

NO. 1 ELECTRONIC SWITCHING SYSTEM APPLICATION
TN08 MESSAGES ANALYSIS PROCEDURES
NO. 2 SWITCHING CONTROL CENTER SYSTEM
OPERATION, MAINTENANCE, AND ADMINISTRATION

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1. GENERAL

1.01 This section gives guidelines for monitoring, controlling, and analyzing trunk, transmitter, and receiver failures reported in TN08 messages. TN08 messages are real-time reports of outgoing or incoming calls that fail for reasons other than network blockage.

1.02 This section is being expanded to include changes caused by No. 2 Switching Control Center System (SCCS) Generics 4 and 5. This section now covers Generics 2, 3, 4, and 5. Additional changes in the suggested procedures for setting multiple message threshold (MMT) parameters and responding to analysis reports are also included. Since this reissue is a general revision, no revision arrows have been used.

1.03 The title for each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

1.04 Recommendations for changes, additions or deletions to this section should be forwarded on Form E-3973 and as specified in Section 000-010-015.

1.05 Two types of TN08 message analysis are performed by the No. 2 SCCS:

(a) MMT analysis is performed in real time as the TN08 messages are received. The TN08 messages generate exception reports on those trunks and service circuits which experience a higher than normal call failure rate. This analysis is intended for use in protecting service.

(b) TN08 Batch Analysis is a scheduled, longer term analysis which generates a hard-copy summary of those trunks, trunk groups, and service circuits which received excessive failure implications by TN08 messages during the analysis period. This analysis is intended for use in improving service.

1.06 The purposes of this section are to:

- (a) Describe TN08 MMT and Batch Analysis algorithms and reports, and the role of each type of analysis in the overall trunk maintenance job.
- (b) Give procedures for setting thresholds and adjusting schedules for these analyses
- (c) Give procedures for processing analysis reports.

1.07 Information Letter/System Letter 78-11-036 (available as Section 190-130-200 by the 4th quarter of 1980) gives recommended procedures for the overall trunk maintenance job at the SCC. The general trouble analysis information for centralized trunk operations is also included in Section 190-130-200.

1.08 Detailed guidelines are given for the following procedures:

- (a) Responding to TN08 MMT Analysis reports
- (b) Processing TN08 Batch Analysis reports.

1.09 This section specifically refers to analysis of incoming and outgoing call failures. Transmitters, receivers, incoming, outgoing, and 2-way trunks are implicated.

1.10 Abbreviations used in this section are explained in Part 5.

2. ADMINISTERING THE ANALYSIS

2.01 This part provides general descriptions of the TN08 MMT and Batch Analysis algorithms and the reports generated by these analyses. Guidelines are provided for setting TN08 analysis-variable parameters (thresholds, list sizes, etc) and establishing the TN08 Batch Analysis schedule.

TN08 MMT ANALYSIS ADMINISTRATION

A. General Administration

2.02 MMT analysis is performed on all TN08 messages received on TTY channels for which alerting is required. The algorithm used is common to all MMT analyses and is described in

the No. 2 SCCS Common Program Application, Alerter Section.

2.03 In No. 2 SCCS Generics 2 and 3, four categories have been established for TN08 MMT analysis:

- (a) Incoming trunks
- (b) Outgoing trunks
- (c) Transmitters
- (d) Receivers.

Note: A 2-way trunk is viewed, for the purpose of analysis, as the combination of an outgoing trunk and an incoming trunk.

2.04 Associated with each category is a list of the units presently undergoing analysis. Since each TN08 message implicates both the trunk and the service circuit used in the call attempt, each message causes entries to be made on two MMT analysis lists. For example, a TN08 reporting an outgoing failure would cause an entry to be made on the outgoing trunks list and another entry to be made on the transmitters list. Furthermore, a 2-way trunk which is failing in both directions simultaneously may have two separate analysis list entries and thus may be reported separately for each direction of failure.

2.05 In Generics 4 and 5, one category has been established for TN08 MMT analysis. This one category contains four types:

- (a) Incoming trunks
- (b) Outgoing trunks
- (c) Transmitters
- (d) Receivers.

In this case, 2-way trunks are viewed as single trunks.

2.06 Associated with the category is a list that is used by all four types of units undergoing analysis. Since each TN08 message implicates both the trunk and the service circuit used in the call attempt, each message causes two entries to be made on the one MMT category analysis list.

Caution: For 2-way trunks, failures in either direction will contribute to a single failure count. The analysis type (ICT or OGT) is determined by the direction of the most recent failure.

2.07 When it is determined that a certain trunk or service circuit has been implicated by an excessive number of TN08 messages in a specified time interval, an exception report is displayed on the alarm monitor (Fig. 1 and 2). The exception report identifies the circuit being reported, the type of circuit, and the rate at which TN08 messages implicating the circuit are being received.

2.08 TN08 MMT analysis should be used primarily for service protection as it is very limited in use for service improvement. Service protection is the quick detection of hard faults on trunks and service circuits. A more effective means of service improvement (Batch Analysis) is considered in this part under TN08 Batch Analysis Administration.

B. MMT Parameters

2.09 Associated with TN08 MMT analysis are parameters which control the sensitivity (eg, thresholds and time limits), the audible alarm levels associated with the exception reports, and the number of circuits (list size) in each analysis category which can be analyzed simultaneously. The values of the parameters are established and controlled by the Operating Telephone Company (OTC) using the RC:MMT message found in the No. 2 SCCS Input Manual.

2.10 A complete list of the per office parameters controlled by the OTC is as follows:

GENERIC 2 AND 3

- (a) List size
- (b) Message threshold count
- (c) Message threshold time limit
- (d) Alarm level
- (e) Overflow threshold count
- (f) Overflow threshold time limit.

GENERIC 4 AND 5

- (a) List size
- (b) Message threshold count, first level
- (c) Message threshold count, second level
- (d) Message threshold count, repeat levels
- (e) Message threshold time limit
- (f) Alarm level, first level threshold
- (g) Alarm level, second level threshold
- (h) Group threshold
- (i) Group repeat threshold
- (j) Alarm level, group threshold
- (k) Overflow threshold count
- (l) Overflow threshold time limit
- (m) Alarm level, overflow threshold.

2.11 Default values for the MMT parameters are provided in the No. 2 SCCS generic program. These values should usually be considered appropriate for a typical No. 1 ESS, but the default values provided in the initial issue of No. 2 SCCS, Generic 2, are incorrect and will result in numerous unproductive reports. In general, the setting of MMT parameters should be considered on an **office by office** basis to ensure that the most appropriate values are obtained. Techniques for making this determination are provided in the following paragraphs.

C. Reviewing MMT Parameters

2.12 The primary purpose of the TN08 MMT analysis is the quick detection of hard faults on trunks and service circuits so that appropriate service protection action can be taken. For TN08 MMT analysis to effectively accomplish this task, it is necessary that proper values be established for the analysis parameters. The determination of proper analysis parameter values require that a careful balance be made between the quality of service provided to the customers and the amount of effort spent processing the analysis reports.

The following paragraphs provide guidelines for initially balancing these two factors.

2.13 To minimize the backlog of hard-fault circuits with high failure rates, an SCC should:

- (a) Use MMT analysis with reasonable thresholds to identify only those circuits having high failure rates
- (b) Take service protection action, and repair reported troubles as they occur.

Note: If an office still has a TN08 rate higher than its objective after (a) and (b), it is usually the result of circuits with persistent, intermittent troubles. These circuits may pass repeated diagnostics but still produce a significant number of failures in a 24-hour period. This type of trouble should be identified by TN08 Batch Analysis methods. (See Part 4.) Attempting to find this type of trouble by using low thresholds on MMT analysis is usually impractical and uneconomical.

2.14 Setting thresholds to their lowest possible values will not necessarily provide the best quality of service to the customers. Intuitively, it seems that, the best service is provided with the lower threshold since hard faults are reported at the earliest possible moment. This logic assumes, however, that (1) only hard faults are reported and (2) that each exception report will be processed as soon as it is displayed on the alarm monitor.

2.15 The first assumption, that only hard faults are reported, is not a valid one. The volumes of exception reports and the percentage of productive reports (hard faults) are very sensitive to threshold variations in the range of two through six. If the thresholds are set too low, numerous unproductive exception reports will be generated, making it difficult to identify the productive reports and reducing the maintenance personnel's confidence in the MMT analysis. In most cases, at least 75 percent fewer exception reports will be received at a threshold of six than at a threshold of two. Furthermore, the portion of exception reports which are productive is well over twice as high at a threshold of six than at a threshold of two.

2.16 The second assumption that each exception report will be processed as soon as it is

displayed on the alarm monitor is not valid. Realistically, the maintenance personnel cannot begin processing a new exception report until after completing the reports already in process. Thus, there is some delay from the time the exception report is displayed until processing of the report by maintenance personnel actually begins. If the trunk implicated in the exception report is truly a faulty trunk, call failures continue to accumulate on this trunk during the delay.

2.17 Figure 3 illustrates the actual service impact of hard faults for a range of threshold values. As the threshold is increased from two through six, more call failures are accumulated on a hard fault before it is reported. However, the lowered volume of exception reports makes it possible for the TN08 analyzer to respond more quickly. The quick response results in an overall reduction in the service impact of the hard faults. As the threshold is increased past six, the TN08 analyzer's response is almost immediate. However, the increasing number of call failures required to report a hard fault causes the overall call failure rate to increase.

2.18 In the preceding example, a threshold value of six optimizes the service being provided to the customers. Of course if sufficient personnel are added to process all exception reports as they occur, improved service can be realized but with increased labor costs. The threshold values in this section are recommended as the most efficient and usually the most practical values.

2.19 It should also be noted that the person responsible for processing TN08 MMT analysis exception reports must typically respond to the reports of several offices. Therefore, threshold values chosen for a particular office affect the time available for other offices and, unless more personnel are assigned, the quality of service provided in other offices is affected.

2.20 The purpose of this discussion has been to show that setting TN08 MMT analysis threshold values is not a simple or straightforward task. It is a problem which must be approached systematically with consideration for all factors that are affected by threshold changes.

D. Initial Setting and Adjusting of MMT Analysis Parameters

Initial Setting of TN08 MMT Thresholds and Time Windows for Outgoing and Incoming Trunks and Service Circuits

2.21 The following observations should govern the setting of TN08 MMT thresholds for outgoing and incoming call failures:

- (a) In a typical No. 1 ESS, the majority of the TN08 messages will result from causes other than hard faults on trunks.
- (b) Hard faults on trunks occur at a fairly slow rate (usually one to four faults per office per day).

2.22 It is recalled that the principal strength of the TN08 MMT analysis is the detection of hard faults. Based on the above observations, it is futile to try to use MMT analysis exception reports to track every TN08 message. In general, the MMT analysis threshold levels should be chosen with the following objectives in mind.

- (a) There should be at least a 50 percent chance for each office that an alarm monitor exception report represents a verifiable trouble.
- (b) The total volume of exception reports should not exceed the ability of the available personnel to respond.
- (c) Sufficient personnel should be assigned to meet service objectives.

