PERMANENT SIGNALS

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1. GENERAL

1.01 This section outlines procedures to be followed by the test center forces in receiving, recording, and clearing reports of permanent signals received from Plant and Traffic Department employees.

1.02 Permanent signals are the result of line conditions involving receiver off hook, short circuits, cable failures, or grounded conductors causing a subscriber's line to be connected to originating central office equipment.

1.03 A permanent signal prevents any calls from being connected to the line, since the line is in effect made busy, therefore, all parties on the lines are restricted from originating or receiving calls. In addition, unless permanent signals are promptly handled, the resulting tie-up of central office equipment would seriously impair service.

1.04 Since permanent signals are also one of the first indications of failure of outside plant, it is essential that they be treated without delay.

1.05 Prompt testing of permanent signals and restoral of service will tend to reduce subscriber reports and provide better service to the subscriber, who, in many cases, is not aware that a trouble condition exists on his line.

1.06 Since the handling of permanent signals is a responsibility of the Traffic Department and central office forces as well as the test center forces, general information regarding their procedure is included.

2. TRAFFIC DEPARTMENT AND CENTRAL OFFICE FORCE PROCEDURES

2.01 General information regarding Traffic Department and central office force procedures for handling permanent signals are described according to type of office.

(A) Manual Office

2.02 Permanent signals in a manual office are detected by the Traffic Department and are reported to the repair service clerk by the traffic trouble operator or chief operator.

(B) Step-by-Step Office

2.03 Permanent signals in a step-by-step office are indicated by a time alarm on the connector and selector frames. After a permanent signal is located by the central office forces it is reported to the repair service clerk by originating equipment number.

(C) Panel Office

2.04 Permanent signals are under the supervision of the sender monitor operator.

2.05 In panel offices connections to senders in which the required number of digits have not been dialed, are automatically routed to permanent signal holding trunks terminated on the sender monitor position of the DSA board lighting the associated lamps.

2.06 The sender monitor operator challenges immediately; if no answer is received, the operator will attempt to restore the line to service.

2.07 If unable to clear the permanent signal and a telephone number is obtained, the operator will report the telephone number and the associated permanent signal holding trunk to the repair service clerk.

2.08 If unable to clear the permanent signal and no telephone number is obtained, a test cord terminating on the test desk is inserted in the affected holding trunk jack.

Note: In the event that test cords terminating at the test desk are not provided at the sender monitor position, the sender monitor operator will refer the permanent signal with the permanent signal holding trunk number to the central office forces for tracing.

2.09 Upon appearance of a signal on the test cord circuit at the test desk, the deskman shall immediately test the line. If a receiver off-hook condition is indicated, the deskman shall attempt to restore the line to service.

2.10 If the permanent signal is cleared and no other trouble exists on the line, the deskman shall release the test cord from the holding trunk.

Note: Unless test cords are released the line will continue to be out of service.

2.11 If a receiver off-hook condition is indicated and can not be cleared, the deskman shall release the test cord from the holding trunk. These permanent signals will be held at the DSA board for a specified period, according to local instructions, then referred to the central office forces for tracing.

2.12 If tests indicate trouble other than a receiver off-hook condition, the deskman shall instruct the sender monitor operator to refer the permanent signal holding trunk to the central office forces for tracing.

2.13 Permanent signals referred to the central office forces by the sender monitor operator will be traced and the originating equipment number, with the permanent signal holding trunk number, will be reported to the repair service clerk.

(D) No. 1 Crossbar Office

Permanent Signal Holding Trunks Terminating Only at the DSA Switchboard

2.14 Each permanent signal holding trunk appears at the sender monitor position of the DSA switchboard. When a subscriber line is connected to a permanent signal holding trunk, the associated lamp lights at the DSA switchboard. The trunk also applies tone to the ring conductor as a "line out of order" signal.

2.15 The sender monitor operator challenges immediately, if no answer is received, the operator will attempt to restore the line to service.

2.16 If unable to clear the permanent signal and a telephone number is obtained, the operator will report the telephone number and the associated permanent signal holding trunk number to the repair service clerk.

