Supplement No. 3

to

NAB (NARTB) ENGINEERING HANDBOOK

(Fourth edition, 1949)

NARTB SAMPLE TRANSMITTER OPERATING LOGS AND PERTINENT FCC RULES AND REGULATIONS

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NARTB SAMPLE TRANSMITTER OPERATING LOGS

and

PERTINENT FCC RULES AND REGULATIONS

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OCTOBER 1953

NARTB Sample Transmitter Operating Logs and Pertinent FCC Rules and Regulations

INTRODUCTION

The Rules and Regulations of the Federal Communications Commission require that operating logs be maintained by all broadcasting stations. These requirements are set forth in the Rules and Regulations, in the Standards of Good Engineering Practice, and in some instances in the instrument of authorization, i.e., license, construction permit, temporary authorization, etc. The attached article consolidates the FCC Rules, Regulations and Standards of Good Engineering Practice pertaining to AM, FM and TV broadcast station logs, and, in addition, presents a revised version of the NARTB Sample Logs.

The material presented herewith is divided into three sections:

Section I lists pertinent parts of the FCC's present Rules and Regulations and Standards of Good Engineering Practice pertaining to logs and entries required in them.

Section II contains pertinent facts concerning the format and use of transmitter operating logs and discusses each part of the log requirements. Section II additionally makes suggestions with respect to the NAB Sample Logs appearing in Section III.

Section III contains explanations and illustrations of Sample Logs.

Maintenance logs are not considered in this material since the requirements for such logs are somewhat peculiar to each transmitter installation. In most instances, maintenance logs are found to be kept separately from the operating log. This procedure, while generally desirable, is not, however, mandatory. The logs may be combined. Also combination (basic) logs may be used in such instances where one operator is in charge of the actual operation of an AM transmitter and an FM transmitter.

The FCC does not place its official approval on any particular log as compared to another; its only interest is that the required entries be made in a neat and orderly fashion in accordance with the Rules and Regulations. The Sample Logs attached have been examined by Commission Engineering personnel, and are believed to meet all their requirements.

We hereby acknowledge our thanks and appreciation to them for their help and criticism.

SECTION I

F.C.C. Rules, Regulations and Standards of Good Engineering Practice Pertaining to Transmitter Logs

(RELATING IN PARTICULAR TO STANDARD BROADCAST STATIONS, FM BROADCAST STATIONS, AND TELEVISION BROADCAST STATIONS)

AM Stations—Rules—Subpart A—RULES GOVERNING STANDARD BROADCAST STATIONS

§ 3.781 *Logs.* The licensee or permittee of each standard broadcast station shall maintain program and operating logs and shall require entries to be made as follows:

* * * * * * * *

(b) In the operating log:

(1) An entry of the time the station begins to supply power to the antenna, and the time it stops.

(2) An entry of the time the program begins and ends.

(3) An entry of each interruption to the carrier wave, its cause, and duration.

(4) An entry of the following each 30 minutes:

(i) Operating constants of last radio stage (total plate current and plate voltage).

(ii) Antenna current.

(iii) Frequency monitor reading.

(iv) Temperature of crystal control chamber if thermometer is used.

(5) Log of experimental operation during experimental period (If regular operation is maintained during this period, the above logs shall be kept.)

(i) A log must be kept of all operation during the experimental period. If the entries required above are not applicable thereto, then the entries shall be made so as to fully describe the operation.

(c) Where an antenna structure(s) is required to be illuminated see § 17.38, *Recording of tower light inspections in the station record,* of Part 17 of this chapter (Construction, Marking and Lighting of Antenna Structures).

§ 3.782 *Logs, retention of.*[3m] Logs of standard broadcast stations shall be retained by the licensee or permittee for a period of two years: *Provided, however,* That logs involving communications incident to a disaster or which include communications incident to or involved in an investigation by the Commission and concerning which the licensee or permittee has been notified, shall be retained by the licensee or permittee until he is specifically authorized in writing by the Commission to destroy them: *Provided, further,* That logs incident to or involved in any claim or complaint of which the licensee or permittee has notice shall be retained by the licensee or permittee until such claim or complaint has been fully satisfied or until the same has been barred by statute limiting the time for the filing of suits upon such claims.

§ 3.783 *Logs; by whom kept.* Each log shall be kept by the person or persons competent to do so having actual knowledge of the facts required, who shall sign the log

[3m] Attention is called to the fact, however, that application forms for licenses and other authorizations require that certain operating program data be supplied. It is suggested that these application forms be kept in mind in connection with maintenance of station program and operating records.

when starting duty and again when going off duty. The logs shall be made available upon request by an authorized representative of the Commission.

