NO. 4 ELECTRONIC SWITCHING SYSTEM
TRAFFIC MEASUREMENTS
INEFFECTIVE ATTEMPTS

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1. GENERAL

1.01 In the No. 4 Electronic Switching System (ESS), every recognized seizure that does not result in successful completion of address signaling is considered an ineffective machine attempt (IMA). Those calls which fail after outgoing signaling are considered ineffective network attempts (INA). Minimizing ineffective attempts enhances network call completions.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 Network management (NM) is concerned with real time ineffective attempts. The measurements data base provides data to the NM system.

1.04 The machine administrator is responsible for maintaining a high level of efficiency in the No. 4 ESS. Long term analysis of ineffective attempts will permit the machine administrator to identify problems which are not readily apparent.

2. MEASUREMENT DATA BASE

2.01 A measurement data base is provided to assist the machine administrator and network manager in executing their responsibilities. A series of reports, administered by the machine administrator, provides the means for retrieving information contained in the measurement data base. These measurement reports are discussed in DFMP, Division H, Section 9f(1), Measurements—General.

2.02 In order to get maximum use of the measurements provided, the machine administrator must have a thorough understanding of call processing in the No. 4 ESS. At various points in the call processing flow chain, the measurements system records attempt counts which succeed or fail. Included in these counts are ineffective attempts.

2.03 Fig. 1 through 6 provide flow charts of various call types as processed by the No. 4 ESS. Call failure registers are highlighted in these flow charts. Flow charts for CCIS call processing are not currently available. These flow charts will be included in this document when they are available.

2.04 The machine administrator has access to all measures in the measurement data bases via the 24 measurement reports provided by the measurement system. This system of reports is the machine administrator's primary tool for isolating problems contributing to ineffective attempts.

2.05 As an example, one measurement report provides a count of all instances of glare occurring in the office. Other measures break this figure down to counts of glare conditions when the No. 4 ESS released control, and those when the far-end machine released control. These counts are further defined as occurring on TSGs assigned to specific control or administrative areas within the Trunk Operations Center (TOC).

2.06 Another example is attempt counts. MF incoming attempts are presented in one report as one total count. Other measures separate this total count into MF operator attempts and MF equipment attempts.

2.07 Maintenance measures are defined in Section 234-100-045 of Bell System Practices and in TG-4, No. 4 ESS Translation Guide, Division 10. The machine administrator should become familiar with all of the measures available in the measurement data base in order to utilize this information to maximize machine performance. The data within the measurement data base is manipulated in different ways according to the needs of different groups—MAC, MTCE, and NM. The machine administrator must be familiar with the differences to ensure that all persons are talking about the same thing when conferring on a problem.

2.08 At various times the machine administrator and network manager will work together to resolve ineffective attempt problems. On these occasions, the base count being used by the network management system to compute ineffective attempts must be defined in order for the machine administrator to relate the network management data to the traffic measures defined in TG-4, Division 6, Section 9. Close coordination between the network management, Maintenance Operations Center (MOC), and Machine Administration Center (MAC) forces will aid in keeping ineffective attempts to a minimum number.

3. TRAFFIC MEASUREMENT DEFINITIONS

3.01 As discussed in DFMP, Division H, Section 9f(1), Measurements System-General, measurements are divided into measurement subclasses (MSC) and output measurement sets (OMS).

3.02 Table A provides definitions for the measures contained in the measurement system. The definitions are listed by MSC and OMS.

4. INEFFECTIVE MACHINE ATTEMPTS (IMA)

4.01 IMAs are those attempts which fail in the No. 4 ESS before successful outpulsing is completed. At present, there are 65 IMA types identified in the No. 4 ESS. This number may increase as common channel interoffice signaling (CCIS) is incorporated into the network. IMAs are broadly categorized as:

- Failures due to equipment malfunction or dial error.
- Blocking due to equipment shortages.

4.02 A more specific classification of the 65 types of IMAs identified is provided by grouping them into one of the following nine classes.

(1) No Circuit

(2) Control

(3) CAMA

(4) Internal Queue

(5) Time Outs

(6) Outgoing Failures

(7) Vacant Code/INWATS Band Check

(8) Permanent Signal/False Start

(9) Incoming Failures

4.03 Table B provides a list of the 65 IMAs which are presently identified. Table C contains definitions for each of the 65 IMAs. Included with each definition are the appropriate MSC and OMS and figure number of the flow chart where each item can be found.

5. EQUIPMENT INEFFECTIVE ATTEMPTS

5.01 In addition to IMAs on a total office basis, No. 4 ESS provides a measure of equipment ineffective attempts (EIA). EIA counts include certain IMA counts, but also include failure conditions that do not result in IMAs. EIA counts measure retrial attempts, as well as final trial failures.

5.02 The following IMAs are also measured as EIAs.

INCOMING	OUTGOING
*AIF	CKF
*ANI	GLR
*CDT	IKF
CGF	NSD
CPE	UXS
CST	XST

CTR

FSA

MAB

PDA

PDT

PER

PST

*Does not result in call failures.

6. INEFFECTIVE NETWORK ATTEMPTS (INA)

6.01 INAs are those failures which occur after outpulsing. These are due to distant machine congestion or facility failure in the telephone network. This type of failure may require action by the network manager to prevent degradation of service provided by the No. 4 ESS.

7. BASE COUNTS

7.01 To provide meaningful data in connection with ineffective attempts, a relationship must be established between success and failure of call processing. This is accomplished by dividing a given IA by a given base count. The results are expressed as a percentage. Percent total IA is expressed as the relationship between total failures and total incoming seizures. The measurements system also provides various other base counts which enable the machine administrator to more closely examine particular IA categories in order to pinpoint specific problem areas. The following is a list of total office counts and their definitions:

(a) ***Total Incoming Calls*** — This count is made after at least one digit is received. This count will not reflect false starts, permanent signals or any failures occurring before the first digit is received. (MSC 5 OMS 0)

(b) ***Total DP Incoming Seizures*** — To determine the total DP originations, the DP delay dial incoming seizure PC and DP-immediate start incoming seizure PC must be added together.

(c) ***Total MF Incoming Seizures*** — This count indicates the total number of MF originations processed and includes false starts, permanent signals, continuity failures, as well as incoming calls. (MSC 5 OMS 1)

(d) ***Total CCIS Incoming Calls*** — This count consists of the CCIS call register PC, CCIS origination call queue overflow PC, and CCIS origination queue abandon PC. (MSC 5 OMS 1)

(e) ***Total Network Path Hunt Attempts*** — Adding the network path hunt success PC and failure PCs together provides the total network attempts. (MSC 4 OMS 0)

(f) ***Total CAMA Calls*** — This count reflects the total number of calls which were received for automatic number identification (ANI) or operator number identification (ONI). (MSC 3 OMS 0)

(g) ***Total ONI Calls*** — This count is the total number of calls received on an ONI trunk for which an information digit was received indicating ONI is required. (MSC 3 OMS 0)

(h) ***Total ANI Calls*** — To determine this count, the total ONI calls must be subtracted from the total CAMA calls.

(i) ***Total INWATS Calls*** — This count is made during the terminating trunk hunt when the type or routing data block is determined to be INWATS. (MSC 5 OMS 0)

(j) ***Total Outgoing Intertoll Seizures*** — This count is the sum of the outgoing seizure peg counts collected from all intertoll TSGs. This count only indicates that an idle trunk was found during trunk hunt and does not indicate that the outgoing call was successfully completed. (MSC 5 OMS 0)

(k) ***Total Outgoing Toll Completing Seizures***—Provides a count of all seizures on Toll Completing trunks. This count is made before outpulsing. (MSC 5 OMS 0)

(l) ***DP Outpulsing Attempts*** — This total reflects the total number of DP calls for which at least one digit was sent to the SP for outpulsing. This count includes the number of DP calls which occurred due to ineffective attempts

during outpulsing and for which retrial trunk hunts were performed. (MSC 5 OMS 2)

(m) ***CCIS Outgoing Calls*** — This count indicates the total number of CCIS outgoing calls. Every call for which an address message was transmitted is counted including retrial. (MSC 5 OMS 2)

8. QUEUE LENGTHS

8.01 Due to the varying volume of traffic presented to the switching system, there are times when service equipment, MF transmitters, MF receivers, etc, may not be available at the instant required by a call proceeding through the call processing chain. When this occurs, the call will be put on a waiting list called a queue rather than failing to be serviced. As a service device becomes idle, a call is moved off the queue for that device and presented for servicing.

8.02 The measurement system provides measures of the activity on these queues relating to device availability. The availability can be affected by several conditions. Under engineering, too many devices out of service for maintenance, extended time required to perform designated function (holding time), or large volumes of traffic can contribute to a degradation of service due to the lack of availability of service devices. Any one or a combination of these conditions may cause this problem. The machine administrator must monitor the queue activity to aid in maintaining a high grade of service.

8.03 A brief description of the queue measurements is provided in the following paragraphs.

(a) ***MF Transmitters*** — MF calls which have received a valid start dial signal are put on this queue. The queue is of varying length, determined by the number of units installed minus those units presently maintenance busy plus those units presently idle. Based on this formula, it is very evident that MF transmitter holding time and waiting for wink time will have a large impact on calls attempting to access MF transmitters. A congestion situation at a far-end office could prevent a call from accessing an MF transmitter although idle MF transmitters were available. This would occur if a slow wink response from the congested office resulted in calls in the waiting-for-wink condition preventing other calls from getting on the queue. Peg count, usage, and queue abandon counts are provided for this queue. A fourth measure, MF transmitter queue entry failure, indicates the number of calls which went to final handling because the queue was full.

(b) ***CCIS Transceivers*** — To be provided.

(c) ***CAMA Operator*** — This queue is of a variable length and is a function of CAMA operator positions which are assigned to the No. 4 ESS. The queue length will equal four times the number of CAMA positions occupied (a maximum of 256). Counts provided are for peg count, usage, overflow, and abandon. A count of calls which remained on the CAMA operator queue for over five seconds is also provided.

(d) ***DP ANI MF Receiver*** — All CAMA calls require an MF receiver to accept the digits identifying the calling number. Peg count, usage, and abandon counts are maintained in this category. This queue is a fixed length of 64 calls. It applies to only those CAMA calls which originate on DP trunks.

(e) ***MF Originations*** — This queue is a linked list of the trunk registers of all MF trunks which have accepted MF seizures. Peg count, usage, and abandon counts are maintained.

(f) ***DP Call Register*** — This queue is of fixed length with a maximum of 64 entries. Peg count, usage, overflow, and abandon counts are provided.

(g) ***CCIS Call Register*** — To be provided.

(h) ***High Priority Disk*** — The maximum number of entries on this queue is fixed at 48. Only call processing requests are assigned high priority. Peg count, usage, and overflow counts are recorded.

(i) ***Low Priority Disk*** — Counts are scored for peg count, usage, and overflow. Call processing does not use this queue.

(j) ***DP Incoming Worklist Full/DP Outgoing Worklist Full*** — These counts indicate when an SP cannot process DP calls due to the volume of DP calls. These counts are scored when an SP reports the worklist full.

This is not the count of calls blocked but a count of the times the worklists became full for the DP incoming worklist. The DP outgoing worklist full count is the number of actual calls blocked.

9. TIMING INTERVALS

9.01 As calls proceed along the call processing chain, they are subjected to various timing intervals. Some intervals are required to determine that valid signals have been received while others insure the capability to operate with other types of switching systems.

9.02 These timing intervals insure that the switching system does not expend valuable processing time waiting for indications or data which will not be forthcoming.

9.03 In most cases, attempts which do not pass these timing intervals are given a second trial. Failures on second trial, and some first trials, are forwarded to final handling disposition. Some timing intervals are common to all call types while others are unique to a specific call type. Failures due to timing intervals result in ineffective attempts.

A. Wink Start Timing

9.04 For trunks which require wink-start operation, a wink is sent from the terminating end of the trunk to indicate the ready to receive digits condition. When an incoming seizure is recognized, this wink, which has a duration of 150 milliseconds (ms), is sent to the originating end of the trunk. This timing is common to both DP and MF call types. The wink is an off-hook condition, toward the originating end, on the "M" lead of the incoming trunk (ICT). If the ICT returns to the on-hook condition during or at the end of this timing interval, the attempt will be scored as a false start abandon on dial pulse-delay dial trunks. On an MF trunk, this same condition will be scored as a permanent signal time-out. This is due to a difference in the position of the 150 ms wink timing in the DP and MF call processing sequence.

B. Early Digit Timing

9.05 An immediate start trunk does not require return supervision. Dial pulse immediate start trunks can be expected to forward digits immediately after the incoming seizure is recognized. In order to insure recognition of the first digit sent, a 60 or 90 ms early-digit-timing is employed.

9.06 In some cases the signal processor performs a 30 ms hit timing on trunks. If the SP is doing hit timing, a 60 ms early digit timing is accomplished by call processing. If no hit timing is currently provided by the SP, call processing utilizes a 90 ms early digit timing interval. This interval is only employed on DP-immediate-start trunks. On-hook of the ICT at the end of this timing interval will be scored as a false-start abandon.

C. Dial Pulse Reflection Timing

9.07 On dial pulse delay-dial calls, a 40 ms reflection timing is performed after completion of the 150 ms wink-start timing. This protects against hits or spurious pulses caused by equipment at the far end from being recognized as a digit or on-hook. At the end of this timing, the trunk register is initialized for digit reception. If the ICT is on-hook at the end of this interval, the attempt will be scored as a false-start abandon.

D. Permanent Signal Timing

9.08 To prevent seizures which are not valid attempts from tying up equipment, a permanent signal timing is provided. If no digits have been received by the end of this interval, the seizure is directed to final handling.

9.09 In the case of MF call types, a 2-second permanent signal timing is used. If the trunk is an operator trunk, an additional 10-second timing is provided for a total of 12 seconds for operator trunk permanent signal timing. The additional 10-second timing is provided based on the incoming signalling characteristics being a Toll Operator or TSPS type. This timing starts when the MF receiver is attached to the ICT.

9.10 Permanent signal timing for DP seizures is accomplished by the SP. This timing is a combination of permanent signal and partial dial timing. The SP makes three reports at intervals of 4.65 seconds. After the third report (approximately 14 seconds), the attempt is directed to final handling.

9.11 DP attempts which time out score permanent signal and partial dial (PSPD) time-out count.

MF attempts score the permanent signal time-out (PSTO) count.

E. Partial Dial Timing

9.12 On each MF incoming bid for service, for which one digit has been received, a 15-second partial dial timing is initiated. If the expected number of digits, including the ST pulse, has not been received at the end of the 15 seconds, the attempt is sent to final handling and scored as a partial dial time-out (PDTO). If the ICT goes on-hook during this interval, the attempt is scored as a partial dial abandon (PDA).

9.13 DP attempts are monitored by the signal processor which contains the timing for permanent signal and partial dial. Partial dial abandon is also determined by the SP.

F. Start Dial Timing

9.14 When an outgoing trunk is seized, an off-hook condition is presented to the far end. Before pulsing is commenced, the far end must indicate readiness to accept digits. Failure to get the start-dial signal will result in a no-start dial (NSD) or integrity check failure (IKF) as discussed in the following paragraphs.

9.15 With the exception of immediate-start trunks, a four-second interval is provided for the far end to return a start dial signal. When this interval elapses, and no off-hook signal has been received, the scoring of failures are accomplished in the following manner:

(a) ***Delay Dial-Start Dial (DD-SD)*** — First failure scores integrity check failure (IKF), then retrial is initiated. If the retrial fails, the IKF is again scored and the final trial IKF is scored. The attempt is sent to final handling.

(b) ***Wink Start*** — First failures score no start dial (NSD), then retrial is attempted. Second trial failures score NSD and final trial NSD, and the attempt goes to final handling.

9.16 The start dial signal from the far end is an off-hook condition followed by an on-hook condition. A measure of the time between the two conditions determines if a valid start dial indication has been received.

(a) ***DP DD-SD*** — The interval between off-hook and on-hook must be equal to or greater than 60 ms to be a valid start dial signal. If the interval is less than 60 ms, a restart of the four-second start dial timing is initiated.

(b) ***DP and MF Wink Start*** — The interval between the off-hook and on-hook must be equal to or greater than 100 ms. If this criterion is not met, a restart of the four-second start dial timing is initiated.

G. Glare Timing

9.17 When switching machines at both ends of a two-way TSG attempt to seize the same trunk at the same time, a condition known as glare exists. When this condition exists, one of the machines must back off and permit the other machine to proceed with an attempt. Switching machines can be arranged to react to glare conditions as directed by the MA. Guidelines for this procedure are established in DFMP Division H, Section 9c, No. 4 ESS Assignment Practices.

9.18 This timing is started when the off-hook of the start-dial signal is received. The No. 4 ESS employs four unique glare timing intervals, and two distinct checks are made to determine if a glare condition exists.

9.19 An initial glare check is performed when the outgoing trunk is determined to be a two-way trunk. At this time a direct scan of the "E" lead is made to determine if the OGT is off-hook from the far end at the time of the scan. If a glare condition exists, the glare occurrence count is incremented. If this is the first glare occurrence, a retrial will be initiated. A glare failure on retrial scores the glare occurrence count, and the attempt is sent to final handling.

9.20 The four timing intervals are provided to accommodate the various types of calls which are processed. The criteria which determine which of the four timing intervals is used include type of signalling, traffic carried, and first or second (final) trial.

- Intertoll wink-start first trial — .350 seconds
- Intertoll wink-start trunk second trial — 4.0 seconds

- Intertoll DD-SD Trunk first and second trial — 4.0 seconds
- Toll connecting DD-SD trunk first trial — 5.0 seconds
- Toll connecting DD-SD trunk second trial — 10.0 seconds

9.21 The glare timing is applied to all outgoing trunks regardless of directionality. Obviously, a one-way outgoing trunk should not be seized from the far end. It is possible, however, to enounter glare indications during glare timing on a one-way outgoing trunk. These indications could be the result of a trunk trouble producing a false off-hook condition that remains for the duration of the timing interval. If all criteria are met, the call will be treated as if glare had occurred; however, no glare counts will be scored on the one-way outgoing trunk. If the trunk is wink-start, an NSD will be scored. An IKF will be scored if the trunk is DD-SD. When glare time-out occurs on a two-way trunk, counts are scored based on whether the No. 4 ESS maintains control (GLC) or backs off allowing the far end control (GLR). If one glare condition has occurred, a retrial is permitted. A retrial failure due to glare scores GLC or GLR as well as a final trial glare occurrence.

9.22 If the No. 4 ESS backs off due to a glare condition, the seizure from the far end is immediately treated as an incoming seizure.

9.23 The glare counts are available in the measurement data base. The maintenance data breaks the glare counts into the types of glare response (GLC, GLR). For the purposes of the traffic data base, these counts are combined into a total glare occurrence count.

H. DP Stop-Go Timing

9.24 Expected stop/go operation is accommodated by a four-second timing interval. If the "go" signal (on-hook) is not received by the end of the four seconds, a retrial is initiated. The failure of the retrial will result in the call being forwarded to final handling and the scoring of a final trial XST (expected stop).

I. Pulsing Delay

9.25 During outpulsing, three delay intervals are associated with the MF and DP call types.

9.26 DP outpulsing incorporates a 70 ms initial delay and also a 70 ms delay when the last digit is outpulsed.

9.27 If MF outpulsing is 7 pulses per second (pps), a 20 ms initial delay is incorporated. If 10 pps outpulsing is used, an 80 ms initial delay is used.

J. Ring Forward Timing

9.28 Ring forward is a method for operators to call back on a trunk when additional information is required. This signal consists of a momentary on-hook without breaking the connection. For metallic trunks, a 130V signal is used for ring forward signalling.