2.17 If unable to clear the permanent signal and no telephone number is obtained, the sender monitor operator reports the permanent signal holding trunk number to the central office forces for tracing.

2.18 Permanent signals referred to the central office forces by the sender monitor operator will be traced and the originating equipment number with the permanent signal holding trunk number will be reported to the repair service clerk.

Permanent Signal Holding Trunks Terminating at the Sender Make-Busy Frame and Served Through Concentrating Circuits to the DSA Switchboard

2.19 Each permanent signal holding trunk appearance at the sender make-busy frame and each concentrating circuit appearance consists of a jack and three lamps. The lamps are designated C (coin), NC (non-coin) and PB (PBX) to indicate the class of service in central office arranged to segregate these three classes.

2.20 When a subscriber's line is connected to a permanent signal holding trunk, the associated lamp, corresponding to the class of service of the line being served, is lighted steadily at the sender make-busy frame. The trunk then connects a concentrating circuit and causes the proper class lamp to flash slowly at the sender monitor position of the DSA switchboard, tone is also applied to the ring conductor of the subscriber's line as a "line out of order" signal.

2.21 The sender monitor operator challenges immediately, if no answer is received, the operator will attempt to restore the line to service.

2.22 If unable to clear the permanent signal, and a telephone number is obtained, the operator will report the telephone number and the associated permanent signal holding trunk number to the repair service clerk.

2.23 If unable to clear the permanent signal and no telephone number is obtained, the operator will disconnect, the lamp signal at the DSA switchboard and the concentrating circuit will restore to normal. The lamp signal at the sender make-busy frame, however, remains steadily lighted for a predetermined time interval after which it changes to a rapidly flashing signal (120 IPM) and a minor alarm sounds.

2.24 If the signal is not answered at the DSA switchboard within the predetermined time interval, the concentrating circuit is dismissed, the lamp at the switchboard is extinguished, the trunk lamp at the sender make-busy frame changes to a rapid flash, and a minor alarm sounds.

2.25 When a permanent signal is answered at the sender make-busy frame before the operator answers, the concentrating circuit is dismissed, the lamp at the DSA switchboard is extinguished, and the steadily lighted C, NC or PB trunk lamp at the sender make-busy frame changes to a slowly flashing signal (60 IPM) at the end of the timing interval.

2.26 If a permanent signal is answered at the sender make-busy frame after the timing interval has expired, the rapidly flashing C, NC or PB lamp changes to a slowly flashing lamp and the minor alarm is retired.

2.27 At the sender make-busy frame a test connection can be established by the central office forces whereby any of the following conditions can be applied to the subscriber's line:

(a) Talking with loop supervision.

(b) Ringing on the tip or ring, with or without ringing ground.

(c) Coin collect or return with a lamp indication to show presence of a coin.

(d) Howler tone application for a receiver off-hook condition on non-PBX lines.

(e) Voltmeter tests.

2.28 All permanent signals, which can not be cleared by the central office forces, will be reported by originating equipment number to the repair service clerk.

2.29 In addition to its appearance at the sender make-busy frame, each permanent signal holding trunk also appears on the office link multiple at the outgoing trunk test frame and on the test distributor where provided. The former appearance provides a means of making the trunk busy and the latter is used by the deskman to obtain direct access to the trunk when testing the reported trouble.

Permanent Signal Holding Trunks Terminating Only at the Sender Make-Busy Frame

2.30 Each permanent signal holding trunk appearance at the sender make-busy frame usually consists of a jack and a lamp; in offices where the coin district junctor circuits are not arranged for automatic coin disposal on calls to the operator, an additional coin supervisory jack and lamp are provided. Permanent signal holding trunks are usually grouped into three classes, Coin, Non-coin and Non-PBX, and PBX.

2.31 When a subscriber's line is connected to a permanent signal holding trunk, the lamp at the sender make-busy frame lights steadily but no audible alarm sounds. If the signal is not answered within the predetermined time interval the lamp changes to a rapid flash (120 IPM) and the minor alarm sounds.

