

# METHODS & PRACTICES

Network Staff

# PACIFIC TELEPHONE



# FLASH

NO. 758

CALIFORNIA-NEVADA

SAN FRANCISCO, 11-2-81

## Bell System Practice

Distribution Codes: A01, A34, D01, D05, E01, E02, E09, E12, F01, F15, M46, M47, M48, M49, M51, M52, S96

Review this Flash with all test center provisioning and maintenance personnel. File it in front of Section 309-400-004, Issue 2. Destroy this Flash upon receipt of a Pacific Company addendum or Issue 3 of the main section.

## ELECTRONIC TANDEM NETWORKS (ETN)

### CLARIFICATION OF ETN TRUNKS

This Flash is issued to clearly define Electronic Tandem Network (ETN) trunks that are controlled by the Plant Control Office (PCO) of the ETN tandem switch indicating proper Common Language Circuit Identification (CLCI) for purposes of tallying work units, inventorying for class of service 14 and for providing test access within the misroute guidelines.

#### CLCI

IT

TA

SA

#### ETN DEFINITION

Intertandem Tie trunks connect ETN tandem switches that may be DIMENSION® 2000 FP-8 or I/IA ESS generic IE6 or later.

Tandem Access trunks connect subtending main PBXs or Centrexes to the tandem switches. This includes Bypass Access Tie Trunks from a tandem switch that connects to a main PBX or Centrex that is homed to another tandem switch.

Satellite Access trunks can present a problem for ETN configurations. If there is a Main/Satellite configuration when both the Main and Satellite PBXs

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are DIMENSION 2000 FP-8s and one of them is the tandem switch, the SA trunks are part of the ETN. The balance of the SA trunks, not following this definition are separate from the ETN.

OPS

Off Premise Stations can present a problem for ETN configurations. The OPS that are to be included as part of the ETN must meet the following criteria:

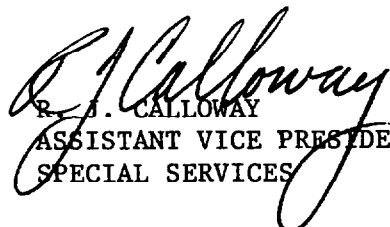
- (a) The OPS must be homed on the ETN tandem switch.
- (b) If the tandem switch is a DIMENSION 2000 FP-8, the OPS must terminate in an LC-361 circuit pack to qualify.

The trunks that are maintained under the ETN maintenance plan, namely IT, TA, (includes Bypass Access trunks) and selected OPS and SA trunks should have test access by the PCO for the tandem switch within the misroute guidelines, inventoried in the Special Services System (SSS) under class of service 14, and tallied for ETN trunk testing work units.

When an ETN is established with these ETN trunks within the same exchange, the same ETN PCO for the tandem switch is designated PCO. The circuits should also have ETN PCO test access, be inventoried as class of service 14 and tallied with the appropriate ETN work units.

All other circuits with connectability to the ETN tandem switch are maintained separately from the ETN maintenance plan. These circuits are Wide Area Telephone Service (WATS), Foreign Exchange (FX), and Central Office trunks.

Any additional information may be obtained by calling your staff representative. My contact on this subject is Frank P. Grasso on (415) 774-9139.

