APPENDIX B

SUCCESS CRITERIA AND SEQUENCE QUANTIFICATION

Intentionally Left Blank

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES (Continued)

B.1 SUCCESS CRITERIA DEVELOPMENT

The system success criteria are based on information provided in the North Anna UFSAR, NUREG/CR-4550, the Westinghouse WCAPs, the Surry IPE and other documents referenced in Section 3.1.1 of this report. However, in order to identify the timing requirement for initiation of systems to prevent core damage it was necessary to perform additional analysis using other sources of information and thermal hydraulic calculations. The MAAP code was used to perform these calculations and also to indicate the possibility of alternate success criteria when the licensing requirements appeared overly conservative. In a number of cases where timing and RCS thermal hydraulic information was given in the WCAPs, the code had been benchmarked against the results for the Surry specific design and the same results were used for North Anna. Specific calculations used in each of the event trees are discussed in the following subsections.

B.1.1 Large LOCA Event Tree (A)

The timing for the emptying of the RWST and changing to recirculation is given in Table B.1-1. It is based on initiation of all injection pumps and sprays at the time of the SI signal and containment high pressure signal and gives the minimum time to empty the RWST.

MAAP calculations were used to confirm the necessity for sprays to provide sufficient NPSH for operation of the Recirculation Spray systems. The results indicate that there is adequate margin for Outside Recirculation Spray operation but that it is marginal for Inside Recirculation Spray operation, therefore the necessity for successful Quench Spray operation in order to be able to use the Inside Recirculation Spray as modeled in the event tree.

B.1.2 Medium LOCA Event Tree (S1)

The critical break size defined in the Westinghouse analysis is a 3" break. MAAP shows the time to core uncovery with this break size is 20 minutes if HHSI is not established. If the High Head Safety Injection pumps and Accumulators inject during a 5" LOCA, the RWST will be empty in 90 minutes. See MAAP results in Table B.1-2. Quench Spray will come on in approximately 8 minutes.

At the time of changeover to recirculation the RCS pressure is 500 psia. The low head injection/recirculation will not have provided any water to the RCS and high head recirculation is still required.

The time to initiate cooldown to achieve low head injection pressure in a controlled manner is approximately 29 minutes after the LOCA. The cooldown required is approximately 58°F in the next

36 minutes. Observation in the simulator of initiation of cooldown indicates the operator would not start cooldown until 32 minutes which is longer than the 29 minute window.

MAAP analysis runs were performed to benchmark the Surry MAAP model for emergency cooldown as described in WCAP-9754 for loss of injection following small break LOCAs. The results were similar. Therefore it is considered that emergency cooldown using Condenser Steam Dumps or Steam Generator PORVs and Low Head Safety Injection pumps can be used at North Anna as was assumed for the Surry IPE.

B.1.3 Small LOCA Event Tree (S2)

For a small break LOCA, the time to core uncovery without Safety Injection ranges from 7.7 hours for a 1/2" break to 2.2 hours for a 1" break. The latter timing is used to evaluate the human reliability data for core cooling recovery (Function Y). The timing for the 1/2" break is shown in Table B.1-3 and for the 1" break in Table B.1-4.

A MAAP run was made to determine if feed and bleed core cooling is successful with one Charging Pump operating and one RCS PORV open. The results of the run indicate that this configuration is indeed successful. The case analyzed was a 2" LOCA. Safety injection initiated at about 48 seconds. The primary system pressure drops sharply, at first, to about 1100 psia. The pressure then reduces gradually until stabilizing at about 5 hours. The hottest core node temperature is just above 600°F at about 30 minutes into the transient and decreases steadily.

B.1.4 Loss of Offsite Power (T1, T1A)

B.1.4.1 RC Pump Seal LOCA Model

The RC Pump seal LOCA model is based on the past analysis of Reactor Coolant Pump seal failure in the Westinghouse WCAP-10541 (Figure 10-3) and non-recovery of offsite power in NUREG/CR-4550 Table 4.9-7. These are shown in this report as Figures B.1-1 through B.1-3. In Figure B.1-1 the probability of core uncovery after 8 hours is equal to 0.109. In this study we have assumed that the probability of core uncovery is 1.0 at approximately 10 hours. This leads to the modified curve shown in Figure B.1-2.

In quantifying the various functions in the Loss of Offsite Power tree the probability that seal failure will lead to core damage before power is recovered can be written as:

$$P(B) = \frac{\int_0^t f(t) P_{NRAC}(t)\,dt}{\int_0^t f(t)\,dt}$$

(The lower limit is shown as the earliest time core uncovery may begin and is fixed at 1/2 hours.)

Function S1c

This function assesses the ability to provide seal cooling cross connect from Unit 2.

Function B

The probability of failure to recover offsite power before core uncovery given that the probability of core uncovery at 10 hrs is 1.0 is calculated using the information provided above and is .02 (B10).

B.1.4.2 Recovery of Offsite Power

There are a number of different conditions.

(1) Successful operation of AFW, battery depletion at 2 hours, continued operation of AFW after battery depletion, no seal LOCA, resulting in core uncovery at about 11.2 hours (MAAP Case 20). From Figure B.1-3 the value of B16 = 7.5E-3.

(2) Failure of AFW: MAAP runs with no Feedwater, time to SG dryout is 1.5 hours and time to core uncovery is 2.4 hours. The time for B02 is taken at 1.5 hours so B02 = .34

(3) From MAAP analysis the time to core uncovery given a stuck open PORV is .6 hr. thus B01 = .48.

(4) The remaining times for the function B and associated non-recovery probabilities are:

Function	Time	Probabilities
B117		.68
B111		.68
B103		.68
B102		.68
B12 AVE	12 hr. average	.106
B235		9E-4
B229		9E-4
B221		9E-4
B220		9E-4

B.1.4.3 Feed and Bleed

A RETRAN run was made for the loss of offsite power initiator to determine if feed and bleed cooling was successful with one Charging Pump and one Pressurizer PORV open. The analysis assumed that the instructions in EOP 1-FR-H.1 were successfully implemented when required. The RETRAN run was made to about 13000 seconds at which time numerical difficulties were encountered. However, it was noted that the safety injection flowrate was more than sufficient to remove the decay heat being generated.

The MAAP run made for T1 conditions is assumed to be valid for T1A conditions. The only question is whether or not the steam generators will dry out before operators initiate feed and bleed after power recovery. The timing is marginal. In order to estimate the sensitivity of the P-function in this tree a sensitivity was performed where sequences 34 through 40 was requantified with P01 = 1.00. The increase in the T1A contribution to CDF was only 1.92E-8/yr which is negligible.

B.1.5 All Transients Except Loss of Offsite Power

If Main Feedwater is lost the success criteria states one AFW pump will provide adequate core cooling although licensing criteria indicates two motor driven AFW pumps are required if the RCPs are running. A MAAP run was performed and confirmed that 1 motor driven AFW is adequate to achieve secondary heat removal, with the RCPs operating. If feedwater is not available core cooling recovery is accomplished by opening the RCS PORVs and turning on the Charging Pumps.

A MAAP run was made to simulate the loss of secondary heat sink with transition to feed and bleed cooling. The emergency procedures were followed to estimate when important actions would be accomplished. Since the RCP's are turned off in Step 3 of 1-FR-H.1 it was estimated they would run for only ten minutes after reactor trip. The MAAP run showed that the hottest core node temperature was only slightly higher than the normal operation value. The peak value was reached within about four minutes and gradually declined thereafter for the duration of the three hour simulation.

A MAAP run was performed to estimate the timing required for the performance of feed and bleed. The emergency procedures call for initiation of feed and bleed at 21% level in the Steam Generators. This occurs approximately 33 minutes after loss of all Feedwater. Quench Sprays also actuate 57 minutes later and changeover to high head recirculation is required approximately 2.3 hours after the initiating event. The sequence of events for this MAAP run is shown in Table B.1-5.

B.1.6 RC Pump Seal LOCA

For loss of RC Pump seal cooling initiators, if it is assumed a seal LOCA in a single pump occurs at time zero with a leakage rate of 200 gpm with no charging flow, core uncovery occurs at approximately 7.0 hours and the RCS pressure remains above the Accumulator injection pressure. Therefore, there is sufficient time to cooldown, depressurize, and inject with the Low Head Safety Injection pumps to prevent core uncovery.

If the operator cools down prior to the occurrence of a seal failure, the seal LOCA will be avoided. The probability that a seal LOCA occurs is therefore a function of the probability of the operator achieving adequate cooldown in time (t) and that a seal LOCA has not occurred by time (t).

Core uncovery will lead to inadequate core cooling and the initiation of emergency core cooling recovery.

B.1.7 Loss of DC Buses / Loss of 4160 V Buses (T5A, T5B/T9A, T9B)

RETRAN and MAAP Analyses have shown that only one Pressurizer PORV is required for successful feed and bleed cooling during a loss of offsite power event (T1). However, for functions with degraded electrical power supplies no thermal hydraulic analyses have been completed so it has been assumed that both PORVs are required for successful feed and bleed cooling.

B.1.8 Steam Generator Tube Rupture (T7)

The time to fill the Steam Generator given that the operator does not cooldown and depressurize the RCS but does control Feedwater flow is taken to be one hour based on previous studies. Thus the operator has to have achieved RCS pressure below the SG PORV set point within 1 hour to prevent passing a steam water mixture through the SG PORV or possibly the SG SRV. A MAAP run has shown that the Steam Generator fills up in 56 minutes if the AFW flow is throttled.

The timing for late cooldown depends on the length of time to empty the RWST into the RCS. The MAAP runs showed that depending on break size up to 10 hours is available. For a ruptured SG tube approximately 10 hours is considered for the timing for function O2.

Feed and bleed cooling using 1/2 Pressurizer PORVs was also assumed in the SGTR event trees. A MAAP run was made which considered a SGTR with loss of secondary heat sink. The Charging Pumps activate early due to the RCS depressurization. The SG PORV was opened based on SG dryout criteria specified in the background documents

to the emergency procedures. The result of the MAAP run was that the RCS depressurizes at an equilibrium pressure until steam generator dryout occurs. After this time RCS pressure decreases rapidly. Throughout the analysis the hottest core node temperature remained at or below the normal operating value for full power.

B.1.9 Anticipated Transient Without Scram (TH, TL)

The event trees for this event were based on the event trees in the latest Westinghouse document (WCAP-11992). A cycle specific unfavorable exposure time (UET) calculation was made, where UET is the fraction of cycle life during which core power is predicted to be higher than that allowed by the critical power trajectories in WCAP-11992. It was found to be 27.7% for the most limiting combination (e.g., only two motor driven/turbine driven pump and no PORVs available or manual rod insertion). Therefore, in the event tree only the minimum conditions for Auxiliary Feedwater, of two motor driven pumps, or the turbine driven pump are considered for the Auxiliary Feedwater function. For the loss of feedwater, AFW pump start signals were provided by low SG level and low Feedwater flow.

The sizing of the RCS pressurizer safety valves and PORVs is such that the success criteria for these valves are three safety valves, or two safety valves and two PORVs.

AMSAC is installed at North Anna so the turbine trip / Auxiliary Feedwater start functions are modeled based on the availabilities of an independent signal to initiate these events.

B.1.10 Interfacing System LOCA (V)

This event had been vigorously evaluated for the previous study reported in NUREG/CR-4550 and the data from this study was used to quantify the initiating event frequency.

An evaluation of the potential to isolate indicated that the most likely scenario would lead to the Low Head Safety Injection pumps emptying the RWST through the break and flooding the area of the break. In order to isolate a break in the injection line the open MOV would have to close against a much higher differential pressure than design so it was not considered possible to isolate a break at the interface of this cold leg injection lines.

B.1.11 Loss of Emergency Switchgear Room Cooling (T8)

The success criteria for Emergency Switchgear Room cooling are based on the design criteria that 1 AHU provides sufficient chiller air and that only one chiller is required for heat transfer to the

Service Water system under all conditions. Following loss of Unit 1 ESGR cooling adequate cooling can be provided by opening the doors between the Unit 1 and Unit 2 ESGRs and using portable fans to circulate chilled air from the Unit 2 ESGR cooling system.

B.2 QUANTIFICATION OF EVENT TREES

B.2.1 Introduction

Appendix B.2 provides an understanding of event tree quantification. This information supplements the material discussed in the main report, especially Section 3.3.5, Quantification of Unavailability of Systems and Functions, and Section 3.3.6, Quantification of Sequence Frequencies.

B.2.2 Summary of Information

The first two tables, B.2-1, Description of the House Events, and B.2-2, House Event Status in House BED Files, are used to identify the status of house events. House events provide control over which basic events are included in quantification of a fault tree. Table B.2-1 provides a brief description of each house event and a listing of fault trees which use the house event. Notice that most house events are only used in one fault tree. Table B.2-2 is a matrix of each house event and the house event BED files showing when the house events were set equal to one or zero. These tables are especially useful in determining which success criteria were used for Auxiliary Feedwater, or which equipment failures can be expected when reviewing cut sets.

The third table in this appendix, B.2-3 Event Tree Function Solution Summary is an overview of each event tree function solution. It provides a listing of every function used within each event tree and indicates how the function was solved. The table is a quick way to find out if function solution is made up of single basic events, Functional Fault Tree models, simple system fault trees, or complex system fault trees OCLs.

Table B.2-4, Summary of OCL Files, provides the Boolean logic which was used to solve functions requiring OCL files. OCL is the computer filename extension used for all merge control files. Merge control files were used to solve functions which were combinations of other function equations, or to solve functions for fault trees which were too complex to solve directly. The complex fault trees were solved at gates below the top gate and the function merge control file, OCL file, was used to perform the merging operation of the subparts into one equation file. Table B.2-4 provides the merging logic and Table B.2-5 provides the details of which fault tree and gates were used for each subpart.

All equation files beginning with INT are temporary files and are not saved. The final equation files were given the function name and were saved as equation files, filename extension .EQN, and printout files, filename extension .MGP.

The most useful function table is B.2-5, Summary of Function Quantification. It contains detailed information for each function used in the front end analysis. The functions are listed with complement functions first, then initiating event functions, and finally with the event functions in alphabetical order. For system fault trees which are easily solved at the top gate, the function information will be contained within a single line with the linked fault tree name, the house BED file used to set the house events, and the gate at which the function was quantified. House BED files were not necessary for Functional Fault Tree, FFT, equations. For the most part, FFTs are gates with input from only one or two basic events. If a merge control file was used to process the function then the function will be listed in Table B.2-5 as multiple lines. The last line in the grouping provides the Boolean combination of the subfunctions used for the final equation file if adequate space exists. The other lines of a function grouping utilize the function name with an extra alphanumeric added on the end of the name. Note that the Boolean logic for these OCL merge files is also given in Table B.2-4.

Tables B.2-6, Cross Reference of Fault Trees to Functions and Event Trees, and B.2-7, Summary Description of Function Headings and Applicable Event Tree, are two listings of the functions referencing the corresponding event trees. Table B.2-6 is alphabetized by the fault tree names. Table B.2-7 is alphabetized by the function names.

The results of sequence quantification may be found in Table B.2-8, A Summary of Event Tree Core Damage Frequencies, and Table B.2-10, A Summary of Transfers. The core damage frequency for the Virginia Power PRAs is compared to NUREG/CR-4550 and WASH-1400 in Table B.2-8. Table B.2-10 is a listing of the transfer core damage sequences and the corresponding initiating event frequencies. The transfer sequences are not included in the core damage frequency for the event tree from which they originate. Since many of the transfer sequence frequencies are significantly less than the initiating event unavailability these sequences require no further analysis. However, some of the HV transfer sequence frequencies large enough that transfer trees were required as indicated in the table. The sequence frequency becomes the initiating event frequency for these trees. The Hv transfer event trees were generated for the initiating events T1, T2, T2A, T3, T9A and T9B, based upon the initial criteria that the transfer sequence frequency is not less than about two orders of magnitude below the T8 initiator frequency. The final criteria was lowered to capture initiators that involved dependencies that could exacerbate ESGR faults or recoveries (e.g., T9B loss of 4160 V bus 1J).

Table B.2-9, Sequence Frequencies is a listing of all the sequence frequencies grouped by initiator. Table B.2-11 is a listing of the top cut sets, which could fit on one page, for all sequences with a core damage frequency greater than 1.0E-7.

B.2.3 Special Fault Trees

The four figures included in Appendix B.2 are fault trees created for sequence quantification and are not part of system modeling. Figure B.2-1, Fault Tree: Initiating Events, contains the basic events used to establish the initiating event equations. Some of the initiating events were evaluated using more complicated fault trees, but were simplified into single basic events for sequence quantification. Note that the initiators T9A and T9B are not included in the Initiating Event fault tree, Figure B.2-1. These initiators are developed from special fault trees shown in Figures C.4-4 and 5 which include component faults necessary (in some cases) for the initiator which could also affect front line or support systems required for success. The T9A and T9B function solutions include cut sets containing these dependent events, which are merged with the event function solutions in the event tree solution process. In this way, the dependencies in the initiator are merged with the dependencies of the event function.

Figure B.2-2, Fault Tree: Tech Spec Disallowed Maintenance, was originally used to create cut sets which represent equipment combinations which may not be out of service at the same time. This fault tree generally combines unavailability basic events for both trains of equipment on two train systems. Technical Specifications allow limited continued power operation for one train inoperable but requires a unit shutdown, within 6 hours, if both trains are inoperable. Unavailability due to testing and maintenance were included within this fault tree. The cut set results were put into a function equation named DAM.EQN, which was used as a delete term to remove the disallowed test and maintenance combinations from the sequence equations. Table B.2-12 shows the top cut sets from the disallowed maintenance. The DAM fault tree usage has been expanded to include nonsensical combinations of basic events. Prominent examples include a cut set with both a 2 EDG CCF (Common Cause Fault) and a 3 EDG CCF, or a cut set with a SW pipe UM and with a HEP to recover an alternate SW feeder header that would be in service if the SW UM evolution had begun.

When equation files of single basic events were needed to define a function, the basic event was put into a functional fault tree. This tree has numerous top gates. Figure B.2-3, Fault Tree: Functional Fault Tree, shows the structure of the tree and Tables B.2-5 and B.2-6 provide the details of how the FFT basic events were utilized.

The NUPRA code assumes a success path has the value of one since system unavailabilities are quite small. When the system unavailability is greater than approximately .05 a complement function can be used to change the value assigned to the success path. A fault tree has been created to organize all of the complement basic events and support complement equation generation. This fault tree has many top gates and is shown in Figure B.2-4.

B.2.4 Event Trees

The event trees are presented in Figures B.2-A through B.2-VX. Each tree has been prepared to show functional unavailability and sequence frequency. Sequences which result in core damage have been assigned a plant damage state group for accident progression analysis. Sequences which result in no core damage have a status of "OK." Those sequences which cannot be resolved have been assigned a status of "TR." These sequences must transfer to another tree to determine if core damage occurs. However, if the frequency of a transfer sequence is much less than the initiating event frequency of the transfer tree, it is neglected. Table B.2-10 shows which transfers were processed further and which were not pursued due to their low significance.

B.3 SEQUENCE RECOVERY

This section discusses recovery actions for the North Anna IPE. Recovery of the North Anna model is necessary to account for equipment and operator action not included in the base model. These recovery actions can be incorporated into the event and fault trees in future North Anna PRA models if so desired.

Section B.3.1 will define every recovery basic event in detail. Each of these basic events is a combination of applicable mechanical failures and operator errors. This section is divided into subsections which are numbered to correspond to the appropriate NUPRA edit file.

Section B.3.2 discusses how recovery basic events were applied to individual cut sets. It starts with defining edit files which provide detailed information concerning each cut set recovery. Basic events were not totally removed from sequence equations. They were used only to identify which cut sets should be modified by which recovery basic events. This section also includes a list of which edit files were applied to each sequence.

Section B.3.3 includes the information for recovery of the flooding event trees.

Section B.3.4 is a results and conclusion section which includes sensitivity analysis.

B.3.1 Recovery Basic Events

Table B.3-1 is a summary of the basic events used for recovery of the sequence equations. Details of the how the point estimate are derived follow.

B.3.1.1 REC-CONTAINMENT

B.3.1.1.1 Equivalent Surry Recovery Action: none

The Surry IPE report Level 1 analysis explicitly included this term in the MSLB level 1 event trees.

B.3.1.1.2 Hardware Failure: REC-CONTAINMENT

Use a hardware failure probability of 0.02 taken from the Core Vulnerable condition in Appendix A of NUREG/CR-4450. This value represents the probability that a sequence with failure of containment heat removal but successful ECCS results in core damage as a result of subsequent containment failure. The Containment failure provides an energy release path from the fuel to the LHSI system and out into the atmosphere. If the Containment remains intact the LHSI system may heat to the point that fuel damage occurs.

This recovery term will be applied to sequences where there has been success of LHSI during recirculation. LHSI recirculation is assumed to be successful whenever HHSI successfully operates on recirculation.

B.3.1.1.3 Human Error: REC-CONTAINMENT

There are no operator actions associated with this recovery term.

B.3.1.1.4 Summary: REC-CONTAINMENT

- Combining the equipment failure probability with the human error probability.

$$P_{recovery}(\text{mean}) = P_{equipment} + P_{human\ error}$$

$$= 2.00E-2 + 0.00E+0 = 2.00E-2$$

$P_{recovery}$(median) = P(mean) / M
where $M=EXP\{[(1/1.645)* \ln (EF)]^2/2\}$
M=1.25 for an EF = 3
= 2.000E-2 / 1.25 = 1.600E-2

- REC-CONTAINMENT should appear in the CONTAIN.EDT file to be multiplied by the initiating event for each applicable sequence. This recovery term is applicable to all sequences which have failure of Containment heat removal and success of the LHSI system. The appropriate sequences which should have the Core Vulnerable term applied are indicated as a 1 or 2 plant damage state on the event trees. Other sequences should be not be adjusted by REC-CONTAINMENT.

Physical Id: REC-CONTAINMENT

Description: RECOVER_SEQUENCES__
CONTAINMENT_HAS____
FAILED_NO_CORE_MELT

Failure Rate: 2.000E-2____

Distribution: Lognormal
Median: 1.600E-2_____
Error Factor: 3____

Reference: 325MAF.N.4__________
9-15-92_____________

Why modified: NAPS IPE Final Quantification Value

B.3.1.2 REC-1ES1:2

B.3.1.2.1 Equivalent Surry Recovery Action: REC-STEAM-DUMP

See Surry IPE report page 3-220
hardware failure probability = 1.00E-3
human error probability = 2.66E-2
Total = 2.76E-2

Local opening of block valve for Condenser Steam Dump or SG-PORV within six hours of small break LOCA or SGTR.

B.3.1.2.2 Hardware Failure Probability: REC-1ES1:2

The Surry IPE uses an equipment failure rate of 1.00E-3. The generic failure probability (NAPS1.PRM) for an air operated valve to fail closed is 1.81E-2. The common cause failure of an AOV is 1.81E-3. Since RCS cooldown can be accomplished by using any two of three atmospheric steam dumps the CCF value is appropriate.

B.3.1.2.3 Human Error Probability: REC-1ES1:2

- Use the mean human error probability determined for HEP-1ES1:2-S2, 8.5E-4. REC-1ES1:2 will not be applied to cut sets with HEP-1ES1:2-S2.

B.3.1.2.4 Summary: REC-1ES1:2

- Combining the equipment failure probability with the human error probability.

$$P_{recovery}(\text{mean}) = P_{equipment} + P_{human\ error}$$

$$= 1.81E-3 \quad + 8.500E-4 = 2.660E-3$$

$$P_{recovery}(\text{median}) = P(\text{mean}) / M$$

where $M=EXP\{[(1/1.645)*\ln(EF)]^2/2\}$

$M=1.25$ for an $EF = 3$

$$= 2.660E-3 / 1.25 = 2.128E-3$$

- REC-1ES1:2 should appear in the COOLDOWN.EDT file to be multiplied by the basic event 1MSMV--LK-1MS21, 1MSMV--LK-1MS59 or 1MSMV--LK-1MS97. This recovery term is applicable to all sequences which have failure of the atmospheric steam dump valves. This event is used in functions O, O2, and Y. Failures of these functions appear in numerous sequences in the S1, S2, T1, T2Tr, T3Tr, T4, T7 and T8 event trees. There are no sequences in which 1-MS-21, -59 or -97 appears that should not be adjusted by REC-1ES1:2.

Physical Id: REC-1ES1:2______

Description: 1-ES-1.2_POST_LOCA_ COOLDOWN_AND_______ DEPRESSURIZATION___

Failure Rate: 2.660E-3

Distribution: Lognormal
Median: 2.128E-3
Error Factor: 3

Reference: 325MAF.N.4
9-15-92

Why modified: NAPS IPE Final Quantification Value

B.3.1.3 REC-1OP21:6

B.3.1.3.1 Equivalent Surry Recovery Action: REC-ESGR-ROOMCOOL

See Surry IPE report page 3-260
hardware failure probability = 4.69E-3
human error probability = 2.66E-2
Total = 3.13E-2

Recovery of ESGR Unit 1 room cooling by starting fan in Unit 2 ESGR, opening fire door between ESGR's, and locating portable fans in necessary locations. Allowable time is 4 hours.

B.3.1.3.2 Hardware Failure Probability: REC-1OP21:6

Use 6.384E-4 which is calculated by using the mean failure rate of a STR-PG, 2.66E-5, multiplied by a 24 hour mission time.

B.3.1.3.3 Human Error Probability: REC-1OP21:6

- NAPS Procedures:

0-AP-55	Loss of Control Room/Emergency Switchgear Room Air Conditioning, Rev 0, 3-28-91.
1-OP-21.6	Main Control Room and Relay Room Air Conditioning, Rev 9, 5-26-88.
1-OP-26.1A	Valve Checkoff Control and Relay Room Chilled Water, Rev 2, 2-26-88.
MMP-P-MR-1	Mechanical Maintenance Procedure for the Periodic Disassembly, Inspection, and Repair of the Control Room Air Conditioning Chillers, Rev 2, 10-27-88.
MMP-C-MR-2	Mechanical Maintenance Procedure for Trouble Shooting and Repair of Control Room Air Conditioning Chiller Units, Rev 1, 9-15-88.

- 0-AP-55 provides instructions to follow in the event of a loss of Control Room or Emergency Switchgear Room Air Conditioning. This procedure is entered when either all three Control Room Air Conditioning Units on either unit have failed, or when both of the air handlers in either the Control Room or the Emergency Switchgear Room on either unit. This procedure has the operators start two air handling units on the unaffected unit, open the fire doors between the two unit's Emergency Switchgear Rooms, and open cabinet doors and provide portable ventilation.

- 1-OP-21.6 provides operating instructions for the Main Control Room and Relay Room Air Conditioning systems and provides for valve and component alignment.

  Use the mean human error probability determined for HEP-1OP21:6 of 1.05E-3.

B.3.1.3.4 Summary: REC-1OP21:6

- Combining the equipment failure probability with the human error probability.

$$P_{recovery}(\text{mean}) = P_{equipment} + P_{human\ error}$$

$$= 6.384E-4 + 1.05E-3 = 1.688E-3$$

$$P_{recovery}(\text{median}) = P(\text{mean}) / M$$

where $M=EXP\{[(1/1.645)*\ln(EF)]^2/2\}$

$M=1.25$ for an $EF = 3$

$= 1.688E-3 / 1.25 = 1.350E-3$

- REC-1OP21:6 should appear in the ESGR.EDT file to be applied to the basic events for the loss of a strainer due to plugging while in service or standby. This recovery term is necessary for all sequences which have the HV function, loss of ESGR cooling.

Physical Id: REC-1OP21:6_____

Description: 1-OP-21.6_MCR_AND__
RELAY_ROOM_AIR_____
CONDITIONING_______

Failure Rate: 1.688E-3

Distribution:	Lognormal
Median:	1.350E-3
Error Factor:	3

Reference: 325MAF.N.4
9-15-92

Why modified: NAPS IPE Final Quantification Value

B.3.1.4 REC-MMP-C-MR-2

B.3.1.4.1 Equivalent Surry Recovery Action: REC-ESGR-ROOMCOOL

See Surry IPE report page 3-260
hardware failure probability = 4.69E-3
human error probability = 2.66E-2
Total = 3.13E-2

Recovery of ESGR Unit 1 room cooling by starting fan in Unit 2 ESGR, opening fire door between ESGR's, and locating portable fans in necessary locations. Allowable time is 4 hours.

B.3.1.4.2 Hardware Failure Probability: REC-MMP-C-MR-2

Use 1.51E-3, the probability of a chiller unit failing to run for 24 hours. A CCF probability may be more appropriate since only one of six chillers is necessary for success of this recovery action. The mechanics will have sufficient spare parts by cannibalizing five of the chillers to restore one chiller.

B.3.1.4.3 Human Error Probability: REC-MMP-C-MR-2

- NAPS Procedures:

0-AP-55	Loss of Control Room/Emergency Switchgear Room Air Conditioning, Rev 0, 3-28-91.
1-OP-21.6	Main Control Room and Relay Room Air Conditioning, Rev 9, 5-26-88.
1-OP-26.1A	Valve Checkoff Control and Relay Room Chilled Water, Rev 2, 2-26-88.
MMP-P-MR-1	Mechanical Maintenance Procedure for the Periodic Disassembly, Inspection, and Repair of the Control Room Air Conditioning Chillers, Rev 2, 10-27-88.

MMP-C-MR-2 Mechanical Maintenance Procedure for Trouble Shooting and Repair of Control Room Air Conditioning Chiller Units, Rev 1, 9-15-88.

- 0-AP-55 provides instructions to follow in the event of a loss of Control Room or Emergency Switchgear Room Air Conditioning. This procedure is entered when either all three Control Room Air Conditioning Units on either unit has failed, or when both of the air handlers in either the Control Room or the Emergency Switchgear Room have failed on either unit. This procedure has the operators start two air handling units on the unaffected unit, open the fire doors between the two unit's Emergency Switchgear Rooms, and open cabinet doors and provide portable ventilation.

- 1-OP-21.6 provides operating instructions for the Main Control Room and Relay Room Air Conditioning systems and provides for valve and component alignment.

- MMP-C-MR-2 provides instructions for trouble shooting and repairing the MCR/ESGR chiller units.

Use the information from HEP-0OP21:6 with the following changes.

T_b = 15 minutes. There may be a slight delay before the MCR personnel are aware that all MCR/ESGR chiller units have failed.

T_e = 4 hours. System time-window is defined by engineering calculations which show that the ESGR will heat up to 120F, the maximum acceptable limit before equipment failure can be expected.

T_a = 2 hours. Task action time, using MMP-C-MR-2, to trouble shoot and repair one of the six chillers. ESGR temperature is expected to stop or decrease immediately after completing the procedure. This is an estimated value.

T_w = 1.75 hours. Time available for cognitive response ($T_w = T_e - T_b - T_a$).

$T_{1/2}$ = 1 hour. Operator median response time. The Control Room personnel will call in a qualified mechanic to repair a chiller. It is estimated that it will take an hour for a mechanic to arrive on site.

Calculations:

$$p_2(\text{mean}) = 1 - \Phi(\ln(T_w/T_{1/2}) / \sigma)$$
$$= 1 - \Phi(\ln(1.75/1) / 0.8)$$
$$= 1 - \Phi(0.70)$$
$$= 2.42E-1$$

$$P_2(\text{median}) = \text{HEP(mean)} / M$$
where $M=EXP\{[1/1.645)* \ln (EF)]^2/2\}$
$M=1.25$ for an $EF = 3$
$$= 2.42E-1 / 1.25 = 1.936E-1$$

- Adjustment For Recovery:

  R = 1. No credit is taken for immediate recovery of this HEP.

  $p_3 = p_3 * R = 6.0E-3 * 1.0 = 6.0E-3$

  $\text{HEP(median)} = p_2 + p_3 = 1.936E-1 + 6.0E-3 = 1.996E-1$

Conversion To A Mean:

$$\text{HEP(mean)} = \text{HEP(median)} * M$$
where $M=1.25$ for an $EF = 3$
$$= 1.996E-1 * 1.25 = 2.495E-1$$

B.3.1.4.4 Summary: REC-MMP-C-MR-2

- Combining the equipment failure probability with the human error probability.

  $$P_{recovery}(\text{mean}) = P_{equipment} + P_{human\ error}$$
  $$= 1.51E-3 + 2.495E-1 = 2.510E-1$$

$$P_{recovery}(\text{median}) = P(\text{mean}) / M$$
where $M=EXP\{[(1/1.645)* \ln (EF)]^2/2\}$
$M=1.25$ for an $EF = 3$
$$= 2.510E-1 / 1.25 = 2.008E-1$$

- REC-MMP-C-MR-2 should appear in the ESGR.EDT file to be applied to the cut sets where multiple chillers have failed. This recovery term is necessary for all sequences which have the HV function, loss of ESGR cooling.

Physical Id:	REC-MMP-C-MR-2__
Description:	MMP-C-MR-2_TROUBLE_ SHOOTING_&_REPAIR__ MCR_CHILLER_UNITS__
Failure Rate:	2.510E-1
Distribution:	Lognormal
Median:	2.008E-1
Error Factor:	3
Reference:	325MAF.N.4 9-15-92
Why modified:	NAPS IPE Final Quantification Value

B.3.1.5 REC-SCREEN-TURNS

B.3.1.5.1 Equivalent Surry Recovery Action

None.

B.3.1.5.2 Hardware Failure Probability: REC-SCREEN-TURNS

Use a point estimate of 0.1 to represent the probability that mechanical hardware failure can not be recovered. This is a reasonable estimate without a detailed analysis.

B.3.1.5.3 Human Error Probability: REC-SCREEN-TURNS

None, there is no need for operator action for this recovery term.

B.3.1.5.4 Summary: REC-SCREEN-TURNS

- Combining the equipment failure probability with the human error probability.

$$P_{recovery}(\text{mean}) = P_{equipment} + P_{human\ error}$$
$$= 0.1 \quad + 0 \quad = 1.0E-1$$

$P_{recovery}(\text{median}) = P(\text{mean}) / M$
where $M=EXP\{[(1/1.645)* \ln (EF)]^2/2\}$
$M=1.25$ for an $EF = 3$
$= 1.000E-1 / 1.25 = 8.000E-2$

- REC-SCREEN-TURNS should appear in the ESGR.EDT file to be applied to the cut sets where the SW reservoir travelling screens have plugged. This recovery term is necessary for all sequences which have the HV function, loss of ESGR cooling.

Physical Id: REC-SCREEN-TURNS

Description: SW_RESERVOIR_______
TRAVELING_SCREEN___
AUTO_ROTATES_&_WASH

Failure Rate: 1.000E-1

Distribution: Lognormal
Median: 8.000E-2
Error Factor: 3

Reference: 325MAF.N.4__________
9-15-92_____________

Why modified: NAPS IPE Final Quantification Value

B.3.1.6 REC-1AP28

B.3.1.6.1 Equivalent Surry Recovery Action: REC-INAIR-LOCAL

See Surry IPE report page 3-221
hardware failure probability = 0
human error probability = 2.66E-2
Total = 2.66E-2

Reestablish Instrument Air locally, to necessary loads as directed by AP40, within 4 hours.

B.3.1.6.2 Hardware Failure: REC-1AP28

Use a point estimate of 0.1 to represent the probability that mechanical hardware can not be recovered. This is a reasonable estimate without a detailed analysis. The Instrument Air system is backed up from the Service Air system or Unit 2 Instrument Air System. The reliability of Service Air is estimated to be equal to

the reliability of the IA equipment. A lower hardware probability is not used because the failure may be due to a local failure affecting only a few pieces of equipment and there are multiple ports where bottled air can be used.

B.3.1.6.3 Human Error: REC-1AP28

- HEP Calculation:

Input Parameters:

T_b = 0 minutes. The CROs will be able to immediately detect failure of the Instrument Air system.

T_e = 4 hours. System time-window is defined as the earliest that any air operated valve must be opened to avoid core damage. This is the same length of time established for Surry. It is true for the SW valves for ESGR cooling, CC valves which provide thermal barrier cooling, CC flow to the RHR system and the MFW feed regulating bypass valves.

T_a = 1 hour. Task action time for the CRO to restore the IA system using 1-AP-28. This is sufficient time to restore the entire IA system due utilizing SA compressors or construction air compressors, or to locally open the valves mechanically without Instrument Air.

T_w = 3 hours. Time available for cognitive response ($T_w = T_e - T_b - T_a$).

$T_{1/2}$ = 15 minutes. Operator median response time. It is estimated that the CRO in the Control Room will initiate 1-AP-28 within 15 minutes once he is aware of IA system failure.

σ = 0.8 for non emergency procedures for which there is procedural guidance, and there has been training.

p_3 = 6.0E-6, 3.0E-3 is the estimated human error probability from NUREG/CR-1278, Table 20-12, item 2, estimated probabilities of errors of commission in operating manual controls, select wrong control on a panel from an array of similar appearing controls, identified by labels only. The error rate has been doubled due to operators normally working 12 hour shifts.

Calculations:

$$p_2(\text{mean}) = 1 - \Phi(\ln(T_w/T_{1/2}) / \sigma)$$
$$= 1 - \Phi(\ln(3/0.25) / 0.8)$$
$$= 1 - \Phi(3.11)$$
$$= 9.0E-4$$

$$P_2(\text{median}) = \text{HEP(mean)} / M$$
where $M=EXP\{[(1/1.645)* \ln (EF)]^2/2\}$
$M=1.25$ for an $EF = 3$
$$= 9.0E-4 / 1.25 = 7.2E-4$$

- Adjustment For Recovery:

  R = 0.1, recovery factor. From NUREG/CR-1278, Table 20-22, Estimated probabilities that a checker will fail to detect errors made by others, item 1, checking routine tasks, checker using over the shoulder inspections, verifying positions etc. Error Factor = 5. The TSC will be fully manned within one hour. These personnel will provide adequate verification of recovering IA.

  $p_3(\text{recovered}) = p_3 * R = 6.0E-3 * 0.1 = 6.0E-4$

  $\text{HEP(median)} = p_2 + p_3 = 7.2E-4 + 6.0E-4 = 1.32E-3$

- Consideration of Dependency:

  This recovery term will not be applied to a specific HEP basic event.

- HEP Conversion To A Mean:

$$\text{HEP(mean)} = \text{HEP(median)} * M$$
where $M=EXP\{[1/1.645)* \ln (EF)]^2/2\}$
$M=1.25$ for an $EF = 3$
$$= 1.32E-3 * 1.25 = 1.650E-3$$

B.3.1.6.4 Summary: REC-1AP28

- Combining the equipment failure probability with the human error probability.

$$P_{recovery}(\text{mean}) = P_{equipment} + P_{human\ error}$$
$$= 1.0E-1 + 1.650E-3 = 1.017E-1$$

$P_{recovery}$(median) = P(mean) / M
where $M=EXP\{[(1/1.645)* \ln (EF)]^2/2\}$
M=1.25 for an EF = 3
= 1.017E-1 / 1.25 = 8.136E-2

- REC-1AP28 should appear in the ESGR.EDT file to be multiplied by the basic event 1IAIAS-LF-OUTIA. This basic event appears in the sequence which have HV failures and the sequence T6P16.

Physical Id: REC-1AP28

Description: 1-AP-28_LOSS_OF___
INSTRUMENT_AIR____

Failure Rate: 1.017E-1____

Distribution: Lognormal
Median: 8.136E-2_____
Error Factor: 3____

Reference: 325MAF.N.4__________
9-15-92_____________

Why modified: NAPS IPE Final Quantification Value

B.3.1.7 REC-2AP28

B.3.1.7.1 Equivalent Surry Recovery Action: REC-INAIR-LOCAL

See Surry IPE report page 3-221
hardware failure probability = 0
human error probability = 2.66E-2
Total = 2.66E-2

Reestablish Instrument Air locally, to necessary loads as directed by AP40, within 4 hours.

B.3.1.7.2 Hardware Failure: REC-2AP28

Use a point estimate of 0.1 to represent the probability that mechanical hardware failure can not be recovered. This is a reasonable estimate without a detailed analysis.

B.3.1.7.3 Human Error: REC-2AP28

Use 1.275E-3 from the value the analysis of REC-1AP28.

B.3.1.7.4 Summary: REC-2AP28

- Use the values from REC-1AP28.
- REC-2AP28 should appear in the ESGR.EDT file to be multiplied by the basic event 2IAIAS-LF-OUTIA. This basic event appears in the sequence which have HV failures and the sequence T6P16.

Physical Id: REC-2AP28

Description: 2-AP-28_LOSS_OF___ INSTRUMENT_AIR____

Failure Rate: 1.017E-1____

Distribution: Lognormal
Median: 8.136E-2_____
Error Factor: 3____

Reference: 325MAF.N.4__________ 9-15-92_____________

Why modified: NAPS IPE Final Quantification Value

B.3.1.8 REC-1FRH:1-4

B.3.1.8.1 Equivalent Surry Recovery Action

None.

B.3.1.8.2 Hardware Failure Probability: REC-1FRH:1-4

Use 8.18E-3 from the North Anna quantification of Main Feedwater fault tree MF200 which includes the MFW pumps failing to start and run. This function is M01 and could be added to the event trees T8, T9A and T9B where AFW is lost but MFW is still available.

B.3.1.8.3 Human Error Probability: REC-1FRH:1-4

- NAPS Procedures:

1-E-0 Reactor Trip or Safety Injection, Rev 9, 12-14-91.

1-ES-0.1 Reactor Trip Response, Rev 8, 3-5-91.

1-F-0 Critical Safety Function Status Trees, Rev 0, 12-27-89.

1-FR-H.1 Response To Loss of Secondary Heat Sink, Rev 3, 5-31-90.

- 1-E-0 verifies proper response of the Reactor Protection and Emergency Core Cooling Systems. Step 4 checks if SI is actuated. The RNO is to transition to 1-ES-0.1.

- 1-ES-0.1 provides instructions to stabilize and control the plant following a Reactor Trip without Safety Injection. Step 2 check Feedwater status, including AFW status. Step 6 checks SG levels

- 1-F-0 provides a method for checking Critical Safety Factions. These status trees are monitored during all emergency procedures except during the first 25 steps of 1-E-0. Operators will immediately implement the applicable procedure whenever an orange or red path are encountered. Attachment 3 is for Heat Sink. The red paths implement 1-FR-H.1, there are no orange paths, the yellow paths implement 1-FR-H.2 or -H.3, -H.4 or -H.5 and the green path is CSF satisfactory. The red path is valid when total feedwater flow to the SGs is less than 340 gpm and either narrow range SG level is less than 10% or pressure in all SG is less than 1135 psig.

- 1-FR-H.1 provides instructions to respond to a loss of secondary Heat Sink in all Steam Generators. Step 2 tries to establish AFW flow to at least on SG. Step 4 tries to establish Main Feed flow to at least one SG. Step 5 checks SG levels to determine if flow to at least one SG exists if so the operator is to wait for narrow range level to be restored. The RNO is to continue. Step 6 tries to establish feed flow from the Condensate system. Step 7 tries to establish feed flow from alternate sources. Step 8 checks SG narrow range levels. Step 9 checks SG wide range levels. Step 10 and after give up on feedwater flow and establish SI feed and bleed cooling.

  Use the mean human error probability determined for HEP-1FRH:1-5 of 3.125E-3.

B.3.1.8.4 Summary: REC-1FRH:1-4

- Combining the equipment failure probability with the human error probability.

$$P_{recovery}(\text{mean}) = P_{equipment} + P_{human\ error}$$

$$= 8.18E-3 + 3.125E-3 = 1.131E-2$$

$$P_{recovery}(\text{median}) = P(\text{mean}) / M$$

where $M=EXP\{[(1/1.645)*\ln(EF)]^2/2\}$

$M=1.25$ for an $EF = 3$

$$= 1.131E-2 / 1.25 = 9.048E-3$$

- REC-1FRH:1-4 should appear in the MFW.EDT file to be multiplied by the initiating events for the sequences which should have asked if Main Feedwater is available. The applicable sequences are in the T5A, T5B, T7, T8, T9A and T9B event trees. REC-1FRH:1-4 should be applied to cut sets in the following sequences:

  T5AP02, T5AP03, T5AP04, T5AP05, T5AP06, T5AP18, T5AP19, T5AP20, T5AP21, T5AP22, T5AP23

  T5BP02, T5BP03, T5BP04, T5BP05, T5BP06, T5BP18, T5BP19, T5BP20, T5BP21, T5BP22, T5BP23

  T7P27, T7P28

  T9AP02, T9AP03, T9AP04, T9AP05, T9AP06, T9AP18, T9AP19, T9AP20, T9AP21, T9AP22, T9AP23

  T9BP02, T9BP03, T9BP04, T9BP05, T9BP06, T9BP18, T9BP19, T9BP20, T9BP21, T9BP22, T9BP23

Physical Id: REC-1FRH:1-4____

Description: 1-FR-H.1_LOSS_OF___
HEAT_SINK_STEP_4___
MAIN_FEEDWATER_____

Failure Rate: 1.131E-2

Distribution: Lognormal
Median: 9.048E-3
Error Factor: 3

Reference: 325MAF.N.4
9-15-92

Why modified: NAPS IPE Final Quantification Value

B.3.1.9 REC-1OP14:1

B.3.1.9.1 Equivalent Surry Recovery Action: REC-RH-LOCAL

See Surry IPE report page 3-220
hardware failure probability 1.00E-1
human error probability = 2.66E-2
Total = 1.27E-1

Local opening of RHR valves in Containment to recover actuator faults, within six hours.

B.3.1.9.2 Hardware Failure: REC-1OP14:1

Use a point estimate of 0.1 to represent the probability that mechanical hardware failure can not be recovered. This is a reasonable estimate without a detailed analysis.

B.3.1.9.3 Human Error: REC-1OP14:1

- NAPS Procedures:

1-OP-3.3 "Unit Shutdown From Mode 4 to Mode 5," Rev 19, 12-20-90. Step 5.6 initiates 1-PT-78.1, Step 5.13 places RHR in service using 1-OP-14.1.

1-OP-14.1 "Residual Heat Removal," Rev 28, 9-26-90. Step 5.3.15 opens the RHR inlet MOVs.

- HEP Calculation:

Use the mean human error probability determined for HEP-1OP14:1-5:13, 4.260E-3.

B.3.1.9.4 Summary: REC-1OP14:1.

- Combining the equipment failure probability with the human error probability.

$P_{recovery}(\text{mean}) = P_{equipment} + P_{human\ error}$

$= 1.0E-1 + 4.260E-3 = 1.043E-1$

$P_{recovery}(\text{median}) = P(\text{mean}) / M$

where $M = EXP\{[(1/1.645) * \ln(EF)]^2/2\}$

$M = 1.25$ for an $EF = 3$

$= 1.043E-1 / 1.25 = 8.344E-2$

- REC-1OP14:1 should appear in the RHR.EDT file to recover RHR related valves failing closed. The basic events which can be recovered are as follows.

  1CCAOV-FC-TV103A
  1CCAOV-FC-TV103B
  1CCMOV-FC-CC100A
  1CCMOV-FC-CC100B
  1CCMOV-CC-CC100AB
  1RHHCV-FC-1758
  1RHMOV-FC-1700
  1RHMOV-FC-1701
  1RHMOV-CC-1720
  1RHMOV-FC-1720A
  1RHMOV-FC-1720B

REC-1OP14:1 should be applied to all T7 sequences.

Physical Id: REC-1OP14:1

Description: 1-OP-14.1_RHR______
RECOVERY___________
____

Failure Rate: 1.043E-1____

Distribution: Lognormal
Median: 8.344E-2_____
Error Factor: 3____

Reference: 325MAF.N.4__________
9-15-92_____________
____

Why modified: NAPS IPE Final Quantification Value

B.3.1.10 REC-1ES1:4-1

B.3.1.10.1 Equivalent Surry Recovery Action: REC-HTLEG-LHSI

See Surry IPE report page 3-219
hardware failure probability < 1.0E-3
human error probability = 2.66E-2
Total = 2.66E-2

Open Valve 890A or 890B to allow hot leg injection of LHSI pumps within six hours of initiator.

B.3.1.10.2 Hardware Failure: REC-1ES1:4-1

Use a point estimate of 0.1 to represent the probability that mechanical hardware failure can not be recovered. This is a reasonable estimate without a detailed analysis.

B.3.1.10.3 Human Error: REC-1ES1:4-1

- NAPS Procedures:

1-ES-1.4 Transfer to Hot Leg Recirculation, Rev 3, 12-27-89.

- HEP Calculation:

Input Parameters:

T_b = 0 minutes. The CROs will be able to immediately detect failure of MOV-1890C to open.

T_e = 6 hours. System time-window is a estimate of the time before SI must be changed from cold leg injection to hot leg injection before boric acid plate out blocks SI flow.

T_a = 15 minutes. Task action time for the CRO to send someone to the breaker for MOV-1890C and MOV-1890D, unlock and close the breakers, then the CRO to depress the open pushbuttons and allow the MOVs to stroke open (approximately two minutes).

T_w = 5.75 hours. Time available for cognitive response ($T_w = T_e - T_b - T_a$).

$T_{1/2}$ = 15 minutes. Operator median response time. It is estimated that the CRO in the Control Room will initiate hot leg injection within 15 minutes once he is aware of the need to swapover from cold leg injection to hot leg injection.

σ = 0.6 for emergency procedure steps after the immediate operator action steps, and there has been training.

p_3 = 3.0E-3 is the estimated human error probability from NUREG/CR-1278, Table 20-7, item 2, estimated probabilities of errors of omission per item of instruction when use of written procedures is specified, when procedures with checkoff provisions are correctly used, long list >10 items. Error Factor = 3.

Calculations:

p_2(mean) = 1 - $\Phi(\ln(T_w/T_{1/2})/\ \sigma\ )$
= 1 - $\Phi(\ln(5.75/0.25)\ /\ 0.6\ )$
= 1 - $\Phi(5.23)$
= 1.0E-4

P_2(median) = HEP(mean) / M
where $M=EXP\{[(1/1.645)*\ \ln\ (EF)]^2/2\}$
M=1.25 for an EF = 3
= 1.0E-4 / 1.25 = 8.0E-5

- Adjustment For Recovery:

R = 1, the recovery factor. No credit is taken for recovery from this Human Error. There is no independent verification or other recovery factors.

p_3(recovered) = p_3 * R = 3.0E-3 * 1.0 = 3.0E-3

HEP(median) = p_2 + p_3 = 1.0E-4 + 3.0E-3 = 3.1E-3

- Consideration of Dependency:

This recovery term will not be applied to a specific HEP basic event.

- HEP Conversion To A Mean:

HEP(mean) = HEP(median) * M
where $M=EXP\{[1/1.645)* \ln (EF)]^2/2\}$
M=1.25 for an EF = 3

= 3.1E-3 * 1.25 = 3.875E-3

B.3.1.10.4 Summary: REC-1ES1:4-1

- Combining the equipment failure probability with the human error probability.

$P_{recovery}$(mean) = $P_{equipment}$ + $P_{human\ error}$

= 1.0E-1 + 3.875E-3 = 1.039E-1

$P_{recovery}$(median) = P(mean) / M
where $M=EXP\{[(1/1.645)* \ln (EF)]^2/2\}$
M=1.25 for an EF = 3
= 1.039E-1 / 1.25 = 8.312E-2

Sequences Applied:

A all

Physical Id: REC-1ES1:4-1___

Description: 1-ES-1.4_HOT_LEG__
RECIRC_STEP_1_OPEN
MOV-1890A_&_B_____

Failure Rate: 1.039E-1____

Distribution: Lognormal
Median: 8.312E-2_____
Error Factor: 3____

Reference: 325MAF.N.4__________
9-15-92_____________

Why modified: NAPS IPE Final Quantification Value

B.3.1.11 REC-B12AVE

B.3.1.11.1 Equivalent Surry Recovery Action: B12AVE

Hardware failure probability	1.056E-1
Human error probability =	0
Total =	1.056E-1

B.3.1.11.2 Hardware Failure: REC-B12AVE

Use a point estimate of 1.056E-1 based on time averaged non-recovery of AC power in 12 hours from Surry recovery analysis file 325MAF.3 Table 1, Table 3 (T1B sequences) section 4.4 and Reviewer comment #2. See also NUREG/CR-4550 Volume 3, Rev 1, Part 2, Appendix D, section D.6.19, page D-83. Probability of non recovery of offsite power equation is taken from the Accident Sequence Quantification Analysis File, 321MAF.N.1, section 6.1 equation (10) page 26, and is as follows.

$$NRAC(t) = 0.61\exp(-0.39t)$$

where t = time after loss of offsite power in bus.

B.3.1.11.3 Human Error: REC-B12AVE

Not necessary for this recovery term.

B.3.1.11.4 Summary: REC-B12AVE

- Combining the equipment failure probability with the human error probability.

$$P_{recovery}(\text{mean}) = P_{equipment} + P_{human\ error}$$

$$= 1.056E{-1} + 0 = 1.056E{-1}$$

$$P_{recovery}(\text{median}) = P(\text{mean}) / M$$

where $M=EXP\{[(1/1.645)*\ln(EF)]^2/2\}$

$M=1.25$ for an $EF = 3$

$$= 1.056E{-1} / 1.25 = 8.448E{-2}$$

Sequences Applied:

T1AP46 to T1AP56

Physical Id:	REC-B12AVE_____
Description:	TIMED_AVERAGED____ NON_RECOVERY_OF_AC POWER_IN_12_HOURS_
Failure Rate:	1.056E-1____
Distribution:	Lognormal
Median:	8.448E-2_____
Error Factor:	3____
Reference:	325MAF.N.4__________ 9-15-92_____________
Why modified:	NAPS IPE Final Quantification Value

B.3.2 NUPRA Computer Files For Recovery

The NUPRA computer code uses several files to perform the automatic cut set editing. The recovery basic events defined in section B.3.1 are added to cut sets according to the substitution rules established in the edit (.EDT) files. Seven edit files were used for the North Anna IPE. These edit files may be found in Tables B.3.2-1 to B.3.2-7.

NUPRA also requires two input files to interpret which edit file should applied to which sequence equations. Table B.3.2-8 is the edit table file (RECOVERY.TBL) which establishes a numeric value for each edit file name. Table B.3.2-9 is the application instructions file (RECOVERY.APP) it defines which edit files (using the number set by the .TBL file) are applied to which sequence equations. NUPRA will process these from the top to the bottom of the list, but each sequence will be modified only once. If a sequence is not specifically listed then the generic recoveries for that event tree were applied.

B.3.3 Flooding Recovery

The flooding event tree sequences were recovered in a manner similar to the internal event initiators. Recovery was only performed for the containment vulnerable sequences. These sequences have failure of QS and RS, resulting in Containment failure which may lead to core damage creating an energy release path to the atmosphere. Table B.3.3-1 is the edit file (FLOOD.EDT), Table B.3.3-2 is the is the input table file (FLOOD.TBL) and Table B.3.3-3 is the application instructions file (FLOOD.APP) used for flooding recovery.

B.3.4 Results And Conclusions

B.3.4.1 Minimalized Cut Sets For Disallowed Combinations

After the NUPRA auto cut set editing was completed on the sequence equations a review of the individual cut sets was performed to identify combinations of basic events which should not be allowed. These disallowed combinations involve recovery basic events and human error probability (HEP) basic events. NUPRA does not minimalize within a cut set when performing automatic cut set editing; therefore, all recovery terms which appeared more than once in a cut set were reduced to a single basic event. Some recovery terms and some HEPs should not appear together within a cut set because they are illogical combinations or have a conditional dependency which must be taken into account. For example, if the operator has failed to take a corrective actions as represented by an HEP then no credit can be given for recovering the function unless significant time has passed or a different set of operators become involved. Table B.3.4-1 is a list of disallowed combinations of recovery and HEP basic events.

B.3.4.2 Results

A sensitivity study of recovery basic events was performed on the quantification results (NAPS1.EQN). This study examined the cut set which had an unavailability greater than 1E-11. The core damage shows that the recovery terms are responsible for reducing the overall core damage frequency from 2.23E-4 to 6.8E-5/year. Table B.3.4-2 shows the sensitivity results for each recovery basic event.

B.4 REFERENCES

Bertucio, R. C., and J. A. Julius, Analysis of Core Damage Frequency from Internal Events: Surry Unit 1, NUREG/CR-4500, Volume 3, Revision 1, Part 1, Sandia National Laboratories, Albuquerque, New Mexico, April 1990.

NRC (U.S. Nuclear Regulatory Commission), Reactor Safety Study: An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants, WASH-1400, NUREG/75-014, Washington, D.C., October 1975.

Virginia Power (Virginia Electric and Power Company), Probabilistic Risk Assessment Surry Nuclear Power Plant Units 1 and 2 for the Individual Plant Examination: Final Report, Richmond, Virginia, August 1991.

Virginia Power (Virginia Electric and Power Company), Updated Final Safety Evaluation Report, Revision 21, Richmond, Virginia, 1992.

Westinghouse Electric Corporation, Inadequate Core Cooling Studies of Scenarios with Feedwater Available Using NOTRUMP Computer Code, WCAP-9754, Pittsburgh, Pennsylvania, June 1980b.

Westinghouse Electric Corporation, Westinghouse Owners Group Report: Reactor Coolant Pump Seal Performance Following A Loss of All AC Power, WCAP-10541, Revision 2, Pittsburgh, Pennsylvania, November 1986.

Westinghouse Electric Corporation, Joint Westinghouse Owners Group/Westinghouse Program: ATWS Rule Administration Process, WCAP-11992, Pittsburgh, Pennsylvania, 1988.

