44. Another phenomenon that we should also take note of is the

[25] Critical hours are the two hours following sunrise and the two hours preceeding sunset at each Class II station.

skywave interference that a Class I station causes to its own daytime service contour. At a distance from a station such that the groundwave and skywave are similar in strength, considerable distortion in the received program is experienced because of the cancellation from moment to moment of first one side-band frequency then another, including the carrier. This creates the so called "distortion zone" which by usual convention extends from the inner edge, where the ratio of the groundwave signal to instantaneous skywave signal is 2 to 1 to the outer edge, where the ratio of the instantaneous skywave signal to groundwave signal is 2 to 1. This matter was studied in the Hearing in Docket 6742[26] and was included in Exhibit 109 of that Hearing.

45. The Commission performed studies concerning self interference and the results using KOA, Denver, Colorado, as the subject station, are shown in Figures 10 and 11. These figures demonstrate the degree to which KOA's groundwave signal is limited by its own 50% and 10% skywave signals at different times of the day. The 0.1 mV/m daytime contour of KOA along the 65 ° azimuth extends approximately 309 miles. At sunset (SS) at KOA it is seen that the 50% skywave signal has limited the groundwave service along this azimuth to approximately 208 miles and 0.37 mV/m. Similarly, the 10% skywave signal at sunset has limited the groundwave service to approximately 144 miles and 1.1 mV/m. At sunset minus one hour (SS-1), it is seen that the 10% skywave has already limited the groundwave service to 226 miles and 0.280 mV/m.

46. Because the Commission has recognized that considerable interference occurs at the daytime contour of Class I's, we did not propose additional protection standards for this contour in this *Notice*. However, CCBS and others urged the Commission to restrict interference at the 0.1 mV/m from daytimers operating extended hours to 5 uV/m. In view of the substantial interference already caused, as discussed in foregoing paragraphs, we do not believe that such a high degree of protection is justified, especially since it would unduly restrict post-sunset operation. We now believe, however, that some degree of additional protection is warranted to guard against the creation of any new serious interference. We have considered several alternatives ranging from (1) computing the interference limited contour for protection purposes, (2) permitting interference from each daytime-only station during extended hours to equal interference it caused during critical hours, to (3) permitting the daytime-only station to continue operating with its daytime or critical hours facilities, limited to 500 watts, until sunset at the dominant station.

47. The first of these alternatives would be excessively complex

[26] See figure 4, *National Coverage of Standard Broadcast Stations During Nighttime Hours*; T. R. R. Report No. 2. 3. 5., October 1, 1957.

for this application and the other two alternatives would potentially create new interference since multiple interfering signals would be reaching peak levels simultaneously (this would occur at sunset at the dominant station). We have concluded that the solution is to limit the amount of skywave radiation at the 0.1 mV/m contour from any one station operating post-sunset hours to 25 uV/m. This provides a sufficient margin of safety to guard against any new serious interference in two significant respects. First, any single limit will be at most half of the typical levels of interference being caused. Thus, even if multiple interference occurred at any point on the contour, the RSS will remain within typical levels of interference that can occur. Second, as sunset approaches at the dominant station, the dominant station's own skywave signal increasingly limits its groundwave service to distances closer than the 0.1 mV/m contour.

48. Once sunset occurs at the daytime-only station, it will be required to reduce power, using daytime facilities or critical hours facilities if required, sufficiently so that at the time sunset occurs at the dominant station, the daytime-only station is not producing a skywave signal of more than 25 uV/m at any point on the 0.1 mV/m contour of the dominant station. If the daytime-only station is outside the 0.5 mV/m 50% contour, then a further power reduction may be required to protect the skywave contour. Daytime-only stations east of a dominant station and within its protected skywave contour must go off the air at sunset at the Class I. Those west of the dominant station and within its protected skywave contour will not qualify for post-sunset operation.[27]

49. For the purposes of these rules, sunset and sunrise times will be calculated using the coordinates of the transmitter sites involved, and the 0.1 mV/m contour is to be determined on the basis of FCC figure M3, Estimated Effective Ground Conductivity in the U.S. The periods of extended operation will be rounded to the nearest 15 minutes. Using this convention, no daytime-only station will be authorized for extended hours on Clear Channel frequencies unless its extended period, rounded off, is calculated to be 15 minutes or more. In no event will operation beyond 2 hours past local sunset be permitted and in no case may the power exceed 500 watts or daytime power, whichever is lower. Class II-D stations also will be required to fully protect full-time Class II stations in the same way that daytime-only stations on the Regional Channels are required to protect full-time stations. The reasoning for requiring this protection is the same as that given in our discussion concerning the Regional Channels. Thus, further discussion is not warranted here.