9.29 At the on-hook a 200 ms timing is initiated. If the off-hook condition has not returned at the end of this interval, the circuit is considered as disconnected. If the off-hook condition returns before time-out of the 200 ms, the circuit reverts to the talk state.

K. Guard Timing

9.30 In various places in the call processing chain, attempts may be terminated. When this occurs, the equipment which has been seized prior to this time must be returned to the idle state. Guard timing intervals are instituted to allow all equipment to return to the idle state before the next attempt is processed. Guard timing, on the disconnect of a call, permits the far end to return to an idle state before another attempt is made on the same trunk.

9.31 Guard timing intervals may be from .1 to 1 second in duration depending on the application.

L. High Priority Disk Request Queue Timing

9.32 When disk access is required for call processing, and no disk request register is available, the request is placed on the high-priority queue. When placed on the queue, the entry is timed; and, if not serviced at the end of 10 seconds, the attempt is returned to the main call processing

where it is directed to final handling. On this failure there is no second trial.

M. Tone Trunk or Recorded Announcement Disconnect Timing

9.33 When a tone trunk or recorded announcement trunk is attached to an ICT, a 30-60 second timing is initiated. At the end of this timing, the ICT is disconnected from the RA or RO trunk. Failure to connect to a RA/RO trunk results in the ICT being put on the high and wet list.

N. CAMA Timing

9.34 The CAMA operation requires timing intervals which are associated with automatic number identification (ANI) and operator number identification (ONI). CAMA determination is made after all digits have been received and routing has been determined.

ANI Seizure Timing

9.35 For ANI calls, a five-second interval is provided to collect the calling party number. A five-second time-out before all digits are received results in the call being forwarded to ONI. An ANI office failure (ANF) will be scored in this situation.

ONI Seizure Timing

9.36 In the ONI operation, a five-second seizure timing is provided to permit seizure of a CAMA operator position. This should not be confused with the five-second ANI seizure timing as this interval is only concerned with seizure of the position. A time-out without seizure of a position results in the scoring of CAMA seizure time-out (CST) and the call being sent to final handling.

Order Tone Timing 100 ms (480 hz)

9.37 Prior to digits being collected, two spurts of 100 ms order tone must be sent. These two 100 ms spurts are separated by a 100 ms interval.

Position Attachd Timing

9.38 If the 100 ms order tones have been sent and a position has not yet been attached (the call is connected to audible ring), a 30-second position attached interval is initiated. A time-out results in the call being sent to final handling.

Connection to Audible Ring Timing

9.39 For CAMA calls which are in the position attached timing, an additional two-second timing may be introduced. If the ICT has not been connected to an audible ring trunk at the start of the 30-second timing, the two-second timing is also started. If an audible ring trunk has not been connected to the ICT at the end of two seconds, the attempt to connect an audible ring trunk is abandoned. The network path hunt failure and announcement and tone group overflow are scored. The call does not fail at this point but continues the 30-second position attached timing.

Order Tone Timing 500 ms

9.40 Calls which are sent to the ONI, due to five-second ANI seizure time-out, utilize a 500 ms order tone in place of the two 100 ms order tones normally provided in ONI operation.

Disconnect Timing 5 Seconds

9.41 When the SP sends orders to release the "M" relays of the talk trunk and keying trunk, a five-second timing is started. When the keying trunk is reported off-hook (position disconnected) the AMA call record is formed.

Disconnect Timing 200 ms (Ring Forward)

9.42 When the ICT goes on-hook, a 200 ms timing is started on the disconnect (on-hook condition) of the outgoing trunk. If the ICT reverts to the off-hook condition prior to this time-out, the call reverts to the talk state. If both ICT and OGT are on-hook at the end of the 200 ms, a CAMA disconnect is recognized.

Outgoing Trunk Off-Hook Timing

9.43 When an OGT disconnect is received, a check is made of the ICT to determine if the on-hook condition is present, indicating a total disconnect. If the ICT is off-hook, an 800 ms timing is started. If the off-hook lasts more than 800 ms, a 10-second disconnect is initiated. If the off-hook lasts less than 800 ms, a CAMA answer is indicated.

Disconnect Timing 10 Seconds

9.44 An off-hook from the ICT lasting more than 800 ms is subjected to a 10-second disconnect timing. If the off-hook condition exists at the end of the 10 seconds, a 1-second guard-timing is provided before the circuits are disconnected.

10. TRUNK ERROR ANALYSIS

10.01 The machine administrator should be familiar with the trunk error analysis program (TERA). TERA works in connection with and is scheduled by the trunk maintenance administration program (TMAD) which handles call failures in the No. 4 ESS. The purpose of TERA is to:

(1) Record trunk failure data on a per occurrence basis

(2) Analyze trunk failure data to identify faulty trunks

(3) Compile a list of TSGs that have the poorest performance on a daily basis.

10.02 Inputs and outputs associated with TERA are handled by the TMAD program. A detailed description of TERA can be found in Section 234-180-241 of Bell System Practices.

10.03 This is a trunk maintenance tool which may prove valuable to the machine administrator in identifying problem areas.

TABLE A

TRAFFIC MEASUREMENT DEFINITIONS

MSC 0 OMS 0

MF RECEIVER COUNTS

1. *Seizure Peg Count* — This count is incremented by one when an idle receiver is made service busy.

2. *Receiver Service Usage* — This counter is incremented after each 10-second scan, by the number of receivers found service busy. Output data is converted to CCS by the traffic program.

3. *Receiver Maintenance Usage* — After each 10-second scan, this counter will be incremented by the number of receivers found maintenance busy. This data is converted to CCS units before output.

MF TRANSMITTER COUNTS

4. *Transmitter Queue Peg Count* — When a CR is linked to the queue the count is incremented by one.

5. *MF Transmitter Queue Usage* — After each 10-second scan, this counter is incremented by the number of call registers linked to the queue. This data will be converted to CCS units by the traffic program before output.

6. *MF Transmitter Queue Abandon Peg Count* — This counter is incremented by one when the call register of a call that has been abandoned is unlinked from the MF Transmitter Queue.

7. *MF Transmitter Seizure Peg Count* — This counter is incremented by one when an idle MF transmitter is made service busy. This is done by writing a service busy state code in the transmitter trunk register (TR). The MF transmitter seizure peg count reflects not only the number of MF outgoing calls, but also the number of successful reattempts to seize and MF transmitter for calls that have experienced ineffective attempts during outpulsing.

8. *MF Transmitter Service Usage* — After each 10-second scan, this counter will be incremented by the number of MF transmitters found service busy. This data will be converted to CCS units by the traffic program before output.

9. *MF Transmitter Maintenance Usage* — After each 10-second scan period, this counter will be incremented by the number of MF transmitters found maintenance busy. Before output, this data will be converted to CCS units by the traffic program.

MSC 1 OMS 0

CCIS TRANSCEIVERS

1. *CCIS Transceiver Seizure Peg Count* — When a call register (CR) is linked on the CCIS transceiver queue, this counter is incremented by one. Only international calls queue for a CCIS transceiver.

2. *CCIS Transceiver Service Usage* — After each 10-second scan this register is incremented by the number of CCIS Transceivers linked on the CCIS transceiver queue. This data will be converted by the traffic program to CCS units before output.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 1 OMS 0

3. *CCIS Transceiver Maintenance Usage* — This counter is incremented by the number of CCIS transceivers found maintenance busy after each 10-second period. This data is converted to CCS units before output.

4. *CCIS Transceiver Overflow Peg Count* — This counter is incremented by one when a hunt for an idle CCIS transceiver fails because there are no idle transceivers in the group.

5. *VPA Cancellation and Path Hunt Peg Count* — Each call will increment this counter by one when the Voice Path Assurance (VPA) test on a CCIS outgoing trunk is canceled due to the current level of overload control. This counter is also incremented when a network path between the CCIS transceiver and the outgoing trunk can not be found.

MSC 2 OMS 0 THRU 29

ANNOUNCEMENT CIRCUITS

There can be up to 32 types of announcement and tone groups in No. 4 ESS. The announcement or tone group number will be equal to the OMS number. The following paragraphs describe how each of the counters in one announcement or tone group are to be adjusted when a group is accessed.

1. *Announcement Group Seizure Peg Count* — When a path through the network between an incoming trunk and an announcement or tone has been seized and connected, this counter is incremented by one.

2. *Dedicated TSI Usage* — After each 10-second scan, this counter is incremented by the total number of paths through the network between an incoming trunk and an announcement or tone that are seized and connected. This data is converted into CCS units by the traffic program before output.

3. *Dedicated TSI Overflow Peg Count* — This counter is incremented by one when a hunt for an idle announcement or tone circuit fails because there was no available time slot in the TSI.

MSC 3 OMS 0

CAMA

1. *Total CAMA Positions Seizure Peg Count* — This counter is incremented by one when an occupied (manned) and idle CAMA operator position is made occupied and busy. This is accomplished by changing the first busy idle bit associated with a position's keying trunk from 1 to 0.

2. *Total CAMA Positions Service Usage* — After each 10-second scan, this counter is incremented by the number of CAMA operator positions that are found occupied and service busy. This data is converted into CCS by the traffic program before output.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 3 OMS 0

3. *CAMA Positions Usage* — This counter is incremented by the number of CAMA positions found occupied after each 10-second scan. This data is converted into CCS for output.

4. *CAMA Position Abandon During Seizure Peg Count* — This counter is incremented by one when an operator unplugs from her position after it has been seized but prior to the completion of the order tones.

5. *CAMA Positions Disconnect Peg Count* — When an operator depresses the position disconnect key or unplugs from a position in the face of a seizure after the reception of the order tones, this counter is incremented by one.

6. *CAMA Operator Queue Peg Count* — When a call register is linked on the CAMA operator queue, this counter is incremented by one.

7. *CAMA Operator Queue Usage* — After each 10-second scan, this counter is incremented by the number of call registers linked on the CAMA operator queue. This data is converted into CCS by the traffic program before output.

8. *CAMA Operator Queue Overflow Peg Count* — When an attempt to link a call register on the CAMA operator queue fails because the queue is full, this counter is incremented by one.

9. *CAMA Operator Queue Abandon Peg Count* — This counter is incremented by one when the call register of a call that has been abandoned is unlinked from the CAMA operator queue.

10. *DP ANI MF Receiver Queue Peg Count* — This counter is incremented by one when a call register associated with a DP ANI call is linked on the DP ANI MF receiver queue. This link to the queue is necessary while awaiting a receiver to collect the information digit and the calling number.

11. *DP ANI MF Receiver Queue Usage* — After each 10-second scan, this counter is incremented by the number of call registers (associated with a DP ANI call) that are linked on the DP ANI MF receiver queue. This data is converted into CCS by the traffic program before output.

12. *DP ANI MF Receiver Queue Abandon Peg Count* — When the call register of a call that has been abandoned is unlinked from the DP ANI MF receiver queue, this counter is incremented by one.

13. *Total CAMA Calls Peg Count* — After a called number is received for automatic number identification (ANI), or operator number identification (ONI), this counter is incremented by one.

14. *Operator Number Identification (ONI) Peg Count* — This counter is incremented by one when a CAMA call originates on an ONI trunk and when an information digit is received which indicates that ONI is required.

15. *CAMA Calls Queued Over 5 Seconds Peg Count* — This measurement reflects the number of call registers linked on the CAMA operator queue for greater than 5 seconds.

16. *Automatic Number Failure Peg Count* — On CAMA automatic number identification calls, each time an error is received in the calling party number digits as received from ANI equipment, or the ANI timeout interval is exceeded, this counter will be incremented by one.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 3 OMS 0

17. *ANI Office Failure Peg Count* — This counter will be incremented by one each time, on CAMA automatic number identification calls, an indication is received from the connecting office that no ANI information will be forthcoming.

MSC 3 OMS 1

CAMA

1. *Match Check Failure Peg Count* — This counter is incremented by one when it is determined that the operator has keyed in the called number instead of the calling number.

2. *Wrong Calling Code Peg Count* — When it is determined that the operator has keyed in an invalid calling code, this counter is incremented by one.

MSC 3 OMS 2

CAMA

1. *AMA Call Record Peg Count* — This counter is incremented by one when an AMA call record is stored in the AMA tape buffer.

2. *AMA Tape Block Peg Count* — When a 510 character block of AMA data is written onto the AMA tape, this counter is incremented by one.

MSC 4 OMS 0

NETWORK

1. *Network Path Hunt Success Peg Count* — This counter is incremented by one when a path through the network has been seized. This action either reserves a path between an incoming trunk and an outgoing trunk or corresponds to the connection of a service circuit to an incoming or outgoing trunk.

2. *Network Path Hunt Failure Peg Count* — When an attempt to seize an idle path through the network has failed because it appeared that no acceptable idle path was available, this counter is incremented by one. This counter contains the total number of network path hunt failures.

3. *Network Total Usage* — After every 180 second scan, the total number of occupied paths in the network is added to this counter. This data is converted into CCS by the traffic program before output.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 5 OMS 0

OFFICE TOTALS

1. *Total Incoming Calls Peg Count* — This counter is incremented for every incoming call for which at least one digit has been received.

2. *Total Inwats Calls Peg Count* — This counter is incremented by one during the terminating trunk hunt when the type or routing data block is determined to be INWATS.

3. *Total Outgoing Intertoll Trunk Seizure Peg Count* — This counter is set to the sum of the outgoing seizure peg counts collected from all outgoing intertoll TSGs at the time of the collection of TSG data.

4. *Total Outgoing Toll Completing Trunk Seizure Peg Count* — This counter is set to the sum of the outgoing seizure peg counts collected from all outgoing toll connecting and toll completing TSGs at the time of the collection of TSG data.

MSC 5 OMS 1

OFFICE TOTALS

1. *MF Incoming Seizure Peg Count* — This counter is incremented at the start of each base level cycle by the number of MF originations processed in the last base level cycle. This count of originations includes false starts, permanent signals, continuity test failures, as well as incoming calls.

2. *DP Delay Dial Incoming Seizure Peg Count* — When a DP origination is recognized on a DP delay dial trunk, this counter is incremented by one.

3. *DP Immediate Start Incoming Seizure Peg Count* — When a DP origination is recognized on a DP immediate start trunk, this counter is incremented by one.

4. *CCIS Incoming Calls Peg Count* — The CCIS incoming calls count is calculated each quarter hour. A summation of the CCIS call register seizure peg count, the CCIS origination call register queue overflow peg count, and the CCIS origination call register queue abandon peg count is stored in this counter.

MSC 5 OMS 2

OFFICE TOTALS

1. *MF Outgoing Attempts Peg Count* — This measurement reflects the total number of MF outgoing call attempts. This counter reflects not only the number of MF outgoing calls, but also the number of times MF outpulsing recurred for MF calls that experienced ineffective attempts during outpulsing and for which retrial trunk hunts were performed.

2. *DP Outpulsing Attempts Peg Count* — This counter is incremented by one when DP outpulsing is first attempted for an outgoing DP call. That is, when the first digit to be outpulsed is sent to the signal processor.

   This counter reflects not only the number of DP outgoing calls, but also the number of times DP outpulsing recurred for DP calls that experienced ineffective attempts during outpulsing and for which retrial trunk hunts were performed.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 5 OMS 2

3. *CCIS Outgoing Calls Peg Count* — This measurement reflects the total number of all CCIS outgoing calls. Every call for which an initial address message is transmitted is included in this count. This measurement also reflects the number of times retrial trunk hunts were performed for CCIS outgoing calls for which a backward failure message is received or for which the voice path assurance test fails.

MSC 5 OMS 3

OFFICE TOTALS

1. *Stable Calls Lost, Carrier Group Failure, Peg Count* — For each call in the waiting for answer state or in the talking state that is lost due to carrier group failure, this counter is incremented by one.

MSC 6 OMS 0

MF IRREGULARITIES

1. *MF Non-OP False Start Peg Count* — Each time a bid for service is received on an incoming MF non-operator trunk, but no digits are received and the call is abandoned prior to permanent signal time out, this counter will be incremented by one.

2. *MF OP False Start Peg Count* — This counter will be incremented by one each time a bid for service is received on an incoming MF trunk with operator pulsing but for which no digits are received, and the call is abandoned prior to permanent signal time out.

3. *MF Non-OP Permanent Signal Peg Count* — Each time a bid for service is received on an incoming MF trunk without operator pulsing but for which no digits are received with in the permanent signal time out interval, this counter will be incremented by one.

4. *MF OP Permanent Signal Peg Count* — This counter is increased by one each time a bid for service is received but no digits are received within the permanent signal time out interval on an incoming MF trunk with operator pulsing.

5. *MF Non-OP Partial Dial Abandon Peg Count* — This counter will be incremented by one each time a bid for service is received on an incoming MF trunk without operator pulsing and at least one digit (but less than the expected number of digits) is received, and the bid is removed prior to partial dial time out.

6. *MF OP Partial Dial Abandon Peg Count* — This counter will be increased by one each time a bid for service is received on an incoming MF trunk with operator pulsing, and at least one digit (but less than the expected number of digits) is received, and the bid is removed prior to partial dial time out.

7. *MF Non-OP Partial Dial Time Out Peg Count* — This counter will be incremented by one each time at least one (but less than the expected number of digits) is received prior to partial dial time out on an incoming MF trunk without operator pulsing.

8. *MF OP Partial Dial Time Out Peg Count* — This counter will be increased by one when at least one but less than the expected number of digits is received prior to partial dial timeout on an incoming MF trunk with operator pulsing.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 7 OMS 0

DP IRREGULARITIES

1. *DP Non-OP False Start Peg Count* — Each time a bid for service is received on an incoming DP trunk without operator pulsing, but no digits are received and the call is abandoned prior to permanent signal time out, this counter will be incremented by one.

2. *DP OP False Start Peg Count* — This counter will be incremented by one each time a bid for service is received on an incoming DP trunk with operator pulsing, but for which no digits are received and the call is abandoned prior to permanent signal time out.

3. *DP Non-OP Permanent Signal Peg Count* — Each time a bid for service is received on an incoming DP trunk without operator pulsing, but for which no digits are received within the permanent signal time out interval, this counter will be incremented by one.

4. *DP OP Permanent Signal Peg Count* — This counter is incremented by one each time a bid for service is received on an incoming DP trunk with operator pulsing but for which no digits are received within the permanent signal time out interval.

5. *DP Non-OP Partial Dial Abandon Peg Count* — This counter will be incremented by one each time a bid for service is received on an incoming DP trunk without operator pulsing, and at least one digit (but less than the expected number of digits) is received and the bid is removed prior to partial dial time out.

6. *DP OP Partial Dial Abandon Peg Count* — This counter will be incremented by one each time a bid for service is received on an incoming DP trunk with operator pusling, and at least one digit, but less than the expected number of digits, is received and the bid is removed prior to partial dial time out.

7. *DP Non-OP Partial Dial Time Out Peg Count* — This counter will be increased by one each time at least one, but less than the expected number of digits, is received prior to partial dial time out on an incoming DP trunk without operator pulsing.

8. *DP OP Partial Dial Time Out Peg Count* — This counter will be incremented by one each time at least one, but less than the expected number of digits, is received prior to partial dial time out on an incoming DP trunk with operator pulsing.

MSC 7 OMS 1

DP IRREGULARITIES

1. *Incoming DP Early Digit Peg Count* — This counter is incremented by one when a call is sent to final handling treatment after the reception of a digit buffer report from the signal processor. This report indicates that a DP change of state occurred prior to the time when the system is ready to receive digits. This count is incremented for both immediate start and delay dial/start dial trunks.