  
R. J. CALLOWAY  
ASSISTANT VICE PRESIDENT  
SPECIAL SERVICES

# ELECTRONIC TANDEM NETWORK (ETN)

## TROUBLE REPORTING PROCEDURES

### SWITCHED SERVICE NETWORKS

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1. INTRODUCTION . . . . .	1	A. General
A. General . . . . .	1	1.01 This section describes the trouble reporting procedures for Electronic Tandem Networks (ETNs). General responsibilities are covered in Section 309-400-001. Customer Administration Center, Customer Administration Panel, and Local Customer Administration System troubles are covered in Section 309-400-002.
B. Terms . . . . .	2	1.02 This section is reissued to provide additional information on trouble reporting procedures. Revision arrows are used to emphasize the more significant changes.
2. GENERAL RESPONSIBILITIES OF WORK CENTERS . . . . .	2	1.03 The ETN provides the customer with a private switched communications network with features available to meet unique customer requirements. The switched environment and the complexity of Electronic Tandem Switching (ETS) require trouble reporting and trouble clearing procedures different from those found in other services.
A. General . . . . .	2	1.04 The ETN consists of the DIMENSION® PBX with FP8 and/or the No. 1/1A ESS Centrex (CTX) with Generic 1E6, or later, to provide tandem switching. The tandem switches, PBX/CTX, may be arranged in a two-level hierarchy interconnected with private lines. For convenience, the private lines have been termed intertandem tie trunks, access tie trunks, bypass access tie trunks as well as FX, WATS, and CO trunks (Fig. 1).¶
B. Network Control Office (NCO) . . . . .	2	1.05 Some network troubles can be easily located and cleared. Other troubles may be intermittent or may show up only under specific conditions. These troubles are located by accumulating and analyzing data. The most important source of this data is trouble reports.
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## SECTION 309-400-004

**1.06** ♦There are various techniques that can be used to detect troubles. These are:

- (a) Customer reports—customer detected and reported trouble condition on the network. This is the primary source for trouble detection.
- (b) Pattern analysis—the use of input data to detect and isolate possible trouble conditions (ie, Special Services System (SSS) Analysis Reports).
- (c) Troubles detected automatically by:
  - (1) Continuous monitoring testing—the monitoring and analyzing of network parameters (ie, facility, PBX/CTX and 1/1A ESS alarms and reports).
  - (2) Per-use or per-call testing—the performance and analysis of test calls.
  - (3) Periodic testing—the analysis of automatic or manual test results (routines).
  - (4) ♦NCO access to CACS - for automatic circuit assurance (ACA) reports and the trunk made busy (TMB) list.
  - (5) ♦Network Control Operations Support System (NCOSS)—Data reports and searches to provide message detail recording (MDR) information and other information for trouble analysis use.♦

### B. Terms

**1.07** In developing the trouble reporting section for ETN, certain terms have been used that require definition and explanation. These terms are given in the following paragraphs.

- (a) **Trouble Screening**—This function determines if further maintenance action is required for a reported trouble. This is done by analyzing data to determine if the trouble condition results from circuit or equipment design, customer control actions, or faulty equipment.
- (b) **Network Localization**—This determines the specific network element responsible for the trouble condition.

(c) **Element Sectionalization**—This function refers to the process of determining the individual portion of a network element responsible for a trouble condition. This permits referral to a single entity responsible for clearing the trouble.

(d) **Trouble Clearance**—This signals the termination of the corrective maintenance process related to the trouble report.

## 2. GENERAL RESPONSIBILITIES OF WORK CENTERS

### A. General

**2.01** Trouble indications will come from a wide variety of sources in ETN. In order to properly handle trouble reports and direct the activities associated with operating an ETN, certain responsibilities have been assigned to the various operations control offices serving the network. This section lists these offices and contains some of their responsibilities. More detail can be found in Section 309-400-001.

### B. Network Control Office (NCO)

**2.02** The NCO is responsible for the overall service condition of the network. The responsibilities of the NCO are outlined in the Intercompany Services Coordination Plan, Section 010-520-137, and the Office Responsibilities-Special Services, Section 660-005-011. Some responsibilities of the NCO in addition to those described in these sections are:

- (a) To assist the Customer Administration Center (CAC) in its day-to-day operations by serving as customer interface with the Bell System.
- (b) To accept reports of CAC System (CACS) troubles. Obvious CACS hardware/software troubles will be reported to the Repair Service Bureau/Automated Repair Service Bureau (RSB/ARSB). Detailed CACS trouble reporting procedures are covered in Section 309-400-002.
- (c) To perform network analysis of all services in ETN and initiate corrective action as indicated.
- (d) To assist the Plant Control Office (PCO) in localization of network troubles. This may entail reception of trouble referral, screening,