[27] Reference to east/west relationship is intended to reflect the relationship of sunrise/sunset of the stations involved rather than a true east/west orientation. Taking this into account, it is estimated that 110 stations will not qualify.

50. *Pre-sunrise Operations, Class II Stations*—The primary intent of the Commission's proposals concerning pre-sunrise operations by Class II stations on the Class I-A Clear Channels was to conform the rules in order to provide the same treatment of Class II stations on the Class I-A Clear Channels as that provided on the Class I-B Clear Channels, and to permit use of the diurnal curves for interference calculations. One of the reasons for this lack of conformity until now is that at the time the rules in Section 73.99 were adopted, the Class I-A Clear Channel stations were afforded a degree of protection that derived from the exclusivity of the Class I-A nighttime priority within the North American Region. However, as indicated in the *Notice*, we eliminated such nighttime exclusivity in 1980 and opened up all 25 of the Class I-A Clear Channels for the assignment of unlimited-time Class II stations that would protect the 0.5 50% skywave contours of co-channel Class I-A stations during nighttime hours. As noted earlier in this *Report*, limited comments were received expressing concern about the Commission's pre-sunrise proposals. However, these arguments were not persuasive and based upon the experience that has been gained over the years with Class II stations operating pre-sunrise on the Class I-B Clear Channels, we believe that it is appropriate to adopt the proposed pre-sunrise rule changes. Although DBA urged the Commission to adopt rules that would permit pre-sunrise operation 2 hours before sunrise year-round, we are persuaded that the listening habits and the justification for more uniform higher power during the early morning hours during the winter months makes our different treatment of pre-sunrise and post-sunset operation justified. Therefore, we must reject DBA's recommendation. Otherwise, we would be compelled to require all stations operating pre-sunrise to provide full protection, something which we believe would be to the detriment of listeners depending upon current pre-sunrise service.

51. *International Considerations*—As we indicated earlier, before the Commission can fully implement most of the changes in the rules relating to extended hours of operation it must take into account several pertinent international agreements and understandings.[28] In fact, except for the proposals to extend pre-sunrise authority to additional Class II stations on U.S. Class I-A Clear Channels, none of the proposals can be fully implemented without reaching agreement with neighboring countries. We are hopeful that the necessary agreements can be reached and that the rule changes we are adopting can be at least partially implemented in the near future, but until this happens, only limited relief can be provided. To clarify the matter, the following is a description of the status of the negotiations and their impact on the rule changes being made. Tentative agreement has been reached with Canada regarding

[28] The agreements are listed in footnote 4, *supra*.

extended hours operations and it will be possible to allow post-sunset operation of Class II-D (daytime) and Class III stations upon exchange of Notes implementing the agreement. Such exchange is now imminent. Protection will be required to Canadian full-time stations by the new agreement. In addition, the tentative agreement provides for the use of diurnal curves in making pertinent interference calculations. Not only does this mean that overall fuller use of the channels will be possible during the post-sunset period, it can make it possible for a number of stations now operating during pre-sunrise hours to employ greater power than has been possible before. Finally, and most importantly, the Canadians have agreed to the use of Canadian Clear Channels for both pre-sunrise and post-sunset operation, using diurnal curves for pertinent calculations. By virtue of this tentative agreement, there no longer appears to be any Canadian impediment to full implementation of the new rules.

52. Unfortunately, it has not yet been possible to obtain agreement with Mexico or the Bahama Islands. Mexican negotiations are actively underway and the Commission is quite hopeful that the negotiations can be brought to a prompt and successful conclusion. In the meantime, however, there is no choice but to delay implementation in several regards. First, it will not be possible to calculate permissible powers using diurnal factors. Also, there is no agreement yet for post-sunset operation extending beyond 6:00 p.m. local time. This means that, except on the U. S. I-A Clear Channels, where the United States has treaty priorities under both the United States/Mexican AM Agreement as well as NARBA, post-sunset operations will be possible for U. S. Class II-D (daytime) and Class III daytime stations only until 6:00 p. m. local time. Finally, negotiations are planned with the government of the Bahama Islands, but until such agreement is reached, no changes can be made in the extended hours use of the Bahamian Clear Channel (1540 kHz).