2. *Incoming DP Worklist Full Peg Count* — When a call is sent to final handling treatment after the reception of a digit buffer incoming DP "worklist full" report from the signal processor, this counter will be increased by one. This count only reflects the number of times the work list was full, not the number of calls blocked due to the work list being full.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 7 OMS 1

3. *DP Outpulsing Worklist Full Peg Count* — When a call is sent to final handling treatment because the signal processor DP outpulsing worklist is full, this counter will be incremented by one.

MSC 8 OMS 0

INCOMING PROCESSING DELAYS

1. *MF Incoming Delay Acceptable Peg Count* — This counter is incremented by the test call program when the length of the MF incoming delay (measured by a test call) is less than or equal to the seizure time threshold.

2. *MF Incoming Delay Unacceptable Peg Count* — When the length of the MF incoming delay interval measured for a test call is greater than the seizure time threshold, this counter is incremented by one by the test call program.

3. *DP Incoming Delay Acceptable Peg Count* — This counter is incremented by one when the length of the DP incoming delay interval measured for a test call is less than or equal to the seizure time threshold.

4. *DP Incoming Delay Unacceptable Peg Count* — When the length of the DP incoming delay interval measured for a test call is greater than the seizure time threshold, this counter is incremented by the test call program.

5. *CCIS Incoming Delay Acceptable Peg Count* — When the length of the CCIS incoming delay interval measured for a test call is less than or equal to the seizure time threshold, this counter is incremented via the test call program.

6. *CCIS Incoming Delay Unacceptable Peg Count* — This counter is incremented when the length of the CCIS incoming delay interval (measured by a test call) is greater than the seizure time threshold.

MSC 9 OMS 0

PROCESSOR LOAD

1. *Average Base Level Cycle Length* — This time is obtained by adding together the number of base level cycles (approximately 10 ms of time is used to enter base level) plus the number of 10 ms interjects that occurred in each base level cycle, and then dividing the whole by the number of base level cycles. The quotient will then be multiplied by 10 to produce the average base level cycle length in milliseconds. The time spent in maintenance interrupts is *not* included in this average length.

MSC 9 OMS 1

1. *Non-Load No Overload Control Peg Count* — This measurement reflects the number of base level cycles during which no overload controls were in effect.

2. *Non-Load MAC Overload Control Peg Count* — This counter is incremented by the overload control program at the beginning of each base level cycle if it had instituted the set of state two controls in

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 9 OMS 1

the previous base level cycle. These controls are nonload affecting, but restrict the number of segments allowed the maintenance administration control (MAC) program in the base level cycle.

3. *Non-Load Segment Overload Control Peg Count* — At the beginning of each base level cycle, this counter is incremented by the overload control program if the set of state three controls had been instituted in the previous base level cycle. These controls are nonload affecting, but restrict the number of segments that are allowed for deferrable programs. In addition, a total dynamic overload control (DOC) MC1 control is sent out to contiguous offices.

4. *Load Level 1 Overload Control Peg Count* — This counter is incremented at the beginning of each base level cycle if the overload control program had instituted the set of state four controls in the previous base level cycle. These controls reduce the accepted load to an overload level 1, further reduce the number of segments that MAC can have, and restrict the voice path assurance (VPA) test for CCIS outgoing calls.

5. *Load Level 2 Overload Control Peg Count* — The overload control program will increment this counter at the beginning of each base level cycle, if the set of state four controls had been instituted in the previous cycle. These controls further reduce the accepted load to an overload level 2 and send out a total DOC MC2 control to continuous offices.

6. *Load Level 3 Overload Control Peg Count* — This counter is incremented by the overload control program at the beginning of each base level cycle if it had instituted the set of state six controls in the previous base level cycle. These controls reduce the accepted load to zero.

MSC 10 OMS 0 THRU 2047

TRAFFIC SEPARATIONS

1. *Traffic Separation Class Peg Count* — This counter is incremented by one just before a call goes into the waiting for answer state. Both INSEP and DESEP will reside in the CR and can be retrieved to index the counter block.

2. *Traffic Separation Class Usage* — After each 180 second scan, this register will be incremented by the number of calls (for this class) that are found busy. The traffic measurements program will convert this number to CCS units before output.

MSC 11 OMS 0

INEFFECTIVE ATTEMPTS

MSC 11 is the ineffective attempt measurement class for the nonequipment related ineffective machine attempts (NIAs). The following paragraphs define each counter for each NIA as it is referred to in a No. 4 ESS.

1. *Pusling Error Peg Count* — This register will be incremented by one each time one or more of the received digits is in error. This error may be defined by one of the following:

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 11 OMS 0

(a) Multilated Digit — On MF pulsing calls, when a single frequency or more than two frequencies are received in a digit pulse.

(b) Misplaced Start — On MF pulsing calls, when a start (ST) signal is received in an improper position.

(c) False Key Pulse — On MF pulsing calls, when a second keypulse (KP) signal is received.

(d) Extra Digit — When more digits are received than are expected.

(e) Extra Pulse — On DP calls, when an eleventh pulse is received for a single digit.

(f) Pulsing Error Other — This includes such things as a valid MF code which is an illegal character, or any other error not covered by one of the above definitions.

2. *Outpulsing Failures Peg Count* — This register will be incremented by one each time an outpulsing failure occurs for any of the following reasons:

(a) Unexpected Stop — This count will be incremented by one each time an unexpected stop dial signal is received because of any of the following reasons.

(1) Any stop dial during pulsing on an MF trunk.

(2) Any stop dial during pulsing on a DP trunk that does not have the "expect stop-go" class.

(3) A second stop dial during pulsing on a DP trunk that does have "expect stop-go" class.

(4) On DP stop-go trunks, a stop dial at an invalid time.

(b) Integrity Check Failure — Each time there is a failure of the trunk E&M lead integrity check (expected on delay dial-start dial trunks) this counter will be incremented by one.

(c) Continuity Test Failure — This count will be incremented by one each time there is a failure of the continuity and polarity test.

(d) No Start Dial — This count will be increased by one each time the delay dial signal (off-hook) from the office persists beyond the transmitter time out interval on MF or DP delay dial trunks. For wink start trunks, this count is also incremented if the first part of the wink (on to off-hook) is not received within the transmitter time out interval, or the second part of the wink (off to on-hook) is not received within a specified interval of receipt of the first part of the wink.

(e) Expected Stop Time Out — Each time, on any DP trunk with expected stop-go class, an unexpected stop dial signal is received during outpulsing and persists beyond the transmitter time out interval, this counter will be incremented by one.

3. *Glare Peg Count* — This register will be incremented by one each time a glare condition is encountered on any trunk terminating in the No. 4 ESS. This is Total Office Final Trial Glare.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 11 OMS 1

INEFFECTIVE ATTEMPTS

1. *Final Trial Network Path Hunt Failure Peg Count* — This counter is incremented when a call is sent to final handling treatment because an attempt to seize an idle path through the network fails due to no acceptable idle path availability.

2. *No Circuit Intertoll Peg Count* — When a call is sent to final handling treatment because it has overflowed all the available intertoll routes in its routing chain, this counter is incremented by one.

3. *No Circuit Toll Completing Peg Count* — When a call is sent to final handling treatment because it has overflowed all of the available toll completing routes to its destination, this counter is incremented by one.

4. *Carrier Group Failure Peg Count* — This counter is incremented by one for every incoming seizure that is processed as an origination and is later determined to be an off-hook due to a carrier group failure.

MSC 11 OMS 2

INEFFECTIVE ATTEMPTS

1. *Vacant Code Peg Count* — When a call is sent to final handling treatment because a return from translations is interpreted to be a vacant code (unassigned routing digits have been received for this call), this counter is incremented by one.

2. *INWATS Band Check Peg Count* — When a call is sent to final handling treatment because a return from the terminating translation indicates that the zonal band check has failed, this counter will be incremented by one.

MSC 11 OMS 3

INEFFECTIVE ATTEMPTS

1. *Code Block Control Blocked Peg Count* — When a call that has been blocked by a network management code block control is sent to final handling treatment, this counter is incremented by one.

2. *SDOC Control Blocked Peg Count* — This counter is incremented when a call that has been blocked by a network management selective dynamic overload control is sent to final handling treatment.

3. *STR Control Blocked Peg Count* — When a call has been blocked by a network management activated selective trunk reservation control and sent to final handling treatment, this counter is incremented by one.

4. *Cancel To Control Blocked Peg Count* — This counter is increased by one when a call that has been blocked by a network management "cancel to control" is sent to final handling treatment.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 11 OMS 3

5. *Cancel From Control Blocked Peg Count* — When a call is blocked by a network management "cancel from control" and then sent to final handling treatment, this counter is incremented by one.

6. *AOOC Blocked Peg Count* — When a call is blocked by a network management "automatic out of chain" control and sent to final handling treatment, this counter will be incremented by one.

MSC 11 OMS 4

INEFFECTIVE ATTEMPTS

1. *MF Transmitter Queue Entry Failure Peg Count* — This counter is incremented by one when a call is sent to final handling treatment because the number of entries on the MF transmitter queue, plus the number of calls waiting to go on the MF transmitter queue, is greater than the number of nonmaintenance busy MF transmitters.

2. *MF Transmitter Queue Abandon Peg Count* — This counter is incremented by one when the call register of a call that has been abandoned is unlinked from the MF transmitter queue (same count as MSC 0 OMS 0 — F).

MSC 11 OMS 5

INEFFECTIVE ATTEMPTS

1. *DP CR Queue Overflow Peg Count* — When an attempt to link the trunk register of a trunk associated with a DP call to an entry on the DP call register queue fails because there is no free entry on the queue, this counter will be incremented by one (same count as MSC 17 OMS 0 — G).

2. *DP CR Queue Abandon Peg Count* — This counter is incremented by one when the trunk register of a trunk associated with a DP call that has been abandoned is unlinked from the DP call register queue (same count as MSC 17 OMS 0 — H).

3. *CCIS Origination CR Queue Overflow Peg Count* — When an attempt to place an IAM and other identifying information associated with a CCIS call in an entry on the CCIS origination call register queue fails because no free entry is available, this counter will be incremented by one (same count as MSC 17 OMS 0 — K).

4. *CCIS Origination CR Queue Abandon Peg Count* — When the IAM and other identifying information for a CCIS call that has been abandoned is removed from the CCIS origination call register queue, this counter is incremented by one (same count as MSC 17 OMS 0 — L).

5. *MF Origination Queue Abandon Peg Count* — This counter is incremented by one when the trunk register of a trunk with an MF origination is unlinked from the MF origination queue after the origination is abandoned (same count as MSC 17 OMS 0 — 0).

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 12 OMS 0

TSI USAGE

Measurement subclass 12 is the time slot interchange (TSI) usage measurement class. This MSC provides the capability of obtaining estimates of the usage on up to eight selected TSIs.

1. *TSI Number* — This register contains the TSI number that was previously specified by an input message as requiring usage measurements. Up to eight TSI numbers can be stored.

2. *TSI Usage Measurement* — For those TSIs that require usage measurements, the TSI usage (occupancy) count is determined every 180 seconds by counting the busy idle bits in the time slot memory map. The traffic measurements program will convert this count into CCS before output.

MSC 13

TRUNK SUBGROUPS

There are three possible types of output measurement sets. These sets relate to the TSGs by directionality. That is, one way incoming, one way outgoing, and two-way. The OMS number will be the abbreviated circuit identification number (CIN) of the TSG. Each TSG is provided with a complete set of traffic counters (irrespective of its directionality). Thus for one way TSGs, certain counters will be unused and should always contain zeros.

OMS

FOR ONE WAY INCOMING TRUNK SUBGROUPS

1. *Incoming Seizure Peg Count* — When an incoming trunk in this TSG is represented as busy (by changing the trunk's busy idle bits from one to zero), this counter is incremented by one.

2. *Total Usage Measurement* — The trunk subgroups occupancy counter is scanned every 180 seconds for the number of busy circuits. This number is accumulated over the measurement interval and converted to CCS units before output.

MSC 13 OMS

FOR ONE WAY OUTGOING TRUNK SUBGROUPS

1. *Outgoing Attempts Peg Count* — This counter is incremented by one when an idle outgoing trunk in this TSG is made busy by changing the trunk's busy idle bits from one to zero. Should an outgoing ineffective attempt occur on this TSG prior to or during outpulsing, a retrial trunk hunt starting with this TSG can be performed. The TSG outgoing attempts peg counter, if nonzero, is decremented prior to the retrial trunk hunt to avoid pegging it twice for the same call. Note that the number of call attempts made on a TSG is the sum of the TSG outgoing attempts peg counter and the TSG overflow peg counter.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 13 OMS

2. *Total Usage Measurement* — The trunk subgroups occupancy counter is scanned every 180 seconds for the number of busy circuits. This number is accumulated over the measurement interval and converted to CCS units before output.

3. *Overflow Peg Count* — This counter is incremented by one when an attempt to hunt an idle trunk fails because there are no idle trunks in this TSG.

4. *Reroute To Seizure Peg Count* — This counter is incremented by one whenever a call which is routed out of chain to this outgoing TSG seizes an idle trunk. This count includes the number of incoming calls that have been automatically or manually rerouted out of chain and recognized by the via office as out of chain routed. It also includes the number of calls which may have been rerouted in this office by either a manual reroute control or an automatic out of chain control. Should an outgoing ineffective attempt occur on this TSG for a call that has been routed out of chain to it, the TSG reroute to seizure peg counter, if nonzero, is decremented by one prior to a retrial trunk hunt.

5. *SDOC Peg Count* — Whenever an attempt to hunt an idle trunk in this TSG is aborted because a selective dynamic overload control (SDOC) is in effect, this counter is incremented by the network management program.

6. *STR Peg Count* — This counter is increased by one by the network management program whenever an attempt to hunt an idle trunk in this TSG is aborted because a selective trunk reservation control is in effect.

7. *Cancel To Peg Count* — Whenever an attempt to hunt an idle trunk in this TSG is aborted because a manual "Cancel To" control is in effect, the network management program will increment this counter by one.

8. *Manual From Peg Count* — This counter is increased by one by the network management program whenever an attempt to hunt an idle trunk in this TSG is aborted because a manual "Cancel From" control is in effect. In addition, this counter is incremented by one whenever an attempt fails to find an idle trunk in this TSG and the call is rerouted because a manual reroute control is in effect.

9. *Skip Peg Count* — Whenever an attempt to hunt an idle trunk in this TSG is aborted because a "skip" control is in effect, the network management program will increment this counter.

10. *Time Out Peg Count* —This counter is incremented by one by the network management program whenever outpulsing over an OGT in an MF or DP TSG cannot begin because the proper response to a seizure was not received.

MSC 13 OMS

FOR TWO WAY TRUNK SUBGROUPS

1. *Incoming Seizure Peg Count* — When an incoming trunk in this TSG is represented as busy (by changing the trunks busy idle bits from one to zero), this counter is incremented by one.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 13 OMS

2. *Outgoing Attempts Peg Count* — This counter is incremented by one when an idle outgoing trunk in this TSG is made busy by changing the trunks busy idle bits from one to zero. Should an outgoing ineffective attempt occur on this TSG prior to, or during outpulsing, a retrial hunt can be performed (starting with this TSG). The TSG outgoing attempts peg counter, if nonzero, is decremented prior to the retrial trunk hunt to avoid pegging it twice for the same call. Note that the number of call attempts made on a TSG is the sum of the TSG outgoing attempts peg counter and the TSG overflow peg counter.

3. *Total Usage Measurement* — The trunk subgroup's occupancy counter is scanned every 180 seconds for the number of busy circuits. This number is accumulated over the measurement interval and converted to CCS units before output.

4. *Overflow Peg Count* — This counter is incremented by one when an attempt to hunt an idle trunk fails because there are no idle trunks in this TSG.

5. *Reroute To Seizure Peg Count* — This counter is incremented by one whenever a call which is routed out of chain to this outgoing TSG seizes an idle trunk. This count includes the number of incoming calls that have been automatically or manually rerouted out of chain and that have been recognized by the via office as out of chain routed. It also includes the number of calls which may have been rerouted in this office by either a manual reroute control or an automatic out of chain control. Should an outgoing ineffective attempt occur on this TSG for a call that has been routed out of chain to it, the TSG reroute to seizure peg counter, if nonzero, is decremented by one (prior to a retrial trunk hunt).

6. *SDOC Peg Count* — Whenever an attempt to hunt an idle trunk in this TSG is aborted because a selective dynamic overload control (SDOC) is in effect, this counter is incremented by one by the network management program.

7. *STR Peg Count* — This counter is incremented by one by the network management program whenever an attempt to hunt an idle trunk in this TSG is aborted because a selective trunk reservation control is in effect.

8. *Cancel To Peg Count* — Whenever an attempt to hunt an idle trunk in this TSG is aborted because a manual "Cancel To" control is in effect, the network management program will increment this counter by one.

9. *Manual From Peg Count* — This counter is incremented by one by the network management program whenever an attempt to hunt an idle trunk in this TSG is aborted because a manual "Cancel From" control is in effect. In addition, this counter is incremented by one whenever an attempt fails to find an idle trunk in this TSG and the call is rerouted because a manual reroute control is in effect.

10. *Skip Peg Count* — Whenever an attempt to hunt an idle trunk in this TSG is aborted because a "skip" control is in effect, the network management program will increment this counter by one.

11. *Time Out Peg Count* — This counter is incremented by one by the network management program whenever outpulsing over an OGT in an MF or DP TSG cannot begin because the proper response to a seizure was not received.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 14 OMS 0

CCIS DATA LINK

The OMS numbers for this MSC will correspond to the CCIS signaling links (CCIS Terminals) engineered for the No. 4 ESS office. Each OMS will supply the following 16 measurements.

1. *VFL-1 Near-end Initiated Automatic Changeovers Peg Count* — This counter is incremented by one when a signaling link is automatically relieved of its traffic load (changeover) and this event is initiated by the near end office.

2. *VFL-2 Near-end Initiated Automatic Changeovers Peg Count* — Same as (1) above except for VFL-2

3. *VFL-1 Far-end Initiated Automatic Changeovers Peg Count* — This counter is incremented by one when a signaling link is automatically relieved of its traffic load (changeover) and this event is initiated by the far end office.

4. *VFL-2 Far-end Initiated Automatic Changeovers Peg Count* — Same as (3) above except for VFL-2

5. *VFL-1 Retransmission Requests Peg Count* — This counter is maintained by the CCIS terminal and it is incremented by one each time a retransmission request is received by the terminal. If the number of changeovers for the signaling link is zero during a quarter hour, this count is read from the terminal memory and attributed to the VFL over which transmission occurred during the quarter hour. The count of retransmission requests for the other VFL of the pair is set to zero. If changeovers occurred during the quarter hour, the retransmission requests peg counters for both VFLs are set to zero.

6. *VFL-2 Retransmission Requests Peg Count* — Same as (5) above except for VFL-2

7. *VFL-1 Signal Units in Error Peg Count* — This counter is maintained by the CCIS terminal and it is incremented by one each time a signal unit is received in error by the terminal. (A signal unit is considered in error when the 8 bit checksum over the other 20 bits in the signal unit that is transmitted do not match the checksum over the first 20 bits in the signal unit that is computed upon reception of the signal unit). If the number of changeovers for the signaling link is zero during the quarter hour, this count is read from the terminal memory and attributed to the VFL over which transmission occurred during the quarter hour. The count of signal units in error for the other VFL of the pair is set to zero. If changeovers occurred during the quarter hour, the signal units in error peg counts for both VFLs are set to zero.

8. *VFL-2 Signal Units in Error Peg Count* — Same (7) above except for VFL-2.

9. *VEL-1 Quarter Hour in Service Peg Count* — This counter is set to one each quarter hour during which no changeovers for the signaling link occurred. The quarter hour in service peg counter for the other VFL of the pair is set to zero. If changeovers occurred during the quarter hour, the quarter hour in service peg counters for both VFLs are set to zero.

