4-WIRE LOCAL LOOP
MAINTENANCE PROCEDURES
DIGITAL DATA SYSTEM

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1. GENERAL

1.01 ▶This section describes maintenance procedures used to locate trouble on a Digital Data System (DDS) 4-wire local loop. These procedures refer to tests that are documented in Sections 314-410-510, 314-901-530, 314-901-531, and 666-612-300 depending on which test equipment is used.◀

1.02 This section is reissued for the following reasons:

(a) To include information on SLC*-96 Carrier System when using dataport channel units

(b) To include information on the 500B Data Service Unit

(c) To include information on Line Access Test System (LATS), Bit Access Test System (BATS), Automated Bit Access Test System (ABATS), and Switched Maintenance Access System/Switched Access Remote Test System (SMAS/SARTS)

(d) To change Serving Test Center (STC) to Centralized Test Center (CTC).

Revision arrows are used to emphasize the more significant changes.

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1.03 A DDS local loop consists of the following:

(a) A 500A-type data service unit (DSU), or a 550A-type channel service unit (CSU) located on customer premises

(b) A connecting 4-wire local loop

(c) An office channel unit (OCU) or OCU dataport channel unit (OCU DP) located in the serving central office (SCO)

(d) A maximum of two 56-kb/s repeaters where 56-kb/s service is provided.

1.04 The 4-wire local loop consists of cable to a SCO where DDS multiplexing equipment is located. In some cases the cable may be routed through a baseband office. Nonloaded cable pairs ***must*** be used and are the same as those used for any of the common services such as message telephone, and short-haul carrier systems.

1.05 A DDS local loop trouble is indicated by:

(a) A satisfactory OCU loopback test and a failed channel loopback test

(b) A satisfactory OCU and channel loopback test and a failed DSU loopback test

(c) Intermittent error performance on channel and/or DSU loopback test.

1.06 ◗Trouble analysis procedures and information in this section are based on the results of the one-employee and/or two-employee tests. The test results should be recorded as a benchmark value on a local loop record card E-6528.

1.07 ***Warning: A dc loop current in excess of 250 mA may damage the DSU/CSU at the station end when making either the one-employee or two-employee test. Do not use test equipment, for example, a breakdown test set, that applies a current greater than 250 mA to the cable pairs, unless the OCU or OCU DP has been unplugged and the DSU/CSU has been disconnected from the pairs. This warning applies to paragraphs 1.08 and 1.09.***

1.08 The ***one-employee tests*** are primarily for maintenance and trouble clearing but may also be used for installation testing, if requested. The one-employee tests may be made at the OCU bay, OCU DP, local test desk (LTD), LATS test panel, SMAS/SARTS, BATS, or ABATS.

1.09 The ***two-employee*** tests are primarily for installation tests but may also be used for maintenance testing, if requested. The two-employee test is made between the station and the OCU bay, OCU DP, LATS test panel, SMAS/SARTS, BATS, or ABATS.◖

2. TROUBLE REPORTING AND ISOLATION

2.01 Routine maintenance is not required for DDS local loops. Procedures for clearing trouble normally start by receipt of a trouble report at a CTC. The CTC is the primary point of contact for the DDS customer.

2.02 Transmission faults on the local loop are not alarmed and will normally be reported to the CTC by the customer. The customer may detect faults by lamp or interface lead indications on the DSU.

2.03 Routine maintenance is not required for the digital 56-kb/s repeater. All circuit packs are installed on a plug-in basis. In the event of a repeater failure, the defective circuit pack can be easily replaced.

2.04 Two green light emitting diodes (LEDs) on the central office (CO) mounted repeater monitor for the presence of data or idle code transmitted through the repeater in each direction. The TRMT DA LED, when illuminated, indicates the presence of data toward the station DSU or CSU. The RCV DA LED, when illuminated, indicates the presence of data towards the DDS network. The absence of data, due to facility trouble or component failure, will cause one or both of the LEDs to be off. A fuse failure will cause an office alarm and a red F ALM lamp is lighted.

2.05 Four jacks located on the CO mounted repeater shelf provide access for dc and ac testing of the loop facilities from the repeater location. The repeater can also be bypassed by operating a switch located at the front of the repeater or removing simplex current in the newer (List 2) version of the repeater. In the bypassed condition, testing of the entire loop (except the repeater) can be performed from the CO containing the OCU.

Note: The outside plant (OP) repeater can be remotely bypassed to allow dc tests to be per-

formed by removing the dc simplex current from the loop. Normal OP repeater operation is restored by reapplying dc simplex current to the loop.

2.06 ▶After a touble report is referred from a CTC, a technician must perform a foreign voltage test, an insulation resistance test, and a loop resistance test within 15 minutes in order to meet the overall maintenance objectives for DATAPHONE ® Digital Service. These tests may be made by using ABATS, BATS/LATS, SMAS/SARTS. They may also be made at the OCU or LTD of the SCO. The test results must be passed to the CTC so a dispatch to the customer station can be determined and coordinated if required.

3. TROUBLE ANALYSIS PROCEDURES

3.01 This part provides the trouble analysis procedures for the DDS local loops without 56-kb/s digital repeaters and for loops with repeaters. These loops are also referred to as nonrepeatered and repeatered with each type requiring different trouble clearing procedures. These procedures are followed with the coordination of the responsible serving hub office. These procedures begin after some loopback testing has already been made, such as an OCU loopback test that passed, but the DSU and the channel loopback tests failed. Loopback testing is possible from different locations within the DDS.

3.02 The loopback tests procedures are documented in different sections depending on the test equipment or test system used. The recommended test system (ABATS) can only test loops that are connected to a hub office via LATS. Refer to Section 314-901-531 for these remote test procedures. Manual test procedures using BATS is documented in Section 314-901-530. Local loop test procedures for intermediate and end offices may use SMAS/SARTS, local OCU or OCU DP, or LTD test procedures which are contained in Section 314-410-510.

LOCAL LOOP WITHOUT 56-KB/S DIGITAL REPEATER(S)

3.03 This subpart provides procedures that are used to isolate and clear troubles on a DDS local loop that does not contain digital 56-kb/s repeater(s) (nonrepeatered loop). Figure 1 shows the trouble clearing procedure for a nonrepeatered loop which provides subrate (2.4-, 4.8-, and 9.6-kb/s) service and for short loop 56-kb/s service. These procedures are made from the SCO.◀

LOCAL LOOP CONTAINING 56-KB/S DIGITAL REPEATERS

3.04 This subpart outlines the analysis procedures that are used to isolate and clear troubles on the DDS local loop containing 56-kb/s digital repeater(s). Figure 2 shows the various loop arrangements that can be configured for 56-kb/s service and the various types of loop sections (A through H type) that may be involved. ▶The trouble should have already been isolated by the channel loopback test to a specific section, ie, between OCU or OCU DP and a repeater, between two repeaters, or between the last repeater and the station. Some of the isolation procedures require tests between a CO or an OP repeater and the station. Other procedures are required between repeaters or between a simplex power unit and a repeater.

