PROCEDURES IN CASE OF SUBSCRIBER CABLE FAILURE

NO. 5 CROSSBAR OFFICES

1. GENERAL

1.01 This section is reissued to include procedures for handling permanent signals in 2-wire switching offices arranged for permanent signal expanded routing feature and to include an additional method for clearing permanent signals due to subscriber cable failures. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.02 A subscriber cable failure is usually indicated by a large number of permanent signal calls, the lighting of a number of alarm lamps, the sounding of the major audible alarm, and by trouble recorder cards.

1.03 In marker groups ***arranged for permanent signal expanded routing feature,*** an improved method of testing permanent signals provides for marker tests to detect trouble conditions (subscriber cable failures) as opposed to receiver off-hook conditions. This arrangement allows the marker to test each permanent signal through a test termination using a trunk appearance circuit (dummy trunk) on the trunk link frame as a means of distinguishing between trouble conditions and rceiver off-hook conditions. The marker then attempts to route advance from the trunk appearance circuit to a PSG trunk (common overflow trunk) for all trouble conditions or to a ROH trunk (permanent signal holding trunk) for all receiver off-hook conditions. If the marker is unable to complete a connection to a PSG trunk group, ROH trunk group, or trunk appearance circuit due to an all trunk busy condition or no channel available condition, a route advance by the marker is made to a selected ***overflow link*** as a final termination where interrupted high tone is returned to the connected subscriber line.

2. APPARATUS

2.01 322A (make-busy) plugs as required.

2.02 1011G dial hand test set or equivalent.

2.03 KS-2827 pliers (for use in extracting heat coils).

2.04 319D (dummy) plugs as required (for use in opening subscriber lines associated with 444-type jacks at the main distributing frame).

2.05 Blocking and insulating tools as required. Use tools and apply as covered in section 069-020-801.

3. ALARMS

3.01 Where the marker ***is not arranged for permanent signal expanded routing feature,*** the permanent signal alarm circuit is connected directly to both the permanent signal holding trunk and common overflow trunk groups. Where the marker is ***is arranged for permanent signal expanded routing feature,*** the permanent signal alarm circuit is connected directly to ***only*** a PSG trunk group (common overflow trunks). When the APS/NPS key is in the normal position and a specified number (determined from office records) of permanent signal holding trunks with their NC, PB, or C lamps and/or common overflow trunks with their PS lamps lighted are connected to subscriber lines, the permanent signal alarm circuit functions to sound the major audible alarm. In offices where the permanent signal alarm circuit is controlled from the jack, lamp, and key circuit, the PSA lamp will also light. In offices where the permanent signal alarm circuit is controlled from a relay rack equipment unit, the MP lamp will also light. The alarm may be retired as follows.

(a) To retire the major alarm when the PSA lamp is lighted, momentarily operate the PSA-AR key to determine whether the condition that caused the alarm is still present. If the PSA lamp remains lighted, the major alarm may be silenced by momentary operation of the PSAC key. The PSA lamp remains lighted as a guard signal. When the permanent signals are cleared, the alarm circuit may be restored to normal by momentary operation of the PSA-AR key. The

PSA lamp will extinguish and the major alarm will silence if the PSAC key had not been previously operated.

(b) To retire the major alarm when the MP lamp is lighted, momentarily operate the CO switch. The MP lamp remains lighted as a guard signal. When the permanent signals are cleared, the alarm circuit may be restored to normal, by momentarily operation of the AR switch. The MP lamp will extinguish and the major alarm will silence if the CO switch had not been previously operated.

3.02 The white ORST lamp may be lighted at the master test frame as an indication of an all originating registers busy condition. The red ORST lamp (if provided) may also be lighted at the line load control cabinet, as an indication of this busy condition.

3.03 If the line load control cabinet is provided, individual red G lamps may be lighted at the control cabinet as an indication of an overload condition in the associated line link frames.