10. *VFL-2 Quarter Hour in Service Peg Count* — Same as (9) above except for VFL-2

11. *Received Repeated ACU Peg Count* — This counter is maintained by the CCIS terminal and is incremented by one each time a received Acknowledgement Signal Unit (ACU) contains a block acknowledgement number equal to the block acknowledgement number in the last ACU received. If the

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 14 OMS 0

number of changeovers for the signaling link is zero during the quarter hour, this count is read from the terminal. Otherwise, it is set to zero.

12. *Received Skipped ACU Peg Count* — This counter is maintained by the CCIS terminal and is incremented by one each time a received ACU contains an acknowledgement number that is more than one greater than the block acknowledgement number in the last ACU received. A retransmission request is then made for the skipped block. If the number of changeovers for the signaling link is zero during the quarter hour, this count is read from the terminal. Otherwise it is set to zero.

13. *Total Incoming Data Filled Signal Units Peg Count* — This counter is maintained by the CCIS terminal and is incremented by one for each non-SYN, non-ACU signal unit that is received. This count includes retransmitted data filled signal units.

14. *Total Outgoing Data Filled Signal Units Peg Count* — This counter is maintained by the CCIS terminal and is incremented by one for each non-Synchronour (SYN), non-ACU signal unit that is transmitted. This count includes retransmitted data filled signal units.

15. *Incoming IAM Peg Count* — This counter is maintained by the CCIS terminal and is incremented by one for each Initial Address Message (IMA) that is received. This count includes retransmitted IAMs.

16. *Outgoing IAM Peg Count* — This counter is maintained by the CCIS terminal and is incremented by one for each IAM that is transmitted. This count includes retransmitted IAMs.

MSC 15 OMS 0

INTERNATIONAL CALLS

Information for this measurement subclass is not presently available. It will be issued at a later date.

MSC 16 OMS 0

I/O, FILE STORE, TAPE UNIT, AND DATA LINK

1. *Output Message Success Peg Count* — When an output message is successfully loaded and placed on the translate link list, this counter is incremented by one.

2. *Output Message Failure Peg Count* — This counter is incremented by one when an output message is not successfully loaded due to: incorrect input data in the PRINT call; or to a failed attempt to remove output message register (OMRs) from the OMR idle link list (insufficient OMRs available); or the idle link list is found in an invalid state.

3. *OMR Seizure Peg Count* — Each time an output message is loaded into one or more output message registers (OMRs) this counter is incremented by the number of OMRs removed from the OMR idle link list.

4. *OMR Usage* — The OMR occupancy counter is scanned every ten seconds for the number of OMRs that are busy. This number is accumulated over the measurement interval and it is converted to CCS units before output.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 16 OMS 0

5. *OMR Overflow Peg Count* — When an attempt to remove OMRs from the OMR idle link list for an output message fails because sufficient OMRs are not available, this counter is incremented by the number of OMRs requested for the output message.

MSC 16 OMS 1

I/O, FILE STORE, TAPE UNIT, AND DATA LINK

1. *Disk Requests Accepted Peg Count* — This counter is incremented by one immediately before the load success return of the file store administration submit program for each disk request that is successfully loaded in a disk request register or placed on the high priority or low priority queue.

2. *Disk Requests Rejected Peg Count* — Immediately before the immediate fail return or queue full return of the file store administration submit program for each rejected request, this counter will be incremented by one. A request is rejected when a software check determines that the input parameters fail range checks or that the specified file is under supervision of the fault recognition recovery program. In addition, a request is rejected when an attempt to place it on a queue fails because the queue is either full or garbaged.

3. *Disk Requests Successfully Completed Peg Count* — Immediately before the successful completion return of the file store administration answer dispenser program, this counter will be incremented by one.

4. *Disk Requests Canceled Peg Count* — This measurement is an accumulation of counts that reflect the number of times a disk request was loaded in a disk request register (DRR) and then canceled.

5. *Disk Requests Failed Peg Count* — This measurement is summary of counts that reflect the total number of times a disk request failed. This count does not include disk requests canceled.

6. *High Priority Queue Peg Count* — When the data associated with a disk request is placed in an entry on the high priority queue, this counter is incremented by one.

7. *High Priority Queue Usage* — The high priority queue occupancy count is scanned every ten seconds for the number of entries on the queue. This number is accumulated over the measurement interval and it is converted to CCS units before output.

8. *High Priority Queue Overflow Peg Count* — When an attempt to place a disk request in an entry on a high priority queue fails because no free entry is available, this counter will be incremented by one.

9. *Low Priority Queue Peg Count* — When the data associated with a disk request is placed in an entry on the low priority queue, this counter is incremented by one.

10. *Low Priority Queue Usage* — The low priority queue occupancy count is scanned every ten seconds for the number of entries on the queue. This number is accumulated over the measurement interval and then converted to CCS units before output.

11. *Low Priority Queue Overflow Peg Count* — When an attempt to place a disk request in an entry on a low priority queue fails because no free entry is available, this counter will be incremented by one.

12. *DRR 0 Peg Count* — This counter is incremented by one when a disk request register for file store community 0 (DRR 0) is seized to be loaded with a disk request or when disk request data is removed from a queue entry, and a DRR 0 is found available for loading. The DRR 0 status indicators are then set to busy.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 16 OMS 1

13. *DRR 0 Usage* — The DRR 0 occupancy count is scanned every ten seconds for the number of registers that are busy. This number is accumulated over the measurement interval and converted to CCS units before output.

14. *DRR 0 Overflow Peg Count* — When an attempt to seize a DRR 0 fails because no idle DRR 0 is available, this counter is incremented by one.

15. *DRR 1 Peg Count* — This counter is incremented by one when a disk request register for file store community 1 (DRR 1) is seized to be loaded with a disk request or when disk request data is removed from a queue entry, and a DRR 1 is found available for loading. The DRR 1 status indicators are then set to busy.

16. *DRR 1 Usage* — The DRR 1 occupancy count is scanned every ten seconds for the number of registers that are busy. This number is accumulated over the measurement interval and converted to CCS units before output.

17. *DRR 1 Overflow Peg Count* — When an attempt to seize a DRR 1 fails because no idle DRR 1 is available, this counter is incremented by one.

MSC 17 OMS 0

ENGINEERED MEMORY

1. *MF CR Seizure Peg Count* — When a call register (CR) is removed from the link list of idle CRs and initialized for an MF call or for a test call, this counter will be incremented by one.

2. *DP CR Seizure Peg Count* — When a CR is removed from the link list of idle CRs and initialized for a DP call, this counter will be incremented by one.

3. *CCIS CR Seizure Peg Count* — When a CR is removed from the link list of idle CRs and initialized for a CCIS call, this counter will be incremented by one.

4. *CR Usage* — The call register occupancy count is scanned every ten seconds for the number of CRs that are busy. This number is accumulated over the measurement interval and then converted to CCS units before output.

5. *DP CR Queue Peg Count* — When the trunk register (TR) of a trunk associated with an incoming DP call is linked to an entry on the DP CR queue, this counter will be incremented by one.

6. *DP CR Queue Usage* — The DP CR queue occupancy count is scanned every ten seconds for the number of entries on the queue. This number is accumulated over the measurement interval and it is converted to CCS units before output.

7. *DP CR Queue Overflow Peg Count* — This counter is incremented by one when an attempt to link the trunk register of a trunk handling a DP call with an entry on the DP CR queue fails because there is no free entry on the queue.

8. *DP CR Queue Abandon Peg Count* — When the trunk register of a trunk associated with a DP call that has been abandoned is unlinked from the DP CR queue, this counter is incremented by one.

9. *CCIS Origination CR Queue Peg Count* — This counter is incremented by one each time an initial address message (IAM) is read from a terminal for which no CR can be assigned. The message and identifying information will be stored in an entry on the queue.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 17 OMS 0

10. *CCIS Origination CR Queue Usage* — The queue occupancy count is scanned every ten seconds for the number of entries on the queue. This number is accumulated over the measurement interval and then converted to CCS units before output.

11. *CCIS Origination CR Queue Overflow Peg Count* — When an attempt to place an IAM, and other identifying information associated with a CCIS call, in an entry on the CCIS origination CR queue fails because no free entry is available, this counter is incremented by one.

12. *CCIS Origination CR Queue Abandon Peg Count* — When the IAM and other identifying information for a CCIS call that has been abandoned is removed from the CCIS origination call register queue, this counter is incremented by one.

13. *MF Origination Queue Peg Count* — When the trunk register of a trunk with an MF origination is linked to the MF origination queue, this counter will be incremented by one.

14. *MF Origination Queue Usage* — The MF origination queue occupancy count is scanned every ten seconds for the number of entries on the queue. This number is accumulated over the measurement interval and then converted to CCS units before output.

15. *MF Origination Queue Abandon Peg Count* — When the trunk register of a trunk with an MF origination is unlinked from the MF origination queue after the origination is abandoned, this counter is incremented by one.

MSC 17 OMS 1

ENGINEERED MEMORY

1. *TMR Seizure Peg Count* — When a trunk maintenance register (TMR) is removed from the link list of idle TMRs and initialized for a trunk maintenance test, this counter will be incremented by one.

2. *TMR Usage* — The TMR occupancy count is scanned every ten seconds for the number of registers that are busy. This number is accumulated over the measurement interval and converted to CCS units before output.

3. *TMR Overflow Peg Count* — This counter is incremented by one when an attempt to seize an idle TMR fails because there are no idle TMRs on the TMR idle link list.

TABLE A (Cont)

TRAFFIC MEASUREMENT DEFINITIONS

MSC 17 OMS 0

CAMA INEFFECTIVE ATTEMPTS

1. *CAMA Position Seizure Timeout Peg Count* — This register will be incremented when an occupied and idle CAMA operator position is seized, but remains unassigned until it times out.

2. *CAMA Position Error Peg Count* — When any error is committed by a CAMA operator which results in the call being aborted (for example; double keying, extra digit or key timeout, this register will be incremented by one.

3. *CAMA Position Report Peg Count* — This register will be incremented by one when a trouble condition is reported by the operator. An example might be poor transmission. This results in a predetermined seven digit trouble code being keyed (rather than a calling party number) and the call is aborted.

4. *CAMA Operator Position Abandon During Seizure Peg Count* — This counter is incremented by one when an operator unplugs from her position after it has been seized but prior to the completion of the order tones. (Same as MSC 3 OMS 0 — D.)

5. *CAMA Position Disconnect Peg Count* — When an operator depresses the position disconnect key, or unplugs from her position in the face of a seizure after the reception of the order tones, this counter is incremented by one (same as MSC 3 OMS 0 — E).

6. *CAMA Operator Queue Overflow Peg Count* — When an attempt to link a call register on the CAMA operator queue fails because the queue is full, this counter incremented by one (same as MSC 3 OMS 0 — H).

7. *CAMA Operator Queue Abandon Peg Count* — This counter is incremented when the call register of a call that has been abandoned is unlinked from the CAMA operator queue (same as MSC 3 OMS 0 — I).

8. *DP ANI MF Receiver Queue Abandon Peg Count* — When the call register of a call that has been abandoned is unlinked from the DP ANI MF receiver queue, this counter is incremented by one. (Same as MSC 3 OMS 0 — L).

9. *Misrouted CAMA Peg Count* — This counter is incremented by one when a call is sent to final handling treatment because a return is made from the local call intercept translation that says the call should have been completed locally.

10. *Unauthorized CAMA Peg Count* — This counter is incremented by one when a call is sent to final handling treatment because a return is made from the local call intercept translation which indicates that the dialed number is unauthorized for CAMA (for example, operator codes).

TABLE B

IMA CATEGORIZATION SUMMARY

FAILURES		BLOCKAGES	
INCOMING	OUTGOING	INTERNAL	EXTERNAL
CGF	ATO	CQA	AOB
CPE	CFD	CQO	CBB
CTO	CKF	DED	CFB
CTR	IKF	DQA	CTB
CST	SNF	DQO	GLR
*FSA 1—4	UXS	HQO	NCI
IAD		IWF	NCT
IWS		MQA	NSD
MAB		OQA	SDB
MCA		OQO	SRB
OPA		OWF	XST
OPD		PHF	
*PDA 1—4		RQA	
*PDT 1—4		TQA	
*PER 1—4		TQF	
*PST 1—4			
UCA			
VCA			

* 1 — DP Operator
  2 — DP Non-Operator
  3 — MF Operator
  4 — MF Non-Operator

TABLE C

IMA DEFINITIONS

NO CIRCUIT

AOB – Out of Chain Blocked — *MSC 11* *OMS 4*

This IMA occurs when an AOC call is blocked by a NM control. This check is made in the initial stages of the trunk hunt sequence. TMAD determines the call was blocked by NM and directs the appropriate register to be scored.

NCI – No Circuit Intertoll — *MSC 11* *OMS 1*

Failure to find an idle circuit on initial or trunk rehunt for an intertoll trunk occurs in outgoing trunk hunt sequence.

DP - Fig. 2, Sheet 1
MF - Fig. 4, Sheet 1
CCIS -

NCT – No Circuit Toll — *MSC 11* *OMS 1*

Failure to find an idle toll connecting trunk on initial or retrial trunk hunt occurs in outgoing trunk hunt sequence.

DP - Fig. 2, Sheet 1
MF - Fig. 4, Sheet 1
CCIS -

GLR – Glare Occurrence — *MSC 11* *OMS 0*

Occurs in outgoing trunk hunt sequence when two switching machines attempt to seize the same 2-way trunk at the same time.

DP - Fig. 2, Sheet 1
MF - Fig. 4, Sheet 1
CCIS -

Traffic measurements presents a count of all glare occurrences in office, both initial glare check failures and glare timing failures.

CONTROL

CBB – Code Blocked — *MSC 11* *OMS 4*

Results from a NM code block control. Checks for code block are made in the early stages of digit translations.

DP - Fig. 1, Sheet 3
MF - Fig. 3, Sheet 2

TABLE C (Cont)

IMA DEFINITIONS

CIRCUIT (Cont)

CFB – Canceled From a TSG — *MSC 11* *OMS 4*

Calls which are canceled after a trunk hunt on a TSG, which has this control applied, will score this count.

CTB – Canceled To a TSG — *MSC 11* *OMS 4*

This IMA is the result of a NM control applied to a TSG. Calls are canceled when they attempt to make a trunk hunt on the TSG which has the control activated.

SDB – Blocked by Selective Dynamic Overload Control — *MSC 11* *OMS 4*

Calls which are blocked by SDOC action score this count.

SRB – Blocked by Selective Trunk Reservation — *MSC 11* *OMS 4*

Calls blocked by STR controls increment this IMA.

Note: These IMA counts do not appear on the flow charts. TMAD determines the cause of failure and scores the appropriate register.

CAMA

OQA – CAMA Operator Queue Abandon — *MSC 3* *OMS 0*

Occurs during incoming sequence for a CAMA call. Incoming trunk goes on-hook while on CAMA operator queue.

CAMA – Fig. 6, Sheet 2

OQO – CAMA Operator Queue Full — *MSC 3* *OMS 0*

Occurs when an incoming CAMA call cannot get on CAMA operator queue due to queue being full. This IMA is the CAMA operator queue overflow peg count.

CAMA - Fig. 6, Sheet 2

RQA – Abandon CAMA MFR Queue — *MSC 3* *OMS 0*

Occurs when a DP ANI call goes on-hook while on queue for an MF receiver, required for ANI operation.

CAMA - Fig. 6, Sheet 1

Note: These counts also appear in MSC 18 OMS 0.

TABLE C (Cont)

IMA DEFINITIONS

INTERNAL QUEUES

CQA – CCIS Origination Queue Abandon *MSC 11* *OMS 5*

Occurs during incoming sequence when the IAM or other identifying information is removed from CR queue for a CCIS call.

CCIS –

CQO – CCIS Origination Queue Full *MSC 11* *OMS 5*

Occurs when ther' is overflow on the CCIS origination queue during incoming CCIS call sequence.

CCIS –

DED – Dial Pulse Early Digit Lost

This IMA occurs when the SP determines that an early digit was lost or an immediate start DP trunk.

DP - Fig. 1, Sheet 1

DQO – Dial Pulse CR Queue Full *MSC 11* *OMS 5*

Occurs during incoming DP call sequence. The DP CR queue overflow reflects this IMA. It occurs after at least 3 digits have been received.

DP - Fig. 1, Sheet 1

IWF – Incoming Dial Pulse Worklist Full *MSC 7* *OMS 1*

Occurs when the signal processor cannot process any more DP originations DP worklist full report from SP triggers this count. This is only the count of the timers the worklist was full, not the number of calls denied.

DP - Fig. 1, Sheet 1

MQA – Abandon MF Origination Queue *MSC 11* *OMS 5*

Occurs when incoming MF trunk returns to on-hook condition while on queue for an MF CR and receiver.

MF - Fig. 3, Sheet 1

TABLE C (Cont)

IMA DEFINITIONS

INTERNAL QUEUES (Cont)

MAB – Miscellaneous Abandon

Occurs when the incoming trunk goes on-hook during outgoing sequence. The trunk administration program determines cause of failures and increments this register, for DP the MAB is scored when the ICT goes on-hook before outpulsing is complete.

DP - Fig. 2, Sheets 2 and 3
MF - Fig. 4, Sheets 2, 3, and 4
CCIS -

PHF – Network Path Hunt Failures *MSC 4* *OMS 0*

Occurs whenever there is a failure to find a path through the time division network. Occurs during both incoming and outgoing sequences. The count is made on the ability to reserve a path. If a network path has been reserved and there is a failure to find that path idle at time of activation no count is recorded.

DP - Fig. 1, Sheet 3; Fig. 2, Sheets 1, 2, and 3
MF - Fig. 3, Sheet 1; Fig. 4, Sheets 1, 2, and 3
CCIS -
CAMA - Fig. 6, Sheets 1, 2, and 4

OWF – DP Outpulsing Worklist Full *MSC 7* *OMS 1*

When the queue for outpulsing by the SP is full and no more DP calls can be entered on the list. This check is made after the valid start dial is received.

DP - Fig. 2, Sheet 2

TQA – MF Transmitter Queue Abandon *MSC 11* *OMS 5*

Occurs prior to MF outpulsing and after a valid start dial is received from far end.

MF - Fig. 4, Sheet 2

TQF – MF Transmitter Queue Full *MSC 11* *OMS 5*

Occurs in outgoing sequence of an MF call when a call cannot get on the queue for an MF transmitter due to the number of MF calls writing to be serviced. This check is made after the start dial signal is received.

MF - Fig. 4, Sheet 2

TABLE C (Cont)

IMA DEFINITIONS

INTERNAL QUEUES (Cont)

HQO – High Priority Disk Queue Full *MSC 16* *OMS 1*

Occurs whenever disk access is required but there is no room on the queue. This IMA is reflected as high priority queue overflow.

DKAD - Fig. 5

TIMEOUTS

NSD – No Start Dial *MSC 11* *OMS 0*

Occurs in the outgoing sequence for DP and MF calls. This IMA is the result of a time-out awaiting wink-start signal.

DP - Fig. 2, Sheet 1
MF - Fig. 4, Sheet 1

XST – Expected Stop Timeout *MSC 11* *OMS 0*

This IMA occurs on DP trunks conditioned for expected stop-go operation during outpulsing. When the interval of the stop signal exceeds 4 seconds stop-go timing interval.

DP - Fig. 2, Sheet 2

Note: These counts are combined with several other IMAs which are categorized as outpulsing failures.

OUTGOING FAILURES

ATO – Address Complete Timeout (CCIS)

This count is the result of a CCIS call timing out while waiting for an address complete signal on an outgoing trunk.