Intentionally Left Blank

TABLE B.1-1
TIMING OF EVENTS FOR LARGE LOCA

Time (Sec.)	Event Code	Event Description
0.0	39	PZR EQUIL THERMO
0.0	167	UNBKN S/G EQUIL THERMO
0.0	189	B SPRAY PUMPS INSUFF NPSH
0.0	190	UHI ACCUM EMPTY
0.0	209	PS BREAK(S) FAILED
0.2	13	REACTOR SCRAM
0.2	39	PZR NONEQ THERMO
0.2	154	AUX FEEDWATER ON
0.2	156	MSIV CLOSED
0.2	167	UNBKN S/G NONEQ THERMO
4.9	81	WATER ON LOWER CMPT FLOOR
9.8	11	CHARGING PUMPS ON
10.0	6	LPI ON
10.0	81	LOWER CMPT FLOOR DRY
10.2	81	WATER ON LOWER CMPT FLOOR
16.7	32	PZR EMPTY
17.2	32	PZR NOT EMPTY
18.1	32	PZR EMPTY
18.3	15	UNBKN LOOP HOMOGENEOUS
62.0	103	CONTMT SPRAYS ON
68.4	4	MAIN COOLANT PUMPS OFF
68.4	215	MCP SWITCH OFF OR HI-VIBR TRIP
79.3	32	PZR NOT EMPTY
80.2	32	PZR EMPTY
94.8	32	PZR NOT EMPTY
96.6	32	PZR EMPTY
125.9	32	PZR NOT EMPTY
128.9	32	PZR EMPTY
129.8	15	UNBKN LOOP PHASES SEPERATED
139.1	32	PZR NOT EMPTY
142.3	32	PZR EMPTY
186.3	57	WATER IN CAVITY
224.9	188	ACCUMULATOR WATER DEPLETED
368.0	189	B SPRAY PUMPS NPSH OK
370.6	14	FP MODELS ON
1061.0	32	PZR NOT EMPTY
1062.8	32	PZR EMPTY
1254.1	65	CAV CPLD MODEL USED
1668.9	68	CAVITY SOLID
1822.4	32	PZR NOT EMPTY
1822.4	181	RECIRC SYSTEM IN OPERATION
1822.4	220	RECIRC SWITCH: MAN ON
1823.7	32	PZR EMPTY

TABLE B.1-1 (Continued)
TIMING OF EVENTS FOR LARGE LOCA

Time (Sec.)	Event Code	Event Description
2533.2	32	PZR NOT EMPTY
2535.0	32	PZR EMPTY
3197.9	32	PZR NOT EMPTY
3201.5	32	PZR EMPTY
3653.2	182	A SPRAY PUMPS INSUFF NPSH
3653.2	187	RWST WATER DEPLETED
3683.7	32	PZR NOT EMPTY
3685.2	32	PZR EMPTY
4128.6	32	PZR NOT EMPTY
4135.1	32	PZR EMPTY
4551.6	32	PZR NOT EMPTY
4559.9	32	PZR EMPTY
4864.5	32	PZR NOT EMPTY
4874.2	32	PZR EMPTY
5231.2	32	PZR NOT EMPTY
5240.6	32	PZR EMPTY
5507.7	32	PZR NOT EMPTY
5518.6	32	PZR EMPTY
5764.9	32	PZR NOT EMPTY
5773.3	32	PZR EMPTY
6049.2	32	PZR NOT EMPTY
6053.4	32	PZR EMPTY
6286.8	32	PZR NOT EMPTY
6292.4	32	PZR EMPTY
6481.6	32	PZR NOT EMPTY
6495.8	32	PZR EMPTY
6693.3	32	PZR NOT EMPTY
6702.3	32	PZR EMPTY
6963.0	32	PZR NOT EMPTY
6971.8	32	PZR EMPTY
7192.0	32	PZR NOT EMPTY
7200.0	32	PZR EMPTY

TABLF B.1-2
TIMING OF EVENTS FOR MEDIUM LOCA

Time (Sec.)	Event Code	Event Description
0.0	39	PZR EQUIL THERMO
0.0	167	UNBKN S/G EQUIL THERMO
0.0	189	B SPRAY PUMPS INSUFF NPSH
0.0	190	UHI ACCUM EMPTY
0.0	209	PS BREAK(S) FAILED
0.2	13	REACTOR SCRAM
0.2	39	PZR NONEQ THERMO
0.2	154	AUX FEEDWATER ON
0.2	156	MSIV CLOSED
0.2	167	UNBKN S/G NONEQ THERMO
7.1	81	WATER ON LOWER CMPT FLOOR
11.7	81	LOWER CMPT FLOOR DRY
12.0	11	CHARGING PUMPS ON
12.3	6	LPI ON
14.8	81	WATER ON LOWER CMPT FLOOR
20.5	32	PZR EMPTY
21.2	32	PZR NOT EMPTY
21.9	32	PZR EMPTY
22.3	15	UNBKN LOOP HOMOGENEOUS
278.4	4	MAIN COOLANT PUMPS OFF
278.4	215	MCP SWITCH OFF OR HI-VIBR TRIP
306.2	14	FP MODELS ON
340.5	15	UNBKN LOOP PHASES SEPERATED
369.2	57	WATER IN CAVITY
491.8	103	CONTMT SPRAYS ON
797.8	189	B SPRAY PUMPS NPSH OK
943.2	32	PZR NOT EMPTY
1703.4	65	CAV CPLD MODEL USED
1950.1	32	PZR EMPTY
1956.8	32	PZR NOT EMPTY
2050.2	32	PZR EMPTY
2060.9	32	PZR NOT EMPTY
2096.9	32	PZR EMPTY
2108.1	32	PZR NOT EMPTY
2115.5	68	CAVITY SOLID
2372.7	32	PZR EMPTY
2379.5	32	PZR NOT EMPTY
2579.8	32	PZR EMPTY
2588.2	32	PZR NOT EMPTY
3111.6	32	PZR EMPTY
3119.2	32	PZR NOT EMPTY
3553.6	181	RECIRC SYSTEM IN OPERATION
3553.6	220	RECIRC SWITCH: MAN ON

TABLE B.1-2 (Continued)
TIMING OF EVENTS FOR MEDIUM LOCA

Time (Sec.)	Event Code	Event Description
3640.2	32	PZR EMPTY
3648.3	32	PZR NOT EMPTY
3651.5	32	PZR EMPTY
3658.1	32	PZR NOT EMPTY
3734.7	32	PZR EMPTY
3748.3	32	PZR NOT EMPTY
3979.1	32	PZR EMPTY
3986.4	32	PZR NOT EMPTY
3993.6	32	PZR EMPTY
3994.5	32	PZR NOT EMPTY
4307.7	32	PZR EMPTY
4312.8	32	PZR NOT EMPTY
5181.6	32	PZR EMPTY
5190.3	32	PZR NOT EMPTY
5196.9	32	PZR EMPTY
5206.5	32	PZR NOT EMPTY
5381.2	182	A SPRAY PUMPS INSUFF NPSH
5381.2	187	RWST WATER DEPLETED
5392.5	32	PZR EMPTY
5398.6	32	PZR NOT EMPTY
5401.5	32	PZR EMPTY
6476.4	188	ACCUMULATOR WATER DEPLETED
6581.3	32	PZR EMPTY
6585.1	32	PZR NOT EMPTY
6779.2	32	PZR EMPTY
6784.4	32	PZR NOT EMPTY
6787.7	32	PZR EMPTY
6800.0	32	PZR NOT EMPTY
6965.0	32	PZR EMPTY
6972.4	32	PZR NOT EMPTY
6988.4	32	PZR EMPTY
6993.8	32	PZR NOT EMPTY

TABLE B.1-3
TIMING OF EVENTS FOR 1/2" BREAK LOCA

Time (Sec.)	Event Code	Event Description
0.0	39	PZR EQUIL THERMO
0.0	167	UNBKN S/G EQUIL THERMO
0.0	189	B SPRAY PUMPS INSUFF NPSH
0.0	190	UHI ACCUM EMPTY
0.0	209	PS BREAK(S) FAILED
0.4	13	REACTOR SCRAM
0.4	39	PZR NONEQ THERMO
0.4	154	AUX FEEDWATER ON
0.4	156	MSIV CLOSED
0.4	167	UNBKN S/G NONEQ THERMO
978.7	32	PZR EMPTY
1029.1	81	WATER ON LOWER CMPT FLOOR
1046.5	32	PZR NOT EMPTY
1052.3	32	PZR EMPTY
1381.4	15	UNBKN LOOP HOMOGENEOUS
1393.0	32	PZR NOT EMPTY
1396.9	32	PZR EMPTY
2410.2	32	PZR NOT EMPTY
2429.6	32	PZR EMPTY
2649.9	32	PZR NOT EMPTY
2905.0	32	PZR EMPTY
3067.3	32	PZR NOT EMPTY
3218.0	32	PZR EMPTY
3357.1	32	PZR NOT EMPTY
1318.0	39	PZR EQUIL THERMO
1349.9	39	PZR NONEQ THERMO
1361.5	32	PZR EMPTY
1398.9	32	PZR NOT EMPTY
1402.0	32	PZR EMPTY
1638.4	32	PZR NOT EMPTY
1642.6	32	PZR EMPTY
1840.8	32	PZR NOT EMPTY
1857.4	32	PZR EMPTY
1877.4	32	PZR NOT EMPTY
1957.4	32	PZR EMPTY
1984.8	32	PZR NOT EMPTY
1992.2	32	PZR EMPTY
1994.0	32	PZR NOT EMPTY
2063.5	32	PZR EMPTY
2074.0	32	PZR NOT EMPTY
2074.8	32	PZR EMPTY
2100.5	32	PZR NOT EMPTY
2107.9	32	PZR EMPTY

TABLE B.1-3 (Continued)
TIMING OF EVENTS FOR 1/2" BREAK LOCA

Time (Sec.)	Event Code	Event Description
2215.7	32	PZR NOT EMPTY
2229.9	32	PZR EMPTY
2282.5	32	PZR NOT EMPTY
2447.1	39	PZR EQUIL THERMO
2464.8	92	Q/T RUPTURE DISK FAILED
2484.3	4	MAIN COOLANT PUMPS OFF
2484.3	215	MCP SWITCH OFF OR HI-VIBR TRIP
2550.1	15	UNBKN LOOP PHASES SEPERATED
2991.4	39	PZR NONEQ THERMO
3055.1	57	WATER IN CAVITY
3138.9	32	PZR EMPTY
3184.1	32	PZR NOT EMPTY
3208.3	32	PZR EMPTY
3299.6	32	PZR NOT EMPTY
3314.1	32	PZR EMPTY
3353.1	32	PZR NOT EMPTY
3364.5	32	PZR EMPTY
3384.2	32	PZR NOT EMPTY
3419.1	32	PZR EMPTY
4398.0	32	PZR NOT EMPTY
5982.0	39	PZR EQUIL THERMO
7412.8	154	AUX FEEDWATER OFF
7412.8	191	CST WATER DEPLETED
6572.6	151	BROKEN S/G DRY
6594.8	161	UNBKN S/G DRY
7627.0	25	PS NONEQ THERMO
7629.6	25	PS EQUIL THERMO
7665.7	25	PS NONEQ THERMO
7745.7	14	FP MODELS ON
7745.7	49	CORE HAS UNCOV
3147.0	39	PZR NONEQ THERMO
4243.3	32	PZR EMPTY
4672.6	32	PZR NOT EMPTY
4827.7	32	PZR EMPTY
5082.2	32	PZR NOT EMPTY
5083.8	32	PZR EMPTY
5622.7	32	PZR NOT EMPTY
5706.6	32	PZR EMPTY

TABLE B.1-4
TIMING OF EVENTS FOR 1" BREAK LOCA

Time (Sec.)	Event Code	Event Description
0.0	39	PZR EQUIL THERMO
0.0	167	UNBKN S/G EQUIL THERMO
0.0	189	B SPRAY PUMPS INSUFF NPSH
0.0	190	UHI ACCUM EMPTY
0.0	209	PS BREAK(S) FAILED
0.4	13	REACTOR SCRAM
0.4	39	PZR NONEQ THERMO
0.4	154	AUX FEEDWATER ON
0.4	156	MSIV CLOSED
0.4	167	UNBKN S/G NONEQ THERMO
129.9	81	WATER ON LOWER CMPT FLOOR
131.9	81	LOWER CMPT FLOOR DRY
136.3	81	WATER ON LOWER CMPT FLOOR
138.3	81	LOWER CMPT FLOOR DRY
142.6	81	WATER ON LOWER CMPT FLOOR
144.6	81	LOWER CMPT FLOOR DRY
175.5	81	WATER ON LOWER CMPT FLOOR
179.0	81	LOWER CMPT FLOOR DRY
183.2	81	WATER ON LOWER CMPT FLOOR
185.1	81	LOWER CMPT FLOOR DRY
189.4	81	WATER ON LOWER CMPT FLOOR
191.4	81	LOWER CMPT FLOOR DRY
197.3	81	WATER ON LOWER CMPT FLOOR
199.3	81	LOWER CMPT FLOOR DRY
205.0	81	WATER ON LOWER CMPT FLOOR
207.0	81	LOWER CMPT FLOOR DRY
213.2	81	WATER ON LOWER CMPT FLOOR
216.9	81	LOWER CMPT FLOOR DRY
221.4	81	WATER ON LOWER CMPT FLOOR
225.1	81	LOWER CMPT FLOOR DRY
229.7	81	WATER ON LOWER CMPT FLOOR
233.4	81	LOWER CMPT FLOOR DRY
235.9	81	WATER ON LOWER CMPT FLOOR
242.2	81	LOWER CMPT FLOOR DRY
244.7	81	WATER ON LOWER CMPT FLOOR
251.1	81	LOWER CMPT FLOOR DRY
255.2	81	WATER ON LOWER CMPT FLOOR
259.1	81	LOWER CMPT FLOOR DRY
263.0	32	PZR EMPTY
263.0	81	WATER ON LOWER CMPT FLOOR
291.2	32	PZR NOT EMPTY
293.1	32	PZR EMPTY
334.1	15	UNBKN LOOP HOMOGENEOUS

TABLE B.1-4 (Continued)
TIMING OF EVENTS FOR 1" BREAK LOCA

Time (Sec.)	Event Code	Event Description
343.3	32	PZR NOT EMPTY
351.1	32	PZR EMPTY
378.0	14	FP MODELS ON
1320.1	32	PZR NOT EMPTY
1440.0	32	PZR EMPTY
1627.6	32	PZR NOT EMPTY
1938.8	32	PZR EMPTY
2066.4	32	PZR NOT EMPTY
2495.4	57	WATER IN CAVITY
2934.3	32	PZR EMPTY
2942.3	32	PZR NOT EMPTY
2943.5	32	PZR EMPTY
2954.3	32	PZR NOT EMPTY
2957.3	32	PZR EMPTY
2986.5	32	PZR NOT EMPTY
3022.3	39	PZR EQUIL THERMO
3037.5	92	Q/T RUPTURE DISK FAILED
3040.0	4	MAIN COOLANT PUMPS OFF
3040.0	215	MCP SWITCH OFF OR HI-VIBR TRIP
3104.9	15	UNBKN LOOP PHASES SEPERATED
3541.8	39	PZR NONEQ THERMO
3634.7	32	PZR EMPTY
3943.0	32	PZR NOT EMPTY
3944.9	32	PZR EMPTY
4892.6	32	PZR NOT EMPTY
7631.7	25	PS NONEQ THERMO
7637.5	25	PS EQUIL THERMO
7681.1	25	PS NONEQ THERMO
7688.8	25	PS EQUIL THERMO
7701.4	25	PS NONEQ THERMO
7827.1	32	PZR EMPTY
7827.1	49	CORE HAS UNCOV

TABLE B.1-5
TIMING OF EVENTS FOLLOWING TOTAL LOSS OF FEEDWATER

Time (Sec.)	Event Code	Event Description
0.0	13	REACTOR SCRAM
0.0	156	MSIV CLOSED
0.0	189	B SPRAY PUMPS INSUFF NPSH
0.0	190	UHI ACCUM EMPTY
0.0	224	AUX FEED WATER FORCED OFF
0.0	227	MANUAL SCRAM
600.1	4	MAIN COOLANT PUMPS OFF
600.1	215	MCP SWITCH OFF OR HI-VIBR TRIP
2026.7	11	CHARGING PUMPS ON
2026.7	211	PZR PORV: MAN OPEN
2026.7	231	CHARGING PUMP SWITCH: MAN ON
2042.2	6	LPI ON
2125.3	39	PZR EQUIL THERMO
2185.8	40	PZR SOLID
2200.0	92	Q/T RUPTURE DISK FAILED
2204.1	40	PZR HAS STEAM
2435.8	81	WATER ON LOWER CMPT FLOOR
2442.8	81	LOWER CMPT FLOOR DRY
2454.9	81	WATER ON LOWER CMPT FLOOR
2462.4	81	LOWER CMPT FLOOR DRY
2476.4	81	WATER ON LOWER CMPT FLOOR
2494.7	14	FP MODELS ON
2496.2	81	LOWER CMPT FLOOR DRY
2510.8	81	WATER ON LOWER CMPT FLOOR
2513.3	81	LOWER CMPT FLOOR DRY
2518.3	81	WATER ON LOWER CMPT FLOOR
3153.0	40	PZR SOLID
3237.4	40	PZR HAS STEAM
3438.0	57	WATER IN CAVITY
3717.3	40	PZR SOLID
3731.4	40	PZR HAS STEAM
4287.4	40	PZR SOLID
4597.2	40	PZR HAS STEAM
5473.2	151	BROKEN S/G DRY
5475.4	103	CONTMT SPRAYS ON
5488.9	161	UNBKN S/G DRY
5781.4	189	B SPRAY PUMPS NPSH OK
5966.9	189	B SPRAY PUMPS INSUFF NPSH
5987.2	189	B SPRAY PUMPS NPSH OK
5989.7	189	B SPRAY PUMPS INSUFF NPSH
5993.2	189	B SPRAY PUMPS NPSH OK
6008.4	189	B SPRAY PUMPS INSUFF NPSH
6010.1	189	B SPRAY PUMPS NPSH OK

TABLE B.1-5 (Continued)
TIMING OF EVENTS FOLLOWING TOTAL LOSS OF FEEDWATER

Time (Sec.)	Event Code	Event Description
6576.1	151	BROKEN S/G NOT DRY
6613.6	161	UNBKN S/G NOT DRY
6644.2	65	CAV CPLD MODEL USED
7058.1	68	CAVITY SOLID
8456.5	181	RECIRC SYSTEM IN OPERATION
8456.5	220	RECIRC SWITCH: MAN ON
0282.5	182	A SPRAY PUMPS INSUFF NPSH
0282.5	187	RWST WATER DEPLETED
0752.2	40	PZR SOLID
0758.7	40	PZR HAS STEAM
0770.6	40	PZR SOLID
0772.8	40	PZR HAS STEAM

TABLE B.2-1
NORTH ANNA 1 FINAL QUANTIFICATION
DESCRIPTION OF THE HOUSE EVENTS

Identifier	Description	Fault Tree(s)
XHOS-1-OF-2-SG	AFW flow to 1 of 2 Steam Generators required for SGTR (T7) event. Used in conjunction with XHOS-NO-SGA, B or C to achieve 1/2 logic.	AF100
XHOS-1-OF-3-SQ	AFW flow to 1 of 3 Steam Generators required.	AF100
XHOS-1H-FAILS	Fails 4160 VAC bus 1H for T6 and T9A events.	E1H00
XHOS-1J-FAILS	Fails 4160 VAC bus 1J for T6 and T9B events.	E1J00
XHOS-2-OF-2-SG	AFW flow to 2 of 2 Steam Generators required for SGTR (T7) event. Used in conjunction with XHOS-NO-SGA, B or C to achieve 2/2 logic.	AF100
XHOS-2-OF-3-SG	AFW flow to 2 of 3 Steam Generators required for S1 core cooling recovery (S1CCR), T1CCR, and ATWS (TH).	AF100
XHOS-2H-FAILS	Fails 4160 VAC bus 2H for T6 event (loss of SW fails Unit 2 ESGR cooling).	E2H00
XHOS-2J-FAILS	Fails 4160 VAC bus 2J for T6 event (loss of SW fails Unit 2 ESGR cooling).	E2J00
XHOS-ATWS	AFW pump conditions for ATWS. Sets pump mission time to 1 hour and pump auto-actuation faults. When XHOS-ATWS = 1, must set XHOS-NO-ATWS = 0 and XHOS-SBO = 0.	AF100

TABLE B.2-1 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
DESCRIPTION OF THE HOUSE EVENTS

Identifier	Description	Fault Tree(s)
XHOS-CASCOOLREQD	Casing Cooling flow to ORS pump suction required for ORS pump NPSH. Used when Quench Spray is actuated due to High Containment Pressure.	RS100
XHOS-CORECOOLREC	Core cooling recovery for event S1, 3 Accumulators required, for S1CCR, only.	AC100
XHOS-DCBUS-1-I	Fails 125 VDC bus 1-I for T5A events.	E1H00
XHOS-DCBUS-1-II	Fails 125 VDC bus 1-II -- not used, always = 0.	E1H00
XHOS-DCBUS-1-III	Fails 125 VDC bus 1-III for T5B events.	E1J00
XHOS-DCBUS-1-IV	Fails 125 VDC bus 1-IV -- not used, always = 0.	E1J00
XHOS-DCBUS-2-I	Fails 125 VDC bus 2-I -- not used, always = 0.	E2H00
XHOS-DCBUS-2-II	Fails 125 VDC bus 2-II -- not used, always = 0.	E2H00
XHOS-DCBUS-2-III	Fails 125 VDC bus 2-III -- not used, always = 0.	E2J00
XHOS-DCBUS-2-IV	Fails 125 VDC bus 2-IV -- not used, always = 0.	E2J00
XHOS-DG-1H-FAILS	Fails Emergency Diesel Generator 1H for SBO event.	EDG00
XHOS-DG-1J-FAILS	Fails Emergency Diesel Generator 1J for SBO event.	EDG00
XHOS-DG-2H-FAILS	Fails Emergency Diesel Generator 2H; modeling EDG 2H unavailability with the T1A fault trees.	EDG00

TABLE B.2-1 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
DESCRIPTION OF THE HOUSE EVENTS

Identifier	Description	Fault Tree(s)
XHOS-DG-2J-FAILS	Fails Emergency Diesel Generator 2J; use value of 0 for initial quantification, modeling EDG 2J unavailability with the T1A fault trees.	EDG00
XHOS-DG-AAC-FAIL	Fails Alternate AC Diesel. Use value of 1 (no 0 value planned -- this logic for future expansion).	EDG00
XHOS-ELE-1H-2J	Fails electric power to 1H from 2J Crosstie. Use value of 0 except for Loss of Offsite Power events (T1, T1A, SBO), events with partial loss of switchyard power (T9A, T9B) and loss of SW (T6). The Crosstie is failed for these events because a Unit 2 demand on the 2J EDJ is possible, and Unit 2 conditions may prohibit isolation of 2J bus (and its safety-related loads) to allow Crosstie. Also, Crosstie for T6 or T8 is nonsensical if 1H bus is overheated from lack of Unit 1 ESGR cooling.	E1H00
XHOS-ELE-1H-AAC	Fails electric power to 1H from Alternate AC Diesel through Bus 1F. Use value of 1 (no 0 value planned -- this logic for future expansion).	E1H00
XHOS-ELE-1J-AAC	Fails electric power to 1J from Alternate AC Diesel through Bus 1D. Use value of 1 (no 0 value planned -- this logic for future expansion).	E1J00
XHOS-ELE-2H-2J	Fails electric power to 2H from 2J Crosstie. Use value of 0 (no 1 value to fail Crosstie planned).	E2H00

TABLE B.2-1 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
DESCRIPTION OF THE HOUSE EVENTS

Identifier	Description	Fault Tree(s)
XHOS-ELE-2H-AAC	Fails electric power to 2H from Alternate AC Diesel through Bus 1E. Use value of 1 (no 0 value planned -- this logic for future expansion).	E2H00
XHOS-ELE-2J-AAC	Fails electric power to 2J from Alternate AC Diesel through Bus 1F. Use value of 1 (no 0 value planned -- this logic for future expansion).	E2J00
XHOS-HIRCSPRESS	LHSI pump recirculation faults enabled because high RCS pressure has deadheaded pumps (set to 1 for all but event A).	LH100 LR100
XHOS-LOOP	Fails offsite electric power for T1 and SBO events. Use value of 0 for T1A, as this HOS BED file is for L04 and assumes offsite power restoration.	ESY00 00100 00200 00300 SW200
XHOS-NO-ATM-DUMP	Fails all 3 SG atmospheric dump valves. Use value of 0 to always enable all SG ADVs (no value of 1 is planned -- this logic for use if MAAP indicates that SG ADVs provide insufficient relief).	MS100
XHOS-NO-ATWS	AFW pump conditions for non-ATWS events. Sets pump mission time to 24 hours, and allows manual pump actuation. When XHOS-NO-ATWS = 1, must set XHOS-ATWS = 0 and XHOS-SBO = 0.	AF100

TABLE B.2-1 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
DESCRIPTION OF THE HOUSE EVENTS

Identifier	Description	Fault Tree(s)
XHOS-NO-CND-DUMP	Fails both modulated condenser dump valves (other 6 valves not modeled). Use value of 0 (valves operable) for only T7 and ATWS (TH & TL).	MS100 00100 00200 00300
XHOS-NO-SGA	Fails Steam Generator A for SGTR (T7) where AFW cooling can only be provided by 2 or less SG's.	AF100 CC100
XHOS-NO-SGB	Fails Steam Generator B for SGTR (T7) where AFW cooling can only be provided by 2 or less SG's.	AF100 CC100
XHOS-NO-SGC	Fails Steam Generator C for SGTR (T7) where AFW cooling can only be provided by 2 or less SG's.	AF100 CC100
XHOS-QS-REQ-NPSH	Quench Spray to containment required for IRS pump NPSH. Used when Quench Spray is actuated by high Containment pressure.	RS100
XHOS-SBO	AFW turbine driven pump conditions for SBO. Used in T1A for normal SBO, and in T6 and T8 for loss of ESGR cooling SBO. Sets pump mission time to 12 hours. When XHOS-SBO = 1, must set XHOS-ATWS = 0 and XHOS-NO-ATWS = 0.	AF100
XHOS-SI	Auto-actuation SI signal to all 4 normal SW pumps. Use value of 1 for LOCAs (A & S1), T1 (excluding T1A and SBO) and T7.	SW200 00100 00200

TABLE B.2-1 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
DESCRIPTION OF THE HOUSE EVENTS

Identifier	Description	Fault Tree(s)
XHOS-SLB	Enables SI actuation faults for steam line break event. XHOS-SLB = 0 for all events.	SI100
XHOS-SW	SW is available to Recirculation Spray for containment heat removal (i.e., links SW to RS).	RS100
XHOS-TDP-FAILED	Fails AFW turbine driven pump during SBO after 12 hour pump mission time. Used only in event T1A sequence with L04 success (which models MD AFW pumps after power restoration and TD AFW pump failure).	AF100

TABLE B.2-2
NORTH ANNA 1 FINAL QUANTIFICATION
HOUSE EVENT STATUS IN HOUSE BED FILES

LOCA House Bed Files

HOUSE EVENT	A	AC	S1	S1C	S1CCR
XHOS-1-OF-2-SG	0	0	0	0	0
XHOS-1-OF-3-SG	1	1	1	1	0
XHOS-1H-FAILS	0	0	0	0	0
XHOS-1J-FAILS	0	0	0	0	0
XHOS-2-OF-2-SG	0	0	0	0	0
XHOS-2-OF-3-SG	0	0	0	0	1
XHOS-2H-FAILS	0	0	0	0	0
XHOS-2J-FAILS	0	0	0	0	0
XHOS-ATWS	0	0	0	0	0
XHOS-CASCOOLREQD	1	1	0	0	0
XHOS-CORECOOLREC	0	0	0	0	1
XHOS-DCBUS-1-I	0	0	0	0	0
XHOS-DCBUS-1-II	0	0	0	0	0
XHOS-DCBUS-1-III	0	0	0	0	0
XHOS-DCBUS-1-IV	0	0	0	0	0
XHOS-DCBUS-2-I	0	0	0	0	0
XHOS-DCBUS-2-II	0	0	0	0	0
XHOS-DCBUS-2-III	0	0	0	0	0
XHOS-DCBUS-2-IV	0	0	0	0	0
XHOS-DG-1H-FAILS	0	0	0	0	0
XHOS-DG-1J-FAILS	0	0	0	0	0
XHOS-DG-2H-FAILS	0	0	0	0	0
XHOS-DG-2J-FAILS	0	0	0	0	0
XHOS-DG-AAC-FAIL	1	1	1	1	1
XHOS-ELE-1H-2J	0	0	0	0	0
XHOS-ELE-1H-AAC	1	1	1	1	1
XHOS-ELE-1J-AAC	1	1	1	1	1
XHOS-ELE-2H-2J	1	1	1	1	1
XHOS-ELE-2H-AAC	1	1	1	1	1
XHOS-ELE-2J-AAC	1	1	1	1	1
XHOS-HIRCSPRESS	0	0	1	1	1
XHOS-LOOP	0	0	0	0	0
XHOS-NO-ATM-DUMP	0	0	0	0	0
XHOS-NO-ATWS	1	1	1	1	1
XHOS-NO-CND-DUMP	1	1	1	1	1
XHOS-NO-SGA	0	0	0	0	0
XHOS-NO-SGB	0	0	0	0	0
XHOS-NO-SGC	0	0	0	0	0
XHOS-QS-REQ-NPSH	1	1	0	0	0
XHOS-SBO	0	0	0	0	0
XHOS-SI	1	1	1	1	1
XHOS-SLB	0	0	0	0	0
XHOS-SW	0	1	0	1	0
XHOS-TDP-FAILED	0	0	0	0	0

TABLE B.2-2 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
HOUSE EVENT STATUS IN HOUSE BED FILES

Loss of Offsite Power House Bed Files

HOUSE EVENT	T1	T1C	T1N	T1NC	T1CCR
XHOS-1-OF-2-SG	0	0	0	0	0
XHOS-1-OF-3-SG	1	1	1	1	0
XHOS-1H-FAILS	0	0	0	0	0
XHOS-1J-FAILS	0	0	0	0	0
XHOS-2-OF-2-SG	0	0	0	0	0
XHOS-2-OF-3-SG	0	0	0	0	1
XHOS-2H-FAILS	0	0	0	0	0
XHOS-2J-FAILS	0	0	0	0	0
XHOS-ATWS	0	0	0	0	0
XHOS-CASCOOLREQD	0	0	1	1	0
XHOS-CORECOOLREC	0	0	0	0	0
XHOS-DCBUS-1-I	0	0	0	0	0
XHOS-DCBUS-1-II	0	0	0	0	0
XHOS-DCBUS-1-III	0	0	0	0	0
XHOS-DCBUS-1-IV	0	0	0	0	0
XHOS-DCBUS-2-I	0	0	0	0	0
XHOS-DCBUS-2-II	0	0	0	0	0
XHOS-DCBUS-2-III	0	0	0	0	0
XHOS-DCBUS-2-IV	0	0	0	0	0
XHOS-DG-1H-FAILS	0	0	0	0	0
XHOS-DG-1J-FAILS	0	0	0	0	0
XHOS-DG-2H-FAILS	0	0	0	0	0
XHOS-DG-2J-FAILS	0	0	0	0	0
XHOS-DG-AAC-FAIL	1	1	1	1	1
XHOS-ELE-1H-2J	1	1	1	1	1
XHOS-ELE-1H-AAC	1	1	1	1	1
XHOS-ELE-1J-AAC	1	1	1	1	1
XHOS-ELE-2H-2J	1	1	1	1	1
XHOS-ELE-2H-AAC	1	1	1	1	1
XHOS-ELE-2J-AAC	1	1	1	1	1
XHOS-HIRCSPRESS	1	1	1	1	1
XHOS-LOOP	1	1	1	1	1
XHOS-NO-ATM-DUMP	0	0	0	0	0
XHOS-NO-ATWS	1	1	1	1	1
XHOS-NO-CND-DUMP	1	1	1	1	1
XHOS-NO-SGA	0	0	0	0	0
XHOS-NO-SGB	0	0	0	0	0
XHOS-NO-SGC	0	0	0	0	0
XHOS-QS-REQ-NPSH	0	0	0	0	0
XHOS-SBO	0	0	0	0	0
XHOS-SI	1	1	1	1	1
XHOS-SLB	0	0	0	0	0
XHOS-SW	0	1	0	1	0
XHOS-TDP-FAILED	0	0	0	0	0

TABLE B.2-2 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
HOUSE EVENT STATUS IN HOUSE BED FILES

Station Blackout House Bed Files

HOUSE EVENT	SBO	T1A	T6
XHOS-1-OF-2-SG	0	0	0
XHOS-1-OF-3-SG	1	1	1
XHOS-1H-FAILS	0	0	1
XHOS-1J-FAILS	0	0	1
XHOS-2-OF-2-SG	0	0	0
XHOS-2-OF-3-SG	0	0	0
XHOS-2H-FAILS	0	0	1
XHOS-2J-FAILS	0	0	1
XHOS-ATWS	0	0	0
XHOS-CASCOOLREQD	0	0	0
XHOS-CORECOOLREC	0	0	0
XHOS-DCBUS-1-I	0	0	0
XHOS-DCBUS-1-II	0	0	0
XHOS-DCBUS-1-III	0	0	0
XHOS-DCBUS-1-IV	0	0	0
XHOS-DCBUS-2-I	0	0	0
XHOS-DCBUS-2-II	0	0	0
XHOS-DCBUS-2-III	0	0	0
XHOS-DCBUS-2-IV	0	0	0
XHOS-DG-1H-FAILS	1	0	0
XHOS-DG-1J-FAILS	1	0	0
XHOS-DG-2H-FAILS	0	0	0
XHOS-DG-2J-FAILS	0	0	0
XHOS-DG-AAC-FAIL	1	1	1
XHOS-ELE-1H-2J	1	1	1
XHOS-ELE-1H-AAC	1	1	1
XHOS-ELE-1J-AAC	1	1	1
XHOS-ELE-2H-2J	1	1	1
XHOS-ELE-2H-AAC	1	1	1
XHOS-ELE-2J-AAC	1	1	1
XHOS-HIRCSPRESS	1	1	1
XHOS-LOOP	1	0	0
XHOS-NO-ATM-DUMP	0	0	0
XHOS-NO-ATWS	0	1	0
XHOS-NO-CND-DUMP	1	1	1
XHOS-NO-SGA	0	0	0
XHOS-NO-SGB	0	0	0
XHOS-NO-SGC	0	0	0
XHOS-QS-REQ-NPSH	0	0	0
XHOS-SBO	1	0	1
XHOS-SI	0	0	0
XHOS-SLB	0	0	0
XHOS-SW	0	0	0
XHOS-TDP-FAILED	0	1	0

TABLE B.2-2 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
HOUSE EVENT STATUS IN HOUSE BED FILES

T5A, Loss of 125 VDC Bus 1-I House Bed Files

HOUSE EVENT	T5A	T5AC	T5AN	T5ANC
XHOS-1-OF-2-SG	0	0	0	0
XHOS-1-OF-3-SG	1	1	1	1
XHOS-1H-FAILS	0	0	0	0
XHOS-1J-FAILS	0	0	0	0
XHOS-2-OF-2-SG	0	0	0	0
XHOS-2-OF-3-SG	0	0	0	0
XHOS-2H-FAILS	0	0	0	0
XHOS-2J-FAILS	0	0	0	0
XHOS-ATWS	0	0	0	0
XHOS-CASCOOLREQD	0	0	1	1
XHOS-CORECOOLREC	0	0	0	0
XHOS-DCBUS-1-I	1	1	1	1
XHOS-DCBUS-1-II	0	0	0	0
XHOS-DCBUS-1-III	0	0	0	0
XHOS-DCBUS-1-IV	0	0	0	0
XHOS-DCBUS-2-I	0	0	0	0
XHOS-DCBUS-2-II	0	0	0	0
XHOS-DCBUS-2-III	0	0	0	0
XHOS-DCBUS-2-IV	0	0	0	0
XHOS-DG-1H-FAILS	0	0	0	0
XHOS-DG-1J-FAILS	0	0	0	0
XHOS-DG-2H-FAILS	0	0	0	0
XHOS-DG-2J-FAILS	0	0	0	0
XHOS-DG-AAC-FAIL	1	1	1	1
XHOS-ELE-1H-2J	0	0	0	0
XHOS-ELE-1H-AAC	1	1	1	1
XHOS-ELE-1J-AAC	1	1	1	1
XHOS-ELE-2H-2J	1	1	1	1
XHOS-ELE-2H-AAC	1	1	1	1
XHOS-ELE-2J-AAC	1	1	1	1
XHOS-HIRCSPRESS	1	1	1	1
XHOS-LOOP	0	0	0	0
XHOS-NO-ATM-DUMP	0	0	0	0
XHOS-NO-ATWS	1	1	1	1
XHOS-NO-CND-DUMP	1	1	1	1
XHOS-NO-SGA	0	0	0	0
XHOS-NO-SGB	0	0	0	0
XHOS-NO-SGC	0	0	0	0
XHOS-QS-REQ-NPSH	0	0	1	1
XHOS-SBO	0	0	0	0
XHOS-SI	0	0	0	0
XHOS-SLB	0	0	0	0
XHOS-SW	0	1	0	1
XHOS-TDP-FAILED	0	0	0	0

TABLE B.2-2 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
HOUSE EVENT STATUS IN HOUSE BED FILES

T5B, Loss of 125 VDC Bus 1-III House Bed Files

HOUSE EVENT	T5B	T5BC	T5BN	T5BNC
XHOS-1-OF-2-SG	0	0	0	0
XHOS-1-OF-3-SG	1	1	1	1
XHOS-1H-FAILS	0	0	0	0
XHOS-1J-FAILS	0	0	0	0
XHOS-2-OF-2-SG	0	0	0	0
XHOS-2-OF-3-SG	0	0	0	0
XHOS-2H-FAILS	0	0	0	0
XHOS-2J-FAILS	0	0	0	0
XHOS-ATWS	0	0	0	0
XHOS-CASCOOLREQD	0	0	1	1
XHOS-CORECOOLREC	0	0	0	0
XHOS-DCBUS-1-I	0	0	0	0
XHOS-DCBUS-1-II	0	0	0	0
XHOS-DCBUS-1-III	1	1	1	1
XHOS-DCBUS-1-IV	0	0	0	0
XHOS-DCBUS-2-I	0	0	0	0
XHOS-DCBUS-2-II	0	0	0	0
XHOS-DCBUS-2-III	0	0	0	0
XHOS-DCBUS-2-IV	0	0	0	0
XHOS-DG-1H-FAILS	0	0	0	0
XHOS-DG-1J-FAILS	0	0	0	0
XHOS-DG-2H-FAILS	0	0	0	0
XHOS-DG-2J-FAILS	0	0	0	0
XHOS-DG-AAC-FAIL	1	1	1	1
XHOS-ELE-1H-2J	0	0	0	0
XHOS-ELE-1H-AAC	1	1	1	1
XHOS-ELE-1J-AAC	1	1	1	1
XHOS-ELE-2H-2J	1	1	1	1
XHOS-ELE-2H-AAC	1	1	1	1
XHOS-ELE-2J-AAC	1	1	1	1
XHOS-HIRCSPRESS	1	1	1	1
XHOS-LOOP	0	0	0	0
XHOS-NO-ATM-DUMP	0	0	0	0
XHOS-NO-ATWS	1	1	1	1
XHOS-NO-CND-DUMP	1	1	1	1
XHOS-NO-SGA	0	0	0	0
XHOS-NO-SGB	0	0	0	0
XHOS-NO-SGC	0	0	0	0
XHOS-QS-REQ-NPSH	0	0	1	1
XHOS-SBO	0	0	0	0
XHOS-SI	0	0	0	0
XHOS-SLB	0	0	0	0
XHOS-SW	0	1	0	1
XHOS-TDP-FAILED	0	0	0	0

TABLE B.2-2 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
HOUSE EVENT STATUS IN HOUSE BED FILES

SGTR (T7) and ATWS (TH & TL) House Bed Files

HOUSE EVENT	T7	T7D1	TH	TL
XHOS-1-OF-2-SG	1	0	0	0
XHOS-1-OF-3-SG	0	0	0	1
XHOS-1H-FAILS	0	0	0	0
XHOS-1J-FAILS	0	0	0	0
XHOS-2-OF-2-SG	0	1	0	0
XHOS-2-OF-3-SG	0	0	1	0
XHOS-2H-FAILS	0	0	0	0
XHOS-2J-FAILS	0	0	0	0
XHOS-ATWS	0	0	1	1
XHOS-CASCOOLREQD	0	0	0	0
XHOS-CORECOOLREC	0	0	0	0
XHOS-DCBUS-1-I	0	0	0	0
XHOS-DCBUS-1-II	0	0	0	0
XHOS-DCBUS-1-III	0	0	0	0
XHOS-DCBUS-1-IV	0	0	0	0
XHOS-DCBUS-2-I	0	0	0	0
XHOS-DCBUS-2-II	0	0	0	0
XHOS-DCBUS-2-III	0	0	0	0
XHOS-DCBUS-2-IV	0	0	0	0
XHOS-DG-1H-FAILS	0	0	0	0
XHOS-DG-1J-FAILS	0	0	0	0
XHOS-DG-2H-FAILS	0	0	0	0
XHOS-DG-2J-FAILS	0	0	0	0
XHOS-DG-AAC-FAIL	1	1	1	1
XHOS-ELE-1H-2J	0	0	0	0
XHOS-ELE-1H-AAC	1	1	1	1
XHOS-ELE-1J-AAC	1	1	1	1
XHOS-ELE-2H-2J	1	1	1	1
XHOS-ELE-2H-AAC	1	1	1	1
XHOS-ELE-2J-AAC	1	1	1	1
XHOS-HIRCSPRESS	1	1	1	1
XHOS-LOOP	0	0	0	0
XHOS-NO-ATM-DUMP	0	0	0	0
XHOS-NO-ATWS	1	1	0	0
XHOS-NO-CND-DUMP	0	0	0	0
XHOS-NO-SGA	0	0	0	0
XHOS-NO-SGB	0	0	0	0
XHOS-NO-SGC	1	1	0	0
XHOS-QS-REQ-NPSH	0	0	0	0
XHOS-SBO	0	0	0	0
XHOS-SI	1	1	0	0
XHOS-SLB	0	0	0	0
XHOS-SW	0	0	0	0
XHOS-TDP-FAILED	0	0	0	0

TABLE B.2-2 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
HOUSE EVENT STATUS IN HOUSE BED FILES

T9A, Loss of 4160 VAC Bus 1H House Bed Files

HOUSE EVENT	T9A	T9AC	T9AN	T9ANC
XHOS-1-OF-2-SG	0	0	0	0
XHOS-1-OF-3-SG	1	1	1	1
XHOS-1H-FAILS	1	1	1	1
XHOS-1J-FAILS	0	0	0	0
XHOS-2-OF-2-SG	0	0	0	0
XHOS-2-OF-3-SG	0	0	0	0
XHOS-2H-FAILS	0	0	0	0
XHOS-2J-FAILS	0	0	0	0
XHOS-ATWS	0	0	0	0
XHOS-CASCOOLREQD	0	0	1	1
XHOS-CORECOOLREC	0	0	0	0
XHOS-DCBUS-1-I	0	0	0	0
XHOS-DCBUS-1-II	0	0	0	0
XHOS-DCBUS-1-III	0	0	0	0
XHOS-DCBUS-1-IV	0	0	0	0
XHOS-DCBUS-2-I	0	0	0	0
XHOS-DCBUS-2-II	0	0	0	0
XHOS-DCBUS-2-III	0	0	0	0
XHOS-DCBUS-2-IV	0	0	0	0
XHOS-DG-1H-FAILS	0	0	0	0
XHOS-DG-1J-FAILS	0	0	0	0
XHOS-DG-2H-FAILS	0	0	0	0
XHOS-DG-2J-FAILS	0	0	0	0
XHOS-DG-AAC-FAIL	1	1	1	1
XHOS-ELE-1H-2J	1	1	1	1
XHOS-ELE-1H-AAC	1	1	1	1
XHOS-ELE-1J-AAC	1	1	1	1
XHOS-ELE-2H-2J	1	1	1	1
XHOS-ELE-2H-AAC	1	1	1	1
XHOS-ELE-2J-AAC	1	1	1	1
XHOS-HIRCSPRESS	1	1	1	1
XHOS-LOOP	0	0	0	0
XHOS-NO-ATM-DUMP	0	0	0	0
XHOS-NO-ATWS	1	1	1	1
XHOS-NO-CND-DUMP	1	1	1	1
XHOS-NO-SGA	0	0	0	0
XHOS-NO-SGB	0	0	0	0
XHOS-NO-SGC	0	0	0	0
XHOS-QS-REQ-NPSH	0	0	1	1
XHOS-SBO	0	0	0	0
XHOS-SI	0	0	0	0
XHOS-SLB	0	0	0	0
XHOS-SW	0	1	0	1
XHOS-TDP-FAILED	0	0	0	0

TABLE B.2-2 (Continued)
NORTH ANNA 1 FINAL QUANTIFICATION
HOUSE EVENT STATUS IN HOUSE BED FILES

T9B, Loss of 4160 VAC Bus 1J House Bed Files

HOUSE EVENT	T9B	T9BC	T9BN	T9BNC
XHOS-1-OF-2-SG	0	0	0	0
XHOS-1-OF-3-SG	1	1	1	1
XHOS-1H-FAILS	0	0	0	0
XHOS-1J-FAILS	1	1	1	1
XHOS-2-OF-2-SG	0	0	0	0
XHOS-2-OF-3-SG	0	0	0	0
XHOS-2H-FAILS	0	0	0	0
XHOS-2J-FAILS	0	0	0	0
XHOS-ATWS	0	0	0	0
XHOS-CASCOOLREQD	0	0	1	1
XHOS-CORECOOLREC	0	0	0	0
XHOS-DCBUS-1-I	0	0	0	0
XHOS-DCBUS-1-II	0	0	0	0
XHOS-DCBUS-1-III	0	0	0	0
XHOS-DCBUS-1-IV	0	0	0	0
XHOS-DCBUS-2-I	0	0	0	0
XHOS-DCBUS-2-II	0	0	0	0
XHOS-DCBUS-2-III	0	0	0	0
XHOS-DCBUS-2-IV	0	0	0	0
XHOS-DG-1H-FAILS	0	0	0	0
XHOS-DG-1J-FAILS	0	0	0	0
XHOS-DG-2H-FAILS	0	0	0	0
XHOS-DG-2J-FAILS	0	0	0	0
XHOS-DG-AAC-FAIL	1	1	1	1
XHOS-ELE-1H-2J	1	1	1	1
XHOS-ELE-1H-AAC	1	1	1	1
XHOS-ELE-1J-AAC	1	1	1	1
XHOS-ELE-2H-2J	1	1	1	1
XHOS-ELE-2H-AAC	1	1	1	1
XHOS-ELE-2J-AAC	1	1	1	1
XHOS-HIRCSPRESS	1	1	1	1
XHOS-LOOP	0	0	0	0
XHOS-NO-ATM-DUMP	0	0	0	0
XHOS-NO-ATWS	1	1	1	1
XHOS-NO-CND-DUMP	1	1	1	1
XHOS-NO-SGA	0	0	0	0
XHOS-NO-SGB	0	0	0	0
XHOS-NO-SGC	0	0	0	0
XHOS-QS-REQ-NPSH	0	0	1	1
XHOS-SBO	0	0	0	0
XHOS-SI	0	0	0	0
XHOS-SLB	0	0	0	0
XHOS-SW	0	1	0	1
XHOS-TDP-FAILED	0	0	0	0

TABLE B.2-3
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
A	X			See IE-EQN
HV01	X			
D201	X			
D301	X			
QS01	X			
RS01	X			
RS02	X			
CH01	X		X	
CH02	X		X	
H101	X			
DH01	X			

Note: FTS = Solution of System Fault Trees.
FFT = Solution of Functional Fault Trees.
OCL = Merging of basic events with other basic events and/or other equation.

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
RX	X			See IE-EQN
QS01	X			
D301	X			
RS01	X			
CH01	X		X	

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
S1	X			See IE-EQN
K01	X			
HV01	X			
D101	X			
D202	X			
D203	X			
L01	X			
L02	X			
O01	X		X	
Y01	X		X	
D302	X			
H201	X		X	
H102	X			
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
S2	X			See IE-EQN
K01	X			
HV01	X			
D101	X		X	
L01	X			
L02	X			
FM01		X		
P01	X			
O02	X		X	
O03	X		X	
Y02	X		X	
D203	X			
D302	X			
H201	X		X	
H102	X			
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T1	X			See IE-EQN
K01	X			
DG01	X		X	
HV02	X		X	
Q01	X			
L03	X			
P02	X			
P03	X			
D102	X		X	
D103	X		X	
SLC01	X		X	
O04	X		X	
Y03	X		X	
D203	X			
D304	X			
H202	X		X	
QS02	X			
RS04	X			
RS05	X			
CH04	X		X	
CH05	X		X	
H107	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T1A (T1P64)				*
Q02	X			
LT01	X		X	
SLC02	X			
B01		X		
B02		X		
B10		X		
B16		X		
B102		X		
B103		X		
B111		X		
B117		X		
B220	X		X	
B221		X		
B229		X		
B235		X		
L04	X			
P01	X			
D101	X			
D105	X			
H102	X			
H201	X		X	
QS01	X			
RS01	X			
CH01	X		X	

* Transfer from T1 Tree

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T1TR (T1P63)				*
004	X		X	
LT01	X			
RC103	X		X	
RC203		X		
RC303		X		
RC304		X		
D102	X		X	
QS02	X			
RS04	X			
RS05	X			
CH04	X		X	
CH05	X		X	
H107	X			
H202	X		X	

* Transfer from T1 Tree

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T2	X			See IE-EQN
K01	X			
HV01	X			
Q03	X			
L01	X			
P01	X			
D105	X			
H201	X		X	
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	
H102	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T2TR (T2P20)				*
LT01	X			
008	X			
RC102		X		
RC202		X		
RC303		X		
RC304		X		
D105	X			
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	

* Transfer from T2 Tree

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T2A	X			See IE-EQN
K01	X			
HV01	X			
Q03	X			
L01	X			
M01	X			
P01	X			
D105	X			
H201	X		X	
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T2ATR (T2AP21)				*
LT01	X			
008	X			
RC102		X		
RC202		X		
RC303		X		
RC304		X		
D105	X			
QS01	X			
RS01	X			
RS03	X			
CH01	X			
CH03	X			
H102	X			

* Transfer from T2A Tree

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T3	X			See IE-EQN
K01	X			
HV01	X			
Q03	X			
L01	X			
M02	X			
P01	X			
D105	X			
H201	X		X	
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	
H102	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T3TR (T3P21)				
LT01	X			
008	X			
RC102		X		
RC202		X		
RC303		X		
RC304		X		
D105	X			
QS01	X			
RS01	X			
RS03	X			
CH01	X			
CH03	X			
H102	X			

* Transfer from T3 Tree

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T4	X			See IE-EQN
K01	X			
HV01	X			
L01	X			
O05	X		X	
Y04	X		X	
D203	X			
D302	X			
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	
H102	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T5A	X			See IE-EQN
K01	X			
HV03	X			
Q04	X			
L05	X			
D106	X			
H203	X		X	
QS03	X			
RS06	X			
RS07	X			
CH06	X			
CH07	X			
H103	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T5B	X			See IE-EQN
K01	X			
HV04	X		X	
Q05	X			
L06	X			
D107	X			
H204	X		X	
QS04	X			
RS08	X			
RS09	X			
CH08	X			
CH09	X			
H104	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T6	X			See IE-EQN
008	X			
LT01	X			
RC101		X		
RC201		X		
RC301		X		
RC302		X		
D101	X			
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	
H102	X			
H201	X		X	

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T7	X			See IE-EQN
K01	X			
HV01	X			
D101	X			
L07	X			
L08	X			
P01	X			
SGI01	X			
O06	X		X	
O07	X		X	
O201	X		X	
O202	X		X	
O203	X		X	
D203	X			
D302	X			
H201	X		X	
W01	X		X	
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T8	X			See IE-EQN
LT01	X			
O08	X			
RC102		X		
RC202		X		
RC303		X		
RC304		X		
D101	X			
QS01	X			
RS01	X			
RS03	X			
CH01	X		X	
CH03	X		X	
H102	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T9A	X			See IET9A
K01	X			
HV05	X			
Q06	X			
L09	X			
D108	X			
H205	X		X	
QS05	X			
RS10	X			
RS11	X			
CH10	X			
CH11	X			
H105	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T9ATR (T9AP23)				*
008	X			
LT01	X			
RC102		X		
RC202		X		
RC303		X		
RC304		X		
D108	X			
QS05	X			
RS10	X			
RS11	X			
CH10	X			
CH11	X			
H105	X			
H205	X		X	

* Transfer from T9A Tree

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T9B	X			See IET9B
K01	X			
HV06	X			
Q07	X			
L10	X			
D109	X			
H206	X		X	
QS06	X			
RS12	X			
RS13	X			
CH12	X			
CH13	X			
H106	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
T9BTR (T9BP23)				*
008	X			
LT01	X			
RC102		X		
RC202		X		
RC303		X		
RC304		X		
D109	X			
QS06	X			
RS12	X			
RS13	X			
CH12	X			
CH13	X			
H106	X			
H206	X		X	

* Transfer from T8B Tree

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
TH	X			See IE-EQN
K01	X			
M03		X		
TT01	X			
L11	X			
PR01		X		
Q08		X		
Q09	X			
MSL01		X		
D401	X			
D402	X			
QS01	X			
RS01	X			
CH01	X		X	
H102	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
TL	X			See IE-EQN
K01	X			
L12	X		X	
Q03	X			
Q09	X			
MSL01		X		
D401	X			
D402	X		X	
QS01	X			
RS01	X			
CH01	X		X	
H102	X			

TABLE B.2-3 (Continued)
EVENT TREE FUNCTION SOLUTION SUMMARY

EQUATION	FTS	FFT	OCL	OTHER/COMMENT
VX	X			See IE-EQN
FM01		X		
HV01	X			
D101	X		X	
L01	X		X	
O01		X		
VI01		X		

TABLE B.2-4
SUMMARY OF OCL FILES

CH01.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	CH01A	*	CH01B	=	INT1	1.0E-9
2	CH01C	*	CH01D	=	INT2	1.0E-9
3	INT1	*	INT2	=	CH01	5.0E-9

CH02.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	CH01C	*	CH01D	=	CH02	1.0E-9

CH03.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	CH03A	*	CH03B	=	INT1	1.0E-9
2	CH03C	*	CH03D	=	INT2	1.0E-9
3	INT1	*	INT2	=	CH03	5.0E-9

CH04.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	CH04A	*	CH04B	=	INT1	1.0E-9
2	CH04C	*	CH04D	=	INT2	1.0E-9
3	INT1	*	INT2	=	CH04	1.0E-9

CH05.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	CH05A	*	CH05B	=	INT1	1.0E-7
2	CH05C	*	CH05D	=	INT2	1.0E-7
3	INT1	*	INT2	=	CH05	1.0E-7

TABLE B.2-4 (Continued)
SUMMARY OF OCL FILES

D102.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	D102H	*	D102I	=	INT1	1.0E-7
2	INT1	*	D102G	=	INT2	1.0E-7
3	INT2	+	D102F	=	INT3	1.0E-7
4	D102D	+	D102E	=	INT4	1.0E-7
5	INT3	+	INT4	=	INT5	1.0E-7
6	INT5	+	D102B	=	INT6	1.0E-7
7	D102AA	*	D102AB	=	INT7	1.0E-7
8	INT7	*	D102AC	=	INT8	1.0E-7
9	D102AD	+	INT8	=	INT9	1.0E-7
10	INT6	*	INT9	=	INT10	1.0E-7
11	INT10	+	D102C	=	D102	1.0E-7

D103.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	D103G	*	D103H	=	INT1	1.0E-7
2	INT1	*	D103F	=	INT2	1.0E-7
3	INT2	+	D103E	=	INT3	1.0E-7
4	D103C	+	D103D	=	INT4	1.0E-7
5	INT3	+	INT4	=	INT5	1.0E-7
6	INT5	+	D103B	=	INT6	1.0E-7
7	D103AA	*	D103AB	=	INT7	1.0E-7
8	INT7	*	D103AC	=	INT8	1.0E-7
9	INT8	+	D103AD	=	INT9	1.0E-7
10	INT6	*	INT9	=	D103	1.0E-7

D104.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	D104A	*	D104B	=	D104	2.0E-7

TABLE B.2-4 (Continued)
SUMMARY OF OCL FILES

DG01.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	DG01A	*	DG01B	=	DG01	1.0E-9

H201.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	H201A	*	H201B	=	INT0	1.0E-8
2	INT0	*	H201C	=	INT1	1.0E-8
3	H201D	+	INT1	=	INT2	1.0E-8
4	H201G	*	H201H	=	INT3	1.0E-8
5	H201F	*	INT3	=	INT4	1.0E-8
6	H201E	+	INT4	=	INT5	1.0E-8
7	INT5	*	INT2	=	H201	1.0E-8

H202.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	H202A	*	H202B	=	INT1	1.0E-8
2	H202C	+	INT1	=	INT2	1.0E-8
3	H202D	+	INT2	=	INT3	1.0E-8
4	H202E	+	INT3	=	INT4	1.0E-8
5	H202F	*	H202G	=	INT5	1.0E-8
6	H202C	+	INT5	=	INT6	1.0E-8
7	H202H	+	INT6	=	INT7	1.0E-8
8	H202I	+	INT7	=	INT8	1.0E-8
9	H202J	*	H202K	=	INT9	1.0E-8
10	H202C	+	INT9	=	INT10	1.0E-8
11	H202L	+	INT10	=	INT11	1.0E-8
12	H202M	+	INT11	=	INT12	1.0E-8
13	INT4	*	INT8	=	INT13	1.0E-8
14	INT12	*	INT13	=	INT14	1.0E-8
15	H202N	+	INT14	=	INT15	1.0E-8
16	H202O	+	INT3	=	INT16	1.0E-8
17	H202P	+	INT7	=	INT17	1.0E-8
18	INT16	*	INT17	=	INT18	1.0E-8
19	INT11	*	INT18	=	INT19	1.0E-8
20	H202Q	+	INT19	=	INT20	1.0E-8
21	INT15	*	INT20	=	H202	1.0E-8

TABLE B.2-4 (Continued)
SUMMARY OF OCL FILES

H203.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	H203D	+	H203B	=	INT2	1.0E-8
2	H203E	+	H203H	=	INT5	1.0E-8
3	INT5	*	INT2	=	H203	1.0E-8

H204.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	H204A	*	H204C	=	INT1	1.0E-8
2	H204D	+	INT1	=	INT2	1.0E-8
3	H204F	*	H204G	=	INT4	1.0E-8
4	H204E	+	INT4	=	INT5	1.0E-8
5	INT5	*	INT2	=	H204	1.0E-8

H205.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	H205D	+	H205B	=	INT2	1.0E-8
2	H205E	+	H205H	=	INT5	1.0E-8
3	INT5	*	INT2	=	H205	1.0E-8

H206.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	H206F	*	H206G	=	INT4	1.0E-8
2	H206E	+	INT4	=	H206	1.0E-8

TABLE B.2-4 (Continued)
SUMMARY OF OCL FILES

HV02.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	HV02A	*	HV02B	=	INT1	5.0E-8
2	INT1	*	HV02C	=	INT2	5.0E-8
3	INT2	+	HV02D	=	INT5A	5.0E-8
4	INT5A	+	HV02I	=	INT5	5.0E-8
5	HV02E	*	HV02F	=	INT3	5.0E-8
6	HV02G	*	INT3	=	INT4	5.0E-8
7	HV02H	+	INT4	=	INT6A	5.0E-8
8	INT6A	+	HV02J	=	INT6	5.0E-8
9	INT5	*	INT6	=	HV02	5.0E-8

HV04.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	HV04A	*	HV04B	=	HV04	2.0E-7

L12.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	L12A	*	L12B	=	INT1	1.0E-9
2	L12C	*	INT1	=	L12	1.0E-9

O01ACT.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	O01A	+	O01B	=	O01ACT	1.0E-9

O02.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	O01A	+	O02B	=	O02	1.0E-9

TABLE B.2-4 (Continued)
SUMMARY OF OCL FILES

003.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	001A	+	003B	=	003	1.0E-9

004.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	004A	+	004B	=	004	1.0E-9

005.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	005A	+	005B	=	005	1.0E-9

006.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	006A	+	006B	=	006	1.0E-9

007.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	006A	+	007B	=	007	1.0E-9

0201.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	0201A	+	0201B	=	0201	1.0E-9

TABLE B.2-4 (Continued)
SUMMARY OF OCL FILES

0202.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	O201A	+	O202B	=	O202	1.0E-9

0203.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	O201A	+	O203B	=	O203	1.0E-9

RC103.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	RC103A	*	RC103B	=	INT1	1.0E-7
2	INT1	*	RC103C	=	INT2	1.0E-7
3	INT2	+	RC103D	=	INT3	1.0E-7
4	INT3	+	RC103E	=	INT4	1.0E-7
5	INT4	*	RC103F	=	RC103	1.0E-7

SLC01.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	SLC01A	*	SLC01B	=	INT1	1.0E-6
2	INT1	*	SLC01C	=	INT2	1.0E-6
3	INT2	*	SLC01D	=	SLC01	1.0E-6

W01.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	W01A	*	W01B	=	W01	2.0E-7

TABLE B.2-4 (Continued)
SUMMARY OF OCL FILES

Y01.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	Y01A	+	Y01B	=	Y01	1.0E-9

Y02.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	Y01A	+	Y02B	=	Y02	1.0E-9

Y03.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	Y03A	+	Y03B	=	INT1	1.0E-8
2	Y03C	+	INT1	=	Y03	1.0E-8

Y04.OCL

Step	Equation 1		Equation 2		Outcome	Cutoff
1	Y04A	+	Y04B	=	INT1	1.0E-8
2	Y04C	+	INT1	=	Y04	1.0E-8

TABLE B.2-5
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
C-B01	COMPOL	-	GCMP221	5.20E-1	1E-10	1
C-B02	COMPOL	-	GCMP165	6.60E-1	1E-10	1
C-B102	COMPOL	-	GCMP253	3.20E-1	1E-10	1
C-B103	COMPOL	-	GCMP251	3.20E-1	1E-10	1
C-B111	COMPOL	-	GCMP225	3.20E-1	1E-10	1
C-B117	COMPOL	-	GCMP223	3.20E-1	1E-10	1
C-D102	COMPOL	-	GCMP483	9.40E-1	1E-10	1
C-D105	COMPOL	-	GCMP485	9.47E-1	1E-10	1
C-D304	COMPOL	-	GCMP453	8.80E-1	1E-10	1
C-FM01	COMPOL	-	GCMP125	4.80E-2	1E-10	1
C-H103	COMPOL	-	GCMP581	9.61E-1	1E-10	1
C-H104	COMPOL	-	GCMP583	9.62E-1	1E-10	1
C-H105	COMPOL	-	GCMP553	9.49E-1	1E-10	1
C-H106	COMPOL	-	GCMP555	9.36E-1	1E-10	1
C-HV05	COMPOL	-	GCMP383	7.49E-1	1E-10	1

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
C-L08	COMPOL	-	GCMP285	8.41E-1	1E-10	1
C-LT01	COMPOL	-	GCMP481	9.07E-1	1E-10	1
C-M03	COMPOL	-	GCMP385	7.06E-1	1E-10	1
C-O01	COMPOL	-	GCMP121	1.00E-15	1E-16	1
C-O05	COMPOL	-	GCMP323	6.13E-1	1E-10	1
C-P01	COMPOL	-	GCMP161	1.00E+0	1E-10	1
C-P02	COMPOL	-	GCMP255	9.87E-1	1E-10	1
C-P03	COMPOL	-	GCMP281	9.87E-1	1E-10	1
C-PR01	COMPOL	-	GCMP455	7.22E-1	1E-10	1
C-Q08	COMPOL	-	GCMP423	1.00E-15	1E-16	1
C-QS03	COMPOL	-	GCMP521	9.46E-1	1E-10	1
C-QS04	COMPOL	-	GCMP523	9.46E-1	1E-10	1
C-QS05	COMPOL	-	GCMP525	9.46E-1	1E-10	1
C-QS06	COMPOL	-	GCMP551	9.46E-1	1E-10	1
C-RC301	COMPOL	-	GCMP351	8.75E-1	1E-10	1

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
C-RC303	COMP0L	-	GCMP355	8.75E-1	1E-10	1
C-SGI01	COMP0L	-	GCMP321	9.89E-1	1E-10	1
C-TT01	COMP0L	-	GCMP421	8.00E-1	1E-10	1
C-VI01	COMP0L	-	GCMP425	1.00E-15	1E-16	1
C-Y01	COMP0L	-	GCMP123	1.00E-15	1E-16	1
C-Y02	COMP0L	-	GCMP163	9.80E-1	1E-10	1
C-Y03	COMP0L	-	GCMP283	8.98E-1	1E-10	1
C-Y04	COMP0L	-	GCMP325	9.85E-1	1E-10	1
DAM	DAM0OL	-	GDAM112	5.19E-2	1E-10	1568
A	IE-EQN	-	GIE-111	5.00E-4	1E-10	1
S1	IE-EQN	-	GIE-113	1.00E-3	1E-10	1
S2	IE-EQN	-	GIE-115	2.10E-2	1E-10	1
RX	IE-EQN	-	GIE-141	2.66E-7	1E-10	1
T1	IE-EQN	-	GIE-143	1.14E-1	1E-10	1
T2	IE-EQN	-	GIE-145	5.00E-2	1E-10	1

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
T2A	IE-EQN	-	GIE-171	5.50E-1	1E-10	1
T3	IE-EQN	-	GIE-173	1.35E+0	1E-10	1
T4	IE-EQN	-	GIE-175	6.00E-7	1E-10	1
T5A	IE-EQN	-	GIE-211	6.00E-3	1E-10	1
T5B	IE-EQN	-	GIE-213	6.00E-3	1E-10	1
T6	IE-EQN	-	GIE-215	6.27E-6	1E-10	1
T7	IE-EQN	-	GIE-241	1.00E-2	1E-10	1
T8	IE-EQN	-	GIE-243	6.58E-3	1E-10	1
TH	IE-EQN	-	GIE-245	1.75E+0	1E-10	1
TL	IE-EQN	-	GIE-271	3.50E-1	1E-10	1
VX	IE-EQN	-	GIE-273	1.60E-6	1E-10	1
T9A	IET9AL	-	GT9A113	1.79E-2	1E-7	31
T9B	IET9BL	-	GT9B113	1.79E-2	1E-7	31
B01	FFT00L	-	GFFT721	4.80E-1	1E-7	1
B02	FFT00L	-	GFFT722	3.40E-1	1E-7	1

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
B10	FFT00L	-	GFFT723	2.00E-2	1E-10	1
B16	FFT00L	-	GFFT724	7.50E-3	1E-10	1
B102	FFT00L	-	GFFT751	6.80E-1	1E-10	1
B103	FFT00L	-	GFFT752	6.80E-1	1E-10	1
B111	FFT00L	-	GFFT753	6.80E-1	1E-10	1
B117	FFT00L	-	GFFT754	6.80E-1	1E-10	1
B220	FFT00L	-	GFFT781	9.00E-4	1E-10	1
B221	FFT00L	-	GFFT782	9.00E-4	1E-10	1
B229	FFT00L	-	GFFT783	9.00E-4	1E-10	1
B235	FFT00L	-	GFFT784	9.00E-4	1E-10	1
CH01A	RS100LC	HOSAC	GRS1143	8.96E-2	5E-7	84
CH01B	RS100LC	HOSAC	GRS1243	8.94E-2	5E-7	105
CH01C	RS100LC	HOSAC	GRS1322	1.23E-1	5E-7	93
CH01D	RS100LC	HOSAC	GRS1522	1.23E-1	5E-7	108
CH01	OCL (CH01A*CH01B*CH01C*CH01D)			2.67E-3	5E-9	6894
CH02	OCL (CH01C*CH01D)			1.77E-2	1E-9	3104

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
CH03A	RS100MC	HOSSIC	GRS1143	3.60E-2	5E-7	54
CH03B	RS100MC	HOSS1C	GRS1243	3.59E-2	5E-7	63
CH03C	RS100MC	HOSS1C	GRS1322	4.36E-2	5E-7	59
CH03D	RS100MC	HOSS1C	GRS1522	4.35E-2	5E-7	68
CH03	OCL (CH03A*CH03B*CH03C*CH03D)			2.56E-3	5E-9	392
CH04A	RS100NC	HOST1C	GRS1143	8.34E-2	1E-5	49
CH04B	RS100NC	HOST1C	GRS1243	8.33E-2	1E-5	52
CH04C	RS100NC	HOST1C	GRS1322	9.11E-2	1E-5	54
CH04D	RS100NC	HOST1C	GRS1522	9.09E-2	1E-5	57
CH04	OCL (CH04A*CH04B*CH04C*CH04D)			5.48E-3	1E-9	2765
CH05A	RS100OC	HOST1NC	GRS1143	1.37E-1	1E-5	66
CH05B	RS100OC	HOST1NC	GRS1243	1.37E-1	1E-5	69
CH05C	RS100OC	HOST1NC	GRS1322	1.71E-1	1E-5	80
CH05D	RS100OC	HOST1NC	GRS1522	1.70E-1	1E-5	77
CH05	OCL (CH05A*CH05B*CH05C*CH05D)			6.26E-3	1E-7	1706
CH06	RS100PC	HOST5ANC	GRS1101	1.29E-2	5E-6	237
CH07	RS100QC	HOST5AC	GRS1101	4.46E-3	1E-7	197
CH08	RS100RC	HOST5BNC	GRS1101	1.31E-2	5E-6	240
CH09	RS100SC	HOST5BC	GRS1101	4.53E-3	1E-6	104
CH10	RS100TC	HOST9ANC	GRS1101	1.55E-2	1E-6	482
CH11	RS100UC	HOST9AC	GRS1101	6.56E-3	5E-7	187