2.23 The values selected for a particular office should depend primarily upon that office's incoming and outgoing call failure rates (ie, receiver and transmitter timeouts per 10K calls). Table A should be used to establish the threshold values for each office in an SCC. These values will achieve objectives (a), (b), and (c) in most cases, while providing the necessary service protection against hard faults. The use of thresholds lower than those given in Table A will result in an unproductive use of personnel and may result in worse service for the customers.

2.24 In Generics 4 and 5 group thresholding is done for the outgoing and incoming trunk types in the TN08 category. The default value

for the group threshold is set at four and the group repeat threshold at six. This means that any time a trunk group has four of its members on the TN08 category list, a group threshold exception report will occur. If additional failures for any six trunks in the same group happen, a group repeat threshold exception report will occur. If too many groups are being falsely reported, increase the thresholds. If too many group troubles are being missed, decrease the thresholds. Example reports are shown in Fig. 2.

2.25 Group and group repeat thresholds do not account for variation in group size. The user should determine the average group size for the office and then adjust the thresholds to properly detect group troubles on average size groups. Groups significantly larger than average may be falsely reported and those significantly smaller may experience group troubles that go undetected.

2.26 In addition, Generics 4 and 5 have three types of repeat threshold exception reports (high, medium, and low). The repeat threshold exception report provides an indication that the unit being reported has already been reported for exceeding a first or second level threshold and an **additional** quantity of failures has occurred. The additional quantity of failures required is defined by the repeat threshold. The high, medium, or low indicates the **rate** at which the additional quantity of failures occurred. The high, medium, or low rates are defined as follows:

- High—the additional failures occurred at a rate that is more than the minimum rate of failures required to reach a second level threshold.
- Medium—the additional failures occurred at a rate that is less than the minimum rate of failures required to reach a second level threshold, but more than the minimum rate of failures required to reach a first level threshold.
- Low—the additional failures occurred at a rate that is less than the minimum rate of failures required to reach a first level threshold.

Examples of the three types of repeat threshold exception reports are also shown in Fig. 2.

2.27 The primary use of the repeat level MMT alarm is to remind that a circuit is still failing after it was initially reported by a first or second level MMT alarm. A secondary use of the repeat level MMT alarm is as an indication that the craft are becoming overloaded with alarms. The repeat level MMT alarm should not normally occur. The failing trunk should have been responded to when it was reported as a first level MMT alarm, under normal failure rate conditions, or a second level MMT alarm, if the failure rate is above normal. If repeat level MMT alarms are occurring often, under other than short interval temporary alarm overload conditions, the MMT parameters or work force may need to be adjusted. (See paragraph 2.33.)

Initial Setting of TN08 List Size, Overflow Threshold Count, and Overflow Threshold Time Limit

2.28 A fixed length list of items presently undergoing analysis is maintained for each TN08 MMT analysis category. The length specified for this list controls the number of similar units in each office that can be analyzed simultaneously. The MMT analysis monitors the correctness of the list sizes by computing the rate at which units having a failure count of one are bumped from the list. When this rate exceeds the overflow threshold within the overflow threshold time limit, an exception report is displayed on the alarm monitor. The format is shown in Fig. 4 and 5.

2.29 An excessive number of overflow threshold reports can indicate one of the following:

- (a) A failure has occurred which affects a large number of similar units. An example is an equipment trouble that affects an entire trunk group.
- (b) The identified list is too small so enough time is not allowed for a unit to reach its threshold before being bumped.
- (c) Unreasonable levels are set for the overflow threshold count, overflow threshold time limit, or both.

2.30 The following considerations should govern the setting of TN08 MMT analysis list sizes and overflow thresholds.

- (a) List sizes should be governed by the number of trunks served by the office.

(b) Lists for service circuits should be smaller than for trunks because an office has less service circuits than trunks (applies to Generics 2 and 3 only.)

(c) The overflow threshold for this type of MMT analysis should be set equal to the list size.

(d) The overflow threshold time should be set equal to the average time between failures required for the units being analyzed to reach a first level threshold. This time is referred to as the mean interarrival time (MIT) and is calculated using the following formula. Since a single list is used for all four categories in Generics 4 and 5, the overflow threshold time should be set equal to MIT calculated for OGT (see paragraph 2.06).

$$\frac{\text{First Level Threshold Time}}{\text{First Level Threshold Count} - 1} = \text{MIT}$$

2.31 By setting the overflow threshold count and overflow threshold time limit as explained in (c) and (d) in paragraph 2.30, any circuit failing at or above the first level threshold rate will do one of the following:

- (a) Remain on the list long enough to reach the first level threshold
- (b) Generate an overflow exception report which indicates the list is turning over too fast to allow failing units to stay on the list long enough to reach a first level threshold.

2.32 Tables B, C, and D present the recommended list sizes, overflow threshold counts, and overflow threshold times for each TN08 MMT analysis category.

Note: If Enhanced Private Switched Communications Service (EPSCS) and/or Electronic Tandem Service (ETS) are not provided by the ESS office, zero the list size for these MMT analyses to make more list entries available for use on other MMT lists (Generics 4 and 5).

Adjusting MMT Parameters

2.33 If the MMT parameters shown in Tables A, B, C, and D are not producing the desired results, the parameter should be changed. Figure 6 is a guide to identify the proper action to be taken. Use the following steps when working with Fig. 6.

- (a) Track the following items:
- (1) Quantity of alarms
 - (2) Diagnostic failure rate of TN08 MMT exception reports
 - (3) Service index (time-out components)

Note: Items 1 and 2 can be tracked using the TN08 MMT log.

- (b) Identify the item that is making the TN08 analysis ineffective. Verify that the item is constantly occurring, two or three days, and not just a momentary effect.
- (c) Perform the action specified in Fig. 6.
- (d) Change the overflow threshold and overflow threshold time so they meet the requirements in paragraph 2.30 (c) and (d).
- (e) Again, track the items listed in Step (a).
- (1) If the TN08 MMT analysis is working correctly, STOP.
 - (2) If not, return to Step (b).

TN08 BATCH ANALYSIS ADMINISTRATION**A. General Description**

2.34 TN08 Batch Analysis is a scheduled analysis of the TN08 messages outputted by a No. 1 ESS during a specified time interval. The Batch Analysis algorithm (Fig. 7 and 8) performs a three stage decision process on all TN08 messages received from the office during the specified interval.

2.35 In Generics 2 and 3, after assembling the TN08 messages into an analysis file, the number of TN08 implications against each trunk is

computed. All trunks whose TN08 count exceed their appropriate thresholds are reported, and all TN08 messages implicating these trunks are deleted from the analysis file. Using the remaining messages, the TN08 failure count against each transmitter and receiver is computed, and those with counts above their threshold are reported. Again, all TN08 messages implicating the reported transmitters and receivers are deleted from the analysis file. Finally, the TN08 count against each trunk group is computed and those groups exceeding their threshold are reported.

2.36 In Generics 4 and 5, after assembling the TN08 messages into an analysis file, the number of TN08 implications against each trunk group is computed. All trunk groups whose TN08 count reached their appropriate thresholds are reported, and all TN08 messages implicating these trunk groups are deleted from the analysis file. Using the remaining messages, the TN08 failure count against each trunk is computed, and those reaching their threshold are reported. Again, all TN08 messages implicating the reported trunks are deleted from the analysis file. Finally, the TN08 count against each transmitter and receiver is computed and those with counts that reach the thresholds are reported.

2.37 Generic 4, before point issue 5, can cause numerous unproductive trunk group reports. Generics 4.5 and later will correct this problem. Refer to No. 2 SCCS Program Application Instructions, Analysis Section, (No. 1 ESS Application) for specific details on TN08 Batch Analysis for trunk groups. Refer to paragraph 2.48 for information on the initial setting and adjustment of the trunk group threshold.

2.38 In all generics, for each reported unit, the analysis report identifies the unit (TNN or TGN). The TN08 failure count against the unit is given in the analysis report with other descriptive information about the unit. Examples of the TN08 Batch Analysis report are shown in Fig. 9 and 10.

2.39 TN08 Batch Analysis should be used primarily as a tool for *service improvement* (ie, identification of persistent troubles in the office). To fully use Batch Analysis for service improvement for Generics 2 and 3, trouble history information must be added manually to the Batch Analysis report. A description for manually adding the information is located in paragraph 4.03.

2.40 For Generics 4 and 5, the trouble history information is automatically printed on the Batch Analysis output (see Fig. 10).

B. TN08 Batch Analysis Parameters

2.41 TN08 Batch Analysis has parameters for which values can be entered by the OTC. These parameters include the scheduling of the Batch Analysis and the threshold used by the algorithm. A complete list of the OTC controlled parameters associated with TN08 Batch Analysis for Generic 4, issue 4 and earlier generics is given below:

- (a) Schedule for running Batch Analysis
- (b) Outgoing trunk threshold
- (c) Incoming trunk threshold
- (d) Transmitter threshold
- (e) Receiver threshold
- (f) Outgoing trunk group threshold
- (g) Incoming trunk group threshold.

2.42 Listed below are the OTC controlled parameters associated with TN08 Batch Analysis for Generic 4, point issue 5, and later generics.

- (a) Schedule for running Batch Analysis.
- (b) Outgoing trunk threshold.
- (c) Incoming trunk threshold.
- (d) Transmitter threshold.
- (e) Receiver threshold.
- (f) Required number of trunks with TN08 failures to implicate an outgoing trunk group containing 20 trunks. This parameter is called IMP/20 (Read '/' as 'per').
- (g) Maximum number of trunks with TN08 failures required to implicate any size outgoing trunk group. This parameter is called MAX-IMP.

(h) Required number of TN08 failures per 10 failing trunks in an outgoing group to implicate the trunk group. This parameter is called CNT/10 (Read '/' as 'per').

- (i) IMP/20 for incoming trunk groups.
- (j) MAX-IMP for incoming trunk groups.
- (k) CNT/10 for incoming trunk groups.

2.43 Default values for the Batch Analysis thresholds are provided in the No. 2 SCCS generic, but the schedule for running Batch Analysis must be specified by the OTC. The following paragraphs provide guidelines for scheduling the analysis and for adjusting Batch Analysis threshold values.

C. Initial Setting and Adjusting of Batch Analysis Parameters

2.44 If parameters are adjusted properly, Batch Analysis will be inherently more sensitive to the more subtle troubles than MMT analysis.

2.45 The values of the Batch Analysis parameters can be controlled by the OTC using the RC:THRESH message described in the No. 2 SCCS Input Manual.

2.46 TN08 Batch Analysis should be scheduled to run daily, preferably sometime during the interval from 12 midnight to 5:00 am. The impact of the analysis on CRT terminal response is minimized during these hours. Commands required to establish such a schedule using the RC:SCHED message are found in the No. 2 SCCS Input Manual.

2.47 Table E presents the TN08 Batch Analysis thresholds recommended for use in all offices. It may be desirable to adjust these levels to optimize effectiveness of Batch Analysis. It is suggested that these thresholds not be adjusted below the recommended values. The threshold should be raised if it is found that many of the implicated units have already been reported by MMT. The threshold should be lowered if the Batch Analysis report is small and the TN08 component objectives of the No. 1/1A NSPMP are not met. These values assume that the Batch Analysis is scheduled daily as recommended in paragraph 2.46.