§ 3.184 *Log form.* The log shall be kept in an orderly manner, in suitable form, and in such detail that the data required for the particular class of station concerned are readily available. Key letters or abbreviations may be used if proper meaning or explanation is contained elsewhere in the log.

§ 3.185 *Correction of logs.* No log or portion thereof shall be erased, obliterated, or willfully destroyed within the period of retention provided by the rules. Any necessary correction may be made only by the person originating the entry who shall strike out the erroneous portion, initial the correction made, and indicate the date of correction.

§ 3.186 *Rough logs.* Rough logs may be transcribed into condensed form, but in such case the original log or memoranda and all portions thereof shall be preserved and made a part of the complete log.

AM stations—Standards—STANDARDS OF GOOD ENGINEERING PRACTICE CONCERNING STANDARD BROADCAST STATIONS (535-1605) Kc)

§ 13. *Indicating instruments pursuant to § 3.58.*

The following requirements and specifications shall apply to indicating instruments used by standard broadcast stations:

A. Instruments indicating the plate current or plate voltage of the last radio stage (linear scale instruments), shall meet the following specifications:

(1) Length of scale shall not be less than 2.3 inches.

(2) Accuracy shall be at least 2 percent of the full scale reading.

(3) The maximum rating of the meter shall be such that it does not read off scale during modulation.

(4) Scale shall have at least 40 divisions.

(5) Full scale reading shall not be greater than five times the minimum normal indication.

B. Instruments indicating the antenna current shall meet the following specifications:

(1) Instruments having logarithmic or square law scales.

(a) Shall meet same requirements as 1, 2, and 3 above for linear scale instruments.

(b) Full scale reading shall not be greater than three times the minimum normal indication.

(c) No scale division above one-third full scale reading (in amperes) shall be greater than one-thirtieth of the full scale reading. (Example: An ammeter meeting requirement (*a*) above having full scale reading of 6 amperes is acceptable for reading currents from 2 to 6 amperes, provided no scale division between 2 and 6 amperes is greater than one-thirtieth of 6 amperes, 0.2 ampere.)

(2) Radio frequency instruments having expanded scales.

(a) Shall meet same requirements as 1, 2, and 3 for linear scale instruments.

(b) Full scale reading shall not be greater than five times the minimum normal indication.

(c) No scale division above one-fifth full scale reading (in amperes) shall be greater than one-fiftieth of the full scale reading. (Example: An ammeter meeting the requirement (*a*) above is acceptable for indicating currents from 1 to 5 amperes, provided no division between 1 and 5 amperes is greater than one-fiftieth of 5 amperes, 0.1 ampere.)

(d) Manufacturers of instruments of the expanded scale type must submit data to the Commission showing that these instruments have acceptable expanded scales, and the type number of these instruments must include suitable designation.

(3) Remote reading antenna ammeters may be employed and the indications logged as the antenna current in accordance with the following:

(a) Remote reading antenna ammeters may be provided by:

1. Inserting second thermocouple directly in the antenna circuit with remote leads to the indicating instrument.

2. Inductive coupling to thermocouple or other device for providing direct current to indicating instrument.

3. Capacity coupling to thermocouple or other device for providing direct current to indicating instrument.

4. Current transformer connected to second thermocouple or other device for providing direct current to indicating instrument.

5. Using transmission line current meter at transmitter as remote reading ammeter. See paragraph (*h*) below.

6. Using indications of phase monitor for determining the ratio of antenna currents in the case of directional antennas, provided the indicating instruments in the unit are connected directly in the current sampling circuits with no other shunt circuits of any nature.

(b) A thermocouple type ammeter meeting the above requirements shall be permanently installed in the antenna circuit. (This thermocouple ammeter may be so connected that it is short circuited or open circuited when not actually being read. If open circuited, a make-before-break switch must be employed.)

(c) The remote ammeter shall be connected at the same point in the antenna circuit as the thermocouple ammeter and shall be so connected and calibrated as to read in amperes within 2 percent of this meter over the entire range above one-third or one-fifth full scale. See sections B 1 (*c*) and B 2 (*c*) above respectively.

(d) The regular antenna ammeter shall be above the coupling to the remote meter in the antenna circuit so it does not read the current to ground through the remote meter.

(e) All remote meters shall meet the same requirements as the regular antenna ammeter with respect to scale accuracy, etc.

(f) Calibration shall be checked against the regular meter at least once a week.

(g) All remote meters shall be provided with shielding or filters as necessary to prevent any feed-back from the antenna to the transmitter.