4. TROUBLE RECORD CARDS

4.01 Where the marker ***is not arranged for permanent signal expanded routing feature,*** means are provided for recording permanent signals on trouble record cards for both the permanent signal holding trunk and common overflow trunk groups. When the APS/NPS key is operated to the APS position, all subsequent permanent signals will be recorded; when operated to the NPS position no permanent signals will be recorded. When the APS/NPS key is in the normal position, permanent signals will be recorded when there is a predetermined number (2 to 41) of permanent signals at one time. Where the marker ***is arranged for permanent signal expanded routing feature,*** means are provided for recording permanent signals on trouble recoder cards for the ROH trunk group (permanent signal holding trunks), the PSG trunk group (common overflow trunks), and the overflow links. When the APS/NPS key is operated to the APS position, all subsequent permanent signals will be recorded; when operated to the NPS position, no permanent signals will be recorded. When the APS/NPS key is in the normal position, ***all*** permanent signal trouble conditions (except receiver off-hook conditions) will be recorded.

Note: The number of trouble recorder cards issued is limited by the "number of records control feature" in the trouble recorder circuit. The feature is made inoperative by operating the CTOS (cancel temporarily out of service) key at the trouble recorder control panel.

4.02 Where the marker ***is not arranged for permanent signal expanded routing feature*** and the number of trouble recorder cards is not sufficient for the purpose of analyzing a permanent signal condition, operate the APS/NPS key to the APS position. Operate the CTOS key, after which additional trouble recorder cards may be produced as follows.

(a) When PST keys associated with permanent signal holding trunks are provided, the operation of the PST keys on the trunks selected removes the ground from the PST leads, thus permitting these permanent signal calls to release. The affected lines then initiate other permanent signal calls which will be accompanied by trouble recorder cards.

(b) When PST keys associated with permanent signal holding trunks are not provided, or if the permanent signal connection has been established to a common overflow trunk, the existing connection can be released by manually releasing the S1 relay of the permanent signal or common overflow trunk. The resulting permanent signal calls will be accompanied by trouble recorder cards.

4.03 Where the marker ***is not arranged for permanent signal expanded routing feature,*** monitor and test several of the permanent signal holding trunks and common overflow trunks as determined in 4.01 and 4.02. This action is for the purpose of identifying the subscriber lines which are involved in the cable failure and to eliminate from consideration the permanent signals resulting from receiver off-hook conditions.

4.04 Where the marker ***is arranged for permanent signal expanded routing feature*** and the APS/NPS key is operated to either the APS or normal positions, ***all*** subsequent permanent signal trouble conditions resulting from cable failures on subscriber lines will be recorded on trouble recorder cards. These permanent signal trouble conditions may be terminated on both the PSG trunk group (common overflow trunks) and overflow links (refer

to 1.03) and are identified by the PS and GT5 punch indications on the trouble recorder cards.

5. PROCEDURE FOR LOCATING AND CLEARING TROUBLE

5.01 Where the marker ***is not arranged for permanent signal expanded routing feature,*** and the number of subscriber lines in trouble is in excess of the total number of permanent signal holding trunks and common overflow trunks, the excess faulty lines in trouble will continue to originate calls in competition with legitimate calls. Where the marker ***is arranged for permanent signal expanded routing feature,*** and the number of subscriber lines in trouble is in excess of the total number of PSG trunks (common overflow trunks), the excess faulty lines in trouble will be directed to the ***overflow links*** (refer to 1.03). If the number of subscriber lines in trouble is in excess of the total number of ***overflow links*** and PSG trunks, the excess faulty lines will continue to originate calls in competition with legitimate calls. When these conditions exist and the affected cable has been identified by using the procedures outlined in this Part, it will be necessary to make more than one test of the affected cable with a dial hand test set until all of the faulty lines have been identified.

5.02 In any marker group, silence the major alarm as described in 3.01 (a) or (b) of this section.

5.03 Where the marker ***is not arranged for permanent signal expanded routing feature*** and the permanent signals are associated with permanent signal holding trunks, remove the permanent signal concentrating circuits from service by inserting make-busy plugs into the associated PSCMB_jacks at the master test frame. The PSC_ lamps remain lighted as guard signals.