2.48 Generic 4, before point issue 5, can cause unproductive trunk group reports because the trunk group analysis only requires two trunks, with sufficient TN08 failures, to implicate the trunk group. Therefore SCCs with Generic 4, before point issue 5, should set the trunk group threshold to 30 for outgoing and incoming call failures. Normally this setting will prevent two failing trunks from implicating a trunk group. If trunk groups are still being erroneously implicated, increase the trunk group threshold to more than 30. If trunk group troubles are being missed, decrease the trunk group threshold to less than 30.

2.49 Generic 4, point issue 5, and later generics will correct the problem of having trunk groups falsely implicated by doing the following.

- (a) Making the number of trunks with TN08 failures required to implicate a trunk group dependent on the number of failing trunks
- (b) Making the number of failing trunks required to implicate the group depended on trunk size.

These characteristics are controllable using the previously mentioned user specified trunk group parameters (IMP/20, MAX-IMP, CNT/10).

2.50 The number of trunks with TN08 failures required to implicate a trunk group will be automatically adjusted. The adjustment is made according to the size of the particular trunk group under analysis, given the specification for a trunk group size of 20 trunks (IMP/20). IMP/20 is a user controlled parameter with a default value of four. Table F shows the number of failing trunks required over the range of trunk group sizes for those values of IMP/20 from which the user can select. If it is determined that the resulting range of values does not 'fit' the other trunk group sizes well, then IMP/20 should be readjusted for the best fit.

2.51 The number of TN08 failures needed to implicate a trunk group will be automatically adjusted. The adjustment is made according to the number of failing trunks in the group under analysis, given the specification for 10 failing trunks (CNT/10). CNT/10 is a user controlled parameter with a default value of 15. Table G shows the number of failures needed over the range of failing

trunks for those values of CNT/10 from which the user can select.

2.52 A third user specified parameter labeled MAX-IMP is used to limit the maximum number of trunks with TN08 failures required to implicate a trunk group. The effect of setting MAX-IMP equal to 10 is illustrated in Table F. This parameter is used to prevent the number of trunks with TN08 failures required to implicate a trunk group from becoming too large for very large size trunk groups.

3. RESPONDING TO TN08 MMT ANALYSIS REPORTS

3.01 When a TN08 MMT analysis exception report is displayed on the alarm monitor, the responsible personnel should quickly attempt to make the unit busy and then enter on the TN08 MMT LOG. They should verify the existence of a trouble on the reported unit. If a trouble is verified (when the unit fails the second diagnostic) a trouble ticket should be issued against it. The specific actions required to verify a trouble vary according to the type of unit being reported. The following paragraphs provide detailed procedures for responding to TN08 MMT analysis exception reports. Flowcharts summarizing these procedures are given in Fig. 11 through 14. A blank TN08 MMT LOG form is attached to the back of this section. It is provided as a master for reproduction purposes.

Note: Throughout these procedures it is assumed that the guidelines for setting TN08 MMT analysis parameters have been followed as given in Part 2 (D. Setting and Adjusting MMT Parameters under TN08 MMT Analysis Administration).

A. Response to Exception Reports (Outgoing Trunks and Service Circuits)

3.02 When a TN08 MMT analysis exception report implicating an outgoing trunk, transmitter, or receiver is displayed on the alarm monitor, the following procedure should be followed. This paragraph is summarized in Fig. 11.

(1) Basic Response:

- (a) Make the reported unit busy and request that the regular diagnostic test be run. Enter on TN08 MMT LOG (Fig. 15)

- (b) Continue response based on diagnostic result:

Diagnostic Passed: Go to (2)

Diagnostic Not Available: Go to (2)

Diagnostic Blocked: Go to (3)

Diagnostic Failed: Go to (4).

- (2) Diagnostic Passed or No Test Available:

- (a) Generics 2 and 3: If the failing circuit has reached the first level threshold in less than 30 minutes or is being reported for reaching the first level threshold for the second time today, continue to (b). If not, go to (e).

Generics 4 and 5: In addition to the above, if the circuit has reached the second level threshold or is a repeat threshold report, continue to (b). If not, go to (e).

- (b) If possible, run a repeat diagnostic test on the circuit. If the diagnostic passes, filter the TN08s and analyze for the source of trouble. Also check the Automatic Test Table (ATT) to see if proper test is run. See Note 1 on Fig. 11.

- (c) Leave the circuit out of service and issue a trouble ticket for the circuit. Make a note on the ticket indicating why the circuit was taken out of service. If a repeat diagnostic test was run, the note should contain the result.

- (d) Route the trouble ticket to trunk test. END.

- (e) Restore the unit to service. It should be assumed that the circuit was falsely implicated by MMT analysis. If the unit continues to fail in service, additional MMT reports may be generated or the unit may be detected via the trouble history on Batch Analysis. END.

- (3) Diagnostic Blocked:

- (a) If the diagnostic on this unit has been blocked at least three times in an 8- to

10-minute period, go to (4). Otherwise, continue.

- (b) The diagnostic should be retried. Go to (1).

- (4) Diagnostic Failed:

- (a) For all units, except Switched Special Services (SSS) trunks, leave the unit out of service. Do not generate a trouble ticket at this time since the failure could be caused by temporary conditions which will be detected and cleared by other maintenance forces. The retest time should be approximately one hour from the original time of failure. If the unit is SSS trunk, this includes EPSCS and ETS trunks, priority treatment should be given to the unit. Do not delay one hour before originating a trouble ticket.

- (b) At the specified retest time, request that the regular diagnostic test for the unit be run.

- (c) Continue response based on diagnostic result:

Diagnostic Passed: Go to (d)

Diagnostic Blocked: Go to (f)

Diagnostic Failed: Go to (f).

- (d) Restore the unit to service.

- (e) Enter retest result on TN08 MMT log and close the entry against the unit. Also record the appropriate outage on the Trunk Outage Log (E-4255). END.

- (f) Leave the circuit out of service and issue a trouble ticket against it. Enter the trouble number from the TN01 message on the trouble ticket and on the TN08 MMT log.

- (g) Route the ticket to trunk test. END.

B. Response to Exception Reports (Incoming Trunks)

- 3.03** The proper response to TN08 MMT analysis exception reports for incoming trunks is not

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the same as for other units. Two primary reasons are:

- (a) The maintenance of incoming trunks is controlled by the originating office.
- (b) The value of diagnostic results of incoming trunks is limited since only the incoming trunk is tested, not the end-to-end trunk.

3.04 The following procedure should be used for responding to MMT analysis exception reports on incoming trunks. This procedure is summarized in Fig. 12.

(1) Basic Response:

- (a) Consult TN08 MMT LOG to determine if a trouble ticket against the trunk is presently outstanding.
- (b) Continue response based on findings as follows:

No Trouble Ticket Outstanding: Go to (2)

Trouble Ticket Outstanding: Go to (3).

(2) Response When No Trouble Ticket is Outstanding:

- (a) Issue a trouble ticket against the trunk and make entry on TN08 MMT LOG.
- (b) Inform the originating office of the trouble and request that they remove the trunk from service.
- (c) When the trunk is made busy from the originating end, run the regular diagnostic test.
- (d) Continue response based on diagnostic result.

Diagnostic Passed: Go to (e)

Diagnostic Not Available: Go to (e)

Diagnostic Blocked: Go to (f)

Diagnostic Failed: Go to (h).

(e) Inform originating office that troubleshooting should continue from their end. Treat the trouble ticket as a referral ticket. END.

(f) If the diagnostic on this trunk has been blocked at least three times in an 8- to 10-minute period, go to (h). Otherwise, continue.

(g) The diagnostic should be retried. Go to (c).

(h) If the diagnostic failed, enter the trouble number from the TN01 message on the trouble ticket and route the ticket to dispatch.

(i) Request that the originating office leave the trunk out of service until the repair activity is completed. END.

(3) Response When Trouble Ticket is Still Outstanding:

(a) Escalate and/or refer to supervision.

(b) Inform the originating office that the trunk has been disabled.

(c) Go to (2) (b).

C. Response to Group and Group Repeat Threshold Exception Report

3.05 An MMT analysis group threshold exception report, under normal circumstances, (see paragraph 2.24) indicates that an unusually large number of trunks in a given group are currently experiencing call failures. A subsequent group repeat threshold exception report would indicate that such a trouble condition has persisted and has perhaps become worse.

3.06 The following procedures should be used when responding to group and group repeat threshold exception reports. These procedures are summarized in Fig. 13.

- (a) Record the group or group repeat exception report on the TN08 MMT log.

(b) Filter or browse the logging file over at least the last hour for all TN08s on the implicated group.

(c) Begin searching for common factors, eg, carrier systems, cable pairs, repeater bays, end office incoming and outgoing equipment, or an end office catastrophic failure. (For incoming group reports, the craft person should work with the far end in determining common factors.)

(d) While searching for common factors, the craft person should remain alert for any single TNNs in the implicated group which may be experiencing a higher state of failures than the other members in the group. Normally, such TNNs would be reported via an MMT exception report: but the increased TN08 activity leading to the group report may also be causing service circuits to dominate the list thus inhibiting the reporting of these TNNs. If a TNN with a higher failure rate is found and if the automatic maintenance limit (AML) will not be exceeded, the craft person should:

- (1) Make the trunk busy (if the ER type is OGT), or
- (2) Request that the far end make the trunk busy (if the ER is ICT).

(e) If a common factor is determined and the ER type is OGT, the craft person should do the following:

- (1) If the group or group repeat exception report was caused by an end office catastrophic failure, do not remove any more trunks from service. Instead, consider code blocking with concurrence from the NAC.
- (2) If the exception report was not caused by a catastrophic end office failure, make busy those remaining in-service trunks which share the same common factor. Write a trouble ticket and route it to trunk test.

(f) If a common factor is determined and the ER type is ICT, the craft person should write a trouble ticket and refer or route the ticket, as appropriate, to the proper repair organization.

(g) If no common factor can be found, the craft person should handle the problem as a group of individual trunk troubles and record the associated threshold in the remarks column of the TN08 MMT log.

D. Response to Overflow Threshold Exception Reports

3.07 An MMT analysis overflow threshold exception report indicates that one of the following conditions exists.

- (a) A failure has occurred which is affecting a large number of similar units.
- (b) The identified list is too small.
- (c) The overflow threshold count, overflow time limit, or both are set at unreasonable levels.

3.08 Overflow threshold exception reports can be a symptom of a severe trouble, and thus require an immediate response. The following procedure should be used for responding to overflow threshold exception reports. This procedure is summarized in Fig. 14.

(1) Basic Response:

- (a) Observe the present TTY output message stream from the reported office.
- (b) Continue based on rate at which TN08s are being outputted.
 - A continuing level of increased TN08 rate (not a transient burst) will require list size adjustment: Go to (3).
 - Transient bursts will not require list size adjustment but should be treated as a trouble: Go to (2).

(2) Transient Bursts of TN08 Messages:

- (a) If a single trunk group appears to be implicated, continue; otherwise, go to (d).
- (b) Identify the trunks in the trunk group that are causing the problem and make them busy. If all of the trunks in the group are in trouble, make the trunk group busy. If the problem is a far end office failure, **do not** make the trunk group busy, but consider

code blocking with concurrence from the Network Administration Center (NAC). If the problem is being caused by service circuits, identify the service circuits in trouble and make them busy (see Caution).