(h) In the case of shunt excited antennas, the transmission line current meter at the transmitter may be considered as the remote antenna ammeter provided the transmission line is terminated directly into the excitation circuit feed line, which shall employ series tuning only (no shunt circuits of any type shall be employed), and insofar as practicable, the type and scale of the transmission line meter should be the same as those of the excitation circuit feed line meter (meter in slant wire feed line or equivalent).

(i) Remote reading antenna ammeters employing vacuum tube rectifiers are acceptable provided:

1. The indicating instruments shall meet all the above requirements for linear scale instruments.

2. Data are submitted under oath showing the unit

has an over-all accuracy of at least 2 percent of the full scale reading.

3. The installation, calibration, and checking are in accordance with the above requirements.

(j) In the event there is any question as to the method of providing or the accuracy of the remote meter, the burden of proof of satisfactory performance shall be upon the licensee and the manufacturer of the equipment.

C. Stations determining power by the indirect method may log the transmission line current in lieu of the antenna current provided the instrument meets the above requirements for antenna ammeters, and further provided that the ratio between the transmission line current and the antenna current is entered each time in the log. In case the station is authorized for the same operating power for both day and nighttime operation, this ratio shall be checked at least once daily. Stations which are authorized to operate with nighttime power different from the daytime power shall check the ratio for each power at least once daily.

D. No instrument, the seal of which has been broken, or the accuracy of which is questionable, shall be employed. Any instrument which was not originally sealed by the manufacturer that has been opened shall not be used until it has been recalibrated and sealed in accordance with the following: Repairs and recalibration of instruments shall be made by the manufacturer, by an authorized instrument repair service of the manufacturer or by some other properly qualified and equipped instrument repair service. In either case the instrument must be resealed with the symbol or trade mark of the repair service and a certificate of calibration supplied therewith.

E. Since it is usually impractical to measure the actual antenna current of a shunt excited antenna system, the current measured at the input of the excitation circuit feed line is accepted as the antenna current.

F. Recording instruments may be employed in addition to the indicating instruments to record the antenna current and the direct plate current and direct plate voltage of the last radio stage provided that they do not affect the operation of the circuits or accuracy of the indicating instruments. If the records are to be used in any proceedings before the Commission as representation of operation with respect to plate or antenna current and plate voltage only, the accuracy must be the equivalent of the indicating instruments and the calibration shall be checked at such intervals as to insure the retention of the accuracy.

G. The function of each instrument shall be clearly and permanently shown on the instrument itself or on the panel immediately adjacent thereto.

FM Stations—Rules—Subpart B—RULES GOVERNING FM BROADCAST STATIONS

§ 3.281 *Logs.* The licensee or permittee of each FM broadcast station shall maintain separate program and operating logs for such station: *Provided, however,* If the same licensee or permittee operates an FM broadcast station and a standard broadcast station and simultaneously broadcasts the same programs over the facilities of both such stations, one program log may be maintained for both stations for such periods as both stations simultaneously broadcast the same programs. Such licensee or permittee shall require entries to be made as follows:

* * * * * * * *

(b) In the operating log:

(1) An entry of the time the station begins to supply power to the antenna, and the time it stops.

(2) An entry of the time the program begins and ends.

(3) An entry of each interruption to the carrier wave, its cause, and duration.

(4) An entry of the following each 30 minutes:

(i) Operating constants of last radio stage (total plate current and plate voltage).

(ii) RF transmission line meter reading.

(iii) Frequency monitor reading.

(5) Log of experimental operation during experimental period (if regular operation is maintained during this period, the above logs shall be kept).

(i) A log must be kept of all operation during the experimental period. If the entries required above are not applicable thereto, then the entries shall be made so as to fully describe the operation.

(c) Where an antenna structure(s) is required to be illuminated see § 17.38, *Recording of tower light inspections in the station record,* of Part 17 of this chapter. (Construction, Marking and Lighting of Antenna Structures).

§ 3.282 *Logs; retention of.* Logs of FM broadcast stations shall be retained by the licensee or permittee for a period of two years: *Provided, however,* That logs involving communications incident to a disaster or which include communications incident to or involved in an investigation by the Commission and concerning which the licensee or permittee has been notified, shall be retained by the licensee or permittee until he is specifically authorized in writing by the Commission to destroy them: *Provided, further,* That logs incident to or involved in any claim or complaint of which the licensee or permittee has notice shall be retained by the licensee or permittee until such claim or complaint has been fully satisfied or until the same has been barred by statute limiting the time for the filing of suits upon such claims.

§ 3.283 *Logs; by whom kept.* Each log shall be kept by the person or persons competent to do so, having actual knowledge of the facts required, who shall sign the log when starting duty and again when going off duty. The logs shall be made available upon request by an authorized representative of the Commission.