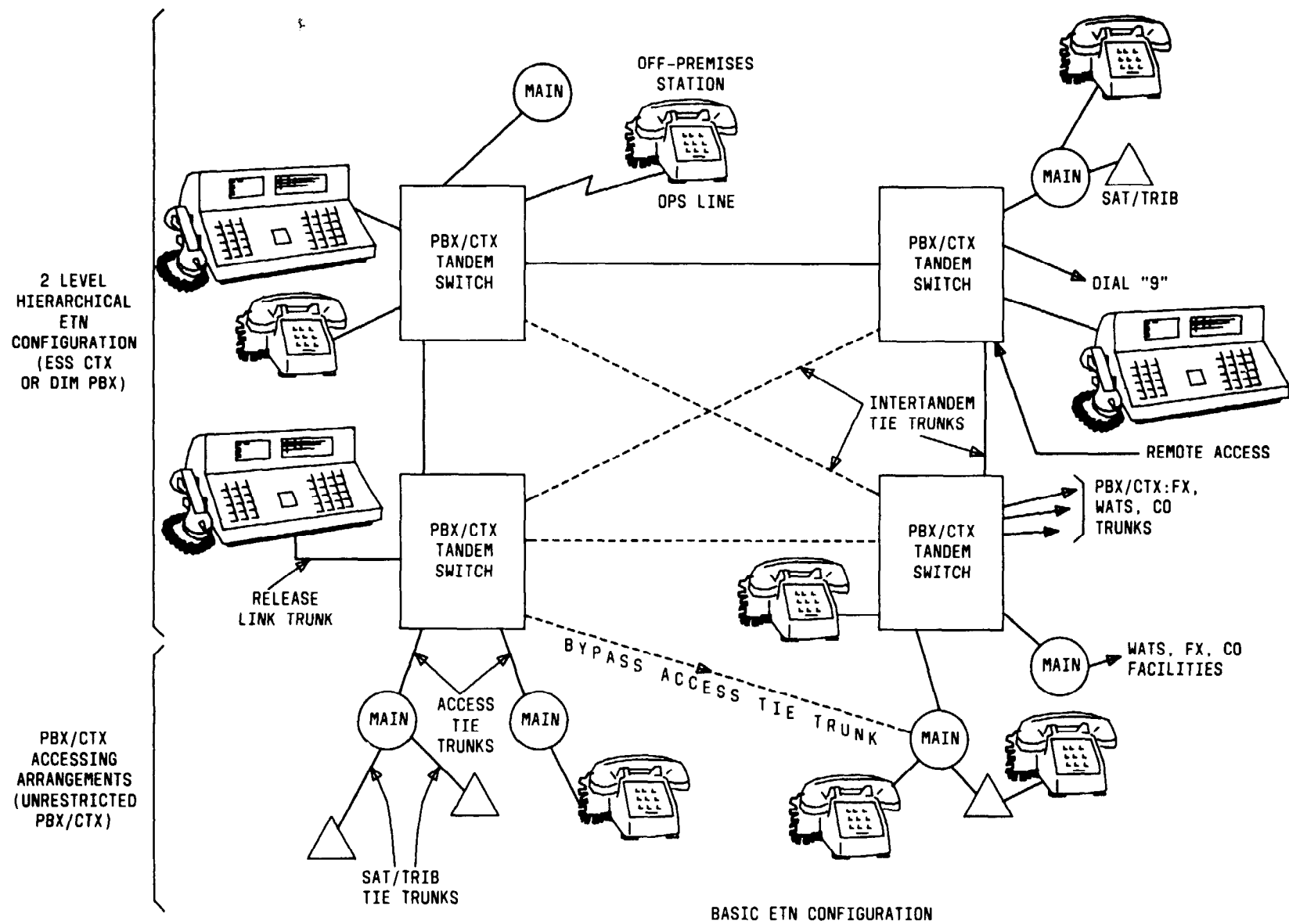


Fig. 1—Basic ETN Configuration

localization, negotiations with customer, referral, follow-up verification of repair and clearance reporting.