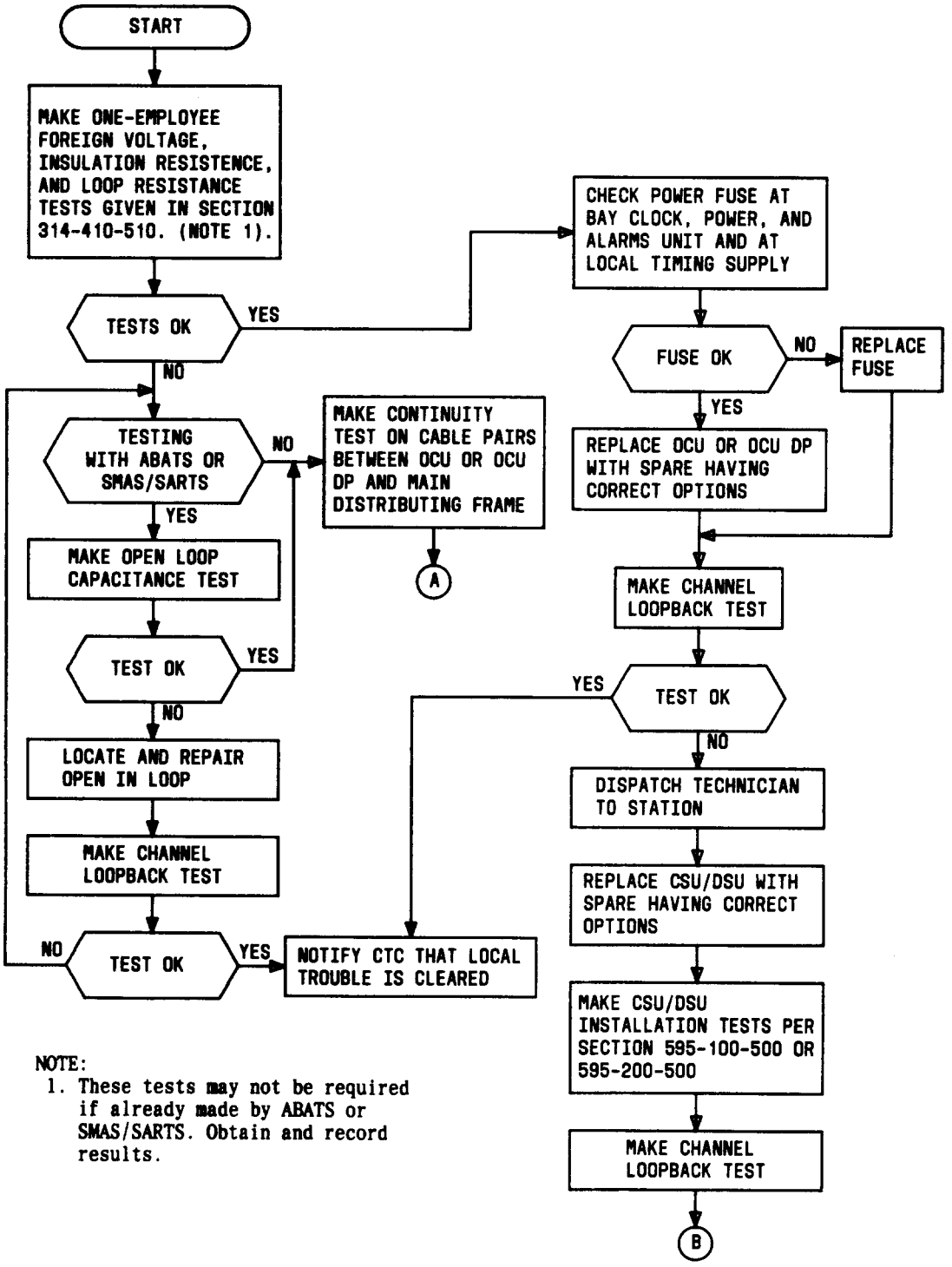
3.05 Trouble clearing procedures begin and are shown in Fig. 3 through 11 for a repeatered loop which is at the 56-kb/s rate.◀

4. REFERENCES

4.01 The following sections can be referenced for additional information on maintaining local loops:

SECTION	DESCRIPTION
103-626-100	6F and 6FR Voiceband Noise Measuring Sets, (J94006F and J94006FR), Description, Operation, and Maintenance
107-600-100	Digital Data System, KS-20909 Data Test Set (Transmitter)
107-601-100	Digital Data System, KS-20908 Data Test Set (Receiver)
314-410-510	4-Wire Local Loop, Test Procedures, Digital Data System
314-901-530	Bit Access Test System (BATS) and Line Access Test System (LATS), Manual Test Procedures, Digital Data System
314-901-531	Automated Bit Access Test System, Remote Test Procedures, Digital Data System
314-910-100	Digital Data System, Office Channel Unit, Description

SECTION	DESCRIPTION
314-910-300	Digital Data System, Office Channel Unit, Maintenance
314-910-500	Digital Data System, Office Channel Unit, Test Procedures
314-920-100	Digital Data System, 56-kb/s Repeater, Description
314-920-500	Digital Data System, 56-kb/s Repeater, Test Procedures
363-200-100	SLC -96 Subscriber Loop Carrier System, General Description
365-150-107	Digital Transmission Systems, D3B Channel Bank, Dataport Operation, Description, Installation, Maintenance and Tests
595-100-100	Digital Data System, 550A-Type Channel Service Unit, Description
595-100-300	Digital Data System, 550A-Type Channel Service Unit, Maintenance
595-100-500	Digital Data System, 550A-Type Channel Service Unit, Test Procedures
595-200-100	Digital Data System, 500A-Type Data Service Unit, Description and Operation
595-200-300	Digital Data System, 500A-Type Data Service Unit, Maintenance
595-200-500	Digital Data System, Data Service Unit 500A-Type, Test Procedures
634-310-501	Locating Cable Faults With the 96A Test Set
640-251-106	468F Apparatus Case, Description and Installation
640-251-107	468F Apparatus Case, Maintenance and Acceptance Testing
666-600-100	Digital Data System, 950A Testboard (J70176A and B), Description and Operation



NOTE:
1. These tests may not be required if already made by ABATS or SMAS/SARTS. Obtain and record results.

Fig. 1—Trouble Clearing Procedures for Local Loop Without Repeater(s) (Sheet 1 of 2)