53. *Procedural Matters*—Although the changes we are making today rest on the simple premise that important relief can be provided consistent with sound engineering practice, the calculations involved are not so simple in all respects. Several parties recommended that the Commission perform the necessary calculations to determine times of extended hours of operation and the maximum power that could be utilized by each station. Because such calculations had to be made by the Commission as part of the decision making process, it was necessary to develop various computer programs needed for making these large scale calculations. With this in mind we have concluded that it is appropriate for the Commission to perform the necessary computations. Doing so could help expedite the bringing of these services to the public and it would reduce the administrative burden on the Commission by eliminating the need to have applications filed for processing. Also, because extended hours operations are secondary, the Commission plans to

do periodic recomputations to determine what adjustments are necessary to protect newly authorized stations or other changes in licensed operations. Current planning suggests that a yearly review would be appropriate. In any case, affected stations would receive a new attachment for their licenses. Here, too, the Commission will not require the station to perform any of its own calculations.

54. Based on the above calculations, the Commission will produce a complete list of daytime-only stations along with the powers they can employ and extended hours periods during which operation will be permitted. In addition to maintaining a master list, the Commission will advise each affected station individually. For all stations that will be able to operate during the pre-sunrise and post-sunset periods, the Commission will provide material to be attached to the station's basic authorization which will set forth the specific operating periods and powers to be employed. However, as noted above, full implementation has to await a final agreement with Mexico. Until that agreement is put into effect, post-sunset operation cannot extend beyond 6:00 p.m. local time. Accordingly, the authorizations will specify that such operation is not to be conducted until advised by the Commission that the Mexican agreement has been implemented. At that point the station will be able to use the full operation as specified in the authorization it is to receive. Also, no operation under the new rules may be conducted until the effective date for the rule changes specified in paragraph 57, below.

55. Because of the nature of the calculation process involved in authorizing extended hours of operation, it is not feasible for the Commission to undertake individual recalculations, nor do we believe that any such recalculation is necessary since the computer programs have been carefully created and fully tested to ensure accurate results. Accordingly, the Commission does not intend to entertain requests from individual stations seeking additional pre-sunrise or post-sunset time or power. The only feasible way for the Commission to handle this subject is through the routinely scheduled periods of review. On the other hand, there may be licensees which believe that specific authorizations would lead to impermissible interference to their service areas. In order for any such objection to be considered, it must be accompanied by a technical showing including *all* the following: the amount of interference (including thereas and populations affected), how the interference was calculated, where the alleged error in the Commission's calculations occurred, and an explanation as to why the interference involverd is not *de minimis*, including maps showing how station coverage is affected. Failure to provide all of this information will result in dismissal of the objection. In addition, any such objection must be served on the offending station which may in turn file a responsive pleading.

56. *Economic Structural Benefits*—Daytime-only AM stations

have always been subjected to limitations in their ability to compete with full-time stations. In fact, these limitations on the hours when they can operate effectively eliminates them from the market during some of the most lucrative portions of the broadcast day. These effects are most pronounced during the winter months when the daylight hours are shortest. As a result of our action relieving many of these restrictions, daytime-only stations will be able to compete more effectively, thus also helping to implement the Commission's mandate to establish a competetive environment within the industry. We believe that such relief is especially important to these stations now that the marketplace of electronic media is expanding and developing new kinds of services and media forms and formats.

57. Accordingly, **IT IS ORDERED That,** Sections 73.99, 73.185, 73.190, 73.1670, and 73.1735 of the Commission's Rules ARE AMENDED, effective (Insert date of 30 days *after F.R.* date) as set forth in the attached appendix.

58. Authority for this action is contained in Sections 4(i), 303 and 307(b) of the Communications Act of 1934, as amended.

59. *Regulatory Flexibility Analysis*

I. *Need for the Purpose of the Rule*

The rule is designed to provide relief for the more than 2400 AM stations that are limited in their hours of operation. These are the stations which are limited to operation during the hours between local sunrise and local sunset. Although many of these stations are able to operate during at least some of the pre-sunrise hours, none of them are able to operate during the post-sunset period. This can have a serious detrimental impact on these stations, especially during winter hours when the hours of daylight are few. The absence of such authority imposes a serious burden on these small entities and on their communities.