§ 3.284 *Log form.* The log shall be kept in an orderly manner, in suitable form, and in such detail that the data required for the particular class of station concerned are readily available. Key letters or abbreviations may be used if proper meaning or explanation is contained elsewhere in the log.

§ 3.285 *Correction of logs.* No log or portion thereof shall be erased, obliterated, or willfully destroyed within the period of retention provided by the rules. Any necessary correction may be made only by the person originating the entry who shall strike out the erroneous portion, initial the correction made, and indicate the date of correction.

§ 3.286 *Rough logs.* Rough logs may be transcribed into condensed form, but in such case the original log or memoranda and all portions thereof shall be preserved and made a part of the complete log.

FM Stations—Standards—STANDARDS OF GOOD ENGINEERING PRACTICE CONCERNING FM BROADCAST STATIONS

SECTION 9. INDICATING INSTRUMENTS PURSUANT TO § 3.258

The following requirements and specifications shall apply to indicating instruments used by FM broadcast stations:

A. Instruments indicating the plate current or plate voltage of the last radio stage (linear scale instruments) shall meet the following specifications:

(1) Length of scale shall be not less than 2.3 inches.

(2) Accuracy shall be at least 2 percent of the full scale reading.

(3) Scale shall have at least 40 divisions.

(4) Full scale reading shall not be greater than five times the minimum normal indication.

B. Instruments indicating transmission line current or voltage shall meet the following specifications:

(1) Instruments having linear scales shall meet the requirements of A (1), (2), (3), and (4) above.

(2) Instruments having logarithmic or square law scales:

(a) Shall meet requirements A (1) and (2) for linear scale instruments.

(b) Full scale reading shall not be greater than three times the minimum normal indication.

(c) No scale division above one-third full scale reading shall be greater than one-thirtieth of the full scale reading.

C. Radio frequency instruments having expanded scales:

(1) Shall meet requirements A (1), (2), and (4) for linear scale instruments.

(2) No scale division above one-fifth full scale reading shall be greater than one-fiftieth of the full scale reading.

(3) The meter face shall be marked with the words "Expanded scale" or the abbreviation thereof (E. S.).

D. No required instrument, the accuracy of which is questionable, shall be employed. Repairs and recalibration of instruments shall be made by the manufacturer, or by an authorized instrument repair service of the manufacturer, or by some other properly qualified and equipped instrument repair service. In any event the required instrument must be supplied with a certificate of calibration.

E. Recording instruments may be employed in addition to the indicating instruments to record the transmission line current or voltage and the direct plate current and/or direct plate voltage of the last radio stage, provided that they do not affect the operation of the circuits or accuracy of the indicating instruments. If the records are to be used in any proceeding before the Commission as representative of operation, the accuracy must be the equivalent of the indicating instruments and the calibration shall be checked at such intervals as to insure the retention of the accuracy.

F. The function of each instrument used in the equipment shall be clearly and permanently shown on the instrument itself or on the panel immediately adjacent thereto.

TV Stations—Rules—Subpart E—RULES GOVERNING TELEVISION BROADCAST STATIONS

§ 3.663 *Logs; maintenance of.* The licensee or permittee of each television station shall maintain program and operating logs and shall require entries to be made as follows:

* * * * * * *

(b) In the operating log:

(1) An entry of the time the station begins to supply power to the antenna, and the time it stops.

(2) An entry of the time the program begins and ends.

(3) An entry of each interruption to the carrier wave, its cause, and duration.

(4) An entry of the following each 30 minutes:

(i) Operating constants of last radio sage of the aural transmitter (total plate current and plate voltage).

(ii) Transmission line meter readings for both transmitters.

(iii) Frequency monitor readings.

(5) Log of experimental operation during experimental period (if regular operation is maintained during this period, the above logs shall be kept).

(i) A log must be kept of all operation during the experimental period. If the entries required above are not applicable thereto, then the entries shall be made so as to describe the operation fully.

(c) Where an antenna structure(s) is required to be illuminated see § 17.38, *Recording the tower light inspections in the station record,* of Part 17 of this chapter (Construction, Marking and Lighting of Antenna Structures).

§ 3.664 *Logs; retention of, etc.*—(a) *Logs; retention of.* Logs of television broadcast stations shall be retained by the licensee or permittee for a period of two years: *Provided, however,* That logs involving communications incident to a disaster or which include communications incident to or involved in an investigation by the Commission and concerning which the licensee or permittee has been notified, shall be retained by the licensee or permittee until he is specifically authorized in writing by the Commission to destroy them: *Provided further,* That logs incident to or involved in any claim or complaint of which the licensee or permittee has notice shall be retained by the licensee or permittee until such claim or complaint has been fully satisfied or until the same has been barred by statute limiting the time for the filing of suits upon such claims.