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
CH12	RS100VC	HOST9BNC	GRS1101	1.44E-2	5E-7	559
CH13	RS100WC	HOST9BC	GRS1101	5.33E-3	5E-7	149
D101	HH100L	HOSS1	GHH1112	4.56E-3	1E-7	177
D102B	FB400L	HOST1C	GFB4181	7.61E-4	1E-7	3
D102C	FB400L	HOST1C	GFB4110	4.82E-2	1E-10	1
D102D	FB400L	HOST1C	GFB4140	4.68E-3	1E-7	178
D102E	FB400L	HOST1C	GFB4144	2.66E-6	1E-7	1
D102F	FB400L	HOST1C	GFB41712	4.29E-3	1E-7	177
D102G	FB400L	HOST1C	GFB4221	5.59E-2	1E-7	154
D102H	FB400L	HOST1C	GFB4612	8.15E-2	1E-7	290
D102I	FB400L	HOST1C	GFB4712	4.08E-2	1E-7	184
D102AA	FB400L	HOST1C	GFB4521	5.67E-2	1E-7	155
D102AB	FB400L	HOST1C	GFB4522	8.23E-2	1E-7	290
D102AC	FB400L	HOST1C	GFB4524	4.09E-2	1E-7	184
D102AD	FB400L	HOST1C	GFB4422	1.08E-1	5E-8	32
D102	OCL (D102AA-D102I)			6.03E-2	1E-7	665
D103B	HH100M	HOST1	GHH1181	7.61E-4	1E-10	3
D103C	HH100M	HOST1	GHH1140	4.68E-3	1E-7	178
D103D	HH100M	HOST1	GHH1144	2.66E-6	1E-7	1
D103E	HH100M	HOST1	GHH1712	4.29E-3	1E-7	177
D103F	HH100M	HOST1	GHH1221	5.58E-2	1E-7	155
D103G	HH100M	HOST1	GHH1612	8.15E-2	1E-7	293
D103H	HH100M	HOST1	GHH1712	4.08E-1	1E-7	185
D103AA	HH100M	HOST1	GHH1521	5.67E-2	1E-7	156
D103AB	HH100M	HOST1	GHH1522	8.23E-2	1E-7	293
D103AC	HH100M	HOST1	GHH1524	4.09E-1	1E-7	185

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
D103AD	HH100M	HOST1	GHH1422	7.15E-2	5E-8	32
D103	OCL (D103AA-D103H)			1.21E-2	1E-7	694
D104A	FFT00L	-	GFFT813	6.00E-2	1E-7	1
D104B	HH100L	HOSS1	GHH1112	4.56E-3	1E-7	177
D104	OCL (D104A*D104B)			2.71E-4	2E-7	31
D105	FB400M	HOSS1	GFB4101	5.28E-2	1E-7	166
D106	HH100N	HOST5A	GHH1112	3.33E-2	1E-7	179
D107	HH100O	HOST5B	GHH1112	5.98E-3	1E-6	75
D108	HH100P	HOST9A	GHH1112	5.68E-2	1E-7	183
D109	HH100Q	HOST9B	GHH1112	5.10E-2	1E-7	100
D201	AC100L	HOSA	GAC1102	4.24E-3	1E-9	7
D202	AC100M	HOSS1CCR	GAC1171	7.65E-5	1E-9	28
D203	AC100M	HOSS1CCR	GAC1102	6.33E-3	1E-9	10
D301	LH100L	HOSA	GLH1112	1.20E-3	5E-9	267
D302	LH100M	HOSS1CCR	GLH1612	2.60E-2	1E-9	276
D304	LH100N	HOST1	GLH1612	1.20E-1	1E-9	102
D401	CH100L	HOSTH	GCH1112	8.99E-3	1E-7	73

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
D402	HH100R	HOSTH	GHH1112	4.00E-3	1E-7	143
DG01A	EDG00L	HOST1	GEDG121	4.74E-2	1E-7	15
DG01B	EDG00L	HOST1	GEDG221	4.74E-2	1E-7	15
DG01	OCL (DG01A*DG01B)			2.72E-3	1E-9	99
DH01	LR100L	HOSA	GLR11012	3.88E-3	5E-8	482
FM01	FFT00L	-	GFFT1013	9.52E-1	1E-10	1
H101	LR100L	HOSA	GLR1112	2.51E-3	1E-7	384
H102	LR100M	HOSS1	GLR1112	2.64E-3	1E-7	521
H103	LR100N	HOST5A	GLR1112	3.86E-2	1E-7	101
H104	LR100O	HOST5B	GLR1112	3.83E-2	1E-7	85
H105	LR100P	HOST9A	GLR1112	5.12E-2	1E-7	132
H106	LR100Q	HOST9B	GLR1112	5.09E-2	1E-7	117
H107	LR100R	HOST1	GLR1112	1.00E-2	1E-7	1003
H201A	HR100L	HOSS1	GHR1521	8.99E-3	1E-8	814
H201B	HR100L	HOSS1	GHR1522	3.43E-2	1E-7	413
H201C	HR100L	HOSS1	GHR1524	3.61E-1	1E-8	854
H201D	HR100L	HOSS1	GHR1422	1.23E-2	1E-8	69
H201E	FFT00L	HOSS1	GFFT113	2.19E-3	1E-8	83
H201F	HR100L	HOSS1	GHR1712	3.60E-3	1E-8	854

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
H201G	HR100L	HOSS1	GHR1221	8.17E-3	1E-8	813
H201H	HR100L	HOSS1	GHR1612	3.64E-2	1E-7	413
H201	OCL (H201A THRU H201H)			5.36E-3	1E-8	787
H202A	HR100M	HOST1	GHR1472	6.42E-2	1E-7	487
H202B	HR100M	HOST1	GHR1473	6.33E-2	1E-7	475
H202C	HR100M	HOST1	GHR11001	4.01E-2	1E-7	34
H202D	HR100M	HOST1	GFFT274	3.58E-1	1E-7	58
H202E	FFT00M	HOST1	GFFT1521	8.21E-4	1E-7	1
H202F	HR100M	HOST1	GHR1682	6.42E-2	1E-7	487
H202G	HR100M	HOST1	GHR1683	6.33E-2	1E-7	475
H202H	FFT00M	HOST1	GFFT213	3.37E-2	1E-7	76
H202I	FFT00M	HOST1	GFFT1523	8.21E-4	1E-7	1
H202J	HR100M	HOST1	GHR1333	6.42E-2	1E-7	487
H202K	HR100M	HOST1	GHR1951	6.32E-2	1E-7	474
H202L	FFT00M	HOST1	GFFT153	4.90E-2	1E-7	43
H202M	FFT00M	HOST1	GFFT1525	8.21E-4	1E-7	1
H202N	HR100M	HOST1	GHR1422	5.97E-2	1E-7	31
H202O	HR100M	HOST1	GFFT1551	4.50E-5	1E-7	1
H202P	HR100M	HOST1	GFFT1553	4.50E-5	1E-7	1
H202Q	FFT00M	HOST1	GFFT113	6.98E-2	1E-7	224
H202	OCL (H202A THRU H202Q)			1.40E-2	1E-3	1416
H203A	HR100N	HOST5A	GHR1521	NO INPUT[1]	5E-8	-
H203B	HR100N	HOST5A	GHR1522	6.83E-2	5E-8	181
H203C	HR100N	HOST5A	GHR1524	NO INPUT[1]	5E-8	-
H203D	HR100N	HOST5A	GHR1422	1.23E-2	5E-8	52
H203E	FFT00N	HOST5A	GFFT113	2.19E-2	5E-8	55
H203F	HR100N	HOST5A	GHR1712	NO INPUT[1]	5E-8	-

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
H203G	HR100N	HOST5A	GHR1221	NO INPUT[1]	5E-8	-
H203H	HR100N	HOST5A	GHR1612	6.75E-2	5E-8	181
H203	OCL (H203A THRU H203H)			6.80E-2	1E-8	208
H204A	HR100O	HOST5B	GHR1521	4.26E-2	5E-8	159
H204B	HR100O	HOST5B	GHR1522	NO INPUT[1]	5E-8	-
H204C	HR100O	HOST5B	GHR1524	3.95E-1	5E-8	183
H204D	HR100O	HOST5B	GHR1422	1.23E-2	5E-8	52
H204E	FFT00O	HOST5B	GFFT113	2.19E-2	5E-8	55
H204F	HR100O	HOST5B	GHR1712	3.94E-1	5E-8	183
H204G	HR100O	HOST5B	GHR1221	4.18E-2	5E-8	152
H204H	HR100O	HOST5B	GHR1612	NO INPUT[1]	5E-8	-
H204	OCL (H204A THRU H204H)			4.04E-2	1E-8	261
H205A	HR100P	HOST9A	GHR1521	NO INPUT[1]	5E-8	-
H205B	HR100P	HOST9A	GHR1522	9.63E-2	5E-8	254
H205C	HR100P	HOST9A	GHR1524	NO INPUT[1]	5E-8	-
H205D	HR100P	HOST9A	GHR1422	1.23E-2	5E-8	52
H205E	FFT00P	HOST9A	GFFT113	2.40E-2	5E-8	56
H205F	HR100P	HOST9A	GHR1712	NO INPUT[1]	5E-8	-
H205G	HR100P	HOST9A	GHR1221	NO INPUT[1]	5E-8	-
H205H	HR100P	HOST9A	GHR1612	9.55E-2	5E-8	254
H205	OCL (H205A THRU H205H)			9.63E-2	1E-8	275
H206A	HR100Q	HOST9B	GHR1521	7.00E-2	5E-8	156
H206B	HR100Q	HOST9B	GHR1522	NO INPUT[1]	5E-8	-
H206C	HR100Q	HOST9B	GHR1524	4.22E-1	5E-8	179
H206D	HR100Q	HOST9B	GHR1422	NO INPUT[1]	5E-8	-
H206E	FFT00Q	HOST9B	GFFT113	2.41E-2	5E-8	28

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
H206F	HR100Q	HOST9B	GHR1712	4.21E-2	5E-8	179
H206G	HR100Q	HOST9B	GHR1221	6.92E-2	5E-8	155
H206H	HR100Q	HOST9B	GHR1612	NO INPUT[1]	5E-8	-
H206	OCL (H206A THRU H206H)			9.05E-2	1E-8	217
HV01	HV100L	HOSA	GHV1113	1.30E-3	1E-7	394
HV02A	HV100M	HOST1	GHV1613	2.52E-1	1E-7	210
HV02B	HV100M	HOST1	GHV1713	2.51E-1	1E-7	98
HV02C	HV100M	HOST1	GHV1461	5.35E-2	1E-7	72
HV02D	HV100M	HOST1	GHV1213	4.78E-2	1E-7	29
HV02E	HV100M	HOST1	GHV1813	5.48E-2	1E-7	75
HV02F	HV100M	HOST1	GHV1565	2.51E-1	1E-7	96
HV02G	HV100M	HOST1	GHV1913	2.51E-1	1E-7	208
HV02H	HV100M	HOST1	GHV1313	7.65E-1	1E-7	34
HV02I	HV100M	HOST1	GHV1421	1.05E-4	1E-7	2
HV02J	HV100M	HOST1	GHV1521	1.82E-2	1E-7	3
HV02	OCL (HV02A THRU HV02J)			1.60E-2	5E-8	1274
HV03	HV100N	HOST5A	GHV1113	1.35E-3	1E-7	397
HV04A	HV100O	HOST5B	GHV1131	1.74E-3	2E-7	219
HV04B	HV100O	HOST5B	GHV1134	4.86E-3	1E-7	429
HV04	OCL (HV04A*HV04B)			1.30E-3	2E-7	303
HV05	HV100P	HOST9A	GHV1113	2.52E-1	2E-7	145

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
HV06	HV100Q	HOST9B	GHV1113	2.55E-3	2E-7	190
K01	RP100L	HOSA	GRP1112	1.87E-6	1E-10	12
L01	AF100L	HOSS1	GAF10112	2.84E-4	1E-9	495
L02	AF100M	HOSS1CCR	GAF10112	3.50E-3	1E-9	1607
L03	AF100N	HOST1	GAF10112	8.12E-4	1E-8	808
L04	AF100O	HOST1A	GAF10112	4.93E-4	1E-9	421
L05	AF100P	HOST5A	GAF10112	1.65E-3	1E-9	381
L06	AF100Q	HOST5B	GAF10112	1.65E-3	1E-9	272
L07	AF100R	HOST7	GAF10112	2.87E-4	1E-9	597
L08	AF100S	HOST7D1	GAF10112	1.59E-1	1E-9	330
L09	AF100T	HOST9A	GAF10112	1.65E-3	1E-9	413
L10	AF100U	HOST9B	GAF10112	1.65E-3	1E-9	276
L11	AF100V	HOSTH	GAF10112	1.77E-3	1E-9	1853
L12A	AF100W	HOSTL	GAF10412	1.11E-2	1E-9	204
L12B	AF100W	HOSTL	GAF10312	1.11E-2	1E-9	188
L12C	AF100W	HOSTL	GAF10221	4.27E-2	1E-9	39
L12	OCL (L12A*L12B*L12C)			5.51E-4	1E-9	516

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
LT01	AF100Z	HOSSBO	GAF10221	9.32E-2	1E-9	28
M01	MF200L	HOSS1	GMF2112	7.05E-3	1E-8	223
M02	MF100L	HOSS1	GMF1112	3.24E-3	1E-8	120
M03	FFT00L	HOSS1	GFFT1213	2.94E-1	1E-10	1
MSL01	FFT00L	HOSS1	GFFT513	2.97E-2	1E-9	1
O01A	OD100L	HOSS1	GOD1121	1.39E-3	1E-9	544
O01B	FFT00L	HOSS1	GFFT322	1.00E+0	1E-9	1
O01ACT	OCL (O01A + O01B)			1.00E+0	1E-9	545
O01	Use O01B			1.00E+0	1E-9	1
O02B	FFT00L	HOSS1	GFFT323	8.50E-4	1E-9	1
O02	OCL (O01A + O02B)			2.24E-3	1E-9	545
O03B	FFT00L	HOSS1	GFFT324	8.50E-4	1E-9	1
O03	OCL (O01A + O03B)			2.24E-3	1E-9	545
O04A	OD100M	HOST1	GOD1121	9.29E-3	1E-8	1184
O04B	FFT00L	HOSS1	GFFT361	8.50E-4	1E-8	1
O04	OCL (O04A + O04B)			1.01E-2	1E-9	1185
O05A	OD100N	HOST7	GOD1121	2.70E-4	1E-9	496
O05B	FFT00L	HOSS1	GFFT362	3.87E-1	1E-9	1
O05	OCL (O05A + O05B)			3.87E-1	1E-9	497

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
O06A	OD200L	HOST7	GOD2121	5.05E-4	1E-9	718
O06B	FFT00L	HOSS1	GFFT363	2.18E-2	1E-9	1
O06	OCL (O06A + O06B)			2.23E-2	1E-9	707
O07B	FFT00L	HOSS1	GFFT364	8.97E-2	1E-9	1
O07	OCL (O06A + O07B)			9.02E-2	1E-9	707
O08	OD300L	HOST6	GOD3112	4.47E-3	1E-9	72
O201A	OD200L	HOST7	GOD2121	5.05E-4	1E-9	718
O201B	FFT00L	HOSS1	GFFT922	3.02E-3	1E-9	1
O201	OCL (O201A + O201B)			3.53E-3	1E-9	707
O202B	FFT00L	HOSS1	GFFT923	7.25E-4	1E-9	1
O202	OCL (O201A + O202B)			1.23E-3	1E-9	707
O203B	FFT00L	HOSS1	GFFT924	4.92E-3	1E-9	1
O203	OCL (O201A + O203B)			5.43E-3	1E-9	707
P01	FB100L	HOSS1	GFB1112	9.36E-3	1E-9	288
P02	FB100M	HOST1	GFB1112	1.33E-2	1E-9	1088
P03	FB100M	HOST1	GFB1112	1.33E-2	1E-9	1088
PR01	FFT00L	HOSS1	GFFT1311	2.78E-1	1E-9	1
Q01	RC100L	HOST1	GRC1112	2.57E-5	1E-10	56

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
Q02	RC200L	HOSSBO	GRC2112	1.00E-2	1E-10	2
Q03	RC100M	HOSS1	GRC1112	9.95E-6	1E-10	35
Q04	RC100N	HOST5A	GRC1112	9.95E-6	1E-10	35
Q05	RC100O	HOST5B	GRC1112	9.95E-6	1E-10	35
Q06	RC100P	HOST9A	GRC1112	1.71E-4	1E-10	23
Q07	RC100Q	HOST9B	GRC1112	1.71E-4	1E-10	17
Q08	FFT00L	HOSS1	GFFT1313	1.00E+0	1E-10	1
Q09	RC300L	HOSTH	GRC3112	3.90E-2	1E-10	128
QS01	QS100L	HOSA	GQS1113	4.02E-3	1E-7	263
QS02	QS100M	HOST1	GQS1113	1.17E-2	1E-7	585
QS03	QS100N	HOST5A	GQS1113	5.41E-2	1E-7	69
QS04	QS100O	HOST5B	GQS1113	5.42E-2	1E-7	48
QS05	QS100P	HOST9A	GQS1113	5.41E-2	1E-7	69
QS06	QS100Q	HOST9B	GQS1113	5.43E-2	1E-7	49

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
RC101	FFT00L	HOSS1	GFFT1122	4.95E-3	1E-10	1
RC102	FFT00L	HOSS1	GFFT1421	6.46E-3	1E-7	484
RC103A	HV200M	HOST1	HV2443	3.40E-1	1E-7	212
RC103B	HV200M	HOST1	HV2473	3.40E-1	1E-7	358
RC103C	HV200M	HOST1	HV2413	1.44E-1	1E-7	344
RC103D	HV200M	HOST1	HV2151	2.55E-2	1E-7	271
RC103E	FFT00M	HOST1	FFT1671	4.95E-3	1E-7	1
RC103F	FFT00M	HOST1	FFT1673	2.00E-2	1E-7	1
RC103	OCL (RC103A - RC103D)			1.19E-3	1E-7	205
RC201	FFT00L	HOSS1	GFFT1123	2.60E-4	1E-7	1
RC202	FFT00L	HOSS1	GFFT1422	1.77E-3	1E-7	484
RC203	FFT00M	HOST1	GFFT1624	1.14E-5	1E-7	19
RC301	FFT00L	HOSS1	GFFT1124	1.25E-1	1E-10	1
RC302	FFT00L	HOSS1	GFFT1125	6.57E-3	1E-10	1
RC303	FFT00L	HOSS1	GFFT1424	1.25E-1	1E-7	1
RC304	FFT00L	HOSS1	GFFT1425	6.57E-3	1E-7	1

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
RS01	RS100L	HOSA	GRS1101	4.48E-4	5E-8	446
RS02	RS100L	HOSA	GRS1114	1.06E-2	5E-8	1145
RS03	RS100M	HOSS1	GRS1101	4.26E-4	1E-9	282
RS04	RS100N	HOST1	GRS1101	3.20E-3	5E-8	264
RS05	RS100O	HOST1N	GRS1101	3.76E-3	5E-8	1777
RS06	RS100P	HOST5AN	GRS1101	7.17E-3	5E-8	653
RS07	RS100Q	HOST5A	GRS1101	1.08E-3	5E-8	147
RS08	RS100R	HOST5BN	GRS1101	7.17E-3	5E-8	693
RS09	RS100S	HOST5B	GRS1101	1.04E-3	5E-8	121
RS10	RS100T	HOST9AN	GRS1101	7.17E-3	5E-8	659
RS11	RS100U	HOST9A	GRS1101	1.08E-3	5E-8	147
RS12	RS100V	HOST9BN	GRS1101	7.18E-3	5E-8	698
RS13	RS100W	HOST9B	GRS1101	1.05E-3	5E-8	119
SGI01	SG100L	HOSS1	GSG1112	1.14E-2	1E-9	72

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
SLC01A	CH200L	HOST1	GCH2120	4.90E-2	1E-6	24
SLC01B	CH200L	HOST1	GCH2212	7.86E-2	1E-6	93
SLC01C	CH200L	HOST1	GCH2312	4.05E-1	1E-6	57
SLC01D	CC200L	HOST1	GCC2113	9.70E-2	1E-6	106
SLC01	OCL (SLC01A*SLC01B*SLC01C*SLC01D)			4.83E-3	1E-6	149
SLC02	FFT00L	HOSS1	GFFT613	2.81E-2	1E-9	1
TT01	AM100L	HOSS1	GAM1512	2.00E-1	1E-9	697
VI01	FFT00L	-	GFFT1211	1.00E+0	1E-10	1
W01A	RH100L	HOST7	GRH1121	6.16E-2	2E-7	354
W01B	RH100L	HOST7	GRH1124	6.16E-2	2E-7	354
W01	OCL (W01A*W01B)			5.02E-2	2E-7	334
Y01A	MS100L	HOSS1	GMS1123	9.09E-3	1E-9	1048
Y01B	FFT00L	HOSS1	GFFT421	1.00E+0	1E-9	1
Y01	Use Y01B[2]			1.00E+0	1E-9	1049
Y02B	FFT00L	HOSS1	GFFT422	1.06E-2	1E-9	1
Y02	OCL (Y01A+Y02B)			1.97E-2	1E-9	1049
Y03A	MS100M	HOST1	GMS1123	7.65E-2	1E-9	2667
Y03B	FFT00L	HOSS1	GFFT423	1.06E-2	1E-9	1
Y03C	AF100X	HOST1CCR	GAF10112	2.12E-2	1E-9	2154
Y03	OCL (Y03A+Y03B+Y03C)			1.02E-1	1E-8	2013

TABLE B.2-5 (Continued)
SUMMARY OF FUNCTION QUANTIFICATION

Function Name	Linked Fault Tree	House BED File	Top Gate	Top Event Unavailability	Cutoff Value	Number of Cut Sets
Y04A	MS100N	HOST7	GMS1123	1.01E-3	1E-9	1419
Y04B	FFT00L	HOSS1	GFFT424	1.06E-2	1E-9	1
Y04C	AF100Y	HOSS1CCR	GAF10112	3.50E-3	1E-9	1607
Y04	OCL (Y04A+Y04B+Y04C)			1.51E-2	1E-8	1302

[1] For functions solved with merge control files (e.g., H203), some subfunctions (e.g., H203A) are listed with an unavailability entry of "NO INPUT". This represents the NUPRA message "NO INPUT TO TOP GATE AFTER HOUSE EVENT PROCESSING" which means a house event within the subfunction causes the solution to be unity, 1.0, which NUPRA will not process. In all cases, these subfunction gates are inputs into an AND gate, and a solution of 1 can be ignored (actually, this subfunction is omitted from the merge control file or OCL file, so that the gate is not processed within the AND gate). The approach yields a rigorous solution, event though the "NO INPUT" entry obscures the actions taking place.

[2] Y01 OCL of (Y01A + Y01B) with unavailability of 1.01 was inadvertently used to generate cut sets for function solution. After generating sequence solutions and Level 2 analysis the error was discovered and the function value was changed to = Y01B to display probability of 1.0 in Event Tree. Although Y01B could be reduced to be the complement of Y01A (e.g., Y01A + Y01B = 1.0) this change was untenable in this report due to the impact on Level 2 calculations. Since a solution with Y01 = 1.01 is conservative, this dual Y01 solution approach is adequate. The correct solution of Y01 will be used in future updates.

TABLE B.2-6
CROSS REFERENCE OF FAULT TREES TO FUNCTIONS AND EVENT TREES

Fault Tree	Function	Event Trees
AC100	D201	A
	D202	S1
	D203	S1 S2 T1 T4 T7
AF100	L01	S1 S2 T2 T2A T3 T4 VX
	L02	S1 S2
	L03	T1
	L04	T1A
	L05	T5A
	L06	T5B
	L07	T7
	L08	T7
	L09	T9A
	L10	T9B
	L11	TH
	L12	TL
	LT01	T1A T1TR T2TR T2ATR T3TR T6 T8 T9ATR T9BTR
	Y03	T1
	Y04	T4
AM100	TT01	TH
CC200	SLC01	T1
CH100	D401	TH TL
CH200	SLC01	T1
COMPO	C-CHFLD	FAB1 FAB2
	C-O01	S1
	C-Y01	S1
	C-FM01	S2 VX
	C-P01	S2 T1A T2 T2A T3 T7
	C-Y02	S2
	C-B02	T1A
	C-B01	T1A
	C-B117	T1A
	C-B103	T1A
	C-P02	T1
	C-B102	T1A

TABLE B.2-6 (Continued)
CROSS REFERENCE OF FAULT TREES TO FUNCTIONS AND EVENT TREES

Fault Tree	Function	Event Trees
COMP0	C-P03	T1
	C-Y03	T1
	C-L08	T7
	C-SGI01	T7
	C-D105	T1A T2 T2A T2ATR T3
	C-LT01	T1TR T2TR T2ATR T3TR T6 T8 T9ATR T9BTR
	C-D102	T1TR
	C-QS03	T5A
	C-QS04	T5B
	C-H103	T5A
	C-H104	T5B
	C-PR01	TH
	C-D304	T1
	C-H106	T9B T9BTR
	C-QS06	T9B T9BTR
	C-H105	T9A T9ATR
	C-QS05	T9A T9ATR
	C-O05	T4
	C-Y04	T4
	C-RC301	T6
	C-RC303	T1TR T2TR T2ATR T3TR T9ATR T9BTR
	C-HV05	T9A
	C-B111	T1A
	C-M03	TH
	C-TT01	TH
	C-Q08	TH TL
	C-VI01	VX
EDG00	DG01	T1
FB100	P01	S2 T1A T2 T2A T3 T7
	P02	T1
	P03	T1
FB200	PR01	TH
FB400	D102	T1 T1TR
	D105	T1A T2 T2A T2TR T2ATR T3 T3TR

TABLE B.2-6 (Continued)
CROSS REFERENCE OF FAULT TREES TO FUNCTIONS AND EVENT TREES

Fault Tree	Function	Event Trees
FFT00	B01	T1A
	B02	T1A
	B10	T1A
	B16	T1A
	B102	T1A
	B103	T1A
	B111	T1A
	B117	T1A
	B220	T1A
	B221	T1A
	B229	T1A
	B235	T1A
	FM01	S2 VX
	H201	S1 S2 T2 T2A T1A T3 T7
	H202	T1 T1TR
	H203	T5A
	H204	T5B
	H205	T9A
	H206	T9B
	MSL01	TH TL
	M03	TH
	O01	S1 VX
	O02	S2
	O03	S2
	O04	T1
	O05	T4
	O06	T7
	O07	T7
	O08	T6 T8
	O201	T7
	O202	T7
	O203	T7
	Q08	T6 T8
	RC101	T6
	RC102	T2TR T2ATR T3TR T8 T9ATR T9BTR
	RC201	T6
	RC202	T2TR T2ATR T3TR T8 T9ATR T9BTR
	RC203	T1TR

TABLE B.2-6 (Continued)
CROSS REFERENCE OF FAULT TREES TO FUNCTIONS AND EVENT TREES

Fault Tree	Function	Event Trees
FFT00	RC301	T6
	RC302	T6
	RC303	T1TR T2TR T2ATR T3TR T8 T9ATR T9BTR
	RC304	T1TR T2TR T2ATR T3TR T8 T9ATR T9BTR
	SLC02	T1A
	VI01	VX
	Y01	S1
	Y02	S2
	Y03	T1
	Y04	T4
HH100	D101	S1 S2 T1A T6 T7 T8 VX
	D103	T1
	D104	T1A
	D106	T5A
	D107	T5B
	D108	T9A
	D109	T9B
	D402	TH TL
HR100	H201	S1 S2 T1A T2 T2A T3 T7
	H202	T1 T1TR
	H203	T5A
	H204	T5B
	H205	T9A T9ATR
	H206	T9B T9BTR
HV100	HV01	A S1 S2 T2 T2A T3 T4 T7 VX
	HV02	T1
	HV03	T5A
	HV04	T5B
	HV05	T9A
	HV06	T9B
	RC103	T1TR

TABLE B.2-6 (Continued)
CROSS REFERENCE OF FAULT TREES TO FUNCTIONS AND EVENT TREES

Fault Tree	Function	Event Trees
IE-EQN	A	A
	S1	S1
	S2	S2
	RX	RX
	T1	T1
	T2	T2
	T2A	T2A
	T3	T3
	T4	T4
	T5A	T5A
	T5B	T5B
	T6	T6
	T7	T7
	T8	T8
	TH	TH
	TL	TL
	VX	VX
IET9A	T9A	T9A
IET9B	T9B	T9B
LH100	D301	A RX
	D302	S1 S2 T4 T7
	D303	Not Used
	D304	T1
LR100	DH01	A
	H101	A
	H102	S1 S2 T1A T2 T2TR T2A T2ATR T3 T3TR T4 T6 T8 TH TL
	H103	T5A
	H104	T5B
	H105	T9A T9ATR
	H106	T9B T9BTR
	H107	T1 T1TR
MF100	M02	T3
MF200	M01	T2A

TABLE B.2-6 (Continued)
CROSS REFERENCE OF FAULT TREES TO FUNCTIONS AND EVENT TREES

Fault Tree	Function	Event Trees
MS100	Y01	S1
	Y02	S2
	Y03	T1
	Y04	T4
OD100	O01	S1
	O02	S2
	O03	S2
	O04	T1
	O05	T4
	O201	T7
	O202	T7
	O203	T7
OD200	O06	T7
	O07	T7
OD300	O08	T6 T8
QS100	QS01	A RX S1 S2 T1A T2 T2TR T2A T2ATR T3 T3TR T4 T6 T7 T8 TH TL
	QS02	T1 T1TR
	QS03	T5A
	QS04	T5B
	QS05	T9A T9ATR
	QS06	T9B T9BTR
RC100	Q01	T1
	Q03	T2 T2A T3 TL
	Q04	T5A
	Q05	T5B
	Q06	T9A
	Q07	T9B
RC200	Q02	T1A
RC300	Q09	TH TL
RH100	W01	T7
RP100	K01	S1 S2 T1 T2 T2A T3 T4 T5A T5B T7 T9A T9B TH TL

TABLE B.2-6 (Continued)
CROSS REFERENCE OF FAULT TREES TO FUNCTIONS AND EVENT TREES

Fault Tree	Function	Event Trees
RS100	CH01	A RX S1 S2 T2TR T1A T2 T2A T2ATR T3 T3TR T4 T6 T7 T8 TH TL VX
	CH02	A
	CH03	S1 S2 T1A T2 T2TR T2A T2ATR T3 T3TR T4 T6 T7 T8
	CH04	T1 T1TR
	CH05	T1 T1TR
	CH06	T5A
	CH07	T5A
	CH08	T5B
	CH09	T5B
	CH10	T9A T9ATR
	CH11	T9A T9BTR
	CH12	T9B T9BTR
	CH13	T9B T9BTR
	RS01	A RX S1 S2 T1A T2 T2A T2TR T2ATR T3 T3TR T4 T6 T7 T8 TH TL VX
	RS02	A
	RS03	S1 S2 T1A T2 T2TR T2A T2ATR T3 T3TR T4 T6 T7 T8
	RS04	T1 T1TR
	RS05	T1 T1TR
	RS06	T5A
	RS07	T5A
	RS08	T5B
	RS09	T5B
	RS10	T9A T9ATR
	RS11	T9A T9ATR
	RS12	T9B T9BTR
	RS13	T9B T9BTR
SG100	SGI01	T7

TABLE B.2-7
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
B	B01	AC power recovery before core damage for T1A SBO, within .6 hour assumes RCS boundary not intact.	T1A
	B02	AC power recovery before core damage for T1A SBO, within 1.5 hour. Assumes Lt failure (turbine driven AFW pump).	T1A
	B10	AC power recovery before core uncovery for T1A SBO, within 10 hours. Assumes Slc failure (RCP seal failure due to failure of CCW from Unit 2.	T1A
	B16	AC power recovery before core damage for T1A SBO, within about 11 hours. Assumes AFW failure about 9 hours after battery depletion.	T1A
B1	B102	AC power recovery after core damage but before vessel failure for T1A SBO. Assumes RCS boundary not intact and B01 failure.	T1A
	B103	AC power recovery after core damage but before Reactor Vessel failure for T1A SBO. Assumes B02 failure and Lt failure (turbine driven AFW pump).	T1A
	B111	AC power recovery after core damage but before Reactor Vessel failure for T1A SBO. Assumes B10 failure and Slc failure (RCP seal failure due to failure of CCW from Unit 2).	T1A

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
B1	B117	AC power recovery after core damage but before Reactor Vessel failure for T1A SBO. Assumes B16 failure and AFW failure about 9 hours after battery depletion.	T1A
B2	B220	AC power recovery after Reactor Vessel damage but before Containment failure for T1A SBO. Assumes RCS boundary not intact and B102 failure.	T1A
	B221	AC power recovery after Reactor Vessel damage but before Containment failure for T1A SBO. Assumes B103 failure and Lt failure (turbine driven AFW pump).	T1A
	B229	AC power recovery after Reactor Vessel damage but before Containment failure for T1A SBO. Assumes B117 failure and Slc failure (RCP seal failure due to failure of CC from Unit 2).	T1A
	B235	AC power recovery after Reactor Vessel damage but before Containment failure for T1A SBO. Assumes B117 failure and AFW failure about 9 hours after battery depletion.	T1A
Ch	Ch01	Containment heat removal by 1 of 4 IRS or ORS trains with SW and Casing Cooling. Assumes Qs01 success. Requires XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 1.	A RX S1 S2 T2TR T1A T2 T2A T2ATR T3 T3TR T4 T6 T7 T8 TH TL

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
Ch	Ch02	Containment Heat removal by 1 of 2 ORS trains with SW and Casing Cooling. Assumes Qs01 failure, failing IRS trains. Requires XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 1.	A
	Ch03	Containment heat removal by 1 of 4 IRS or ORS trains with SW but without Casing Cooling. No Quench Spray assumed. Requires XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 1.	S1 S2 T1A T2 T2TR T2A T2ATR T3 T3TR T4 T6 T7 T8
	Ch04	Containment heat removal for T1 LOOP by 1 of 4 IRS or ORS trains with SW but without Casing Cooling. No Quench Spray assumed. Requires XHOS-LOOP = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 1.	T1 T1TR
	Ch05	Containment heat removal for T1 LOOP by 1 of 4 IRS or ORS trains with SW and Casing Cooling. Assumes Qs02 success. Requires XHOS-LOOP = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 1.	T1 T1TR
	Ch06	Containment heat removal for T5A by 1 of 4 IRS or ORS trains with SW and Casing Cooling. Assumes Qs03 success. Requires XHOS-DCBUS-1-I = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 1.	T5A

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
Ch	Ch07	Containment heat removal for T5A by 1 of 4 IRS or ORS trains with SW but without Casing Cooling. No Quench Spray assumed. Requires XHOS-DCBUS-1-I = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 1.	T5A
	Ch08	Containment heat removal for T5B by 1 of 4 IRS or ORS trains with SW and Casing Cooling. Assumes Qs04 success. Requires XHOS-DCBUS1-III = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 1.	T5B
	Ch09	Containment heat removal for T5B by 1 of 4 IRS or ORS trains with SW but without Casing Cooling. No Quench Spray assumed. Requires XHOS-DCBUS-1-III = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 1.	T5B
	Ch10	Containment heat removal for T9A by 1 of 4 IRS or ORS trains with SW and Casing Cooling. Assumes Qs05 success. Requires XHOS-1H-FAILS = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 1.	T9A
	Ch11	Containment heat removal for T9A by 1 of 4 IRS or ORS trains with SW but without Casing Cooling. No Quench Spray assumed. Requires XHOS-1H-FAILS = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 1.	T9A

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
Ch	Ch12	Containment heat removal for T9B by 1 of 4 IRS or ORS trains with SW and Casing Cooling. Assumes Qs06 success. Requires XHOS-1J-FAILS = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 1.	T9B
	Ch13	Containment heat removal for T9B by 1 of 4 IRS or ORS trains with Sw but without Casing Cooling. No Quench Spray assumed. Requires XHOS-1J-FAILS = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 1.	T9B
D1	D101	High Head Safety Injection by 1 of 3 HHSI trains.	S1 S2 T1A T6 T7 T8 VX
	D102	High Head Safety Injection by 1 of 3 HHSI trains for T1, after manual start for Feed & Bleed (do not set HOS-SI = 0 because QS/RS receive High Containment Pressure auto-start signal, which also starts SW pumps). XHOS-LOOP = 1.	T1 T1TR
	D103	High Head Safety Injection by 1 of 3 HHSI trains for T1, assuming auto-start upon Q failure. XHOS-LOOP = 1.	T1
	D104	Recovery of AC power following a SBO and High Head Safety Injection after RCP seal LOCA, but prior to core damage. Uses PROB-D104A to estimate the probability that a seal LOCA is in progress when AC power is restored following the SBO.	T1A

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
D1	D105	High Head Safety Injection by 1 of 3 HHSI trains, assuming manual start for Feed & Bleed (D102 with XHOS-LOOP = 0). Used for T1A after power restoration and for T2 as part of feed and bleed.	T1A T2 T2A T2TR T2ATR T3 T3TR
	D106	High Head Safety Injection by 1 of 3 HHSI trains for T5A, assuming auto-start upon Q failure. XHOS-DCBUS-1-I = 1.	T5A
	D107	High Head Safety Injection by 1 of 3 HHSI trains for T5B, assuming auto-start upon Q failure. XHOS-DCBUS-1-III = 1.	T5B
	D108	High Head Safety Injection by 1 of 3 HHSI trains for T9A, assuming auto-start upon Q failure. XHOS-1H-FAILS = 1.	T9A
	D109	High Head Safety Injection by 1 of 3 HHSI trains for T9B, assuming auto-start upon Q failure. XHOS-1J-FAILS = 1.	T9B
D2	D201	Accumulator injection, 2 of 2 Accumulators. Assumes failure of the break RCS leg Accumulator (for 2/2 Accumulator logic, requires XHOS-CORECOOLREC = 0).	A
	D202	Accumulator injection, 2 of 3 Accumulators, for S1 with HPI. Requires XHOS-CORECOOLREC = 1 for 2/3 Accumulator logic.	S1

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
D2	D203	Accumulator injection, 3 of 3 Accumulators, for S1 without HPI (assumes D1 failure). Also used after Core Cooling Recovery success (Y) for other events (S2, T1, T4 and after T7 (SGTR) without HPI), Operator Cooldown (O) failure, but with Late Operator Cooldown (O2) success. Requires XHOS-CORECOOLREC = 1 for 2/3 Accumulator logic.	S1 S2 T1 T4 T7
D3	D301	Low Head Safety Injection by 1 of 2 LHSI trains. Assumes auto-start on SI signals (requires XHOS-HIRCSPRESS = 0).	A RX
	D302	Low Head Safety Injection by 2 of 2 LHSI trains following Core Cooling Recovery (Y) success, for S1, S2, T4 and T7. Requires XHOS-2-OF-3-SG = 1 and XHOS-CORECOOLREC = 1.	S1 S2 T4 T7
	D303	Not used, replaced by H107 in T1.	
	D304	Low Head Safety Injection by 2 of 2 LHSI trains following Core Cooling Recovery (Y) success, for T1 LOOP. Requires XHOS-LOOP = 1, XHOS-2-OF-3-SG = 1 and XHOS-CORECOOLREC = 0.	T1
D4	D401	Emergency Boration for ATWS events through the normal charging header by 1 of 2 Charging Pumps and makeup from either the BAST or RWST.	TH TL

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
D4	D402	Emergency Boration for ATWS events through Safety Injection of the BIT by 1 of 3 Charging Pumps. Assumes stuck open Pressurizer PORV (Q) and SI actuation is manual.	TH TL
DG	DG01	Emergency bus power from 1 of 2 EDGs (1H or 1J).	T1
Dh	Dh01	Hot leg recirculation swap-over for 1 of 2 LHSI trains.	A
Fm	Fm01	Probability of a very small LOCA given that the event S2 has occurred. Note that the event S2 includes both small and very small LOCAs, so this function serves to separate the two.	S2 VX
H1	H101	Low head recirculation by 1 of 2 LHSI trains for A. Assumes auto-start on SI signals. Requires XHOS-HIRCSPRESS = 0 (LHSI pump recirculation faults disabled due to low RCS pressure).	A
	H102	Low head recirculation by 1 of 2 LHSI trains for S1, S2 and many transients. Assumes auto-start of SI signals. Requires XHOS-HIRCSPRESS = 1 (LHSI pump recirculation faults enabled).	S1 S2 T1A T2 T2A T2TR T2ATR T3 T3TR T4 T6 T8 TH TL

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
H1	H103	Low head recirculation by 1 of 2 LHSI trains for T5A. Assumes auto-start of SI signals. Requires XHOS-DCBUS-1-I = 1 and XHOS-HIRCSPRESS = 1 (LHSI pump recirculation faults enabled).	T5A
	H104	Low head recirculation by 1 of 2 LHSI trains for T5B. Assumes auto-start of SI signals. Requires XHOS-DCBUS-1-III = 1 and XHOS-HIRCSPRESS = 1 (LHSI pump recirculation faults enabled).	T5B
	H105	Low head recirculation by 1 of 2 LHSI trains for T9A. Assumes auto-start of SI signals. Requires XHOS-1H-FAILS = 1 and XHOS-HIRCSPRESS = 1 (LHSI pump recirculation faults enabled).	T9A T9ATR
	H106	Low head recirculation by 1 of 2 LHSI trains for T9B. Assumes auto-start of SI signals. Requires XHOS-1J-FAILS = 1 and XHOS-HIRCSPRESS = 1 (LHSI pump recirculation faults enabled).	T9B T9BTR
	H107	Low head recirculation by 1 of 2 LHSI trains for T1 LOOP. Assumes auto-start of SI signals. Requires XHOS-LOOP = 1 and XHOS-HIRCSPRESS = 1 (LHSI pump recirculation faults enabled).	T1 T1TR
H2	H201	High head recirculation by 1 of 3 HHSI trains for S1, S2, T2, T2A, T3, and T7.	S1 S2 T1A T2 T2A T3 T7
	H202	High head recirculation by 1 of 3 HHSI trains for T1 LOOP. Requires XHOS-LOOP = 1.	T1 T1TR

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
H2	H203	High head recirculation by 1 of 3 HHSI trains for T5A. Requires XHOS-DCBUS-1-I = 1.	T5A
	H204	High head recirculation by 1 of 3 HHSI trains for T5B. Requires XHOS-DCBUS-1-III = 1.	T5B
	H205	High head recirculation by 1 of 3 HHSI trains for T9A. Requires XHOS-1H-FAILS = 1.	T9A T9ATR
	H206	High head recirculation by 1 of 3 HHSI trains for T9B. Requires XHOS-1J-FAILS = 1.	T9B T9BTR
Hv	Hv01	Emergency Switchgear Room cooling by 1 of 2 air handling units and 1 of 3 chiller trains.	A S1 S2 T2 T2A T3 T4 T7 VX
	Hv02	Emergency Switchgear Room cooling by 1 of 2 air handling units and 1 of 3 chiller trains, for T1 LOOP. Requires XHOS-LOOP = 1.	T1
	Hv03	Emergency Switchgear Room cooling by 1 of 2 air handling units and 1 of 3 chiller trains,	T5A
	Hv04	Emergency Switchgear Room cooling by 1 of 2 air handling units and 1 of 3 chiller trains, for T5B. Requires XHOS-DCBUS-1-III = 1.	T5B
	Hv05	Emergency Switchgear Room cooling by 1 of 2 air handling units and 1 of 3 chiller trains, for T9A. Requires XHOS-1H-FAILS = 1.	T9A

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
Hv	Hv06	Emergency Switchgear Room cooling by 1 of 2 air handling units and 1 of 3 chiller trains, for T9B. Requires XHOS-1J-FAILS = 1.	T9B
K	K01	Failure to insert all but 1 Control Rod given a trip signal.	S1 S2 T1 T2 T2A T3 T4 T5A T5B T7 T9A T9B TH TL
L	L01	Auxiliary Feedwater to 1 of 3 SGs. Requires XHOS-1-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	S1 S2 T2 T2A T3 T4 VX
	L02	Auxiliary Feedwater to 2 of 3 SGs, for S1 core cooling recovery. Requires XHOS-2-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	S1 S2
	L03	Auxiliary Feedwater to 1 of 3 SGs, for T1. Requires XHOS-LOOP = 1, XHOS-1-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	T1
	L04	Auxiliary Feedwater to 1 of 3 SGs with only 1 of 2 motor driven AFW pumps, after LOOP power restoration. Requires XHOS-TDP-FAILED = 1, XHOS-1-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	T1A
	L05	Auxiliary Feedwater to 1 of 3 SGs, for T5A. Requires XHOS-DCBUS-1-I = 1, XHOS-1-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	T5A

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
L	L06	Auxiliary Feedwater to 1 of 3 SGs, for T5B. Requires XHOS-DCBUS-1-III = 1, XHOS-1-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	T5B
	L07	Auxiliary Feedwater to 1 of 2 SGs, for T7 SGTR. Requires XHOS-NO-SGC = 1, XHOS-1-OF-2-SG = 1 and other XHOS-X-OF-Y-SG = 0.	T7
	L08	Auxiliary Feedwater to 2 of 2 SGs, for T7 assuming HPI failure (D101). Requires XHOS-NO-SGC = 1, XHOS-2-OF-2-SG = 1 and other XHOS-X-OF-Y-SG = 0.	T7
	L09	Auxiliary Feedwater to 1 of 3 SGs, for T9A. Requires XHOS-1H-FAILS = 1, XHOS-1-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	T9A
	L10	Auxiliary Feedwater to 1 of 3 SGs, for T9B. Requires XHOS-1J-FAILS = 1, XHOS-1-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	T9B
	L11	Auxiliary Feedwater to 2 of 3 SGs, for TH ATWS. Requires XHOS-ATWS = 1, XHOS-2-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	TH
	L12	Auxiliary Feedwater to 1 of 3 SGs, for TL ATWS. Requires XHOS-ATWS = 1, XHOS-1-OF-3-SG = 1 and other XHOS-X-OF-Y-SG = 0.	TL

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
Lt	Lt01	Auxiliary Feedwater from the turbine driven AFW pump to its assigned SG for 12 hours during SBO or loss of Emergency Power events (LOOP with SBO, or loss of Emergency Power caused by loss of SW or loss of ESGR cooling. Requires XHOS-SBO =1, XHOS-DG-1H-FAILS=1, XHOS-DG-1J-FAILS=1, XHOS-NO-ATWS = 0, XHOS-ATWS = 0, XHOS-TDP-FAILED = 0, and XHOS-1-OF-3-SG = 1.	T1A T1TR T2TR T2ATR T3TR T6 T8 T9ATR T9BTR
M	M01	Main Feedwater recovery (MFW pumps start and run) for T2A.	T2A
	M02	Main Feedwater available (MFW pumps run) for T3.	T3
	M03	Probability that a loss of MFW event occurs given that an ATWS event initiated at high power level (>= 40%) has occurred.	TH
MS1	MS101	Manual Scram, late, for ATWS (TH & TL). Involves operator action to drive in control rods, or to disconnect electrical power to control rod drive Motor Generator sets. Use HEP-1FRS:1-5.	TH TL
O	O01	Operator RCS cooldown from 1 of 3 SGs for S1 (assumes D1, D2, & L success). Requires cooling from 1 SG, Pressurizer spray and 1 SG ADV. XHOS-NO-CND-DUMP = 1, and use HEP-1ES1:2-S1.	S1 VX

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
O	O02	Operator RCS cooldown from 1 of 3 SGs for S2 small LOCA (assumes D1 & L success). Requires cooling from 1 SG, Pressurizer spray and 1 SG ADV. XHOS-NO-CND-DUMP = 1, and use HEP-1ES1:2-S2.	S2
	O03	Operator RCS cooldown from 1 of 3 SGs for S2 very small LOCA (assumes D1 & L success, and Fm failure for very small break). Requires cooling from 1 SG, Pressurizer spray and 1 SG ADV. XHOS-NO-CND-DUMP = 1, and use HEP-1ES1:2-S2.	S2
	O04	Operator RCS cooldown from 1 of 3 SGs for T1 LOOP (assumes D1 & L success). Requires cooling from 1 SG, Pressurizer spray and 1 SG ADV. XHOS-NO-CND-DUMP = 1, XHOS-LOOP = 1, and use HEP-1ES1:2-S2.	T1
	O05	Operator RCS cooldown from 1 of 3 SGs for T4 (assumes L success, but no HPI). Requires cooling from 1 SG, Pressurizer spray and 1 SG ADV. XHOS-NO-CND-DUMP = 0, and use HEP-1AP33:1.	T4
	O06	Operator RCS cooldown from 1 of 2 SGs for T7 (assumes D1 & L success). Requires cooling from 1 SG, Pressurizer spray and 1 SG ADV. XHOS-NO-CND-DUMP = 0, and use HEP-1ES3-13.	T7

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
O	O07	Operator RCS cooldown from 1 of 2 SGs for T7 (assumes L success, but HPI failure). Requires cooling from 1 SG, Pressurizer spray (auxiliary spray is failed) and 1 SG ADV. XHOS-NO-CND-DUMP = 0, and use HEP-1ECA3:3-27.	T7
	O08	Operator RCS cooldown from 1 of 3 SGs for T6 & T8, for loss of Emergency Power caused by loss of SW or loss of ESGR cooling. Pressurizer spray (both regular and auxiliary) are lost due to RC pump trip or loss of Charging Pumps. Requires XHOS-1H-FAILS = 1, XHOS-1J-FAILS = 1, XHOS-2H-FAILS = 1, XHOS-2J-FAILS = 1, XHOS-NO-ATWS = 0, XHOS-NO-CND-DUMP = 1, and XHOS-SBO = 1.	T6 T8
O2	O201	Operator late RCS cooldown from 1 of 2 SGs for T7 SGTR (assumes O failure). Requires cooling from 1 SG, Pressurizer spray and 1 SG ADV. XHOS-NO-CND-DUMP = 0, and use HEP-1ECA3:1-16.	T7
	O202	Operator late RCS cooldown from 1 of 2 SGs for T7 SGTR (assumes SGI failure). Requires cooling from 1 SG, Pressurizer spray and 1 SG ADV. XHOS-NO-CND-DUMP = 0, and use HEP-1ECA3:2-5.	T7
	O203	Operator late RCS cooldown from 1 of 2 SGs for T7D1 SGTR without HPI (assumes D1 and O failure). Requires cooling from 1 SG, Pressurizer spray (auxiliary spray is failed) and 1 SG ADV. XHOS-NO-CND-DUMP = 0, and use HEP-1ECA3:3-35.	T7

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
P	P01	Feed and Bleed with 1 of 2 RCS PORVs opening, for S2 and other transients.	S2 T1A T2 T2A T3 T7
	P02	Feed and Bleed with 1 of 2 RCS PROVs opening, for T1 LOOP. Requires XHOS-LOOP = 1.	T1
	P03	Feed and Bleed with 1 of 1 RCS PORVs opening, given 1 PORV stuck open (Q01), for T1 LOOP. Requires XHOS-LOOP = 1. P03 is the same as P02 to NUPRA, since an open PORV is open regardless of the demand modeled in Q or in P.	T1
Pr	Pr01	Pressure Relief by 3 RCS SRVs, or by 2 RCS SRVs and 2 RCS PORVs, for ATWS (TH). Requires XHOS-ATWS = 1 when function is not dominated by UET. Dominated by probability of UET (Unfavorable Exposure Time) in which an unfavorable moderator temperature coefficient results in RCS pressure greater than 3200 psi.	TH
Q	Q01	Failure of RCS PORVs to reclose after T1 LOOP. Requires XHOS-LOOP = 1.	T1
	Q02	Failure of RCS PORVs to reclose after SBO. Requires XHOS-SBO = 1.	T1A
	Q03	Failure of RCS PORVs to reclose after transients.	T2 T2A T3 TL
	Q04	Failure of RCS PORVs to reclose after T5A. Requires XHOS-DCBUS-1-I = 1.	T5A

TABLE B.2-7 (Continued)

SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
Q	Q05	Failure of RCS PORVs to reclose after T5B. Requires XHOS-DCBUS-1-III = 1.	T5B
	Q06	Failure of RCS PORVs to reclose after T9A. Requires XHOS-1H-FAILS = 1.	T9A
	Q07	Failure of RCS PORVs to reclose after T9B. Requires XHOS-1J-FAILS = 1.	T9B
	Q08	RCS leakage due to RCS pressure in excess of 3200 psi during a high power ATWS.	TH
	Q09	Failure of RCS PORVs to reclose after ATWS (both TH & TL).	TH TL
Qs	Qs01	Quench spray by 1 of 2 QS trains.	A RX S1 S2 T1A T2 T2A T3 T4 T6 T7 T8 TH TL T2TR T2ATR T3TR
	Qs02	Quench spray by 1 of 2 QS trains for T1 LOOP. Requires XHOS-LOOP = 1.	T1
	Qs03	Quench spray by 1 of 2 QS trains for T5A. Requires XHOS-DCBUS-1-I = 1.	T5A
	Qs04	Quench spray by 1 of 2 QS trains for T5B. Requires XHOS-DCBUS-1-III = 1.	T5B

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
Qs	Qs05	Quench spray by 1 of 2 QS trains for T9A. Requires XHOS-1H-FAILS = 1.	T9A T9ATR
	Qs06	Quench spray by 1 of 2 QS trains for T9B. Requires XHOS-1J-FAILS = 1.	T9B T9BTR
RC1	RC101	Probability of Non-Recovery of SW in 10 hours before core damage for T6 loss of SW event. Assumes O or Lt failure (for O failure, RCP seal LOCA occurs at 10 hours; for Lt failure, core damage occurs 2 hours after loss of all AFW, or at 10 hours). Reactor Vessel failure assumed a few hours later.	T6
	RC102	Probability of Non-Recovery of ESGR cooling in 10 hours before core damage for T8 loss of Emergency Switchgear Room cooling event. Assumes Lt failure (core damage occurs 2 hours after loss of all AFW; loss of Emergency Power at 8 hours fails MD AFW pumps, and Lt fails TD AFW pump). Reactor Vessel failure assumed a few hours later.	T2TR T2ATR T3TR T8 T9ATR T9BTR
	RC103	Probability of Non-Recovery of ESGR cooling in 10 hours before core damage for T1 Loss of Offsite Power event. Assumes O or Lt failure (for O failure, RCP seal LOCA occurs at 10 hours; for Lt failure, core damage occurs 2 hours after loss of all AFW, or at 10 hours). Reactor Vessel failure assumed a few hours later.	T1TR

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
RC2	RC201	Probability of Non-Recovery of SW in 20 hours after T6. Assumes O and Lt success, but since turbine driven AFW lasts only 10 hours after loss of Emergency Power (i.e., from 8 to 18 hours) core damage and vessel failure occur at 20 hours, 2 hours after all AFW is lost.	T6
	RC202	Probability of Non-Recovery of ESGR cooling in 20 hours after T8. Assumes Lt success, but since turbine driven AFW lasts only 10 hours after loss of Emergency Power (i.e., from 8 to 18 hours) core damage and Reactor Vessel failure occur at 20 hours, 2 hours after all AFW is lost.	T2TR T2ATR T3TR T8 T9ATR T9BTA
	RC203	Probability of Non-Recovery of ESGR cooling in 20 hours after T1. Assumes Lt success, but since turbine driven AFW lasts only 10 hours after loss of Emergency Power (i.e., from 8 to 18 hours) core damage and Reactor Vessel failure occur at 20 hours, 2 hours after all AFW is lost.	T1TR
RC3	RC301	Probability of Non-Recovery of SW between 20 and 30 hours after T6. Assumes RC201 failure, but O and Lt success. Core damage and Reactor Vessel failure are assumed at 20 hours on RC201 failure, and RC301 addresses Containment failure.	T6
	RC302	Probability of Non-Recovery of SW between 10 and 30 hours after T6. Assumes RC101 failure (core damage and Reactor Vessel failure at 10 hours), and RC302 failure addresses Containment failure.	T6

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
	RC303	Probability of Non-Recovery of SW between 20 and 30 hours after T8. Assumes RC202 failure, but Lt success. Core damage and Reactor Vessel failure are assumed at 20 hours on RC202 failure, and RC303 failure addresses Containment failure.	T1TR T2TR T2ATR T3TR T8 T9ATR T9BTR
	RC304	Probability of Non-Recovery of SW between 10 and 30 hours after T8. Assumes RC102 failure (core damage and Reactor Vessel failure at 10 hours), and RC304 failure addresses Containment failure.	T1TR T2TR T2ATR T3TR T8 T9ATR T9BTR
Rs	Rs01	Recirculation spray by 1 of 4 IRS or ORS trains with Casing Cooling, for Level 2. Assumes Qs01 success. Requires XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 0.	A RX S1 S2 T1A T2 T2A T2TR T2ATR T3 T3TR T4 T6 T7 T8 TH TL VX
	Rs02	Recirculation spray by 1 of 2 ORS trains with Casing Cooling, for Level 2. Assumes Qs01 failure, failing IRS trains. Requires XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 0.	A
	Rs03	Recirculation spray by 1 of 4 IRS or ORS trains without Casing Cooling, for Level 2. No Quench Spray assumed. Requires XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 0.	S1 S2 T1A T2 T2A T2TR T2ATR T3 T3TR T4 T6 T7 T8 TH TL VX

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
Rs	Rs04	Recirculation spray by 1 of 4 IRS or ORS trains with Casing Cooling, for T1 LOOP, Level 2. No Quench Spray assumed. Requires XHOS-LOOP = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 0.	T1 T1TR
	Rs05	Recirculation spray by 1 of 4 IRS or ORS trains without Casing Cooling, for T1 LOOP, Level 2. Assumes QS02 success. Requires XHOS-LOOP = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 0.	T1 T1TR
	Rs06	Recirculation spray by 1 of 4 IRS or ORS trains with Casing Cooling, for T5A, Level 2. Assumes Qs03 success. Requires XHOS-DCBUS-1-I = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 0.	T5A
	Rs07	Recirculation spray by 1 of 4 IRS or ORS trains without Casing Cooling, for T5A, Level 2. No Quench Spray assumed. Requires XHOS-DCBUS-1-I = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 0.	T5A
	Rs08	Recirculation spray by 1 of 4 IRS or ORS trains with Casing Cooling, for T5B, Level 2. Assumes Qs04 success. Requires XHOS-DCBUS-1-III = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 0.	T5B

Event	Function Name	Description	Event Tree(s)
Rs	Rs09	Recirculation spray by 1 of 4 IRS or ORS trains without Casing Cooling, for T5B, Level 2. No Quench Spray assumed. Requires XHOS-DCBUS-1-III = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 0.	T5B
	Rs10	Recirculation spray by 1 of 4 IRS or ORS trains with Casing Cooling, for T9A, Level 2. Assumes Qs05 success. Requires XHOS-1H-FAILS = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 0.	T9A T9ATR
	Rs11	Recirculation spray by 1 of 4 IRS or ORS trains without Casing Cooling, for T9A, Level 2. No Quench Spray assumed. Requires XHOS-1H-FAILS = 1, XHOS-CASCOOLREQD = 0, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 0.	T9A T9ATR
	Rs12	Recirculation spray by 1 of 4 IRS or ORS trains with Casing Cooling, for T9B, Level 2. Assumes Qs06 success. Requires XHOS-1J-FAILS = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 1, and XHOS-SW = 0.	T9B T9BTR
	Rs13	Recirculation spray by 1 of 4 IRS or ORS trains without Casing Cooling, for T9B, Level 2. No Quench Spray assumed. Requires XHOS-1J-FAILS = 1, XHOS-CASCOOLREQD = 1, XHOS-QS-REQ-NPSH = 0, and XHOS-SW = 0.	T9B T9BTR

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
SGI	SGI01	Failure of SG Isolation following SGTR.	T7
Slc	Slc01	RC Pump seal cooling for T1 LOOP by 1 of 3 charging pumps or by 1 of 2 CC trains. Requires XHOS-LOOP = 1.	T1
	Slc02	RC Pump seal cooling for T1A SBO by 1 of 3 Unit 2 Charging Pumps. Use HEP-1AP15-6.	T1A
Tt	Tt01	Turbine Trip actuated by AMSAC following ATWS TH event initiated at high power level (>= 40%).	TH
V	VI01	Non-isolation probability for interfacing system LOCA.	VX
W	W01	RCS cooling by 1 of 2 RHR heat exchangers and 1 of 2 RHR pumps.	T7
Y	Y01	Core Cooling Recovery for S1 by AFW to 2 of 3 SGs and by 2 of 3 SG ADV success. Assumes HPI failure (D101). Requires XHOS-NO-CND-DUMP = 1, and use HEP-1FRC:1-11-S1.	S1
	Y02	Core Cooling Recovery for S2 by AFW to 2 of 3 SGs and by 2 of 3 SG ADV success. Assumes HPI failure (D101). Requires XHOS-NO-CND-DUMP = 1, and use HEP-1FRC:1-11-S2.	S2

TABLE B.2-7 (Continued)
SUMMARY DESCRIPTION OF FUNCTION HEADINGS AND APPLICABLE EVENT TREE

Event	Function Name	Description	Event Tree(s)
Y	Y03	Core Cooling Recovery for T1 LOOP by AFW to 2 of 3 SGs (solved within Y03 OCL) and by 2 of 3 SG ADV success. Assumes HPI failure (D103). Requires XHOS-LOOP = 1, XHOS-NO-CND-DUMP = 1, and use HEP-1FRC:1-11-S2.	T1
	Y04	Core Cooling Recovery for T4 RCP seal LOCA by AFW to 2 of 3 SGs and by 2 of 3 SG ADV success. Assumes HPI failure (part of initiator). Requires XHOS-NO-CND-DUMP = 0, and use HEP-1FRC:1-11-S2.	T4

TABLE B.2-8
A SUMMARY OF EVENT TREE CORE DAMAGE FREQUENCIES

Event Tree	North Anna	Surry	NUREG/CR-4550	WASH-1400
A	4.09E-6	4.57E-6	2.0E-6	2.9E-5
S1	6.64E-6	5.30E-6	3.1E-6	
S2	1.01E-5	1.14E-5	4.3E-7	
Rx	2.68E-7	2.66E-7		
T1	4.60E-6	See T1B		
T1TR	7.27E-6			
T1A	7.98E-6	8.10E-6	2.7E-5	3E-6
T1B	See T1	7.11E-6	< 1E-7	6E-6
T2	8.86E-7	4.69E-7	1.5E-6	1E-7
T2TR	1.44E-7			
T2A	6.11E-8	7.25E-7		
T2ATR	1.65E-6			
T3	7.61E-8	2.04E-6		
T3TR	4.06E-6			
T4	1.07E-8	7.74E-7	< 1E-7	
T5A	1.11E-7	6.84E-7	1.5E-7	
T5B	1.09E-7	6.84E-7	1.5E-7	
T6	4.52E-9	1.29E-6		
T7	7.02E-6	1.04E-5	1.9E-6	NA
T8	6.56E-6	1.81E-5		

TABLE B.2-8 (Continued)
A SUMMARY OF EVENT TREE CORE DAMAGE FREQUENCIES

Event Tree	North Anna	Surry	NUREG/CR-4550	WASH-1400
T9A	4.15E-7			
T9ATR	3.26E-6			
T9B	5.81E-7			
T9BTR	6.78E-8			
TH	4.20E-7	3.15E-7	1.4E-6	4E-6
TL	0.00E+0	2.42E-9		
VX	1.60E-6	1.62E-6	1.6E-6	4E-6
TOTAL CDF	6.79E-5	7.38E-5	4.0E-5	4.6E-5