CCIS -

CFD – Call Fail Detection (CCIS)

This IMA occurs when a confusion signal, release guard message or reset signal, is received.

CCIS -

TABLE C (Cont)

IMA DEFINITIONS

OUTGOING FAILURES (Cont)

CKF – CCIS Continuity Check Failure *MSC 11* *OMS 0*

A failure of the continuity test of the talk path of a CCIS call results in this IMA.

CCIS –

SNF – CCIS Signaling Network Failure *MSC 11* *OMS 0*

A failure to send an initial address message (outgoing trunk) or an address complete message (incoming trunk) due to a failure of the signaling network or when a refusal signal is received for an outgoing CCIS call will increment this count.

CCIS –

IKF – Integrity Check Failure *MSC 11* *OMS 0*

This IMA occurs when there is a failure of the E&M lead integrity check on a delay dial – start dial trunk when the timing for the start dial signal is exceeded this IMA is scoared.

DP - Fig. 2, Sheet 1

UXS – Unexpected Stop *MSC 11* *OMS 0*

This IMA occurs any time there is an unexpected stop during outpulsing. This does not include DP trunks conditioned for expected stop-go operation.

DP - Fig. 2, Sheet 2
MF - Fig. 4, Sheet 3

Note: IKF and UXS counts are combined in the count for outpulsing failures along with CKF, NSD, and XST counts.

VACANT CODE/INWATS

IWS – INWATS Screening Failure *MSC 11* *OMS 2*

This count occurs during the translations when it is determined that the zonal band check has failed. This IMA is not indicated on the flow charts but is incremented as a result of terminating translations.

DP - Fig. 1, Sheet 2
MF - Fig. 3, Sheet 2
CCIS -

TABLE C (Cont)

IMA DEFINITIONS

VACANT CODE/INWATS (Cont)

VCA – Vacant Code Announcement — *MSC 11* *OMS 2*

This IMA occurs when translations determines that non-routable digits have been received.
DP - Fig. 1, Sheets 1 and 2
MF - Fig. 3, Sheet 2
CCIS -

PERMANENT SIGNAL TIMEOUT/FALSE START ABANDONS

CGF – Carrier Group Failure — *MSC 11* *OMS 1*

This IMA occurs when incoming seizures are processed and then determined to be off-hook due to carrier failures.

PSTO – Permanent Signal Time Out — *(MF) MSC 6* *OMS 0*; *(DP) MSC 7* *OMS 0*

This IMA occurs due to seizure which is processed but no digits are received within a timed interval. The ICT remains off-hook during this interval. Counts are provided for DP operator, DP non-operator, MF operator and MF non-operator trunks.
DP - Fig. 1, Sheet 1
MF - Fig. 3, Sheet 1

FSA – False Start Abandon — *(MF) MSC 6* *OMS 0*; *(DP) MSC 7* *OMS 0*

This IMA occurs when a seizure is recognized and the ICT returns to the on-hook condition before the permanent signal time-out interval is exceeded. No digits are received during this interval. Counts are provided for MF and DP operator and non-operator trunks.
DP - Fig. 1, Sheet 1
MF - Fig. 3, Sheet 1

INCOMING FAILURES NON-CAMA

CTO – Continuity Timeout (CCIS)

When the test on signal is not received before the time-out interval is exceeded, this IMA is scored.

IAD – Incomplete Address Message (CCIS)

When the initial address message contains insufficient data to route the CCIS call, this count is scored.

TABLE C (Cont)

IMA DEFINITIONS

INCOMING FAILURES NON-CAMA (Cont)

PDA – Partial Dial Abandon — *(MF) MSC 6* *OMS 0*; *(DP) MSC 7* *OMS 0*

This IMA occurs when at least one digit is received on a seizure and the ICT returns to the on-hook state prior to the expected number of digits being received or exceeding the partial dial time-out interval. Counts are maintained on DP and MF operator and non-operator trunks.

DP - Fig. 1, Sheet 1
MF - Fig. 3, Sheet 2

PDT – Partial Dial Timeout — *(MF) MSC 6* *OMS 0*; *(DP) MSC 7* *OMS 0*

This IMA occurs when one digit has been received on a seizure but the partial dial time interval has been exceeded before the expected number of digits have been received.

DP - Fig. 1, Sheet 1
MF - Fig. 3, Sheet 2

PER – Pulsing Errors — *MSC 11* *OMS 0*

This category of IMA includes all errors in the pulse train. This could be mutilated digits and such. This register is scored based on determination of failure by TMAD.

DP - Fig. 1, Sheet 3
MF - Fig. 3, Sheet 2

INCOMING FAILURE – CAMA

CPE – CAMA Position Error — *MSC 18* *OMS 0*

This count occurs when the CAMA operator makes an error which results in the call being aborted, such as double keying.

CST – CAMA Seizure Timeout — *MSC 18* *OMS 0*

This IMA occurs when the 5-second ONI seizure timing is exceeded. This is scored when the CAMA position fails to recognize the seizure within 5 seconds.

CAMA - Fig. 6, Sheet 2

TABLE C (Cont)

IMA DEFINITIONS

INCOMING FAILURE – CAMA (Cont)

CTR – CAMA Position Trouble Report *MSC 18* *OMS 0*

This results from a 7-digit trouble code being keyed by the CAMA operator. The trouble could represent problems with transmission, etc.
CAMA - Fig. 6, Sheet 3

OPA – CAMA Position Abandon *MSC 3* *OMS 0*

When an operator unplugs from a CAMA position after it has been seized but prior to the completion of order tones, this action will cause an IMA.
CAMA - Fig. 6, Sheet 2

OPD – CAMA Position Disconnect *MSC 3* *OMS 0*

When the CAMA operator pushes the disconnect key or unplugs in the face of a seizure after order tones have been sent, this IMA is scored.
CAMA - Fig. 6, Sheet 2

MCA – Misrouted CAMA *MSC 18* *OMS 0*

This IMA is scored when it is determined by local call intercept translation that the call should have been handled locally.
CAMA - Fig. 6, Sheets 1 and 3

UCA – Unauthorized CAMA *MSC 18* *OMS 0*

When translations indicate that the dialed number is not authorized for CAMA, this count is scored.

CAMA - Fig. 6, Sheets 1 and 3

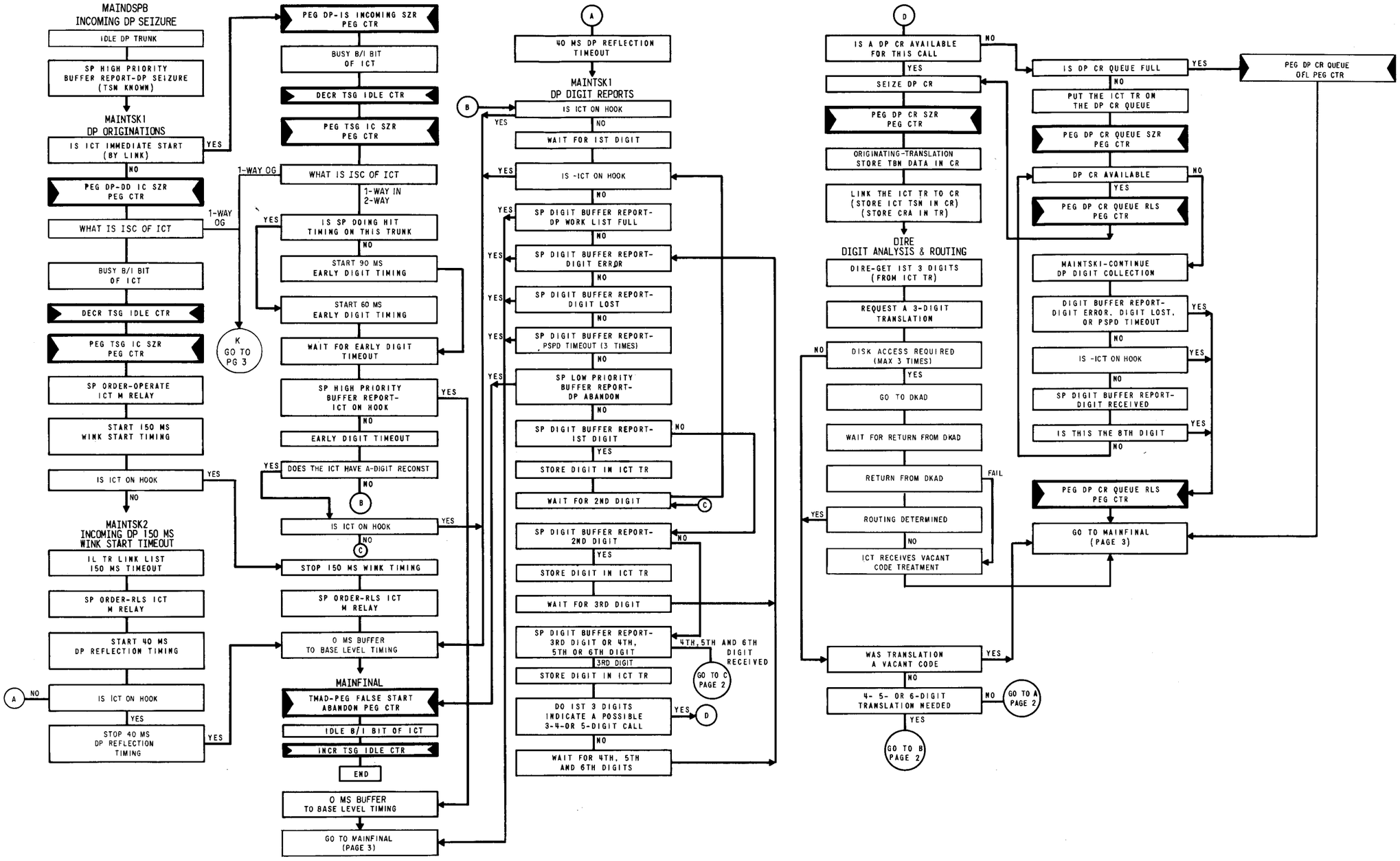


Fig. 1—No. 4 ESS Call Flow Traffic and Plant Registers Associated with a DP Incoming Call Including Failure Paths (Page 1 of 3)

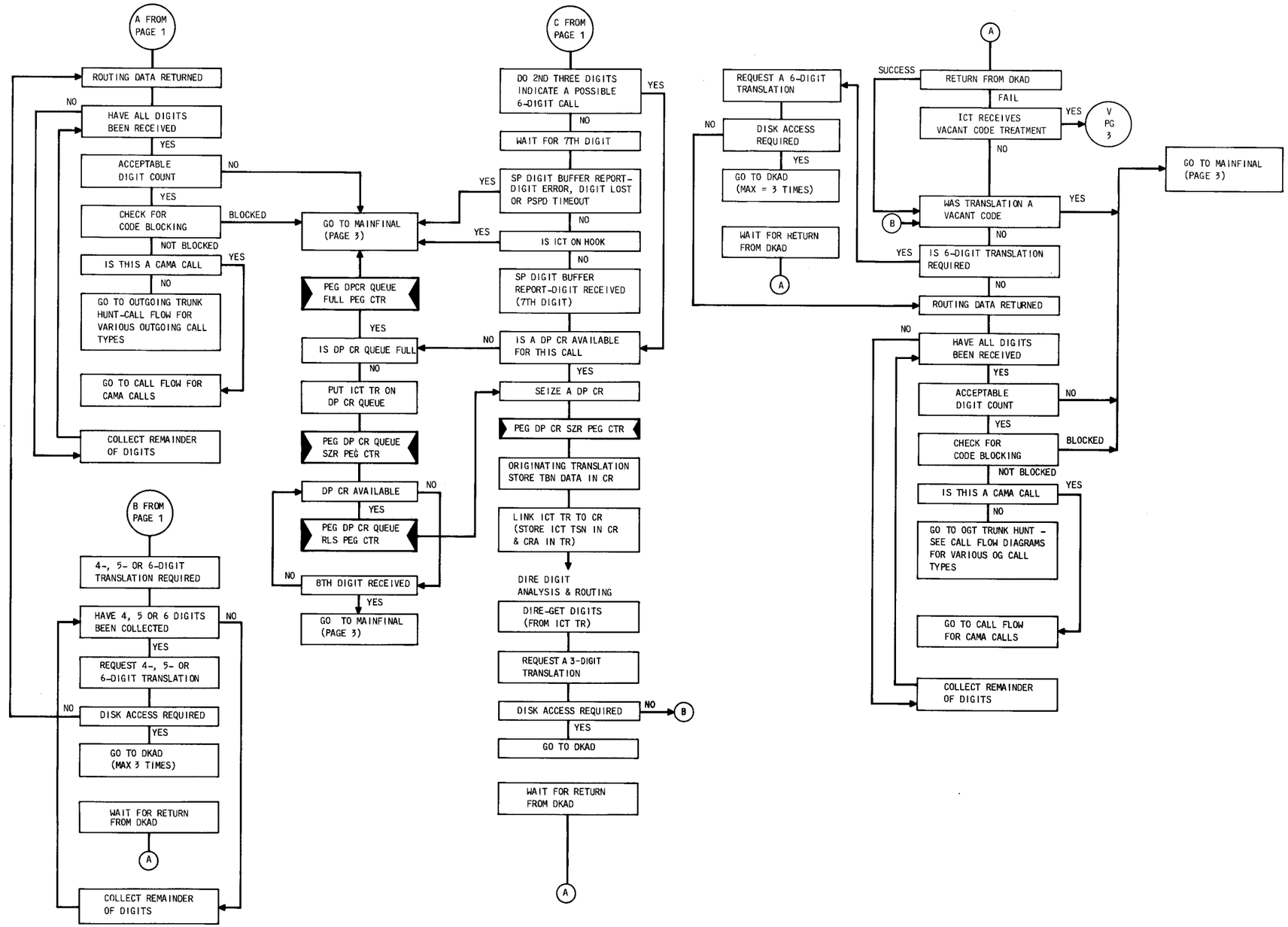


Fig. 1—No. 4 ESS Call Flow Traffic and Plant Registers Associated with a DP Incoming Call Including Failure Paths (Page 2 of 3)

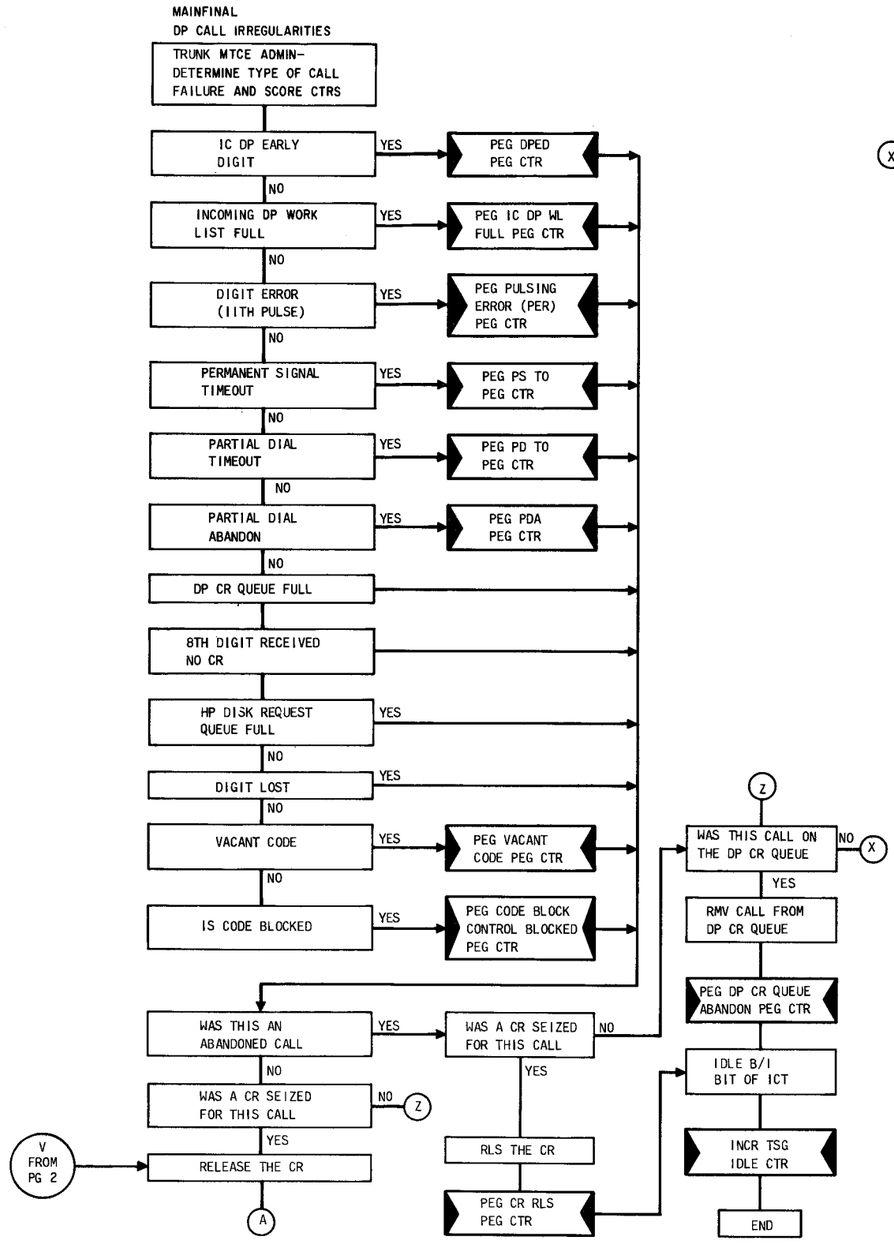
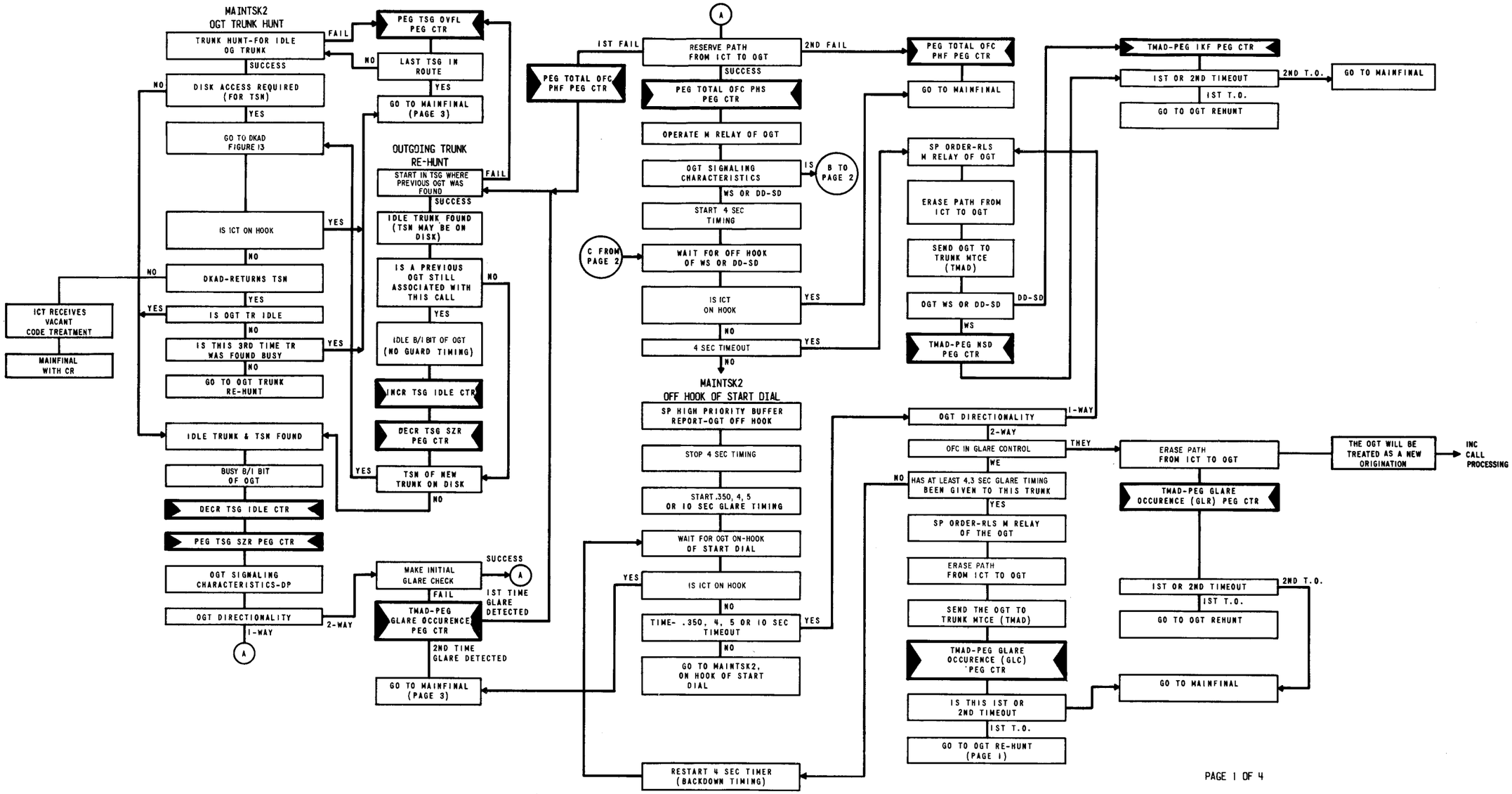