5.04 Record the line locations or directory numbers of the subscriber lines obtained from the trouble recorder cards as described in 4.01 through 4.03 where the marker ***is not arranged for permanent signal expanded routing feature*** or as described in 4.04 where the marker ***is arranged for permanent signal expanded routing feature.***

> ***Note:*** If the trouble recorder is made busy and it is not permissible to restore it to service obtain the line locations of several subscriber lines by tracing the permanent signal connections as outlined in Section 218-101-301. Follow the procedure outlined in 4.01 through 4.04 of this section to select the permanent signals involved in the subscriber cable failure.

5.05 It will usually be found that the affected cable and cable pairs may be identified from a relatively few trouble cards or tracings. Notify the test desk supervisor that a subscriber cable failure has occurred and report the line locations or the directory numbers.

> ***Note:*** If the test center is not attended (or if the test center can not be reached for other reasons), identify the affected cable by tracing the main distributing frame cross-connections from the horizontal to the vertical side.

5.06 At the master test frame, operate the CCT key, the CLPT or the CGT-PBX key, and the CGT or CGT-N-PBX key to cancel the continuity and the loop and ground test features. This action eliminates the trouble record cards that would otherwise result from continuity failures and loop and ground test failures.

5.07 At the main distributing frame protectors associated with the affected cable, listen for high pitched tone on the ring contact springs with the dial hand test set and remove the heat coils from the protector springs of the affected cable pairs.

> ***Note:*** When protectors are not provided, the affected lines are opened by inserting 319D (dummy) plugs into the associated 444-type jacks at the main distributing frame.

5.08 Record the cable pairs from which the heat coils have been removed (or the cable pairs which have been opened at the 444-type jacks) and report the affected cable pairs to the test desk supervisor.

> ***Note:*** If the test center is not attended (or if the test center can not be reached for other reasons), report the subscriber cable failure and the extent of the damage to the proper person in accordance with local procedures.

5.09 As requested, plug the cable pairs of non-PBX lines to available plugging-up circuits.

5.10 If some, but not all of the lines in a PBX group are affected, record and open the sleeve cross connections of the affected PBX lines at the horizontal main distributing frame in order to make the lines busy to terminating traffic.

5.11 If all of the lines in a PBX group are affected, proceed as follows:

(a) Remove the F and G cross connections of the called directory number at the number group frame.

(b) If the PBX group is associated with a PBX allotter circuit, remove the F and G cross connections of the first line associated with the PBX group at each of the involved number group frames.

(c) At the main distributing frame, open the sleeve cross connections of the lines used as night numbers, particularly if the subscriber cable failure occurs during nonbusiness hours.

(d) If some but not all of the lines in a PBX group are restored to service, proceed as outlined in 5.10 of this section.

5.12 An additional method may be used for clearing the lines on permanent signal during a major trouble condition involving many cables.

(a) At line link frame line switch, monitor each operated hold magnet for permanent signal tone.

(b) At each hold magnet having permanent signal tone, insulate the off normal contacts and release the hold magnet.

5.13 When the number of permanent signal calls remaining is incapable of causing the permanent signal alarm circuit to function, restore the alarm circuit to service as follows:

(a) If the PSA lamp is lighted, momentarily operate the PSA-AR key at the master test frame. Observe that the PSA lamp is extinguished.

(b) If the MP lamp is lighted, momentarily operate the AR switch at the permanent signal alarm circuit equipment bay to the OFF position. Observe that the MP lamp is extinguished.

5.14 At the trouble recorder control panel, restore the CTOS key to limit the number of cards issued for a given interval of time.

5.15 At the master test frame, operate the APS/NPS key to the normal position.

5.16 At the master test frame, restore the permanent signal concentrating circuits to service, if made busy, by removing the make-busy plugs from the PSCMB jacks. Observe that the PSC_ lamps are extinguished.

5.17 At the master test frame, (if it is desired to make the continuity and the loop and ground test features operative) restore the CCT key, the CLPT or the CGT-PBX key, and the CGT or CGT-N-PBX key.