TABLE B.2-9
SEQUENCE FREQUENCIES

NUPRA 2.0 VPWR Page 1
FILE : B29 Mon Sep 28 08:57:06 1992
CMF = 6.79E-5
SEQUENCES > 0.00% GROUPED BY INITIATOR

S2	Sum =	1.01E-5	14.8%	
	S2P35	5.15E-6	7.6%	S2D1D3
	S2P04	2.45E-6	3.6%	S2H1
	S2P43	1.19E-6	1.8%	S2D1Y
	S2P39	5.20E-7	0.8%	S2D1D2
	S2P47	3.27E-7	0.5%	S2D1L
	S2P32	9.12E-8	0.1%	S2D1H1
	S2P17	9.02E-8	0.1%	S2FmOH2
	S2P26	5.45E-8	0.1%	S2LP
	S2P06	5.13E-8	0.1%	S2H1Rs
	S2P38	3.26E-8	0.0%	S2D1D3Qs
	S2P02	3.22E-8	0.0%	S2Ch
	S2P23	1.20E-8	0.0%	S2LH2
	S2P46	9.83E-9	0.0%	S2D1YQs
	S2P03	7.56E-9	0.0%	S2Rs
	S2P36	5.35E-9	0.0%	S2D1D3Ch
	S2P34	3.94E-9	0.0%	S2D1H1Rs
	S2P10	3.84E-9	0.0%	S2OH2
	S2P19	2.85E-9	0.0%	S2FmOH2Rs
	S2P30	2.52E-9	0.0%	S2D1Ch
	S2P05	2.44E-9	0.0%	S2H1Ch
	S2P37	2.02E-9	0.0%	S2D1D3Rs
	S2P50	1.30E-9	0.0%	S2D1LQs
	S2P44	1.26E-9	0.0%	S2D1YCh
	S2P15	1.18E-9	0.0%	S2FmOCh
	S2P31	5.99E-10	0.0%	S2D1Rs
	S2P45	4.41E-10	0.0%	S2D1YRs
	S2P25	3.65E-10	0.0%	S2LH2Rs
	S2P16	3.50E-10	0.0%	S2FmORs
	S2P42	3.46E-10	0.0%	S2D1D2Qs
	S2P41	1.82E-10	0.0%	S2D1D2Rs
	S2P21	1.75E-10	0.0%	S2LCh
	S2P28	1.34E-10	0.0%	S2LPRs
	S2P12	1.23E-10	0.0%	S2OH2Rs
	S2P40	9.08E-11	0.0%	S2D1D2Ch
	S2P49	7.28E-11	0.0%	S2D1LRs
	S2P27	6.45E-11	0.0%	S2LPCh
	S2P08	5.82E-11	0.0%	S2OCh
	S2P22	4.37E-11	0.0%	S2LRs
	S2P09	1.40E-11	0.0%	S2ORs
	S2P48	6.29E-12	0.0%	S2D1LCh

TABLE B.2-9 (Continued)
SEQUENCE FREQUENCIES

T1A Sum =	7.98E-6	11.7%	
T1AP51	2.99E-6	4.4%	T1ALtBB1
T1AP46	1.41E-6	2.1%	T1ALtB
T1AP07	1.38E-6	2.0%	T1ABB1
T1AP67	8.86E-7	1.3%	T1AQBB1
T1AP02	6.51E-7	1.0%	T1AB
T1AP58	4.17E-7	0.6%	T1AQB
T1AP26	1.04E-7	0.2%	T1ASlcBB1
T1AP22	4.89E-8	0.1%	T1ASlcB
T1AP14	3.18E-8	0.0%	T1ASlcH1
T1AP15	1.14E-8	0.0%	T1ASlcCh
T1AP55	8.08E-9	0.0%	T1ALtBB1Qs
T1AP53	4.08E-9	0.0%	T1ALtBB1Ch
T1AP52	3.87E-9	0.0%	T1ALtBB1H1
T1AP50	3.27E-9	0.0%	T1ALtBQs
T1AP16	3.22E-9	0.0%	T1ASlcRs
T1AP56	2.38E-9	0.0%	T1ALtBB1B2
T1AP71	2.37E-9	0.0%	T1AQBB1Qs
T1AP48	1.78E-9	0.0%	T1ALtBCh
T1AP11	1.43E-9	0.0%	T1ABB1Qs
T1AP17	1.42E-9	0.0%	T1ASlcD1
T1AP47	1.29E-9	0.0%	T1ALtBH1
T1AP62	1.29E-9	0.0%	T1AQBD1
T1AP69	1.28E-9	0.0%	T1AQBB1Ch
T1AP54	1.11E-9	0.0%	T1ALtBB1Rs
T1AP12	1.05E-9	0.0%	T1ABB1B2
T1AP68	9.93E-10	0.0%	T1AQBB1H1
T1AP72	7.58E-10	0.0%	T1AQBB1B2
T1AP60	5.50E-10	0.0%	T1AQBCh
T1AP41	5.41E-10	0.0%	T1ALtLD1
T1AP10	4.94E-10	0.0%	T1ABB1Rs
T1AP49	4.81E-10	0.0%	T1ALtBRs
T1AP08	3.58E-10	0.0%	T1ABB1H1
T1AP70	3.16E-10	0.0%	T1AQBB1Rs
T1AP59	3.11E-10	0.0%	T1AQBH1
T1AP37	2.36E-10	0.0%	T1ALtLP
T1AP06	2.26E-10	0.0%	T1ABQs
T1AP05	2.26E-10	0.0%	T1ABRs
T1AP61	1.49E-10	0.0%	T1AQBRs
T1AP30	3.61E-11	0.0%	T1ASlcBB1Qs
T1AP29	3.61E-11	0.0%	T1ASlcBB1Rs
T1AP31	3.05E-11	0.0%	T1ASlcBB1B2
T1AP24	1.55E-11	0.0%	T1ASlcBRs
T1AP25	1.55E-11	0.0%	T1ASlcBQs

TABLE B.2-9 (Continued)
SEQUENCE FREQUENCIES

T1Tr	Sum =	7.27E-6	10.7%	
	T1TrP17	4.00E-6	5.9%	T1TrOD1
	T1TrP21	2.22E-6	3.3%	T1TrOD1Qs
	T1TrP14	1.01E-6	1.5%	T1TrOH1
	T1TrP19	1.20E-8	0.0%	T1TrOD1Ch
	T1TrP16	1.10E-8	0.0%	T1TrORs
	T1TrP15	4.28E-9	0.0%	T1TrOCh
	T1TrP08	1.29E-9	0.0%	T1TrLtRC1
	T1TrP09	6.05E-10	0.0%	T1TrLtRC1Ch
	T1TrP22	5.15E-10	0.0%	T1TrORC1
	T1TrP18	3.82E-10	0.0%	T1TrOD1H1
T7	Sum =	7.02E-6	10.3%	
	T7P04	2.98E-6	4.4%	T7OO2
	T7P03	1.98E-6	2.9%	T7OW
	T7P06	1.10E-6	1.6%	T7SGIW
	T7P26	3.85E-7	0.6%	T7D1SGI
	T7P23	1.80E-7	0.3%	T7D1OD3
	T7P07	1.10E-7	0.2%	T7SGIO2
	T7P25	8.44E-8	0.1%	T7D1OO2
	T7P27	7.20E-8	0.1%	T7D1L
	T7P14	3.15E-8	0.0%	T7LSGI
	T7P22	3.10E-8	0.0%	T7D1OW
	T7P15	2.59E-8	0.0%	T7LP
	T7P24	1.86E-8	0.0%	T7D1OD2
	T7P11	5.62E-9	0.0%	T7LH2
	T7P09	4.13E-9	0.0%	T7LCh
	T7P10	1.04E-9	0.0%	T7LRs
	T7P28	8.03E-10	0.0%	T7D1LSGI
	T7P19	2.60E-10	0.0%	T7LPSGI
	T7P13	1.72E-10	0.0%	T7LH2Rs
	T7P18	6.48E-11	0.0%	T7LPQs
	T7P16	3.04E-11	0.0%	T7LPCh
	T7P17	9.25E-12	0.0%	T7LPRs
S1	Sum =	6.64E-6	9.8%	
	S1P38	4.04E-6	5.9%	S1D1Y
	S1P10	2.45E-6	3.6%	S1OH2
	S1P12	5.09E-8	0.1%	S1OH2Rs
	S1P08	3.19E-8	0.0%	S1OCh
	S1P46	2.49E-8	0.0%	S1D1D2
	S1P41	1.53E-8	0.0%	S1D1YQs
	S1P42	1.36E-8	0.0%	S1D1L
	S1P09	7.50E-9	0.0%	S1ORs
	S1P39	6.19E-9	0.0%	S1D1YCh
	S1P11	3.21E-9	0.0%	S1OH2Ch
	S1P40	1.67E-9	0.0%	S1D1YRs

TABLE B.2-9 (Continued)
SEQUENCE FREQUENCIES

	S1P16	3.37E-10	0.0%	S1LH2
	S1P22	5.60E-11	0.0%	S1D2H2
	S1P45	1.14E-11	0.0%	S1D1LQs
	S1P25	1.11E-11	0.0%	S1D2L
	S1P14	5.46E-12	0.0%	S1LCh
	S1P15	1.31E-12	0.0%	S1LRs
T8	Sum =	6.56E-6	9.7%	
	T8P22	3.17E-6	4.7%	T8LtRC1
	T8P02	2.52E-6	3.7%	T8RC2
	T8P06	6.06E-7	0.9%	T8RC2RC3
	T8P11	9.57E-8	0.1%	T8OD1
	T8P08	5.85E-8	0.1%	T8OH1
	T8P09	3.90E-8	0.1%	T8OCh
	T8P26	2.02E-8	0.0%	T8LtRC1RC3
	T8P25	1.13E-8	0.0%	T8LtRC1Qs
	T8P10	1.05E-8	0.0%	T8ORs
	T8P03	1.01E-8	0.0%	T8RC2Ch
	T8P16	7.70E-9	0.0%	T8ORC2
	T8P05	6.35E-9	0.0%	T8RC2Qs
	T8P23	5.61E-9	0.0%	T8LtRC1Ch
	T8P12	3.21E-9	0.0%	T8OD1H1
	T8P24	1.29E-9	0.0%	T8LtRC1Rs
	T8P04	9.19E-10	0.0%	T8RC2Rs
	T8P20	8.72E-10	0.0%	T8ORC2RC3
	T8P15	4.93E-11	0.0%	T8OD1Qs
	T8P17	2.72E-11	0.0%	T8ORC2Ch
	T8P14	1.52E-11	0.0%	T8OD1Rs
T1	Sum =	4.60E-6	6.8%	
	T1P10	2.71E-6	4.0%	T1LD1
	T1P07	5.66E-7	0.8%	T1LH2H1
	T1P15	5.16E-7	0.8%	T1LP
	T1P14	2.07E-7	0.3%	T1LD1Qs
	T1P19	1.91E-7	0.3%	T1LPQs
	T1P06	1.69E-7	0.2%	T1LH2
	T1P21	8.17E-8	0.1%	T1QH1
	T1P36	7.75E-8	0.1%	T1QD1D3
	T1P46	5.42E-8	0.1%	T1QD1Y
	T1P11	2.21E-8	0.0%	T1LD1H1
	T1P16	4.39E-9	0.0%	T1LPH1
	T1P12	1.48E-9	0.0%	T1LD1Ch
	T1P09	1.32E-9	0.0%	T1LH2Rs
	T1P04	9.95E-10	0.0%	T1LCh
	T1P13	7.42E-10	0.0%	T1LD1Rs
	T1P50	4.40E-10	0.0%	T1QD1YQs
	T1P40	3.95E-10	0.0%	T1QD1D3Qs

TABLE B.2-9 (Continued)
SEQUENCE FREQUENCIES

	T1P17	3.50E-10	0.0%	T1LPCh
	T1P05	2.55E-10	0.0%	T1LRs
	T1P18	1.30E-10	0.0%	T1LPRs
	T1P22	4.33E-11	0.0%	T1QCh
	T1P24	2.13E-11	0.0%	T1QRs
A	Sum =	4.09E-6	6.0%	
	AP15	2.12E-6	3.1%	AD2
	AP03	8.26E-7	1.2%	AH1
	AP11	5.88E-7	0.9%	AD3
	AP02	5.17E-7	0.8%	ADh
	AP04	1.60E-8	0.0%	ACh
	AP20	7.68E-9	0.0%	AD2Qs
	AP05	4.28E-9	0.0%	ARs
	AP17	2.73E-9	0.0%	AD2H1
	AP25	2.28E-9	0.0%	AD2D3
	AP16	2.07E-9	0.0%	AD2Dh
	AP08	1.90E-9	0.0%	AQsH1
	AP14	1.81E-9	0.0%	AD3Qs
	AP07	1.69E-9	0.0%	AQsDh
	AP12	8.41E-10	0.0%	AD3Ch
	AP13	2.24E-10	0.0%	AD3Rs
	AP10	1.21E-10	0.0%	AQsRs
	AP09	7.54E-11	0.0%	AQsCh
	AP18	6.52E-11	0.0%	AD2Ch
	AP19	1.57E-11	0.0%	AD2Rs
T3Tr	Sum =	4.06E-6	6.0%	
	T3TrP11	1.67E-6	2.5%	T3TrOD1
	T3TrP03	1.57E-6	2.3%	T3TrRC2Ch
	T3TrP06	2.83E-7	0.4%	T3TrRC2RC3
	T3TrP23	1.84E-7	0.3%	T3TrLtRC1Ch
	T3TrP22	1.21E-7	0.2%	T3TrLtRC1
	T3TrP08	6.67E-8	0.1%	T3TrOH1
	T3TrP02	5.83E-8	0.1%	T3TrRC2
	T3TrP09	4.70E-8	0.1%	T3TrOCh
	T3TrP16	1.44E-8	0.0%	T3TrORC2
	T3TrP10	1.27E-8	0.0%	T3TrORs
	T3TrP12	6.16E-9	0.0%	T3TrOD1H1
	T3TrP17	5.90E-9	0.0%	T3TrORC2Ch
	T3TrP15	5.09E-9	0.0%	T3TrOD1Qs
	T3TrP05	3.84E-9	0.0%	T3TrRC2Qs
	T3TrP13	2.36E-9	0.0%	T3TrOD1Ch
	T3TrP20	1.76E-9	0.0%	T3TrORC2RC3
	T3TrP26	9.96E-10	0.0%	T3TrLtRC1RC3
	T3TrP14	6.08E-10	0.0%	T3TrOD1Rs
	T3TrP04	5.89E-10	0.0%	T3TrRC2Rs

TABLE B.2-9 (Continued)
SEQUENCE FREQUENCIES

T3TrP25	1.35E-10	0.0%	T3TrLtRC1Qs
T3TrP24	6.74E-11	0.0%	T3TrLtRC1Rs
T9ATr Sum =	3.26E-6	4.8%	
T9ATrP08	1.53E-6	2.2%	T9ATrLtRC1
T9ATrP02	8.33E-7	1.2%	T9ATrRC2
T9ATrP14	3.88E-7	0.6%	T9ATrOH1
T9ATrP17	3.07E-7	0.5%	T9ATrOD1
T9ATrP06	1.07E-7	0.2%	T9ATrRC2RC3
T9ATrP22	2.01E-8	0.0%	T9ATrORC1
T9ATrP11	1.89E-8	0.0%	T9ATrLtRC1Qs
T9ATrP03	1.87E-8	0.0%	T9ATrRC2Ch
T9ATrP19	1.69E-8	0.0%	T9ATrOD1Ch
T9ATrP05	1.17E-8	0.0%	T9ATrRC2Qs
T9ATrP21	8.77E-9	0.0%	T9ATrOD1Qs
T9ATrP16	9.42E-10	0.0%	T9ATrORs
T9ATrP09	8.22E-10	0.0%	T9ATrLtRC1Ch
T2ATr Sum =	1.65E-6	2.4%	
T2ATrP11	6.78E-7	1.0%	T2ATrOD1
T2ATrP03	6.40E-7	0.9%	T2ATrRC2Ch
T2ATrP06	1.15E-7	0.2%	T2ATrRC2RC3
T2ATrP23	7.51E-8	0.1%	T2ATrLtRC1Ch
T2ATrP22	4.75E-8	0.1%	T2ATrLtRC1
T2ATrP08	2.71E-8	0.0%	T2ATrOH1
T2ATrP02	2.19E-8	0.0%	T2ATrRC2
T2ATrP09	1.92E-8	0.0%	T2ATrOCh
T2ATrP16	5.89E-9	0.0%	T2ATrORC2
T2ATrP10	5.15E-9	0.0%	T2ATrORs
T2ATrP12	2.51E-9	0.0%	T2ATrOD1H1
T2ATrP17	2.40E-9	0.0%	T2ATrORC2Ch
T2ATrP15	2.07E-9	0.0%	T2ATrOD1Qs
T2ATrP05	1.56E-9	0.0%	T2ATrRC2Qs
T2ATrP13	9.63E-10	0.0%	T2ATrOD1Ch
T2ATrP20	8.18E-10	0.0%	T2ATrORC2RC3
T2ATrP26	3.83E-10	0.0%	T2ATrLtRC1RC3
T2ATrP14	2.48E-10	0.0%	T2ATrOD1Rs
T2ATrP04	2.40E-10	0.0%	T2ATrRC2Rs
T2ATrP25	4.08E-11	0.0%	T2ATrLtRC1Qs
T2ATrP24	2.70E-11	0.0%	T2ATrLtRC1Rs
VX Sum =	1.60E-6	2.4%	
VXP07	1.52E-6	2.2%	VXFm
VXP03	7.68E-8	0.1%	VXO
VXP05	2.70E-10	0.0%	VXD1
VXP04	1.34E-11	0.0%	VXL
VXP06	1.97E-12	0.0%	VXHv

TABLE B.2-9 (Continued)
SEQUENCE FREQUENCIES

T2 Sum =	8.86E-7	1.3%	
T2P09	7.22E-7	1.1%	T2LD1
T2P14	1.30E-7	0.2%	T2LP
T2P06	2.43E-8	0.0%	T2LH2H1
T2P05	2.28E-9	0.0%	T2LH2
T2P10	2.16E-9	0.0%	T2LD1H1
T2P13	1.42E-9	0.0%	T2LD1Qs
T2P11	8.98E-10	0.0%	T2LD1Ch
T2P08	8.24E-10	0.0%	T2LH2Rs
T2P03	3.94E-10	0.0%	T2LCh
T2P18	3.26E-10	0.0%	T2LPQs
T2P12	2.53E-10	0.0%	T2LD1Rs
T2P16	1.54E-10	0.0%	T2LPCh
T2P15	1.44E-10	0.0%	T2LPH1
T2P04	9.38E-11	0.0%	T2LRs
T2P17	4.53E-11	0.0%	T2LPRs
T9B Sum =	5.81E-7	0.9%	
T9BP02	2.37E-7	0.3%	T9BL
T9BP10	1.79E-7	0.3%	T9BQH2
T9BP13	1.30E-7	0.2%	T9BQD1
T9BP06	1.78E-8	0.0%	T9BLQs
T9BP03	1.15E-8	0.0%	T9BLH1
T9BP17	4.31E-9	0.0%	T9BQD1Qs
T9BP14	5.66E-10	0.0%	T9BQD1H1
T9BP04	5.44E-10	0.0%	T9BLCh
T9BP05	1.26E-10	0.0%	T9BLRs
T9BP08	1.06E-10	0.0%	T9BQCh
T9BP12	3.47E-11	0.0%	T9BQH2Rs
T9BP16	2.36E-11	0.0%	T9BQD1Rs
T9BP09	2.16E-11	0.0%	T9BQRs
T9BP18	1.40E-11	0.0%	T9BQL
TH Sum =	4.20E-7	0.6%	
THP46	2.14E-7	0.3%	THKMTtQ
THP30	2.06E-7	0.3%	THKMPr
THP32	7.72E-11	0.0%	THKMPrRs
THP33	7.72E-11	0.0%	THKMPrQs
T9A Sum =	4.15E-7	0.6%	
T9AP02	1.72E-7	0.3%	T9AL
T9AP10	1.31E-7	0.2%	T9AQH2
T9AP13	1.02E-7	0.2%	T9AQD1
T9AP06	6.25E-9	0.0%	T9ALQs
T9AP17	1.90E-9	0.0%	T9AQD1Qs
T9AP03	1.72E-9	0.0%	T9ALH1
T9AP14	4.36E-10	0.0%	T9AQD1H1

TABLE B.2-9 (Continued)
SEQUENCE FREQUENCIES

RX Sum =	2.68E-7	0.4%	
RXP01	2.66E-7	0.4%	RX
RXP04	9.71E-10	0.0%	RXQs
RXP02	4.16E-10	0.0%	RXCh
RXP03	1.13E-10	0.0%	RXRs
T2Tr Sum =	1.44E-7	0.2%	
T2TrP11	6.06E-8	0.1%	T2TrOD1
T2TrP03	5.82E-8	0.1%	T2TrRC2Ch
T2TrP06	8.32E-9	0.0%	T2TrRC2RC3
T2TrP23	6.82E-9	0.0%	T2TrLtRC1Ch
T2TrP22	2.91E-9	0.0%	T2TrLtRC1
T2TrP08	2.45E-9	0.0%	T2TrOH1
T2TrP09	1.74E-9	0.0%	T2TrOCh
T2TrP02	1.29E-9	0.0%	T2TrRC2
T2TrP16	5.31E-10	0.0%	T2TrORC2
T2TrP10	4.67E-10	0.0%	T2TrORs
T2TrP12	2.28E-10	0.0%	T2TrOD1H1
T2TrP17	2.17E-10	0.0%	T2TrORC2Ch
T2TrP15	1.87E-10	0.0%	T2TrOD1Qs
T2TrP05	1.42E-10	0.0%	T2TrRC2Qs
T2TrP13	8.75E-11	0.0%	T2TrOD1Ch
T2TrP20	7.43E-11	0.0%	T2TrORC2RC3
T2TrP26	3.35E-11	0.0%	T2TrLtRC1RC3
T2TrP04	2.15E-11	0.0%	T2TrRC2Rs
T2TrP14	2.10E-11	0.0%	T2TrOD1Rs
T5A Sum =	1.11E-7	0.2%	
T5AP02	9.36E-8	0.1%	T5AL
T5AP06	9.63E-9	0.0%	T5ALQs
T5AP03	3.56E-9	0.0%	T5ALH1
T5AP10	1.98E-9	0.0%	T5AQH2
T5AP13	1.53E-9	0.0%	T5AQD1
T5AP04	2.89E-10	0.0%	T5ALCh
T5AP11	1.76E-10	0.0%	T5AQH2Ch
T5AP17	1.42E-10	0.0%	T5AQD1Qs
T5AP05	6.05E-11	0.0%	T5ALRs
T5B Sum =	1.09E-7	0.2%	
T5BP02	9.37E-8	0.1%	T5BL
T5BP06	9.33E-9	0.0%	T5BLQs
T5BP03	3.51E-9	0.0%	T5BLH1
T5BP10	2.07E-9	0.0%	T5BQH2
T5BP04	2.89E-10	0.0%	T5BLCh
T5BP13	1.06E-10	0.0%	T5BQD1
T5BP17	7.98E-11	0.0%	T5BQD1Qs
T5BP05	6.05E-11	0.0%	T5BLRs
T5BP11	5.77E-11	0.0%	T5BQH2Ch

TABLE B.2-9 (Continued)
SEQUENCE FREQUENCIES

T3	Sum =	7.61E-8	0.1%	
	T3P10	4.87E-8	0.1%	T3LMD1
	T3P15	1.92E-8	0.0%	T3LMP
	T3P09	6.97E-9	0.0%	T3LMH2Rs
	T3P07	1.15E-9	0.0%	T3LMH2H1
	T3P06	4.66E-11	0.0%	T3LMH2
	T3P05	3.04E-12	0.0%	T3LMRs
T9BTr	Sum =	6.78E-8	0.1%	
	T9BTrP14	2.53E-8	0.0%	T9BTrOH1
	T9BTrP03	1.89E-8	0.0%	T9BTrRC2Ch
	T9BTrP17	1.76E-8	0.0%	T9BTrOD1
	T9BTrP06	2.71E-9	0.0%	T9BTrRC2RC3
	T9BTrP22	2.08E-9	0.0%	T9BTrORC1
	T9BTrP09	1.05E-9	0.0%	T9BTrLtRC1Ch
	T9BTrP16	1.67E-10	0.0%	T9BTrORs
T2A	Sum =	6.11E-8	0.1%	
	T2AP10	4.55E-8	0.1%	T2ALMD1
	T2AP15	1.23E-8	0.0%	T2ALMP
	T2AP09	2.84E-9	0.0%	T2ALMH2Rs
	T2AP07	4.69E-10	0.0%	T2ALMH2H1
	T2AP06	1.90E-11	0.0%	T2ALMH2
	T2AP05	3.37E-12	0.0%	T2ALMRs
T4	Sum =	1.07E-8	0.0%	
	T4P08	5.84E-9	0.0%	T4OD3
	T4P17	3.06E-9	0.0%	T4OY
	T4P12	1.45E-9	0.0%	T4OD2
	T4P03	2.12E-10	0.0%	T4OH1
	T4P22	1.43E-10	0.0%	T4L
	T4P07	1.14E-11	0.0%	T4ORsH1
	T4P04	7.13E-12	0.0%	T4OCh
	T4P06	1.71E-12	0.0%	T4ORs
T6	Sum =	4.52E-9	0.0%	
	T6P08	2.89E-9	0.0%	T6LtRC1
	T6P02	1.29E-9	0.0%	T6RC2
	T6P06	1.85E-10	0.0%	T6RC2RC3
	T6P22	1.08E-10	0.0%	T6ORC1
	T6P17	2.50E-11	0.0%	T6OD1
	T6P12	1.17E-11	0.0%	T6LtRC1RC3
	T6P16	8.16E-12	0.0%	T6ORs
TL	Sum =	0.00E+0	0.0%	

TABLE B.2-10
A SUMMARY OF TRANSFERS

TRANSFERS TO EVENT TREE S2:

Sequence	Core Damage Frequency (Per Year)
T1P02	1.6E-4
T1P20	2.9E-6
T1AP57	0.0E-6
T2P19	4.8E-7
T2AP20	5.5E-6
T3P20	1.3E-5
T5AP07	5.9E-8
T5BP07	5.9E-8
T9AP07	2.3E-6
T9BP07	3.1E-6
THP09	8.3E-8
THP10	0.0E+0
THP23	2.0E-8
THP24	0.0E+0
TLP09	0.0E+0
TLP10	0.0E+0

Undeveloped Transfer Sequence Frequency 1.88E-4
S2 Initiating Event Frequency 2.10E-2

TRANSFERS TO EVENT TREE TH:

Sequence	Core Damage Frequency (Per Year)
S1P51	1.9E-9
S2P52	3.9E-8
T1P65	2.1E-7
T2P21	9.3E-8
T2AP22	1.0E-6
T3P22	2.5E-6
T4P30	0.0E+0
T5AP24	1.1E-8
T5BP24	1.1E-8
T7P28	1.9E-8
T9AP24	3.2E-8
T9BP24	3.2E-8

Undeveloped Transfer Sequence Frequency 3.95E-6
TH Initiating Event Frequency 1.75E+0

TABLE B.2-10 (Continued)
A SUMMARY OF TRANSFERS

TRANSFERS TO EVENT TREE T8:

Sequence	Core Damage Frequency (Per Year)
AP29	3.5E-7
S1P50	6.8E-7
S2P51	1.4E-5
T1P63*	1.2E-3
T2P20*	3.4E-5
T2AP21*	3.7E-4
T3P21*	9.1E-4
T4P27	2.8E-10
T5AP23	4.4E-6
T5BP23	4.1E-6
T7P29	6.8E-6
T9AP23*	4.0E-3
T9BP23*	3.1E-5

Undeveloped Transfer Sequence Frequency	3.03E-5
T8 Initiating Event Frequency	6.58E-3

* These sequences were further developed using transfer event trees.

TABLE B.2-11
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

AP02.MGP		12:20 9/28/1992
Top event unavailability	=	5.169E-7
Number of cut sets in equation	=	76
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	6
Basic Event Data file referenced	=	NAPS1

1	4.2489E-7	IE-A	HEP-1ES1:4		
2	3.1692E-8	IE-A	1SICKV-CC-959903		
3	3.1692E-8	IE-A	1SICKV-CC-206207		
4	6.1749E-9	IE-A	1SIMOV-FO-1864A	REC-1ES1:4-1	1SIMOV-FO-1864B
5	6.1749E-9	IE-A	1SIMOV-FC-1890A	REC-1ES1:4-1	1SIMOV-FO-1864B
6	6.1749E-9	IE-A	1SIMOV-FC-1890B	REC-1ES1:4-1	1SIMOV-FO-1864A
7	6.1749E-9	IE-A	1SIMOV-FC-1890A	REC-1ES1:4-1	1SIMOV-FC-1890B
8	3.5900E-10	IE-A	1SICKV-FC-1SI206	1SIMOV-FO-1864B	REC-1ES1:4-1
9	3.5900E-10	IE-A	1SICKV-FC-1SI206	1SIMOV-FC-1890B	REC-1ES1:4-1
10	3.5900E-10	IE-A	1SICKV-FC-1SI207	1SIMOV-FC-1890A	REC-1ES1:4-1
11	3.5900E-10	IE-A	1SICKV-FC-1SI207	1SIMOV-FO-1864A	REC-1ES1:4-1
12	2.0091E-10	IE-A	1SICKV-FC-1SI207	1SICKV-FC-1SI206	
13	1.1325E-10	IE-A	1EEBUS-UM-1H1-2N	1SIMOV-FO-1864B	REC-1ES1:4-1
14	1.1325E-10	IE-A	1EEBUS-UM-1H1-2N	1SIMOV-FC-1890B	REC-1ES1:4-1
15	6.3376E-11	IE-A	1SICKV-FC-1SI207	1EEBUS-UM-1H1-2N	
16	4.9528E-11	IE-A	1SILMS-LF-1860B	1SIPSB-FR-24HP1A	
17	4.9528E-11	IE-A	1SIPSB-FR-24HP1B	1SILMS-LF-1860A	
18	4.7115E-11	IE-A	1SIPSB-FR-24HP1A	1SIMOV-FO-1885D	1SIMOV-FO-1885B
19	4.7115E-11	IE-A	1SIMOV-FO-1885A	1SIMOV-FO-1885C	1SIPSB-FR-24HP1B
20	4.3070E-11	IE-A	1SIPSB-UM-1SIP1A	1EETFM-LP-1J	
21	4.3070E-11	IE-A	1SIPSB-UM-1SIP1B	1EETFM-LP-1H1	
22	4.3070E-11	IE-A	1SIPSB-UM-1SIP1B	1EETFM-LP-1H	
23	4.2775E-11	IE-A	1SIMV--PG-1SI306	1SICKV-FC-1SI1	
24	4.2775E-11	IE-A	1SICKV-FC-1SI1	1SIMOV-PG-1862B	
25	4.2775E-11	IE-A	1SIMOV-PG-1862A	1SICKV-FC-1SI16	
26	4.2775E-11	IE-A	1SICKV-FC-1SI16	1SIMV--PG-1SI305	
27	4.2154E-11	IE-A	1SICKV-FC-1SI16	HEP-1ES1:3	1SIMOV-FC-1863A
28	4.2154E-11	IE-A	1SICKV-FC-1SI26	HEP-1ES1:3	1SIMOV-FC-1863A
29	4.2154E-11	IE-A	1SICKV-FC-1SI18	HEP-1ES1:3	1SIMOV-FC-1863A
30	4.2154E-11	IE-A	HEP-1ES1:3	1SIMOV-FC-1863B	1SICKV-FC-1SI9

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

AP03.MGP 12:19 9/28/1992

Top event unavailability	=	8.253E-7
Number of cut sets in equation	=	270
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	5
Basic Event Data file referenced	=	NAPS1

1	1.9515E-7	IE-A	1SIMOV-CC-1860AB	
2	5.9439E-8	IE-A	1SIMOV-FO-1862B	1SIMOV-FO-1862A
3	5.9439E-8	IE-A	1SIMOV-FC-1860B	1SIMOV-FC-1860A
4	5.9439E-8	IE-A	1SIMOV-FC-1860A	1SIMOV-FO-1862B
5	5.9439E-8	IE-A	1SIMOV-FO-1862A	1SIMOV-FC-1860B
6	3.1692E-8	IE-A	1SICKV-CC-FC116	
7	2.4729E-8	IE-A	1SIPSB-UM-1SIP1B	1SIMOV-FO-1862A
8	2.4729E-8	IE-A	1SIPSB-UM-1SIP1A	1SIMOV-FC-1860B
9	2.4729E-8	IE-A	1SIMOV-FC-1860A	1SIPSB-UM-1SIP1B
10	2.4729E-8	IE-A	1SIMOV-FO-1862B	1SIPSB-UM-1SIP1A
11	2.1903E-8	IE-A	1SIMOV-FO-1862B	1SIPSB-FS-1SIP1A
12	2.1903E-8	IE-A	1SIPSB-FS-1SIP1B	1SIMOV-FO-1862A
13	2.1903E-8	IE-A	1SIMOV-FC-1860A	1SIPSB-FS-1SIP1B
14	2.1903E-8	IE-A	1SIPSB-FS-1SIP1A	1SIMOV-FC-1860B
15	7.3978E-9	IE-A	1SIMOV-PG-1860B	1SIMOV-FO-1862A
16	7.3978E-9	IE-A	1SIMOV-PG-1860A	1SIMOV-FC-1860B
17	7.3978E-9	IE-A	1SIMOV-FC-1860A	1SIMOV-PG-1860B
18	7.3978E-9	IE-A	1SIMOV-FO-1862B	1SIMOV-PG-1860A
19	4.4737E-9	IE-A	1SIMOV-PG-1864B	1SIMOV-FC-1860A
20	4.4737E-9	IE-A	1SIMOV-FC-1860B	1SIMOV-PG-1864A
21	4.4737E-9	IE-A	1SIMOV-FO-1862A	1SIMOV-PG-1864B
22	4.4737E-9	IE-A	1SIMOV-PG-1864A	1SIMOV-FO-1862B
23	4.3209E-9	IE-A	1SIMOV-FO-1862B	1SIPSB-FR-24HP1A
24	4.3209E-9	IE-A	1SIPSB-FR-24HP1B	1SIMOV-FO-1862A
25	4.3209E-9	IE-A	1SIMOV-FC-1860A	1SIPSB-FR-24HP1B
26	4.3209E-9	IE-A	1SIPSB-FR-24HP1A	1SIMOV-FC-1860B
27	3.4557E-9	IE-A	1SICKV-FC-1SI26	1SIMOV-FC-1860A
28	3.4557E-9	IE-A	1SICKV-FC-1SI18	1SIMOV-FO-1862A
29	3.4557E-9	IE-A	1SICKV-FC-1SI9	1SIMOV-FO-1862B
30	3.4557E-9	IE-A	1SICKV-FC-1SI16	1SIMOV-FC-1860A

Contribution of equation cut sets not listed = 9.56E-8

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    AP11.MGP              12:20   9/28/1992
Top event unavailability             =    5.881E-7
Number of cut sets in equation       =         122
Cutoff value used last step          =    1.000E-11
Longest cut set (# of events)        =           4
Basic Event Data file referenced     =     NAPS1
```

1	2.4666E-7	IE-A	1SIPSB-CC-FS1A1B	
2	1.9515E-7	IE-A	1SIMOV-CC-1890CD	
3	3.3740E-8	IE-A	1QSMV--PG-1QS38	
4	3.1692E-8	IE-A	1SICKV-CC-FC926	
5	3.1692E-8	IE-A	1SICKV-CC-838689	
6	9.1125E-9	IE-A	1SIPSB-FS-1SIP1B	1SIPSB-UM-1SIP1A
7	9.1125E-9	IE-A	1SIPSB-UM-1SIP1B	1SIPSB-FS-1SIP1A
8	8.0709E-9	IE-A	1SIPSB-FS-1SIP1B	1SIPSB-FS-1SIP1A
9	1.8613E-9	IE-A	1SIMOV-PG-1864A	1SIPSB-UM-1SIP1B
10	1.8613E-9	IE-A	1SIPSB-UM-1SIP1A	1SIMOV-PG-1864B
11	1.6485E-9	IE-A	1SIMOV-PG-1864A	1SIPSB-FS-1SIP1B
12	1.6485E-9	IE-A	1SIPSB-FS-1SIP1A	1SIMOV-PG-1864B
13	1.4377E-9	IE-A	1SIPSB-UM-1SIP1B	1SICKV-FC-1SI9
14	1.4377E-9	IE-A	1SICKV-FC-1SI18	1SIPSB-UM-1SIP1A
15	1.4377E-9	IE-A	1SICKV-FC-1SI26	1SIPSB-UM-1SIP1A
16	1.2734E-9	IE-A	1SICKV-FC-1SI26	1SIPSB-FS-1SIP1A
17	1.2734E-9	IE-A	1SICKV-FC-1SI18	1SIPSB-FS-1SIP1A
18	1.2734E-9	IE-A	1SIPSB-FS-1SIP1B	1SICKV-FC-1SI9
19	4.0169E-10	IE-A	1EEBUS-UM-DC-III	1SIPSB-FS-1SIP1A
20	4.0169E-10	IE-A	1SIPSB-FS-1SIP1B	1EEBUS-UM-DC-I
21	3.3672E-10	IE-A	1SIMOV-PG-1864B	1SIMOV-PG-1864A
22	3.0611E-10	IE-A	1SIPSB-UM-1SIP1B	1SIMV--PG-1SI305
23	3.0611E-10	IE-A	1SIPSB-UM-1SIP1B	1SIMOV-PG-1862A
24	3.0611E-10	IE-A	1SIMV--PG-1SI306	1SIPSB-UM-1SIP1A
25	3.0611E-10	IE-A	1SIMOV-PG-1862B	1SIPSB-UM-1SIP1A
26	2.7112E-10	IE-A	1SIMV--PG-1SI306	1SIPSB-FS-1SIP1A
27	2.7112E-10	IE-A	1SIMOV-PG-1862B	1SIPSB-FS-1SIP1A
28	2.7112E-10	IE-A	1SIPSB-FS-1SIP1B	1SIMOV-PG-1862A
29	2.7112E-10	IE-A	1SIPSB-FS-1SIP1B	1SIMV--PG-1SI305
30	2.6010E-10	IE-A	1SIMOV-PG-1864A	1SICKV-FC-1SI26

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

AP15.MGP 12:16 9/28/1992

Top event unavailability = 2.120E-6
Number of cut sets in equation = 7
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 2
Basic Event Data file referenced = NAPS1

1	4.1029E-7	IE-A	1SIMOV-PG-1865C
2	4.1029E-7	IE-A	1SIMOV-PG-1865A
3	3.1692E-7	IE-A	1SICKV-FC-1SI127
4	3.1692E-7	IE-A	1SICKV-FC-1SI161
5	3.1692E-7	IE-A	1SICKV-FC-1SI125
6	3.1692E-7	IE-A	1SICKV-FC-1SI159
7	3.1692E-8	IE-A	1SICKV-CC-ACCCKV

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    RXP01.MGP           12:22   9/28/1992
Top event unavailability            =   2.664E-7
Number of cut sets in equation      =          1
Cutoff value used last step         =   1.000E-11
Longest cut set (# of events)       =          1
Basic Event Data file referenced    =    NAPS1
---------------------------------------------------------------------------------
  1    2.6635E-7    IE-RX
```

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

S1P10.MGP 12:16 9/28/1992

Top event unavailability = 2.451E-6
Number of cut sets in equation = 532
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 7
Basic Event Data file referenced = NAPS1

1	4.9333E-7	IE-S1	HEP-1ES1:2-S1	1SIPSB-CC-FS1A1B	
2	3.9029E-7	IE-S1	HEP-1ES1:2-S1	1SIMOV-CC-1860AB	
3	1.1888E-7	IE-S1	HEP-1ES1:2-S1	1SIMOV-FC-1860B	1SIMOV-FC-1860A
4	1.1888E-7	IE-S1	HEP-1ES1:2-S1	1SIMOV-FC-1860A	1SIMOV-FO-1862B
5	1.1888E-7	IE-S1	HEP-1ES1:2-S1	1SIMOV-FC-1863B	1SIMOV-FC-1863A
6	1.1888E-7	IE-S1	HEP-1ES1:2-S1	1SIMOV-FO-1862A	1SIMOV-FC-1860B
7	1.1888E-7	IE-S1	HEP-1ES1:2-S1	1SIMOV-FO-1862B	1SIMOV-FO-1862A
8	6.3383E-8	IE-S1	HEP-1ES1:2-S1	1SICKV-CC-FC926	
9	6.3383E-8	IE-S1	HEP-1ES1:2-S1	1SICKV-CC-FC116	
10	4.9459E-8	IE-S1	HEP-1ES1:2-91	1SIPSB-UM-1SIP1A	1SIMOV-FC-1860B
11	4.9459E-8	IE-S1	HEP-1ES1:2-S1	1SIPSB-UM-1SIP1B	1SIMOV-FO-1862A
12	4.9459E-8	IE-S1	HEP-1ES1:2-S1	1SIMOV-FC-1860A	1SIPSB-UM-1SIP1B
13	4.9459E-8	IE-S1	HEP-1ES1:2-S1	1SIMOV-FO-1862B	1SIPSB-UM-1SIP1A
14	4.3805E-8	IE-S1	HEP-1ES1:2-S1	1SIMOV-FC-1860A	1SIPSB-FS-1SIP1B
15	4.3805E-8	IE-S1	HEP-1ES1:2-S1	1SIPSB-FS-1SIP1B	1SIMOV-FO-1862A
16	4.3805E-8	IE-S1	HEP-1ES1:2-S1	1SIPSB-FS-1SIP1A	1SIMOV-FC-1860B
17	4.3805E-8	IE-S1	HEP-1ES1:2-S1	1SIMOV-FO-1862B	1SIPSB-FS-1SIP1A
18	3.7531E-8	IE-S1	HEP-1ES1:2-S1	1SIMOV-FO-1115D	1SICKV-FO-1SI47
19	3.7531E-8	IE-S1	HEP-1ES1:2-S1	1SICKV-FO-1SI47	1SIMOV-FO-1115B
20	1.8225E-8	IE-S1	HEP-1ES1:2-S1	1SIPSB-FS-1SIP1B	1SIPSB-UM-1SIP1A
21	1.8225E-8	IE-S1	HEP-1ES1:2-S1	1SIPSB-UM-1SIP1B	1SIPSB-FS-1SIP1A
22	1.6142E-8	IE-S1	HEP-1ES1:2-S1	1SIPSB-FS-1SIP1B	1SIPSB-FS-1SIP1A
23	1.4796E-8	IE-S1	HEP-1ES1:2-S1	1SIMOV-PG-1860B	1SIMOV-FO-1862A
24	1.4796E-8	IE-S1	HEP-1ES1:2-S1	1SIMOV-PG-1860A	1SIMOV-FC-1860B
25	1.4796E-8	IE-S1	HEP-1ES1:2-S1	1SIMOV-FC-1860A	1SIMOV-PG-1860B

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                 S1P38.MGP          12:13   9/28/1992
Top event unavailability         =  4.038E-6
Number of cut sets in equation   =       248
Cutoff value used last step      =  1.000E-11
Longest cut set (# of events)    =         6
Basic Event Data file referenced =   NAPS1
```

1	1.1471E-6	IE-S1	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	HEP-1FRC:1-11-S1	
2	6.3384E-7	IE-S1	1SICKV-FC-1S147	HEP-1FRC:1-11-S1		
3	4.9671E-7	IE-S1	1CHPAT-CC-FS1ABC	HEP-1FRC:1-11-S1		
4	3.9029E-7	IE-S1	1SIMOV-CC-1115BD	HEP-1FRC:1-11-S1		
5	3.9029E-7	IE-S1	1SIMOV-CC-867836	HEP-1FRC:1-11-S1		
6	3.9029E-7	IE-S1	1SIMOV-CC-1115CE	HEP-1FRC:1-11-S1		
7	1.1888E-7	IE-S1	1SIMOV-FO-1115E	1SIMOV-FO-1115C	HEP-1FRC:1-11-S1	
8	1.1888E-7	IE-S1	1SIMOV-FC-1115D	1SIMOV-FC-1115B	HEP-1FRC:1-11-S1	
9	6.7479E-8	IE-S1	1QSMV--PG-1QS38	HEP-1FRC:1-11-S1		
10	6.3383E-8	IE-S1	1SICKV-CC-838689	HEP-1FRC:1-11-S1		
11	6.3383E-8	IE-S1	1SICKV-CC-79185	HEP-1FRC:1-11-S1		
12	4.4987E-8	IE-S1	1SIMV--PG-1S146	HEP-1FRC:1-11-S1		
13	1.1741E-8	IE-S1	1CHPAT-FS-1CHP1A	1SWTCV-FC-SW102B	1CHPAT-UM-1CHP1C	HEP-1FRC:1-11-S1
14	7.4467E-9	IE-S1	HEP-1E1-25	1SICKV-FC-1S179	HEP-1FRC:1-11-S1	
15	6.9113E-9	IE-S1	1SICKV-FC-1S179	1SIMOV-FC-1836	HEP-1FRC:1-11-S1	
16	4.6946E-9	IE-S1	1CHPAT-UM-1CHP1C	1SWTCV-FC-SW102B	1CHPAT-FR-24HP1A	HEP-1FRC:1-11-S1
17	4.5853E-9	IE-S1	1SIMOV-CC-1867CD	HEP-1E1-25	HEP-1FRC:1-11-S1	
18	4.5853E-9	IE-S1	1SIMOV-CC-1867AB	HEP-1E1-25	HEP-1FRC:1-11-S1	
19	4.2557E-9	IE-S1	1SIMOV-CC-1867CD	1SIMOV-FC-1836	HEP-1FRC:1-11-S1	
20	4.2557E-9	IE-S1	1SIMOV-CC-1867AB	1SIMOV-FC-1836	HEP-1FRC:1-11-S1	
21	3.6235E-9	IE-S1	1SWTCV-FC-SW102B	1EEBUS-UM-DC-I	HEP-1FRC:1-11-S1	
22	3.5939E-9	IE-S1	1CHPAT-FS-1CHP1A	1SWTCV-CC-102BC	HEP-1FRC:1-11-S1	
23	3.2900E-9	IE-S1	1CHPAT-FS-1CHP1A	1CHPAT-FS-1CHP1B	1CHPAT-UM-1CHP1C	HEP-1FRC:1-11-S1
24	2.1802E-9	IE-S1	1EEBUS-UM-1H1-2N	1SIMOV-FC-1115B	HEP-1FRC:1-11-S1	
25	2.1802E-9	IE-S1	1SIMOV-FO-1115E	1EEBUS-UM-1H1-2N	HEP-1FRC:1-11-S1	
26	1.4931E-9	IE-S1	1CHPAT-FS-1CHP1A	1CHPAT-UM-1CHPBC	HEP-1FRC:1-11-S1	
27	1.4370E-9	IE-S1	1SWTCV-CC-102BC	1CHPAT-FR-24HP1A	HEP-1FRC:1-11-S1	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                   S2P04.MGP           12:16   9/28/1992
Top event unavailability          =    2.450E-6
Number of cut sets in equation    =         400
Cutoff value used last step       =    1.000E-11
Longest cut set (# of events)     =           6
Basic Event Data file referenced  =     NAPS1
```

1	4.9727E-7	IE-S2	C-FM01	1SIPSB-CC-FS1A1B	
2	3.9341E-7	IE-S2	C-FM01	1SIMOV-CC-1860AB	
3	1.1983E-7	IE-S2	C-FM01	1SIMOV-FO-1862B	1SIMOV-FO-1862A
4	1.1983E-7	IE-S2	C-FM01	1SIMOV-FC-1860A	1SIMOV-FO-1862B
5	1.1983E-7	IE-S2	C-FM01	1SIMOV-FC-1860B	1SIMOV-FC-1860A
6	1.1983E-7	IE-S2	C-FM01	1SIMOV-FO-1862A	1SIMOV-FC-1860B
7	6.3890E-8	IE-S2	C-FM01	1SICKV-CC-FC116	
8	6.3890E-8	IE-S2	C-FM01	1SICKV-CC-FC1229	
9	6.3890E-8	IE-S2	C-FM01	1SICKV-CC-FC926	
10	4.9854E-8	IE-S2	C-FM01	1SIMOV-FC-1860A	1SIPSB-UM-1SIP1B
11	4.9854E-8	IE-S2	C-FM01	1SIPSB-UM-1SIP1B	1SIMOV-FO-1862A
12	4.9854E-8	IE-S2	C-FM01	1SIMOV-FO-1862B	1SIPSB-UM-1SIP1A
13	4.9854E-8	IE-S2	C-FM01	1SIPSB-UM-1SIP1A	1SIMOV-FC-1860B
14	4.4156E-8	IE-S2	C-FM01	1SIMOV-FC-1860A	1SIPSB-FS-1SIP1B
15	4.4156E-8	IE-S2	C-FM01	1SIMOV-FO-1862B	1SIPSB-FS-1SIP1A
16	4.4156E-8	IE-S2	C-FM01	1SIPSB-FS-1SIP1A	1SIMOV-FC-1860B
17	4.4156E-8	IE-S2	C-FM01	1SIPSB-FS-1SIP1B	1SIMOV-FO-1862A
18	1.8371E-8	IE-S2	C-FM01	1SIPSB-UM-1SIP1B	1SIPSB-FS-1SIP1A
19	1.8371E-8	IE-S2	C-FM01	1SIPSB-FS-1SIP1B	1SIPSB-UM-1SIP1A
20	1.6271E-8	IE-S2	C-FM01	1SIPSB-FS-1SIP1B	1SIPSB-FS-1SIP1A
21	1.4914E-8	IE-S2	C-FM01	1SIMOV-FC-1860A	1SIMOV-PG-1860B
22	1.4914E-8	IE-S2	C-FM01	1SIMOV-FO-1862B	1SIMOV-PG-1860A
23	1.4914E-8	IE-S2	C-FM01	1SIMOV-PG-1860B	1SIMOV-FO-1862A
24	1.4914E-8	IE-S2	C-FM01	1SIMOV-PG-1860A	1SIMOV-FC-1860B
25	9.0191E-9	IE-S2	C-FM01	1SIMOV-FC-1860B	1SIMOV-PG-1864A

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

S2P35.MGP 12:13 9/28/1992

Top event unavailability = 5.152E-6
Number of cut sets in equation = 974
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 7
Basic Event Data file referenced = NAPS1

1	1.3887E-6	IE-S2	1QSMV--PG-1QS38	C-Y02		
2	1.3044E-6	IE-S2	1SICKV-CC-838689	C-Y02		
3	1.0710E-7	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SIPSB-UM-1SIP1A
4	1.0710E-7	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SIPSB-UM-1SIP1B
5	9.4855E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SIPSB-FS-1SIP1B
6	9.4855E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SIPSB-FS-1SIP1A
7	7.4572E-8	IE-S2	1SWTCV-FC-SW102B	1EEBUS-UM-DC-I	C-Y02	
8	5.9176E-8	IE-S2	1SICKV-FC-1S147	C-Y02	1SIPSB-UM-1SIP1A	
9	5.9176E-8	IE-S2	1SICKV-FC-1S147	C-Y02	1SIPSB-UM-1SIP1B	
10	5.2412E-8	IE-S2	1SICKV-FC-1S147	C-Y02	1SIPSB-FS-1SIP1A	
11	5.2412E-8	IE-S2	1SICKV-FC-1S147	C-Y02	1SIPSB-FS-1SIP1B	
12	4.6374E-8	IE-S2	1CHPAT-CC-FS1ABC	C-Y02	1SIPSB-UM-1SIP1B	
13	4.6374E-8	IE-S2	1CHPAT-CC-FS1ABC	C-Y02	1SIPSB-UM-1SIP1A	
14	4.1073E-8	IE-S2	1CHPAT-CC-FS1ABC	C-Y02	1SIPSB-FS-1SIP1A	
15	4.1073E-8	IE-S2	1CHPAT-CC-FS1ABC	C-Y02	1SIPSB-FS-1SIP1B	
16	3.6438E-8	IE-S2	1SIMOV-CC-1115BD	C-Y02	1SIPSB-UM-1SIP1A	
17	3.6438E-8	IE-S2	1SIMOV-CC-1115CE	C-Y02	1SIPSB-UM-1SIP1B	
18	3.6438E-8	IE-S2	1SIMOV-CC-867836	C-Y02	1SIPSB-UM-1SIP1A	
19	3.6438E-8	IE-S2	1SIMOV-CC-1115CE	C-Y02	1SIPSB-UM-1SIP1A	
20	3.6438E-8	IE-S2	1SIMOV-CC-1115BD	C-Y02	1SIPSB-UM-1SIP1B	
21	3.6438E-8	IE-S2	1SIMOV-CC-867836	C-Y02	1SIPSB-UM-1SIP1B	
22	3.2273E-8	IE-S2	1SIMOV-CC-867836	C-Y02	1SIPSB-FS-1SIP1A	
23	3.2273E-8	IE-S2	1SIMOV-CC-1115BD	C-Y02	1SIPSB-FS-1SIP1B	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

S2P39.MGP 12:20 9/28/1992
Top event unavailability = 5.200E-7
Number of cut sets in equation = 261
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 6
Basic Event Data file referenced = NAPS1

1	1.9375E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SIMOV-PG-1865A
2	1.9375E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SIMOV-PG-1865B
3	1.9375E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SIMOV-PG-1865C
4	1.4966E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SICKV-FC-1SI125
5	1.4966E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SICKV-FC-1SI142
6	1.4966E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SICKV-FC-1SI127
7	1.4966E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SICKV-FC-1SI161
8	1.4966E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SICKV-FC-1SI159
9	1.4966E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-Y02	1SICKV-FC-1SI144
10	1.0706E-8	IE-S2	1SICKV-FC-1SI47	C-Y02	1SIMOV-PG-1865A	
11	1.0706E-8	IE-S2	1SICKV-FC-1SI47	C-Y02	1SIMOV-PG-1865B	
12	1.0706E-8	IE-S2	1SICKV-FC-1SI47	C-Y02	1SIMOV-PG-1865C	
13	8.3894E-9	IE-S2	1CHPAT-CC-FS1ABC	C-Y02	1SIMOV-PG-1865A	
14	8.3894E-9	IE-S2	1CHPAT-CC-FS1ABC	C-Y02	1SIMOV-PG-1865B	
15	8.3894E-9	IE-S2	1CHPAT-CC-FS1ABC	C-Y02	1SIMOV-PG-1865C	
16	8.2693E-9	IE-S2	1SICKV-FC-1SI47	C-Y02	1SICKV-FC-1SI161	
17	8.2693E-9	IE-S2	1SICKV-FC-1SI47	C-Y02	1SICKV-FC-1SI125	
18	8.2693E-9	IE-S2	1SICKV-FC-1SI47	C-Y02	1SICKV-FC-1SI159	
19	8.2693E-9	IE-S2	1SICKV-FC-1SI47	C-Y02	1SICKV-FC-1SI127	
20	8.2693E-9	IE-S2	1SICKV-FC-1SI47	C-Y02	1SICKV-FC-1SI144	
21	8.2693E-9	IE-S2	1SICKV-FC-1SI47	C-Y02	1SICKV-FC-1SI142	
22	6.5920E-9	IE-S2	1SIMOV-CC-1115CE	C-Y02	1SIMOV-PG-1865A	
23	6.5920E-9	IE-S2	1SIMOV-CC-1115BD	C-Y02	1SIMOV-PG-1865C	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

S2P43.MGP 12:18 9/28/1992

Top event unavailability = 1.188E-6
Number of cut sets in equation = 589
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 8
Basic Event Data file referenced = NAPS1

1	2.5592E-7	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	HEP-1FRC:1-11-S2	
2	1.4141E-7	IE-S2	1SICKV-FC-1S147	HEP-1FRC:1-11-S2		
3	1.1081E-7	IE-S2	1CHPAT-CC-FS1ABC	HEP-1FRC:1-11-S2		
4	8.7072E-8	IE-S2	1SIMOV-CC-867836	HEP-1FRC:1-11-S2		
5	8.7072E-8	IE-S2	1SIMOV-CC-1115BD	HEP-1FRC:1-11-S2		
6	8.7072E-8	IE-S2	1SIMOV-CC-1115CE	HEP-1FRC:1-11-S2		
7	2.6521E-8	IE-S2	1SIMOV-FO-1115E	1SIMOV-FO-1115C	HEP-1FRC:1-11-S2	
8	2.6521E-8	IE-S2	1SIMOV-FC-1115D	1SIMOV-FC-1115B	HEP-1FRC:1-11-S2	
9	2.4061E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1MSRV--CC-101ABC	
10	1.5054E-8	IE-S2	1QSMV--PG-1QS38	HEP-1FRC:1-11-S2		
11	1.4141E-8	IE-S2	1SICKV-CC-838689	HEP-1FRC:1-11-S2		
12	1.4141E-8	IE-S2	1SICKV-CC-79185	HEP-1FRC:1-11-S2		
13	1.3295E-8	IE-S2	1SICKV-FC-1S147	1MSRV--CC-101ABC		
14	1.2770E-8	IE-S2	1SWTCV-FC-SW102B	1EE-BAT-I-2HR	1EEBKR-SO-15H8	1EE-BAT-II-2HR
15	1.2770E-8	IE-S2	1SWTCV-FC-SW102B	1EE-BAT-I-2HR	1EEBKR-SO-14H1	1EE-BAT-II-2HR
16	1.2770E-8	IE-S2	1SWTCV-FC-SW102B	1EE-BAT-I-2HR	1EEBKR-SO-14H2	1EE-BAT-II-2HR
17	1.0419E-8	IE-S2	1CHPAT-CC-FS1ABC	1MSRV--CC-101ABC		
18	1.0036E-8	IE-S2	1SIMV--PG-1S146	HEP-1FRC:1-11-S2		
19	8.1865E-9	IE-S2	1SIMOV-CC-1115BD	1MSRV--CC-101ABC		
20	8.1865E-9	IE-S2	1SIMOV-CC-867836	1MSRV--CC-101ABC		
21	8.1865E-9	IE-S2	1SIMOV-CC-1115CE	1MSRV--CC-101ABC		
22	7.6835E-9	IE-S2	1EEBKR-SO-15H8	1SIMOV-FC-1115B	1EE-BAT-II-2HR	1EE-BAT-I-2HR
23	7.6835E-9	IE-S2	1SIMOV-FO-1115E	1EEBKR-SO-15H8	1EE-BAT-II-2HR	1EE-BAT-I-2HR
24	7.6835E-9	IE-S2	1SIMOV-FC-1115B	1EEBKR-SO-14H1	1EE-BAT-II-2HR	1EE-BAT-I-2HR
25	7.6835E-9	IE-S2	1EEBKR-SO-14H1	1SIMOV-FO-1115E	1EE-BAT-II-2HR	1EE-BAT-I-2HR
26	7.2263E-9	IE-S2	1SWTCV-FC-SW102B	1EE-BAT-I-2HR	1EETFM-LP-1H	1EE-BAT-II-2HR
27	4.6216E-9	IE-S2	1SWTCV-FC-SW102B	1EE-BAT-I-2HR	1EEBUS-LU-1H1	1EE-BAT-II-2HR
28	4.6216E-9	IE-S2	1SWTCV-FC-SW102B	1EE-BAT-I-2HR	1EEBUS-LU-1H1-4	1EE-BAT-II-2HR
29	4.6216E-9	IE-S2	1SWTCV-FC-SW102B	1EE-BAT-I-2HR	1EEBUS-LU-1H-480	1EE-BAT-II-2HR
30	4.6216E-9	IE-S2	1EEBUS-LU-1H	1SWTCV-FC-SW102B	1EE-BAT-I-2HR	1EE-BAT-II-2HR

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

S2P47.MGP 12:22 9/28/1992

Top event unavailability = 3.248E-7
Number of cut sets in equation = 1081
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 6
Basic Event Data file referenced = NAPS1

1	1.3926E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2
2	1.3926E-8	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2
3	8.4872E-9	IE-S2	1SWTCV-FC-SW102B	1EEBUS-UM-DC-I	1FWTRB-FR-24HP2	
4	7.6949E-9	IE-S2	1SICKV-FC-1S147	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	
5	7.6949E-9	IE-S2	1SICKV-FC-1S147	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	
6	6.0301E-9	IE-S2	1CHPAT-CC-FS1ABC	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	
7	6.0301E-9	IE-S2	1CHPAT-CC-FS1ABC	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	
8	4.7381E-9	IE-S2	1SIMOV-CC-867836	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	
9	4.7381E-9	IE-S2	1SIMOV-CC-1115BD	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	
10	4.7381E-9	IE-S2	1SIMOV-CC-867836	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	
11	4.7381E-9	IE-S2	1SIMOV-CC-1115CE	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	
12	4.7381E-9	IE-S2	1SIMOV-CC-1115CE	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	
13	4.7381E-9	IE-S2	1SIMOV-CC-1115BD	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	
14	4.2542E-9	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3A
15	4.2542E-9	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3B
16	4.2151E-9	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	HEP-1AP22:5	
17	3.4161E-9	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1FWPSB-CC-MDP3AB	
18	2.3782E-9	IE-S2	1EEBUS-UM-DC-I	1CHPAT-FS-1CHP1B	1FWTRB-FR-24HP2	
19	2.3507E-9	IE-S2	1SICKV-FC-1S147	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3A	
20	2.3507E-9	IE-S2	1SICKV-FC-1S147	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3B	
21	2.3291E-9	IE-S2	1SICKV-FC-1S147	HEP-1AP22:5		
22	2.3154E-9	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1FWTRB-FS-1FWP2	1FWPSB-UM-1FWP3A
23	2.3154E-9	IE-S2	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1FWTRB-FS-1FWP2	1FWPSB-UM-1FWP3B

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1AP02.MGP 12:19 9/28/1992
Top event unavailability = 6.511E-7
Number of cut sets in equation = 43
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 5
Basic Event Data file referenced = NAPS1

1	7.2787E-8	IE-T1	1EGEDG-CC-1H-1J	NON-REC-B16	C-B117	
2	6.9783E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	NON-REC-B16	C-B117
3	6.9783E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	NON-REC-B16	C-B117
4	6.4757E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	NON-REC-B16	C-B117
5	6.4757E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	NON-REC-B16	C-B117
6	5.6168E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	NON-REC-B16	C-B117
7	5.2123E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	NON-REC-B16	C-B117
8	5.2123E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	NON-REC-B16	C-B117
9	4.8368E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FR-1J	NON-REC-B16	C-B117
10	2.6174E-8	IE-T1	1EGEDG-CC-1H1J2H	NON-REC-B16	C-B117	
11	2.6174E-8	IE-T1	1EGEDG-CC-1H1J2J	NON-REC-B16	C-B117	
12	1.6645E-8	IE-T1	1EGEDG-CC-ALL	NON-REC-B16	C-B117	
13	2.2365E-9	IE-T1	1EGEDG-TM-1H	1EGEDG-FS-1J	NON-REC-B16	C-B117
14	2.2365E-9	IE-T1	1EGEDG-FS-1H	1EGEDG-TM-1J	NON-REC-B16	C-B117
15	2.0754E-9	IE-T1	1EGEDG-TM-1H	1EGEDG-FR-1J	NON-REC-B16	C-B117
16	2.0754E-9	IE-T1	1EGEDG-FR-1H	1EGEDG-TM-1J	NON-REC-B16	C-B117
17	1.3314E-9	IE-T1	1EEBKR-FO-15H2	1EGEDG-UM-1J	NON-REC-B16	C-B117
18	1.3314E-9	IE-T1	1EGEDG-UM-1H	1EEBKR-FO-15J2	NON-REC-B16	C-B117
19	1.2963E-9	IE-T1	1EGEDG-UM-1H	1EGEDG-CC-1J-2H	NON-REC-B16	C-B117
20	1.2963E-9	IE-T1	1EGEDG-CC-1H-2J	1EGEDG-UM-1J	NON-REC-B16	C-B117
21	1.2963E-9	IE-T1	1EGEDG-UM-1H	1EGEDG-CC-1J-2J	NON-REC-B16	C-B117
22	1.2963E-9	IE-T1	1EGEDG-CC-1H-2H	1EGEDG-UM-1J	NON-REC-B16	C-B117
23	1.0717E-9	IE-T1	1EEBKR-FO-15H2	1EGEDG-FS-1J	NON-REC-B16	C-B117