Fig. 1—No. 4 ESS Call Flow Traffic and Plant registers Associated with a DP Incoming Call Including Failure Paths (Page 3 of 3)



PAGE 1 OF 4

Fig. 2—No. 4 ESS Call Flow Traffic and Plant Registers Associated with a DP Outgoing Call Including Failure Paths (Page 1 of 3)

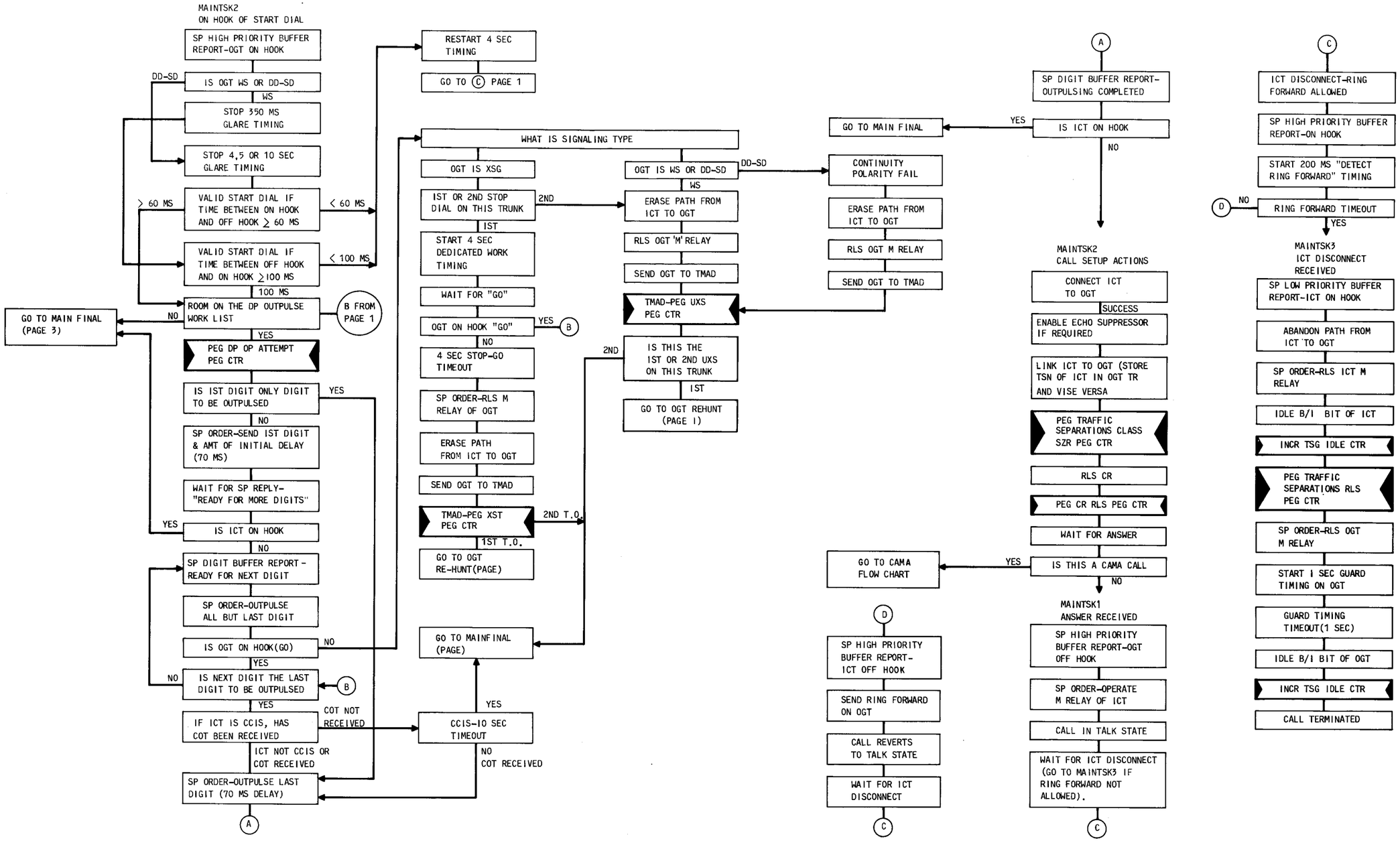


Fig. 2—No. 4 ESS Call Flow Traffic and Plant Registers Associated with a DP Outgoing Call Including Failure Paths (Page 2 of 3)

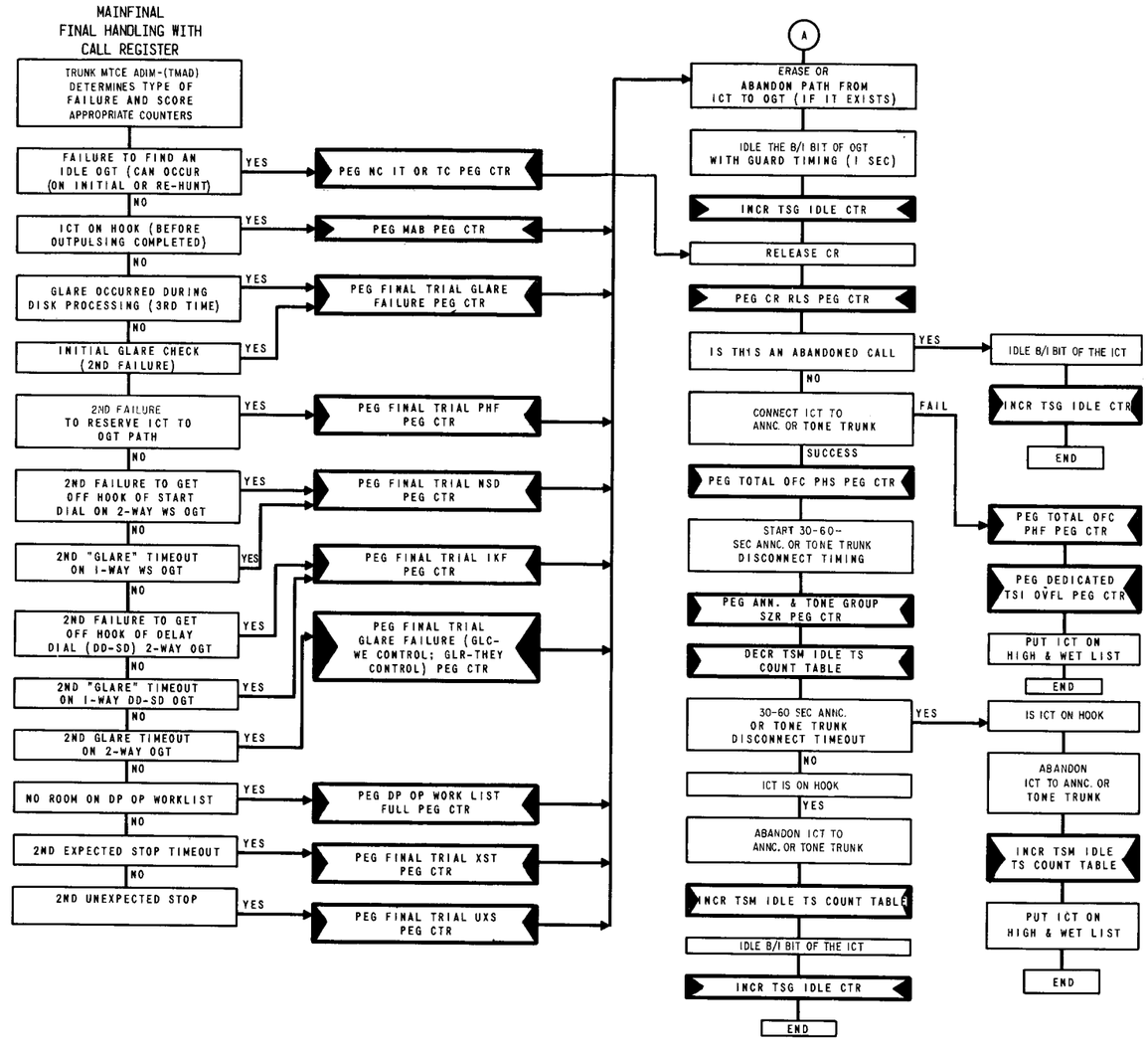


Fig. 2—No. 4 ESS Call Flow Traffic and Plant Registers Associated with a DP Outgoing Call Including Failure Paths (Page 3 of 3)

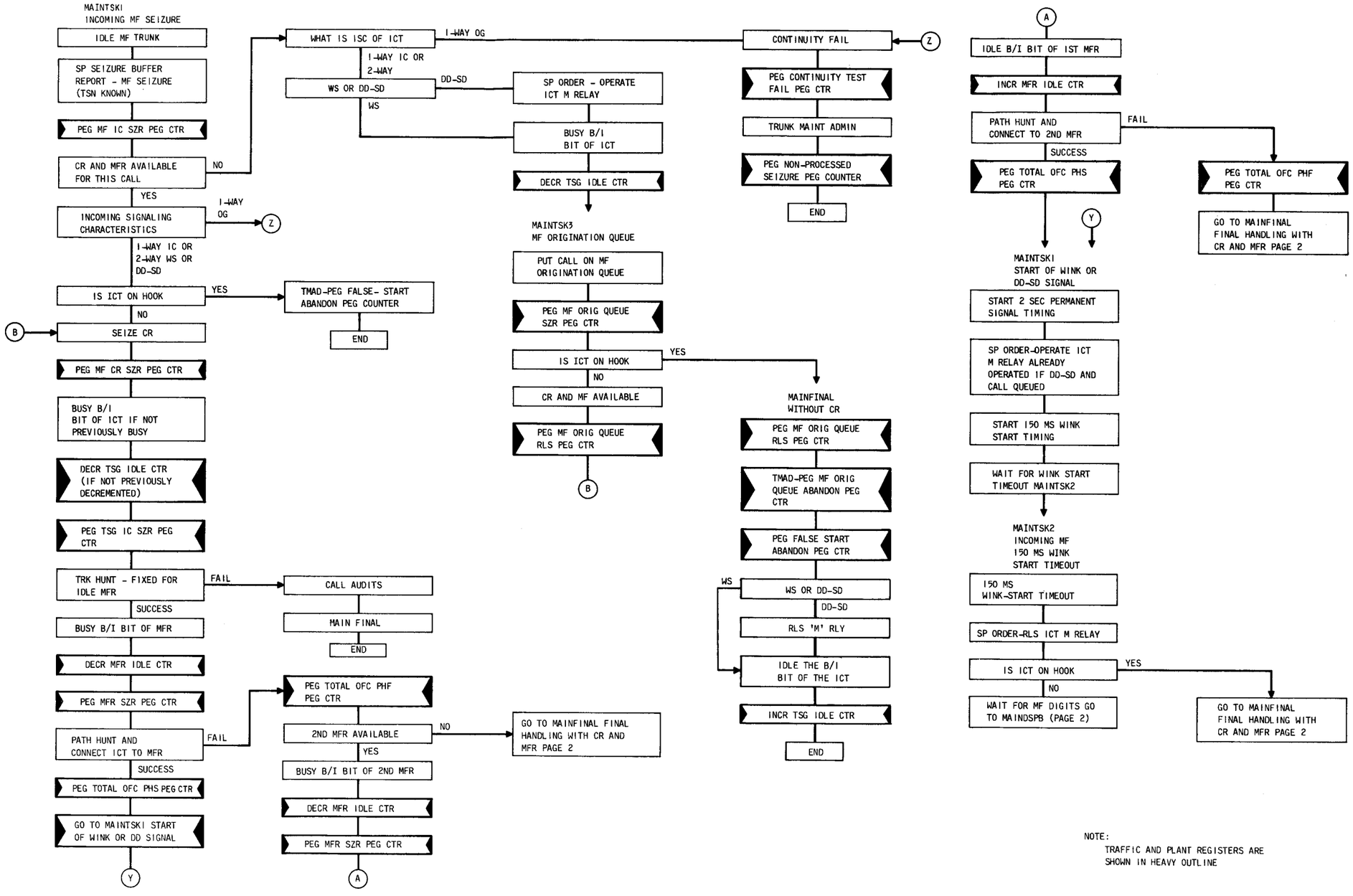


Fig. 3—No. 4 ESS Call Flow Traffic and Plant Registers Associated with an MF Incoming Call (Page 1 of 2)

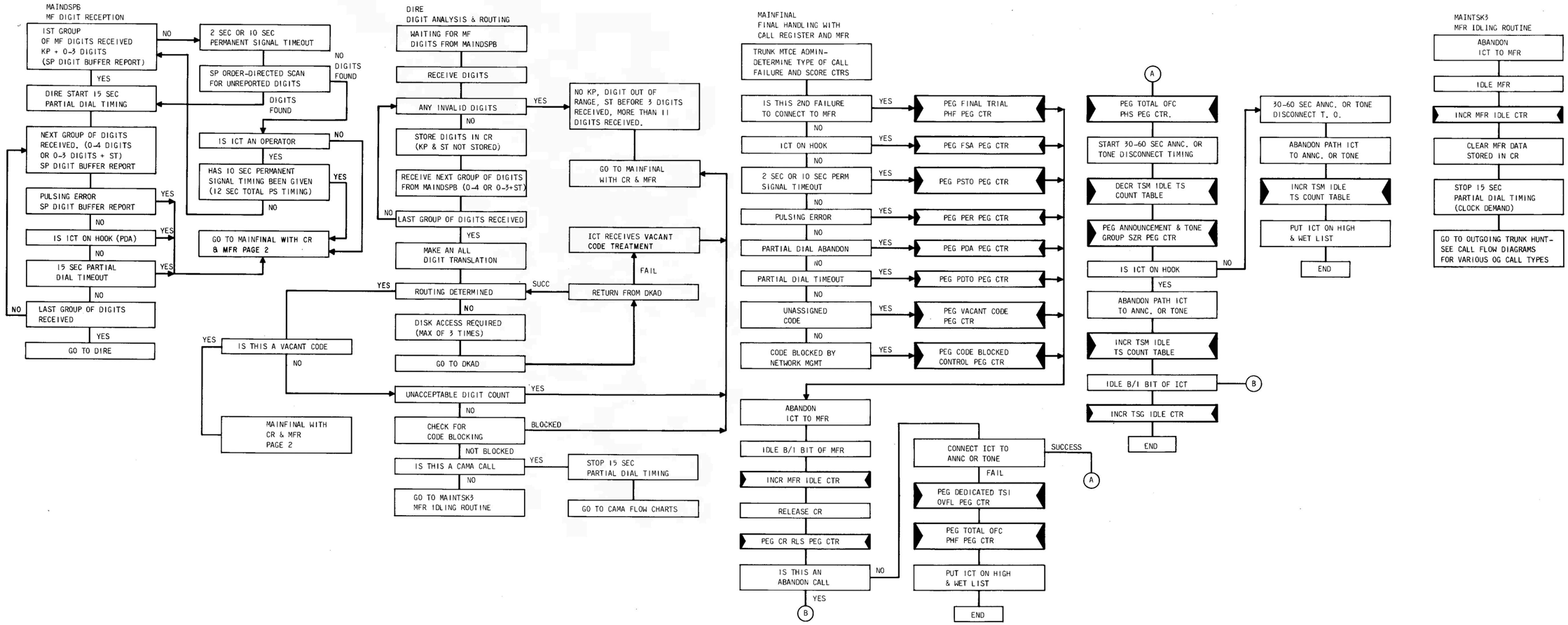


Fig. 3—No. 4 ESS Call Flow Traffic and Plant Registers Associated with an MF Incoming Call (Page 2 of 2)