Caution: *Never make a complete group of data validation protected service circuits busy because this will cause data validations and phases, up to a phase 4, when the ESS restores the protected service circuits to service. See the DV01 output message for a list of the data validation protected service circuits.*

(c) Issue a trouble ticket against the failing circuits, and route the ticket to trunk test for special handling. END.

(d) Continue to observe the message stream until a failure pattern is established. If a pattern can not be established, notify supervision. Once a pattern has been established, take any necessary service protection action.

(e) Issue a trouble ticket against the appropriate equipment and route the ticket to trunk test for special handling. END.

(3) Continuing Level of Increased TN08 Rate:

(a) Make an overflow entry in the TN08 MMT log.

(b) If this is the second overflow entry for the same MMT analysis category within a two-hour period, parameter adjustments may be needed. See paragraphs 2.28 to 2.33 on list size overflow threshold, and time parameter adjustments.

E. Detection of Severe, Service Affecting Conditions

3.09 As mentioned in the preceding paragraphs, overflow threshold exception reports can be used effectively in detecting severe, service affecting conditions. Another means for detecting such conditions is through observation of a group of exception reports on the alarm monitor. These exception reports fit one of the patterns described in the following paragraph.

3.10 Failure conditions occasionally occur which cause all call attempts on a particular trunk group to fail. The result will be a high volume of TN08 messages implicating most of the trunks in that trunk group and falsely implicating the transmitters or receivers used in the call attempt. As a result, at least one of the patterns of exception reports shown in Fig. 16 will appear on the alarm monitor. If either of these patterns is observed, follow the procedure in paragraph 3.08 (D. Response to Overflow Threshold Exception Reports).

4. USING TN08 BATCH ANALYSIS

4.01 TN08 batch analysis provides a means for identifying and tracking persistent troubles on all trunks, trunk groups, and service circuits. Several independent studies have indicated that the TN08 messages outputted by a No. 1 ESS office tend to be clustered in a small number of trunk groups and implicate a large proportion of the trunks within the same groups. Such troubles are usually not identifiable by trunk or trunk group diagnostics and thus do not receive service protection action because of TN08 MMT analysis. As a result, these trunk groups are reported repeatedly by the TN08 Batch Analysis.

4.02 Identifying and analyzing persistent troubles provides the primary means for improving the transmitter and receiver time-out index components in an office. In addition, Batch Analysis is the primary mechanism for detecting most troubles on incoming trunks and special service circuits. This part presents procedures for tracking the trouble history of units reported by Batch Analysis and for using the analysis report once this history is generated.

A. Tracking Trouble History

4.03 For each unit reported on the TN08 Batch Analysis report, a one-week history of trouble conditions should be accumulated. To accomplish this, two additional columns should be added to the Batch Analysis report for Generics 2 and 3 (Fig. 17). These columns should identify the number of times each unit has been reported by Batch Analysis within the past seven days (including the present day) and the cumulative failure count over those days.

4.04 For Generics 4 and 5 the one-week history of trouble conditions is included in the Batch Analysis report (Fig. 10).

B. Procedure for Processing TN08 Batch Analysis Reports

4.05 The procedure for processing TN08 Batch Analysis reports, which is summarized in Fig. 18, is as follows.

- (1) Select next (or first) unit on report.
- (2) If a trouble ticket is presently outstanding against the unit, go to (3).

If a trouble ticket is not presently outstanding against the unit, go to (4).
- (3) Enter the trouble ticket number on the Batch Analysis report. Go to (1).
- (4) If the unit has been reported by Batch Analysis at least three times during the most recent seven days, go to (5). Otherwise, go to (1).
- (5) Issue a trouble ticket against the unit.
- (6) Enter and circle the trouble ticket number on the Batch Analysis report.
- (7) Obtain a hard copy of the most recent day's TN08s against the unit and attach to the trouble ticket.
- (8) Route the trouble ticket to analysis.
- (9) Go to (1).

5. ABBREVIATIONS AND ACRONYMS

5.01 The following is a list of abbreviations and acronyms used in this section.

ABBREVIATION	TITLE
AML	Automatic Maintenance Limit
ATP	All Tests Passed
ATT	Automatic Test Tables
BLKD	Blocked

CCIS	Common Channel Interoffice Signaling
CRT	Cathode-Ray Tube
CNT/10	TN08 Count per 10 trunks
DIAG	Diagnostic
DP	Dial Pulse
DSBLD	Disabled
DV01	No. 1 and 1A ESS Output Message
EPSCS	Enhanced Private Switched Communication Service
ER	Exception Report
ESS	Electronic Switching System
ETS	Electronic Tandem Service
F-BROWSE	Filter Browse
GRP	Group
HI	High
ICT	Incoming Trunk
ICTG	Incoming Trunk Group
IMP/20	Implicated trunks per 20 trunks
INC	Incoming trunk
LVL	Level
MAX-IMP	Maximum implicated trunks required
MB	Make Busy
MED	Medium
MF	Multifrequency
MIN	Minutes
MJ	Major
MMT	Multiple message thresholding

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MN	Minor	SCHED	Schedule
NO.	Number	SSS	Switched Special Service
NSPMP	Network Switching Performance Measurement Plan	TBL	Trouble
NTST	No Test	TERM	Terminating
OGT	Outgoing Trunk	TGN	Trunk Group Number
OGTG	Outgoing Trunk Group	THRESH	Threshold
ORIG	Originating	TKT	Ticket
OTC	Operating Telephone Company	TNN	Trunk Network Number
OVFL	Overflow	TN01	No. 1 and 1A ESS output message
OVFLW	Overflow	TN08	No. 1 and 1A ESS output message
PAT	Pattern	TRK	Trunk
PULS	Pulse	T-TNN	No. 1 and 1A ESS input message
RC	Recent Change	TTY	Teletypewriter
RCV	Receiver	XMT	Transmitter
RCVR	Receiver	XMTR	Transmitter.
REPT	Repeat	10K	Ten Thousand
RP	Revertive Pulse	#	Number
SCC	Switching Control Center	≥	Greater than or equal to
SCCS	Switching Control Center System	<	Less than

<u>LBRD</u>	<u>MAR 18 09:40</u>	<u>MN</u>	<u>TN08 OGT</u>	<u>TRK</u>	<u>32242</u>	<u>COUNT =4 IN 4 MINUTES</u>
1	2	3	4	5	6	7

- 1 OFFICE
- 2 DATE/TIME OF ALARM
- 3 ALARM LEVEL
- 4 MMT ANALYSIS CATEGORY
- 5 REPORTED UNIT TYPE
- 6 TNN OF REPORTED UNIT
- 7 FAILURE RATE

Fig. 1—TN08 MMT Analysis Exception Report (Generics 2 and 3) (2.07)

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(a) Level 1 Exception Report (6 total failures in <150 minutes.)

<u>LBRD</u>	<u>MAR 18 09:40</u>	<u>MN</u>	<u>TN08</u>	<u>OGT</u>	<u>LVL 1</u>	<u>6/00:24*</u>	<u>MF</u>	<u>TNN 32242</u>	<u>TGN 442</u>
1	2	3	4	5	6	7	8	9	10

(b) Level 2 Exception Report (9 total failures in <150 minutes.)

<u>LBRD</u>	<u>MAR 18 09:50</u>	<u>MJ</u>	<u>TN08</u>	<u>OGT</u>	<u>LVL 2</u>	<u>9/00:34†</u>	<u>MF</u>	<u>TNN 32242</u>	<u>TGN 442</u>
1	2	3	4	5	6	7	8	9	10

(c) Low Repeat Exception Report (10 additional failures at a rate of less than the minimum rate required to cause a level 1 exception report)

<u>LBRD</u>	<u>MAR 18 12:50</u>	<u>MN</u>	<u>TN08</u>	<u>OGT</u>	<u>LOW REPT</u>	<u>10</u>	<u>MF</u>	<u>TNN 32242</u>	<u>TGN 442</u>
1	2	3	4	5	6	7	8	9	10

(d) Medium Repeat Exception Report (10 additional failures at a rate of more than the minimum rate required to cause a level 1 exception report, but less than the minimum rate required to cause a level 2 exception report)

<u>LBRD</u>	<u>MAR 18 14:50</u>	<u>MN</u>	<u>TN08</u>	<u>OGT</u>	<u>MED REPT</u>	<u>10</u>	<u>MF</u>	<u>TNN 32242</u>	<u>TGN 442</u>
1	2	3	4	5	6	7	8	9	10

(e) High Repeat Exception Report (10 additional failures at a rate of more than the minimum rate required to cause a level 2 exception report).

<u>LBRD</u>	<u>MAR 18 15:50</u>	<u>MJ</u>	<u>TN08</u>	<u>OGT</u>	<u>HI REPT</u>	<u>10</u>	<u>MF</u>	<u>TNN 32242</u>	<u>TGN 442</u>
1	2	3	4	2	6	7	8	9	10

(f) Group Level Exception Report (4 trunks in the same trunk group are on the thresholding list.)

<u>LBRD</u>	<u>MAR 18 16:10</u>	<u>MN</u>	<u>TN08</u>	<u>OGT</u>	<u>GRP LVL</u>	<u>4</u>	<u>TGN 442</u>
1	2	3	4	5	6	7	10

(g) Group Repeat Exception Report (TN08 failures for any 6 trunks in the same group have occurred since the trunk group was reported by a Group Level Exception Report)

<u>LBRD</u>	<u>MAR 18 16:20</u>	<u>MN</u>	<u>TN08</u>	<u>OGT</u>	<u>GRP REPT</u>	<u>6</u>	<u>TGN 442</u>
1	2	3	4	5	6	7	10

- | | |
|-------------------------|--------------------------|
| 1 OFFICE | 6 MMT THRESHOLD EXCEEDED |
| 2 DATE/TIME OF ALARM | 7 FAILURE RATE |
| 3 ALARM LEVEL | 8 TYPE OF SIGNALING |
| 4 MMT ANALYSIS CATEGORY | 9 TNN OF REPORTED UNIT |
| 5 MMT ANALYSIS TYPE | 10 TGN OR REPORTED UNIT |

*6 failures in 24 minutes

†9 failures in 34 minutes

Fig. 2—TN08 MMT Analysis Exception Report (Generics 4 and 5) (2.07, 2.26)