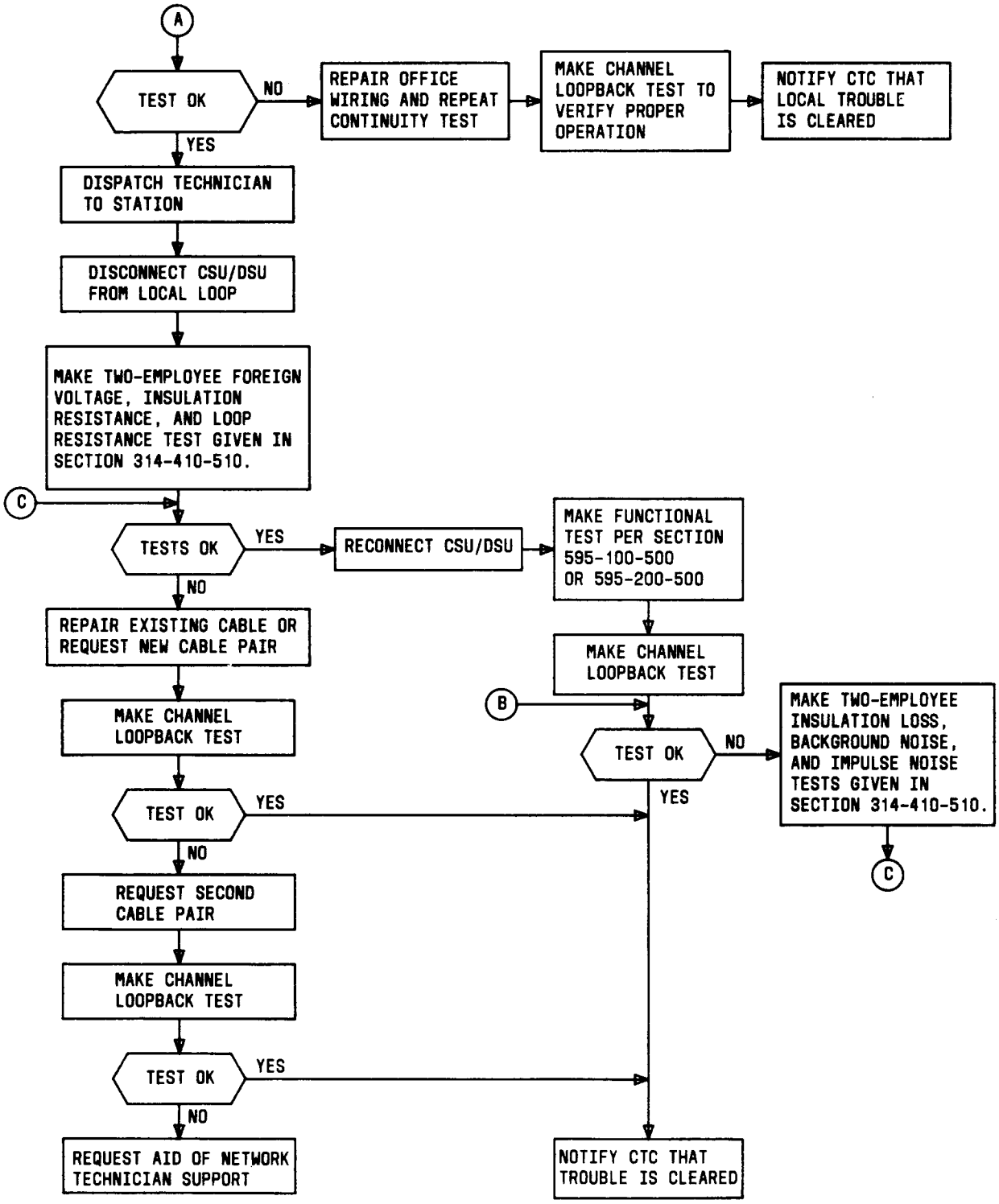


Fig. 1—Trouble Clearing Procedures for Local Loop Without Repeater(s) (Sheet 2 of 2)

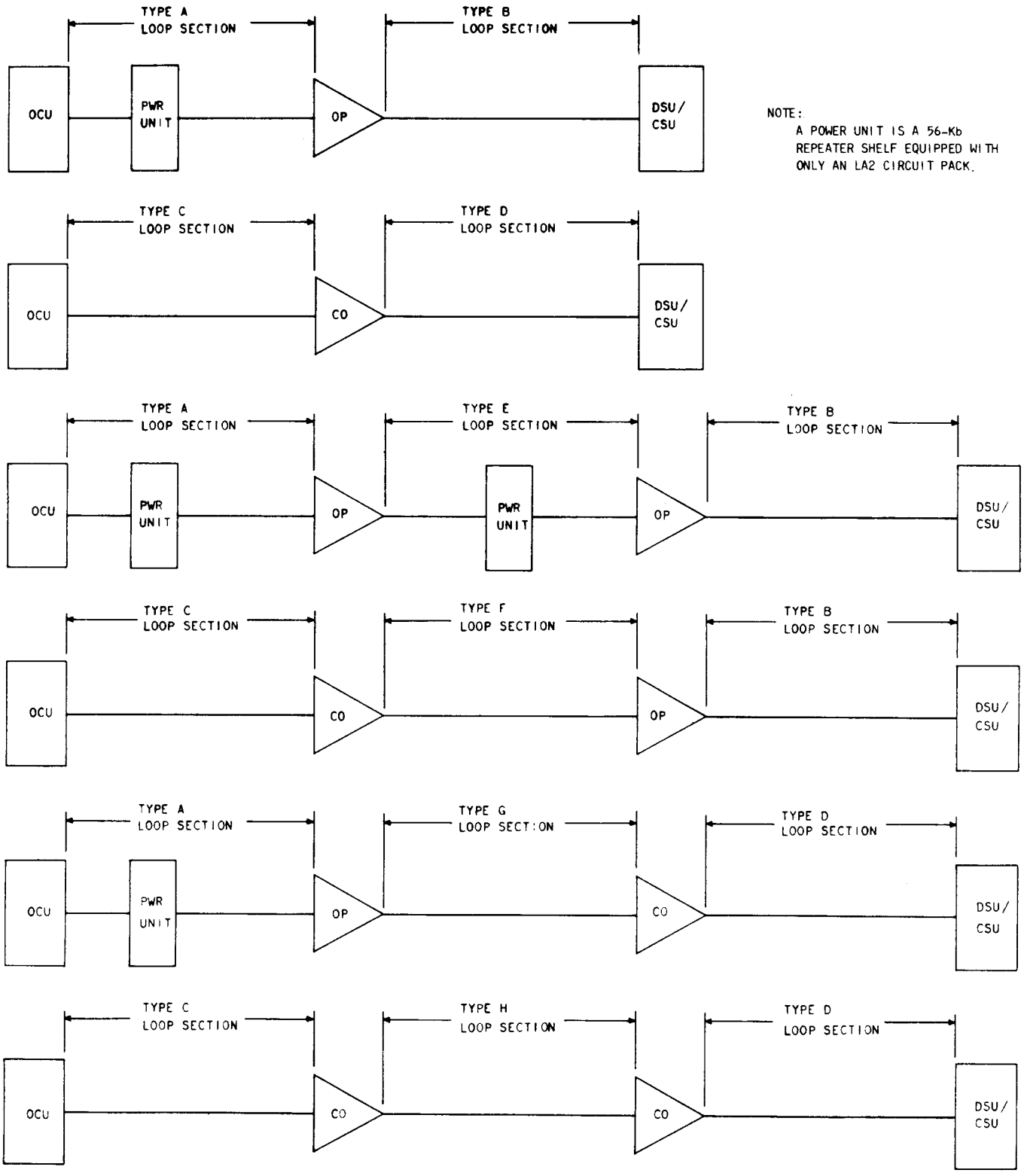
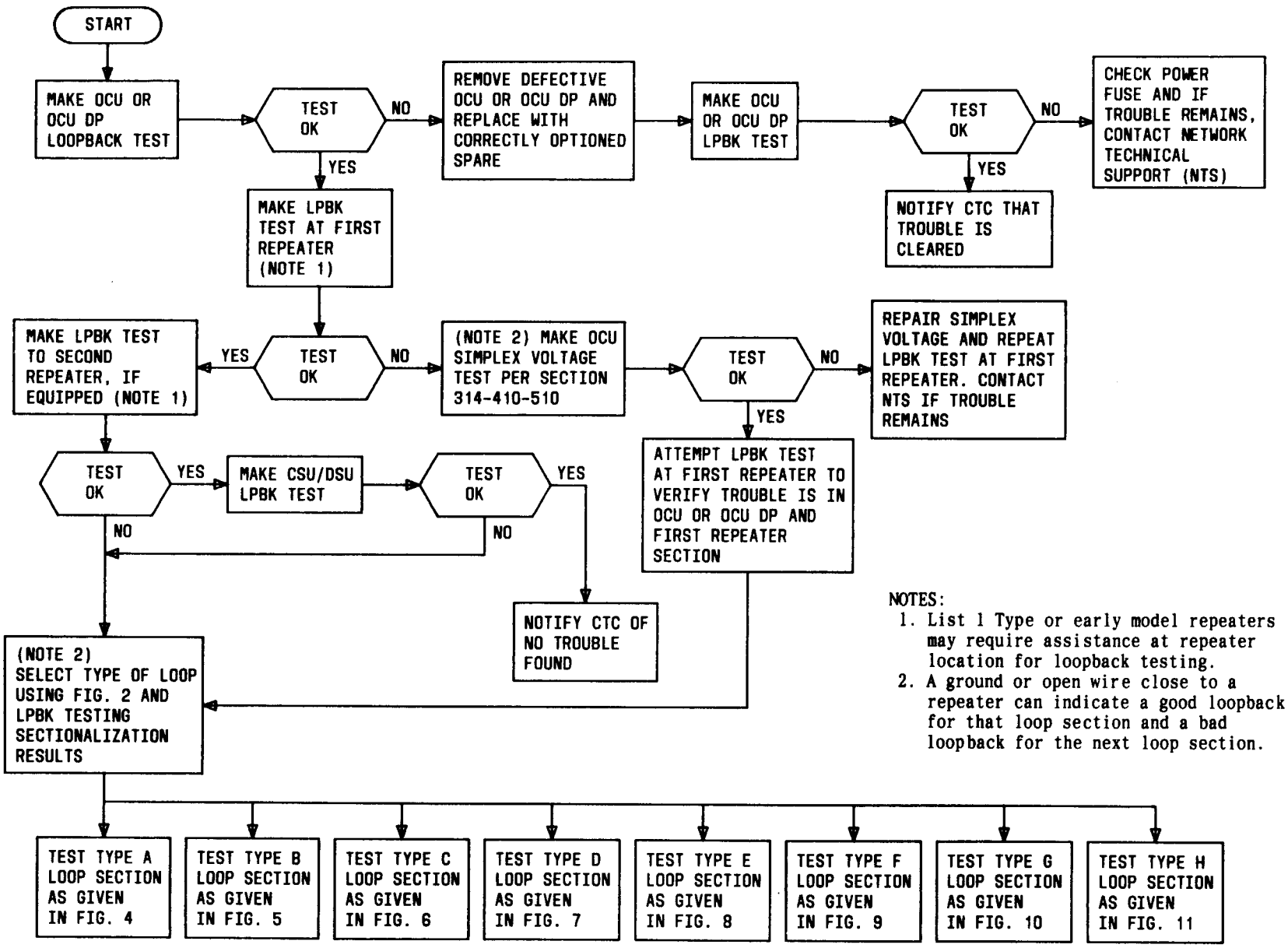