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1AP07.MGP 12:17 9/28/1992

Top event unavailability	=	1.385E-6
Number of cut sets in equation	=	59
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	5
Basic Event Data file referenced	=	NAPS1

1	1.5465E-7	IE-T1	1EGEDG-CC-1H-1J	NON-REC-B16	NON-REC-B117	
2	1.4827E-7	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	NON-REC-B16	NON-REC-B117
3	1.4827E-7	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	NON-REC-B16	NON-REC-B117
4	1.3759E-7	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	NON-REC-B16	NON-REC-B117
5	1.3759E-7	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	NON-REC-B16	NON-REC-B117
6	1.1934E-7	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	NON-REC-B16	NON-REC-B117
7	1.1075E-7	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	NON-REC-B16	NON-REC-B117
8	1.1075E-7	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	NON-REC-B16	NON-REC-B117
9	1.0277E-7	IE-T1	1EGEDG-FR-1H	1EGEDG-FR-1J	NON-REC-B16	NON-REC-B117
10	5.5612E-8	IE-T1	1EGEDG-CC-1H1J2J	NON-REC-B16	NON-REC-B117	
11	5.5612E-8	IE-T1	1EGEDG-CC-1H1J2H	NON-REC-B16	NON-REC-B117	
12	3.5366E-8	IE-T1	1EGEDG-CC-ALL	NON-REC-B16	NON-REC-B117	
13	4.7519E-9	IE-T1	1EGEDG-TM-1H	1EGEDG-FS-1J	NON-REC-B16	NON-REC-B117
14	4.7519E-9	IE-T1	1EGEDG-FS-1H	1EGEDG-TM-1J	NON-REC-B16	NON-REC-B117
15	4.4096E-9	IE-T1	1EGEDG-TM-1H	1EGEDG-FR-1J	NON-REC-B16	NON-REC-B117
16	4.4096E-9	IE-T1	1EGEDG-FR-1H	1EGEDG-TM-1J	NON-REC-B16	NON-REC-B117
17	2.8289E-9	IE-T1	1EGEDG-UM-1H	1EEBKR-FO-15J2	NON-REC-B16	NON-REC-B117
18	2.8289E-9	IE-T1	1EEBKR-FO-15H2	1EGEDG-UM-1J	NON-REC-B16	NON-REC-B117
19	2.7544E-9	IE-T1	1EGEDG-UM-1H	1EGEDG-CC-1J-2J	NON-REC-B16	NON-REC-B117
20	2.7544E-9	IE-T1	1EGEDG-CC-1H-2H	1EGEDG-UM-1J	NON-REC-B16	NON-REC-B117
21	2.7544E-9	IE-T1	1EGEDG-UM-1H	1EGEDG-CC-1J-2H	NON-REC-B16	NON-REC-B117
22	2.7544E-9	IE-T1	1EGEDG-CC-1H-2J	1EGEDG-UM-1J	NON-REC-B16	NON-REC-B117
23	2.2770E-9	IE-T1	1EEBKR-FO-15H2	1EGEDG-FS-1J	NON-REC-B16	NON-REC-B117

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1AP26.MGP 12:24 9/28/1992
Top event unavailability = 1.038E-7
Number of cut sets in equation = 43
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 6
Basic Event Data file referenced = NAPS1

1	1.1608E-8	IE-T1	1EGEDG-CC-1H-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111	
2	1.1129E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
3	1.1129E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
4	1.0327E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
5	1.0327E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
6	8.9574E-9	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
7	8.3122E-9	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
8	8.3122E-9	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
9	7.7135E-9	IE-T1	1EGEDG-FR-1H	1EGEDG-FR-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
10	4.1740E-9	IE-T1	1EGEDG-CC-1H1J2H	HEP-1AP15-6	NON-REC-B10	NON-REC-B111	
11	4.1740E-9	IE-T1	1EGEDG-CC-1H1J2J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111	
12	2.6545E-9	IE-T1	1EGEDG-CC-ALL	HEP-1AP15-6	NON-REC-B10	NON-REC-B111	
13	3.5666E-10	IE-T1	1EGEDG-TM-1H	1EGEDG-FS-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
14	3.5666E-10	IE-T1	1EGEDG-FS-1H	1EGEDG-TM-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
15	3.3097E-10	IE-T1	1EGEDG-FR-1H	1EGEDG-TM-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
16	3.3097E-10	IE-T1	1EGEDG-TM-1H	1EGEDG-FR-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
17	2.1233E-10	IE-T1	1EEBKR-FO-15H2	1EGEDG-UM-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
18	2.1233E-10	IE-T1	1EGEDG-UM-1H	1EEBKR-FO-15J2	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
19	2.0673E-10	IE-T1	1EGEDG-UM-1H	1EGEDG-CC-1J-2H	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
20	2.0673E-10	IE-T1	1EGEDG-CC-1H-2J	1EGEDG-UM-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
21	2.0673E-10	IE-T1	1EGEDG-UM-1H	1EGEDG-CC-1J-2J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
22	2.0673E-10	IE-T1	1EGEDG-CC-1H-2H	1EGEDG-UM-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111
23	1.7090E-10	IE-T1	1EEBKR-FO-15H2	1EGEDG-FS-1J	HEP-1AP15-6	NON-REC-B10	NON-REC-B111

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                T1AP46.MGP          12:17   9/28/1992
Top event unavailability        =   1.407E-6
Number of cut sets in equation  =        344
Cutoff value used last step     =   1.000E-11
Longest cut set (# of events)   =          7
Basic Event Data file referenced =   NAPS1
```

1	6.1189E-8	IE-T1	1EGEDG-CC-1H-1J	1FWTRB-FS-1FWP2	NON-REC-B02	C-B103	
2	5.8842E-8	IE-T1	1EGEDG-CC-1H-1J	C-B103	1FWTRB-FR-12HP2	REC-B12AVE	
3	5.8663E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	1FWTRB-FS-1FWP2	NON-REC-B02	C-B103
4	5.8663E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	1FWTRB-FS-1FWP2	NON-REC-B02	C-B103
5	5.6413E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	C-B103	1FWTRB-FR-12HP2	REC-B12AVE
6	5.6413E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	C-B103	1FWTRB-FR-12HP2	REC-B12AVE
7	5.4438E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	1FWTRB-FS-1FWP2	NON-REC-B02	C-B103
8	5.4438E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	1FWTRB-FS-1FWP2	NON-REC-B02	C-B103
9	5.2350E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	C-B103	1FWTRB-FR-12HP2	REC-B12AVE
10	5.2350E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	C-B103	1FWTRB-FR-12HP2	REC-B12AVE
11	4.7218E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	1FWTRB-FS-1FWP2	NON-REC-B02	C-B103
12	4.5407E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	C-B103	1FWTRB-FR-12HP2	REC-B12AVE
13	4.5076E-8	IE-T1	1EGEDG-CC-1H-1J	1FWTRB-UM-1FWP2	NON-REC-B02	C-B103	
14	4.3817E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	1FWTRB-FS-1FWP2	NON-REC-B02	C-B103
15	4.3817E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	1FWTRB-FS-1FWP2	NON-REC-B02	C-B103
16	4.2137E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	C-B103	1FWTRB-FR-12HP2	REC-B12AVE
17	4.2137E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	C-B103	1FWTRB-FR-12HP2	REC-B12AVE
18	4.0661E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FR-1J	1FWTRB-FS-1FWP2	NON-REC-B02	C-B103
19	3.9102E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FR-1J	C-B103	1FWTRB-FR-12HP2	REC-B12AVE
20	3.4784E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	1FWTRB-UM-1FWP2	NON-REC-B02	C-B103
21	3.2279E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	1FWTRB-UM-1FWP2	NON-REC-B02	C-B103
22	3.2279E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	1FWTRB-UM-1FWP2	NON-REC-B02	C-B103
23	2.9954E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FR-1J	1FWTRB-UM-1FWP2	NON-REC-B02	C-B103

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1AP51.MGP 12:15 9/28/1992

Top event unavailability = 2.990E-6
Number of cut sets in equation = 401
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 7
Basic Event Data file referenced = NAPS1

1	1.3001E-7	IE-T1	1EGEDG-CC-1H-1J	1FWTRB-FS-1FWP2	NON-REC-B02	NON-REC-B103	
2	1.2502E-7	IE-T1	1EGEDG-CC-1H-1J	NON-REC-B103	1FWTRB-FR-12HP2	REC-B12AVE	
3	1.2464E-7	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	1FWTRB-FS-1FWP2	NON-REC-B02	NON-REC-B103
4	1.2464E-7	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	1FWTRB-FS-1FWP2	NON-REC-B02	NON-REC-B103
5	1.1986E-7	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	NON-REC-B103	1FWTRB-FR-12HP2	REC-B12AVE
6	1.1986E-7	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	NON-REC-B103	1FWTRB-FR-12HP2	REC-B12AVE
7	1.1567E-7	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	1FWTRB-FS-1FWP2	NON-REC-B02	NON-REC-B103
8	1.1567E-7	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	1FWTRB-FS-1FWP2	NON-REC-B02	NON-REC-B103
9	1.1123E-7	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	NON-REC-B103	1FWTRB-FR-12HP2	REC-B12AVE
10	1.1123E-7	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	NON-REC-B103	1FWTRB-FR-12HP2	REC-B12AVE
11	1.0033E-7	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	1FWTRB-FS-1FWP2	NON-REC-B02	NON-REC-B103
12	9.6477E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	NON-REC-B103	1FWTRB-FR-12HP2	REC-B12AVE
13	9.5773E-8	IE-T1	1EGEDG-CC-1H-1J	1FWTRB-UM-1FWP2	NON-REC-B02	NON-REC-B103	
14	9.3099E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	1FWTRB-FS-1FWP2	NON-REC-B02	NON-REC-B103
15	9.3099E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	1FWTRB-FS-1FWP2	NON-REC-B02	NON-REC-B103
16	8.9528E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	NON-REC-B103	1FWTRB-FR-12HP2	REC-B12AVE
17	8.9528E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	NON-REC-B103	1FWTRB-FR-12HP2	REC-B12AVE
18	8.6394E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FR-1J	1FWTRB-FS-1FWP2	NON-REC-B02	NON-REC-B103
19	8.3080E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FR-1J	NON-REC-B103	1FWTRB-FR-12HP2	REC-B12AVE
20	7.3906E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	1FWTRB-UM-1FWP2	NON-REC-B02	NON-REC-B103
21	6.8583E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	1FWTRB-UM-1FWP2	NON-REC-B02	NON-REC-B103
22	6.8583E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	1FWTRB-UM-1FWP2	NON-REC-B02	NON-REC-B103
23	6.3644E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FR-1J	1FWTRB-UM-1FWP2	NON-REC-B02	NON-REC-B103

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                  T1AP58.MGP            12:21   9/28/1992
Top event unavailability            =   4.171E-7
Number of cut sets in equation      =        114
Cutoff value used last step         =   1.000E-11
Longest cut set (# of events)       =          7
Basic Event Data file referenced    =    NAPS1
```

1	2.3289E-8	IE-T1	1EGEDG-CC-1H-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	C-B102	
2	2.3289E-8	IE-T1	1EGEDG-CC-1H-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	C-B102	
3	2.2327E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	C-B102
4	2.2327E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	C-B102
5	2.2327E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	C-B102
6	2.2327E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	C-B102
7	2.0719E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	C-B102
8	2.0719E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	C-B102
9	2.0719E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	C-B102
10	2.0719E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	C-B102
11	1.7971E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	C-B102
12	1.7971E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	C-B102
13	1.6677E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	C-B102
14	1.6677E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	C-B102
15	1.6677E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	C-B102
16	1.6677E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	C-B102

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1AP67.MGP 12:19 9/28/1992

Top event unavailability	=	8.864E-7
Number of cut sets in equation	=	132
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	7
Basic Event Data file referenced	=	NAPS1

1	4.9482E-8	IE-T1	1EGEDG-CC-1H-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102	
2	4.9482E-8	IE-T1	1EGEDG-CC-1H-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102	
3	4.7440E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
4	4.7440E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FS-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
5	4.7440E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
6	4.7440E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-UM-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
7	4.4023E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
8	4.4023E-8	IE-T1	1EGEDG-UM-1H	1EGEDG-FR-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
9	4.4023E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-UM-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
10	4.4023E-8	IE-T1	1EGEDG-FR-1H	JEGEDG-UM-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
11	3.8184E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
12	3.8184E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FS-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
13	3.5434E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
14	3.5434E-8	IE-T1	1EGEDG-FS-1H	1EGEDG-FR-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
15	3.5434E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	1RCRV--FO-1456	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102
16	3.5434E-8	IE-T1	1EGEDG-FR-1H	1EGEDG-FS-1J	1RCRV--FO-1455C	1RCPORV-DMDSBO	NON-REC-B01	NON-REC-B102

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

	T1P06.MGP	12:23 9/28/1992
Top event unavailability	=	1.690E-7
Number of cut sets in equation	=	187
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	7
Basic Event Data file referenced	=	NAPS1

1	9.5488E-9	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H		1FWTRB-FR-24HP2	C-P02	C-D102	1SIMOV-FC-1863B
2	9.5488E-9	IE-T1	1EGEDG-FS-1J	1FWPSB-UM-1FWP3A		1FWTRB-FR-24HP2	C-P02	C-D102	1SIMOV-FC-1863A
3	8.8610E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A		1EGEDG-FR-1J	C-P02	C-D102	1SIMOV-FC-1863A
4	8.8610E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H		1FWPSB-UM-1FWP3B	C-P02	C-D102	1SIMOV-FC-1863B
5	3.6241E-9	IE-T1	1FWPSB-FS-1FWP3B	1EGEDG-UM-1H		1FWTRB-FR-24HP2	C-P02	C-D102	1SIMOV-FC-1863B
6	3.6241E-9	IE-T1	1EGEDG-UM-1J	1FWPSB-FS-1FWP3A		1FWTRB-FR-24HP2	C-P02	C-D102	1SIMOV-FC-1863A
7	3.5908E-9	IE-T1	HEP-1AP22:5	C-P02	C-D102	1EGEDG-UM-1H	1SIMOV-FC-1863B		
8	3.5908E-9	IE-T1	HEP-1AP22:5	C-P02	C-D102	1EGEDG-UM-1J	1SIMOV-FC-1863A		
9	3.0146E-9	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H		1FWTRB-FR-24HP2	C-P02	C-D102	1SICKV-FO-1S147
10	3.0146E-9	IE-T1	1EGEDG-FS-1J	1EWPSB-UM-1FWP3A		1FWTRB-FR-24HP2	C-P02	C-D102	1SICKV-FO-1S147
11	2.9170E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3A		1EGEDG-FS-1J	C-P02	C-D102	1SIMOV-FC-1863A
12	2.9170E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FS-1H		1FWPSB-FS-1FWP3B	C-P02	C-D102	1SIMOV-FC-1863B
13	2.8902E-9	IE-T1	HEP-1AP22:5	C-P02	C-D102	1EGEDG-FS-1H	1SIMOV-FC-1863B		
14	2.8902E-9	IE-T1	HEP-1AP22:5	C-P02	C-D102	1EGEDG-FS-1J	1SIMOV-FC-1863A		
15	2.7975E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1EGEDG-FR-1J	C-P02	C-D102	1SICKV-FO-1S147	
16	2.7975E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1FWPSB-UM-1FWP3B	C-P02	C-D102	1SICKV-FO-1S147	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1P07.MGP 12:20 9/28/1992
Top event unavailability = 5.657E-7
Number of cut sets in equation = 714
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 9
Basic Event Data file referenced = NAPS1

1	1.0682E-8	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02	C-D102	HEP-1ES1:3	1EE-BAT-II-2HR	1EE-BAT-I-2HR
2	1.0682E-8	IE-T1	1EGEDG-FS-1J	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	C-P02	C-D102	HEP-1ES1:3	1EE-BAT-IV-2HR	1EE-BAT-III-2HR
3	9.9131E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1EGEDG-FR-1J	C-P02	C-D102	1EE-BAT-III-2HR	1EE-BAT-IV-2HR	HEP-1ES1:3
4	9.9131E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1FWPSB-UM-1FWP3B	C-P02	C-D102	1EE-BAT-I-2HR	1EE-BAT-II-2HR	HEP-1ES1:3
5	9.5488E-9	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02	C-D102	1SIMOV-FC-1860B		
6	9.5488E-9	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02	C-D102	1SIMOV-FO-1862B		
7	9.5488E-9	IE-T1	1EGEDG-FS-1J	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	C-P02	C-D102	1SIMOV-FO-1862A		
8	9.5488E-9	IE-T1	1EGEDG-FS-1J	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	C-P02	C-D102	1SIMOV-FC-1860A		
9	9.1229E-9	IE-T1	HEP-1AP22:5	C-P02	C-D102	1SIPSB-CC-FS1A1B				
10	8.8610E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1EGEDG-FR-1J	C-P02	C-D102	1SIMOV-FC-1860A		
11	8.8610E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1EGEDG-FR-1J	C-P02	C-D102	1SIMOV-FO-1862A		
12	8.8610E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1FWPSB-UM-1FWP3B	C-P02	C-D102	1SIMOV-FO-1862B		
13	8.8610E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1FWPSB-UM-1FWP3B	C-P02	C-D102	1SIMOV-FC-1860B		
14	7.2176E-9	IE-T1	HEP-1AP22:5	C-P02		C-D102	1SIMOV-CC-1860AB			
15	4.0543E-9	IE-T1	1EGEDG-UM-1J	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	C-P02	C-D102	1EE-BAT-III-2HR	1EE-BAT-IV-2HR	HEP-1ES1:3
16	4.0543E-9	IE-T1	1FWPSB-FS-1FWP3B	1EGEDG-UM-1H	1FWTRB-FR-24HP2	C-P02	C-D102	1EE-BAT-I-2HR	1EE-BAT-II-2HR	HEP-1ES1:3

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T1P10.MGP              12:15   9/28/1992
Top event unavailability          =    2.705E-6
Number of cut sets in equation    =        1031
Cutoff value used last step       =    1.000E-11
Longest cut set (# of events)     =           7
Basic Event Data file referenced  =     NAPS1
```

1	9.4898E-7	IE-T1	HEP-1AP22:5	C-P02	HEP-1FRH:1-11		
2	3.4380E-7	IE-T1	1FWCKV-CC-ALLAFW	C-P02	HEP-1FRH:1-11		
3	8.5780E-8	IE-T1	1FWTRB-FR-24HP2	1FWPSB-CC-MDP3AB	C-P02	HEP-1FRH:1-11	
4	5.4228E-8	IE-T1	1FWCKV-LEAKAGE	C-P02	HEP-1FRH:1-11		
5	4.4945E-8	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02	HEP-1FRH:1-11
6	4.4945E-8	IE-T1	1EGEDG-FS-1J	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	C-P02	HEP-1FRH:1-11
7	4.1708E-8	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1FWPSB-UM-1FWP3B	C-P02	HEP-1FRH:1-11
8	4.1708E-8	IE-T1	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1EGEDG-FR-1J	C-P02	HEP-1FRH:1-11
9	2.2567E-8	IE-T1	HEP-1AP22:5	C-P02	1CHCKV-FO-1CH254	HEP-NO-PROCEDURE	
10	1.7058E-8	IE-T1	1FWPSB-FS-1FWP3B	1EGEDG-UM-1H	1FWTRB-FR-24HP2	C-P02	HEP-1FRH:1-11
11	1.7058E-8	IE-T1	1EGEDG-UM-1J	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	C-P02	HEP-1FRH:1-11
12	1.6883E-8	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02	1SWTCV-FC-SW102B
13	1.5667E-8	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1FWPSB-UM-1FWP3B	C-P02	1SWTCV-FC-SW102B
14	1.4262E-8	IE-T1	1FWPSB-CC-MDP3AB	1FWTRB-FS-1FWP2	C-P02	HEP-1FRH:1-11	
15	1.3730E-8	IE-T1	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3A	1EGEDG-FS-1J	C-P02	HEP-1FRH:1-11
16	1.3730E-8	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FS-1H	1FWPSB-FS-1FWP3B	C-P02	HEP-1FRH:1-11
17	1.2741E-8	IE-T1	1EGEDG-FR-1J	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	C-P02	HEP-1FRH:1-11
18	1.2741E-8	IE-T1	1FWPSB-FS-1FWP3B	1EGEDG-FR-1H	1FWTRB-FR-24HP2	C-P02	HEP-1FRH:1-11
19	1.2470E-8	IE-T1	HEP-1AP22:5	C-P02	1SICKV-FC-1SI47		
20	1.0506E-8	IE-T1	1FWTRB-UM-1FWP2	1FWPSB-CC-MDP3AB	C-P02	HEP-1FRH:1-11	
21	1.0158E-8	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02	1SIMOV-FO-1115E
22	1.0158E-8	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02	1SIMOV-FC-1115B
23	1.0158E-8	IE-T1	1EGEDG-FS-1J	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	C-P02	1SIMOV-FO-1115C

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1P14.MGP 12:22 9/28/1992

Top event unavailability = 2.070E-7
Number of cut sets in equation = 200
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 7
Basic Event Data file referenced = NAPS1

1	3.5944E-8	IE-T1	1EEBUS-UM-DC-III	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02		
2	3.5944E-8	IE-T1	1EGEDG-FS-1J	1EEBUS-UM-DC-I	1FWTRB-FR-24HP2	C-P02		
3	3.3355E-8	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1EEBUS-UM-DC-III	C-P02		
4	3.3355E-8	IE-T1	1FWTRB-FR-24HP2	1EEBUS-UM-DC-I	1EGEDG-FR-1J	C-P02		
5	5.9761E-9	IE-T1	1FWTRB-FS-1FWP2	1EEBUS-UM-DC-I	1EGEDG-FS-1J	C-P02		
6	5.9761E-9	IE-T1	1FWTRB-FS-1FWP2	1EGEDG-FS-1H	1EEBUS-UM-DC-III	C-P02		
7	5.5457E-9	IE-T1	1FWTRB-FS-1FWP2	1EEBUS-UM-DC-I	1EGEDG-FR-1J	C-P02		
8	5.5457E-9	IE-T1	1EEBUS-UM-DC-III	1EGEDG-FR-1H	1FWTRB-FS-1FWP2	C-P02		
9	2.7123E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-UM-1H	1EEBUS-LU-DC-III	C-P02		
10	2.7123E-9	IE-T1	1EGEDG-UM-1J	1EEBUS-LU-DC-I	1FWTRB-FR-24HP2	C-P02		
11	2.1831E-9	IE-T1	1EGEDG-FS-1J	1EEBUS-LU-DC-I	1FWTRB-FR-24HP2	C-P02		
12	2.1831E-9	IE-T1	1EEBUS-LU-DC-III	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02		
13	2.0259E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1EEBUS-LU-DC-III	C-P02		
14	2.0259E-9	IE-T1	1EGEDG-FR-1J	1EEBUS-LU-DC-I	1FWTRB-FR-24HP2	C-P02		
15	1.2684E-9	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02	HEP-1FRH:1-11	1QSSTR-PG-1FL1B
16	1.2684E-9	IE-T1	1EGEDG-FS-1J	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	C-P02	HEP-1FRH:1-11	1QSSTR-PG-1FL1A
17	1.1771E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1FWPSB-UM-1FWP3B	C-P02	HEP-1FRH:1-11	1QSSTR-PG-1FL1B
18	1.1771E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1EGEDG-FR-1J	C-P02	HEP-1FRH:1-11	1QSSTR-PG-1FL1A
19	7.5585E-10	IE-T1	HEP-1AP22:5	C-P02	HEP-1FRH:1-11	1QSSTR-PG-1FL1B	1QSSTR-PG-1FL1A	
20	4.9007E-10	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	C-P02	HEP-1FRH:1-11	1QSMOV-FC-101B

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1P15.MGP		12:21 9/28/1992
Top event unavailability	=	5.158E-7
Number of cut sets in equation	=	461
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	7
Basic Event Data file referenced	=	NAPS1

1	1.6440E-7	IE-T1	HEP-1AP22:5	HEP-1FRH:1-15			
2	5.9559E-8	IE-T1	1FWCKV-CC-ALLAFW	HEP-1FRH:1-15			
3	1.9906E-8	IE-T1	HEP-1AP22:5	1RCRV--CC-RCPORV			
4	1.4860E-8	IE-T1	1FWTRB-FR-24HP2	1FWPSB-CC-MDP3AB	HEP-1FRH:1-15		
5	9.4278E-9	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	1RCRV--FC-1456	1EE-BAT-I-2HR
6	9.4278E-9	IE-T1	1EGEDG-FS-1J	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	1EE-BAT-III-2HR	1RCRV--FC-1455C
7	9.3943E-9	IE-T1	1FWCKV-LEAKAGE	HEP-1FRH:1-15			
8	8.7488E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1EGEDG-FR-1J	1RCRV--FC-1455C	1EE-BAT-III-2HR
9	8.7488E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1FWPSB-UM-1FWP3B	1EE-BAT-I-2HR	1RCRV--FC-1456
10	7.7861E-9	IE-T1	1FWPSB-UM-1FWP3B	1EGEDG-FS-1H	1FWTRB-FR-24HP2	HEP-1FRH:1-15	
11	7.7861E-9	IE-T1	1EGEDG-FS-1J	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	HEP-1FRH:1-15	
12	7.2253E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1EGEDG-FR-1J	HEP-1FRH:1-15	
13	7.2253E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1FWPSB-UM-1FWP3B	HEP-1FRH:1-15	
14	7.2117E-9	IE-T1	1FWCKV-CC-ALLAFW	1RCRV--CC-RCPORV			
15	3.5782E-9	IE-T1	1EGEDG-UM-1J	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	1RCRV--FC-1455C	1EE-BAT-III-2HR
16	3.5782E-9	IE-T1	1FWPSB-FS-1FWP3B	1EGEDG-UM-1H	1FWTRB-FR-24HP2	1EE-BAT-I-2HR	1RCRV--FC-1456
17	3.5453E-9	IE-T1	HEP-1AP22:5	1RCRV--FC-1455C	1EGEDG-UM-1J	1EE-BAT-III-2HR	
18	3.5453E-9	IE-T1	HEP-1AP22:5	1EGEDG-UM-1H	1EE-BAT-I-2HR	1RCRV--FC-1456	
19	2.9551E-9	IE-T1	1EGEDG-UM-1J	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	HEP-1FRH:1-15	
20	2.9551E-9	IE-T1	1FWPSB-FS-1FWP3B	1EGEDG-UM-1H	1FWTRB-FR-24HP2	HEP-1FRH:1-15	
21	2.8801E-9	IE-T1	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3A	1EGEDG-FS-1J	1EE-BAT-III-2HR	1RCRV--FC-1455C
22	2.8801E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FS-1H	1FWPSB-FS-1FWP3B	1RCRV--FC-1456	1EE-BAT-I-2HR
23	2.8536E-9	IE-T1	HEP-1AP22:5	1RCRV--FC-1456	1EE-BAT-I-2HR	1EGEDG-FS-1H	
24	2.8536E-9	IE-T1	HEP-1AP22:5	1EE-BAT-III-2HR	1EGEDG-FS-1J	1RCRV--FC-1455C	
25	2.6726E-9	IE-T1	1EGEDG-FR-1J	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	1RCRV--FC-1455C	1EE-BAT-III-2HR

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1P19.MGP 12:22 9/28/1992
Top event unavailability = 1.908E-7
Number of cut sets in equation = 181
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 7
Basic Event Data file referenced = NAPS1

1	3.6417E-8	IE-T1	1EEBUS-UM-DC-III	1EGEDG-FS-1H	1FWTRB-FR-24HP2	1EE-BAT-I-2HR
2	3.6417E-8	IE-T1	1EGEDG-FS-1J	1EEBUS-UM-DC-I	1FWTRB-FR-24HP2	1EE-BAT-III-2HR
3	3.3795E-8	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1EEBUS-UM-DC-III	1EE-BAT-I-2HR
4	3.3795E-8	IE-T1	1FWTRB-FR-24HP2	1EEBUS-UM-DC-I	1EGEDG-FR-1J	1EE-BAT-III-2HR
5	6.0548E-9	IE-T1	1FWTRB-FS-1FWP2	1EGEDG-FS-1H	1EEBUS-UM-DC-III	1EE-BAT-I-2HR
6	6.0548E-9	IE-T1	1FWTRB-FS-1FWP2	1EEBUS-UM-DC-I	1EGEDG-FS-1J	1EE-BAT-III-2HR
7	5.6187E-9	IE-T1	1FWTRB-FS-1FWP2	1EEBUS-UM-DC-I	1EGEDG-FR-1J	1EE-BAT-III-2HR
8	5.6187E-9	IE-T1	1EEBUS-UM-DC-III	1EGEDG-FR-1H	1FWTRB-FS-1FWP2	1EE-BAT-I-2HR
9	2.7480E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-UM-1H	1EEBUS-LU-DC-III	1EE-BAT-I-2HR
10	2.7480E-9	IE-T1	1EGEDG-UM-1J	1EEBUS-LU-DC-I	1FWTRB-FR-24HP2	1EE-BAT-III-2HR
11	2.2118E-9	IE-T1	1EGEDG-FS-1J	1EEBUS-LU-DC-I	1FWTRB-FR-24HP2	1EE-BAT-III-2HR
12	2.2118E-9	IE-T1	1EEBUS-LU-DC-III	1EGEDG-FS-1H	1FWTRB-FR-24HP2	1EE-BAT-I-2HR
13	2.0525E-9	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1EEBUS-LU-DC-III	1EE-BAT-I-2HR
14	2.0525E-9	IE-T1	1EGEDG-FR-1J	1EEBUS-LU-DC-I	1FWTRB-FR-24HP2	1EE-BAT-III-2HR
15	9.1032E-10	IE-T1	1EEBUS-UM-DC-III	1EGEDG-FS-1H	1FWTRB-FR-24HP2	1RCMOV-LK-1536
16	9.1032E-10	IE-T1	1EGEDG-FS-1J	1EEBUS-UM-DC-I	1FWTRB-FR-24HP2	1RCMOV-LK-1535
17	8.4475E-10	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1EEBUS-UM-DC-III	1RCMOV-LK-1536
18	8.4475E-10	IE-T1	1FWTRB-FR-24HP2	1EEBUS-UM-DC-I	1EGEDG-FR-1J	1RCMOV-LK-1535
19	3.6374E-10	IE-T1	1EEBUS-UM-DC-III	1EGEDG-FS-1H	1FWTRB-FR-24HP2	1RCRV--FC-1455C
20	3.6374E-10	IE-T1	1EGEDG-FS-1J	1EEBUS-UM-DC-I	1FWTRB-FR-24HP2	1RCRV--FC-1456
21	3.3755E-10	IE-T1	1FWTRB-FR-24HP2	1EGEDG-FR-1H	1EEBUS-UM-DC-III	1RCRV--FC-1455C
22	3.3755E-10	IE-T1	1FWTRB-FR-24HP2	1EEBUS-UM-DC-I	1EGEDG-FR-1J	1RCRV--FC-1456
23	3.0040E-10	IE-T1	1EEBUS-UM-DC-III	1EGEDG-FS-1H	1FWTRB-FR-24HP2	HEP-1FRH:1-15

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T1TRP14.MGP                   12:18   9/28/1992
     Top event unavailability             =    1.014E-6
     Number of cut sets in equation       =         345
     Cutoff value used last step          =    1.000E-11
     Longest cut set (# of events)        =           9
     Basic Event Data file referenced     =     NAPS1
```

1	1.7653E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1MSRV--FC-101C	C-D102	HEP-1ES1:3
2	1.7653E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1RCRV--FC-1456	1EE-BAT-I-2HR	C-D102	HEP-1ES1:3	1EE-BAT-II-2HR
3	1.6381E-8	IE-T1	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1MSRV--FC-101C	1EE-BAT-II-2HR	1EE-BAT-I-2HR	C-D102	HEP-1ES1:3
4	1.6381E-8	IE-T1	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1RCRV--FC-1456	C-D102	1EE-BAT-II-2HR	HEP-1ES1:3
5	1.5779E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1RCRV--FC-1456	1EE-BAT-I-2HR	C-D102	1SIMOV-FO-1862B	
6	1.5779E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1MSRV--FC-101C	C-D102	1SIMOV-FC-1863B
7	1.5779E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1MSRV--FC-101C	C-D102	1SIMOV-FC-1860B
8	1.5779E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1RCRV--FC-1456	1EE-BAT-I-2HR	C-D102	1SIMOV-FC-1860B	
9	1.5779E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1RCRV--FC-1456	1EE-BAT-I-2HR	C-D102	1SIMOV-FC-1863B	
10	1.5779E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1MSRV--FC-101C	C-D102	1SIMOV-FO-1862B
11	1.4643E-8	IE-T1	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1MSRV--FC-101C	1EE-BAT-II-2HR	1EE-BAT-I-2HR	C-D102	1SIMOV-FC-1860B
12	1.4643E-8	IE-T1	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1MSRV--FC-101C	1EE-BAT-II-2HR	1EE-BAT-I-2HR	C-D102	1SIMOV-FC-1863B
13	1.4643E-8	IE-T1	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1RCRV--FC-1456	C-D102	1SIMOV-FC-1860B	
14	1.4643E-8	IE-T1	1EGEDG-FR-1W	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1RCRV--FC-1456	C-D102	1SIMOV-FC-1863B	
15	1.4643E-8	IE-T1	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1RCRV--FC-1456	C-D102	1SIMOV-FO-1862B	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1TRP17.MGP		12:14 9/28/1992
Top event unavailability	=	4.003E-6
Number of cut sets in equation	=	543
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	8
Basic Event Data file referenced	=	NAPS1

1	2.9740E-7	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1EE-BAT-II-2HR	1EE-BAT-I-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
2	2.7598E-7	IE-T1	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1EE-BAT-II-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
3	1.7791E-7	IE-T1	1EGEDG-UM-1H	1HVCHU-FS-1HVE4B	1EE-BAT-I-2HR	1EE-BAT-II-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
4	1.4320E-7	IE-T1	1EGEDG-FS-1H	1HVCHU-FS-1HVE4B	1EE-BAT-II-2HR	1EE-BAT-I-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
5	1.4078E-7	IE-T1	HEP-1FRH:1-11	1IAIAS-LF-OUTIA	REC-1AP28			
6	1.3289E-7	IE-T1	1EGEDG-FR-1H	1HVCHU-FS-1HVE4B	1EE-BAT-I-2HR	1EE-BAT-II-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
7	7.4272E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1RCRV--FC-1456	1EE-BAT-I-2HR	HEP-1FRH:1-11	
8	7.4272E-8	IE-T1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1MSRV--FC-101C	HEP-1FRH:1-11
9	7.0932E-8	IE-T1	1EGEDG-UM-1H	1HVPCV-FC-1235B1	1EE-BAT-I-2HR	1EE-BAT-II-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
10	7.0932E-8	IE-T1	1EGEDG-UM-1H	1HVTCV-FC-TCV167	1EE-BAT-I-2HR	1EE-BAT-II-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
11	6.8923E-8	IE-T1	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1MSRV--FC-101C	1EE-BAT-II-2HR	1EE-BAT-I-2HR	HEP-1FRH:1-11
12	6.8923E-8	IE-T1	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1EE-BAT-I-2HR	1RCRV--FC-1456	HEP-1FRH:1-11	
13	5.7093E-8	IE-T1	1EGEDG-FS-1H	1HVTCV-FC-TCV167	1EE-BAT-II-2HR	1EE-BAT-I-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
14	5.7093E-8	IE-T1	1EGEDG-FS-1H	1HVPCV-FC-1235B1	1EE-BAT-II-2HR	1EE-BAT-I-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
15	5.2981E-8	IE-T1	1EGEDG-FR-1H	1HVTCV-FC-TCV167	1EE-BAT-I-2HR	1EE-BAT-II-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97
16	5.2981E-8	IE-T1	1EGEDG-FR-1H	1HVPCV-FC-1235B1	1EE-BAT-I-2HR	1EE-BAT-II-2HR	HEP-1FRH:1-11	1MSMV--LK-1MS97

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T1TRP21.MGP		12:16 9/28/1992
Top event unavailability	=	2.224E-6
Number of cut sets in equation	=	180
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	8
Basic Event Data file referenced	=	NAPS1

1	6.8077E-8	IE-T1	1EEBKR-SO-15H8	1EGEDG-UM-1J	1EE-BAT-I-2HR	1EE-BAT-III-2HR
2	6.8077E-8	IE-T1	1EEBKR-SO-14H2	1EGEDG-UM-1J	1EE-BAT-III-2HR	1EE-BAT-I-2HR
3	6.8077E-8	IE-T1	1EEBKR-SO-14H1	1EGEDG-UM-1J	1EE-BAT-III-2HR	1EE-BAT-I-2HR
4	6.8077E-8	IE-T1	1EGEDG-UM-1H	1EEBKR-SO-14J4	1EE-BAT-III-2HR	1EE-BAT-I-2HR
5	6.8077E-8	IE-T1	1EGEDG-UM-1H	1EEBKR-SO-14J1	1EE-BAT-III-2HR	1EE-BAT-I-2HR
6	6.8077E-8	IE-T1	1EGEDG-UM-1H	1EEBKR-SO-15J8	1EE-BAT-III-2HR	1EE-BAT-I-2HR
7	5.4795E-8	IE-T1	1EEBKR-SO-15H8	1EGEDG-FS-1J	1EE-BAT-III-2HR	1EE-BAT-I-2HR
8	5.4795E-8	IE-T1	1EEBKR-SO-14H1	1EGEDG-FS-1J	1EE-BAT-I-2HR	1EE-BAT-III-2HR
9	5.4795E-8	IE-T1	1EEBKR-SO-14H2	1EGEDG-FS-1J	1EE-BAT-I-2HR	1EE-BAT-III-2HR
10	5.4795E-8	IE-T1	1EGEDG-FS-1H	1EEBKR-SO-15J8	1EE-BAT-I-2HR	1EE-BAT-III-2HR
11	5.4795E-8	IE-T1	1EGEDG-FS-1H	1EEBKR-SO-14J1	1EE-BAT-I-2HR	1EE-BAT-III-2HR
12	5.4795E-8	IE-T1	1EGEDG-FS-1H	1EEBKR-SO-14J4	1EE-BAT-I-2HR	1EE-BAT-III-2HR
13	5.0849E-8	IE-T1	1EEBKR-SO-15H8	1EGEDG-FR-1J	1EE-BAT-I-2HR	1EE-BAT-III-2HR
14	5.0849E-8	IE-T1	1EEBKR-SO-14H2	1EGEDG-FR-1J	1EE-BAT-III-2HR	1EE-BAT-I-2HR
15	5.0849E-8	IE-T1	1EEBKR-SO-14H1	1EGEDG-FR-1J	1EE-BAT-III-2HR	1EE-BAT-I-2HR
16	5.0849E-8	IE-T1	1EGEDG-FR-1H	1EEBKR-SO-14J4	1EE-BAT-III-2HR	1EE-BAT-I-2HR
17	5.0849E-8	IE-T1	1EGEDG-FR-1H	1EEBKR-SO-15J8	1EE-BAT-III-2HR	1EE-BAT-I-2HR
18	5.0849E-8	IE-T1	1EGEDG-FR-1H	1EEBKR-SO-14J1	1EE-BAT-III-2HR	1EE-BAT-I-2HR
19	3.8523E-8	IE-T1	1EETFM-LP-1H	1EGEDG-UM-1J	1EE-BAT-III-2HR	1EE-BAT-I-2HR
20	3.8523E-8	IE-T1	1EGEDG-UM-1H	1EETFM-LP-1J	1EE-BAT-III-2HR	1EE-BAT-I-2HR
21	3.4899E-8	IE-T1	1EGEDG-FS-1H	1EEBUS-UM-DC-III	2EGEDG-UM-2J	1EE-BAT-I-2HR
22	3.2386E-8	IE-T1	1EGEDG-FR-1H	2EGEDG-UM-2J	1EEBUS-UM-DC-III	1EE-BAT-I-2HR
23	3.1007E-8	IE-T1	1EETFM-LP-1H	1EGEDG-FS-1J	1EE-BAT-I-2HR	1EE-BAT-III-2HR

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                 T2ATRP03.MGP              12:19   9/28/1992
      Top event unavailability        =    6.403E-7
      Number of cut sets in equation  =           4
      Cutoff value used last step     =    1.000E-11
      Longest cut set (# of events)   =           6
      Basic Event Data file referenced =    NAPS1
```

1	3.6988E-7	IE-T2A	HEP-1OP49:1	C-LT01	C-RC303	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
2	2.3124E-7	IE-T2A	1SWPSB-UM-1SWP-4	C-LT01	C-RC303	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
3	3.0414E-8	IE-T2A	1SWMOV-FC-1SW117	C-LT01	C-RC303	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
4	8.7911E-9	IE-T2A	1SWPSB-FS-1SWP-4	C-LT01	C-RC303	1SWSCN-CC-SWRES	REC-SCREEN-TURNS

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T2ATRP06.MGP 12:24 9/28/1992
Top event unavailability = 1.144E-7
Number of cut sets in equation = 81
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 8
Basic Event Data file referenced = NAPS1

1	5.2833E-8	IE-T2A	HEP-10P49:1	C-LT01		HEP-OAP55-40HR	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
2	3.3029E-8	IE-T2A	1SWPSB-UM-1SWP-4	C-LT01		HEP-OAP55-40HR	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
3	6.4926E-9	IE-T2A	1SW-HOTWEA-9MO	1SWPIP-UM-HDRA	C-LT01	HEP-OAP55-40HR	1HVSTR-PL-1HVS1A	2HVSTR-PG-2HVS1B
4	6.4926E-9	IE-T2A	1SW-HOTWEA-9MO	1SWPIP-UM-HDRB	C-LT01	HEP-OAP55-40HR	1HVSTR-PG-1HVS1B	
5	4.3442E-9	IE-T2A	1SWMOV-FC-1SW117	C-LT01		HEP-OAP55-40HR	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
6	2.6412E-9	IE-T2A	1SW-HOTWEA-9MO	1SWPIP-UM-HDRB	C-LT01	HEP-OAP55-20HR	HEP-OAP55-40HR	1HVSTR-PG-1HVS1B
7	2.1642E-9	IE-T2A	1SW-COLDWEA-3MO	1SWPIP-UM-HDRB	C-LT01	HEP-OAP55-40HR	1HVSTR-PG-1HVS1B	2HVSTR-PL-2HVS1A
8	2.1642E-9	IE-T2A	1SWPIP-UM-HDRA	1SW-COLDWEA-3MO	C-LT01	HEP-OAP55-40HR	1HVSTR-PL-1HVS1A	2HVSTR-PG-2HVS1B
9	1.2557E-9	IE-T2A	1SWPSB-FS-1SWP-4	C-LT01	HEP-OAP55-40HR	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
10	8.8041E-10	IE-T2A	1SW-COLDWEA-3MO	1SWPIP-UM-HDRB	C-LT01	HEP-OAP55-20HR	HEP-OAP55-40HR	1HVSTR-PG-1HVS1B
11	1.1094E-10	IE-T2A	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	C-LT01	HEP-OAP55-20HR	HEP-OAP55-40HR	
12	1.0470E-10	IE-T2A	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	HEP-OAP55-20HR	HEP-OAP55-40HR
13	1.0470E-10	IE-T2A	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	HEP-OAP55-20HR	HEP-OAP55-40HR
14	5.8427E-11	IE-T2A	1HVPAT-FR-HVP22A	1HVCHU-CC-HVE4	C-LT01	HEP-OAP55-20HR	HEP-OAP55-40HR	
15	5.8427E-11	IE-T2A	1HVPAT-FR-HVP20A	1HVCHU-CC-HVE4	C-LT01	HEP-OAP55-20HR	HEP-OAP55-40HR	
16	5.5141E-11	IE-T2A	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVPAT-FR-HVP20A	C-LT01	HEP-OAP55-20HR	HEP-OAP55-40HR
17	5.5141E-11	IE-T2A	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVPAT-FR-HVP22A	C-LT01	HEP-OAP55-20HR	HEP-OAP55-40HR

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T2ATRP11.MGP		12:19 9/28/1992
Top event unavailability	=	6.773E-7
Number of cut sets in equation	=	380
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	8
Basic Event Data file referenced	=	NAPS1

1	6.1646E-7	IE-T2A	C-LT01	HEP-1FRH:1-11	1IAIAS-LF-OUTIA	REC-1AP28			
2	1.4660E-8	IE-T2A	C-LT01	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1IAIAS-LF-OUTIA	REC-1AP28		
3	8.1004E-9	IE-T2A	C-LT01	1SICKV-FC-1SI47	1IAIAS-LF-OUTIA	REC-1AP28			
4	6.3479E-9	IE-T2A	C-LT01	1CHPAT-CC-FS1ABC	1IAIAS-LF-OUTIA	REC-1AP28			
5	4.9879E-9	IE-T2A	C-LT01	1SIMOV-CC-867836	1IAIAS-LF-OUTIA	REC-1AP28			
6	4.9879E-9	IE-T2A	C-LT01	1SIMOV-CC-1115CE	1IAIAS-LF-OUTIA	REC-1AP28			
7	4.9879E-9	IE-T2A	C-LT01	1SIMOV-CC-1115BD	1IAIAS-LF-OUTIA	REC-1AP28			
8	1.5192E-9	IE-T2A	C-LT01	1SIMOV-FO-1115E	1SIMOV-FO-1115C	1IAIAS-LF-OUTIA	REC-1AP28		
9	1.5192E-9	IE-T2A	C-LT01	1SIMOV-FC-1115D	1SIMOV-FC-1115B	1IAIAS-LF-OUTIA	REC-1AP28		
10	8.1002E-10	IE-T2A	C-LT01	1SICKV-CC-79185	1IAIAS-LF-OUTIA	REC-1AP28			
11	5.7492E-10	IE-T2A	C-LT01	1SIMV--PG-1SI46	1IAIAS-LF-OUTIA	REC-1AP28			
12	1.6453E-10	IE-T2A	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	C-LT01	1RCRV--CC-RCPORV	HEP-1FRH:1-11		
13	1.6453E-10	IE-T2A	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	C-LT01	1MSRV--CC-101ABC	HEP-1FRH:1-11		
14	1.5527E-10	IE-T2A	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	1MSRV--CC-101ABC		HEP-1FRH:1-11
15	1.5527E-10	IE-T2A	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	1RCRV--CC-RCPORV	HEP-1FRH:1-11	
16	1.5527E-10	IE-T2A	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	1 RCRV--CC-RCPORV	HEP-1FRH:1-11	
17	1.5527E-10	IE-T2A	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	1MSRV--CC-101ABC	HEP-1FRH:1-11	
18	1.5005E-10	IE-T2A	C-LT01	1CHPAT-FS-1CHP1A	1SWTCV-FC-SW102B	1CHPAT-UM-1CHP1C	1IAIAS-LF-OUTIA	REC-1AP28	
19	1.3999E-10	IE-T2A	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	C-LT01	HEP-1ES1:2-S2	HEP-1FRH:1-11		
20	1.3212E-10	IE-T2A	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	HEP-1ES1:2-S2	HEP-1FRH:1-11	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T2P09.MGP 12:19 9/28/1992

Top event unavailability = 7.222E-7
Number of cut sets in equation = 125
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 7
Basic Event Data file referenced = NAPS1

1	4.2208E-7	IE-T2	HEP-1AP22:5	C-P01	HEP-1FRH:1-11		
2	1.5291E-7	IE-T2	1FWCKV-CC-ALLAFW	C-P01	HEP-1FRH:1-11		
3	3.8152E-8	IE-T2	1FWTRB-FR-24HP2	1FWPSB-CC-MDP3AB	C-P01	HEP-1FRH:1-11	
4	2.4119E-8	IE-T2	1FWCKV-LEAKAGE	C-P01	HEP-1FRH:1-11		
5	1.0037E-8	IE-T2	HEP-1AP22:5	C-P01	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	
6	6.3432E-9	IE-T2	1FWPSB-CC-MDP3AB	1FWTRB-FS-1FWP2	C-P01	HEP-1FRH:1-11	
7	5.5461E-9	IE-T2	HEP-1AP22:5	C-P01	1SICKV-FC-1SI47		
8	4.6728E-9	IE-T2	1FWTRB-UM-1FWP2	1FWPSB-CC-MDP3AB	C-P01	HEP-1FRH:1-11	
9	4.3463E-9	IE-T2	HEP-1AP22:5	C-P01	1CHPAT-CC-FS1ABC		
10	3.6820E-9	IE-T2	1FWTRB-FR-24HP2	1FWPCV-CC-159AB	C-P01	HEP-1FRH:1-11	
11	3.6364E-9	IE-T2	1FWCKV-CC-ALLAFW	C-P01	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	
12	3.4151E-9	IE-T2	HEP-1AP22:5	C-P01	1SIMOV-CC-1115CE		
13	3.4151E-9	IE-T2	HEP-1AP22:5	C-P01	1SIMOV-CC-1115BD		
14	3.4151E-9	IE-T2	HEP-1AP22:5	C-P01	1SIMOV-CC-867836		
15	2.2079E-9	IE-T2	1FWPSB-UM-1FWP3B	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	C-P01	HEP-1FRH:1-11
16	2.2079E-9	IE-T2	1FWPSB-FS-1FWP3B	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	C-P01	HEP-1FRH:1-11
17	2.0093E-9	IE-T2	1FWCKV-CC-ALLAFW	C-P01	1SICKV-FC-1SI47		
18	1.5746E-9	IE-T2	1FWCKV-CC-ALLAFW	C-P01	1CHPAT-CC-FS1ABC		
19	1.2372E-9	IE-T2	1FWCKV-CC-ALLAFW	C-P01	1SIMOV-CC-1115BD		
20	1.2372E-9	IE-T2	1FWCKV-CC-ALLAFW	C-P01	1SIMOV-CC-867836		
21	1.2372E-9	IE-T2	1FWCKV-CC-ALLAFW	C-P01	1SIMOV-CC-1115CE		
22	1.1053E-9	IE-T2	1FWTRB-FR-24HP2	1FWPSB-FR-24HP3A	1FWPSB-UM-1FWP3B	C-P01	HEP-1FRH:1-11
23	1.1053E-9	IE-T2	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1FWPSB-FR-24HP3B	C-P01	HEP-1FRH:1-11

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T2P14.MGP 12:23 9/28/1992
Top event unavailability = 1.298E-7
Number of cut sets in equation = 64
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 6
Basic Event Data file referenced = NAPS1

1	7.2168E-8	IE-T2	HEP-1AP22:5	HEP-1FRH:1-15			
2	2.6146E-8	IE-T2	1FWCKV-CC-ALLAFW	HEP-1FRH:1-15			
3	8.7385E-9	IE-T2	HEP-1AP22:5	1RCRV--CC-RCPORV			
4	6.5234E-9	IE-T2	1FWTRB-FR-24HP2	1FWPSB-CC-MDP3AB	HEP-1FRH:1-15		
5	4.1240E-9	IE-T2	1FWCKV-LEAKAGE	HEP-1FRH:1-15			
6	3.1658E-9	IE-T2	1FWCKV-CC-ALLAFW	1RCRV--CC-RCPORV			
7	1.0846E-9	IE-T2	1FWPSB-CC-MDP3AB	1FWTRB-FS-1FWP2	HEP-1FRH:1-15		
8	8.7282E-10	IE-T2	HEP-1AP22:5	1RCRV--FC-1456	1RCRV--FC-1455C		
9	7.9898E-10	IE-T2	1FWTRB-UM-1FWP2	1FWPSB-CC-MDP3AB	HEP-1FRH:1-15		
10	7.8989E-10	IE-T2	1FWTRB-FR-24HP2	1FWPSB-CC-MDP3AB	1RCRV--CC-RCPORV		
11	6.2957E-10	IE-T2	1FWTRB-FR-24HP2	1FWPCV-CC-159AB	HEP-1FRH:1-15		
12	4.9935E-10	IE-T2	1FWCKV-LEAKAGE	1RCRV--CC-RCPORV			
13	3.7752E-10	IE-T2	1FWPSB-UM-1FWP3B	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	HEP-1FRH:1-15	
14	3.7752E-10	IE-T2	1FWPSB-FS-1FWP3B	1FWPSB-UM-1FWP3A	1FWTRB-FR-24HP2	HEP-1FRH:1-15	
15	3.1621E-10	IE-T2	1FWCKV-CC-ALLAFW	1RCRV--FC-1456	1RCRV--FC-1455C		
16	1.8900E-10	IE-T2	1FWTRB-FR-24HP2	1FWPSB-FR-24HP3A	1FWPSB-UM-1FWP3B	HEP-1FRH:1-15	
17	1.8900E-10	IE-T2	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1FWPSB-FR-24HP3B	HEP-1FRH:1-15	
18	1.7880E-10	IE-T2	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1FWHEP-1FW546	HEP-1FRH:1-15	
19	1.7880E-10	IE-T2	1FWTRB-FR-24HP2	1FWHEP-1FW548	1FWPSB-UM-1FWP3B	HEP-1FRH:1-15	
20	1.6660E-10	IE-T2	1EGEDG-CC-1H1J2J	1EP-LOOP-24	1FWTRB-FR-24HP2	1EE-BAT-III-2HR	1EE-BAT-I-2HR
21	1.5115E-10	IE-T2	1FWTRB-FR-24HP2	1FWCKV-FC-1FW165	1FWPSB-UM-1FWP3B	HEP-1FRH:1-15	
22	1.5115E-10	IE-T2	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	1FWCKV-FC-1FW183	HEP-1FRH:1-15	
23	1.3133E-10	IE-T2	1FWPSB-CC-MDP3AB	1FWTRB-FS-1FWP2	1RCRV--CC-RCPORV		
24	1.1533E-10	IE-T2	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3A	1FWPSB-FS-1FWP3B	HEP-1FRH:1-15	
25	1.0599E-10	IE-T2	1FWPSB-CC-MDP3AB	1MSAOV-CC-111AB	HEP-1FRH:1-15		
26	1.0595E-10	IE-T2	1EGEDG-CC-ALL	1EP-LOOP-24	1FWTRB-FR-24HP2	1EE-BAT-III-2HR	1EE-BAT-I-2HR

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                T3TRP03.MGP                   12:17   9/28/1992
Top event unavailability              =   1.572E-6
Number of cut sets in equation        =          4
Cutoff value used last step           =   1.000E-11
Longest cut set (# of events)         =          6
Basic Event Data file referenced      =    NAPS1
```

1	9.0788E-7	IE-T3	HEP-10P49:1	C-LT01		C-RC303	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
2	5.6758E-7	IE-T3	1SWPSB-UM-1SWP-4	C-LT01		C-RC303	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
3	7.4652E-8	IE-T3	1SWMOV-FC-1SW117	C-LT01		C-RC303	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
4	2.1578E-8	IE-T3	1SWPSB-FS-1SWP-4	C-LT01		C-RC303	1SWSCN-CC-SWRES	REC-SCREEN-TURNS

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T3TRP06.MGP 12:22 9/28/1992
Top event unavailability = 2.825E-7
Number of cut sets in equation = 160
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 8
Basic Event Data file referenced = NAPS1

1	1.2968E-7	IE-T3	HEP-10P49:1	C-LT01	HEP-0AP55-40HR	1SWSCN-CC-SWRES	REC-SCREEN-TURNS		
2	8.1072E-8	IE-T3	1SWPSB-UM-1SWP-4	C-LT01	HEP-0AP55-40HR	1SWSCN-CC-SWRES	REC-SCREEN-TURNS		
3	1.5936E-8	IE-T3	1SW-HOTWEA-9MO	1SWPIP-UM-HDRA	C-LT01	HEP-0AP55-40HR	1HVSTR-PL-1HVS1A	2HVSTR-PG-2HVS1B	
4	1.5936E-8	IE-T3	1SW-HOTWEA-9MO	1SWPIP-UM-HDRB	C-LT01	HEP-0AP55-40HR	1HVSTR-PG-1HVS1B	2HVSTR-PL-2HVS1A	
5	1.0663E-8	IE-T3	1SWMOV-FC-1SW117	C-LT01	HEP-0AP55-40HR	1SWSCN-CC-SWRES	REC-SCREEN-TURNS		
6	6.4830E-9	IE-T3	1SW-HOTWEA-9MO	1SWPIP-UM-HDRB	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	1HVSTR-PG-1HVS1B	
7	5.3121E-9	IE-T3	1SW-COLDWEA-3MO	1SWPIP-UM-HDRB	C-LT01	HEP-0AP55-40HR	1HVSTR-PG-1HVS1B	2HVSTR-PL-2HVS1A	
8	5.3121E-9	IE-T3	1SWPIP-UM-HDRA	1SW-COLDWEA-3MO	C-LT01	HEP-0AP55-40HR	1HVSTR-PL-1HVS1A	2HVSTR-PG-2HVS1B	
9	3.0822E-9	IE-T3	1SWPSB-FS-1SWP-4	C-LT01	HEP-0AP55-40HR	1SWSCN-CC-SWRES	REC-SCREEN-TURNS		
10	2.1610E-9	IE-T3	1SW-COLDWEA-3MO	1SWPIP-UM-HDRB	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	1HVSTR-PG-1HVS1B	
11	6.3893E-10	IE-T3	1SW-HOTWEA-9MO	1SWPIP-UM-HDRB	C-LT01	HEP-0AP55-40HR	1HVSTR-PG-1HVS1B	2IAIAS-LF-OUTIA	REC-2AP28
12	2.7230E-10	IE-T3	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR		
13	2.5698E-10	IE-T3	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
14	2.5698E-10	IE-T3	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
15	1.4341E-10	IE-T3	1HVPAT-FR-HVP20A	1HVCHU-CC-HVE4	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR		
16	1.4341E-10	IE-T3	1HVPAT-FR-HVP22A	1HVCHU-CC-HVE4	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR		
17	1.3535E-10	IE-T3	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVPAT-FR-HVP20A	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T3TRP11.MGP 12:17 9/28/1992
Top event unavailability = 1.669E-6
Number of cut sets in equation = 776
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 9
Basic Event Data file referenced = NAPS1

1	1.5131E-6	IE-T3	C-LT01	HEP-1FRH:1-11	1IAIAS-LF-OUTIA	REC-1AP28		
2	3.5984E-8	IE-T3	C-LT01	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	1IAIAS-LF-OUTIA	REC-1AP28	
3	1.9883E-8	IE-T3	C-LT01	1SICKV-FC-1SI47	1IAIAS-LF-OUTIA	REC-1AP28		
4	1.5581E-8	IE-T3	C-LT01	1CHPAT-CC-FS1ABC	1IAIAS-LF-OUTIA	REC-1AP28		
5	1.2243E-8	IE-T3	C-LT01	1SIMOV-CC-867836	1IAIAS-LF-OUTIA	REC-1AP28		
6	1.2243E-8	IE-T3	C-LT01	1SIMOV-CC-1115CE	1IAIAS-LF-OUTIA	REC-1AP28		
7	1.2243E-8	IE-T3	C-LT01	1SIMOV-CC-1115BD	1IAIAS-LF-OUTIA	REC-1AP28		
8	3.7290E-9	IE-T3	C-LT01	1SIMOV-FO-1115E	1SIMOV-FO-1115C	1IAIAS-LF-OUTIA	REC-1AP28	
9	3.7290E-9	IE-T3	C-LT01	1SIMOV-FC-1115D	1SIMOV-FC-1115B	1IAIAS-LF-OUTIA	REC-1AP28	
10	1.9882E-9	IE-T3	C-LT01	1SICKV-CC-79185	1IAIAS-LF-OUTIA	REC-1AP28		
11	1.4112E-9	IE-T3	C-LT01	1SIMV--PG-1SI46	1IAIAS-LF-OUTIA	REC-1AP28		
12	4.0383E-10	IE-T3	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	C-LT01	1RCRV--CC-RCPORV	HEP-1FRH:1-11	
13	4.0383E-10	IE-T3	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	C-LT01	1MSRV--CC-101ABC	HEP-1FRH:1-11	
14	3.8112E-10	IE-T3	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	1RCRV--CC-RCPORV	HEP-1FRH:1-11
15	3.8112E-10	IE-T3	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	1RCRV--CC-RCPORV	HEP-1FRH:1-11
16	3.8112E-10	IE-T3	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	1MSRV--CC-101ABC	HEP-1FRH:1-11
17	3.8112E-10	IE-T3	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	1MSRV--CC-101ABC	HEP-1FRH:1-11
18	3.6831E-10	IE-T3	C-LT01	1CHPAT-FS-1CHP1A	1SWTCV-FC-SW102B	1CHPAT-UM-1CHP1C	1IAIAS-LF-OUTIA	REC-1AP28
19	3.4362E-10	IE-T3	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	C-LT01	HEP-1ES1:2-S2	HEP-1FRH:1-11	
20	3.2429E-10	IE-T3	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVCHU-FR-1HVE4A	C-LT01	HEP-1ES1:2-S2	HEP-1FRH:1-11