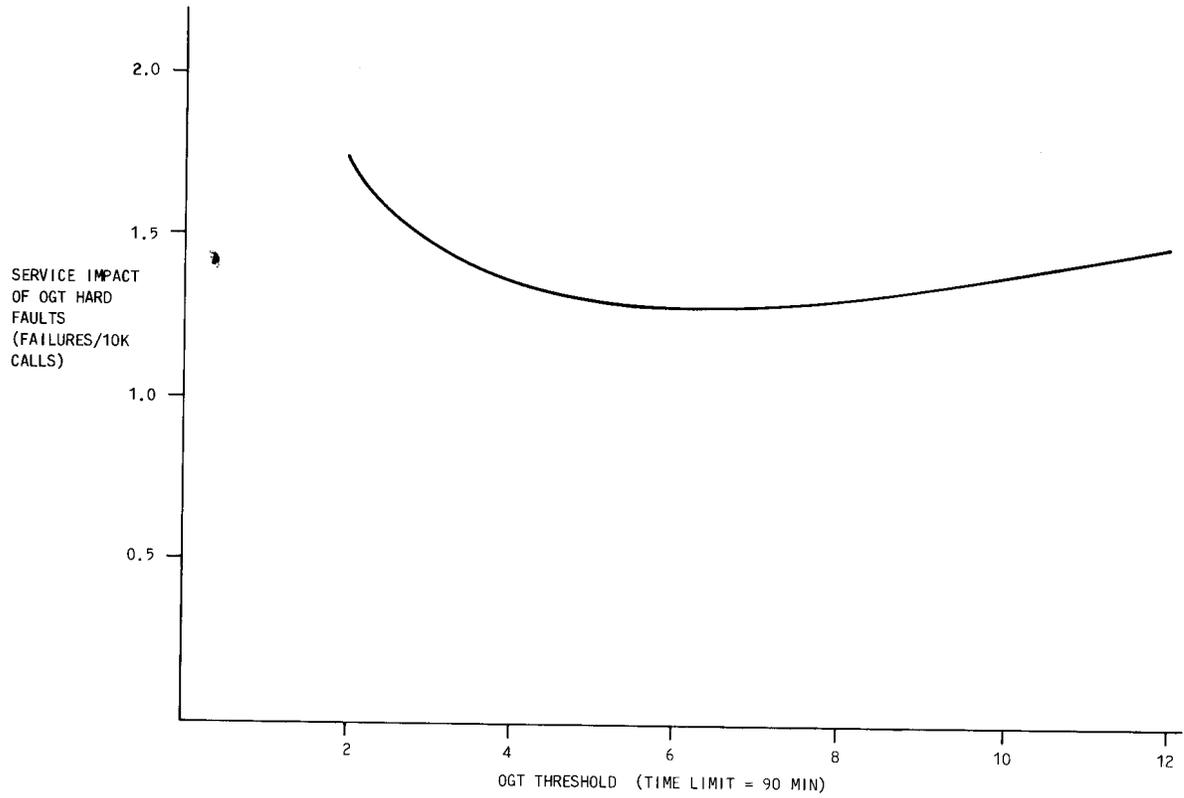


Fig. 3—Effects of MMT Analysis Threshold (Service Impact) (2.17)

<u>AURR</u>	<u>MAR 18 10:25</u>	<u>MN</u>	<u>TN08</u>	<u>OVFLOW COUNT =10 IN 5 MINUTES</u>
1	2	3	4	5

- 1 OFFICE
- 2 DATE/TIME OF ALARM
- 3 ALARM LEVEL
- 4 MMT ANALYSIS CATEGORY
- 5 OVERFLOW RATE

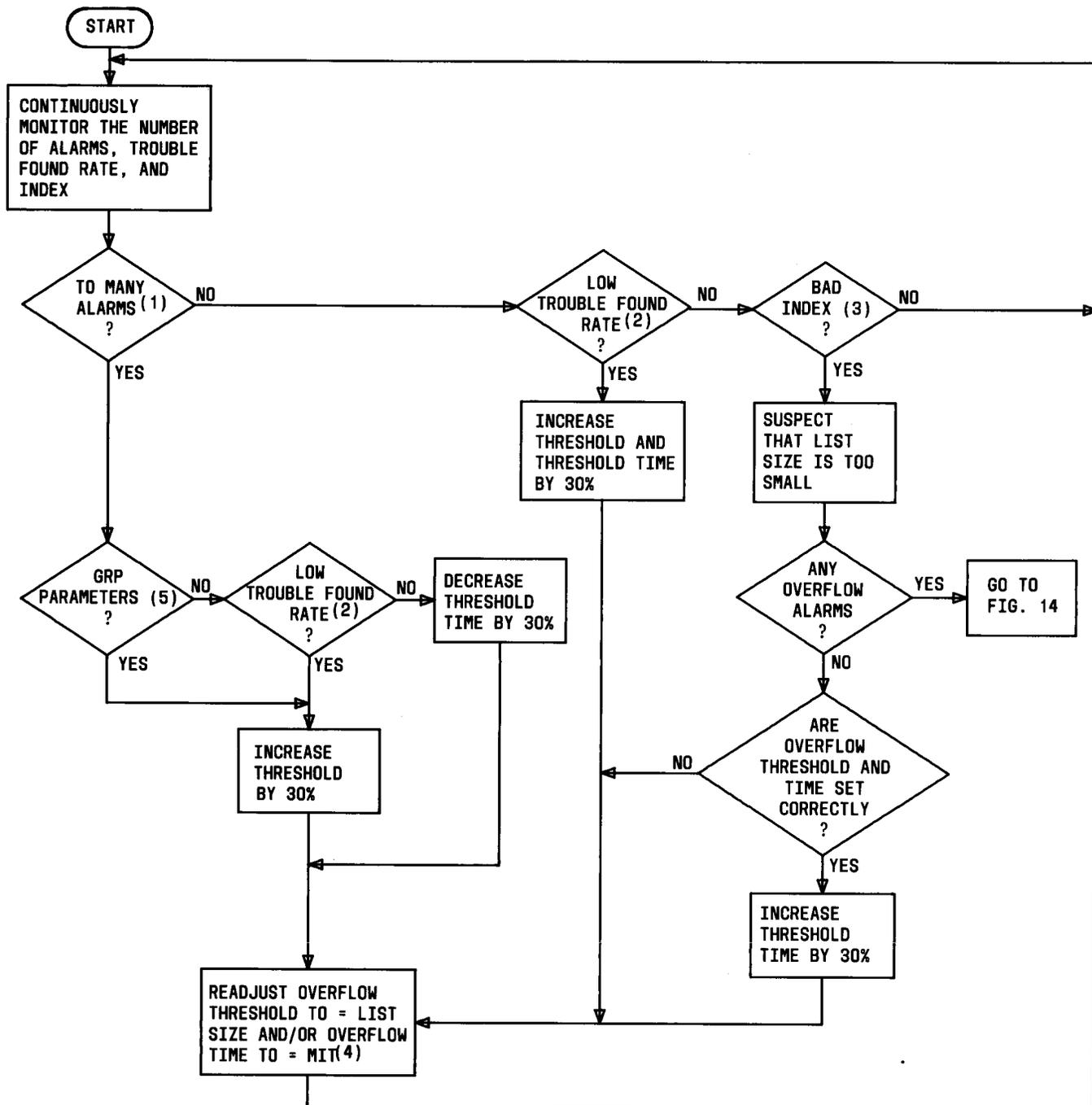
Fig. 4—MMT Analysis Overflow—Threshold Exception Repot (Generics 2 and 3) (2.28)

<u>AURR</u>	<u>MAR 18 10:25</u>	<u>MN</u>	<u>TN08</u>	<u>LIST OVERFLOW</u>	<u>50/00:24*</u>	<u>50</u>
1	2	3	4	5	6	7

- 1 OFFICE
- 2 DATE/TIME OF ALARM
- 3 ALARM LEVEL
- 4 MMT ANALYSIS CATEGORY
- 5 MMT THRESHOLD EXCEEDED
- 6 OVERFLOW RATE
- 7 LIST SIZE

* 50 overflows in 24 minutes

Fig. 5—MMT Analysis Overflow—Threshold Exception Report (Generic 4 and 5) (2.28)



NOTES:

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. TOO MANY ALARMS - CRAFT RESPONSIBLE FOR ALARMS AVERAGES MORE THAN 3 TO 5 MIN DELAY IN RESPONDING TO ALARMS 2. LOW TROUBLE FOUND RATE - DIAGNOSTIC FAILURE RATE OF LESS THAN 50% FOUND RATE 3. BAD INDEX - LESS THAN "0" BAND | <ol style="list-style-type: none"> 4. MIT - MEAN INTERVAL TIME = $\frac{\text{THRESH TIME}}{\text{THRESH COUNT} - 1}$ 5. GRP PARAMETER - EITHER GROUP THRESHOLD OR GROUP REPEAT THRESHOLD 6. THRESHOLD TIME ADJUSTMENTS DO NOT APPLY TO GROUP THRESHOLDS AND GROUP REPEAT THRESHOLDS |
|---|--|

Fig. 6—TNO8 MMT Parameter Control (2.33)

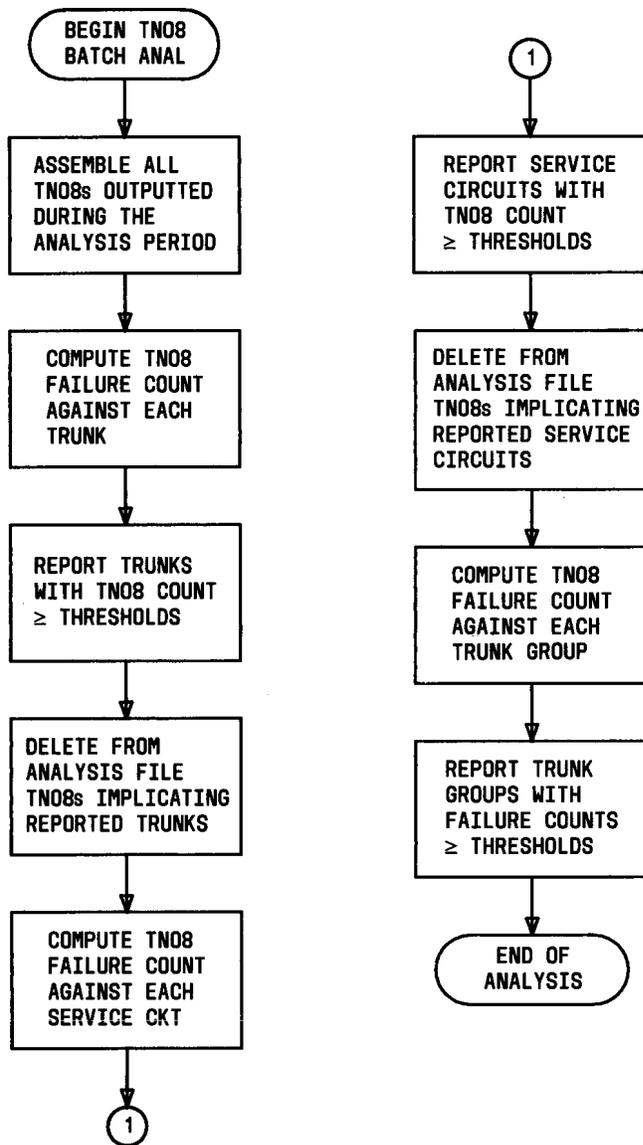


Fig. 7—TN08 Batch Analysis Alogrithm (Generics 2 and 3) (2.34)