Fig. 2—Types of Local Loops Containing 56-kb/s Digital Repeater(s)



NOTES:
1. List 1 Type or early model repeaters may require assistance at repeater location for loopback testing.
2. A ground or open wire close to a repeater can indicate a good loopback for that loop section and a bad loopback for the next loop section.

Fig. 3—Trouble Clearing Procedure for Local Loop Containing 56-kb/s Digital Repeater(s)

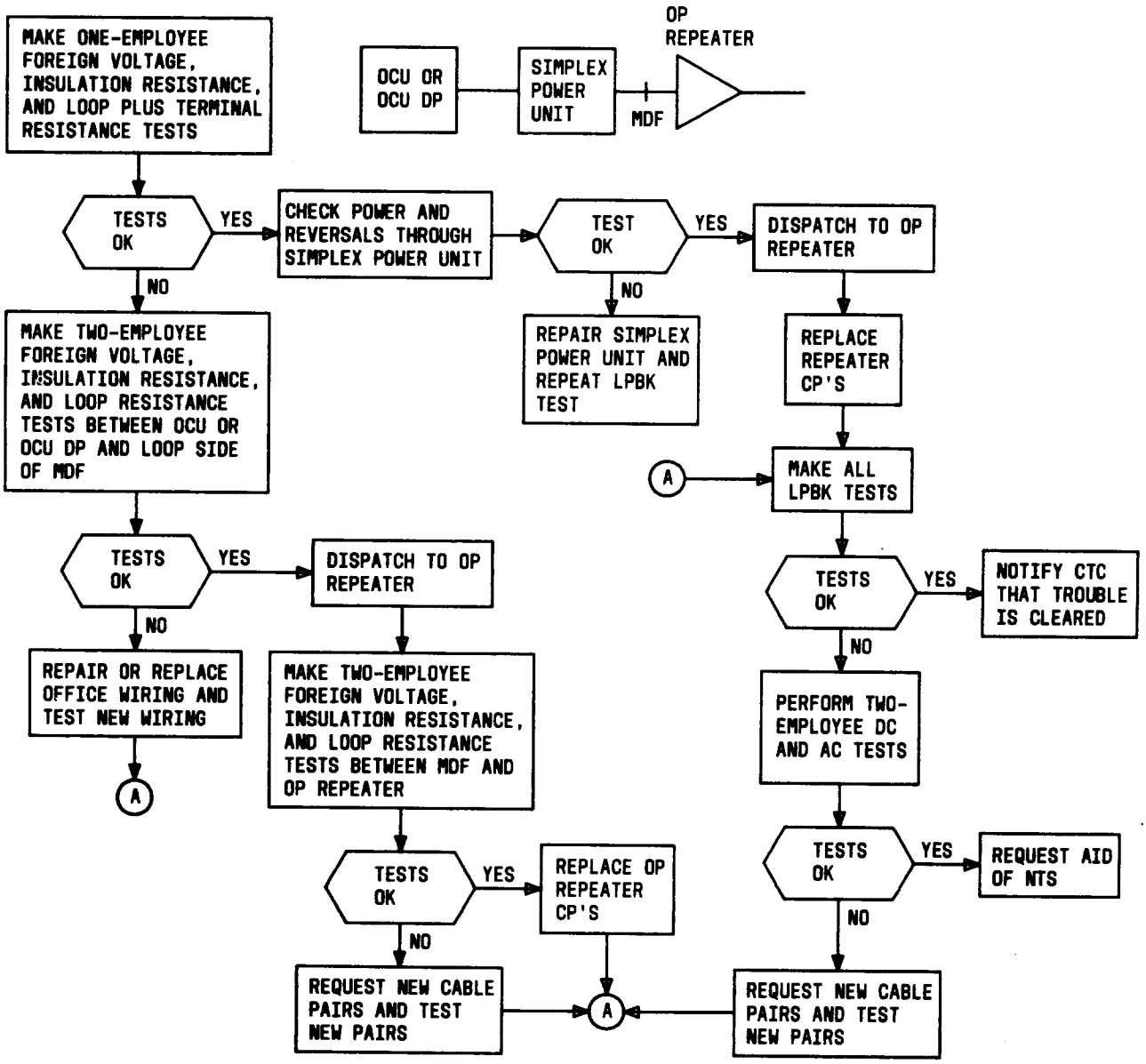


Fig. 4—Trouble Clearing Procedure for Type A Loop Section

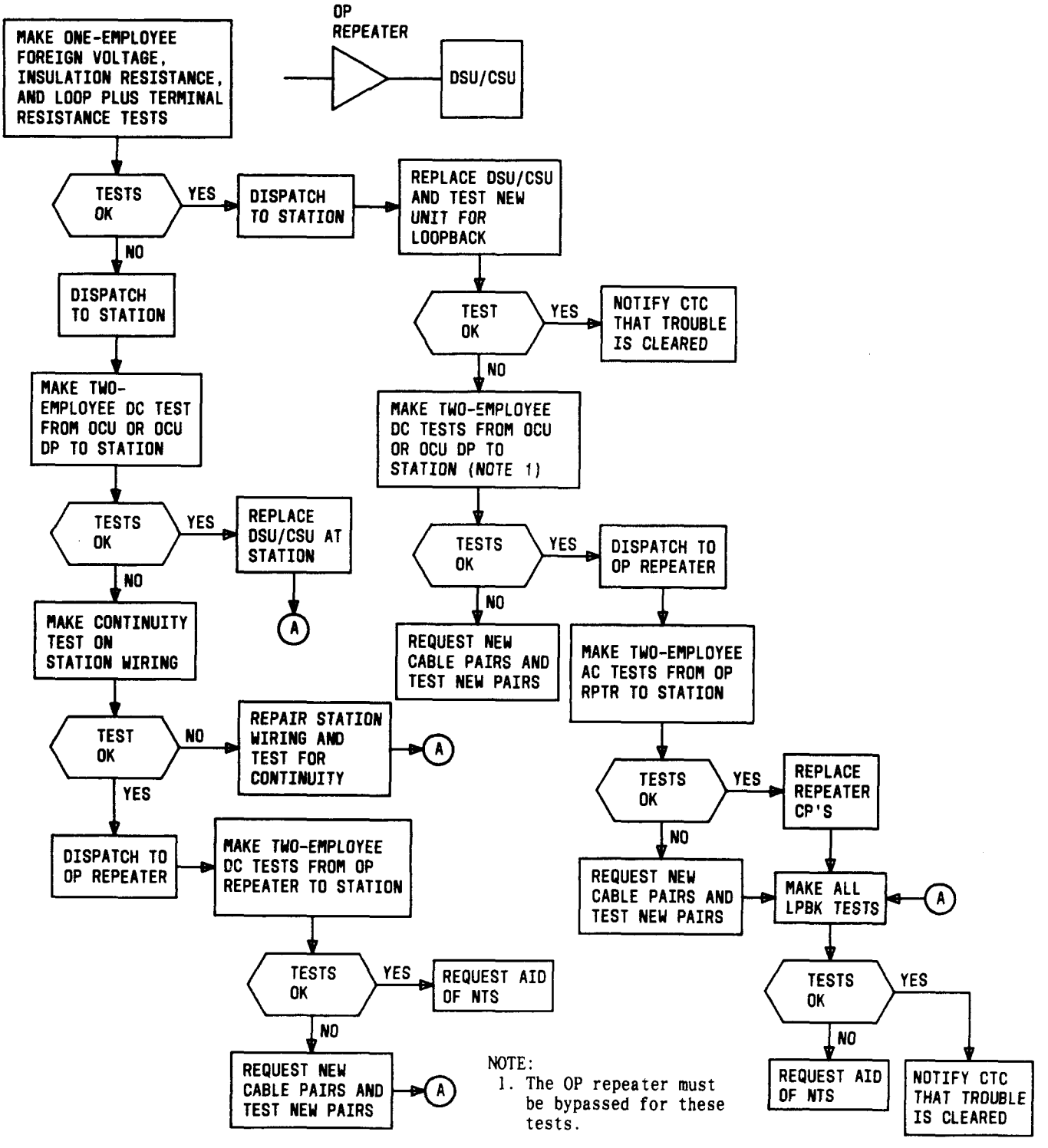


Fig. 5—Trouble Clearing Procedure for Type B Loop Section