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T3TRP22.MGP                  12:24   9/28/1992
      Top event unavailability         =     1.196E-7
      Number of cut sets in equation   =          827
      Cutoff value used last step      =     1.000E-11
      Longest cut set (# of events)    =            7
      Basic Event Data file referenced =      NAPS1
```

1	9.8289E-9	IE-T3	1FWTRB-FR-12HP2	HEP-0AP55-10HR	1IAIAS-LF-OUTIA	REC-1AP28	
2	3.1745E-9	IE-T3	1FWTRB-FS-1FWP2	HEP-0AP55-10HR	1IAIAS-LF-OUTIA	REC-1AP28	
3	2.6263E-9	IE-T3	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	1FWTRB-FR-12HP2	HEP-0AP55-10HR	
4	2.4786E-9	IE-T3	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVCHU-FR-1HVE4A	1FWTRB-FR-12HP2	HEP-0AP55-10HR
5	2.4786E-9	IE-T3	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVCHU-FR-1HVE4A	1FWTRB-FR-12HP2	HEP-0AP55-10HR
6	2.3385E-9	IE-T3	1FWTRB-UM-1FWP2	HEP-0AP55-10HR	1IAIAS-LF-OUTIA	REC-1AP28	
7	1.3832E-9	IE-T3	1HVPAT-FR-HVP20A	1HVCHU-CC-HVE4	1FWTRB-FR-12HP2	HEP-0AP55-10HR	
8	1.3832E-9	IE-T3	1HVPAT-FR-HVP22A	1HVCHU-CC-HVE4	1FWTRB-FR-12HP2	HEP-0AP55-10HR	
9	1.3054E-9	IE-T3	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVPAT-FR-HVP20A	1FWTRB-FR-12HP2	HEP-0AP55-10HR
10	1.3054E-9	IE-T3	1HVCHU-FS-1HVE4C	1HVCHU-UM-1HVE4B	1HVPAT-FR-HVP22A	1FWTRB-FR-12HP2	HEP-0AP55-10HR
11	1.3054E-9	IE-T3	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVPAT-FR-HVP20A	1FWTRB-FR-12HP2	HEP-0AP55-10HR
12	1.3054E-9	IE-T3	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVPAT-FR-HVP22A	1FWTRB-FR-12HP2	HEP-0AP55-10HR
13	1.3051E-9	IE-T3	1HVCHU-FR-1HVE4A	1HVCHU-UM-HVE4BC	1FWTRB-FR-12HP2	HEP-0AP55-10HR	
14	1.2154E-9	IE-T3	1EEBKR-SO-14H4	1HVCHU-UM-1HVE4B	1FWTRB-FR-12HP2	HEP-0AP55-10HR	
15	1.2154E-9	IE-T3	1EEBKR-SO-15H8	1HVCHU-UM-1HVE4B	1FWTRB-FR-12HP2	HEP-0AP55-10HR	
16	1.2154E-9	IE-T3	1EEBKR-SO-14H1	1HVCHU-UM-1HVE4B	1FWTRB-FR-12HP2	HEP-0AP55-10HR	
17	1.1935E-9	IE-T3	1HVCHU-FR-1HVE4A	1HVCHU-FS-1HVE4B	1HVCHU-FS-1HVE4C	1FWTRB-FR-12HP2	HEP-0AP55-10HR
18	1.0468E-9	IE-T3	1HVCHU-FR-1HVE4A	1HVPCV-CC-1235	1FWTRB-FR-12HP2	HEP-0AP55-10HR	
19	9.8820E-10	IE-T3	1HVPCV-FC-1235C1	1HVCHU-UM-1HVE4B	1HVCHU-FR-1HVE4A	1FWTRB-FR-12HP2	HEP-0AP55-10HR
20	9.8820E-10	IE-T3	1HVCHU-UM-1HVE4C	1HVPCV-FC-1235B1	1HVCHU-FR-1HVE4A	1FWTRB-FR-12HP2	HEP-0AP55-10HR
21	9.4329E-10	IE-T3	1HVFAN-FR-1FM06	1HVTCV-FC-TCV167	1FWTRB-FR-12HP2	HEP-0AP55-10HR	
22	8.4823E-10	IE-T3	1HVCHU-FR-1HVE4A	1HVCHU-CC-HVE4	1FWTRB-FS-1FWP2	HEP-0AP55-10HR	
23	8.0053E-10	IE-T3	1HVCHU-UM-1HVE4C	1HVCHU-FS-1HVE4B	1HVCHU-FR-1HVE4A	1FWTRB-FS-1FWP2	HEP-0AP55-10HR

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T3TRP23.MGP 12:22 9/28/1992

Top event unavailability	=	1.842E-7
Number of cut sets in equation	=	21
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	6
Basic Event Data file referenced	=	NAPS1

1	6.5697E-8	IE-T3	HEP-10P49:1	1FWTRB-FR-12HP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
2	4.1071E-8	IE-T3	1SWPSB-UM-1SWP-4	1FWTRB-FR-12HP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
3	2.1218E-8	IE-T3	HEP-10P49:1	1FWTRB-FS-1FWP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
4	1.5631E-8	IE-T3	HEP-10P49:1	1FWTRB-UM-1FWP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
5	1.3265E-8	IE-T3	1SWPSB-UM-1SWP-4	1FWTRB-FS-1FWP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
6	9.7719E-9	IE-T3	1SWPSB-UM-1SWP-4	1FWTRB-UM-1FWP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
7	5.4020E-9	IE-T3	1SWMOV-FC-1SW117	1FWTRB-FR-12HP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
8	2.0736E-9	IE-T3	HEP-10P49:1	1MSAOV-CC-111AB	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
9	1.7447E-9	IE-T3	1SWMOV-FC-1SW117	1FWTRB-FS-1FWP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
10	1.5614E-9	IE-T3	1SWPSB-FS-1SWP-4	1FWTRB-FR-12HP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
11	1.2964E-9	IE-T3	1SWPSB-UM-1SWP-4	1MSAOV-CC-111AB	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
12	1.2853E-9	IE-T3	1SWMOV-FC-1SW117	1FWTRB-UM-1FWP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
13	8.5805E-10	IE-T3	HEP-10P49:1	1FWHEP-1FW543	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
14	7.2536E-10	IE-T3	HEP-10P49:1	1FWCKV-FC-1FW148	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
15	5.3643E-10	IE-T3	1SWPSB-UM-1SWP-4	1FWHEP-1FW543	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
16	5.0431E-10	IE-T3	1SWPSB-FS-1SWP-4	1FWTRB-FS-1FWP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
17	4.5347E-10	IE-T3	1SWPSB-UM-1SWP-4	1FWCKV-FC-1FW148	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
18	3.7579E-10	IE-T3	HEP-10P49:1	1MSAOV-FC-TV111B	1MSAOV-FC-TV111A	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
19	3.7151E-10	IE-T3	1SWPSB-FS-1SWP-4	1FWTRB-UM-1FWP2	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	
20	2.3493E-10	IE-T3	1SWPSB-UM-1SWP-4	1MSAOV-FC-TV111B	1MSAOV-FC-TV111A	1SWSCN-CC-SWRES	REC-SCREEN-TURNS
21	1.7051E-10	IE-T3	1SWMOV-FC-1SW117	1MSAOV-CC-111AB	1SWSCN-CC-SWRES	REC-SCREEN-TURNS	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T7P03.MGP 12:16 9/28/1992

Top event unavailability	=	1.983E-6
Number of cut sets in equation	=	276
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	7
Basic Event Data file referenced	=	NAPS1

1	4.0739E-7	IE-T7	C-SGI01	HEP-1E3-13	1RHHCV-FC-1758	REC-1OP14:1	
2	2.4512E-7	IE-T7	C-SGI01	HEP-1E3-13	1RHMOV-FC-1700	REC-1OP14:1	
3	2.4512E-7	IE-T7	C-SGI01	HEP-1E3-13	1RHMOV-FC-1701	REC-1OP14:1	
4	1.6988E-7	IE-T7	C-SGI01	HEP-1E3-13	1RHHEX-LF-1RHE1B	1RHHEX-LF-1RHE1A	
5	1.6988E-7	IE-T7	C-SGI01	HEP-1E3-13	1RHHEX-LF-1RHE2B	1RHHEX-LF-1RHE2A	
6	8.8478E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHFEL-PG-1605		
7	8.4769E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHPSB-CC-1RHP1		
8	6.7246E-8	IE-T7	C-SGI01	HEP-1E3-13	1EP-LOOP-24		
9	3.7859E-8	IE-T7	C-SGI01	HEP-1E3-13	HEP-1OP14:1-5:13	1RCPIC-LF-PC403	
10	3.7859E-8	IE-T7	C-SGI01	HEP-1E3-13	HEP-1OP14:1-5:13	1RCPIC-LF-PC402	
11	2.3798E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHPSB-FS-1RHP1A	1RHHEX-LF-1RHE2B	
12	2.3798E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHHEX-LF-1RHE2A	1RHPSB-FS-1RHP1B	
13	2.2690E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHPSB-UM-1RHP1B	1RHHEX-LF-1RHE2A	
14	2.2690E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHHEX-LF-1RHE2B	1RHPSB-UM-1RHP1A	
15	1.3665E-8	IE-T7	C-SGI01	HEP-1E3-13	1SICKV-CC-144161		
16	1.3665E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHCKV-CC-1RH715		
17	1.1437E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHHEX-LF-1RHE1B	1CCAOV-FC-TV103A	REC-1OP14:1
18	1.1437E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHHEX-LF-1RHE2A	1CCAOV-FC-TV103B	REC-1OP14:1
19	1.1437E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHHEX-LF-1RHE2B	1CCAOV-FC-TV103A	REC-1OP14:1
20	1.1437E-8	IE-T7	C-SGI01	HEP-1E3-13	1RHHEX-LF-1RHE1A	1CCAOV-FC-TV103B	REC-1OP14:1
21	8.7749E-9	IE-T7	C-SGI01	HEP-1E3-13	1CCMOV-CC-100AB	REC-1OP14:1	
22	8.7749E-9	IE-T7	C-SGI01	HEP-1E3-13	1RHMOV-CC-1720	REC-1OP14:1	
23	7.3829E-9	IE-T7	C-SGI01	HEP-1E3-13	1CCAOV-FC-TV103A	REC-1OP14:1	1CCAOV-FC-TV103B

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T7P04.MGP                12:15   9/28/1992
    Top event unavailability          =     2.983E-6
    Number of cut sets in equation    =          424
    Cutoff value used last step       =     1.000E-11
    Longest cut set (# of events)     =            8
    Basic Event Data file referenced  =      NAPS1
```

1	6.5198E-7	IE-T7	C-SGI01	HEP-1E3-13	HEP-1ECA3:1-16			
2	3.3188E-7	IE-T7	C-SGI01	1EEBKR-SO-14H1	1EE-BAT-II-2HR	1EE-BAT-I-2HR		
3	3.3188E-7	IE-T7	C-SGI01	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBKR-SO-15H8		
4	3.3188E-7	IE-T7	C-SGI01	1EEBKR-SO-14H2	1EE-BAT-II-2HR	1EE-BAT-I-2HR		
5	1.8781E-7	IE-T7	C-SGI01	1EETFM-LP-1H	1EE-BAT-II-2HR	1EE-BAT-I-2HR		
6	1.7901E-7	IE-T7	C-SGI01	1RCPCV-FC-1455A	1RCRV--CC-RCPORV			
7	1.2011E-7	IE-T7	C-SGI01	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBUS-LU-1H		
8	1.2011E-7	IE-T7	C-SGI01	1EEBUS-LU-1H1-4	1EE-BAT-II-2HR	1EE-BAT-I-2HR		
9	1.2011E-7	IE-T7	C-SGI01	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBUS-LU-1H-480		
10	1.2011E-7	IE-T7	C-SGI01	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBUS-LU-1H1		
11	9.8880E-8	IE-T7	C-SGI01	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBUS-UM-1H-480		
12	9.8880E-8	IE-T7	C-SGI01	1EEBUS-UM-1H	1EE-BAT-II-2HR	1EE-BAT-I-2HR		
13	9.8880E-8	IE-T7	C-SGI01	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBUS-UM-1H1-4		
14	1.9753E-8	IE-T7	C-SGI01	1EEBUS-UM-DC-III	1RCRV--FC-1455C			
15	1.7901E-8	IE-T7	C-SGI01	1MSRV--CC-101ABC	1MSTCV-CC-1408AB			
16	1.7901E-8	IE-T7	C-SGI01	1RCPCV-CC-1455AB	1RCRV--CC-RCPORV			
17	1.7880E-8	IE-T7	C-SGI01	1RCPCV-FC-1455A	1RCRV--FC-1455C	1RCRV--FC-1456		
18	7.8332E-9	IE-T7	C-SGI01	1RCRV--CC-RCPORV	1RCPAT-FR-1RCP1A			
19	5.8729E-9	IE-T7	C-SGI01	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EGEDG-UM-1H	2EGEDG-UM-2J	1EP-LOOP-24
20	4.7271E-9	IE-T7	C-SGI01	1EP-LOOP-24	2EGEDG-UM-2J	1EGEDG-FS-1H	1EE-BAT-II-2HR	1EE-BAT-I-2HR
21	4.3866E-9	IE-T7	C-SGI01	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EGEDG-FR-1H	2EGEDG-UM-2J	1EP-LOOP-24

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T7P06.MGP              12:18   9/28/1992
    Top event unavailability           =   1.103E-6
    Number of cut sets in equation     =       1082
    Cutoff value used last step        =   1.000E-11
    Longest cut set (# of events)      =          6
    Basic Event Data file referenced   =    NAPS1
```

1	6.8969E-8	IE-T7	HEP-1E3-3	1RHHCV-FC-1758	REC-10P14:1	
2	6.5055E-8	IE-T7	1MSCKV-FO-1MS58	1RHHCV-FC-1758	REC-10P14:1	
3	6.5055E-8	IE-T7	1MSCKV-FO-1MS19	1RHHCV-FC-1758	REC-10P14:1	
4	5.6531E-8	IE-T7	1MSAOV-FO-TV101C	1EP-LOOP-24		
5	4.1497E-8	IE-T7	HEP-1E3-3	1RHMOV-FC-1700	REC-10P14:1	
6	4.1497E-8	IE-T7	HEP-1E3-3	1RHMOV-FC-1701	REC-10P14:1	
7	3.9142E-8	IE-T7	1MSCKV-FO-1MS19	1RHMOV-FC-1701	REC-10P14:1	
8	3.9142E-8	IE-T7	1MSCKV-FO-1MS19	1RHMOV-FC-1700	REC-10P14:1	
9	3.9142E-8	IE-T7	1MSCKV-FO-1MS58	1RHMOV-FC-1701	REC-10P14:1	
10	3.9142E-8	IE-T7	1MSCKV-FO-1MS58	1RHMOV-FC-1700	REC-10P14:1	
11	2.8760E-8	IE-T7	HEP-1E3-3	1RHHEX-LF-1RHE2B	1RHHEX-LF-1RHE2A	
12	2.8760E-8	IE-T7	HEP-1E3-3	1RHHEX-LF-1RHE1B	1RHHEX-LF-1RHE1A	
13	2.7128E-8	IE-T7	1MSCKV-FO-1MS19	1RHHEX-LF-1RHE1B	1RHHEX-LF-1RHE1A	
14	2.7128E-8	IE-T7	1MSCKV-FO-1MS58	1RHHEX-LF-1RHE2B	1RHHEX-LF-1RHE2A	
15	2.7128E-8	IE-T7	1MSCKV-FO-1MS58	1RHHEX-LF-1RHE1B	1RHHEX-LF-1RHE1A	
16	2.7128E-8	IE-T7	1MSCKV-FO-1MS19	1RHHEX-LF-1RHE2B	1RHHEX-LF-1RHE2A	
17	1.4979E-8	IE-T7	HEP-1E3-3	1RHFEL-PG-1605		
18	1.4351E-8	IE-T7	HEP-1E3-3	1RHPSB-CC-1RHP1		
19	1.4129E-8	IE-T7	1MSCKV-FO-1MS19	1RHFEL-PG-1605		
20	1.4129E-8	IE-T7	1MSCKV-FO-1MS58	1RHFEL-PG-1605		
21	1.3537E-8	IE-T7	1MSCKV-FO-1MS58	1RHPSB-CC-1RHP1		
22	1.3537E-8	IE-T7	1MSCKV-FO-1MS19	1RHPSB-CC-1RHP1		
23	1.1384E-8	IE-T7	HEP-1E3-3	1EP-LOOP-24		
24	1.0738E-8	IE-T7	1MSCKV-FO-1MS19	1EP-LOOP-24		
25	1.0738E-8	IE-T7	1MSCKV-FO-1MS58	1EP-LOOP-24		
26	9.4465E-9	IE-T7	1MSSRV-DMDT7	1MSSV--FO-101C	1RHHCV-FC-1758	REC-10P14:1
27	6.4092E-9	IE-T7	HEP-1E3-3	HEP-10P14:1-5:13	1RCPIC-LF-PC403	
28	6.4092E-9	IE-T7	HEP-1E3-3	HEP-10P14:1-5:13	1RCPIC-LF-PC402	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T7P07.MGP               12:24   9/28/1992
Top event unavailability          =   1.094E-7
Number of cut sets in equation    =        164
Cutoff value used last step       =   1.000E-11
Longest cut set (# of events)     =          7
Basic Event Data file referenced  =    NAPS1
```

1	2.6454E-8	IE-T7	HEP-1E3-3	HEP-1ECA3:2-5		
2	2.4953E-8	IE-T7	1MSCKV-FO-1MS19	HEP-1ECA3:2-5		
3	2.4953E-8	IE-T7	1MSCKV-FO-1MS58	HEP-1ECA3:2-5		
4	3.6233E-9	IE-T7	1MSSRV-DMDT7	1MSSV--FO-101C	HEP-1ECA3:2-5	
5	1.4323E-9	IE-T7	1MSAOV-FO-TV101C	1MSMOV-FO-NRV101	HEP-1ECA3:2-5	
6	1.2247E-9	IE-T7	HEP-1E3-3	1EEBKR-SO-14H1	1EE-BAT-II-2HR	1EE-BAT-I-2HR
7	1.2247E-9	IE-T7	HEP-1E3-3	1EEBKR-SO-14H2	1EE-BAT-II-2HR	1EE-BAT-I-2HR
8	1.2247E-9	IE-T7	HEP-1E3-3	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBKR-SO-15H8
9	1.1552E-9	IE-T7	1MSCKV-FO-1MS19	1EEBKR-SO-14H1	1EE-BAT-II-2HR	1EE-BAT-I-2HR
10	1.1552E-9	IE-T7	1MSCKV-FO-1MS19	1EEBKR-SO-14H2	1EE-BAT-II-2HR	1EE-BAT-I-2HR
11	1.1552E-9	IE-T7	1MSCKV-FO-1MS19	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBKR-SO-15H8
12	1.1552E-9	IE-T7	1MSCKV-FO-1MS58	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBKR-SO-15H8
13	1.1552E-9	IE-T7	1MSCKV-FO-1MS58	1EEBKR-SO-14H1	1EE-BAT-II-2HR	1EE-BAT-I-2HR
14	1.1552E-9	IE-T7	1MSCKV-FO-1MS58	1EEBKR-SO-14H2	1EE-BAT-II-2HR	1EE-BAT-I-2HR
15	9.0595E-10	IE-T7	1MSMV--FO-1MS95	HEP-1ECA3:2-5		
16	6.9302E-10	IE-T7	HEP-1E3-3	1EETFM-LP-1H	1EE-BAT-II-2HR	1EE-BAT-I-2HR
17	6.6056E-10	IE-T7	HEP-1E3-3	1RCPCV-FC-1455A	1RCRV--CC-RCPORV	
18	6.5370E-10	IE-T7	1MSCKV-FO-1MS58	1EETFM-LP-1H	1EE-BAT-II-2HR	1EE-BAT-I-2HR
19	6.5370E-10	IE-T7	1MSCKV-FO-1MS19	1EETFM-LP-1H	1EE-BAT-II-2HR	1EE-BAT-I-2HR
20	6.2307E-10	IE-T7	1MSCKV-FO-1MS58	1RCPCV-FC-1455A	1RCRV--CC-RCPORV	
21	6.2307E-10	IE-T7	1MSCKV-FO-1MS19	1RCPCV-FC-1455A	1RCRV--CC-RCPORV	
22	4.4323E-10	IE-T7	HEP-1E3-3	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBUS-LU-1H
23	4.4323E-10	IE-T7	HEP-1E3-3	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBUS-LU-1H-480
24	4.4323E-10	IE-T7	HEP-1E3-3	1EE-BAT-I-2HR	1EE-BAT-II-2HR	1EEBUS-LU-1H1
25	4.4323E-10	IE-T7	HEP-1E3-3	1EEBUS-LU-1H1-4	1EE-BAT-II-2HR	1EE-BAT-I-2HR

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

	T7P23.MGP	12:23 9/28/1992
Top event unavailability	=	1.796E-7
Number of cut sets in equation	=	319
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	8
Basic Event Data file referenced	=	NAPS1

1	5.0370E-8	IE-T7	1QSMV--PG-1QS38	C-L08	C-SGI01	HEP-1ECA3:3-27		
2	4.7312E-8	IE-T7	1SICKV-CC-838689	C-L08	C-SGI01	HEP-1ECA3:3-27		
3	3.8844E-9	IE-T7	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1A
4	3.8844E-9	IE-T7	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1B
5	3.4404E-9	IE-T7	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-FS-1SIP1A
6	3.4404E-9	IE-T7	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-FS-1SIP1B
7	2.7048E-9	IE-T7	1SWTCV-FC-SW102B	1EEBUS-UM-DC-I	C-L08	C-SGI01	HEP-1ECA3:3-27	
8	2.1464E-9	IE-T7	1SICKV-FC-1SI47	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1A	
9	2.1464E-9	IE-T7	1SICKV-FC-1SI47	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1B	
10	1.9010E-9	IE-T7	1SICKV-FC-1SI47	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-FS-1SIP1B	
11	1.9010E-9	IE-T7	1SICKV-FC-1SI47	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-FS-1SIP1A	
12	1.6820E-9	IE-T7	1CHPAT-CC-FS1ABC	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1A	
13	1.6820E-9	IE-T7	1CHPAT-CC-FS1ABC	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1B	
14	1.4897E-9	IE-T7	1CHPAT-CC-FS1ABC	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-FS-1SIP1B	
15	1.4897E-9	IE-T7	1CHPAT-CC-FS1ABC	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-FS-1SIP1A	
16	1.3216E-9	IE-T7	1SIMOV-CC-1115BD	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1A	
17	1.3216E-9	IE-T7	1SIMOV-CC-1115BD	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1B	
18	1.3216E-9	IE-T7	1SIMOV-CC-1115CE	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1B	
19	1.3216E-9	IE-T7	1SIMOV-CC-1115CE	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1A	
20	1.3216E-9	IE-T7	1SIMOV-CC-867836	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1B	
21	1.3216E-9	IE-T7	1SIMOV-CC-867836	C-L08	C-SGI01	HEP-1ECA3:3-27	1SIPSB-UM-1SIP1A	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T7P26.MGP                 12:21   9/28/1992
Top event unavailability              =    3.848E-7
Number of cut sets in equation        =          310
Cutoff value used last step           =    1.000E-11
Longest cut set (# of events)         =            7
Basic Event Data file referenced      =     NAPS1
```

1	3.5210E-8	IE-T7	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-L08	HEP-1E3-3	
2	3.3212E-8	IE-T7	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-L08	1MSCKV-FO-1MS58	
3	3.3212E-8	IE-T7	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-L08	1MSCKV-FO-1MS19	
4	1.9456E-8	IE-T7	1SICKV-FC-1SI47	C-L08	HEP-1E3-3		
5	1.8352E-8	IE-T7	1SICKV-FC-1SI47	C-L08	1MSCKV-FO-1MS58		
6	1.8352E-8	IE-T7	1SICKV-FC-1SI47	C-L08	1MSCKV-FO-1MS19		
7	1.5246E-8	IE-T7	1CHPAT-CC-FS1ABC	C-L08	HEP-1E3-3		
8	1.4381E-8	IE-T7	1CHPAT-CC-FS1ABC	C-L08	1MSCKV-FO-1MS58		
9	1.4381E-8	IE-T7	1CHPAT-CC-FS1ABC	C-L08	1MSCKV-FO-1MS19		
10	1.1980E-8	IE-T7	1SIMOV-CC-1115BD	C-L08	HEP-1E3-3		
11	1.1980E-8	IE-T7	1SIMOV-CC-867836	C-L08	HEP-1E3-3		
12	1.1980E-8	IE-T7	1SIMOV-CC-1115CE	C-L08	HEP-1E3-3		
13	1.1300E-8	IE-T7	1SIMOV-CC-867836	C-L08	1MSCKV-FO-1MS19		
14	1.1300E-8	IE-T7	1SIMOV-CC-867836	C-L08	1MSCKV-FO-1MS58		
15	1.1300E-8	IE-T7	1SIMOV-CC-1115BD	C-L08	1MSCKV-FO-1MS19		
16	1.1300E-8	IE-T7	1SIMOV-CC-1115BD	C-L08	1MSCKV-FO-1MS58		
17	1.1300E-8	IE-T7	1SIMOV-CC-1115CE	C-L08	1MSCKV-FO-1MS19		
18	1.1300E-8	IE-T7	1SIMOV-CC-1115CE	C-L08	1MSCKV-FO-1MS58		
19	4.8227E-9	IE-T7	HEP-NO-PROCEDURE	1CHCKV-FO-1CH254	C-L08	1MSSRV-DMDT7	1MSSV--FO-101C
20	3.6489E-9	IE-T7	1SIMOV-FC-1115D	1SIMOV-FC-1115B	C-L08	HEP-1E3-3	
21	3.6489E-9	IE-T7	1SIMOV-FO-1115E	1SIMOV-FO-1115C	C-L08	HEP-1E3-3	
22	3.4418E-9	IE-T7	1SIMOV-FO-1115E	1SIMOV-FO-1115C	C-L08	1MSCKV-FO-1MS58	
23	3.4418E-9	IE-T7	1SIMOV-FC-1115D	1SIMOV-FC-1115B	C-L08	1MSCKV-FO-1MS19	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T8P02.MGP 12:16 9/28/1992

Top event unavailability	=	2.518E-6
Number of cut sets in equation	=	353
Cutoff value used last step	=	1.000E-11
Longest cut set (# of events)	=	7
Basic Event Data file referenced	=	NAPS1

1	1.3570E-6	IE-T8	C-LT01	HEP-OAP55-20HR	C-RC303		
2	1.3374E-7	IE-T8	C-LT01	C-RC303	2IAIAS-LF-OUTIA	REC-2AP28	
3	1.8917E-8	IE-T8	C-LT01	2EEBUS-UM-2H-480	2HVTCV-FC-TCV266	C-RC303	
4	1.8917E-8	IE-T8	C-LT01	2EEBUS-UM-2H1-1	2HVTCV-FC-TCV266	C-RC303	
5	1.8917E-8	IE-T8	C-LT01	2EEBUS-UM-2H1-1	2HVPCV-FC-2235B1	C-RC303	
6	1.8917E-8	IE-T8	C-LT01	2EEBUS-UM-2H-480	2HVPCV-FC-2235B1	C-RC303	
7	1.8917E-8	IE-T8	C-LT01	2EEBUS-UM-2H1-4	2HVPCV-FC-2235B1	C-RC303	
8	1.8917E-8	IE-T8	C-LT01	2HVTCV-FC-TCV266	2EEBUS-UM-2H	C-RC303	
9	1.8917E-8	IE-T8	C-LT01	2HVPCV-FC-2235B1	2EEBUS-UM-2H	C-RC303	
10	1.8821E-8	IE-T8	C-LT01	2HVPAT-FR-HVP22A	2HVCHU-CC-HVE4	C-RC303	
11	1.8821E-8	IE-T8	C-LT01	2HVPAT-FR-HVP20A	2HVCHU-CC-HVE4	C-RC303	
12	1.6537E-8	IE-T8	C-LT01	2HVCHU-UM-2HVE4B	2EEBKR-SO-25H8	C-RC303	
13	1.6537E-8	IE-T8	C-LT01	2HVCHU-UM-2HVE4B	2EEBKR-SO-24H1	C-RC303	
14	1.6537E-8	IE-T8	C-LT01	2HVCHU-UM-2HVE4B	2EEBKR-SO-24H4	C-RC303	
15	1.6537E-8	IE-T8	C-LT01	2HVCHU-UM-2HVE4B	2EEBKR-SO-24H2	C-RC303	
16	1.2835E-8	IE-T8	C-LT01	2HVTCV-FC-TCV266	2HVFAN-FR-2FM07	C-RC303	
17	1.1908E-8	IE-T8	C-LT01	2EEBUS-UM-2H1-1	C-RC303	2HVCHU-FS-2HVE4B	REC-MMP-C-MR-2
18	1.1908E-8	IE-T8	C-LT01	2EEBUS-UM-2H1-4	C-RC303	2HVCHU-FS-2HVE4B	REC-MMP-C-MR-2
19	1.1908E-8	IE-T8	C-LT01	2EEBUS-UM-2H	C-RC303	2HVCHU-FS-2HVE4B	REC-MMP-C-MR-2
20	1.1908E-8	IE-T8	C-LT01	2EEBUS-UM-2H-480	C-RC303	2HVCHU-FS-2HVE4B	REC-MMP-C-MR-2
21	1.1382E-8	IE-T8	C-LT01	2EEBUS-UM-2H1-1	2HVMOV-FC-211B	C-RC303	
22	1.1382E-8	IE-T8	C-LT01	2EEBUS-UM-2H1-1	2HVMOD-FO-MOD238	C-RC303	
23	1.1382E-8	IE-T8	C-LT01	2EEBUS-UM-2H-480	2HVMOD-FO-MOD238	C-RC303	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T8P06.MGP                  12:20   9/28/1992
Top event unavailability              =   6.059E-7
Number of cut sets in equation        =        357
Cutoff value used last step           =   1.000E-11
Longest cut set (# of events)         =          6
Basic Event Data file referenced      =    NAPS1
```

1	1.9384E-7	IE-T8	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR		
2	1.2153E-7	IE-T8	C-LT01	1SW-HOTWEA-9MO	1SWPIP-UM-HDRA	HEP-0AP55-40HR	2HVSTR-PG-2HVS1B
3	4.0510E-8	IE-T8	C-LT01	1SWPIP-UM-HDRA	1SW-COLDWEA-3MO	HEP-0AP55-40HR	2HVSTR-PG-2HVS1B
4	1.9103E-8	IE-T8	C-LT01	HEP-0AP55-40HR	2IAIAS-LF-OUTIA	REC-2AP28	
5	8.1512E-9	IE-T8	C-LT01	1SW-HOTWEA-9MO	1SWPIP-UM-HDRB	HEP-0AP55-40HR	2HVSTR-PL-2HVS1A
6	6.7774E-9	IE-T8	C-LT01	2EEBUS-UM-2H-480	HEP-0AP55-40HR	2HVCHU-FS-2HVE4B	
7	6.7774E-9	IE-T8	C-LT01	2EEBUS-UM-2H	HEP-0AP55-40HR	2HVCHU-FS-2HVE4B	
8	6.7774E-9	IE-T8	C-LT01	2EEBUS-UM-2H1-4	HEP-0AP55-40HR	2HVCHU-FS-2HVE4B	
9	6.7774E-9	IE-T8	C-LT01	2EEBUS-UM-2H1-1	HEP-0AP55-40HR	2HVCHU-FS-2HVE4B	
10	5.1044E-9	IE-T8	C-LT01	2HVCHU-CC-HVE4	HEP-0AP55-40HR	2HVCHU-FR-2HVE4A	
11	4.8174E-9	IE-T8	C-LT01	2HVCHU-UM-2HVE4C	HEP-0AP55-40HR	2HVCHU-FR-2HVE4A	2HVCHU-FS-2HVE4B
12	4.8174E-9	IE-T8	C-LT01	2HVCHU-UM-2HVE4B	HEP-0AP55-40HR	2HVCHU-FR-2HVE4A	2HVCHU-FS-2HVE4C
13	2.7171E-9	IE-T8	C-LT01	1SW-COLDWEA-3MO	1SWPIP-UM-HDRB	HEP-0AP55-40HR	2HVSTR-PL-2HVS1A
14	2.7021E-9	IE-T8	C-LT01	2EEBUS-UM-2H1-4	2HVPCV-FC-2235B1	HEP-0AP55-40HR	
15	2.7021E-9	IE-T8	C-LT01	2EEBUS-UM-2H-480	2HVTCV-FC-TCV266	HEP-0AP55-40HR	
16	2.7021E-9	IE-T8	C-LT01	2HVTCV-FC-TCV266	2EEBUS-UM-2H	HEP-0AP55-40HR	
17	2.7021E-9	IE-T8	C-LT01	2EEBUS-UM-2H-480	2HVPCV-FC-2235B1	HEP-0AP55-40HR	
18	2.7021E-9	IE-T8	C-LT01	2EEBUS-UM-2H1-1	2HVPCV-FC-2235B1	HEP-0AP55-40HR	
19	2.7021E-9	IE-T8	C-LT01	2HVPCV-FC-2235B1	2EEBUS-UM-2H	HEP-0AP55-40HR	
20	2.7021E-9	IE-T8	C-LT01	2EEBUS-UM-2H1-1	2HVTCV-FC-TCV266	HEP-0AP55-40HR	
21	2.6884E-9	IE-T8	C-LT01	2HVPAT-FR-HVP20A	2HVCHU-CC-HVE4	HEP-0AP55-40HR	
22	2.6884E-9	IE-T8	C-LT01	2HVPAT-FR-HVP22A	2HVCHU-CC-HVE4	HEP-0AP55-40HR	
23	2.5372E-9	IE-T8	C-LT01	2HVPAT-FR-HVP20A	2HVCHU-UM-2HVE4B	HEP-0AP55-40HR	2HVCHU-FS-2HVE4C

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T8P22.MGP              12:14   9/28/1992
Top event unavailability          =   3.169E-6
Number of cut sets in equation    =       1069
Cutoff value used last step       =   1.000E-11
Longest cut set (# of events)     =          6
Basic Event Data file referenced  =    NAPS1
```

1	1.8695E-6	IE-T8	1FWTRB-FR-12HP2	HEP-0AP55-10HR		
2	6.0381E-7	IE-T8	1FWTRB-FS-1FWP2	HEP-0AP55-10HR		
3	4.4481E-7	IE-T8	1FWTRB-UM-1FWP2	HEP-0AP55-10HR		
4	5.9009E-8	IE-T8	1MSAOV-CC-111AB	HEP-0AP55-10HR		
5	2.4418E-8	IE-T8	1FWHEP-1FW543	HEP-0AP55-10HR		
6	2.0641E-8	IE-T8	1FWCKV-FC-1FW148	HEP-0AP55-10HR		
7	1.0694E-8	IE-T8	1MSAOV-FC-TV111B	1MSAOV-FC-TV111A	HEP-0AP55-10HR	
8	9.6778E-9	IE-T8	1FWTRB-FR-12HP2	2IAIAS-LF-OUTIA	REC-2AP28	
9	3.1257E-9	IE-T8	1FWTRB-FS-1FWP2	2IAIAS-LF-OUTIA	REC-2AP28	
10	2.3026E-9	IE-T8	1FWTRB-UM-1FWP2	2IAIAS-LF-OUTIA	REC-2AP28	
11	2.0641E-9	IE-T8	1FWCKV-CC-ALLAFW	HEP-0AP55-10HR		
12	1.3689E-9	IE-T8	1FWTRB-FR-12HP2	2HVTCV-FC-TCV266	2EEBUS-UM-2H	
13	1.3689E-9	IE-T8	1FWTRB-FR-12HP2	2HVPCV-FC-2235B1	2EEBUS-UM-2H	
14	1.3689E-9	IE-T8	1FWTRB-FR-12HP2	2EEBUS-UM-2H1-1	2HVTCV-FC-TCV266	
15	1.3689E-9	IE-T8	1FWTRB-FR-12HP2	2EEBUS-UM-2H1-4	2HVPCV-FC-2235B1	
16	1.3689E-9	IE-T8	1FWTRB-FR-12HP2	2EEBUS-UM-2H-480	2HVTCV-FC-TCV266	
17	1.3689E-9	IE-T8	1FWTRB-FR-12HP2	2EEBUS-UM-2H1-1	2HVPCV-FC-2235B1	
18	1.3689E-9	IE-T8	1FWTRB-FR-12HP2	2EEBUS-UM-2H-480	2HVPCV-FC-2235B1	
19	1.3619E-9	IE-T8	1FWTRB-FR-12HP2	2HVPAT-FR-HVP20A	2HVCHU-CC-HVE4	
20	1.3619E-9	IE-T8	1FWTRB-FR-12HP2	2HVPAT-FR-HVP22A	2HVCHU-CC-HVE4	
21	1.1967E-9	IE-T8	1FWTRB-FR-12HP2	2HVCHU-UM-2HVE4B	2EEBKR-SO-24H2	
22	1.1967E-9	IE-T8	1FWTRB-FR-12HP2	2HVCHU-UM-2HVE4B	2EEBKR-SO-24H4	
23	1.1967E-9	IE-T8	1FWTRB-FR-12HP2	2HVCHU-UM-2HVE4B	2EEBKR-SO-25H8	
24	1.1967E-9	IE-T8	1FWTRB-FR-12HP2	2HVCHU-UM-2HVE4B	2EEBKR-SO-24H1	
25	9.2879E-10	IE-T8	1FWTRB-FR-12HP2	2HVTCV-FC-TCV266	2HVFAN-FR-2FM07	
26	8.6169E-10	IE-T8	1FWTRB-FR-12HP2	2EEBUS-UM-2H1-1	2HVCHU-FS-2HVE4B	REC-MMP-C-MR-2

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
             T9AP02.MGP                  12:23   9/28/1992
Top event unavailability            =    1.719E-7
Number of cut sets in equation      =          113
Cutoff value used last step         =    1.000E-11
Longest cut set (# of events)       =            8
Basic Event Data file referenced    =     NAPS1
```

1	2.6372E-8	C-HV05	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	C-QS05	C-H105	T9A-FREQ-4160-1H	REC-1FRH:1-4	
2	1.1253E-8	1EGEDG-FS-1H	C-HV05	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	C-QS05	C-H105	T9A-FREQ-500KV-1	REC-1FRH:1-4
3	1.0442E-8	1EGEDG-FR-1H	C-HV05	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	C-QS05	C-H105	T9A-FREQ-500KV-1	REC-1FRH:1-4
4	8.0561E-9	C-HV05	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3B	C-QS05	C-H105	T9A-FREQ-4160-1H	REC-1FRH:1-4	
5	7.9821E-9	C-HV05	HEP-1AP22:5	C-QS05	C-H105	T9A-FREQ-4160-1H	REC-1FRH:1-4		
6	4.5011E-9	1EGEDG-FS-1H	C-HV05	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	C-QS05	C-H105	T9A-FREQ-RSST-C	REC-1FRH:1-4
7	4.3846E-9	C-HV05	1FWTRB-FS-1FWP2	1FWPSB-UM-1FWP3B	C-QS05	C-H105	T9A-FREQ-4160-1H	REC-1FRH:1-4	
8	4.2708E-9	1EGEDG-UM-1H	C-HV05	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3B	C-QS05	C-H105	T9A-FREQ-500KV-1	REC-1FRH:1-4
9	4.2316E-9	1EGEDG-UM-1H	C-HV05	HEP-1AP22:5	C-QS05	C-H105	T9A-FREQ-500KV-1	REC-1FRH:1-4	
10	4.1770E-9	1EGEDG-FR-1H	C-HV05	1FWPSB-UM-1FWP3B	1FWTRB-FR-24HP2	C-QS05	C-H105	T9A-FREQ-RSST-C	REC-1FRH:1-4
11	4.0331E-9	C-HV05	1FWPSB-FR-24HP3B	1FWTRB-FR-24HP2	C-QS05	C-H105	T9A-FREQ-4160-1H	REC-1FRH:1-4	
12	3.8155E-9	C-HV05	1FWHEP-1FW546	1FWTRB-FR-24HP2	C-QS05	C-H105	T9A-FREQ-4160-1H	REC-1FRH:1-4	
13	3.4376E-9	1EGEDG-FS-1H	C-HV05	1FWTRB-FR-24HP2	1FWPSB-FS-1FWP3B	C-QS05	C-H105	T9A-FREQ-500KV-1	REC-1FRH:1-4
14	3.4060E-9	1EGEDG-FS-1H	C-HV05	HEP-1AP22:5	C-QS05	C-H105	T9A-FREQ-500KV-1	REC-1FRH:1-4	
15	3.2254E-9	C-HV05	1FWCKV-FC-1FW183	1FWTRB-FR-24HP2	C-QS05	C-H105	T9A-FREQ-4160-1H	REC-1FRH:1-4	

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T9AP10.MGP 12:23 9/28/1992
Top event unavailability = 1.311E-7
Number of cut sets in equation = 87
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 8
Basic Event Data file referenced = NAPS1

1	9.1124E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	HEP-1ES1:3	1EE-BAT-II-2HR	1EE-BAT-I-2HR
2	8.1454E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1860B		
3	8.1454E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FO-1862B		
4	8.1454E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1863B		
5	4.8308E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	HEP-1ES1:3	1EE-BAT-II-2HR 1EE-BAT-I-2HR
6	4.3181E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FO-1862B	
7	4.3181E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1860B	
8	4.3181E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1863B	
9	3.8883E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	HEP-1ES1:3	1EE-BAT-II-2HR 1EE-BAT-I-2HR
10	3.6083E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	HEP-1ES1:3	1EE-BAT-II-2HR 1EE-BAT-I-2HR
11	3.4757E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FO-1862B	
12	3.4757E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1863B	
13	3.4757E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1860B	
14	3.3889E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIPSB-UM-1SIP1B		
15	3.2253E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1860B	
16	3.2253E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FO-1862B	
17	3.2253E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1863B	
18	3.0015E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIPSB-FS-1SIP1B		
19	2.5716E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SICKV-FO-1S147		
20	1.9323E-9	T9A-FREQ-RSST-C	1EGEDG-UM-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	HEP-1ES1:3	1EE-BAT-II-2HR 1EE-BAT-I-2HR

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T9AP13.MGP 12:24 9/28/1992
Top event unavailability = 1.022E-7
Number of cut sets in equation = 84
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 9
Basic Event Data file referenced = NAPS1

1	1.2154E-8	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SWTCV-FC-SW102B	C-QS05	C-H105	
2	7.3125E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1115B	C-QS05	C-H105	
3	7.3125E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FO-1115E	C-QS05	C-H105	
4	6.4431E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SWTCV-FC-SW102B	C-QS05	C-H105
5	5.1860E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SWTCV-FC-SW102B	C-QS05	C-H105
6	4.8125E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SWTCV-FC-SW102B	C-QS05	C-H105
7	3.8766E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FO-1115E	C-QS05	C-H105
8	3.8766E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1115B	C-QS05	C-H105
9	3.4055E-9	T9A-FREQ-4160-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1CHPAT-FS-1CHP1B	C-QS05	C-H105	
10	3.1203E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FO-1115E	C-QS05	C-H105
11	3.1203E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1115B	C-QS05	C-H105
12	2.8956E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FC-1115B	C-QS05	C-H105
13	2.8956E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SIMOV-FO-1115E	C-QS05	C-H105
14	2.5772E-9	T9A-FREQ-RSST-C	1EGEDG-UM-1H	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SWTCV-FC-SW102B	C-QS05	C-H105
15	2.0744E-9	1EGEDG-FS-1H	T9A-FREQ-RSST-C	C-HV05	1RCPORV-T3	1RCRV--FO-1455C	1SWTCV-FC-SW102B	C-QS05	C-H105

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T9ATRP02.MGP 12:19 9/28/1992
Top event unavailability = 8.327E-7
Number of cut sets in equation = 235
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 10
Basic Event Data file referenced = NAPS1

1	1.1051E-7	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	C-LT01		HEP-0AP55-20HR	C-RC303	C-QS05	
2	5.3211E-8	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	C-LT01		HEP-0AP55-20HR	C-RC303	C-QS05	
3	4.7154E-8	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05
4	4.3758E-8	1EGEDG-FR-1H	T9A-FREQ-500KV-1	1HVCHU-UM-1HVE4B		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05
5	2.8209E-8	1EGEDG-UM-1H	T9A-FREQ-500KV-1	1HVCHU-FS-1HVE4B		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05
6	2.2705E-8	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVCHU-FS-1HVE4B		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05
7	2.1215E-8	T9A-FREQ-4160-1H	1HVTCV-FC-TCV167	C-LT01		HEP-0AP55-20HR	C-RC303	C-QS05	
8	2.1215E-8	T9A-FREQ-4160-1H	1HVPCV-FC-1235B1	C-LT01		HEP-0AP55-20HR	C-RC303	C-QS05	
9	2.1070E-8	1EGEDG-FR-1H	T9A-FREQ-500KV-1	1HVCHU-FS-1HVE4B		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05
10	1.8862E-8	1EGEDG-FS-1H	T9A-FREQ-RSST-C	1HVCHU-UM-1HVE4B		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05
11	1.7503E-8	T9A-FREQ-RSST-C	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05
12	1.2764E-8	T9A-FREQ-4160-1H	1HVMOD-FO-MOD137	C-LT01		HEP-0AP55-20HR	C-RC303	C-QS05	
13	1.2764E-8	T9A-FREQ-4160-1H	1HVMOD-FC-MOD138	C-LT01		HEP-0AP55-20HR	C-RC303	C-QS05	
14	1.2764E-8	T9A-FREQ-4160-1H	1HVMOV-FC-111B	C-LT01		HEP-0AP55-20HR	C-RC303	C-QS05	
15	1.2764E-8	T9A-FREQ-4160-1H	1HVMOV-FC-113B	C-LT01		HEP-0AP55-20HR	C-RC303	C-QS05	
16	1.1283E-8	T9A-FREQ-RSST-C	1EGEDG-UM-1H	1HVCHU-FS-1HVE4B		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05
17	1.1247E-8	1EGEDG-UM-1H	T9A-FREQ-500KV-1	1HVPCV-FC-1235B1		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05
18	1.1247E-8	1EGEDG-UM-1H	T9A-FREQ-500KV-1	1HVTCV-FC-TCV167		C-LT01	HEP-0AP55-20HR	C-RC303	C-QS05

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                T9ATRP06.MGP                 12:24   9/28/1992
Top event unavailability            =   1.066E-7
Number of cut sets in equation      =          79
Cutoff value used last step         =   1.000E-11
Longest cut set (# of events)       =           7
Basic Event Data file referenced    =    NAPS1
```

1	1.6686E-8	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
2	8.0344E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
3	7.1199E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
4	6.6071E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	1HVCHU-UM-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
5	4.2593E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	1HVCHU-FS-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
6	3.4283E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVCHU-FS-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
7	3.2033E-9	T9A-FREQ-4160-1H	1HVPCV-FC-1235B1	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
8	3.2033E-9	T9A-FREQ-4160-1H	1HVTCV-FC-TCV167	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
9	3.1814E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	1HVCHU-FS-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
10	2.8480E-9	1EGEDG-FS-1H	T9A-FREQ-RSST-C	1HVCHU-UM-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
11	2.6428E-9	T9A-FREQ-RSST-C	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
12	1.9273E-9	T9A-FREQ-4160-1H	1HVMOV-FC-113B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
13	1.9273E-9	T9A-FREQ-4160-1H	1HVMOV-FC-111B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
14	1.9273E-9	T9A-FREQ-4160-1H	1HVMOD-FO-MOD137	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
15	1.9273E-9	T9A-FREQ-4160-1H	1HVMOD-FC-MOD138	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR	
16	1.7037E-9	T9A-FREQ-RSST-C	1EGEDG-UM-1H	1HVCHU-FS-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
17	1.6982E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	1HVTCV-FC-TCV167	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
18	1.6982E-9	1EGEDG-UM-1H	T9A-FREQ-500KV-1	1HVPCV-FC-1235B1	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
19	1.6445E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	C-LT01	HEP-0AP55-40HR	2IAIAS-LF-OUTIA	REC-2AP28
20	1.3713E-9	1EGEDG-FS-1H	T9A-FREQ-RSST-C	1HVCHU-FS-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
21	1.3668E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVPCV-FC-1235B1	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
22	1.3668E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVTCV-FC-TCV167	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR
23	1.2726E-9	T9A-FREQ-RSST-C	1EGEDG-FR-1H	1HVCHU-FS-1HVE4B	C-LT01	HEP-0AP55-20HR	HEP-0AP55-40HR

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    T9ATRP08.MGP              12:17   9/28/1992
Top event unavailability              =    1.526E-6
Number of cut sets in equation        =         246
Cutoff value used last step           =    1.000E-11
Longest cut set (# of events)         =           7
Basic Event Data file referenced      =     NAPS1
```

1	1.5224E-7	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05	
2	7.3306E-8	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05	
3	6.4963E-8	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05
4	6.0284E-8	1EGEDG-FR-1H	T9A-FREQ-500KV-1	1HVCHU-UM-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05
5	4.9171E-8	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1FWTRB-FS-1FWP2	HEP-OAP55-10HR	C-QS05	
6	3.8862E-8	1EGEDG-UM-1H	T9A-FREQ-500KV-1	1HVCHU-FS-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05
7	3.6222E-8	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1FWTRB-UM-1FWP2	HEP-OAP55-10HR	C-QS05	
8	3.1280E-8	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVCHU-FS-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05
9	2.9227E-8	T9A-FREQ-4160-1H	1HVPCV-FC-1235B1	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05	
10	2.9227E-8	T9A-FREQ-4160-1H	1HVTCV-FC-TCV167	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05	
11	2.9027E-8	1EGEDG-FR-1H	T9A-FREQ-500KV-1	1HVCHU-FS-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05
12	2.5985E-8	1EGEDG-FS-1H	T9A-FREQ-RSST-C	1HVCHU-UM-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05
13	2.4114E-8	T9A-FREQ-RSST-C	1EGEDG-FR-1H	1HVCHU-UM-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05
14	2.3676E-8	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1FWTRB-FS-1FWP2	HEP-OAP55-10HR	C-QS05	
15	2.0981E-8	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1FWTRB-FS-1FWP2	HEP-OAP55-10HR	C-QS05
16	1.9470E-8	1EGEDG-FR-1H	T9A-FREQ-500KV-1	1HVCHU-UM-1HVE4B	1FWTRB-FS-1FWP2	HEP-OAP55-10HR	C-QS05
17	1.7585E-8	T9A-FREQ-4160-1H	1HVMOD-FC-MOD138	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05	
18	1.7585E-8	T9A-FREQ-4160-1H	1HVMOV-FC-113B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05	
19	1.7585E-8	T9A-FREQ-4160-1H	1HVMOD-FO-MOD137	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05	
20	1.7585E-8	T9A-FREQ-4160-1H	1HVMOV-FC-111B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05	
21	1.7441E-8	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1FWTRB-UM-1FWP2	HEP-OAP55-10HR	C-QS05	
22	1.5545E-8	T9A-FREQ-RSST-C	1EGEDG-UM-1H	1HVCHU-FS-1HVE4B	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05
23	1.5494E-8	1EGEDG-UM-1H	T9A-FREQ-500KV-1	1HVTCV-FC-TCV167	1FWTRB-FR-12HP2	HEP-OAP55-10HR	C-QS05

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T9ATRP14.MGP 12:21 9/28/1992
Top event unavailability = 3.881E-7
Number of cut sets in equation = 257
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 8
Basic Event Data file referenced = NAPS1

1	6.9001E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCRV--CC-RCPORV	HEP-1ES1:3	1EE-BAT-II-2HR	1EE-BAT-I-2HR	
2	6.9001E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1MSRV--CC-101ABC	HEP-1ES1:3	1EE-BAT-II-2HR	1EE-BAT-I-2HR	
3	6.1678E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCRV--CC-RCPORV	1SIMOV-FC-1863B			
4	6.1678E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1MSRV--CC-101ABC	1SIMOV-FC-1860B			
5	6.1678E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCRV--CC-RCPORV	1SIMOV-FO-1862B			
6	6.1678E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCRV--CC-RCPORV	1SIMOV-FC-1860B			
7	6.1678E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1MSRV--CC-101ABC	1SIMOV-FC-1863B			
8	6.1678E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1MSRV--CC-101ABC	1SIMOV-FO-1862B			
9	5.8712E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	HEP-1ES1:2-S2	HEP-1ES1:3	1EE-BAT-II-2HR	1EE-BAT-I-2HR	
10	5.2481E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	HEP-1ES1:2-S2	1SIMOV-FC-1863B			
11	5.2481E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	HEP-1ES1:2-S2	1SIMOV-FO-1862B			
12	5.2481E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	HEP-1ES1:2-S2	1SIMOV-FC-1860B			
13	4.3165E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCMOV-LK-1535	1RCMOV-LK-1536	HEP-1ES1:3	1EE-BAT-II-2HR	1EE-BAT-I-2HR
14	3.8584E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCMOV-LK-1535	1RCMOV-LK-1536	1SIMOV-FO-1862B		
15	3.8584E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCMOV-LK-1535	1RCMOV-LK-1536	1SIMOV-FC-1860B		
16	3.8584E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCMOV-LK-1535	1RCMOV-LK-1536	1SIMOV-FC-1863B		
17	3.3225E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1RCRV--CC-RCPORV	HEP-1ES1:3	1EE-BAT-II-2HR	1EE-BAT-I-2HR	
18	3.3225E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1MSRV--CC-101ABC	HEP-1ES1:3	1EE-BAT-II-2HR	1EE-BAT-I-2HR	
19	2.9699E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1MSRV--CC-101ABC	1SIMOV-FO-1862B			
20	2.9699E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1MSRV--CC-101ABC	1SIMOV-FC-1863B			
21	2.9699E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1MSRV--CC-101ABC	1SIMOV-FC-1860B			
22	2.9699E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1RCRV--CC-RCPORV	1SIMOV-FC-1863B			

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                   T9ATRP17.MGP                 12:22   9/28/1992
Top event unavailability               =    3.066E-7
Number of cut sets in equation         =         191
Cutoff value used last step            =    1.000E-11
Longest cut set (# of events)          =           8
Basic Event Data file referenced       =     NAPS1
```

1	9.2029E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCRV--CC-RCPORV	1SWTCV-FC-SW102B	C-QS05	C-H105	
2	9.2029E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1MSRV--CC-101ABC	1SWTCV-FC-SW102B	C-QS05	C-H105	
3	7.8307E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	HEP-1ES1:2-S2	1SWTCV-FC-SW102B	C-QS05	C-H105	
4	5.7571E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCMOV-LK-1535	1RCMOV-LK-1536	1SWTCV-FC-SW102B	C-QS05	C-H105
5	5.5372E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1MSRV--CC-101ABC	1SIMOV-FO-1115E	C-QS05	C-H105	
6	5.5372E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCRV--CC-RCPORV	1SIMOV-FC-1115B	C-QS05	C-H105	
7	5.5372E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCRV--CC-RCPORV	1SIMOV-FO-1115E	C-QS05	C-H105	
8	5.5372E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1MSRV--CC-101ABC	1SIMOV-FC-1115B	C-QS05	C-H105	
9	4.7115E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	HEP-1ES1:2-S2	1SIMOV-FC-1115B	C-QS05	C-H105	
10	4.7115E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	HEP-1ES1:2-S2	1SIMOV-FO-1115E	C-QS05	C-H105	
11	4.4313E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1MSRV--CC-101ABC	1SWTCV-FC-SW102B	C-QS05	C-H105	
12	4.4313E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	1RCRV--CC-RCPORV	1SWTCV-FC-SW102B	C-QS05	C-H105	
13	3.9269E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1MSRV--CC-101ABC	1SWTCV-FC-SW102B	C-QS05	C-H105
14	3.9269E-9	T9A-FREQ-500KV-1	1EGEDG-FS-1H	1HVCHU-UM-1HVE4B	1RCRV--CC-RCPORV	1SWTCV-FC-SW102B	C-QS05	C-H105
15	3.7706E-9	T9A-FREQ-4160-1H	1HVCHU-FS-1HVE4B	HEP-1ES1:2-S2	1SWTCV-FC-SW102B	C-QS05	C-H105	
16	3.6441E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	1HVCHU-UM-1HVE4B	1RCRV--CC-RCPORV	1SWTCV-FC-SW102B	C-QS05	C-H105
17	3.6441E-9	1EGEDG-FR-1H	T9A-FREQ-500KV-1	1HVCHU-UM-1HVE4B	1MSRV--CC-101ABC	1SWTCV-FC-SW102B	C-QS05	C-H105
18	3.4639E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCMOV-LK-1535	1RCMOV-LK-1536	1SIMOV-FO-1115E	C-QS05	C-H105
19	3.4639E-9	T9A-FREQ-4160-1H	1HVCHU-UM-1HVE4B	1RCMOV-LK-1535	1RCMOV-LK-1536	1SIMOV-FC-1115B	C-QS05	C-H105

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T9BP02.MGP 12:22 9/28/1992
Top event unavailability = 2.358E-7
Number of cut sets in equation = 357
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 8
Basic Event Data file referenced = NAPS1

1	3.4712E-8	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	C-QS06	C-H106	T9B-FREQ-4160-1J	REC-1FRH:1-4	
2	1.4812E-8	1EGEDG-FS-1J	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	C-QS06	C-H106	T9B-FREQ-500KV-2	REC-1FRH:1-4
3	1.3745E-8	1EGEDG-FR-1J	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	C-QS06	C-H106	T9B-FREQ-500KV-2	REC-1FRH:1-4
4	1.0604E-8	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	C-QS06	C-H106	T9B-FREQ-4160-1J	REC-1FRH:1-4	
5	1.0507E-8	HEP-1AP22:5	C-QS06	C-H106	T9B-FREQ-4160-1J	REC-1FRH:1-4		
6	5.9247E-9	1EGEDG-FS-1J	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	C-QS06	C-H106	T9B-FREQ-RSST-A	REC-1FRH:1-4
7	5.7712E-9	1FWPSB-UM-1FWP3A	1FWTRB-FS-1FWP2	C-QS06	C-H106	T9B-FREQ-4160-1J	REC-1FRH:1-4	
8	5.6215E-9	1EGEDG-UM-1J	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	C-QS06	C-H106	T9B-FREQ-500KV-2	REC-1FRH:1-4
9	5.5699E-9	1EGEDG-UM-1J	HEP-1AP22:5	C-QS06	C-H106	T9B-FREQ-500KV-2	REC-1FRH:1-4	
10	5.4980E-9	1EGEDG-FR-1J	1FWTRB-FR-24HP2	1FWPSB-UM-1FWP3A	C-QS06	C-H106	T9B-FREQ-RSST-A	REC-1FRH:1-4
11	5.3086E-9	1FWTRB-FR-24HP2	1FWPSB-FR-24HP3A	C-QS06	C-H106	T9B-FREQ-4160-1J	REC-1FRH:1-4	
12	5.0222E-9	1FWTRB-FR-24HP2	1FWHEP-1FW548	C-QS06	C-H106	T9B-FREQ-4160-1J	REC-1FRH:1-4	
13	4.5248E-9	1EGEDG-FS-1J	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	C-QS06	C-H106	T9B-FREQ-500KV-2	REC-1FRH:1-4
14	4.4832E-9	1EGEDG-FS-1J	HEP-1AP22:5	C-QS06	C-H106	T9B-FREQ-500KV-2	REC-1FRH:1-4	
15	4.2455E-9	1FWTRB-FR-24HP2	1FWCKV-FC-1FW165	C-QS06	C-H106	T9B-FREQ-4160-1J	REC-1FRH:1-4	
16	4.1989E-9	1EGEDG-FR-1J	1FWPSB-FS-1FWP3A	1FWTRB-FR-24HP2	C-QS06	C-H106	T9B-FREQ-500KV-2	REC-1FRH:1-4
17	4.1603E-9	1EGEDG-FR-1J	HEP-1AP22:5	C-QS06	C-H106	T9B-FREQ-500KV-2	REC-1FRH:1-4	
18	3.8064E-9	1FWCKV-CC-ALLAFW	C-QS06	C-H106	T9B-FREQ-4160-1J	REC-1FRH:1-4		
19	2.8143E-9	1EGEDG-UM-1J	1FWTRB-FR-24HP2	1FWPSB-FR-24HP3A	C-QS06	C-H106	T9B-FREQ-500KV-2	REC-1FRH:1-4

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

T9BP13.MGP 12:23 9/28/1992

Top event unavailability = 1.296E-7
Number of cut sets in equation = 139
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 8
Basic Event Data file referenced = NAPS1

1	9.6252E-9	T9B-FREQ-4160-1J	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1115D	C-QS06	C-H106	
2	9.6252E-9	T9B-FREQ-4160-1J	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FO-1115C	C-QS06	C-H106	
3	9.6252E-9	T9B-FREQ-4160-1J	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1867C	C-QS06	C-H106	
4	9.6252E-9	T9B-FREQ-4160-1J	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1867A	C-QS06	C-H106	
5	5.1027E-9	1EGEDG-UM-1J	T9B-FREQ-500KV-2	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FO-1115C	C-QS06	C-H106
6	5.1027E-9	1EGEDG-UM-1J	T9B-FREQ-500KV-2	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1867A	C-QS06	C-H106
7	5.1027E-9	1EGEDG-UM-1J	T9B-FREQ-500KV-2	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1115D	C-QS06	C-H106
8	5.1027E-9	1EGEDG-UM-1J	T9B-FREQ-500KV-2	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1867C	C-QS06	C-H106
9	4.1071E-9	T9B-FREQ-500KV-2	1EGEDG-FS-1J	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1867A	C-QS06	C-H106
10	4.1071E-9	T9B-FREQ-500KV-2	1EGEDG-FS-1J	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1115D	C-QS06	C-H106
11	4.1071E-9	T9B-FREQ-500KV-2	1EGEDG-FS-1J	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FO-1115C	C-QS06	C-H106
12	4.1071E-9	T9B-FREQ-500KV-2	1EGEDG-FS-1J	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1867C	C-QS06	C-H106
13	3.8113E-9	1EGEDG-FR-1J	T9B-FREQ-500KV-2	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1867C	C-QS06	C-H106
14	3.8113E-9	1EGEDG-FR-1J	T9B-FREQ-500KV-2	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1867A	C-QS06	C-H106
15	3.8113E-9	1EGEDG-FR-1J	T9B-FREQ-500KV-2	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FO-1115C	C-QS06	C-H106
16	3.8113E-9	1EGEDG-FR-1J	T9B-FREQ-500KV-2	1RCPORV-T3	1RCRV--FO-1456	1SIMOV-FC-1115D	C-QS06	C-H106

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                    THP30.MGP                12:22   9/28/1992
     Top event unavailability         =   2.058E-7
     Number of cut sets in equation   =          1
     Cutoff value used last step      =   1.000E-11
     Longest cut set (# of events)    =          5
     Basic Event Data file referenced =    NAPS1
```

1	2.0577E-7	IE-TH	1RPROD-LF-CRODS	PROB-M03	C-TT01	PROB-PR01

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

THP46.MGP 12:22 9/28/1992
Top event unavailability = 2.141E-7
Number of cut sets in equation = 6
Cutoff value used last step = 1.000E-11
Longest cut set (# of events) = 6
Basic Event Data file referenced = NAPS1

1	7.4330E-8	IE-TH	1RPROD-LF-CRODS	PROB-M03	1MSPIC-LF-1447	PROB-Q08	
2	7.4330E-8	IE-TH	1RPROD-LF-CRODS	PROB-M03	1MSPIC-LF-1446	PROB-Q08	
3	1.6793E-8	IE-TH	1RPROD-LF-CRODS	PROB-M03	1TMSOV-FC-20-ET	PROB-Q08	
4	1.6793E-8	IE-TH	1RPROD-LF-CRODS	PROB-M03	1TMSOV-FC-ASO	PROB-Q08	
5	1.5941E-8	IE-TH	1MSPIC-LF-1446	HEP-1FRS:1-5	1RPBKR-CC-RTARTB	PROB-M03	PROB-Q08
6	1.5941E-8	IE-TH	1MSPIC-LF-1447	HEP-1FRS:1-5	1RPBKR-CC-RTARTB	PROB-M03	PROB-Q08

TABLE B.2-11 (Continued)
"TOP CUT SETS FOR SEQUENCES GREATER THAN 1.0E-7"

```
                  VXP07.MGP          12:17   9/28/1992
Top event unavailability        =   1.524E-6
Number of cut sets in equation  =          1
Cutoff value used last step     =   1.000E-11
Longest cut set (# of events)   =          2
Basic Event Data file referenced =   NAPS1
```

1	1.5236E-6	IE-VX	PROB-FM01

TABLE B.2-12
TOP CUT SETS FOR DAM.EQN

Top event: GDAM112
Top event unavailability (r.ev. appr)= 5.20E-02
Cutoff value used = 1.00E-11
Number of Boolean Indicated Cut Sets = 1592
Number of MCS listed = 1568
MINIMAL CUT SETS SORTED BY UNAVAILABILITY