2.32 Whenever the signal is answered the lamp changes to a slow flash (60 IPM) and the audible alarm, if operated, is retired. The permanent signal holding trunk also applies tone to the ring conductor as a "line out of order" signal.

2.33 At the sender make-busy frame a test connection can be established by the central office forces whereby any of the following conditions can be applied to the subscriber line:

(a) Talking with loop supervision.

(b) Ringing on the tip or ring, with or without ringing ground.

(c) Coin collect or return with a lamp indication to show presence of a coin.

(d) Howler tone application for a receiver off-hook condition on non-PBX lines.

(e) Voltmeter tests.

2.34 All permanent signals, which can not be cleared by the central office forces, will be reported by originating equipment number to the repair service clerk.

(E) No. 5 Crossbar Office

2.35 Permanent signals in a No. 5 crossbar office may be handled from the following locations:

(a) The DSA switchboard.

(b) The master test frame.

(c) The test desk.

Note: Generally, the test desk handles a permanent signal only upon request of the central office maintenance force.

2.36 Each permanent signal holding trunk appearance on the master test frame jack bay consists of a jack and three lamps. The lamps are designated NC (non-coin), C (coin) and PB (PBX) to indicate the class of subscriber lines. When a subscriber line is connected to a permanent signal holding trunk, a signal appears at the master test frame jack bay and at the DSA switchboard.

2.37 If the signal is not answered at the DSA switchboard within a predetermined time interval, the lamp at the switchboard is extinguished. The indication at the master test frame changes from a steadily lighted lamp to a 120 IPM flashing lamp and a minor alarm is sounded. The permanent signal holding trunk also applies tone to the ring conductor as a "line out of order" signal.

2.38 In general, the DSA switchboard operator answers the permanent signal and attempts to clear the line, in this event only a monitoring connection can be established at the master test frame or test desk. When a permanent signal is answered at the master test frame or test desk before the operator answers, the permanent signal lamp at the operator position is extinguished.

2.39 If a permanent signal is answered at the master test frame or test desk before the timing interval has expired, the steadily lighted NC, C or PB trunk lamp at the master test frame changes to a 60 IPM flashing lamp at the end of the timing interval.

2.40 If a permanent signal is answered at the master test frame or test desk after the timing interval has expired, the 120 IPM flashing NC, C or PB trunk lamp at the master test frame changes to a 60 IPM flashing lamp and the alarm is retired.

2.41 If the operator is successful in clearing the line, the permanent signal holding trunk is restored to normal. The lighted NC, C or PB lamps at both the DSA switchboard and master test frame are extinguished.

2.42 If the operator can not clear a permanent signal and disconnects, the NC, C or PB lamp at the DSA switchboard is extinguished, however, the lamp at the master test frame will remain lighted until the end of the timed interval when the lamp changes to a flashing signal.

2.43 At the master test frame a test connection can be established by the central office forces whereby any of the following conditions can be applied to the subscriber's line:

(a) Talking with loop supervision.

(b) Ringing on tip or ring with or without ring ing ground.

(c) Coin collect or return with a lamp indication to show the presence of a coin.

(d) Howler tone application for a receiver off-hook condition on non-PBX lines.

(e) Voltmeter tests.

2.44 When tests by the central office forces indicate that the trouble causing the permanent signal is located within the central office, the trouble will be cleared.

2.45 All permanent signals, which can not be cleared by the central office forces, will be reported by originating equipment number to the repair service clerk.

3. PERMANENT SIGNALS, EMPLOYEE REPORTS

3.01 Permanent signals, reported by either plant or traffic forces to the repair service clerk or test desk, should be considered as trouble reports when received, with the following exceptions:

(a) Where it is the practice during the evening and night hours, when the test desk is not covered, to keep a list of all permanent signals occurring and to refer this list to the test center at time of opening the following morning, only those lines found to be in trouble at the time the report or list is received should be counted as trouble reports.