(b) *Logs, by whom kept.* Each log shall be kept by the person or persons competent to do so, having actual knowledge of the facts required, who shall sign the log when starting duty and again when going off duty. The logs shall be made available upon request by an authorized representative of the Commission.

(c) *Log form.* The log shall be kept in an orderly manner, in suitable form, and in such detail that the data required for the particular class of station concerned are readily available. Key letters or abbreviations may be used if proper meaning or explanation is contained elsewhere in the log.

(d) *Correction of logs.* No log or portion thereof shall be erased, obliterated, or wilfully destroyed within the period of retention provided by the rules. Any necessary correction may be made only by the person originating the entry who shall strike out the erroneous portion, initial the correction made, and indicate the date of correction.

(e) *Rough logs.* Rough logs may be transcribed into condensed form, but in such case the original log or memoranda and all portions thereof shall be preserved and made a part of the complete log.

The Standards of Good Engineering Practice Concerning TV Stations have been deleted, but for convenience, § 3.688 (Indicating Instruments) is printed below.

§ 3.688 *Indicating instruments.* (a) Each television broadcast station shall be equipped with indicating instruments for measuring the direct plate voltage and current of the last radio stage of the visual and aural transmitters and the transmission line radio frequency current, voltage, or power of both transmitters; such instruments shall conform to the specifications therefor set forth in this subpart.

(b) The following requirements and specifications shall apply to indicating instruments used by television broadcast stations in compliance with paragraph (a) of this section:

(1) Length of scale shall not be less than 2.3 inches.

(2) Accuracy shall be at least 2 percent of the full scale reading.

(3) Scale shall have at least 40 divisions.

(4) Full scale reading shall be not greater than five times the minimum normal indication.

(5) No specifications are prescribed at this time regarding the peak indicating device required by § 3.689(b).

(c) Any required instrument, the accuracy of which is questionable, shall not be employed. Repairs and calibration of instruments shall be made by the manufacturer, or by an authorized instrument repair service of the manufacturer, or by some other properly qualified or equipped instrument repair service. In any case, the repaired instrument must be supplied with a certificate of calibration.

(d) Recording instruments may be employed in addition to the indicating instruments to record the direct plate current and/or voltage to the last radio stage provided that they do not affect the operation of the circuits or accuracy of the indicating instruments. If the records are to be used in any proceeding before the Commission, as representative of operation, the accuracy must be the equivalent of the indicating instruments and the calibration shall be checked at such intervals as to insure the retention of such accuracy.

(e) The function of each instrument used in the equipment shall be clearly and permanently shown on the instrument itself or on the panel immediately adjacent thereto.

(f) In the event that any one of the indicating instruments required by paragraph (a) of this section becomes defective when no substitute which conforms with the required specifications is available, the station may be operated without the defective instrument pending its repair or replacement for a period not in excess of 60 days: *Provided,* that—

(1) Appropriate entries shall be made in the operating log of the station, showing the date and time the meter was removed and restored to service.

(2) The Engineer in Charge of the radio district in which the station is located shall be notified both immediately after the instrument is found to be defective and immediately after the repaired or replacement instrument has been installed and is functioning properly.

(3) If the defective instrument is a plate voltmeter or plate ammeter in the last radio stage, the operating power shall be maintained by means of the radio frequency transmission line meter.

(4) If conditions beyond the control of the licensee prevent the restoration of the meter to service within the above allowed period, informal request may be filed in accordance with § 1.332(d) of this chapter with the Engineer in Charge of the radio district in which the station is located for such additional time as may be required to complete repairs of the defective instrument.

Part 17—Rules Concerning the Construction, Marking and Lighting of Antenna Towers and Supporting Structures

§ 17.37 *Inspection of tower lights and associated control equipment.* The licensee of any radio station which has an antenna structure requiring illumination pursuant to the provisions of § 303(c) of the Communications Act of 1934, as amended, as outlined elsewhere in this part:

(a)(1) Shall make an observation of the tower lights at least once each 24 hours either visually or by observing an automatic and properly maintained indicator designed to register any failure of such lights, to insure that all such lights are functioning properly as required; or alternatively,

(2) Shall provide and properly maintain an automatic alarm system designed to detect any failure of such lights and to provide indication of such failure to the licensee.