II. *Summary of Issues Raised by Public Comment in Response to the Initial Regulatory Flexibility Analysis, Commission Assessment, and Changes Made as a Result.*

A. *Issues Raised*

As discussed in the body of this *Report and Order*, the major issues related to whether pre-sunrise authority could be extended to an additional group of stations and post-sunset operation by daytime-only stations (or to certain categories of full-time stations) could be permitted consistent with sound engineering practice. The Commission was offered several approaches to a resolution of the matter. Daytime-only stations argued in favor of full relief regardless of the service to be lost by other stations. Full-time stations stressed the need for full protection to existing service.

B. *Assessment*

As discussed above, the Commission agreed that daytime-only stations do face serious handicaps in being able to compete with full-time stations and in being able to bring needed service to their

communities. Likewise, it was clear that the potential for interference from unrestricted extension of the hours of operation of these stations was serious. As a consequence, the Commission decided to adopt a system that made full provision for both of these concerns.

C. *Changes Made as a Result*

The Commission's decision follows the suggestions of the full-time stations in regard to the need to provide protection against interference. As a result, the Commission decided against its original proposal that generally would have allowed daytime-only stations to operate with 500 watts power using daytime antenna facilities until 6:00 p.m. local time. Although some protection for Class I stations would have been provided, this was considered to be insufficient. On the other hand, the Commission concluded that it would be possible to provide more relief than had been proposed originally. Thus, it allowed daytime-only stations to operate until two hours after local sunset. This extends the period of operation well beyond 6:00 p.m. in many months of the year. Operation is to be with 500 watts power, reduced as necessary to avoid interference.

III *Significant Alternatives Considered and Rejected*

The only significant alternatives were those discussed above regarding uniform operating schedule throughout the year and the appropriateness of taking interference calculations into account in determining the power which should be employed during the extended hours of operation. Although the Commission was not able to follow all of the urgings of the daytime-only stations, little of the essence of what it sought was rejected; in fact, in some ways it received even more and without the need for the submission of engineering in most cases.

60. For further information concerning this proceeding, contact Wilson La Follette, Mass Media Bureau, (202) 632–5414 or Jonathan David, Mass Media Bureau, (202) 632–7792

FEDERAL COMMUNICATIONS COMMISSION
WILLIAM J. TRICARICO, *Secretary*

Appendices 1, 3 and 4; Figures 12 and 13 - may be seen in FCC Docket Branch, 1919 M Street, N.W., Room #239, Washington, D.C. 20554, or at *48* FR *42944.*

APPENDIX 2

1. Section 73.99 is amended to read as follows:

§ 73.99 Pre-sunrise service authorization (PSRA) and Post-Sunset service authorization (PSSA).

(a) To provide the maximum uniformity in early morning operation capatible with interference considerations, and to provide for additional service during early evening hours for daytime-only stations, the provisions are made for pre-sunrise service and post-sunrise service. The permissible power to be assigned in pre-sunrise or post-sunset service authorization will not exceed 500 watts, or the authorized daytime or critical hours power (whichever is less).

(b) Pre-sunrise service authorization (PSRA) will permit:

(1) Class II stations operating on Mexican, Bahamian, and Canadian Class I-A and I-B Clear Channels to commence PSRA operation at 6:00 a.m. local time and to continue such operation until the sunrise times specified in their basic instrument of authorization.

(2) Class II stations situated outside the respective 0.5 mV/m 50% skywave contours of co-channel domestic Class I-A and I-B stations to commence PSRA operation 6:00 a.m. local time, and continue this operation until sunrise times specified in their basic instruments of authorization.

(3) Class II stations located inside a co-channel 0.5 mV/m 50% skywave contours of domestic Class I-A and I-B stations, to commence PSRA operation either at 6:00 a.m. local time, or at the time of sunrise at the nearest Class I station located east of the Class II station (whichever is later), and continue this operation until the sunrise times specified in their basic instruments of authorization.

(4) Class III stations to commence PSRA operation at 6:00 a.m. local time and to continue such operation until local sunrise times specified in their basic instruments of authorization.

(c) Post-sunset service authorization (PSSA) will permit:

(1) Class II-D stations located on Mexican, Bahamian, and Canadian Class I-A and I-B Clear Channels to commence PSSA operation at sunset times specified in their basic instruments of authorization and to continue for two hours after such specified times.

(2) Class II-D stations situated outside the respective 0.5 mV/m 50% skywave contours of co-channel domestic Class I-A and I-B stations to commence PSSA operations at sunset times specified in their basic instruments of authorization and to continue up to two hours after such specified times.