**C. Plant Control Office (PCO)**

**2.03** The PCO responsibilities will normally be assigned to the Serving Test Center (STC) or Special Service Center (SSC) serving the PBX/CTX tandem. These responsibilities are outlined below:

- (a) The SSC/STC will be PCO on all access tie trunks terminating in the PBX/CTX tandem.
- (b) The SSC/STC will be PCO on designated intertandem tie trunks terminating in the PBC/CTX tandem.
- (c) The PCO is responsible for both voice and data services.

**2.04** The PCO will have the responsibility for receiving all reports and for clearing all network troubles emanating from the PBX/CTX tandem under its control (Fig. 2). Network troubles are defined as troubles relating to an ETN where the customer has dialed the network access code plus seven or ten digits (ie, 8 + 7D on net calls, or 8 + 10D off net calls, Table A). ♦For initial reports of non-circuit specific troubles, three attempts should be made to duplicate the trouble. Related reports of the same trouble require more extensive investigation. Non-circuit specific troubles should be reported using an administrative circuit number established for this kind of trouble reports.♦

**2.05** The PCO will receive trouble reports from:

- (a) PBX attendants or station users. On circuit troubles detected by the DIMENSION FP8 Automatic Circuit Assurance (ACA) feature, the PBX tandem attendant should verify the trouble condition by use of the trunk verification by console (TV) feature before reporting it to the PCO. No. 1/1A ESS trouble identification may be made from the non-usage trunk scan (NUTS) and locked-up trunk scan (LUTS). ♦These features are only available to the customer via CACS. An FP8 ACA audit trail is also available via CACS (FP8 only).♦
- (b) Referrals from the NCO

- (c) Machine detected trouble reports via a Switching Control Center (SCC)

- (d) Trunk and Facility Maintenance Center (TFMC) on facility problems affecting the ETN

- (e) RSB and DTC associated with the ETN.

**2.06** The maintenance of intertandem tie trunks, access tie trunks, bypass access trunks, WATS and FX circuits requires the provision of test access to aid in the sectionalization and clearance of troubles.

**D. Switching Control Center (SCC)**

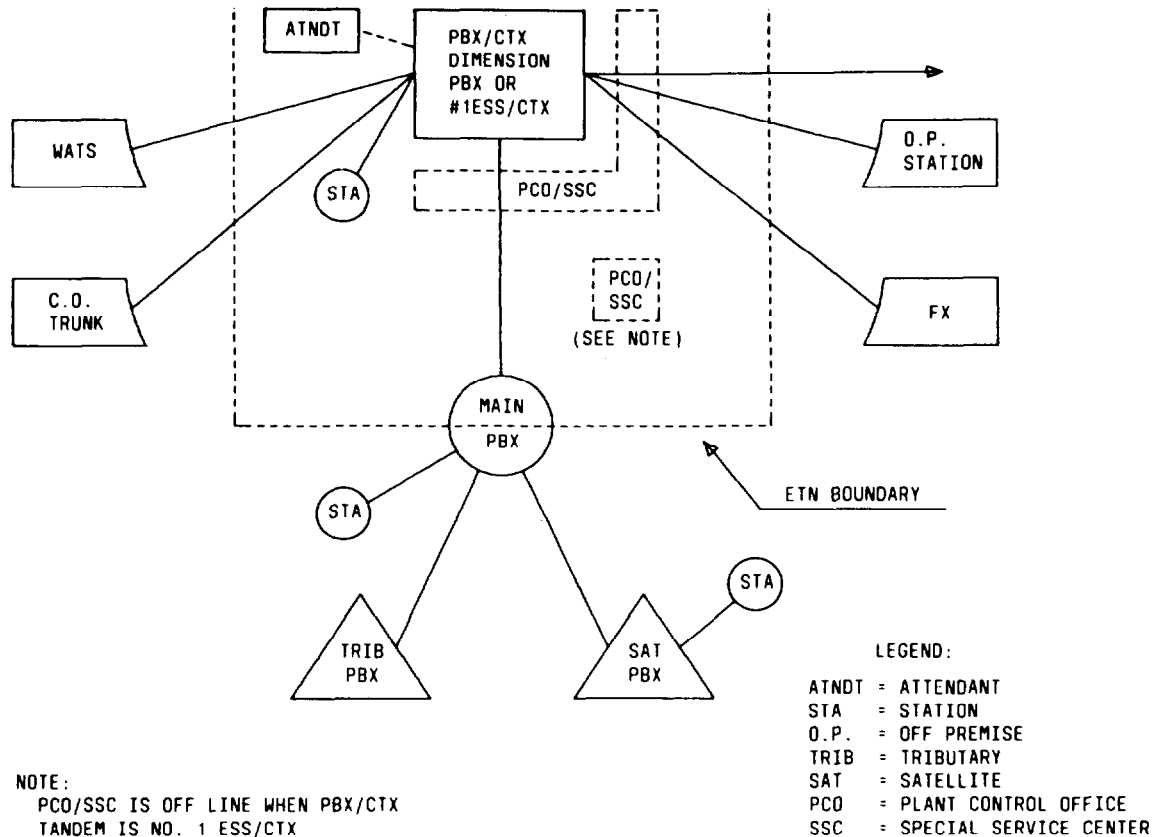
**2.07** The Switching Control Center is a work center providing centralized maintenance and control capabilities for the No. 1 ESS/1E6 (or later) generic associated with ETN. On ETN this center provides a sub-control function. The responsibilities included in this function are as follows:

- (a) To detect trouble conditions on network switches, network features and network trunks
- (b) To receive ESS and other support systems reports for trouble conditions on network elements
- (c) To receive referrals from the PCO concerning repair of network circuits and central office equipment
- (d) To verify machine reported trouble conditions and other referred trouble conditions
- (e) To report clearance of troubles to the PCO on network elements.

**E. Repair Service Bureau**

**2.08** The RSB will support the PCO/NCO on network troubles for voice and data services. The RSB has primary responsibility for receiving station and non-network troubles from the users or attendants.

**2.09** The RSB will use the assistance of the Remote Maintenance Administration and Traffic System (RMATS), when available, to help



**Fig. 2—PCO/SSC Trouble Responsibility for PBX/CTX Tandem Switch**

sectionalize reported troubles on FP8s to specific ETN components.

**2.10** The RSB normally will be responsible for the dispatch of repair forces to the DIMENSION FP8 or subtending PBXs.

**F. Special Service Center/Serving Test Center (SSC/STC) for Customer End (Non-PCO)**

**2.11** These SSCs/STCs (Non-PCO) will be responsible for:

- (a) Maintaining a serving link inventory in Special Services System (SSS) for each circuit (Section 660-225-100)
- (b) Assisting the PCO in circuit order testing, trouble sectionalization and other activities, as directed by the ETN NCO or PCO

(c) Clearing troubles on a serving link or station equipment

(d) Processing trouble tickets referred to it by the NCO or PCO.

In general, Section 660-005-011 applies to these centers.

**2.12** The maintenance plan for access trunks, off premise stations and satellite/tributary tie trunks requires the provision of non-PCO SSC/STC test access. This is to aid in trouble sectionalization and clearance in accordance with the following guidelines:

- (a) SSC switched test access should be provided at the customer end of lines that would normally be routed through an area served by

TABLE A

## REPORTING LOCATIONS FOR NETWORK TROUBLES

TRBL FROM \ TRBL REPORT TO	PLANT CONTROL OFFICE (PCO)	REPAIR SERVICE BUREAU (RSB)	NON-ETN SERVING TEST CENTER (STC)	DATA TEST CENTER (DTC)
PBX/ CTX	8+7D or 10D	All Other		
MAIN	8+7D or 10D	All Other		
SAT/TRIB	8+8+7D or 10D	All Other	8+7D or 10D	
OPX	8+7D or 10D		All Other	
FX			All Reports	
WATS		All Reports		
C.O.		All Reports		
DATA				All Reports

an SSC in accordance with the access point guidelines in Section 667-000-001.

(b) When the STC is involved:

- (1) Test access should be provided at the STC nearest to the customer end of each line that would normally be routed through a city/town having an STC.
- (2) Circuits may not always be routed to an STC when other means of test access are available such as test shoes, jacks at carrier channels or bays, etc, at the toll to local facility interfaces.