(b) Shall report immediately by telephone or telegraph to the nearest Airway Communication Station or office of Civil Aeronautics Administration any observed or otherwise known failure of a code or rotating beacon light or top light not corrected within thirty minutes, regardless of the cause of such failure. Further notification by telephone or telegraph shall be given immediately upon resumption of the required illumination.

(c) Shall inspect at intervals not to exceed three months all automatic or mechanical control devices, indicators and alarm systems associated with the tower lighting to insure that such apparatus is functioning properly.

§ 17.38 *Recording of tower light inspections in the station record.* The licensee of any radio station which has an antenna structure requiring illumination shall make the following entries in the station record of the inspections required by § 17.37:

(a) The time the tower lights are turned on and off each day if manually controlled.

(b) The time the daily check of proper operation of the tower lights was made.

(c) In the event of any observed or otherwise known failure of a tower light:

(1) Nature of such failure.

(2) Date and time the failure was observed, or otherwise noted.

(3) Date, time and nature of the adjustments, repairs, or replacements were made.

(4) Identification of Airways Communication Station (Civil Aeronautics Administration) notified of the failure of any code or rotating beacon light not corrected within thirty minutes, and the date and time such notice was given.

(5) Date and time notice was given to the Airways Communication Station (Civil Aeronautics Administration) that the required illumination was resumed.

(d) Upon completion of the periodic inspection required at least once each three months:

(1) The date of the inspection and the condition of all tower lights and associated tower lighting control devices, indicators and alarm systems.

(2) Any adjustments, replacements, or repairs made to insure compliance with the lighting requirements and the date such adjustments, replacements, or repairs were made.

SECTION II

Pertinent Facts Concerning the Format and Use of Transmitter Operating Logs

Sections 3.181(b) and (c), 3.281(b) and (c), 3.663(b) and (c) 17.37 and 17.38, above set forth the basic requirements as to entries which must be made in the transmitter logs of AM, FM and TV stations.

(b)(1) To comply with paragraph (b)(1) the time (to the nearest minute) any amount of carrier is applied to the radiating systems[1] should be entered in Column 1 of the sample logs, with an appropriate phrase in the "Remarks" column such as "Carrier on." If the carrier is applied in steps, entries of voltage and currents may be made for each step or an entry in the "Remarks" column may be made as to the approximate power. The time the carrier is removed from the radiating system should be entered in Column 1 and in the "Remarks" column the words "Carrier off" may be inserted.

(b)(2) To comply with (b)(2) the time the program is applied to the carrier(s)[1] and the time the program is removed from the carrier(s)[1] should be entered in Column 1. Since the rule requires only two entries for each broadcast period appropriate entries may be made in the "Remarks" column such as "Program on" and "Program off" or "Program begins" and "Program ends". "Program on" and "Program off" times may be entered in the "Remarks" column if desired instead of in Column 1. This is often done when the time at half-hour intervals is printed on the log.

(b)(3) To comply with (b)(3) the time of each carrier interruption must be entered in Column 1, and a statement as to the cause and duration of the interruption must be placed on the log, preferably in the "Remarks" column. Upon resumption of transmission, the time the carrier is placed on the air and the time the program is resumed must be entered in Column 1 with appropriate remarks in the "Remarks" column.

(b)(4) This part requires that certain operating constants of the transmitter(s)[1] be entered in the log every 30 minutes during the time the carrier is on the air. The times that the readings are taken should be entered in Column 1 and the proper entries should be made in Columns 2-6 and 2-5 of the basic logs for either AM or FM or TV stations respectively (Figures 1, 4 and 5, Part III).

(b)(4)(i) In Column 2 of the sample log should be entered the total plate current of the final radio frequency stage in the transmitter. In Column 3 should be entered the plate voltage applied to the final radio frequency stage.

(b)(4)(ii) (NOTE: FOR AM STATIONS) Column 4 of the basic AM log is provided for the entry of the reading of the actual antenna current meter, remote antenna meter, or transmission line current meter, whichever method is elected by the station in accordance with Section 13 of the "Standards of Good Engineering Practice." Column 4 may be labeled I_A for actual antenna current, I_R for remote antenna meter reading, or I_T for transmission line current. If remote reading meters are utilized, calibration must be checked against the actual antenna current meter at least once weekly for each authorized power.[2] The time of the calibration check should be entered in Column 1 and the check data in the "Remarks" column.

Under Section 3.51, the indirect method of determining power may be used under certain conditions on a temporary basis. When this method is used with a series feed antenna the transmission line current may be logged in lieu of the antenna current provided the ratio between transmission line current and the antenna current is logged every 30 minutes. Further, the actual antenna current must be checked for each operating power at least once daily and logged by entering the time of the check in Column 1 and the check data in the "Remarks" column. In such instances, a column headed, for example, I_T I_A should be used. Since the indirect measurement method can be used only on a temorary basis, a permanent column for this purpose is not necessary.