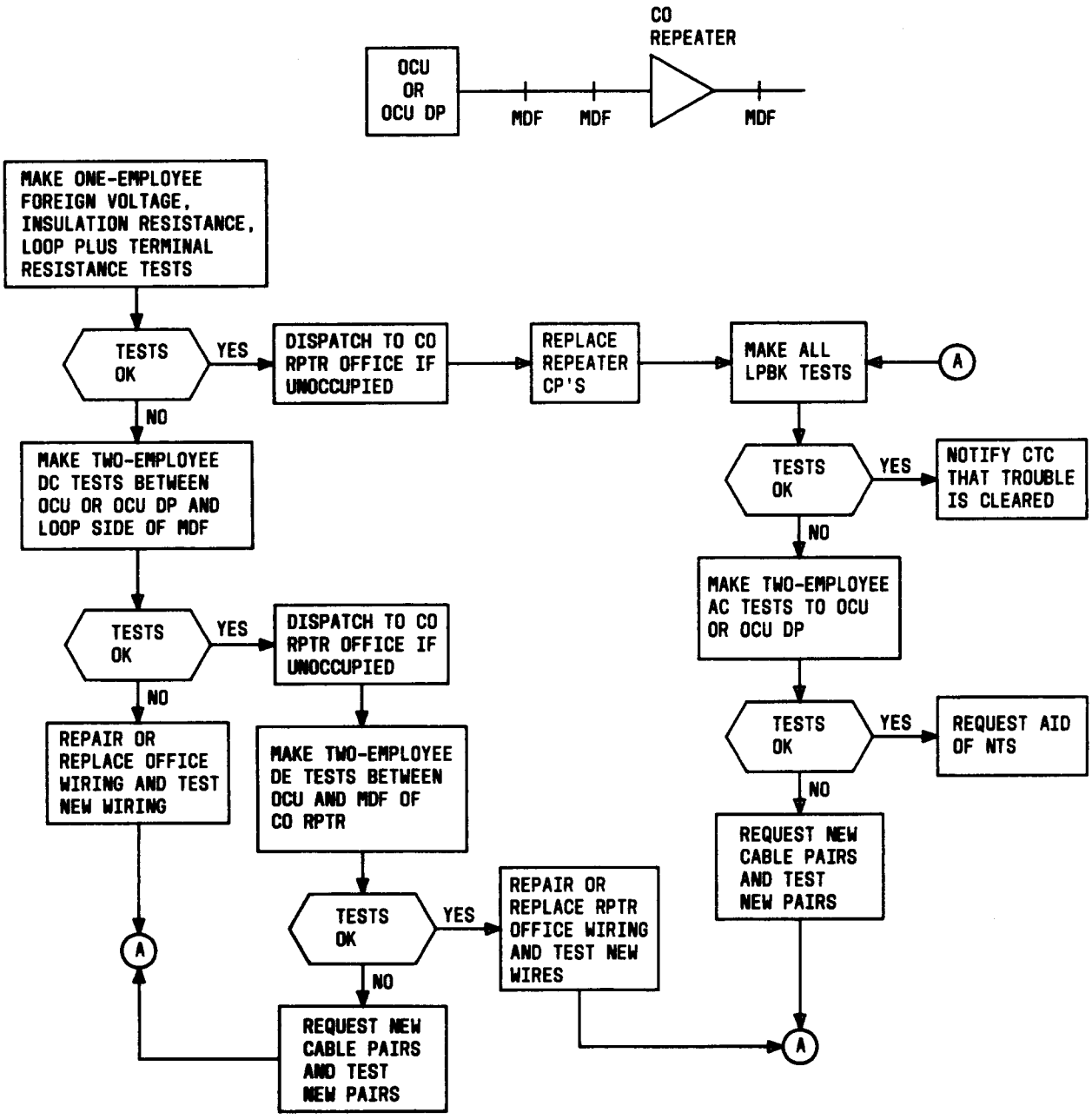


Fig. 6—Trouble Clearing Procedure for Type C Loop Section

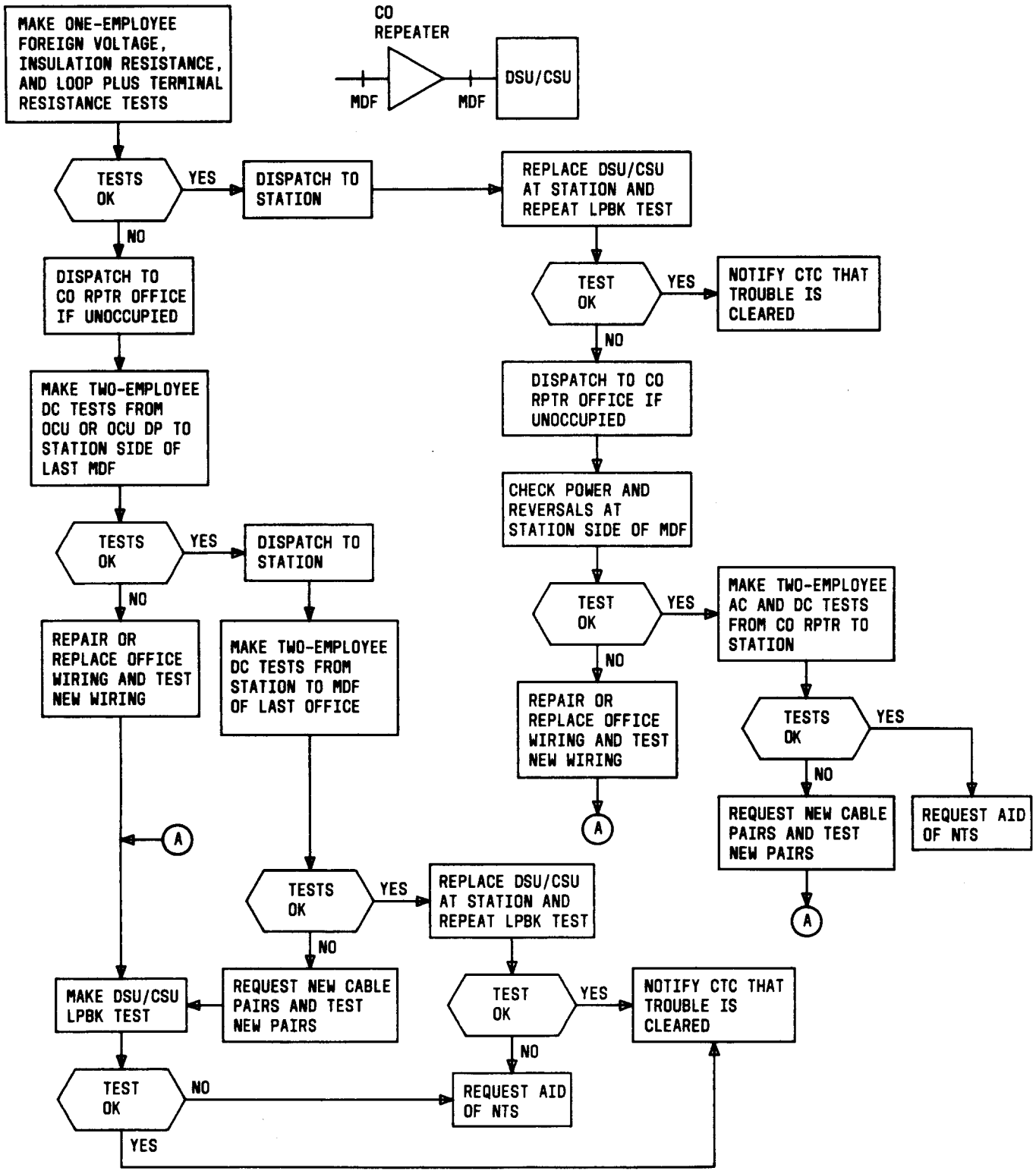


Fig. 7—Trouble Clearing Procedure for Type D Loop Section

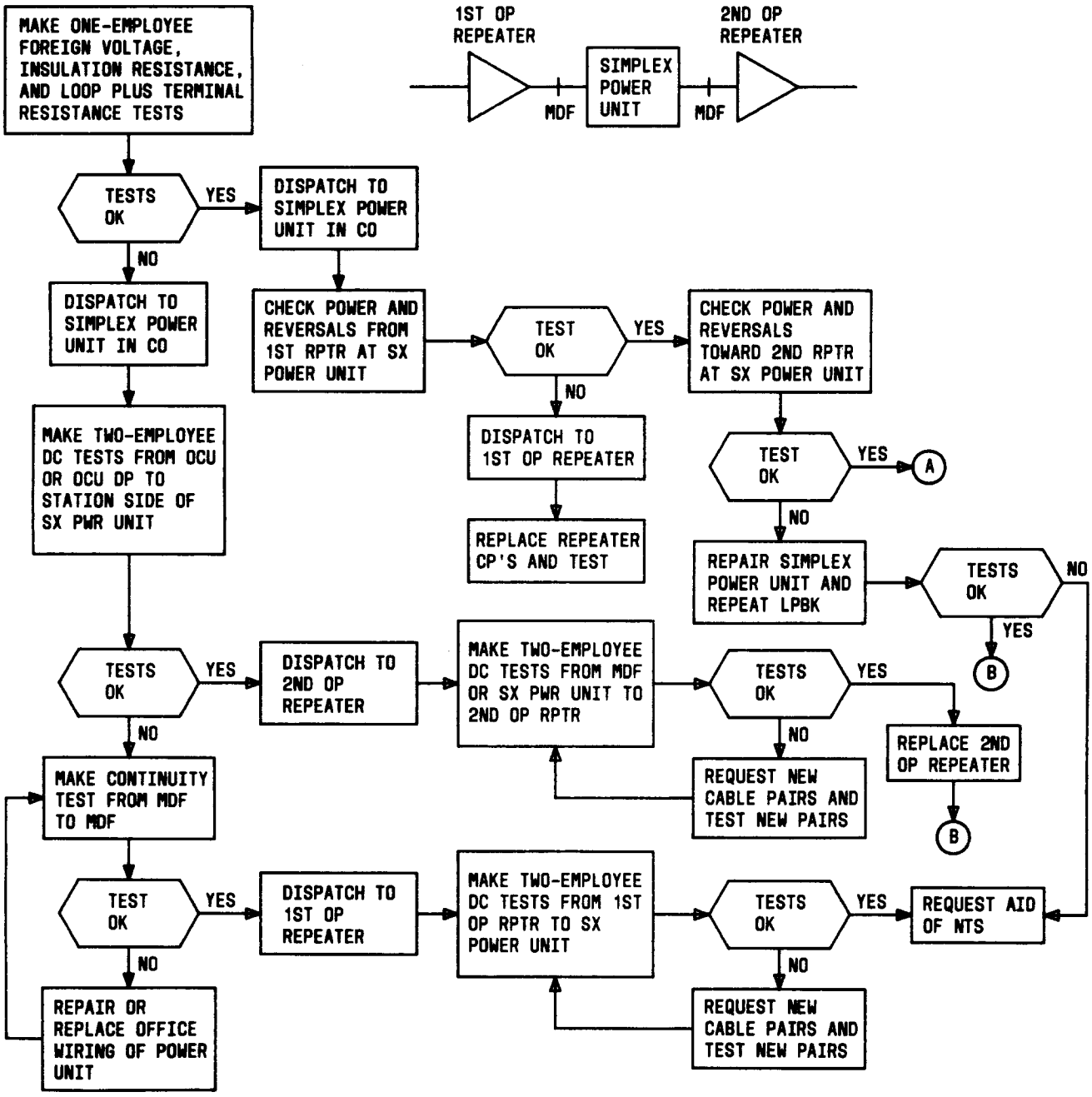


Fig. 8—Trouble Clearing Procedure for Type E Loop Section (Sheet 1 of 2)