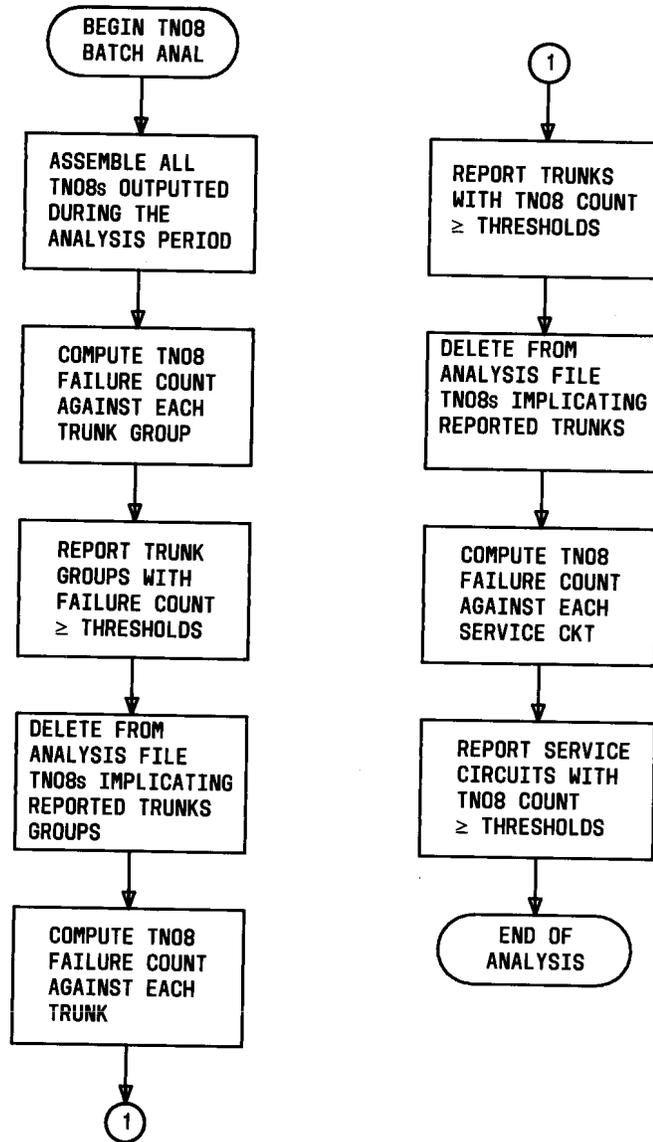


Fig. 8—TN08 Batch Analysis Algorithm (Generics 4 and 5) (2.34)

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tn08 analysis report for aurr
 **** ** ** ** **

from: 08/10 01:18:16

to: 08/11 01:20:46

sorted on outgoing - incoming tnn

thresholds - ogt = 4 inc = 5

failure count	ogt-inc tnn	tgn	ogt-inc	puls type
4	013072	228	ogt	mf
4	023011	047	ogt	mf
5	042033	269	ogt	rp

153 tn08 messages processed

sorted on transmitter - receiver tnn

thresholds - xmtr = 10 rcvr = 10

failure count	xmt-rcv tnn	xmt-rcv	puls type
18	080247	rcvr	mf

140 tn08 messages processed

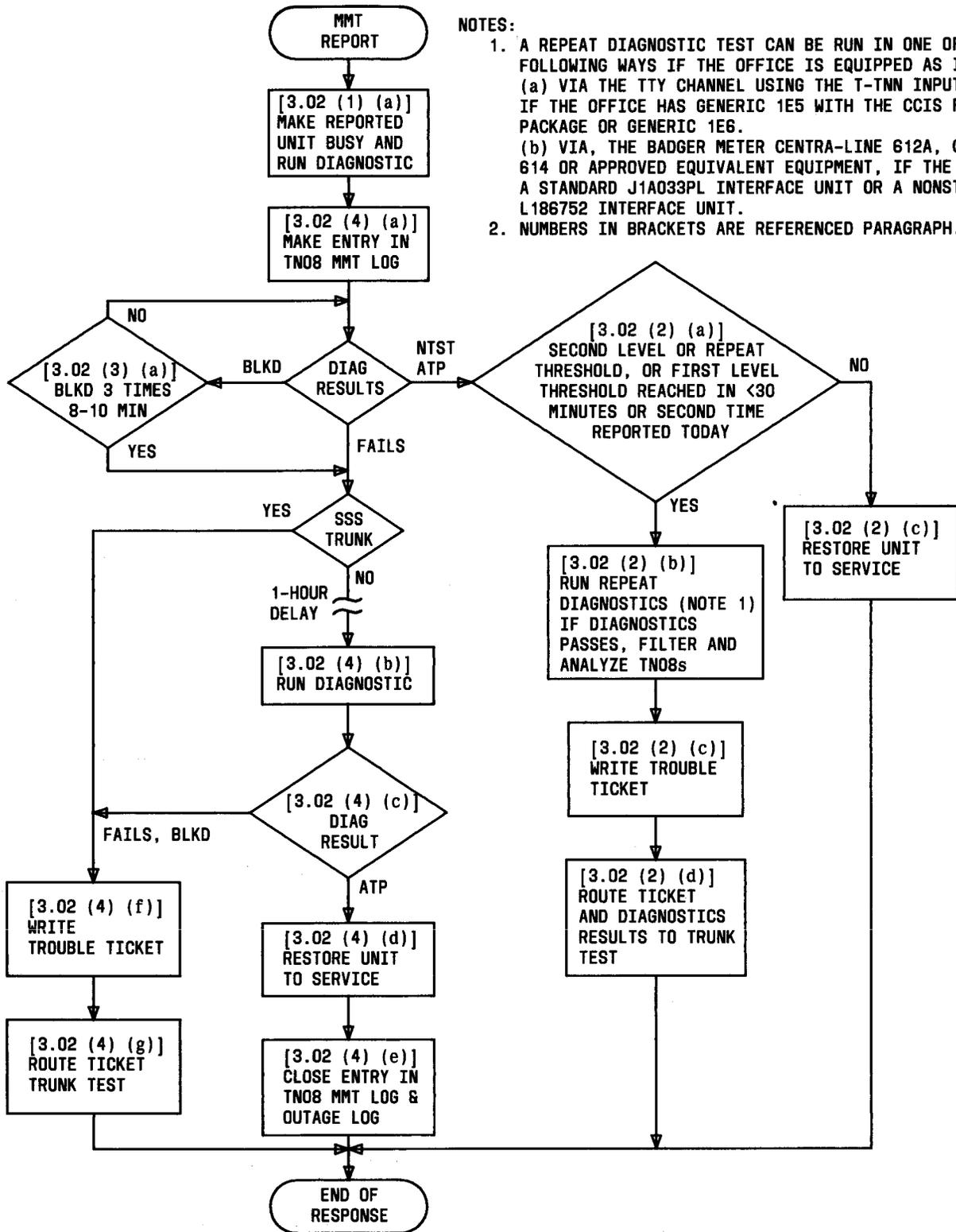
sorted on trunk group

thresholds - ogt = 6 inc = 3

failure count	tgn	ogt-inc	puls type
11	102	inc	mf
10	120	inc	mf
8	266	ogt	rp

122 tn08 messages processed

Fig. 9—TN08 Batch Analysis Report (Generics 2 and 3) (2.38)



NOTES:

1. A REPEAT DIAGNOSTIC TEST CAN BE RUN IN ONE OF THE FOLLOWING WAYS IF THE OFFICE IS EQUIPPED AS INDICATED.
 - (a) VIA THE TTY CHANNEL USING THE T-TNN INPUT MESSAGE, IF THE OFFICE HAS GENERIC 1E5 WITH THE CCIS FEATURE PACKAGE OR GENERIC 1E6.
 - (b) VIA, THE BADGER METER CENTRA-LINE 612A, CENTRA-LINE 614 OR APPROVED EQUIVALENT EQUIPMENT, IF THE OFFICE HAS A STANDARD J1A033PL INTERFACE UNIT OR A NONSTANDARD L186752 INTERFACE UNIT.
2. NUMBERS IN BRACKETS ARE REFERENCED PARAGRAPH.

Fig. 11—TN08 MMT Analysis Response (OGT, XMTR, RCVR) (3.01, 3.02)

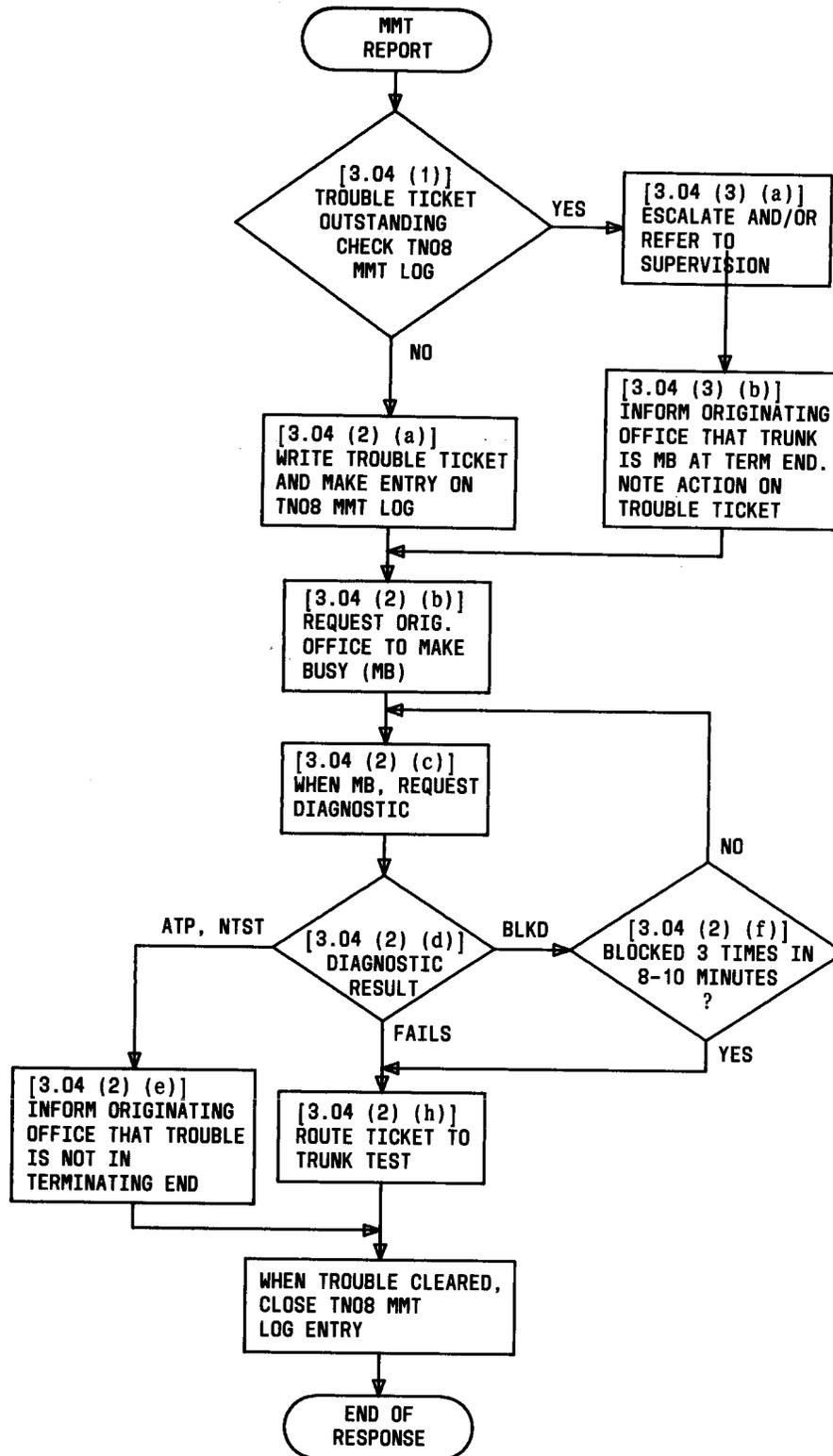


Fig. 12—TN08 MMT Analysis Response (ICT) (3.01, 3.04)