In the case of a shunt excited antenna the transmission line current meter at the transmitter may be considered as a remote antenna ammeter, provided the antenna termination of the transmission line is made directly into a series circuit without parallel tuning components. The transmission feed line meter (meter in slant wire feed line or equivalent) for each authorized power. The time of this observation should be entered in Column 1 and appropriate remarks made in the "Remarks" column.

For installations using directional antenna systems, Section 3.181(b) (4) (ii), which states that merely "antenna current" should be logged, must be considered not only with paragraph 13 of the "Standards of Good Engineering Practice" but with an interpretation of requirements appearing in the instrument of authorization (D.A.Specs) to operate with a directional antenna system. Following are steps of consideration:

1. The antenna current meter reading at the common point of feed must be logged each half hour, since this is the point where power is determined. This may be identified as I_{CP}.

2. Section 13, Part B(3)(a)(6) of the "Standards of Good Engineering Practice" refers to the ratio of antenna currents as determined from the indications of the phase monitor. These indications must be the current flowing in each phase monitor sampling loop circuit with no other shunt circuits of any nature employed. Although no specific rule states that current ratios must be logged, such ratios are included in the instrument of authorization and, for the protection of the licensee, logging of it appears advisable. If loop currents are logged, base currents must be read and logged once each day for each authorized power. Time of these observations should be entered in Columun 1 and data in the "Remarks" column. In the event remote reading meters are used in a directional antenna system to read base currents, a calibration check between meters must be made at least once each week. It is, however, general practice at most stations to make this calibration check once daily.

3. If a phase monitor is employed, relative phase indications between the elements must be logged at least once each hour. This requirement appears only on certain instruments of authorization.

4. In the interest of consistency and to prevent confusion it is suggested that each station select a definite system of identifying elements in a DA system such that each tower can be easily and readily associated with the element identification given in the instrument of authorization. In preparing the log format, this identification should appear at the top of the column used for that tower.

(b)(4)(ii) (NOTE: FOR FM AND TV STATIONS) On FM and TV installations it is required that transmission line voltage or current be logged each half hour. Figure 5 (TV Log) indicates the use of "Reflectometer Unit" as found in one particular make of

[1] Includes video and audio transmitters of TV Stations.
[2] Where convenient it is often advisable to check the calibration daily so that in the event of failure time would permit repair or replacement.

television transmitter. If transmission line voltmeters or ammeters are used, Columns 5-6, 8-9 may be deleted and one column under both audio and video transmitters added for transmission line voltage or current.

(b)(4)(iii) The frequency monitor reading should be entered in Column 5 of the AM and FM logs. Columns 4 and 7 of Figure 5 (TV Log) must be filled in with the frequency deviation in *cps* of the audio and video carriers respectively.

(b)(4)(iv) If a thermometer is used in the crystal chamber of the automatic frequency control equipment of the transmitter, the temperature reading should be entered in Column 6 (Figure 1 only).

SECTION III

Explanations and Illustrations of Sample Logs

Figure 1. BASIC AM LOG. The columns set forth in this form cover the basic AM Requirements, the form being suitable for stations having no special log requirements occasioned by the use of directional antennas. Column 6, "Crystal Temperatures," is required only when a thermometer is used in connection with the crystal temperature control.

Figure 2. This figure consists of three sections to be added to the BASIC AM LOG if directional antennas are employed. The number of columns to be employed would be equal to the number of antennas used in the directional array.

(1) *Antenna Current*—as may be read on remote reading meters. If this method is elected by the station, calibration checks must be made at least once weekly. Most stations, however, provide this calibration check daily.

(2) *Current Ratios.* Ratios are not required to be logged. It is the usual practice to log only currents in the sampling loops, from which ratios may be determined when needed. However, if it appears desirable that operators compute ratios, this column may be used. If sampling loop currents are used, tower base currents must be read daily for each power used. The common point current must also be checked in the normal manner.

(3) *Phasing Relation.* This group of columns must be used if a phase monitor is employed. The readings should follow those values set forth in the instrument of authorization and should show degrees of lead or lag with respect to the reference tower.

If monitoring point readings are required, add additional columns.

The "Remarks" column would follow the final column on the chart.

Figure 3. This is a sample log for a standard station using a three-element directive array at night and nondirectional operation daytime.

Figure 4. BASIC FM LOG. The columns set forth in this sample log cover the basic FM requirements.

Figure 5. BASIC TV LOG. This is a sample log for a television station. Although the rules are somewhat ambiguous as to the frequency monitor reading, the frequency deviation of both carriers must be checked and logged every 30 minutes.