1	1.14E-2	2EGEDG-UM-2J	2EGEDG-UM-2H
2	1.01E-2	2HVCHU-UM-2HVE4B	2EGEDG-UM-2H
3	8.91E-3	1HVCHU-UM-1HVE4C	1HVCHU-UM-1HVE4B
4	8.91E-3	2HVCHU-UM-2HVE4C	2HVCHU-UM-2HVE4B
5	1.68E-3	1HVCHU-UM-1HVE4B	1EGEDG-UM-1H
6	1.43E-3	1SWPIP-UM-HDRA	HEP-OOP49:4A
7	1.43E-3	1SWPIP-UM-HDRB	HEP-OOP49:4A
8	5.20E-4	1SWPIP-UM-HDRB	1SWPIP-UM-HDRA
9	4.06E-4	1SWPIP-UM-HDRB	1EGEDG-UM-1H
10	4.06E-4	1SWPIP-UM-HDRA	1EGEDG-UM-1J
11	3.17E-4	1EGEDG-UM-1J	1EGEDG-UM-1H
12	2.46E-4	1CHPAT-UM-1CHPBC	1CHPAT-UM-1CHP1C
13	2.44E-4	1EGEDG-UM-1H	1FWTRB-UM-1FWP2
14	2.44E-4	1EGEDG-UM-1J	1FWTRB-UM-1FWP2
15	2.42E-4	2HVCHU-UM-HVE4BC	2EGEDG-UM-2H
16	2.13E-4	1HVCHU-UM-HVE4BC	1HVCHU-UM-1HVE4C
17	2.13E-4	1HVCHU-UM-HVE4BC	1HVCHU-UM-1HVE4B
18	2.13E-4	2HVCHU-UM-HVE4BC	2HVCHU-UM-2HVE4C
19	2.13E-4	2HVCHU-UM-HVE4BC	2HVCHU-UM-2HVE4B
20	1.77E-4	2HVACU-UM-2HVAC6	2EGEDG-UM-2H
21	9.22E-5	1EGEDG-UM-1H	1FWPSB-UM-1FWP3B
22	9.22E-5	1EGEDG-UM-1J	1FWPSB-UM-1FWP3A
23	8.76E-5	1RSPSB-TM-1RSP2B	1EGEDG-UM-1H
24	8.76E-5	1RSPSB-TM-1RSP2A	1EGEDG-UM-1J
25	8.08E-5	1RSPSB-UM-1RSP1B	1EGEDG-UM-1H
26	8.08E-5	1RSPSB-UM-1RSP1A	1EGEDG-UM-1J
27	8.08E-5	1EGEDG-UM-1H	1RSPSB-UM-1RSP2B
28	8.08E-5	1EGEDG-UM-1J	1RSPSB-UM-1RSP2A
29	8.08E-5	1SIPSB-UM-1SIP1B	1EGEDG-UM-1H
30	8.08E-5	1SIPSB-UM-1SIP1A	1EGEDG-UM-1J
31	7.10E-5	1FWTRB-UM-1FWP2	1FWPSB-UM-1FWP3B
32	7.10E-5	1FWTRB-UM-1FWP2	1FWPSB-UM-1FWP3A
33	6.67E-5	1EGEDG-UM-1H	1RSPSB-UM-1RSP3B
34	6.67E-5	1EGEDG-UM-1J	1RSPSB-UM-1RSP3A
35	6.67E-5	1RHPSB-UM-1RHP1B	1EGEDG-UM-1H
36	6.67E-5	1RHPSB-UM-1RHP1A	1EGEDG-UM-1J
37	6.67E-5	1EGEDG-UM-1H	1QSPSB-UM-1QSP1B
38	6.67E-5	1QSPSB-TM-1QSP1B	1EGEDG-UM-1H
39	6.67E-5	1EGEDG-UM-1J	1QSPSB-UM-1QSP1A
40	6.67E-5	1QSPSB-TM-1QSP1A	1EGEDG-UM-1J

TABLE B.3.1-1 SUMMARY OF RECOVERY BASIC EVENTS				
Basic Event Name	Equip-ment	Human Error	Total	Description
REC-CONTAINMENT	2E-2	0	2E-2	RECOVER SEQUENCES CONTAINMENT HAS FAILED NO CORE DAMAGE
REC-1ES1:2	2E-3	9E-4	3E-3	1-ES-1.2 POST LOCA COOLDOWN AND DEPRESSURIZATION
REC-1OP21:6	6E-4	1E-3	2E-3	0-OP-21.6 MCR AND RELAY ROOM AIR CONDITIONING
REC-MMP-C-MR-2	2E-3	2E-1	3E-1	MMP-C-MR-2 TROUBLE SHOOTING & REPAIR MCR CHILLER UNITS
REC-SCREEN-TURNS	1E-1	0	1E-1	SW RESERVOIR TRAVELING SCREEN AUTO ROTATES & WASH
REC-1AP28	1E-1	2E-3	1E-1	1-AP-28 LOSS OF INSTRUMENT AIR
REC-2AP28	1E-1	2E-3	1E-1	2-AP-28 LOSS OF INSTRUMENT AIR
REC-1FRH:1-4	8E-3	3E-3	1E-2	1-FR-H.1 LOSS OF HEAT SINK STEP 4 MAIN FEEDWATER
REC-1OP14:1	1E-1	4E-3	1E-1	1-OP-14.1 RHR RECOVERY
REC-1ES1:4-1	1E-1	4E-3	1E-1	1-ES-1.4 HOT LEG RECIRC STEP 1 OPEN 1-SI-MOV-1890A & B
REC-B12AVE	1E-1	0	1E-1	TIME AVERAGED NON RECOVERY OF AC POWER IN 12 HOURS

TABLE B.3.2-1
CONTAINMENT EDIT FILE (CONTAIN.EDT)

```
IE-A               =IE-A               ,REC-CONTAINMENT
IE-RX              =IE-RX              ,REC-CONTAINMENT
IE-S1              =IE-S1              ,REC-CONTAINMENT
IE-S2              =IE-S2              ,REC-CONTAINMENT
IE-T1              =IE-T1              ,REC-CONTAINMENT
IE-T2              =IE-T2              ,REC-CONTAINMENT
IE-T2A             =IE-T2A             ,REC-CONTAINMENT
IE-T3              =IE-T3              ,REC-CONTAINMENT
IE-T4              =IE-T4              ,REC-CONTAINMENT
IE-T5A             =IE-T5A             ,REC-CONTAINMENT
IE-T5B             =IE-T5B             ,REC-CONTAINMENT
T9A-FREQ-4160-1H=T9A-FREQ-4160-1H,REC-CONTAINMENT
T9A-FREQ-500KV-1=T9A-FREQ-500KV-1,REC-CONTAINMENT
T9A-FREQ-RSST-C =T9A-FREQ-RSST-C ,REC-CONTAINMENT
T9B-FREQ-4160-1J=T9B-FREQ-4160-1J,REC-CONTAINMENT
T9B-FREQ-500KV-2=T9B-FREQ-500KV-2,REC-CONTAINMENT
T9B-FREQ-RSST-A =T9B-FREQ-RSST-A ,REC-CONTAINMENT
```

TABLE B.3.2-2
COOLDOWN EDIT FILE (COOLDOWN.EDT)

```
1MSMV--LK-1MS21 =1MSMV--LK-1MS21 ,REC-1ES1:2
1MSMV--LK-1MS59 =1MSMV--LK-1MS59 ,REC-1ES1:2
1MSMV--LK-1MS97 =1MSMV--LK-1MS97 ,REC-1ES1:2
```

TABLE B.3.2-3
EMERGENCY SWITCHGEAR ROOM EDIT FILE (ESGR.EDT)

```
1HVSTR-PL-1HVS1A=1HVSTR-PL-1HVS1A,REC-1OP21:6
1HVSTR-PG-1HVS1B=1HVSTR-PG-1HVS1B,REC-1OP21:6
2HVSTR-PL-2HVS1A=2HVSTR-PL-2HVS1A,REC-1OP21:6
2HVSTR-PG-2HVS1B=2HVSTR-PG-2HVS1B,REC-1OP21:6
2HVCHU-FR-2HVE4A=2HVCHU-FR-2HVE4A,REC-MMP-C-MR-2
2HVCHU-FS-2HVE4B=2HVCHU-FS-2HVE4B,REC-MMP-C-MR-2
2HVCHU-FS-2HVE4C=2HVCHU-FS-2HVE4C,REC-MMP-C-MR-2
1SWSCN-PL-1SWP1A=1SWSCN-PL-1SWP1A,REC-SCREEN-TURNS
1SWSCN-PG-1SWP1B=1SWSCN-PG-1SWP1B,REC-SCREEN-TURNS
1SWSCN-PG-2SWP1B=1SWSCN-PG-2SWP1B,REC-SCREEN-TURNS
1SWSCN-CC-SWRES =1SWSCN-CC-SWRES ,REC-SCREEN-TURNS
1IAIAS-LF-OUTIA =1IAIAS-LF-OUTIA ,REC-1AP28
2IAIAS-LF-OUTIA =2IAIAS-LF-OUTIA ,REC-2AP28
```

TABLE B.3.2-4
MAIN FEEDWATER EDIT FILE (MFW.EDT)

```
IE-T5A          =IE-T5A          ,REC-1FRH:1-4
IE-T5B          =IE-T5B          ,REC-1FRH:1-4
IE-T7           =IE-T7           ,REC-1FRH:1-4
IE-T8           =IE-T8           ,REC-1FRH:1-4
T9A-FREQ-4160-1H=T9A-FREQ-4160-1H,REC-1FRH:1-4
T9A-FREQ-500KV-1=T9A-FREQ-500KV-1,REC-1FRH:1-4
T9A-FREQ-RSST-C =T9A-FREQ-RSST-C ,REC-1FRH:1-4
T9B-FREQ-4160-1J=T9B-FREQ-4160-1J,REC-1FRH:1-4
T9B-FREQ-500KV-2=T9B-FREQ-500KV-2,REC-1FRH:1-4
T9B-FREQ-RSST-A =T9B-FREQ-RSST-A ,REC-1FRH:1-4
```

TABLE B.3.2-5
RESIDUAL HEAT REMOVAL EDIT FILE (RHR.EDT)

```
1CCAOV-FC-TV103A=1CCAOV-FC-TV103A,REC-1OP14:1
1CCAOV-FC-TV103B=1CCAOV-FC-TV103B,REC-1OP14:1
1CCMOV-FC-CC100A=1CCMOV-FC-CC100A,REC-1OP14:1
1CCMOV-FC-CC100B=1CCMOV-FC-CC100B,REC-1OP14:1
1CCMOV-CC-100AB =1CCMOV-CC-100AB ,REC-1OP14:1
1RHHCV-FC-1758  =1RHHCV-FC-1758  ,REC-1OP14:1
1RHMOV-FC-1700  =1RHMOV-FC-1700  ,REC-1OP14:1
1RHMOV-FC-1701  =1RHMOV-FC-1701  ,REC-1OP14:1
1RHMOV-CC-1720  =1RHMOV-CC-1720  ,REC-1OP14:1
1RHMOV-FC-1720A =1RHMOV-FC-1720A ,REC-1OP14:1
1RHMOV-FC-1720B =1RHMOV-FC-1720B ,REC-1OP14:1
```

TABLE B.3.2-6
RECIRCULATION MODE TRANSFER EDIT FILE (RMT.EDT)

```
1SIMOV-FC-1890A =1SIMOV-FC-1890A ,REC-1ES1:4-1
1SIMOV-FC-1890B =1SIMOV-FC-1890B ,REC-1ES1:4-1
1SIMOV-FO-1864A =1SIMOV-FO-1864A ,REC-1ES1:4-1
1SIMOV-FO-1864B =1SIMOV-FO-1864B ,REC-1ES1:4-1
```

TABLE B.3.2-7
AUXILIARY FEEDWATER EDIT FILE (AFW.EDT)

```
NON-REC-B02     ,1FWTRB-FR-12HP2 =1FWTRB-FR-12HP2 ,REC-B12AVE
```

TABLE B.3.2-8
RECOVERY TABLE INPUT FILE (RECOVERY.TBL)

1	CONTAIN
2	COOLDOWN
3	ESGR
4	MFW
5	RHR
6	RMT
7	AFW

TABLE B.3.2-9
RECOVERY APPLICATION INPUT FILE (RECOVERY.APP)

Initiator	Sequence	Edit Files
	AP04	1,6
	AP05	1,6
	AP09	1,6
	AP10	1,6
	AP18	1,6
	AP19	1,6
	AP23	1,6
	AP24	1,6
	AP29	3,6
A		6
	RXP05	1
	RXP06	1
	S1P02	1
	S1P03	1
	S1P08	1
	S1P09	1
	S1P14	1
	S1P15	1
	S1P20	1
	S1P21	1
	S1P29	1
	S1P30	1
	S1P38	2
	S1P40	2
	S1P41	2
	S1P50	3

TABLE B.3.2-9 (Continued)
RECOVERY APPLICATION INPUT FILE (RECOVERY.APP)

Initiator	Sequence	Edit Files
	S2P02	1
	S2P03	1
	S2P08	1,2
	S2P09	1,2
	S2P15	1,2
	S2P16	1,2
	S2P21	1
	S2P22	1
	S2P30	1
	S2P31	1
	S2P51	3
S2		2
	T1P04	1
	T1P05	1
	T1P22	1
	T1P24	1
	T1P27	1
	T1P28	1,2
	T1P29	2
	T1P30	2
	T1P34	1
	T1P35	1
	T1P46	2
	T1P63	3
T1TR		2,3
	T1AP46	7
	T1AP47	7
	T1AP48	7
	T1AP49	7
	T1AP50	7
	T1AP51	7
	T1AP52	7
	T1AP53	7
	T1AP54	7
	T1AP55	7
	T1AP56	7
	T2P03	1
	T2P04	1
	T2TRP11	2,3
T2TR		3

TABLE B.3.2-9 (Continued)
RECOVERY APPLICATION INPUT FILE (RECOVERY.APP)

Initiator	Sequence	Edit Files
	T2AP04	1
	T2AP05	1
	T2ATRP10	2,3
	T2ATRP11	2,3
T2ATR		3
	T3P04	1
	T3P05	1
	T3TRP10	2,3
	T3TRP11	2,3
T3TR		3
	T4P04	1
	T4P06	1
	T4P27	3
	T5AP02	4
	T5AP03	4
	T5AP04	4
	T5AP05	4
	T5AP06	4
	T5AP08	1
	T5AP09	1
	T5AP18	4
	T5AP19	4
	T5AP20	4
	T5AP21	4
	T5AP22	4
	T5AP23	3
	T5BP02	4
	T5BP03	4
	T5BP04	4
	T5BP05	4
	T5BP06	4
	T5BP08	1
	T5BP09	1
	T5BP18	4
	T5BP19	4
	T5BP20	4
	T5BP21	4
	T5BP22	4
	T5BP23	3
	T6P16	3

TABLE B.3.2-9 (Continued)
RECOVERY APPLICATION INPUT FILE (RECOVERY.APP)

Initiator	Sequence	Edit Files
	T7P04	2,5
	T7P07	2,5
	T7P09	1,5
	T7P10	1,5
	T7P25	2,5
	T7P27	4,5
	T7P28	4,5
	T7P29	3,5
T7		5
T8		2,3
	T9AP02	4
	T9AP03	4
	T9AP04	4
	T9AP05	4
	T9AP06	4
	T9AP08	1
	T9AP09	1
	T9AP18	4
	T9AP19	4
	T9AP20	4
	T9AP21	4
	T9AP22	4
T9ATR		3
	T9BP02	4
	T9BP03	4
	T9BP04	4
	T9BP05	4
	T9BP06	4
	T9BP08	1
	T9BP09	1
	T9BP18	4
	T9BP19	4
	T9BP20	4
	T9BP21	4
	T9BP22	4
T9BTR		3
	VXP06	3

TABLE B.3.3-1
FLOODING RECOVERY EDIT FILE (FLOOD.EDT)

IEFAC1	=IEFAC1	,REC-CONTAINMENT
IEFAB2	=IEFAB2	,REC-CONTAINMENT
IEFAB4	=IEFAB4	,REC-CONTAINMENT

TABLE B.3.3-2
FLOODING RECOVERY TABLE FILE (FLOOD.TBL)

1 FLOOD

TABLE B.3.3-3
FLOODING RECOVERY APPLICATION FILE (FLOOD.APP)

FAB2P04	1
FAB2P06	1
FAB4P04	1
FAB4P06	1

TABLE B.3.4-1 DISALLOWED COMBINATIONS OF RECOVERY AND HEP BASIC EVENTS			
basic event	basic event	Allowed	Reason
HEP-1ES1:2-S2	REC-1ES1:2	No	Repeats operator failure to cooldown and depressurize
HEP-1FRH:1-11	REC-1ES1:2	No	HEP is failure to open PORV, REC is failure to depressurize, these are too closely related
REC-1AP28	REC-2AP28	No	Repeats operator failure to restore IA on Unit 1 or 2
HEP-1OP49:1	REC-SCREEN-TURNS	Yes	REC does not contain operator error, only mechanical faults
HEP-1OP21:6	REC-1OP21:6	No	Repeats operator failure to restore ESGR chillers
HEP-1OP21:6	REC-MMP-C-MR-2	No	Repeats operator failure to restore ESGR chillers
REC-1OP21:6	REC-MMP-C-MR-2	Yes	Different Operator actions, SW strainer chiller recovery
HEP-0AP55-10	REC-1OP21:6	Yes	Late success of operator to initiate corrective action before core damage

TABLE B.3.4-1 DISALLOWED COMBINATIONS OF RECOVERY AND HEP BASIC EVENTS			
basic event	basic event	Allowed	Reason
HEP-0AP55-20	REC-1OP21:6	Yes	Success of operator to initiate corrective action before core damage
HEP-0AP55-30	REC-1OP21:6	No	Core damage before operator success*
HEP-0AP55-40	REC-1OP21:6	No	Core damage before operator success*
HEP-0AP55-10	REC-MMP-C-MR-2	Yes	Success of operator to initiate corrective action before core damage
HEP-0AP55-20	REC-MMP-C-MR-2	Yes	Success of operator to initiate corrective action before core damage
HEP-0AP55-30	REC-MMP-C-MR-2	No	Core damage before operator success*
HEP-0AP55-40	REC-MMP-C-MR-2	No	Core damage before operator success*

* For HEP-0AP55-30 and 40, core damage is assumed at 10 or 20 hours. These HEPs only provide binning for Level 2 analysis of Containment failure. Recovery is disallowed so as to avoid masking sequence contribution to event core damage frequency.

TABLE B.3.4-2 SENSITIVITY RESULTS RECOVERY BASIC EVENTS			
Basic Event Name	Mean	Description	CDF With REC=1 (% increase)
REC-CONTAINMENT	2E-2	RECOVER SEQUENCES CONTAINMENT HAS FAILED NO CORE DAMAGE	7.31E-5 (7.6)
REC-1ES1:2	3E-3	1-ES-1.2 POST LOCA COOLDOWN AND DEPRESSURIZATION	6.99E-5 (2.9)
REC-1OP21:6	2E-3	0-OP-21.6 MCR AND RELAY ROOM AIR CONDITIONING	6.99E-5 (3.0)
REC-MMP-C-MR-2	3E-1	MMP-C-MR-2 TROUBLE SHOOTING & REPAIR MCR CHILLER UNITS	6.85E-5 (0.9)
REC-SCREEN-TURNS	1E-1	SW RESERVOIR TRAVELING SCREEN AUTO ROTATES & WASH	9.45E-5 (39.4)
REC-1AP28	1E-1	1-AP-28 LOSS OF INSTRUMENT AIR	9.34E-5 (37.6)
REC-2AP28	1E-1	2-AP-28 LOSS OF INSTRUMENT AIR	7.02E-5 (3.4)
REC-1FRH:1-4	1E-2	1-FR-H.1 LOSS OF HEAT SINK STEP 4 MAIN FEEDWATER	1.31E-4 (93.1)
REC-1OP14:1	1E-1	1-OP-14.1 RHR RECOVERY	8.12E-5 (19.7)
REC-1ES1:4-1	1E-1	1-ES-1.4 HOT LEG RECIRC STEP 1 OPEN 1-SI-MOV-1890A & B	6.81E-5 (0.3)
REC-B12AVE	1E-1	TIME AVERAGED NON RECOVERY OF AC POWER IN 12 HOURS	8.19E-5 (20.7)

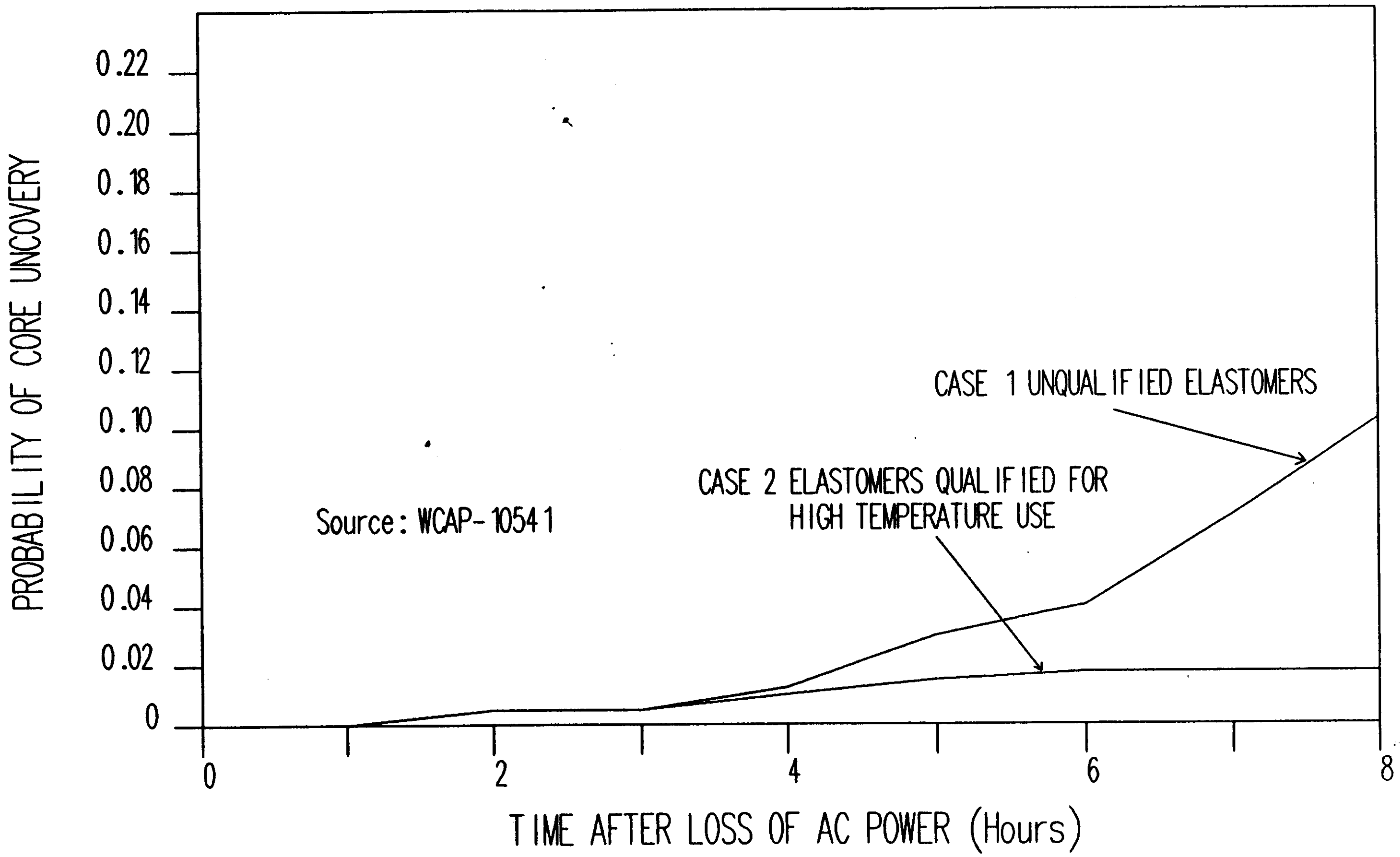


FIGURE B.1-1

PROBABILITY OF NON-RECOVERY OF OFFSITE POWER

ASSUMING LOSS OF ALL AC POWER

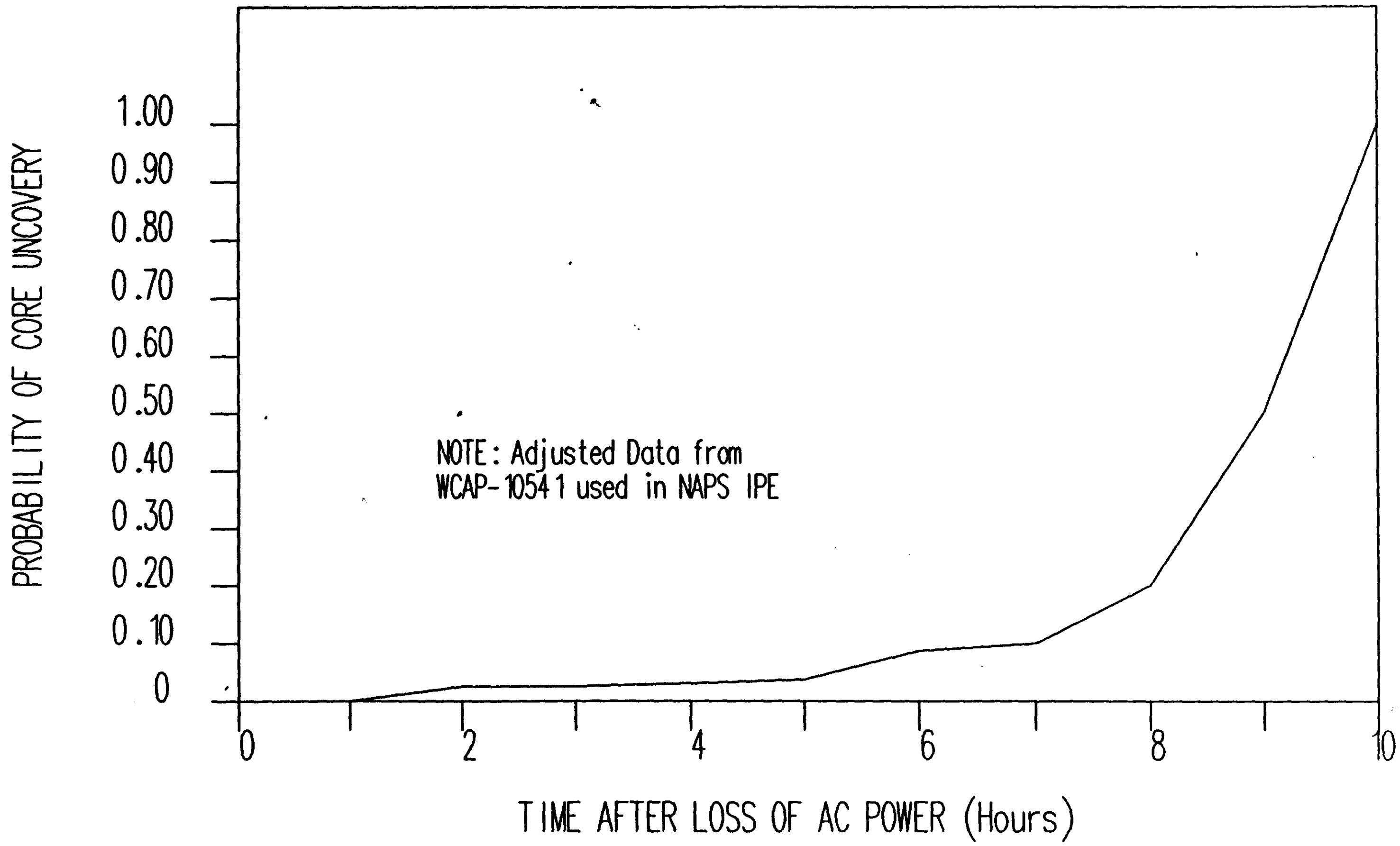


FIGURE B.1-2

PROBABILITY OF CORE UNCOVERY

ASSUMING LOSS OF ALL AC POWER

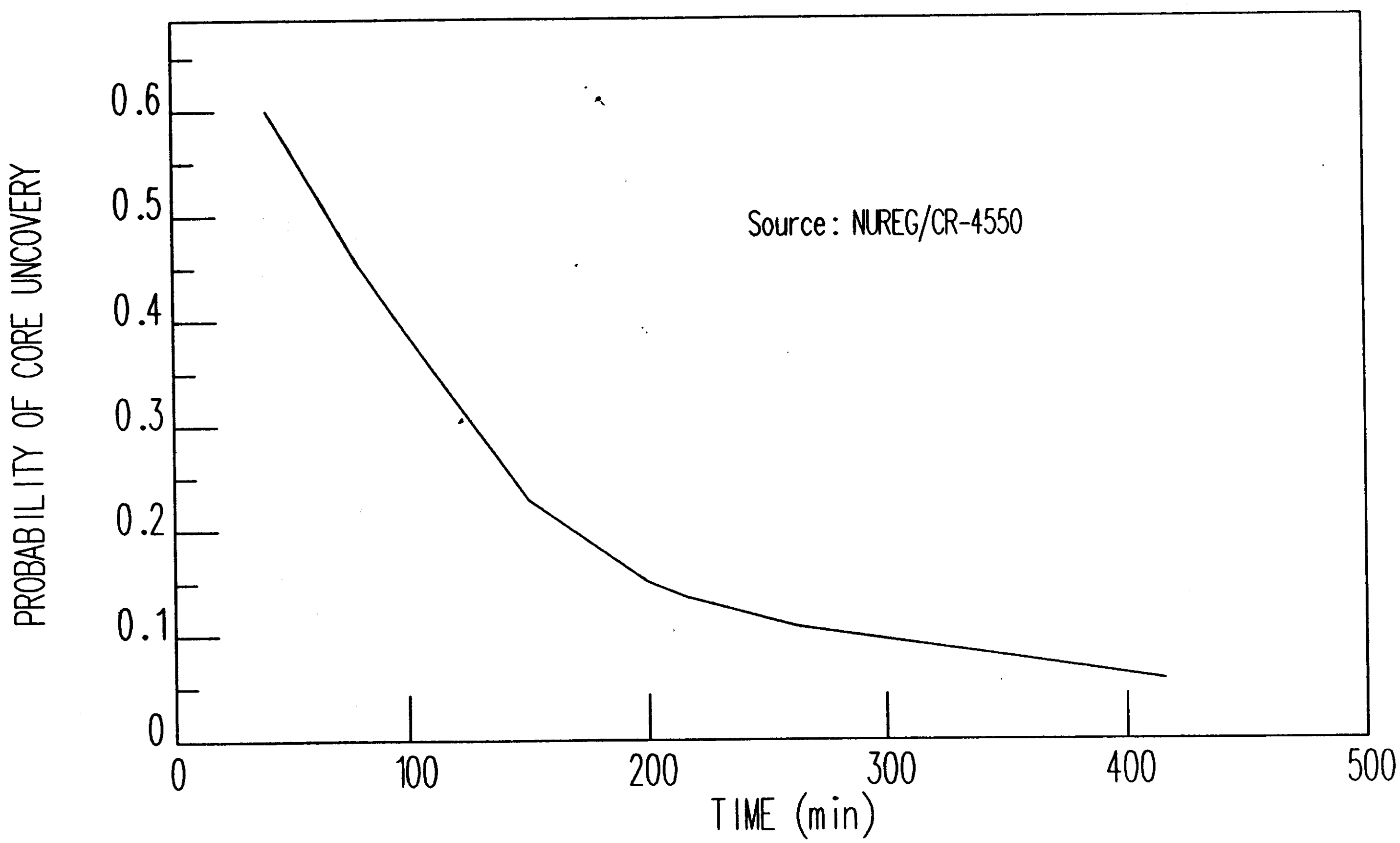


FIGURE B.1-3

PROBABILITY OF NON-RECOVERY OF OFFSITE POWER

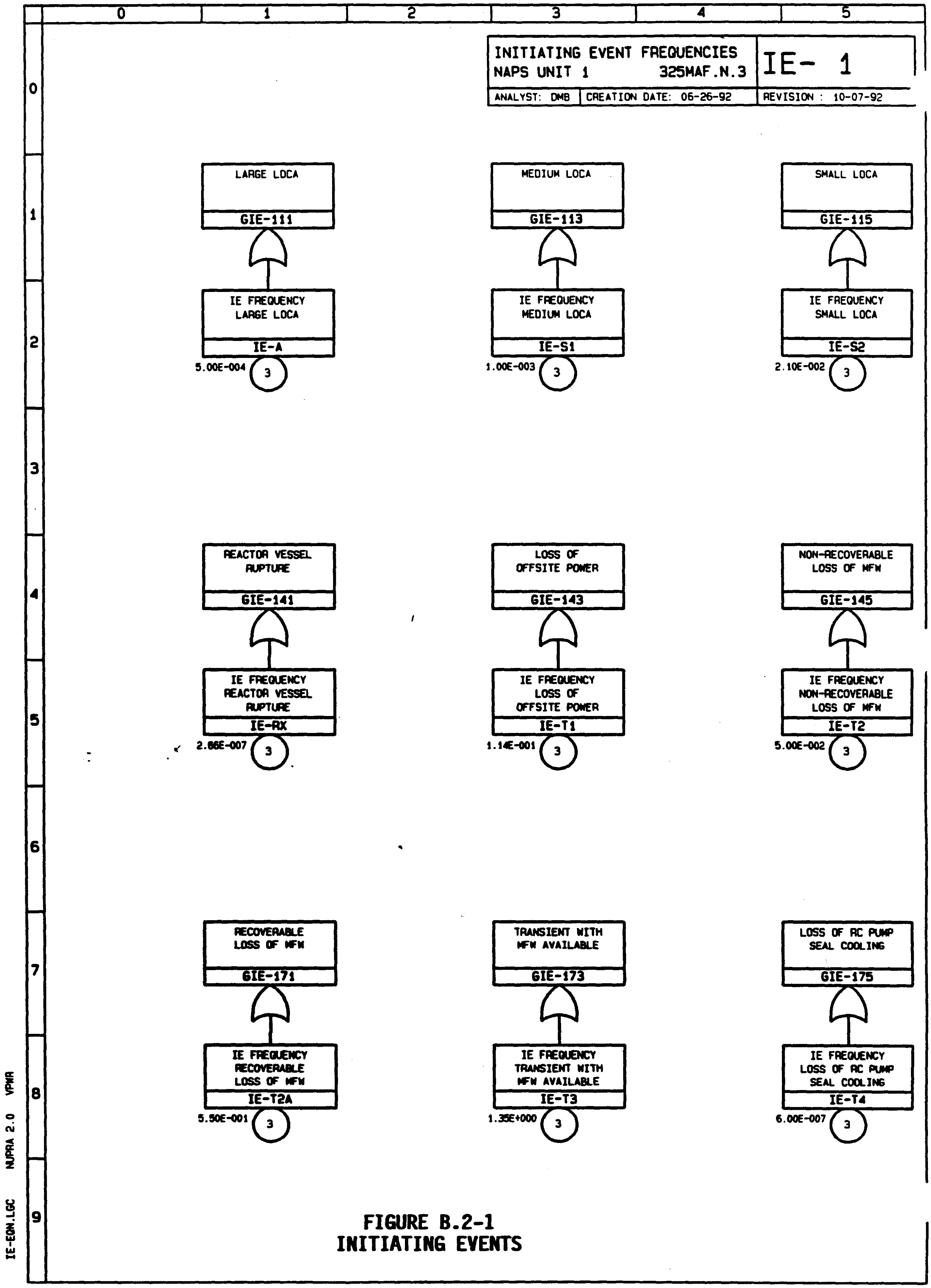


FIGURE B.2-1
INITIATING EVENTS

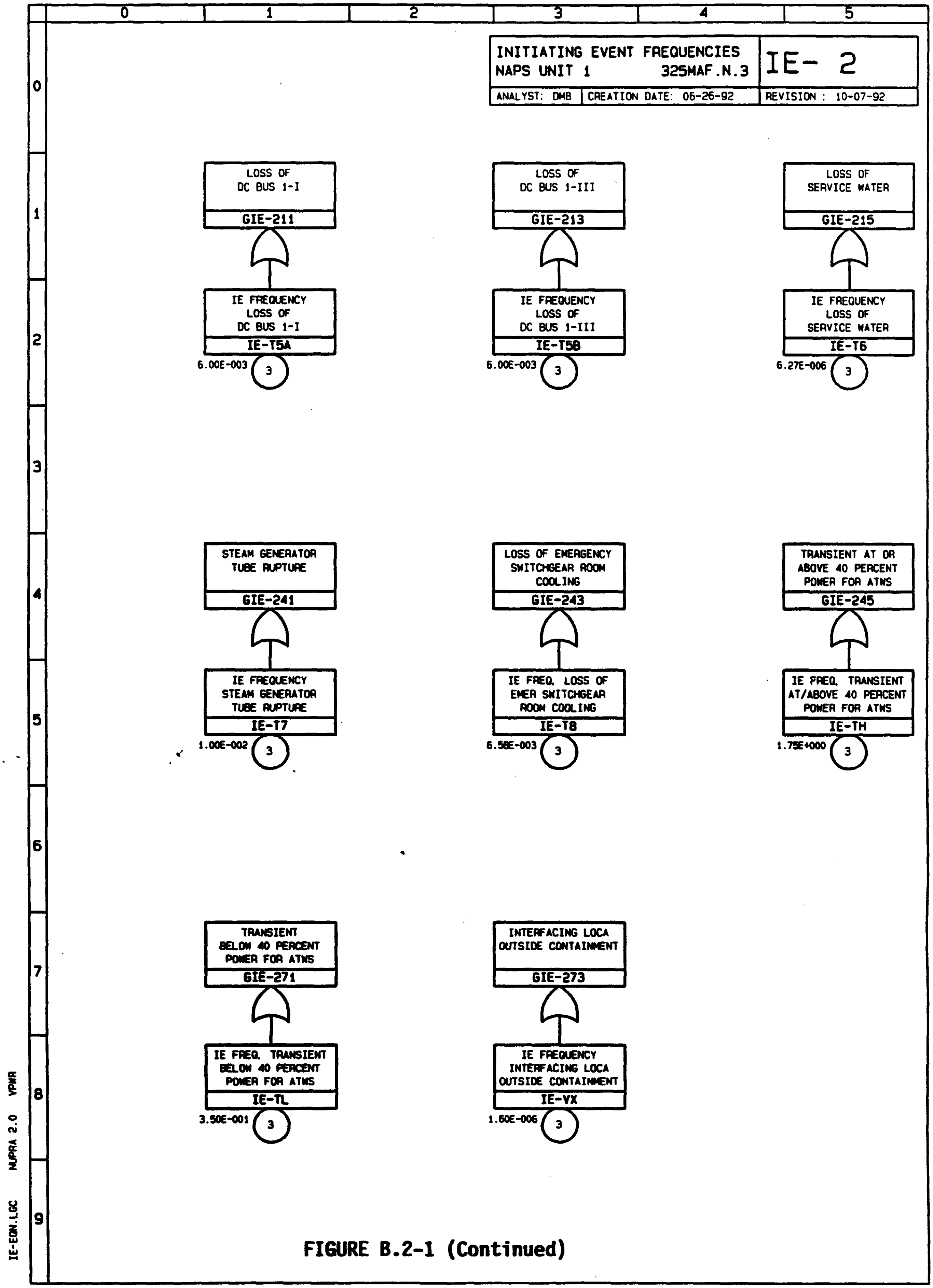
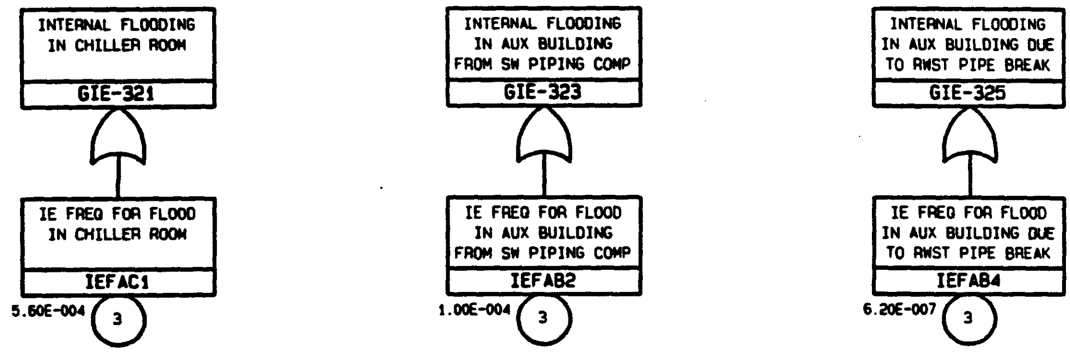


FIGURE B.2-1 (Continued)

INITIATING EVENT FREQUENCIES NAPS UNIT 1 325MAF.N.3	IE- 3
ANALYST: DMB | CREATION DATE: 06-26-92	REVISION : 10-07-92



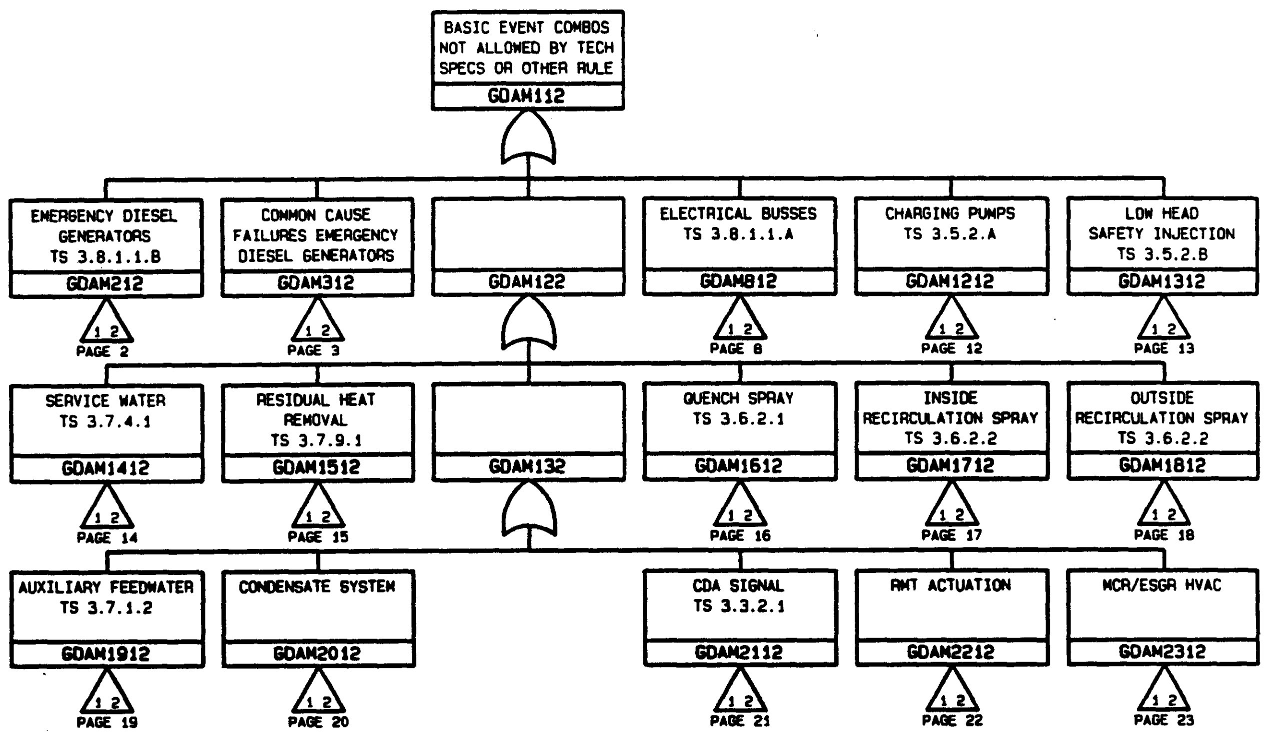
IE-EQN.LGC NUPRA 2.0 VPWR

FIGURE B.2-1 (Continued)

DISALLOWED MAINTENANCE
NAPS UNIT 1 325MAF.N.3

DAM 1

ANALYST: RST | CREATION DATE: 06-22-92 | REVISION : 10-07-92



DAM00.LGC NUPRA 2.0 VPMR

FIGURE B.2-2
TECHNICAL SPECIFICATION DISALLOWED MAINTENANCE

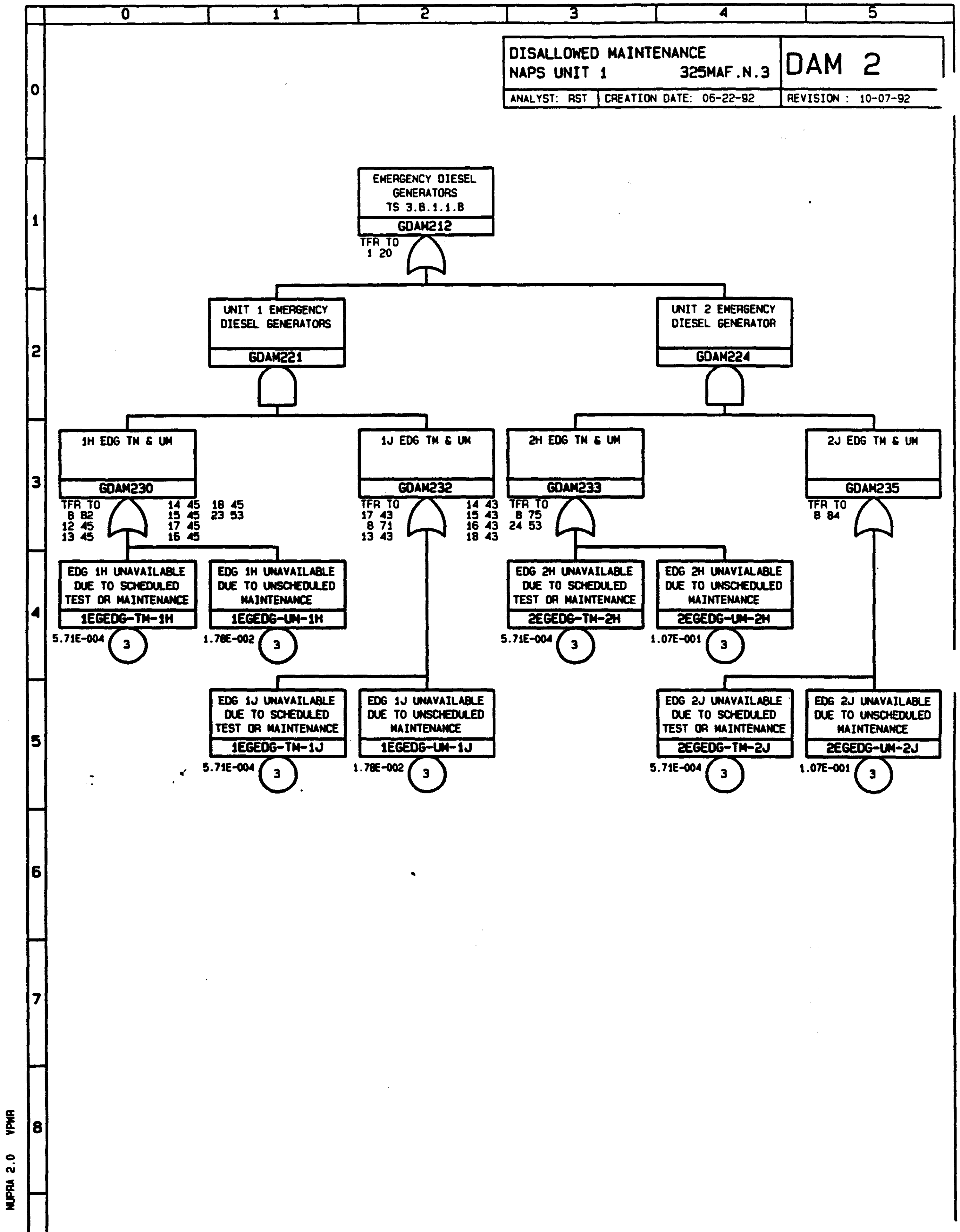


FIGURE B.2-2 (Continued)

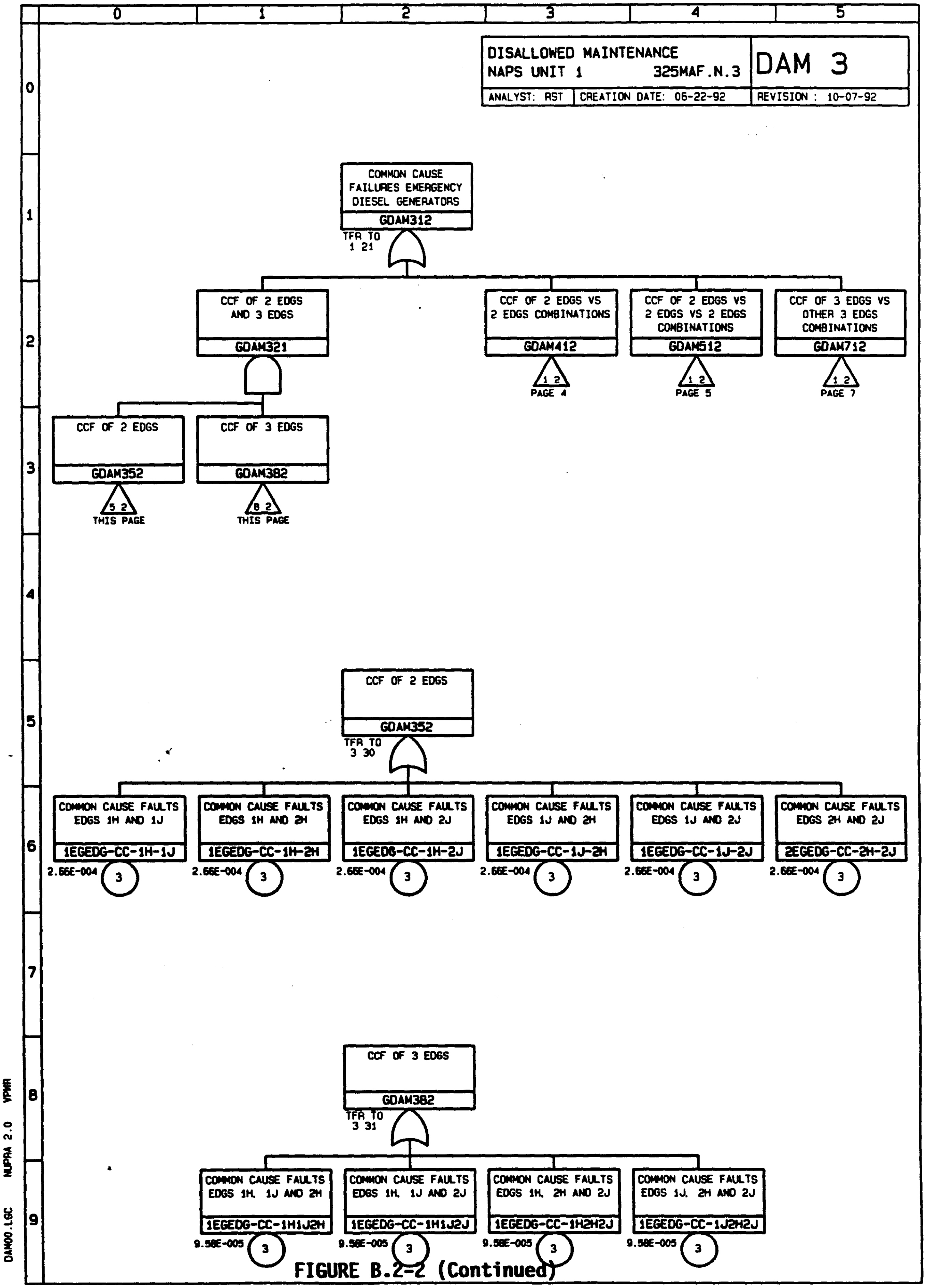


FIGURE B.2-2 (Continued)

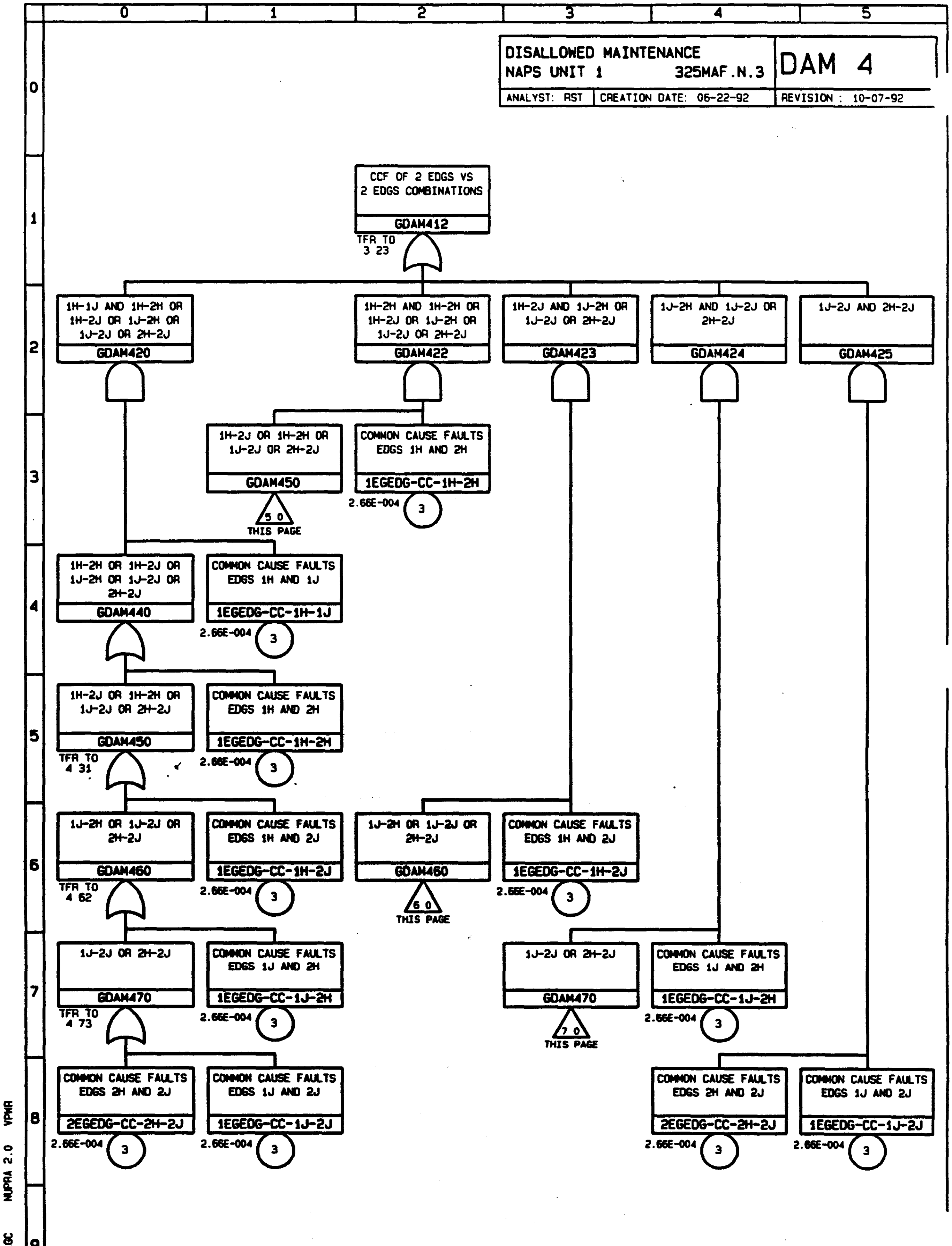


FIGURE B.2-2 (Continued)

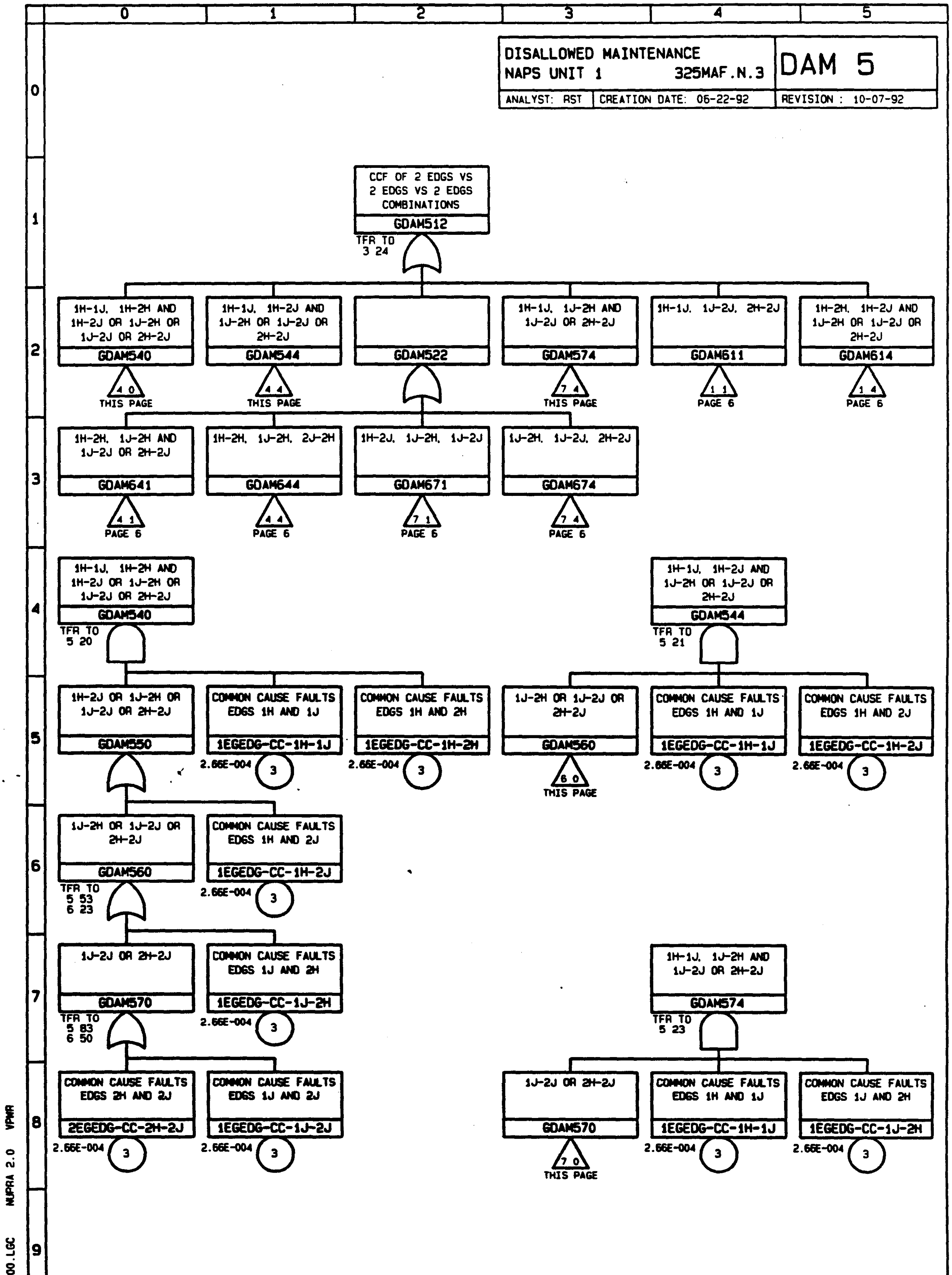
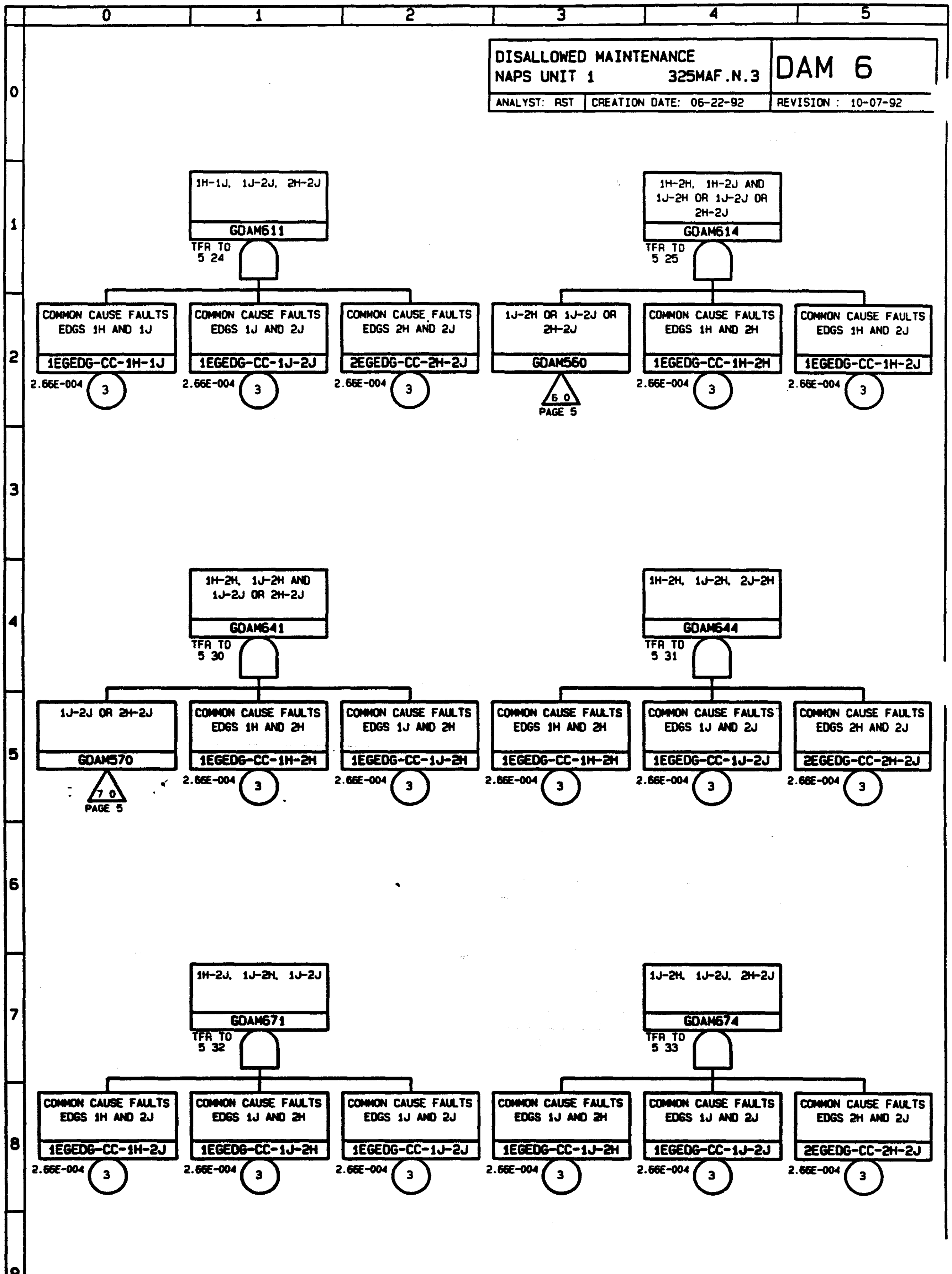


FIGURE B.2-2 (Continued)



DAM00.LGC NUPRA 2.0 VPNR

FIGURE B.2-2 (Continued)