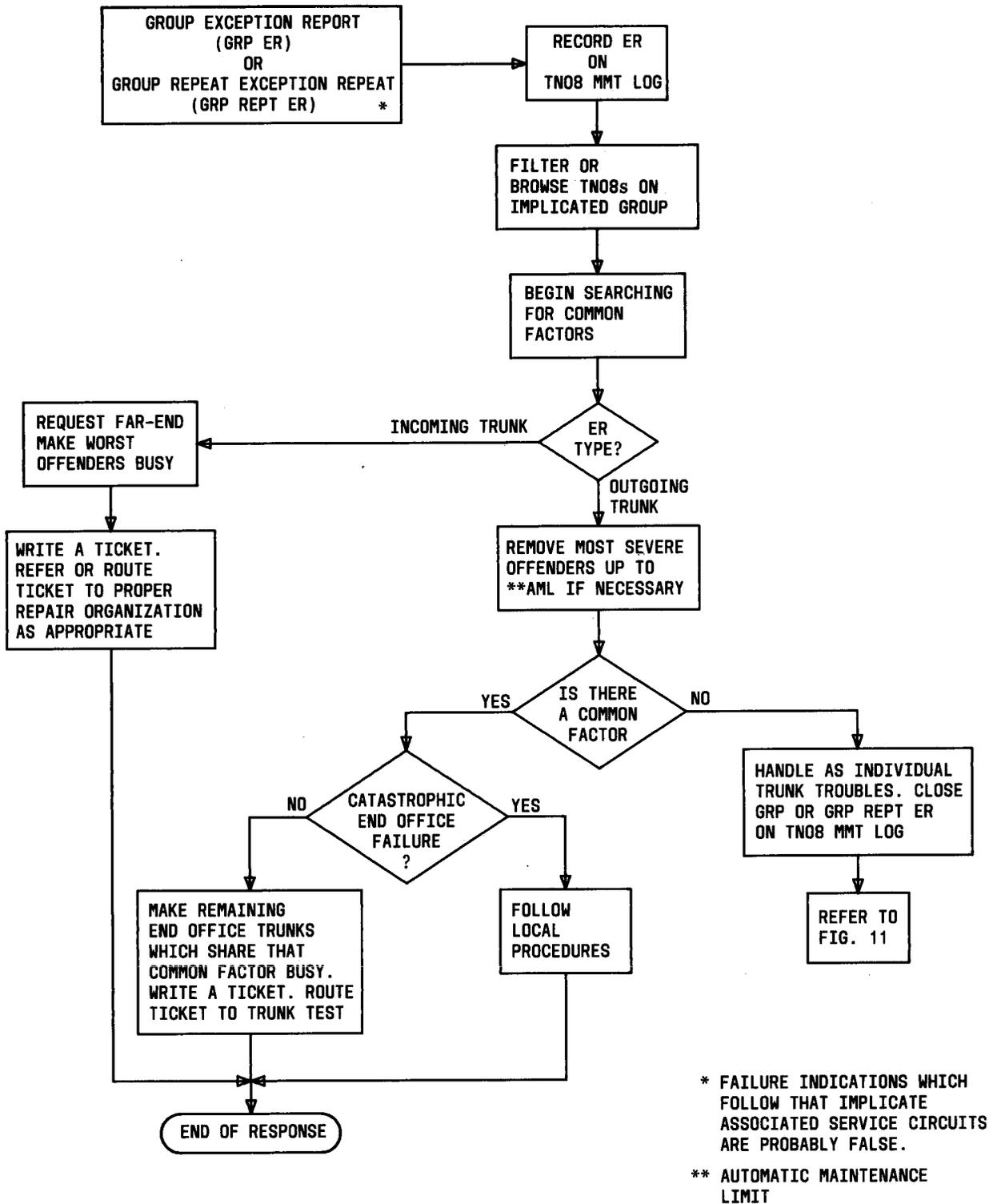


Fig. 13—TN08 MMT Analysis Response (GRP and GRP REPT) (3.01, 3.06)

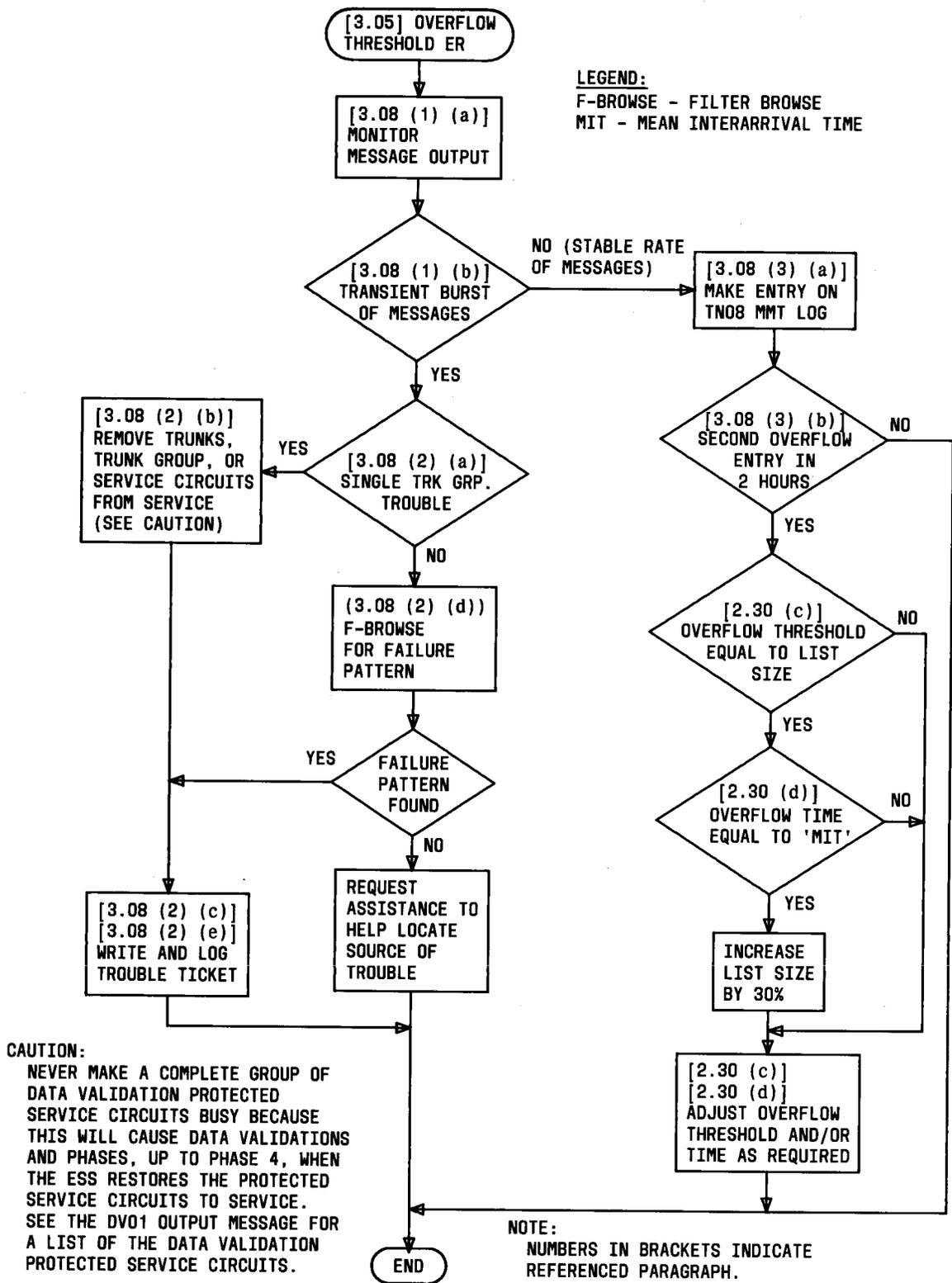


Fig. 14—TN08 MMT Analysis Response (Overflow Failure) (3.01, 3.08)

EXCEPTION REPORT PATTERNS FOR DETECTING SEVERE FAILURESGENERIC 2 AND 3MULTIPLE EXCEPTION REPORTS ON ONE TRUNK GROUP*

LBRD FEB 13 14:56 MN TN08 OGT TRK 40312 COUNT = 4 IN 4 MINUTES
 LBRD FEB 13 14:55 MN TN08 OGT TRK 52212 COUNT = 4 IN 2 MINUTES
 LBRD FEB 13 14:53 MN TN08 OGT TRK 51312 COUNT = 4 IN 4 MINUTES
 LBRD FEB 13 14:52 MN TN08 OCT TRK 52212 COUNT = 4 IN 6 MINUTES
 LBRD FEB 13 14:50 MN TN08 OGT TRK 43112 COUNT = 4 IN 5 MINUTES
 LBRD FEB 13 14:49 MN TN08 OGT TRK 53112 COUNT = 4 IN 4 MINUTES

GENERIC 2 AND 3MULTIPLE EXCEPTION REPORTS ON ONE TYPE OF SERVICE CIRCUIT*

AURR AUG 13 14:59 MN TN08 XMTR 50347 COUNT = 9 IN 10 MINUTES
 AURR AUG 13 14:57 MN TN08 XMTR 10366 COUNT = 9 IN 12 MINUTES
 AURR AUG 13 14:55 MN TN08 XMTR 11330 COUNT = 9 IN 8 MINUTES

GENERIC 4 AND 5MULTIPLE EXCEPTION REPORTS ON ONE TRUNK GROUP

LBRD FEB 13 14:56 MN TN08 OGT LVL1 6/00:12 MF TNN 64207 TGN 127
 LBRD FEB 13 14:55 MN TN08 OGT LVL1 6/00:11 MF TNN 10137 TGN 127
 LBRD FEB 13 14:55 MN TN08 OGT LVL1 6/00:11 MF TNN 00347 TGN 127
 LBRD FEB 13 14:54 MN TN08 OGT LVL1 6/00:10 MF TNN 40227 TGN 127
 LBRD FEB 13 14:50 MN TN08 OGT REPT 6 TGN 127
 LBRD FEB 13 14:48 MN TN08 OGT GRP LVL 4 TGN 127

GENERIC 4 AND 5MULTIPLE EXCEPTION REPORTS ON ONE TYPE OF SERVICE CIRCUIT*

AURR AUG 13 14:59 MN TN08 XMTR LVL1 9/00:12 XMTR 14124
 AURR AUG 13 14:57 MN TN08 XMTR LVL1 9/00:10 XMTR 34124
 AURR AUG 13 14:55 MN TN08 XMTR LVL1 9/00:08 XMTR 44124
 AURR AUG 13 14:51 MN TN08 OGT GRP REPT 6 TGN 201
 AURR AUG 13 14:50 MN TN08 OGT GRP LVL 4 TGN 201

*To be sure that the circuits being reported are in the same group, verify TNN's given in the exception reports.

Fig. 16—Exception Report Patterns for Detecting Severe Failures (3.10)

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tn08 analysis report for aurr
 **** ***** **

from: 08/10 01:18:16

to: 08/11 01:20:46

sorted on outgoing - incoming tnn

thresholds - ogt = 4 inc = 6

Note: The last 2 columns are added manually to aid in tracking trouble history.