(b) Where it is the practice for deskman or central office forces to attempt to clear permanent signals during the period they are normally held before tracing or reporting, an employee report should not be counted if the permanent signal is cleared before the normal holding time has elapsed.

Note: Permanent signals cleared by the plant forces other than as covered in (b) during the evening and night hours, however, should be counted.

3.02 Where the service on a subcriber line is interrupted for the duration of a trouble condition by removing heat coils or placing blocking tools to free central office equipment of permanent signals, an employee report should be counted for each line so treated. This applies generally to cable failure and trouble due to storms.

4. EXCESSIVE PERMANENT SIGNALS

4.01 On those working lines where blocking tools are placed, or heat coils are removed, to free central office equipment of excessive permanent signals, an employee report should be counted for each line so treated. The deskman shall prepare Form E-696, Repair Service Memorandum, as shown in Fig. 1.

(a) Under "Misc." enter a check mark.

(b) Under "Date Received" enter date of first permanent signal report.

(c) Under "Time Received" enter time first permanent signal was reported.

(d) Under "Trouble Reported" enter "P.S."

(e) Under "Class," enter "C4" with the number of working lines on which blocking tools were placed or heat coils removed, minus the number of lines on which "C1" reports were received, as a result of a particular failure, such as "27C4."

(f) Under "Time OK and Date OK" enter time and date trouble cleared.

(g) Under "Miscellaneous Information" enter:

(1) Cause of permanent signal reports such as "Cable Failure."

(2) Action taken such as "Heat Coils Removed," and the number of working pairs affected.

(3) Cable and complement or other outside plant involved, such as "20, 1 - 51."

(4) Cable case number such as "Cable Case No. 81."

(h) Under "Trouble Code" enter the appropriate code such as "31."

4.02 The supervisor in charge of the test center shall arrange to be notified, by the Traffic Department and central office forces, of any appearance of a more than normal number of permanent signals. The number of permanent signals considered normal will vary according to test centers, therefore, this figure will be decided locally.

5. REPAIR SERVICE CLERK, HANDLING PERMANENT SIGNALS

5.01 Upon receipt of a permanent signal report, the repair service clerk shall immediately determine the telephone or bunch block number, if required. The reports shall then be logged, entered on the respective subscriber line cards and the latter forwarded to the test desk.

5.02 It is important that, at the first indication of the receipt of an abnormal number of permanent signal reports, the repair service clerk shall notify the supervisor in charge of the test center.

6. DESKMAN, HANDLING PERMANENT SIGNALS

6.01 Upon receipt of a subscriber line card indicating a permanent signal report, the deskman shall carefully test the line and proceed according to the test indications.

Note: In the event that a number of permanent signals are received at about the same time, an examination of the subscriber's line cards will often aid the deskman in determining whether a particular cable complement or open wire section is involved. If outside plant failure is indicated the case shall be referred to the proper trouble clearing forces.

6.02 If test locates the trouble in the central office, enter the proper notation on the subscriber's line card and refer the case to the central office forces.

6.03 If test indicates a cross with foreign potential, cable trouble is a possibility and cable pairs adjacent to those in trouble should be tested.

6.04 If test indicates a receiver off-hook condition and the line is not terminated on a PBX or a key system, attempt to ring the subscriber. (On party lines, without station relays, use ungrounded ringing current.)

Caution: Howler tone shall not be applied on a trunk to a PBX or key system due to the possibility of the attendant listening in during the howler cycle.

6.05 If the test indicates a short-circuit condition and the line is terminated on a PBX, the trouble may be caused by one of the following conditions:

(a) Trouble between the central office and PBX switchboard.

(b) Incorrect connection or operation at the PBX.

(c) PBX switchboard cord left in trunk jack.

(d) Extension station, on which a permanent signal condition exists, connected to a trunk.

Under the above conditions, attempt to reach the PBX operator, using another trunk if available. If successful in reaching the operator, ascer-

tain the condition existing on the trunk at the PBX switchboard, instruct the operator in any action which may restore the trunk to service.