Important Points of Consideration
in Designing an Operating Log Format
(Sample abbreviations shown in brackets)

1. Be sure the log is properly identified as to station location and frequency. It is sometimes convenient to print the transmitter latitude and longitude in the log.
2. Put the date in a convenient place in the event reference must be made to a specific day.
3. If abbreviations of any nature are used, be certain that each abbreviation is fully explained on the log and as a permanent part of the log. This is generally done at the bottom or on the back of each page when the logs are printed.
4. Where directive arrays are used, identify each tower in a manner consistent with the instrument of authorization.
5. Keep the log neat, precise, simple, and free of extraneous remarks.
6. Provide sufficient room for a "Remarks" column, which may be used for the following:
   a. Operator's signature (not initials) when going on and off duty, if not placed in separate box.
   b. Notation "Carrier On" and "Carrier Off". (CON) (COF)
   c. Notation "Program On" and "Program Off." (PON) (POF)
   d. Remarks as to cause of carrier interruption.
   e. Calibration checks on remote reading meters, etc. (CRRM)
   f. Observation of tower lights and remarks as to steps taken if tower lights fail.
   g. Remarks as to any unusual occurrences affecting transmissions.
   h. Notations and initialling in the case of corrections in log entries.
   i. Time of power change if required.

1-2-08

AM STATION CALL LETTERS

TRANSMITTER OPERATING LOG

12 — KILOCYCLES: 5 KW — DAY 1 KW — NIGHT

DATE _____ 19____

CITY AND STATE

(1) TIME	(2) PLATE CURRENT FINAL STAGE	(3) PLATE VOLTAGE FINAL STAGE	(4) ANTENNA CURRENT AMPS.	(5) FREQUENCY DEVIATION ± CYCLES	(6) CRYSTAL TEMP. °C	REMARKS:

FIGURE 1

COLUMNS (1) TO (6) OF BASIC AM LOG

	1					2			3			
	ANTENNA CURRENT					CURRENT RATIO			PHASING RELATION			REMARKS
	COMMON POINT	1	2	3	4	2/1	3/1	4/1	2/1	3/1	4/1	

FIGURE 2

1-2-60

TRANSMITTER OPERATING LOG

CALL LETTERS

LOCATION

FREQUENCY – POWER – TIME OF OPERATION

DATE ______________ 19 ____

TIME	E_p	I_p	F_d	ANTENNA CURRENTS				PHASE RELATION		REMARKS:
				I_{cp}	I_1	I_2	I_3	T_1/T_2	T_1/T_3	

FIGURE 3

ABBREVIATIONS:

E_p - Final Stage Plate Voltage - Kilovolts

I_p - Final Stage Plate Current - Amperes

F_d - Frequency Deviation - Cycles per Second

I_{cp} - Common Point Antenna Current - Amps - Remote

I_1, I_2, I_3 - Phase Monitor Sampling Loop Currents. I_1 Loop Current Used In Lieu Of Antenna Current On Non-DA Operation.

T_1/T_2 - Phase Difference Between Tower #1 and Tower #2.

T_1/T_3 - Phase Difference Between Tower #1 and Tower #3.

TRANSMITTER OPERATING LOG

CHANNEL 269, — 101.7 MC — POWER 1 KW

(1) TIME	(2) PLATE CURRENT FINAL STAGE	(3) PLATE VOLTAGE FINAL STAGE	(4) TRANSMISSION LINE * CURRENT	(5) FREQUENCY DEVIATION ± CYCLES	REMARKS:

* OR VOLTAGE

1-2-11

FIGURE 4

BASIC FM SAMPLE

TV STATION CALL LETTERS

TRANSMITTER OPERATING LOG

CHANNEL _____

VIDEO FREQUENCY _____

AUDIO FREQUENCY _____

DATE _____

CITY AND STATE _____

TIME (1)	AUDIO TRANSMITTER (I)					VIDEO TRANSMITTER			(II) REMARKS
	E_p	I_p	F_d	REFLECTOMETER INCI.	REFLECTOMETER REFL.	F_d	REFLECTOMETER INCI.	REFLECTOMETER REFL.	
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	

FIGURE 5

BASIC TV SAMPLE

ABBREVIATIONS

E_p - Plate Voltage Final Stage

I_p - Plate Current Final Stage

F_d - Frequency Deviation in Cycles Per Second

(I) Audio: ___ microamperes incident is equal to ___ watts.

(II) Video: ___ microamperes incident is equal to ___ watts.

(I) and (II) calibrated using dummy load beyond side band filter.