### 3. TROUBLE REPORTING PROCEDURES

#### A. General

**3.01** To keep trouble clearing time at a minimum, it is essential that the customer report be referred immediately to the proper work center best able to locate and clear the problem.

**3.02** It is important that the customer know how and where to report troubles. At least two PCO telephone numbers should be provided for trouble reporting. Normal reporting procedures

are for the attendant at the PBX/CTX tandem or subtending PBX to use on-net facilities to the PBX/CTX tandem and then go off-net to the PCO. If it is not possible to use on-net facilities, troubles may be reported using the Message Telecommunications System (MTS). In situations where there is no attendant present, station users may report troubles directly to the PCO. When long distance calls on the MTS are necessary for trouble reporting, collect calls should be accepted by the PCO. When standardized network trouble reporting numbers have been established, arrangements must be made to answer trouble report calls on these numbers at all times. The customer should be instructed to report station and non-network trouble to local repair forces by dialing 611 or equivalent.

**3.03** It is important that all work centers associated with ETN be willing to take any customer trouble report and relay it as necessary. When receiving an erroneously directed trouble report the center should, after taking the report, inform the customer as to the correct reporting procedure and forward the trouble reported to the proper work center.

**3.04** On difficult troubles, the customer may be urged to hold a call for a trace as this will



assist the telephone company in locating these troubles.

**3.05** When NCOSS is available, the PCO should report non-circuit specific and class 2 (SSS) troubles to the NCO for analysis.♦

#### **B. Trouble Conditions**

**3.06** Trouble conditions are divided into two categories; network troubles which involve a network element (network switch, network trunk, access trunk, etc) and non-network troubles which involve a PBX, station set, PBX loop, etc. For station users behind a PBX or tandem, a network trouble is defined as any trouble condition experienced after dialing the network access code (normally "8").

**3.07** Trouble conditions may be reported by the customer, an employee, an operations support system or a network switch. Each of these sources is discussed below.

(a) **Customer Reports**—Trouble conditions may be reported by attendants, station users, or the CAC information, such as calling and called number, approximate time trouble was experienced, symptoms of trouble conditions, etc, should be provided by the source. It is expected that the customer will be the primary source of ETN trouble reports.

(b) **Employee Reports**—Bell System employees are another source of trouble reports. These employees may be operating personnel (testers, repair persons, etc). Employees may detect ETN trouble conditions during maintenance activities (eg, repair). The content of this report should be similar to that of a customer report.

(c) **Operations Support System (OSS) Reports**—These reports are generated by an OSS (eg, CAROT—Centralized Automatic Reporting on Trunks). They include troubles found through continuous observation, periodic testing, and pattern analysis.

(d) **ESS Reports**—The ESS generates numerous reports of trouble conditions. ESS operational test failure reports (eg, TN08s) are generated as a result of an operational test failure on a network trunk, access line, or FX or WATS trunk during a call setup. ESS internal tests

are performed on a demand, continuous, or programmed basis to check the switch performance and are used to discover switch malfunctions.

#### **C. Trouble Indications**

**3.08** Trouble indications will come from a variety of sources in ETN. These sources may be conveniently divided into customer-reported troubles and telephone company-found or automatically detected troubles.

**3.09** The work center is closely involved from reception to closeout for customer-reported troubles. It receives the complaint, screens it, localizes the trouble to a specific element, notifies the customer if repairs will be delayed, verifies restoral and informs customer when repair is completed.

**3.10** When telephone company-found or automatically detected troubles are involved the NCO usually has a limited role. The NCO is available to assist other centers in trouble localization revealed by its pattern analyses.

**3.11** There may be times when problems are caused by station user error. These problems are normally detected by local PBX attendants. However, the PCO must be prepared to recognize and handle complaints caused by user errors. These trouble reports should be classified as customer action.

#### **D. Trouble Localization**

**3.12** When the work center has determined that a valid trouble exists, it will localize the trouble, effect repair and close out the trouble ticket. When persistent network troubles are not located, the NCO may coordinate the testing activities among the work centers.