6.06 If the test indicates a short-circuit condition and the line is terminated on a key system, the trouble may be caused by one of the following conditions:

(a) Operated hold relay.

(b) Receiver off hook.

Under the above conditions attempt to reach the subscriber, using another line if available. If successful in reaching the subscriber, ascertain the condition existing on the line at the key system, instruct the subscriber in any action which may restore the line to service.

6.07 Notations, regarding action taken by the deskman, shall be entered in the proper space of the subscriber line card.

6.08 If tests determine that the trouble is located outside the central office and can not be cleared as previously outlined, the deskman shall have the central office equipment released.

Methods of Releasing Central Office Equipment

6.09 The release of central office equipment may be accomplished by one of the following methods, as applicable, which are listed in order of preference:

(a) Use plugging-up circuits.

(b) Place "make-busy."

(c) Block line relays (or equivalent).

(d) Remove heat coils.

Note: Grouped lines shall be treated as follows:

(1) With a small group, when all are permanent, use a plugging-up circuit on the first line and place "make-busy" on the remaining lines.

(2) With a large group, when all are permanent, use a plugging-up circuit on several of the first choice lines and place "make-busy" on the remaining lines.

(3) When only part of the group is permanent, place "make-busy" on the permanent lines.

Caution: Essential and important service lines shall be given preference in using available plugging-up circuits.

6.10 If the number of permanent signals exceeds the available plugging-up circuits, the deskman shall notify the central office forces of the method to be used to free central office equipment.

6.11 The method used to release the central office equipment shall be noted on the subscriber's line card; additional notations to indicate that the central office equipment has been restored to normal will also be entered. The subscriber's line card shall at all times reflect the action taken by the deskman as well as the condition of a particular line, Fig. 2.

Dispatching Permanent Signal Reports

6.12 The deskman shall periodically retest permanent signals, those which have cleared shall be promptly restored to service.

6.13 The deskman shall dispatch necessary repair forces according to local instructions. Those permanent signals, which indicate a receiver off-hook condition, shall be retested at time of dispatch to prevent unnecessary repair visits.

Restoring Central Office Equipment to Normal

6.14 When an outside trouble has been cleared and dependent upon the method used to release the central office equipment, the deskman shall request the traffic trouble operator or central office forces, as applicable, to:

(a) Remove plugging-up circuits.

(b) Remove "make-busy."

(c) Remove blocking tools.

(d) Replace heat coils.

Testing after Permanent Signal Is Cleared

6.15 The deskman shall test for continuity on each line that has been permanent. Entries shall be completed on the subscriber's line card, or Form E-696, which is then returned to the repair service clerk.

Repeated Reports of Permanent Signals

6.16 Repeated reports of permanent signals caused by receiver off hook or improper operation of PBX and key equipment, shall be referred to the supervisor in charge of the test center for corrective action.