(3) Class II-D stations located inside co-channel 0.5 mV/m 50% skywave contours of domestic Class I-A and I-B stations to commence PSSA operation at sunset times specified in their basic instruments of authorization and to continue such operation until two hours past such specified times, or until the time of sunset at the nearest Class I station located west of the Class II station (whichever is earlier). (Those west of the dominant station do not qualify for PSSA operation.)

(4) Class III daytime only stations to commence PSSA operation at sunset times specified on their basic instruments of authorization and to continue such operation until two hours past such specified times.

(d) *Procedural Matters.*

(1) Applications for PSRA and PSSA operation are not required. Instead, the FCC will calculate the periods of such operation and the power to be used pursuant to the provisions of this Section and the protection requirements contained in applicable international agreements. Licensees will be duly notified of permissable power and times of operation. Pre-sunrise and Post-sunset service authority permits operation on a secondary basis and does not confer license rights. No request for such authority need be filed. However, stations intending to operate PSRA or PSSA shall submit by letter, signed as specified in Section 73.3513, the following information:

(i) licensee name, station call letters and station location,

(ii) indication as to whether PSRA operation, PSSA operation, or both, is intended by the station,

(iii) a description of the method whereby any necessary power reduction will be achieved.

(2) Upon submission of the required information, such operation may begin without further authority.

(e) *Technical Criteria.* Calculations to determine whether there is objectionable interference will be determined in accordance with the AM Broadcast Technical Standards, Sections 73.182 through 73.190, and applicable international agreements. Calculations will be performed using daytime antenna systems, or critical hours antenna systems when specified on the license. In performing calculations to determine assigned power and times for commencement of PSRA and PSSA operation, the following standards and criteria will be used:

(1) Class II stations operating in accordance with (b)(1), (b)(2), (c)(1), and (c)(2) are required to protect the nighttime 0.5 mV/m 50% skywave contours of co-channel Class I stations. Where a 0.5 mV/m 50% skywave signal is not produced, the 0.5 mV/m groundwave contour will be protected.

(2) Class II stations are required to fully protect foreign Class II stations when operating PSRA and PSSA and Class II-D stations operating PSSA are required to fully protect domestic full time Class II stations. For purposes of determining protection, the existing nighttime RSS limit will be used in the determination of maximum power permissible.

(3) Class II stations operating in accordance with (c)(2) and (c)(3) are required to restrict maximum 10% skywave radiation to any point on the daytime 0.1 mV/m groundwave contour of the co-channel Class I station to 25 uV/m. For purposes of performing these calculations the 0.1 mV/m contour of the Class I station will be determined by use of Figure M3, Estimated Ground Conductivity in the United States. When the 0.1 mV/m contour extends beyond the national boundary the international boundary shall be considered the 0.1 mV/m contour.

(4) Class III stations operating PSRA and PSSA are required to provide full protection to co-channel foreign Class III stations. Additionally, Class III daytime only stations operating PSSA are required to fully protect domestic full time Class III stations. For purposes of determining protection, the existing nighttime RSS limit will be used in the determination of maximum power permissible.

(f) Calculations made under paragraph (d) of this Section may not take outstanding PSRA or PSSA operations into account, nor will the grant of a PSRA or PSSA confer any degree of interference protection on the holder thereof.

(g) Operation under a PSRA or PSSA is not mandatory, and will not be included in determining compliance with the requirements of § 73.1740. To the extent actually undertaken, however, pre-sunrise operation will be considered by the FCC in determining overall compliance with past programming representations and station policy concerning commercial matter.

(h) The PSRA or PSSA is secondary to the basic instrument of authorization with which it is to be associated. The PSRA or PSSA may be suspended, modified, or withdrawn by the FCC without prior notice or right to hearing, if necessary to resolve interference conflicts, to implement agreements with foreign governments, or in other circumstances warranting such action. Moreover, the PSRA or PSSA does not extend beyond the term of the basic authorization.

(i) The FCC will periodically recalculate maximum permissible power and times for commencing PSRA and PSSA for each Class II and Class III station. These original notifications and subsequent notifications should be associated with the station authorization. Upon notification of new power and time of commencing operation, affected stations will make necessary adjustments within 30 days.

(j) A PSRA and PSSA does not require compliance with §§ 73.45, 73.182, 73.188, and 73.1560 where the operation might otherwise be considered as technically substan-

dard. Further, the requirements of paragraphs (a)(5), (b)(2), (c)(2), and (d)(2) of § 73.1215 concerning the scale ranges of transmission system indicating instruments are waived for PSRA and PSSA operation except for the radio frequency ammeters used in determining antenna input power.