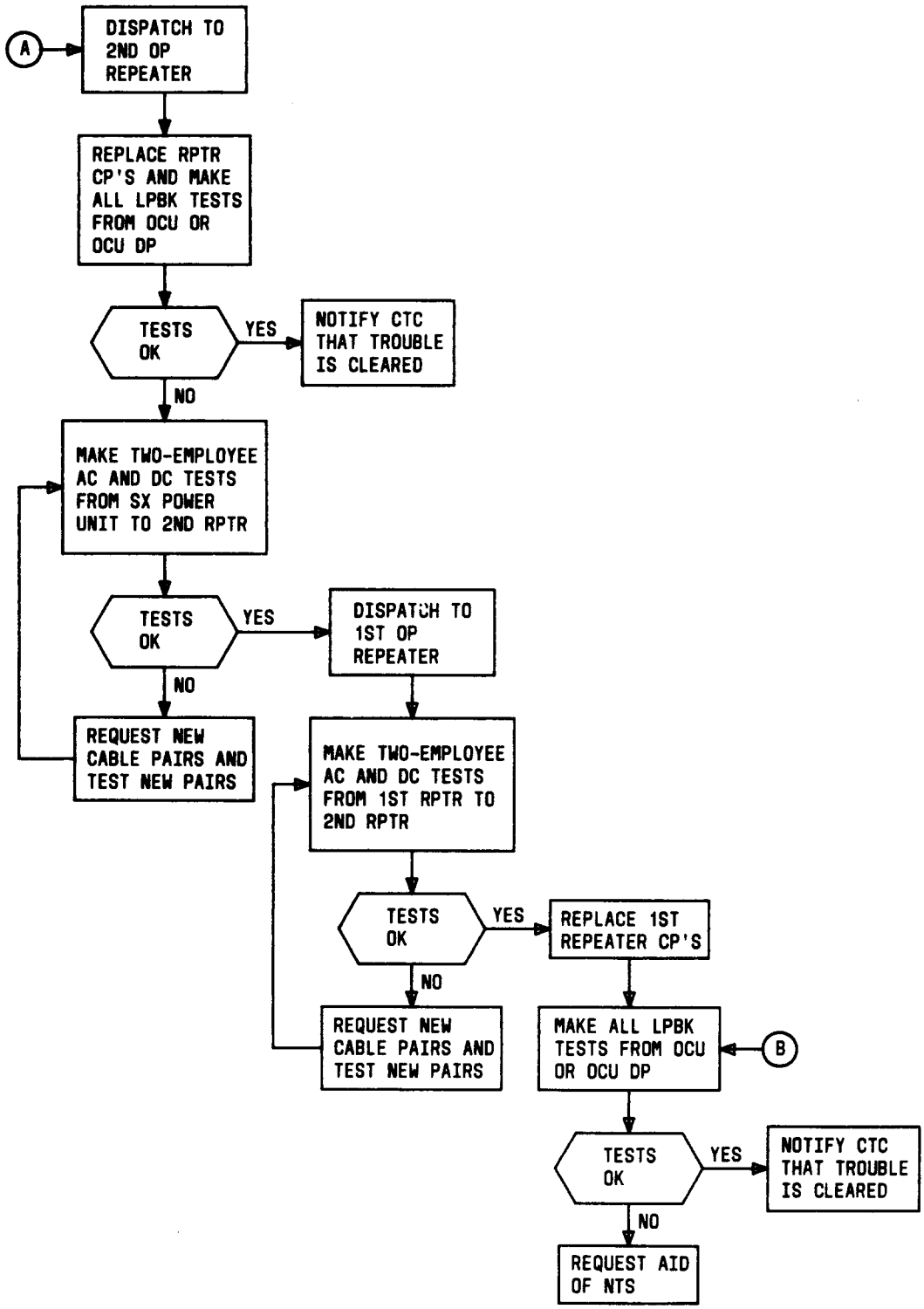


Fig. 8—Trouble Clearing Procedure for Type E Loop Section (Sheet 2 of 2)