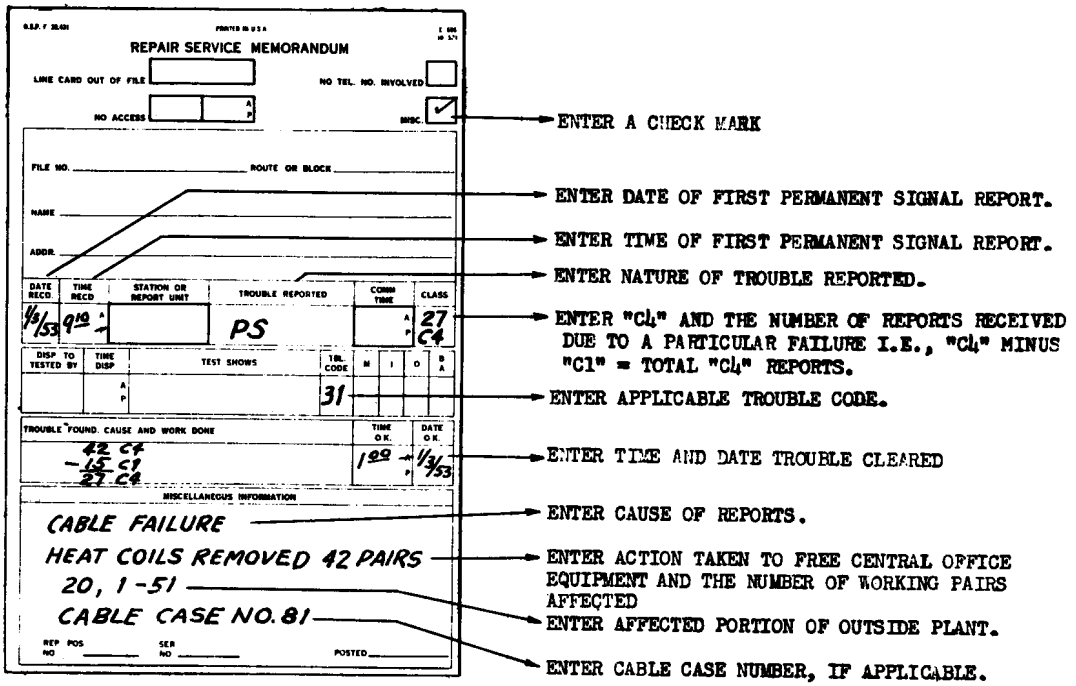

FIG. 1—METHOD OF ENTERING "C4" REPORTS DUE TO A PARTICULAR FAILURE.

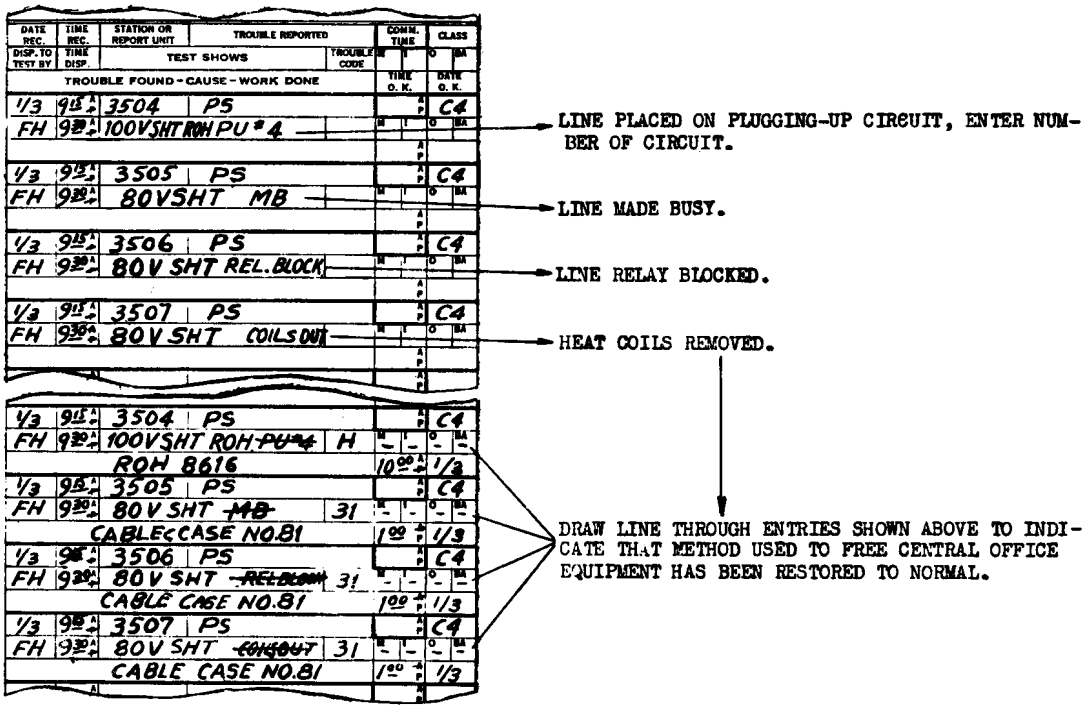

FIG. 2—METHOD OF ENTERING INFORMATION INDICATING USE OF PLUGGING-UP CIRCUITS ETC.