(k) A station having an antenna monitor incapable of functioning at the authorized PSRA and PSSA power when using a directional antenna shall take the monitor reading using unmodulated carrier at the authorized daytime power immediately prior to commencing PSRA or PSSA operations. Special conditions as the FCC may deem appropriate may be included for PSRA or PSSA to insure operation of the transmitter and associated equipment in accordance with all phases of good engineering practice.

Note: Extended hours operations are subject to international agreements governing all operations. These agreements are in the process of revision, but until this process is completed it will not be possible to allow full operation as outlined above.

2. Section 73.185, Computation of interfering signal, is amended by adding new subparagraph (k) as follows:

* * * * *

(k) In performing calculations to determine permissible radiation from stations operating pre-sunrise or post-sunset in accordance with Section 73.99, calculated diurnal factors will be multiplied with the values of skywave signals for such stations obtained from Figure 1a or Figure 2 of Section 73.190.

(1) The diurnal factor is determined using the time of day at the mid-point of path between the site of the interfering station and the point at which interference is being calculated. Diurnal factors are computed using the formula $D_f = a+bF+cF^2+dF^3$ where:

$D_f$represents the diurnal factor,
F is the frequency in MHz,
a,b,c, and d are constants obtained from the tables in (2)

A diurnal factor greater than one will not be used in calculations and interpolation is to be used between calculated values where necessary. For reference purposes, curves for pre-sunrise and post-sunset diurnal factors are contained in Figures 13 and 14 of Section 73.190.

(2) Constants used in calculating diurnal factors for the presunrise and post sunset periods are contained in (i) and (ii) respectively. The columns labeled T_{mp} represents the number of hours before and after sunrise and sunset at the path midpoint.

(i) *Presunrise Constants*

T_{mp}	a	b	c	d
–2	1.3084	.0083	–.0155	.0144
–1.75	1.3165	–.4919	.6011	–.1884
–1.5	1.0079	.0296	.1488	.–.0452
–1.25	.7773	.3751	–.1911	.0736
–1	.6230	.1547	.2654	–.1006
–.75	.3718	.1178	.3632	–.1172
–.5	.2151	.0737	.4167	–.1413
–.25	.2027	–.2560	.7269	–.2577
SR	.1504	–.2325	.5374	–.1729
+.25	.1057	–.2092	.4148	–.1239
+.5	.0642	–.1295	.2583	–.0699

+.75	.0446	–.1002	.1754	–.0405
+1	.0148	–.0135	.0462	.0010

(ii) *Post Sunset Constants*

T_{mp}	a	b	c	d
1.75	.9495	–.0187	.0720	–.0290
1.5	.7196	.3583	–.2280	.0611
1.25	.6756	.1518	.0279	–.0163
1.0	.5486	.1401	.0952	–.0288
.75	.3003	4050	–.0961	.0256
.5	.1186	.4281	–.0799	.0197
.25	.0382	.3706	–.0673	.0171
SS	.0002	.3024	–.0540	.0086
–.25	.0278	.0458	.1473	–.0486
–.5	.0203	.0132	.1166	–.0340
–.75	.0152	–.0002	.0786	–.0185
–1.0	–.0043	.0452	–.0040	.0103
–1.25	.0010	.0135	.0103	.0047
–1.5	.0018	.0052	.0069	.0042
–1.75	–.0012	.0122	–.0076	.0076
–2.0	–.0024	.0141	–.0141	.0091

3. *Section 73.190, Engineering Charts, is amended by deleting Figure 12 and by adding new Figure 12 and new Figure 13.*

4. Section 73.1670 is amended by revising subparagraph (a)(4) to read as follows:

Section 73.1670 Auxiliary transmitters

(a) * * *

* * * * *

(4) The transmission of regular programs by an AM station authorized for Pre-sunrise (PSRA) and/or Post-sunset (PSSA) operation.

* * * * *

5. Section 73.1735 is revised in its entirety to read as follows:

Section § 73.1735 AM station operation pre-sunrise and post-sunset.

Certain classes of AM stations are eligible to operate pre-sunrise and/or post-sunset for specified periods with facilities other than those specified on their basic instruments of authorization. Such pre-sunrise and post-sunset operation is authorized pursuant to the provisions of § 73.99 of the Rules.