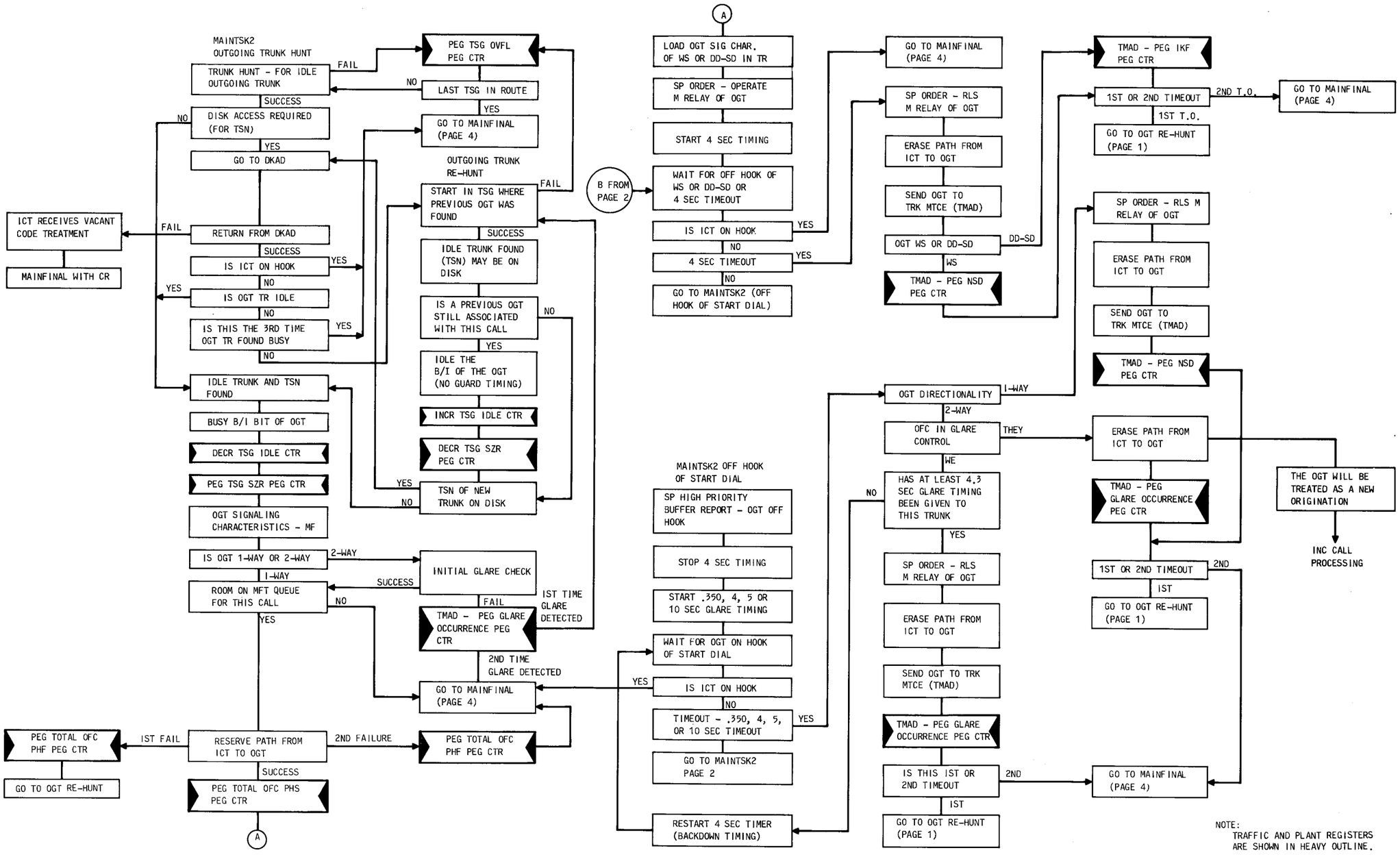
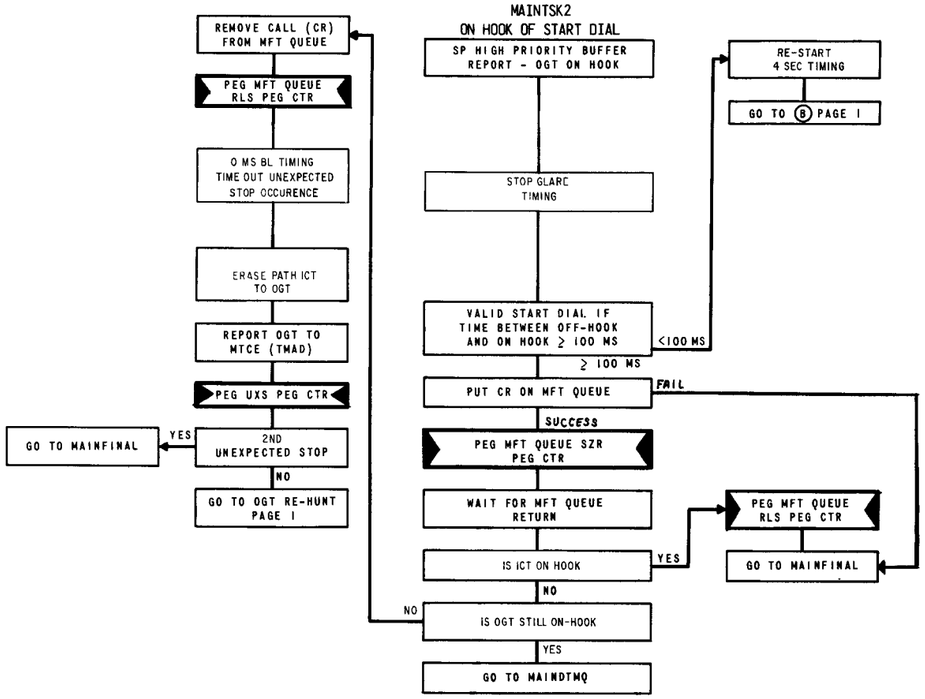
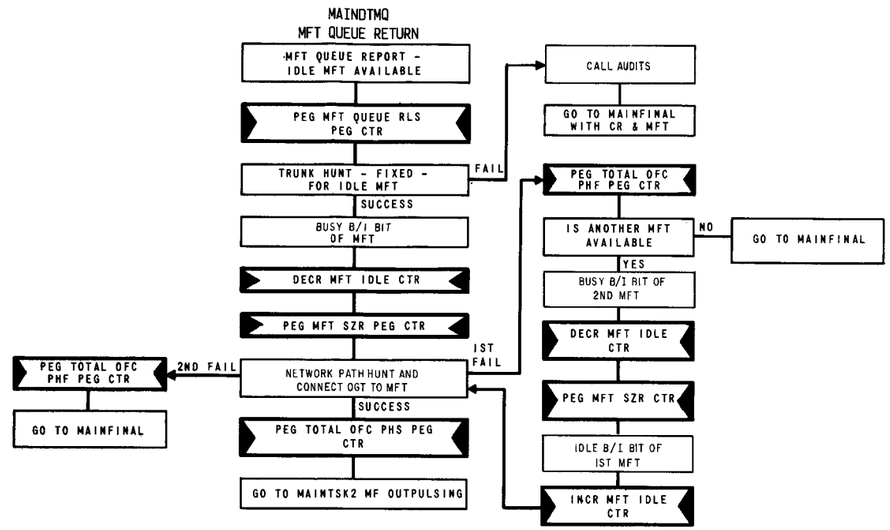


Fig. 4—No. 4 ESS Call Flow Traffic and Plant Registers Associated with an MF Outgoing Call Including Failure Paths (Page 1 of 4)





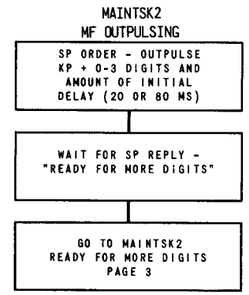
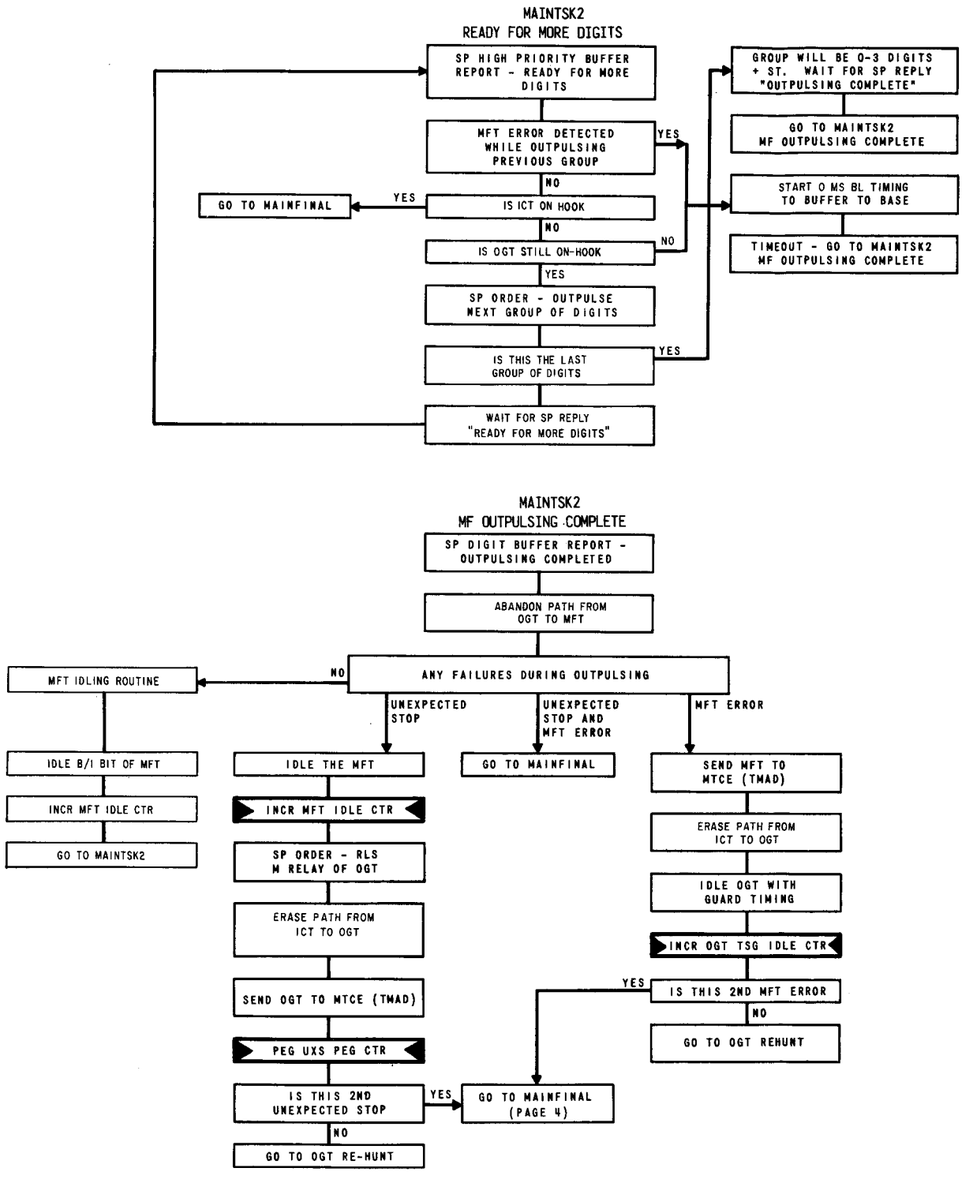


Fig. 4—No. 4 ESS Call Flow Traffic and Plant Registers Associated with an MF Outgoing Call Including Failure Paths (Page 2 of 4)



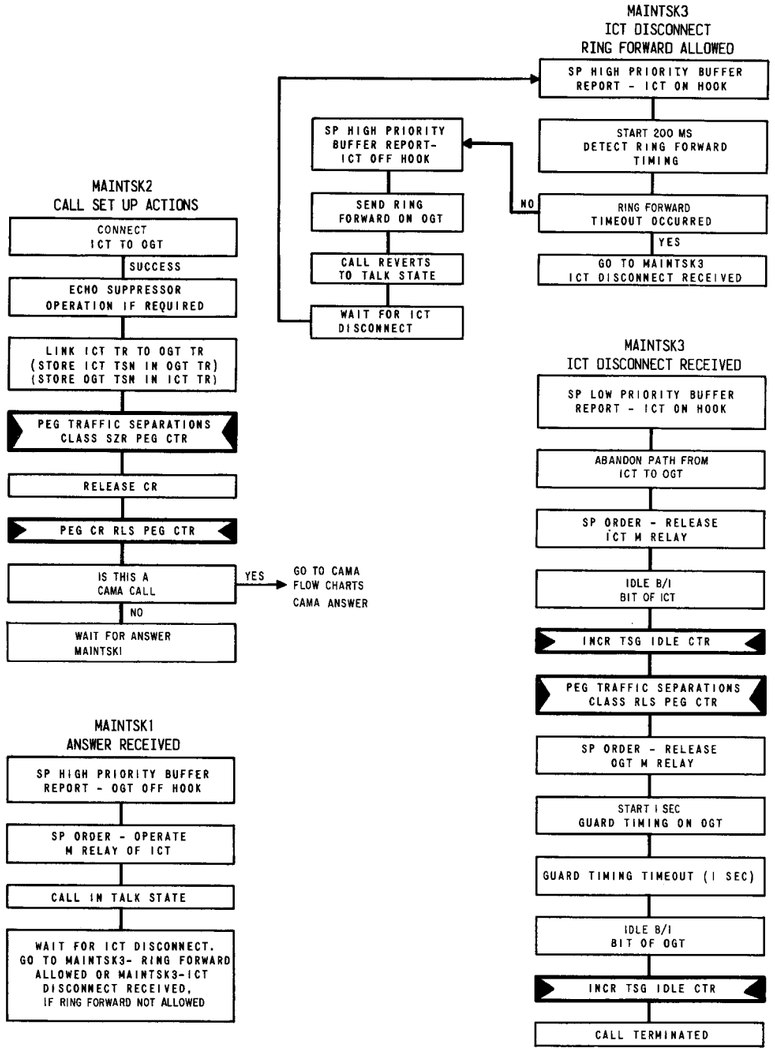


Fig. 4—No. 4 ESS Call Flow Traffic and Plant Registers Associated with an MF Outgoing Call Including Failure Paths (Page 3 of 4)

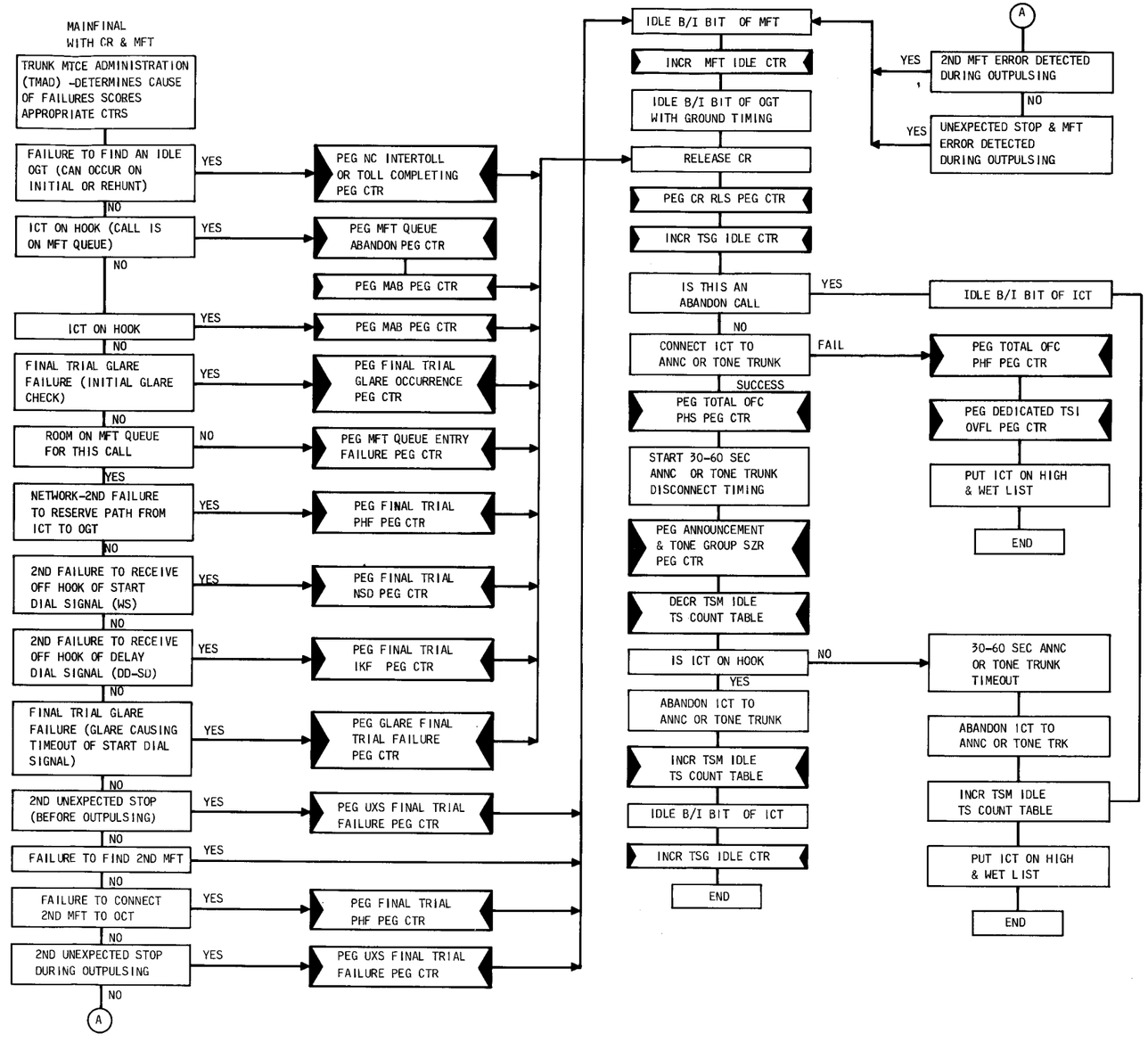


Fig. 4—No. 4 ESS Call Flow Traffic and Plant Registers Associated with an MF Outgoing Call Including Failure Paths (Page 4 of 4)

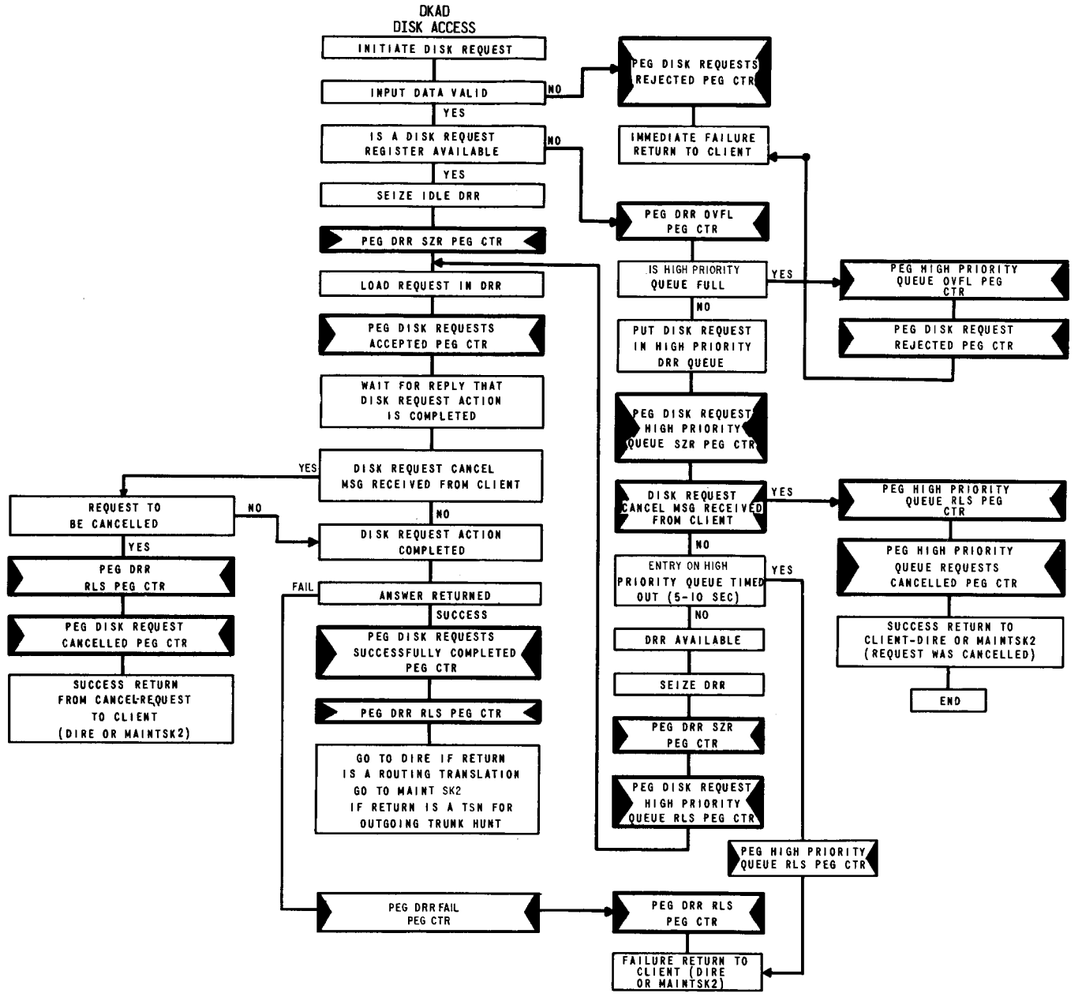
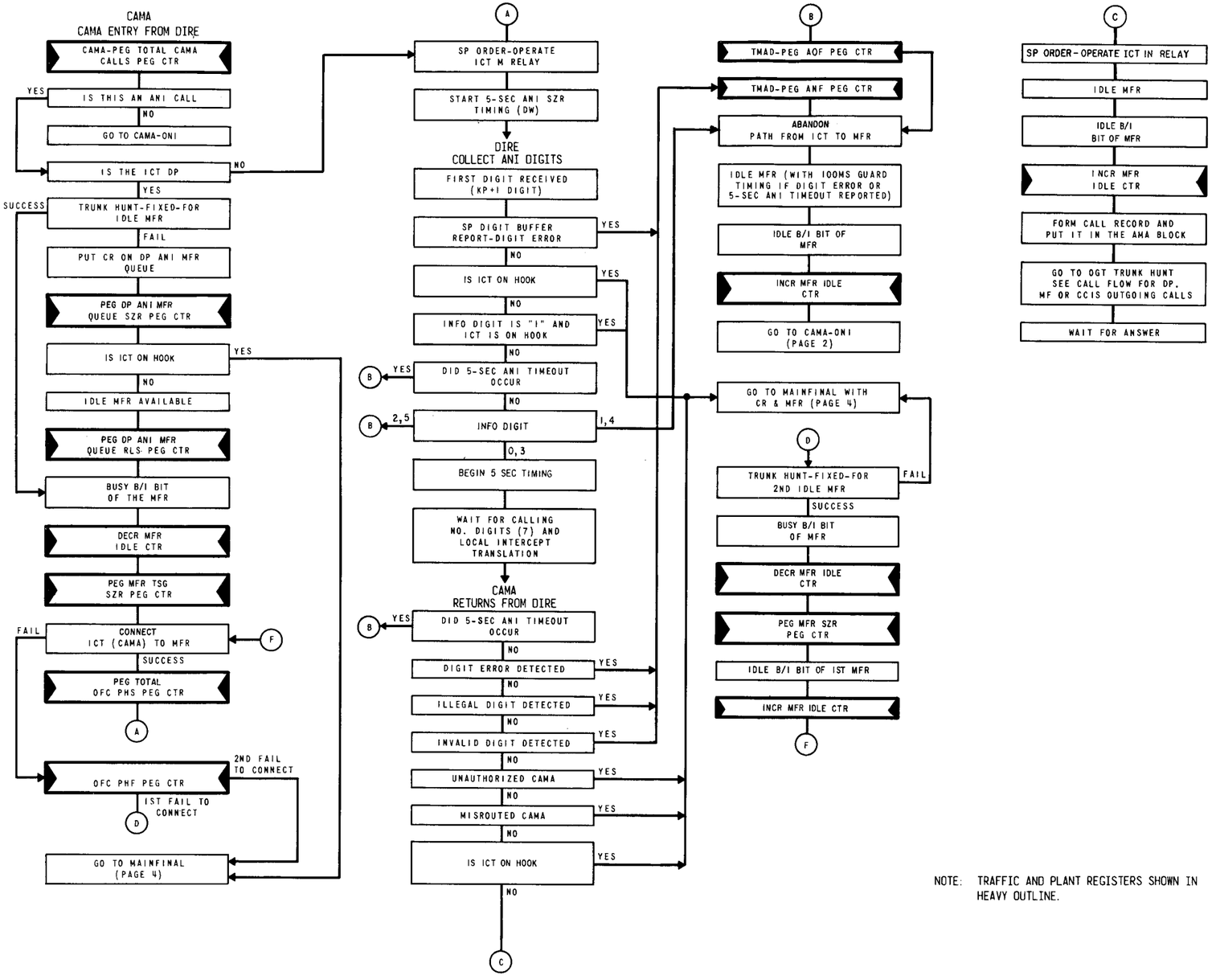