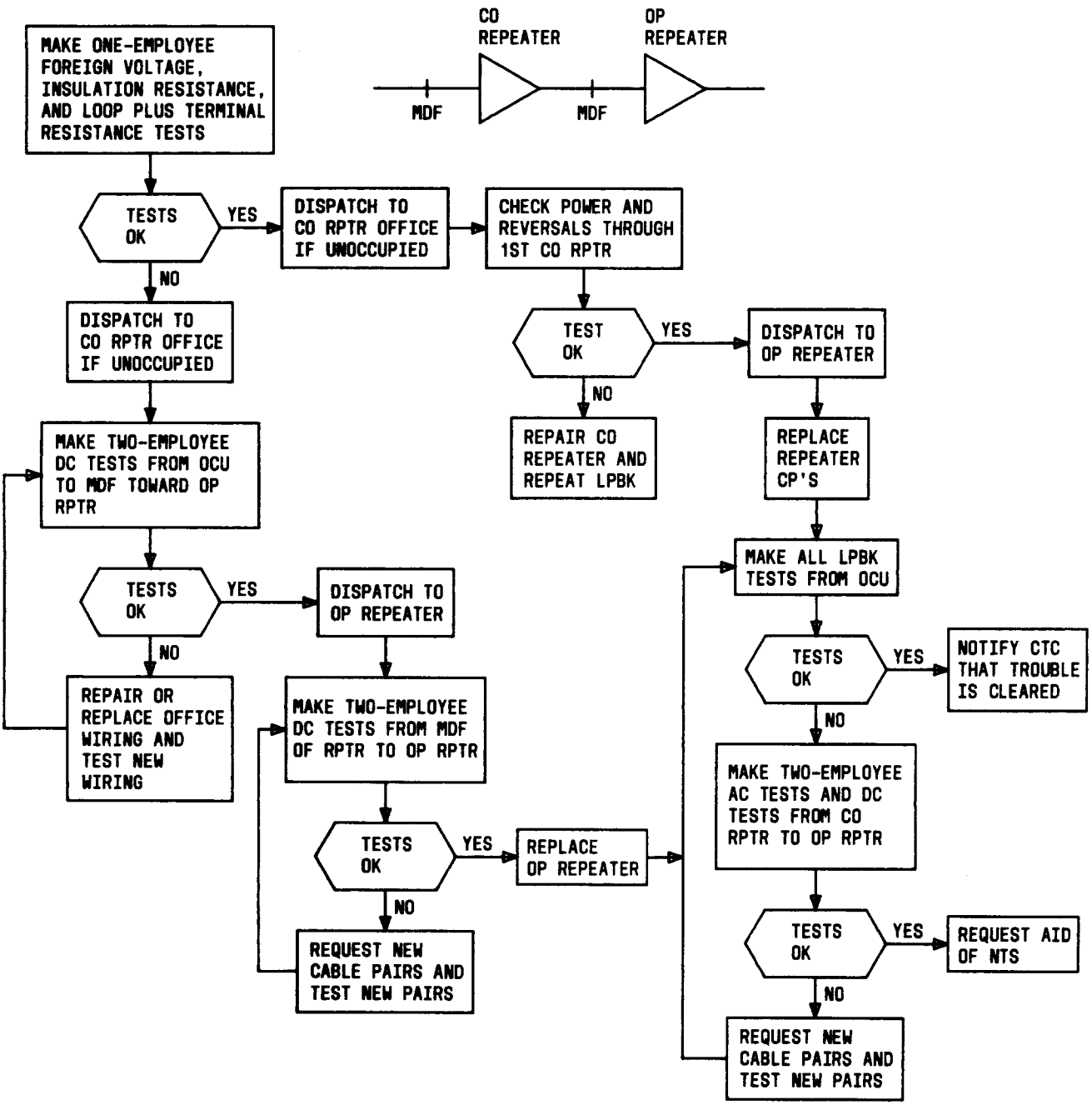


Fig. 9—Trouble Clearing Procedure for Type F Loop Section

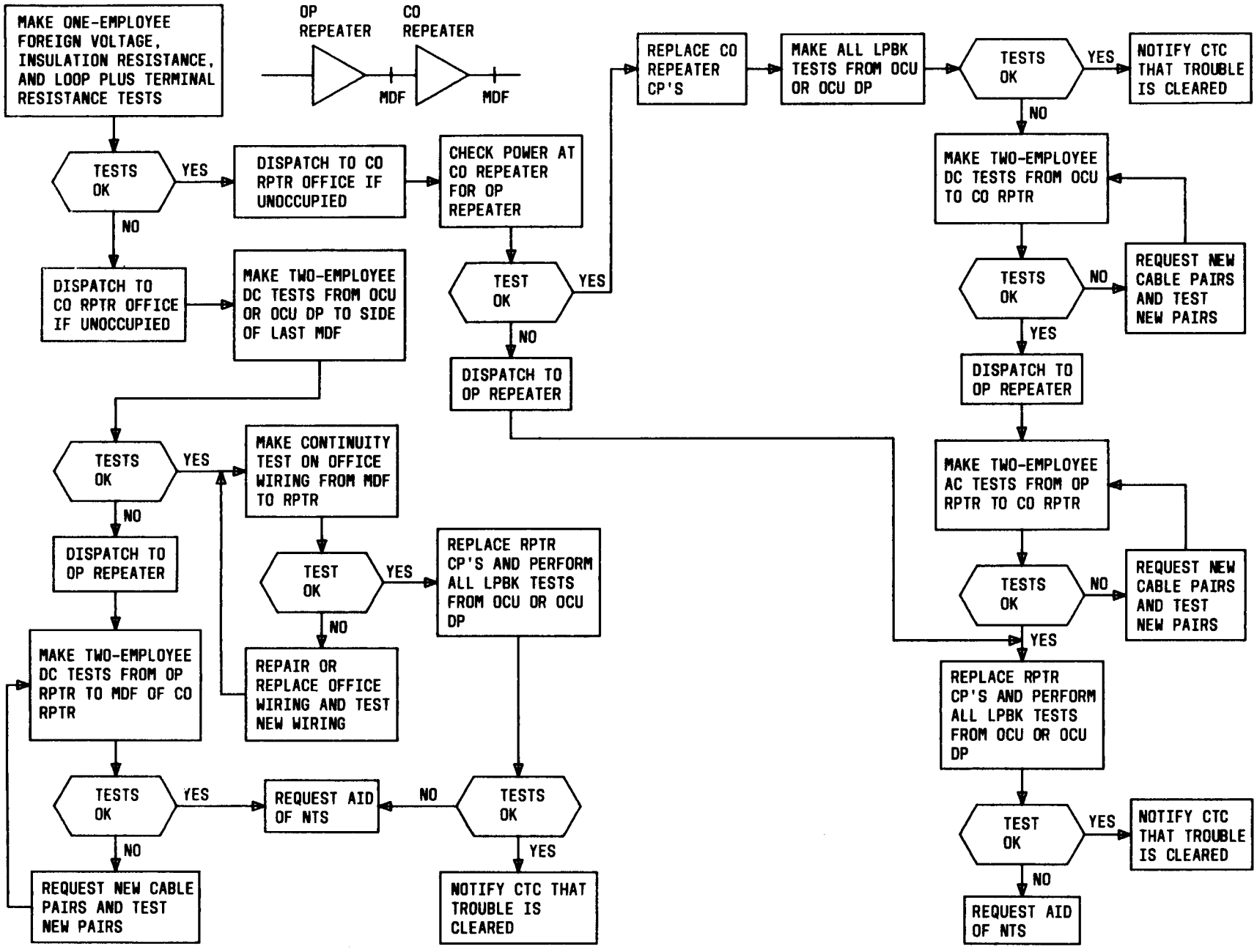


Fig. 10—Trouble Clearing Procedure for Type G Loop Section

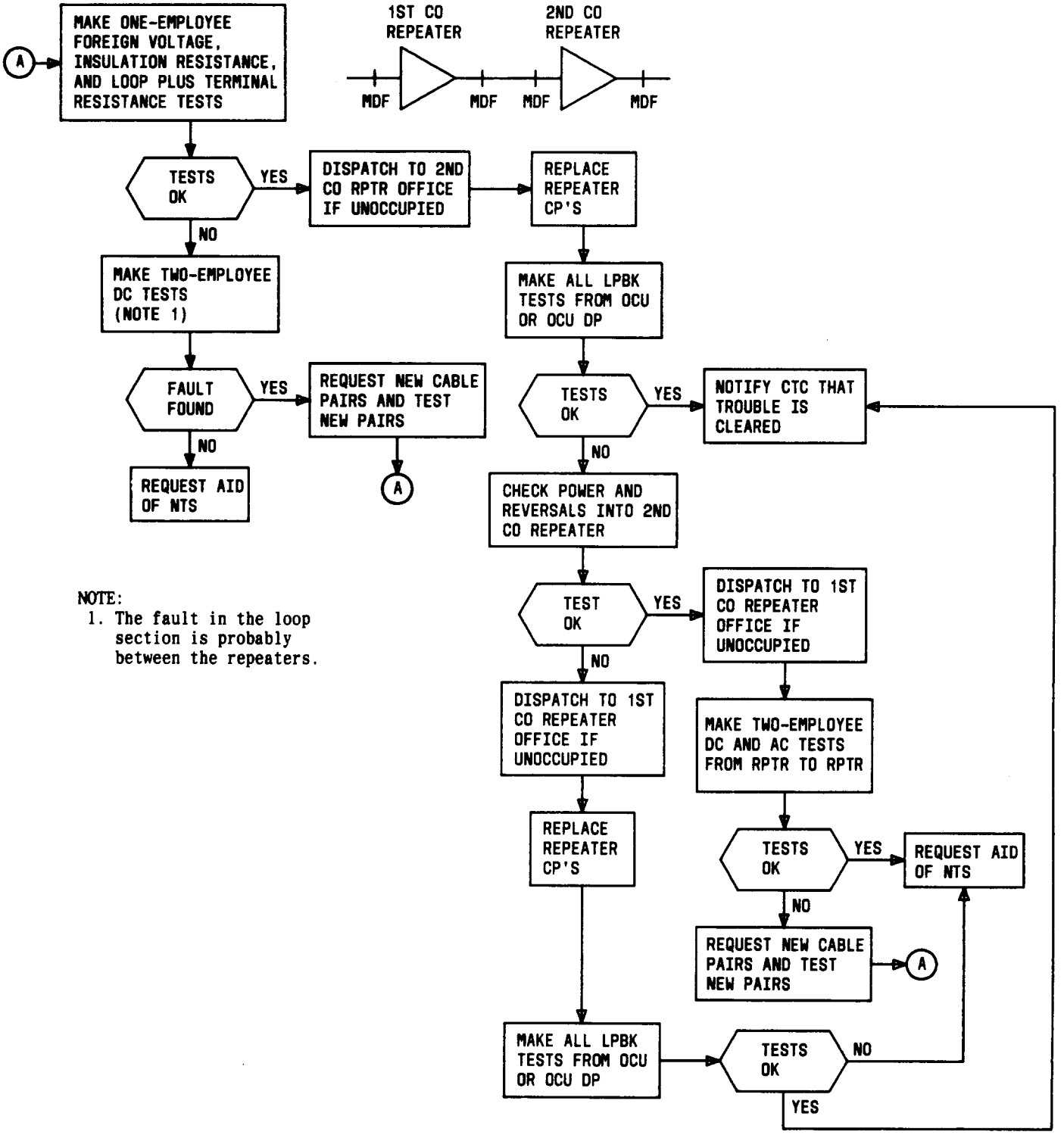


Fig. 11—Trouble Clearing Procedure for Type H Loop Section