**3.13** ♦For non-circuit specific troubles: Three attempts should be made to duplicate the trouble. If the trouble cannot be duplicated, the trouble ticket can be closed as "test okay (TOK)."

#### **E. Deferred Trouble Clearance**

**3.14** If NCOSS is available, the PCO should attempt to duplicate the trouble three times and then refer the trouble to the NCO. The NCO will access NCOSS for a MDR trace.♦

**3.15** Deferred trouble clearance permits the PCO or NCO to defer repair action under certain conditions. The following describes the criteria for trouble clearance:

- (a) If the customer requests repair, there is no deferred clearance.
- (b) If the trouble can be cleared without dispatching, there is no deferred trouble clearance.
- (c) Significant outages affecting a large number of circuits in a network or the inability of a location to access or receive communications from the network should be cleared as promptly as possible.
- (d) Except for those conditions described in (a), (b), and (c), all troubles occurring outside the normal business day (NBD) may be deferred for clearance to the next NBD. (A NBD is usually considered to be Monday through Friday, excluding national holidays, 8:00 AM to 5:00 PM local time). Deferred trouble clearance must have the concurrence of the customer.
- (e) Customer rebate must be rendered for the entire outage even though maintenance was deferred.

**3.16** The following is an example of deferred maintenance:

- (a) Failure occurs at 9:00 PM on Wednesday night
- (b) Repair ♦deferred♦ until 8:00 AM on Thursday morning with customer's consent
- (c) Service is restored at 10:00 AM Thursday morning
- (d) Rebate is rendered from 9:00 PM Wednesday night until 10:00 AM Thursday morning. The outage is 13 hours. ♦However, SVB clearing time (SSS plan) shows two hours.♦

#### F. Trouble Clearing

**3.17** A trouble is reported on a network element to the PCO. The trouble is verified, service protection is initiated if required; the trouble is sectionalized and repairs are initiated. These reports

will be logged on the SSS Trouble Ticket E-6944. This form is described in Section 660-225-104. ♦SSS plan class of service 14 covers ETN circuits.♦

**3.18** Referrals for repairs may be to the Facility Control Office/Trunk and Facilities Maintenance Center (FCO/TFMC) for facility failures. Status and completion of repair must be reported by the FCO/TFMC to the PCO.

**3.19** The PCO may refer a trouble to the RSB for repair when the loop or customer station is involved. The RSB dispatches the repair forces and reports status and final repair to the PCO. In some cases, the PCO may direct repair forces who will report directly to them. The RSB is responsible for dispatching repair forces in maintenance of the DIMENSION FP8 switch.

**3.20** If the trouble condition involves a No. 1/1A ESS switch or CO-CO network trunk, the trouble is referred by the PCO to the SCC or central office which will function as a Sub-Control Office (SCO). The ♦SCO♦ will verify and sectionalize the trouble and maintain a progress log of the repair status. The trouble will be referred to the responsible repair forces for clearance. The SCO will monitor the trouble clearing process and report status and clearance to the PCO.

**3.21** When the network element is returned to the customer for use, the trouble report is closed out. The clearance report should be verified by the PCO.

#### 4. OTHER COMMON CARRIER (OCC)

**4.01** In an ETN environment, there may be a mix of Bell and OCC circuitry. This will mean a fragmentation of maintenance responsibilities on the network. Before assigning responsibilities for operation centers in this environment, the Bell System 471 division—Special Services—Other Common Carrier, should be reviewed.

#### 5. RELATED BELL SYSTEM PRACTICES

**5.01** The following Bell System Practices are related to this section.

SECTION	TITLE
010-520-137	Intercompany Service Coordination Plan

SECTION	TITLE	SECTION	TITLE
309-400-000	ETN General Description	309-400-300	Service Maintenance
309-400-001	General Procedures and Responsibilities	660-005-011	Office Responsibilities—Special Services
309-400-002	CAC/CAP/LCAS	660-225-1XX	Special Service System
309-400-005	Network Analysis	667-000-001	Switched Maintenance Access System (SMAS)
309-400-007	Network Identification		