Fig. 5—No. 4 ESS Call Flow Traffic and Plant Registers Associated with MF, DP, and CCIS Calls Including Failure Paths



NOTE: TRAFFIC AND PLANT REGISTERS SHOWN IN HEAVY OUTLINE.

Fig. 6—No. 4 ESS Call Flow Traffic and Plant Registers Associated with CAMA Calls to DP, MF and CCIS Trunks Including Failure Paths (Page 1 of 5)

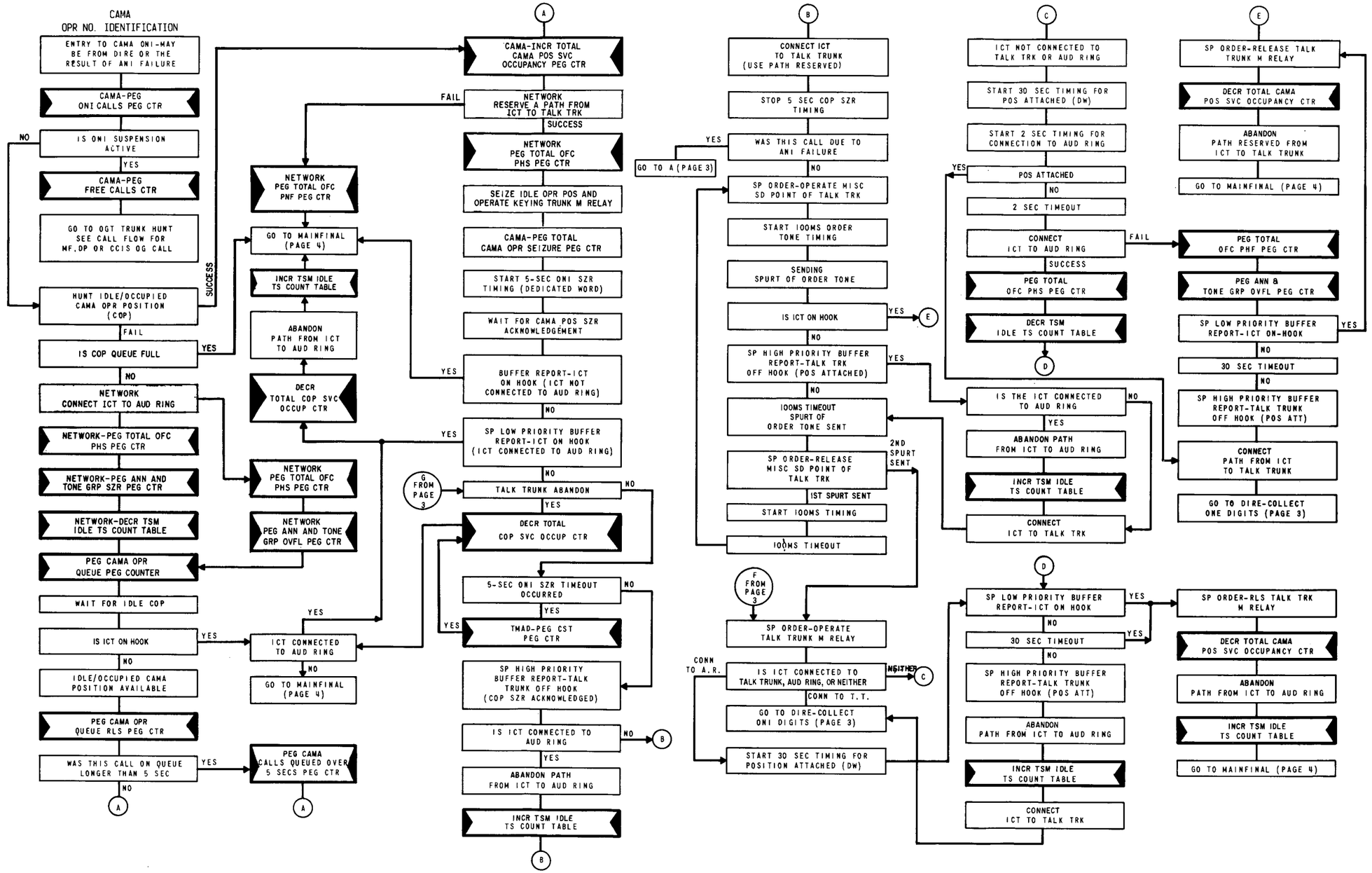


Fig. 6—No. 4 ESS Call Flow Traffic and Plant Registers Associated with CAMA Calls to DP, MF and CCIS Trunks Including Failure Paths (Page 2 of 5)

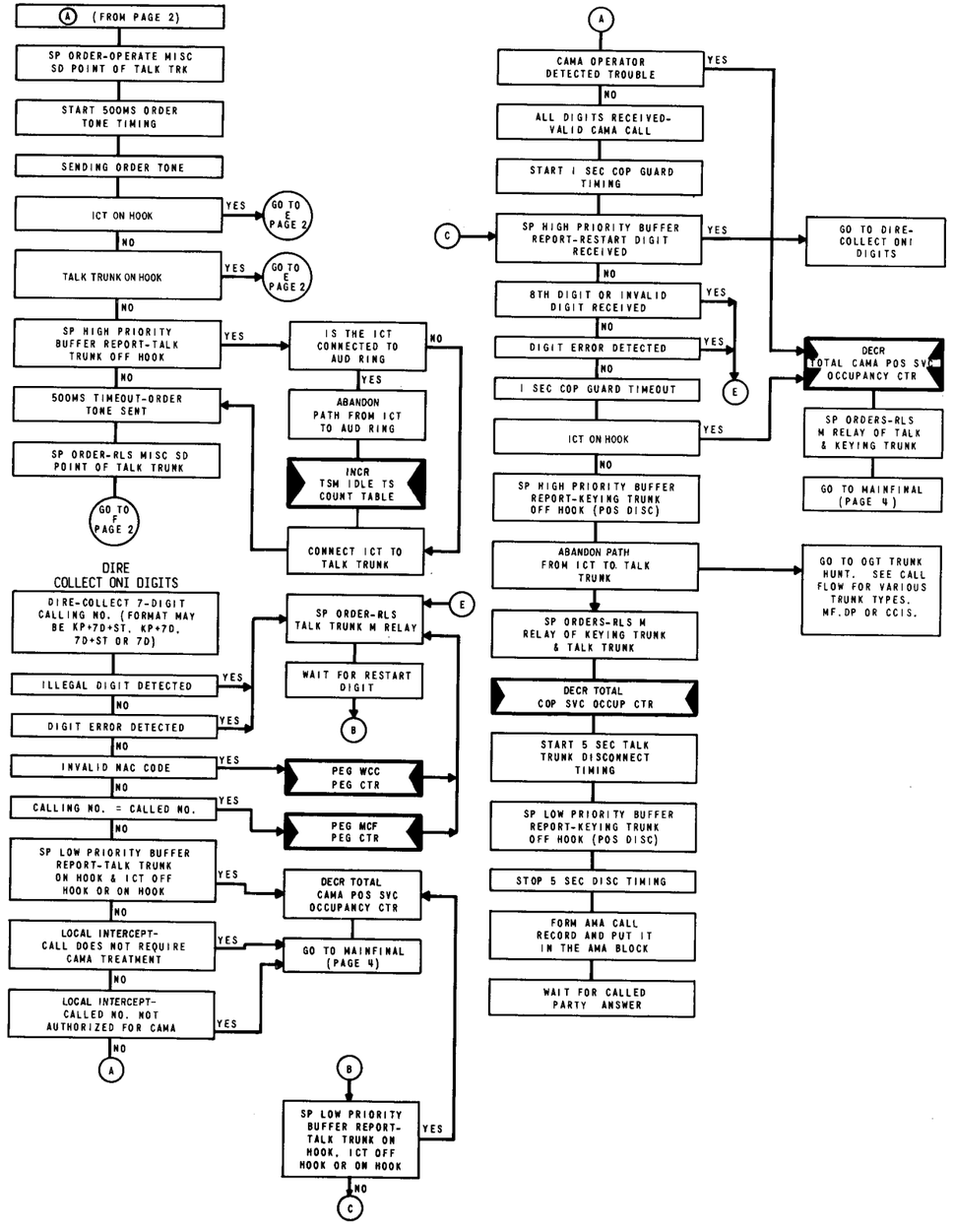


Fig. 6—No. 4 ESS Call Flow Traffic and Plant Registers Associated with CAMA Calls to DP, MF, and CCIS Trunks Including Failure Paths (Page 3 of 5)

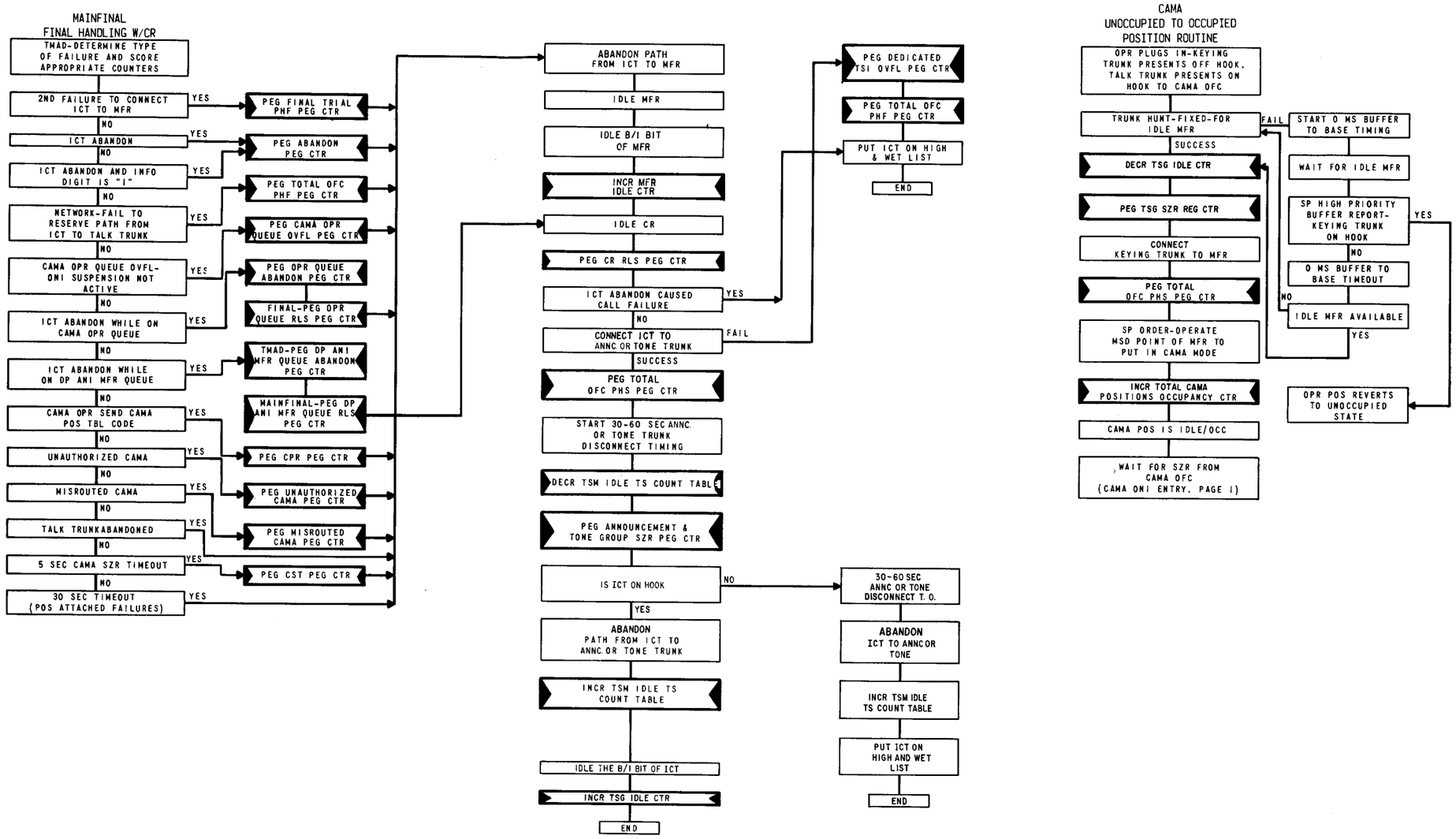


Fig. 6—No. 4 ESS Call Flow Traffic and Plant Registers Associated with CAMA Calls to DP, MF, and CCIS Trunks Including Failure Paths (Page 4 of 5)

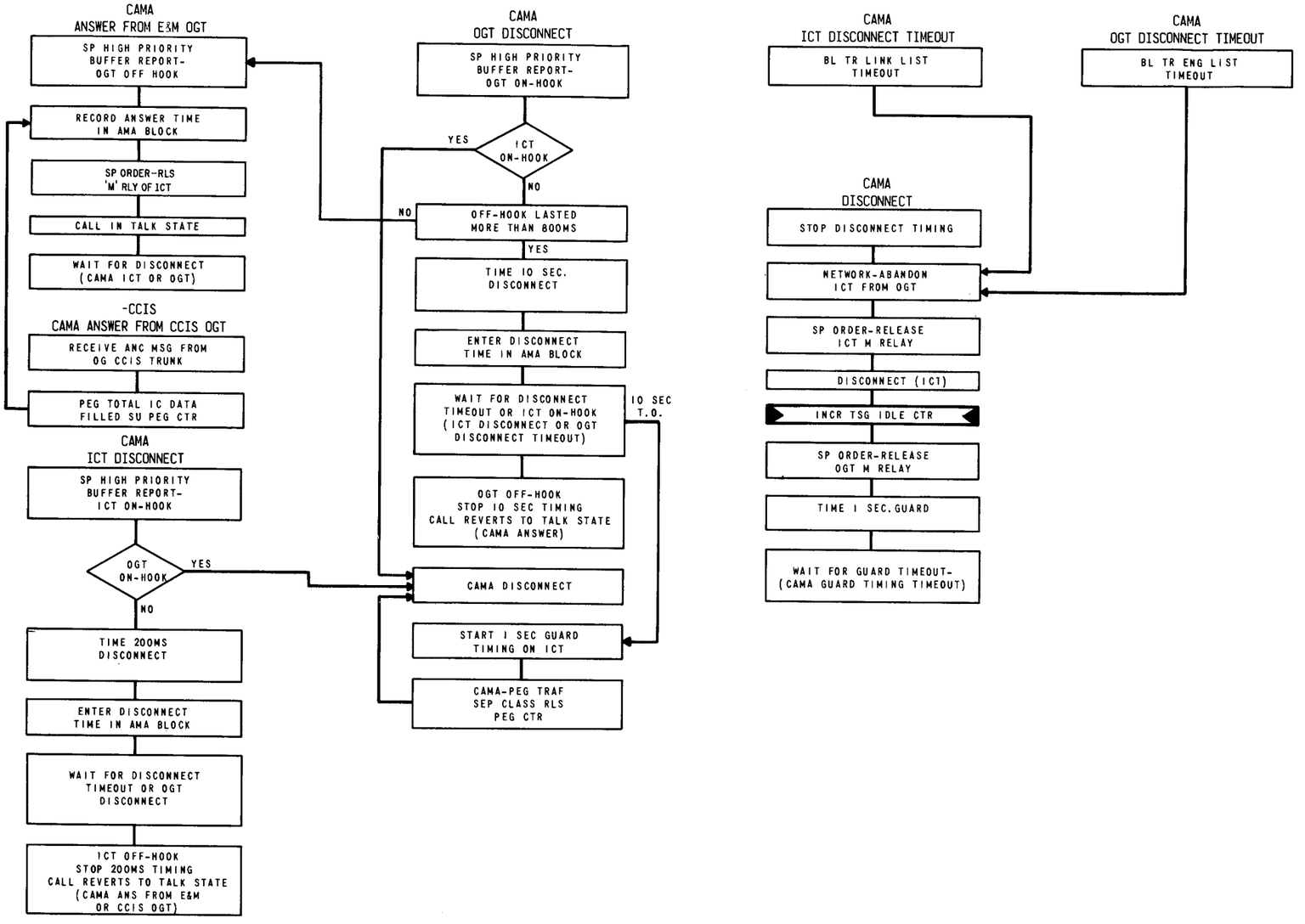


Fig. 6—No. 4 ESS Call Flow Traffic and Plant Registers Associated with CAMA Calls to DP, MF, and CCIS Trunks Including Failure Paths (Page 5 of 5)