<u>failure count</u>	<u>ogt-inc tnn</u>	<u>tgn</u>	<u>ogt-inc</u>	<u>puls type</u>	NUMBER TIMES Reported	CUMULATIVE FAILURE COUNT
4	013072	228	ogt	mf	1	4
4	023011	047	ogt	mf	2	13
5	042033	269	ogt	rp	3	18

153 tn08 messages processed

sorted on transmitter - receiver tnn

thresholds - xmtr = 10

revr = 10

<u>failure count</u>	<u>xmt-rcv tnn</u>	<u>xmt-rcv</u>	<u>puls type</u>	NUMBER TIMES REPORTED	CUMULATIVE FAILURE COUNT
13	080247	rcvr	mf	1	18

140 tn08 messages processed

sorted on trunk group

thresholds - ogt = 6

inc = 8

<u>failure count</u>	<u>tgn</u>	<u>ogt-inc</u>	<u>puls type</u>	NUMBER TIMES REPORTED	CUMULATIVE FAILURE COUNT
11	102	inc	mf	4	43
10	120	inc	mf	4	55
8	266	ogt	rp	1	8

122 tn08 messages processed

Fig. 17—TN08 Batch Analysis Report (with last 2 columns manually added for tracking trouble history) (Generics 2 and 3) (4.03)

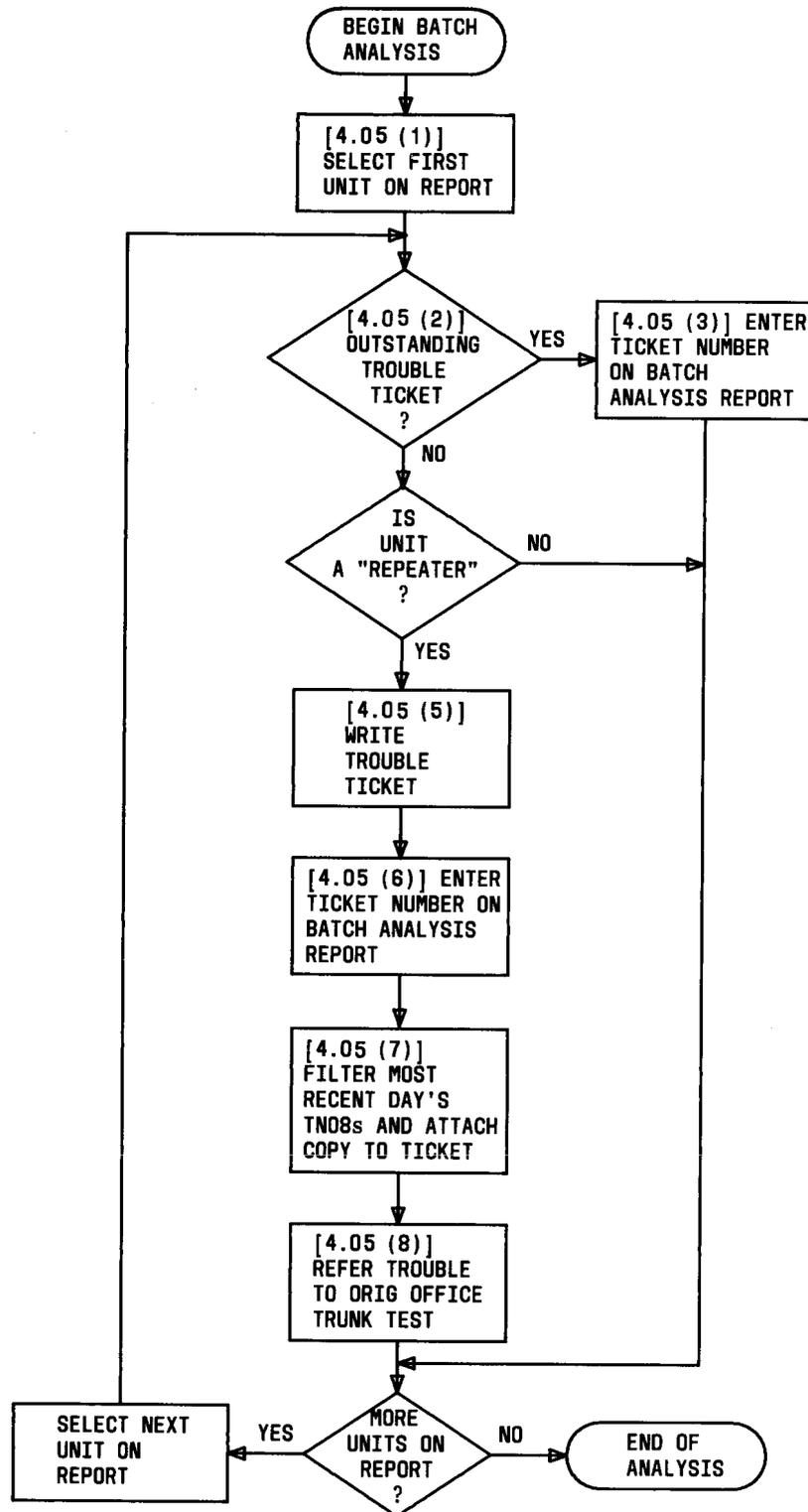


Fig. 18—TN08 Batch Analysis Processing (4.05)

TABLE A

TN08 MMT ANALYSIS THRESHOLDS

MMT THRESHOLDS					
		OGT		XMTR	
XMTR TIME-OUTS PER 10K OUTGOING CALLS	FIRST LEVEL	SECOND LEVEL	FIRST LEVEL	SECOND LEVEL	
0.00–2.99	4 in 90 min.	6 in 90 min.	6 in 30 min.	9 in 30 min.	
3.00 or more	6 in 150 min.	9 in 150 min.	9 in 50 min.	12 in 50 min.	
MMT THRESHOLDS					
		ICT		RCVR	
RCVR TIME-OUTS PER 10K INCOMING CALLS	FIRST LEVEL	SECOND LEVEL	FIRST LEVEL	SECOND LEVEL	
0.00–7.99	6 in 90 min.	9 in 90 min.	6 in 30 min.	9 in 30 min.	
8.00 or more	9 in 150 min.	12 in 150 min.	9 in 50 min.	12 in 50 min.	

Note: Recommended per circuit TN08 MMT analysis thresholds (Generics 2 and 3 only use first level, Generics 4 and 5 use first and second level).

TABLE B

RECOMMENDED TN08 MMT ANALYSIS PARAMETER –
LIST SPECIFICATIONS (GENERIC 2 AND 3)

TYPE OF CIRCUIT	OVFL THRESHOLD TIME	OVFL THRESHOLD
OGT	30	Set OVFL Threshold equal to list size
ICT	20	
XMTR	6	
RCVR	6	

TABLE C

RECOMMENDED TN08 MMT ANALYSIS PARAMETERS –
LIST SPECIFICATIONS (GENERIC 2 AND 3)

LIST SIZE	
FOR ICT AND OGT	FOR XMTR AND RCVR
Set list size equal to X for each circuit type (ie, ICT, OGT) where All circuits in office of $X = \frac{\text{particular type}^*, \text{ eg, OGT}}{200}$ with X not less than 10	Set list size equal to Y for each circuit type (ie, XMTR, RCVR) where All circuits in office of $Y = \frac{\text{particular type, eg, XMTR}}{6}$ with Y not less than 6

* Two-way trunks should also be included. In Generics 2 and 3, a two-way trunk should be considered in the OGT office circuit count and the ICT office circuit count.

TABLE D

TN08 MMT ANALYSIS PARAMETERS –
LIST SPECIFICATIONS (GENERIC 4 AND 5)

LIST SIZE	OVFL THRESHOLD AND TIME
Set list size equal to X, where $X = \frac{\text{All circuits* in office}}{70}$ with X not less than 10	Set OVFL threshold equal to list size Set the time equal to 30 min.

* Circuits should include OGT, ICT, XMTR, and RCVR types.
Two-way trunks should also be included. In Generics 4 and
5 the two-way trunks should be counted once.

TABLE E

RECOMMENDED TN08 BATCH ANALYSIS PARAMETERS

GENERIC	THRESHOLDS					
	OGT	ICT	XTMR	RCVR	OGTG	ICTG
1, 2 and 3	6	8	10	10	6	9
4 before point issue 5	6	8	8	8	30	30
4 point issue 5 and later	6	8	8	8	IMP/20 = 4 MAX-IMP = 10 CNT/10 = 15	IMP/20 = 4 MAX-IMP = 10 CNT/10 = 20

TABLE F
 THE NUMBER OF FAILING TRUNKS REQUIRED TO IMPLICATE A TRUNK GROUP
 AS A FUNCTION OF TRUNK GROUP SIZE AND IMP/20

	NUMBER OF TRUNKS IN THE GROUP																													
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150
1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
I 3	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	7	7	7	7	8	8	8	8	9	9	9	9
M 4	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17
P 5	3	3	4	5	6	6	7	8	9	9	10	11	12	12	13	14	15	15	16	17	18	18	19	20	21	21	22	23	24	25
/ 6	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
2 7	3	4	6	7	8	9	11	12	13	14	16	17	18	19	21	22	23	24	26	27	28	29	31	32	33	34	36	37	38	39
0 8	3	5	6	8	9	11	12	14	15	17	18	20	21	23	24	26	27	29	30	32	33	35	36	38	39	41	42	44	45	47
9	4	5	7	9	11	12	14	16	18	19	21	23	25	26	28	30	32	33	35	37	39	40	42	44	46	47	49	51	53	54
10	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62

FOR A MAXIMUM IMPLICATION OF 10, ALL THE ENTRIES ENCLOSED THAT ARE NOT EQUAL TO 10 ARE REDUCED TO 10.

DEFAULT SETTING FOR OGT

RESULTING RANGE OF APPLIED THRESHOLD

THE NUMBER OF FAILING TRUNKS REQUIRED TO IMPLICATE A TRUNK GROUP AS A FUNCTION OF TRUNK GROUP SIZE AND IMP/20

TABLE G

NUMBER OF FAILURES (TN08s) REQUIRED AS A FUNCTION OF THE ACTUAL NUMBER OF FAILING TRUNKS AND CNT/10

		ACTUAL NUMBER OF FAILING TRUNKS									
		2	4	6	8	10	12	14	16	18	20
DEFAULT SETTING FOR OGT	10	2	4	6	8	10	12	14	16	18	20
C	15	3	6	9	12	15	18	21	24	27	30
N	20	4	8	12	16	20	24	28	32	36	40
T	25	5	10	15	20	25	30	35	40	45	50
/	30	6	12	18	24	30	36	42	48	54	60
1	35	7	14	21	28	35	42	49	56	63	70
0	40	8	16	24	32	40	48	56	64	72	80
	45	9	18	27	36	45	54	63	72	81	90
	50	10	20	30	40	50	60	70	80	90	100

RESULTING RANGE OF APPLIED THRESHOLD

CONTROL VALUES

NUMBERS OF FAILURE (TN08s) REQUIRED AS A FUNCTION OF THE ACTUAL NUMBER OF FAILING TRUNKS AND CTN/10