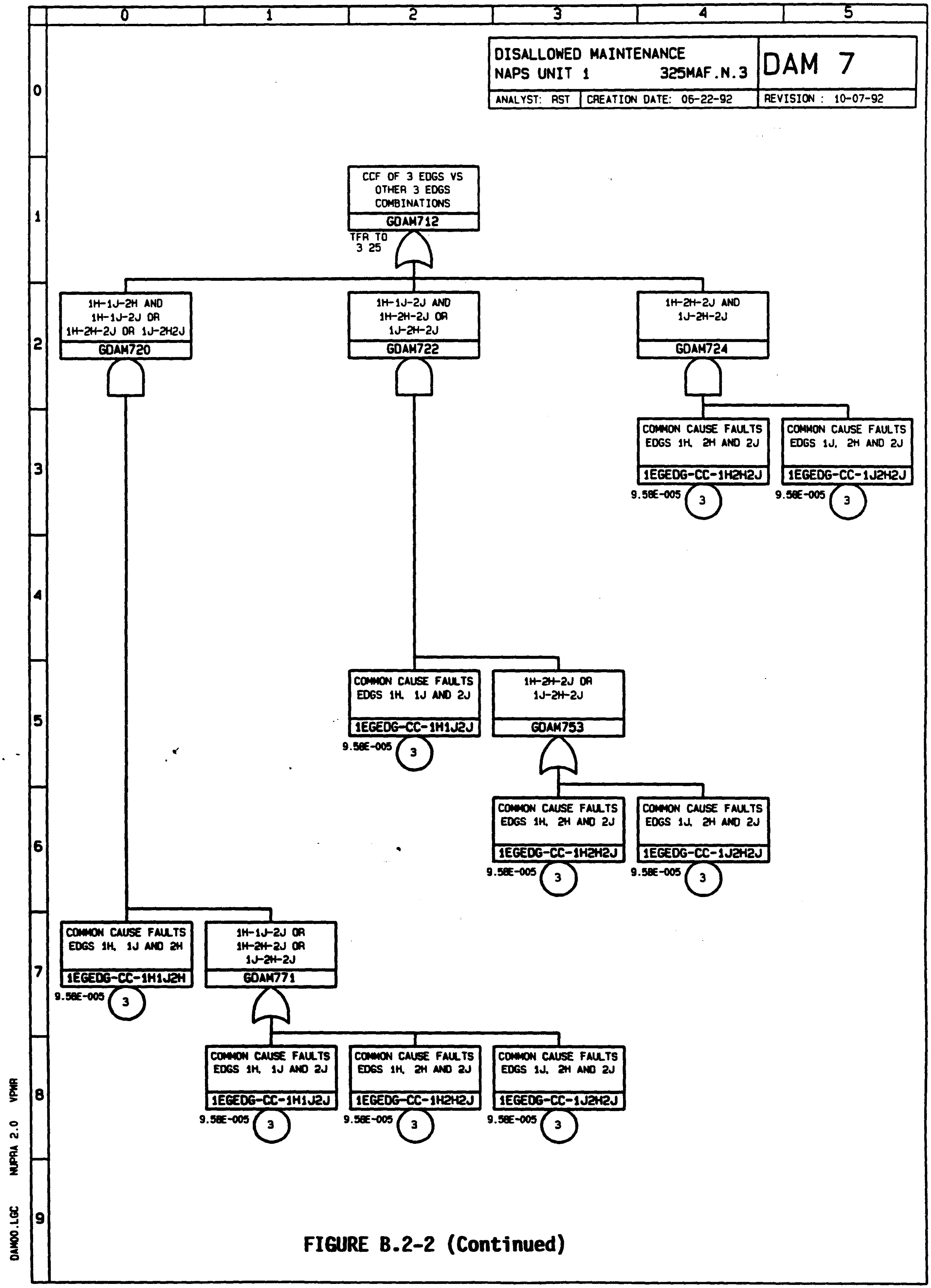


FIGURE B.2-2 (Continued)

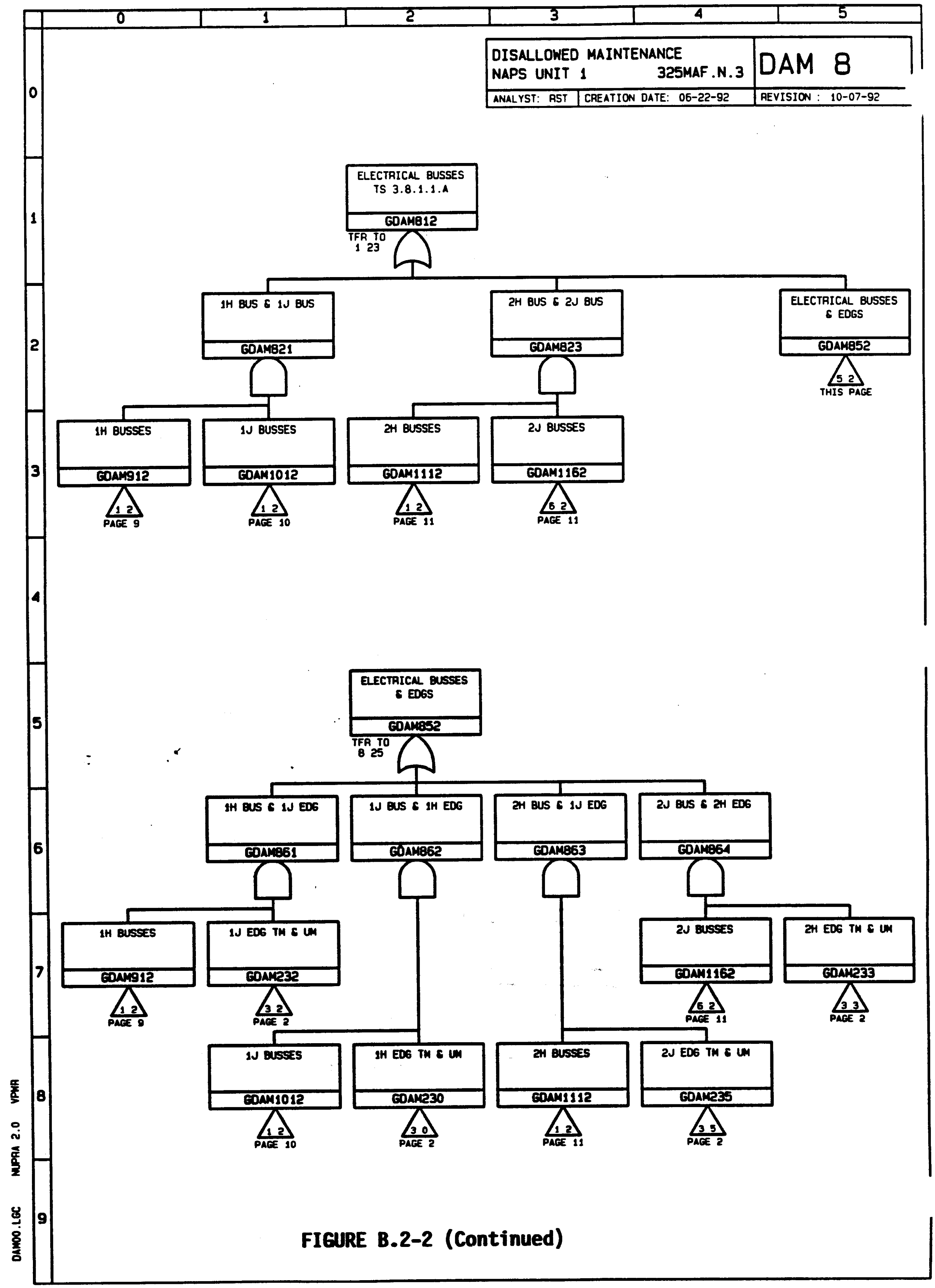


FIGURE B.2-2 (Continued)

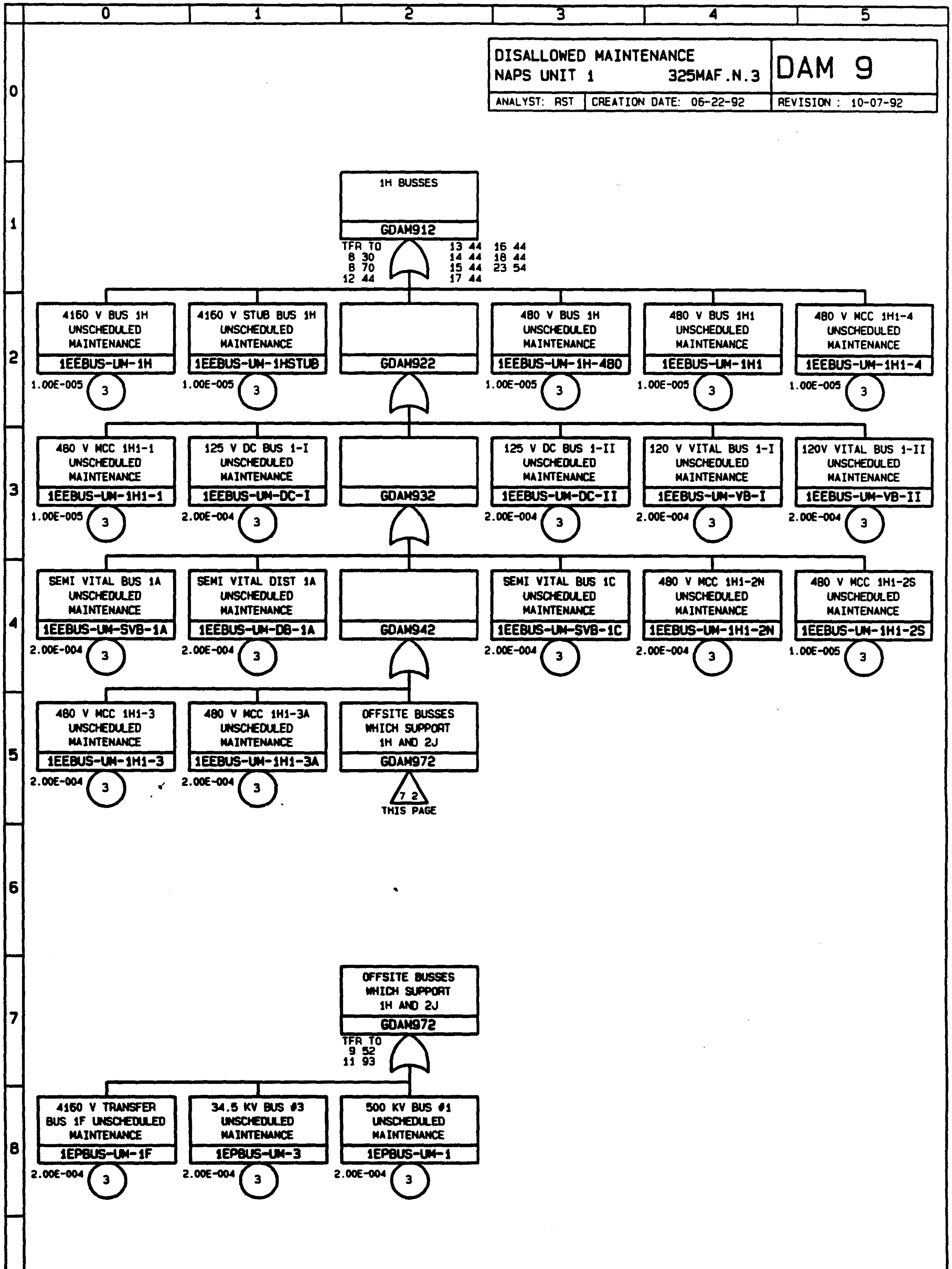


FIGURE B.2-2 (Continued)

DAM00.LGC NUPRA 2.0 VPWR

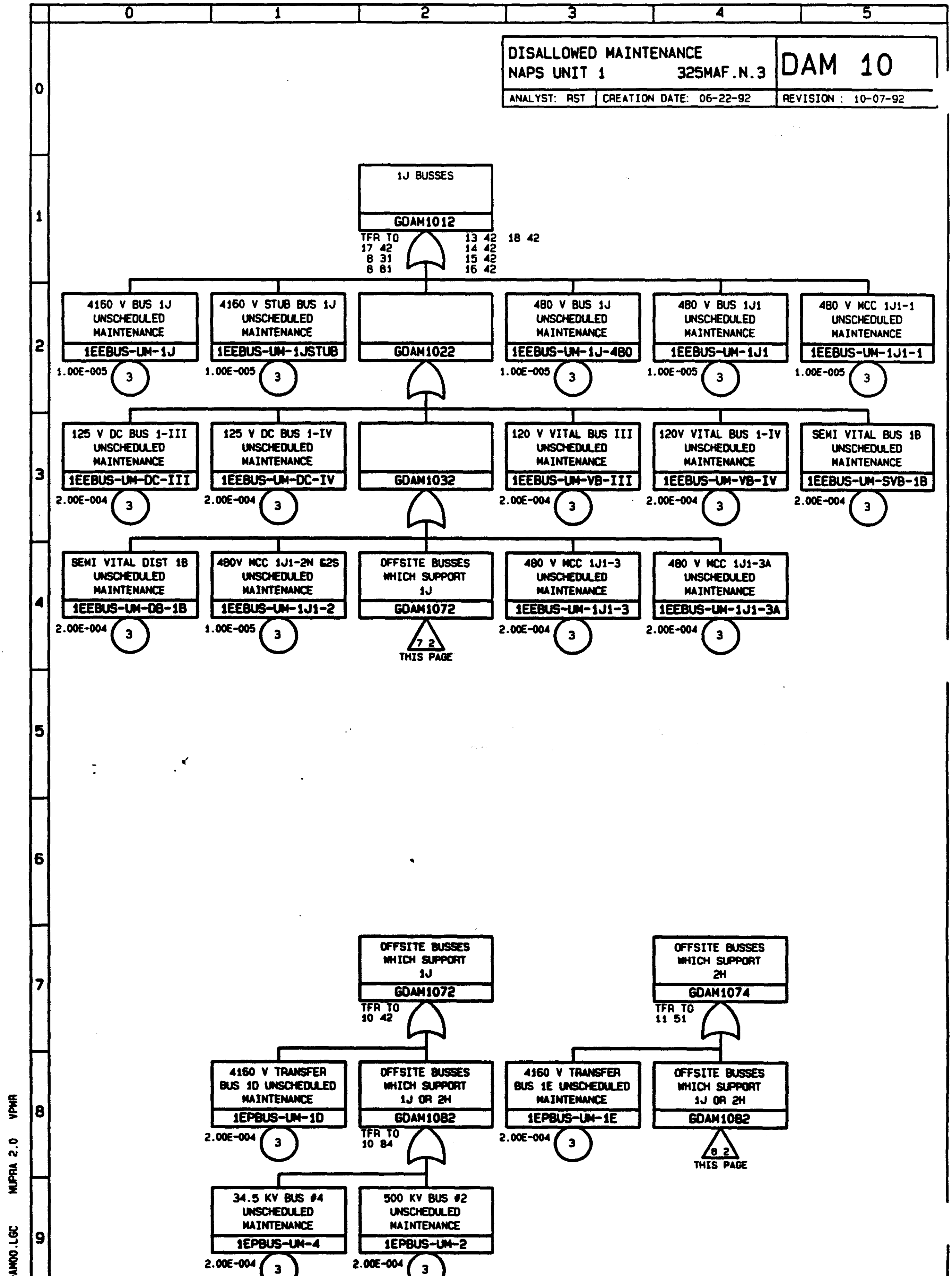


FIGURE B.2-2 (Continued)

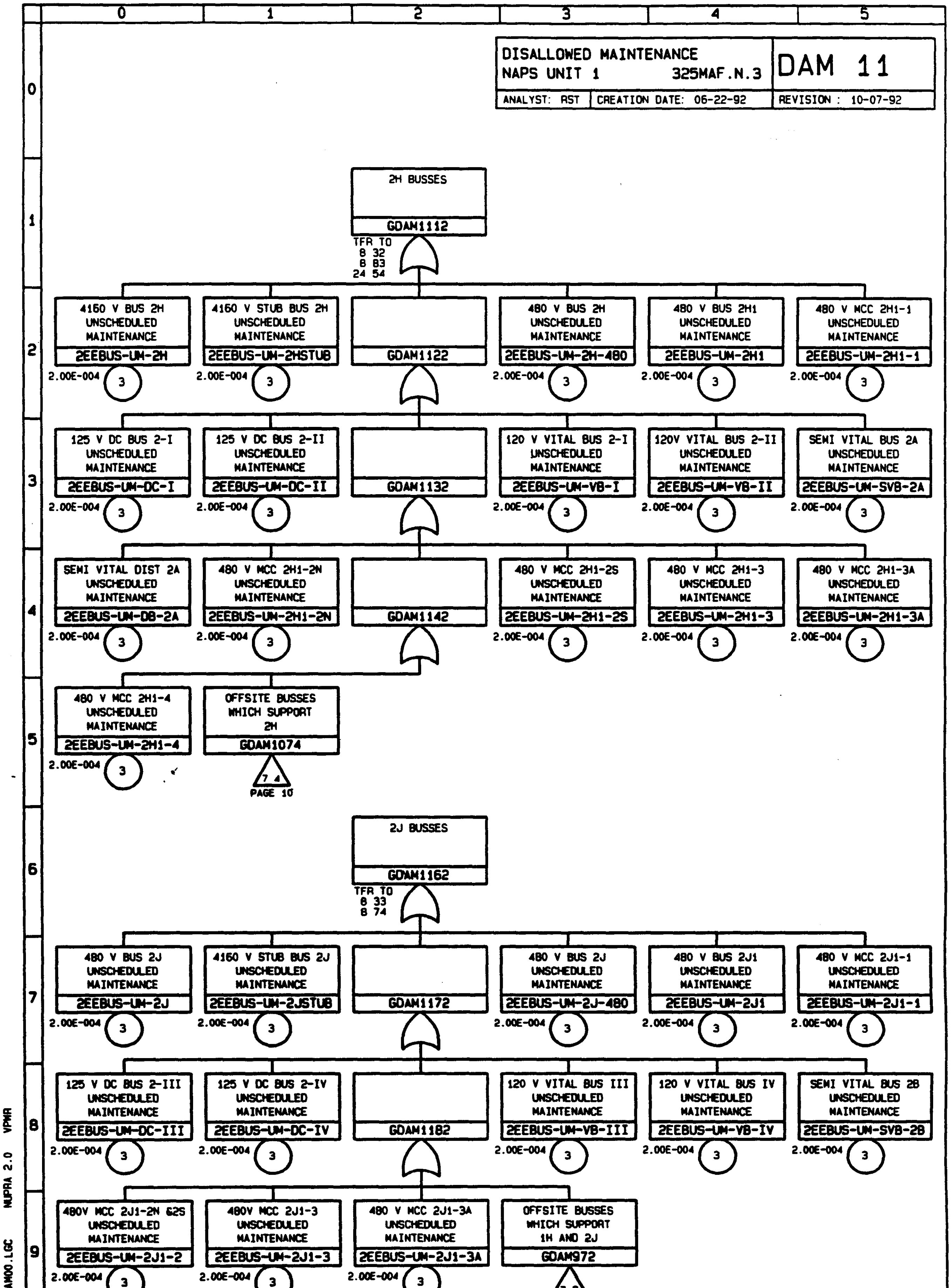


FIGURE B.2-2 (Continued)

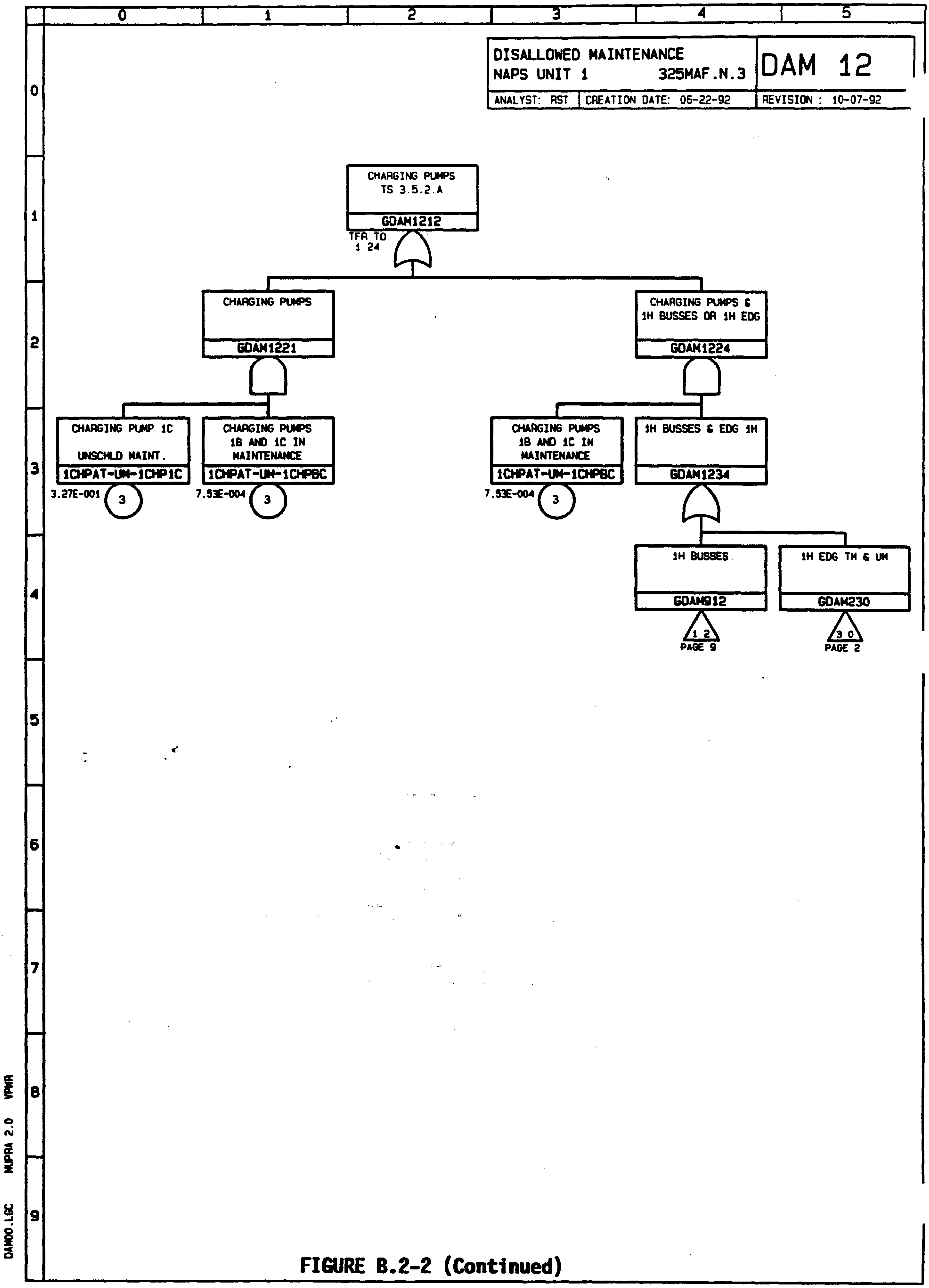


FIGURE B.2-2 (Continued)

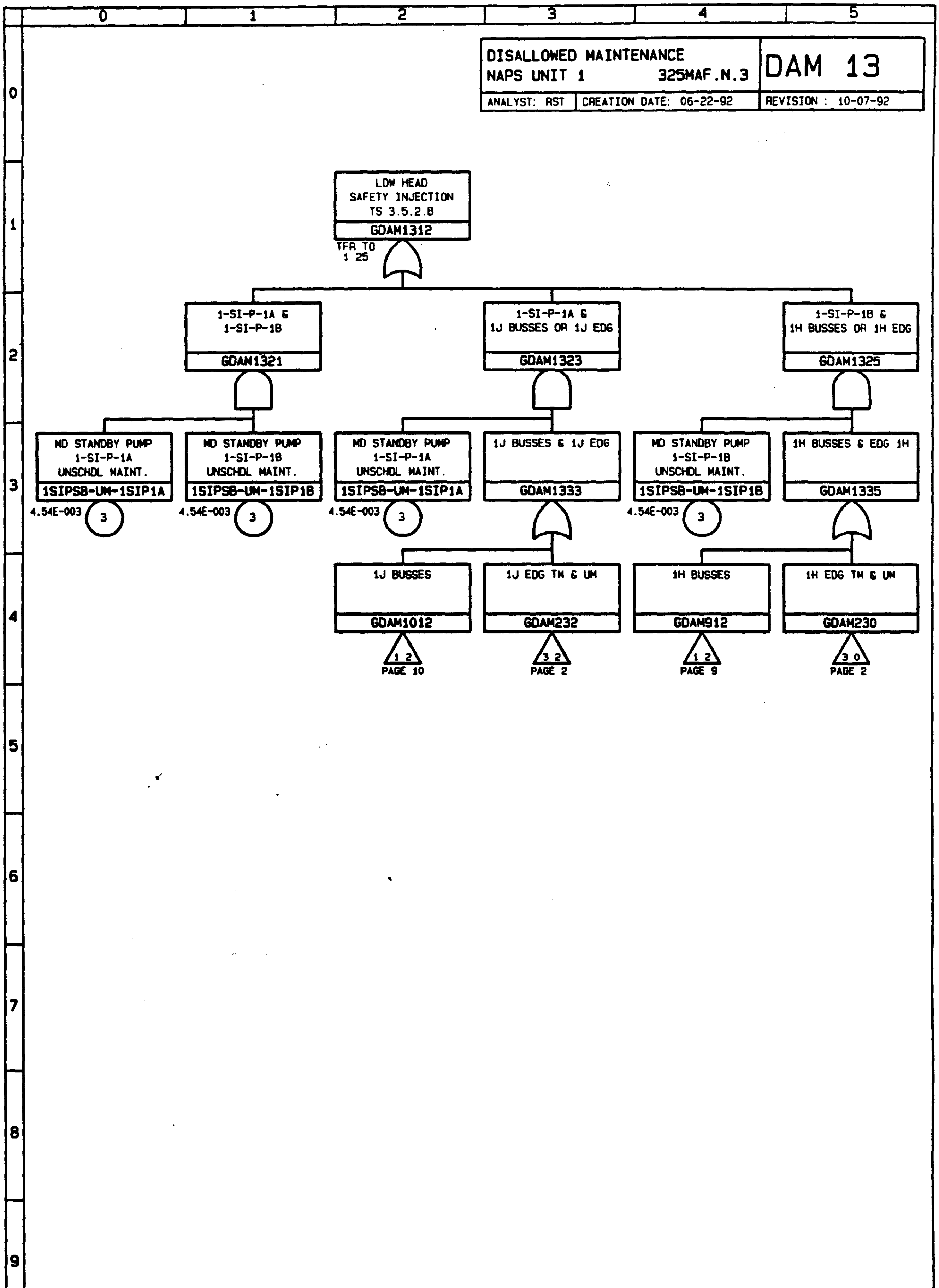


FIGURE B.2-2 (Continued)

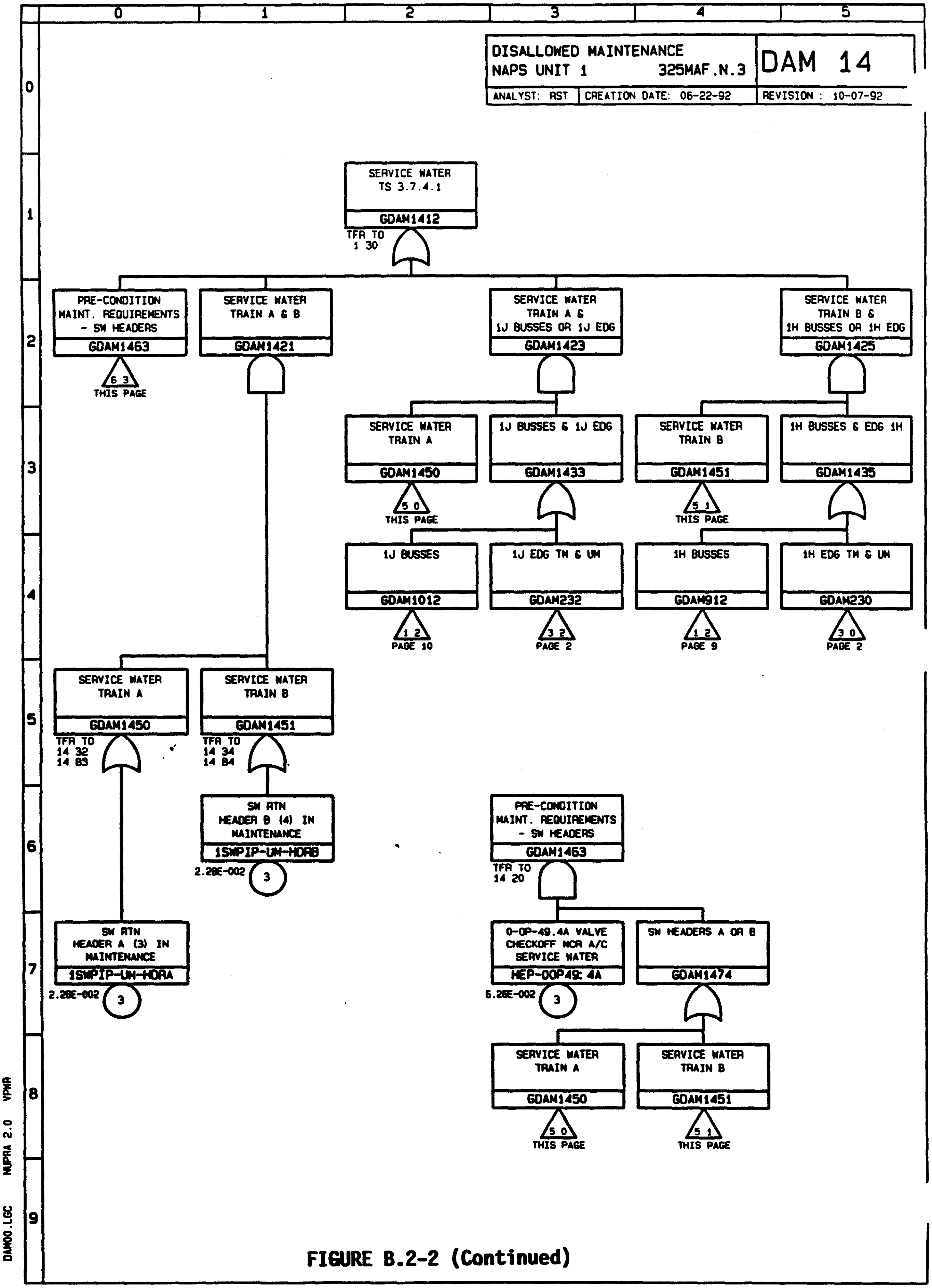


FIGURE B.2-2 (Continued)

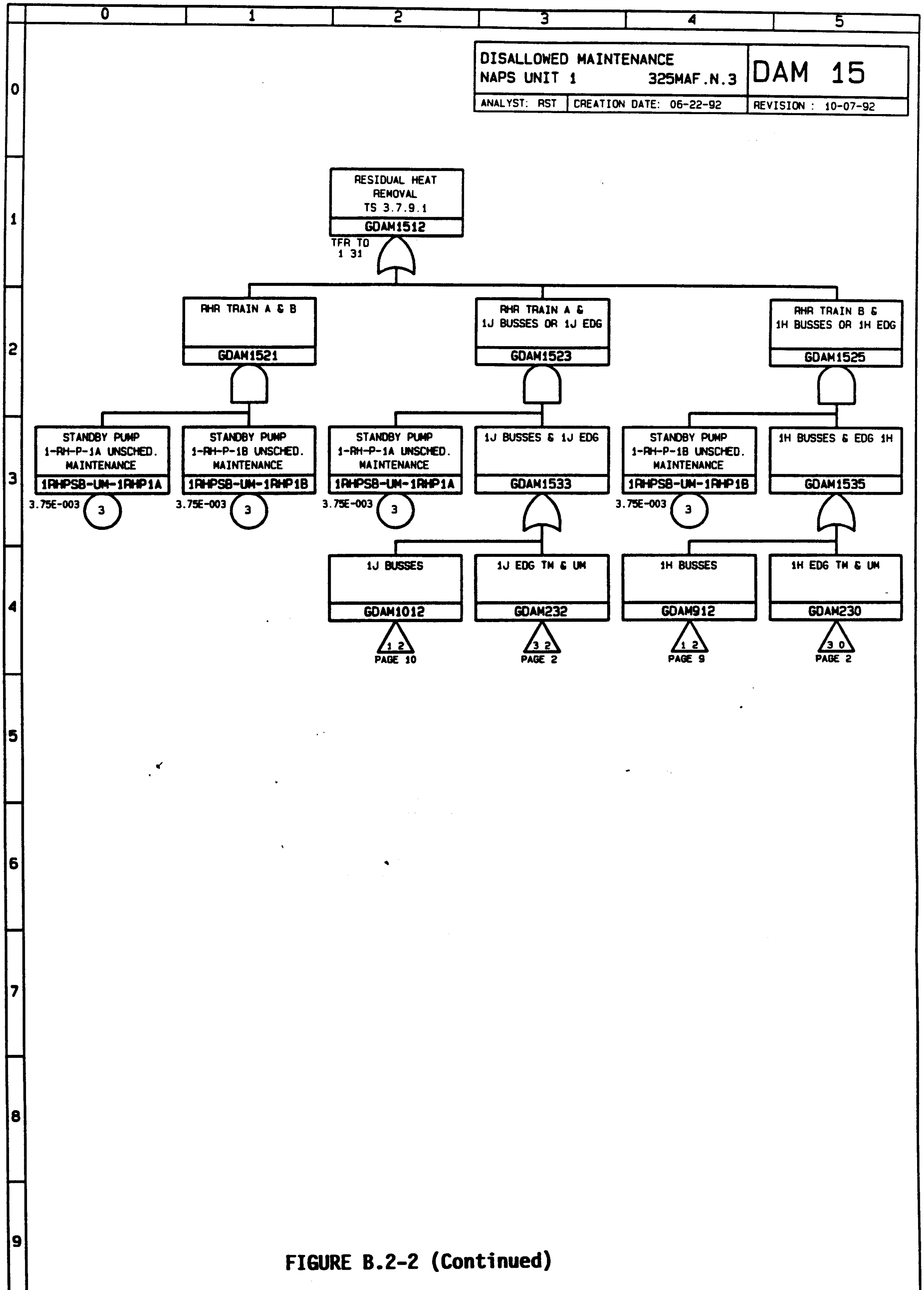


FIGURE B.2-2 (Continued)

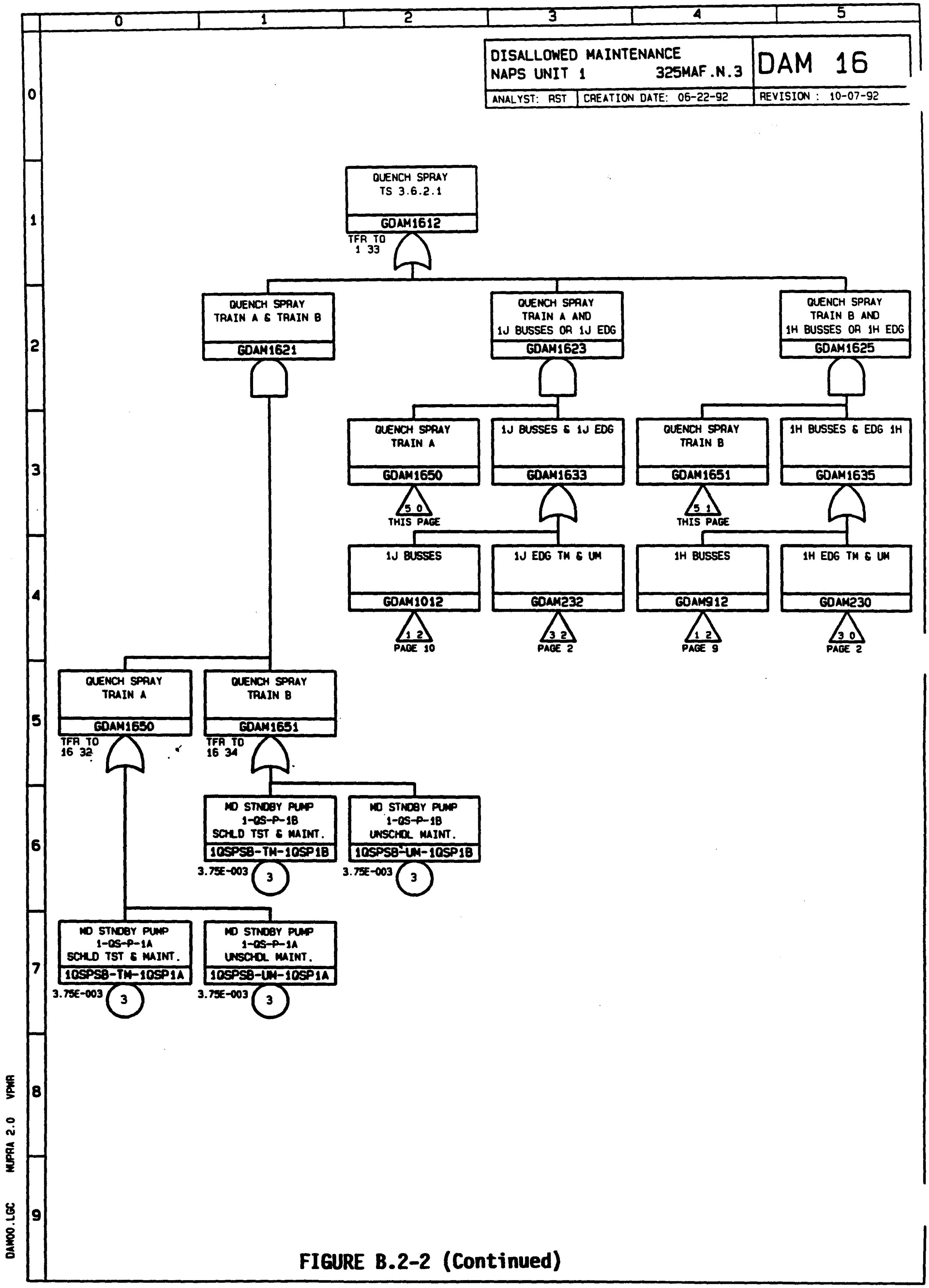


FIGURE B.2-2 (Continued)

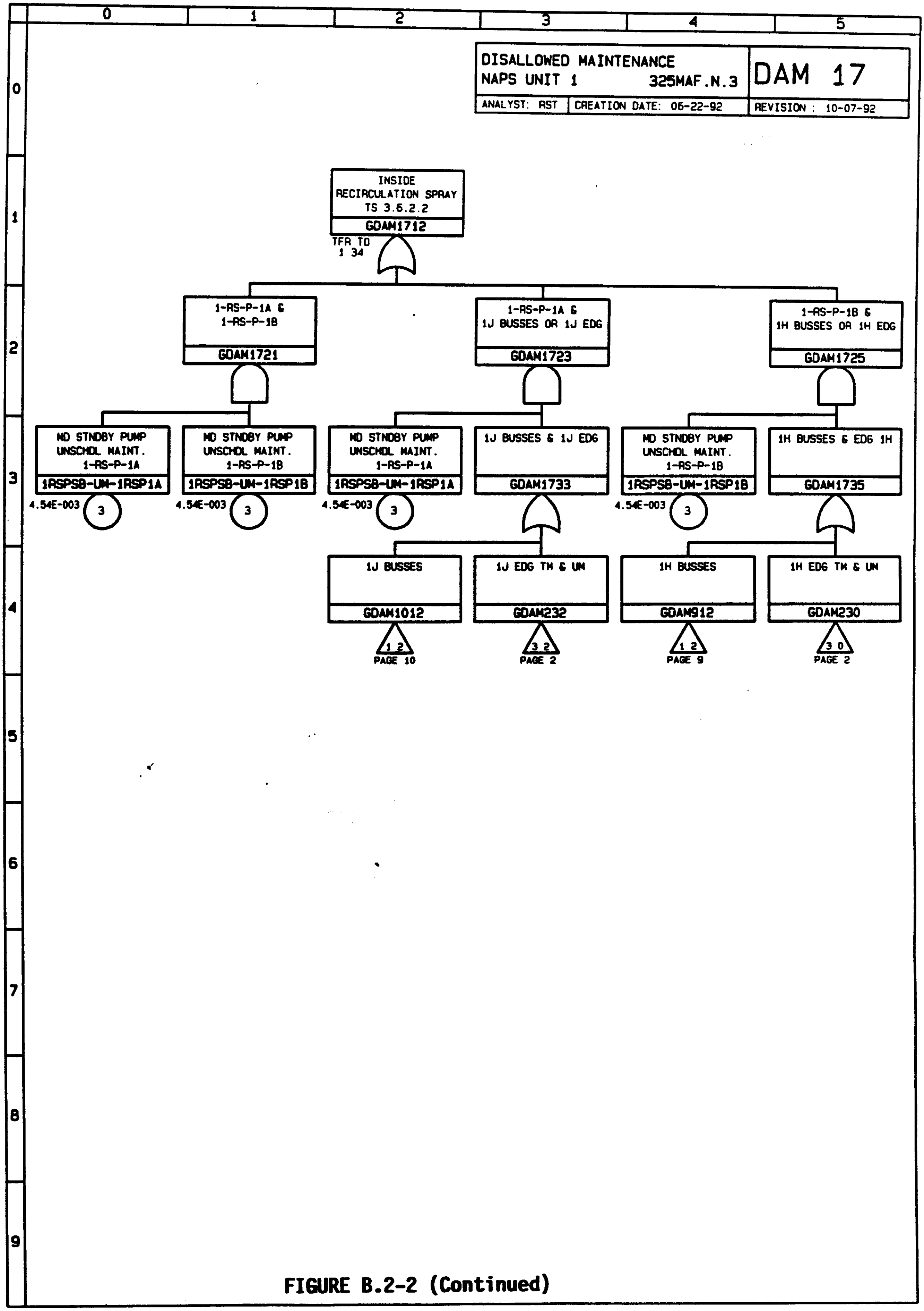


FIGURE B.2-2 (Continued)

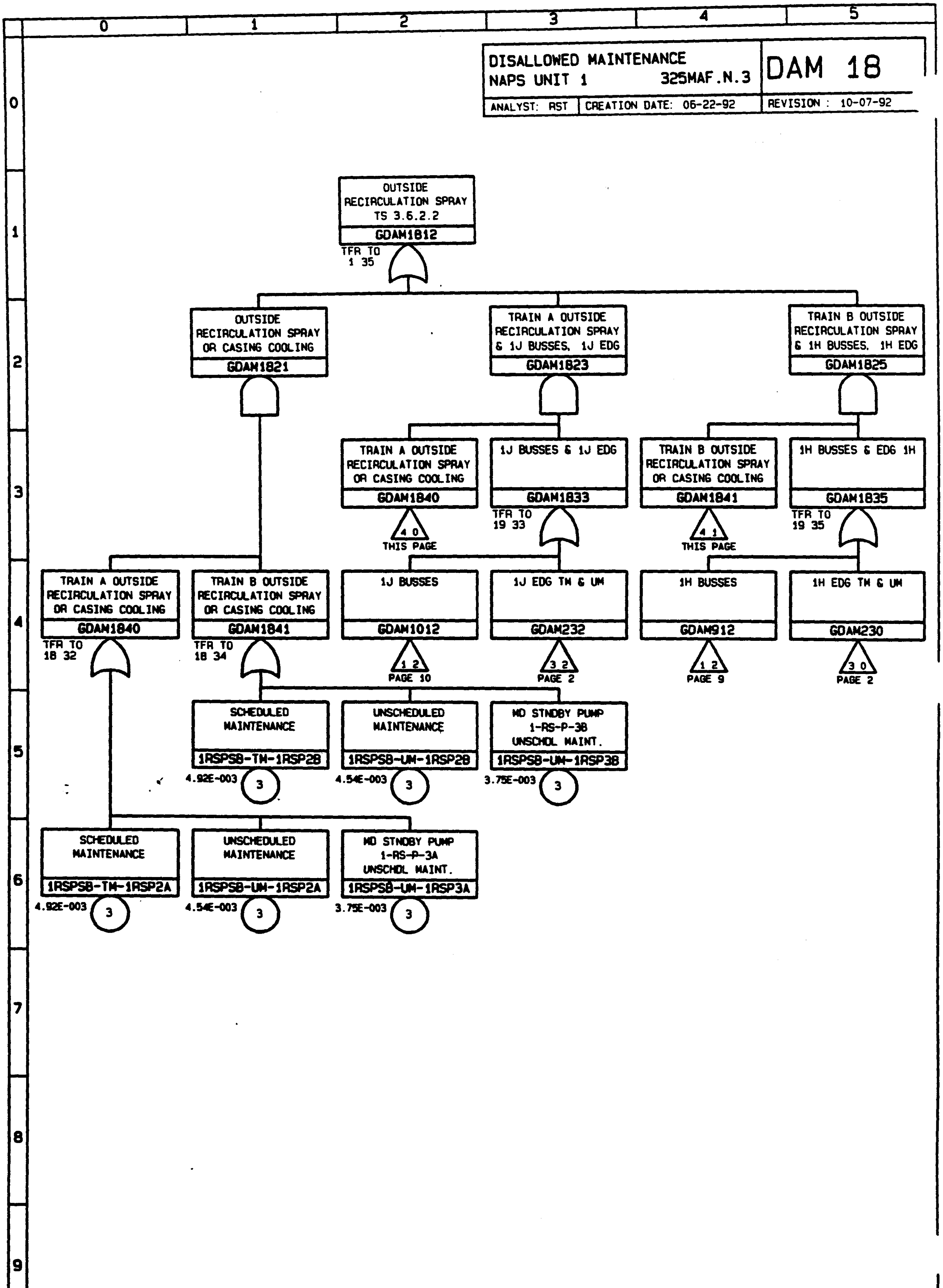


FIGURE B.2-2 (Continued)

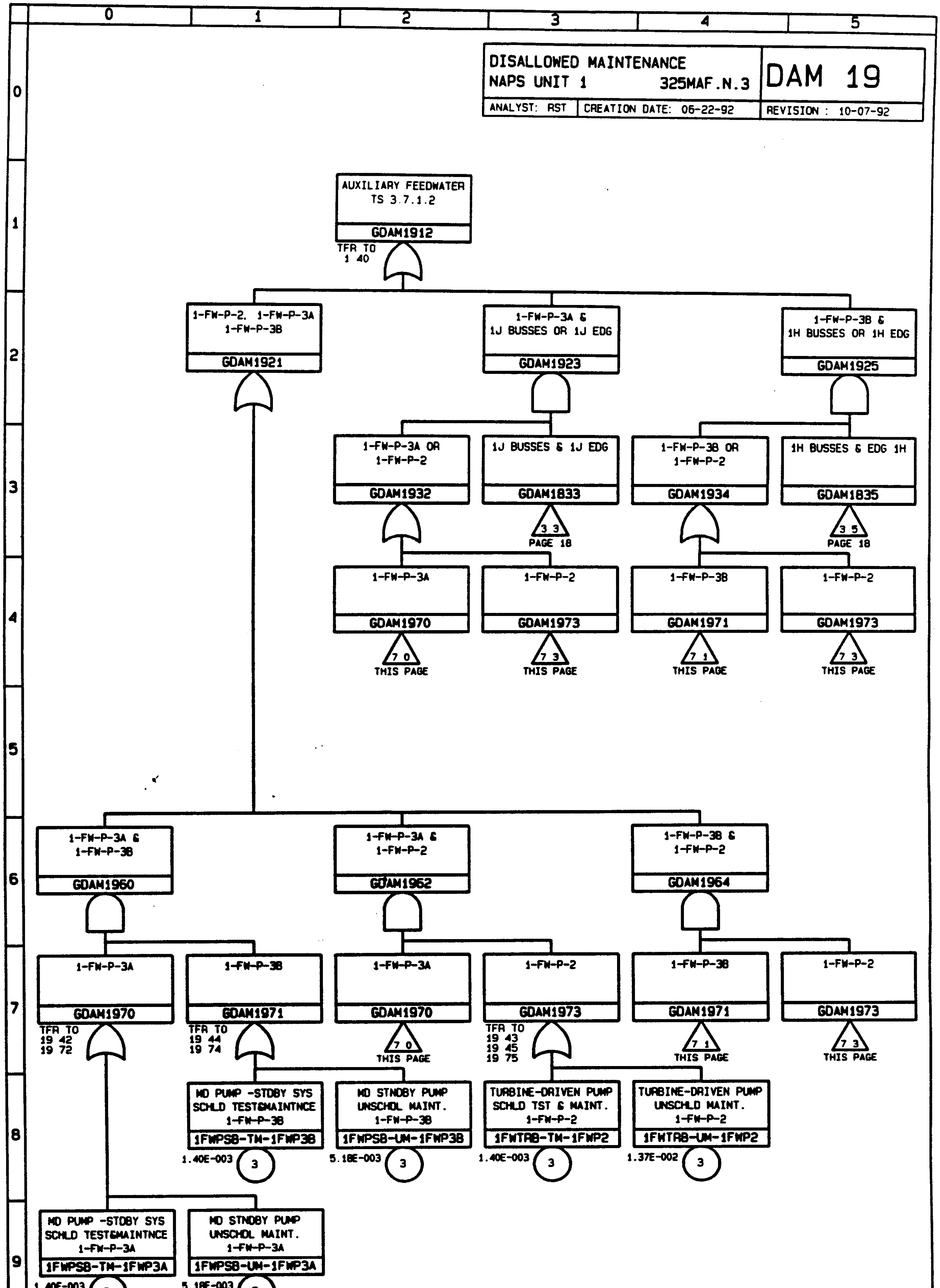


FIGURE B.2-2 (Continued)

DAM00.LGC NUPRA 2.0 VPMR

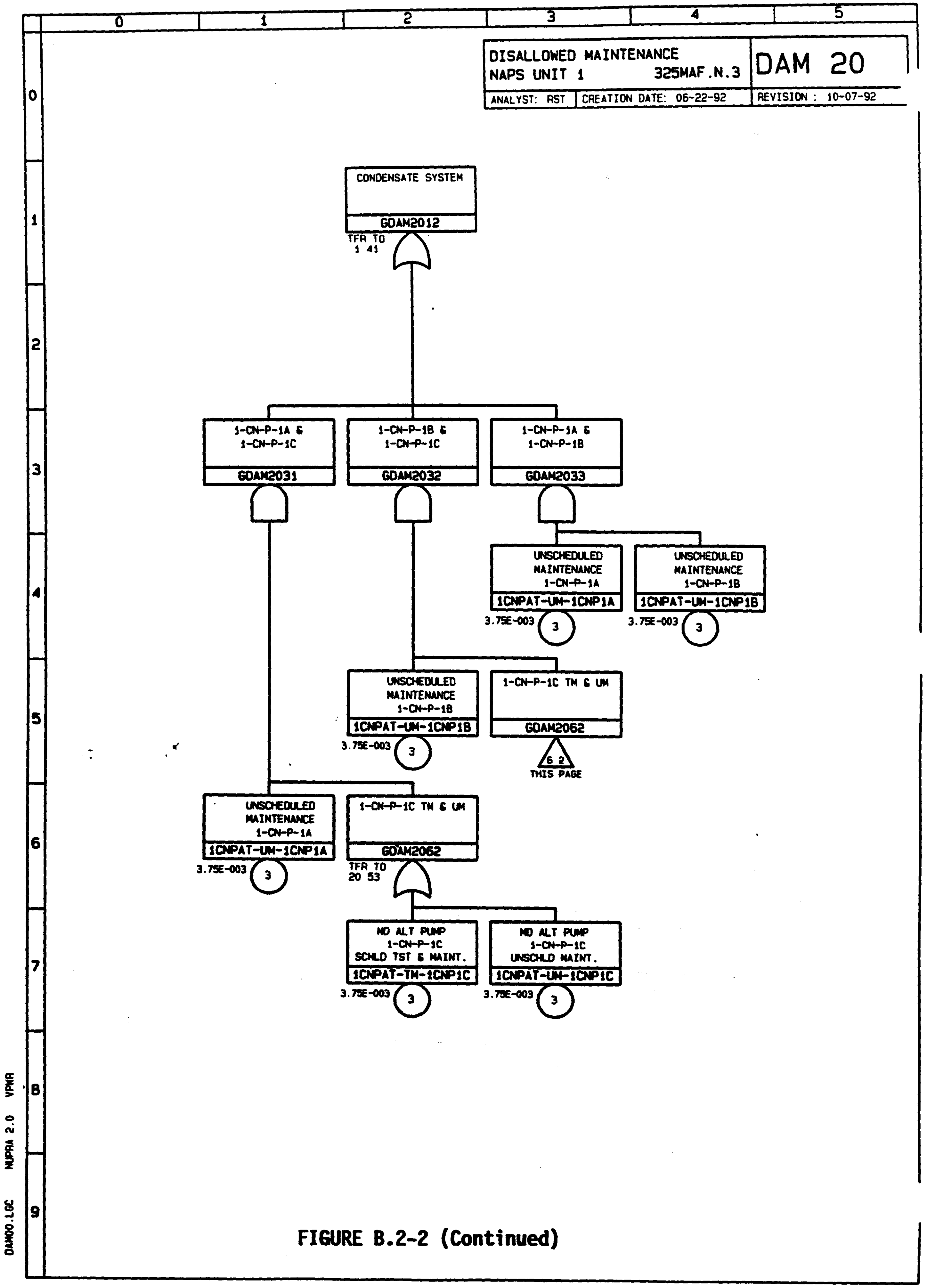


FIGURE B.2-2 (Continued)

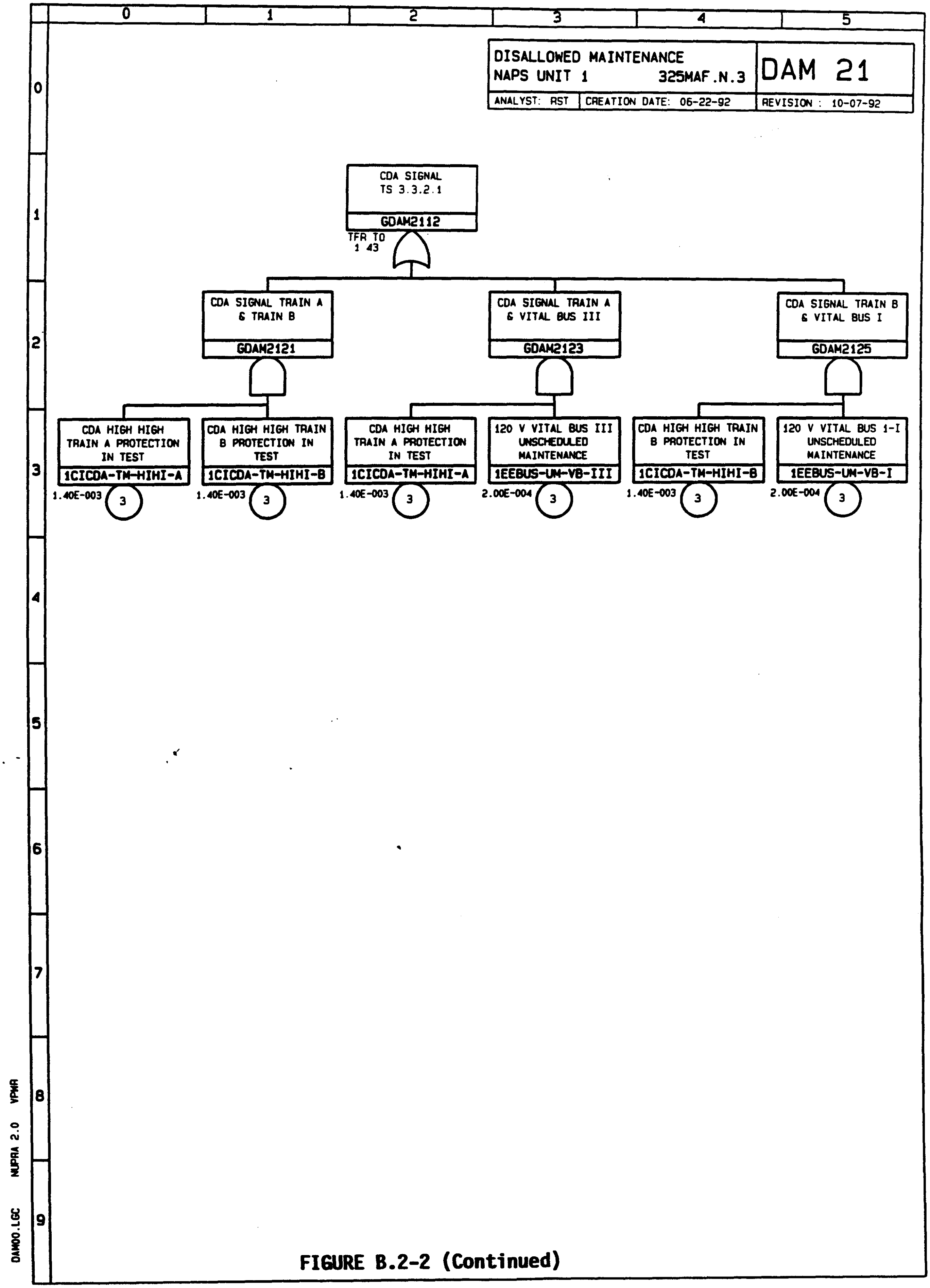


FIGURE B.2-2 (Continued)

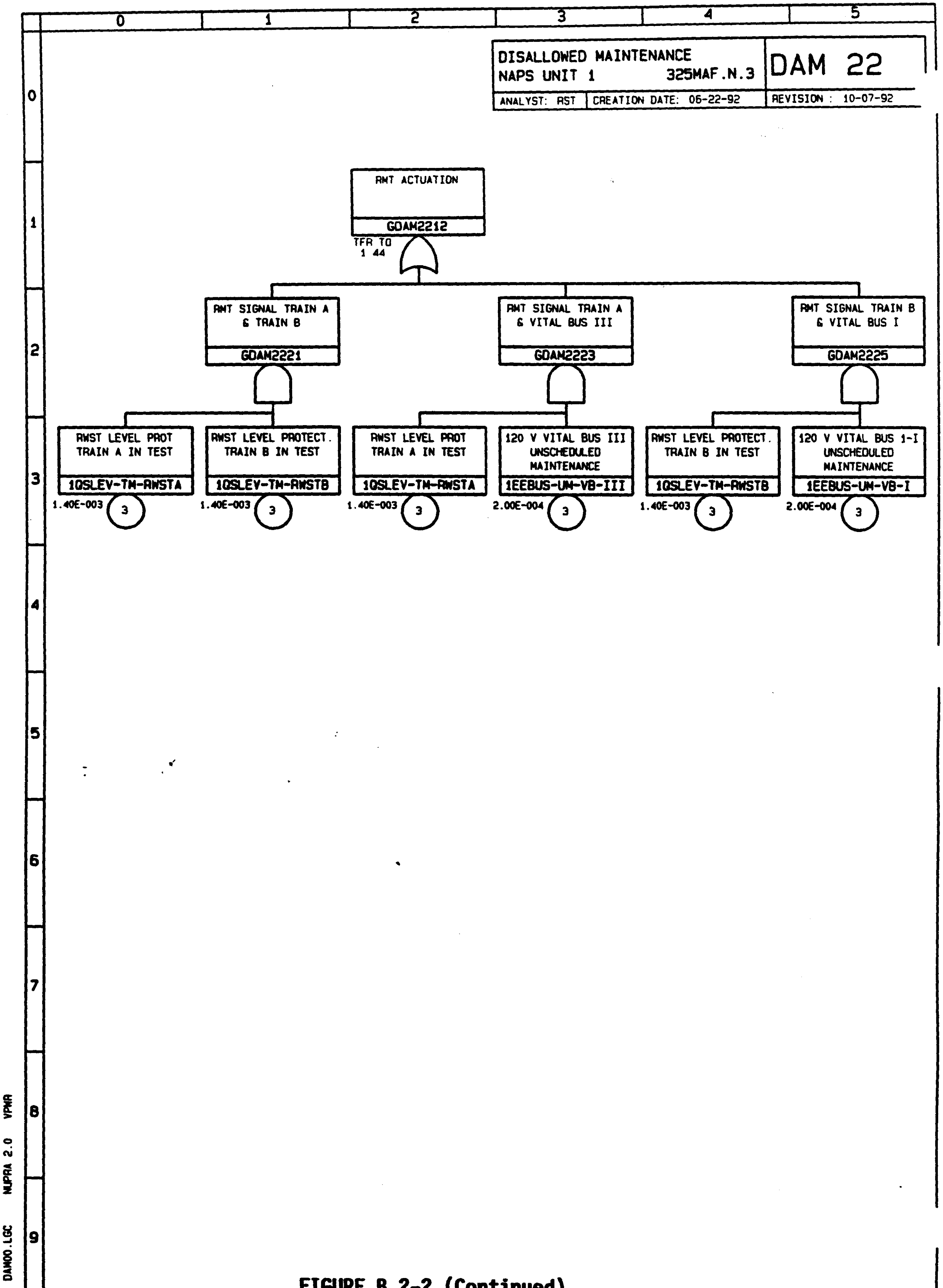


FIGURE B.2-2 (Continued)

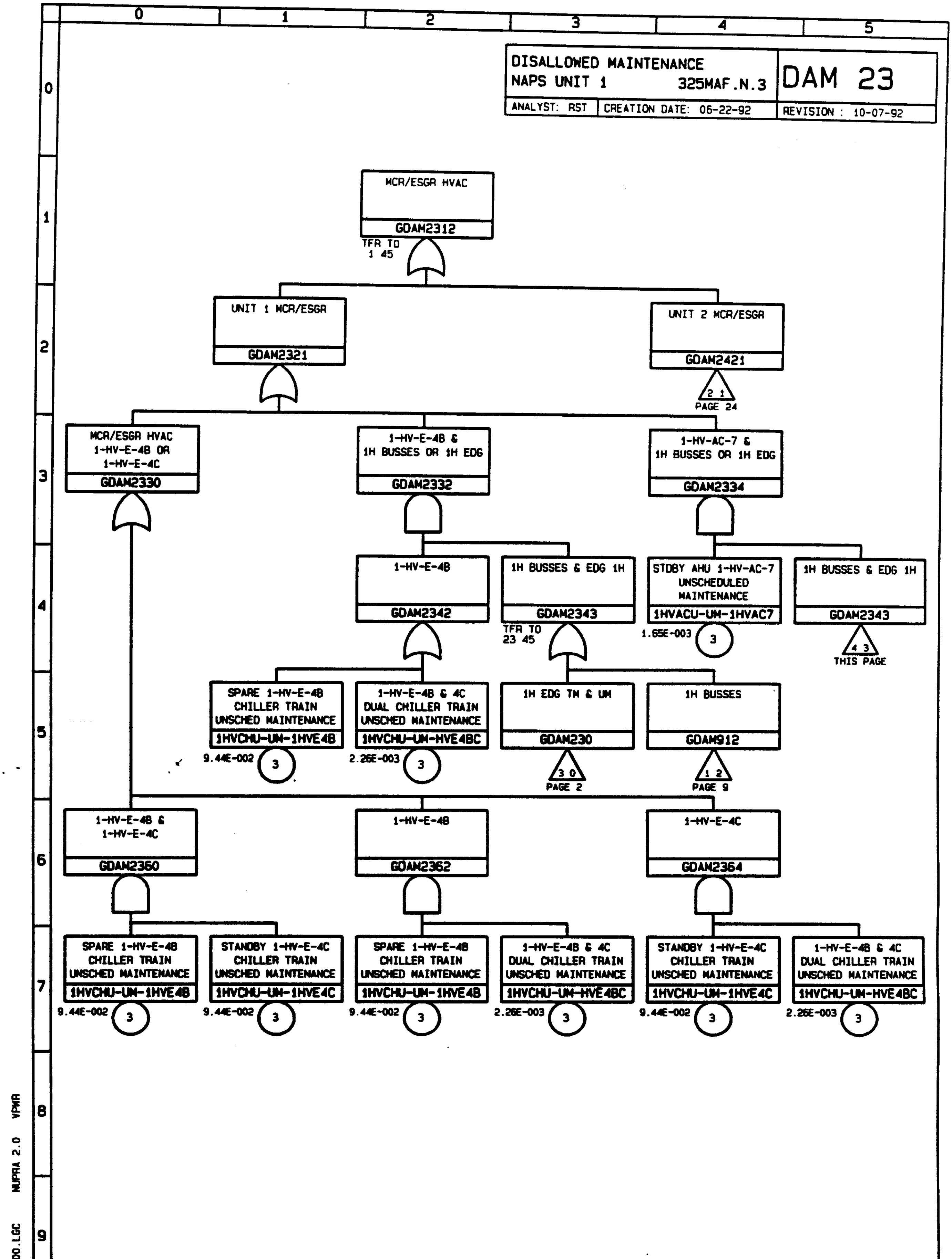


FIGURE B.2-2 (Continued)

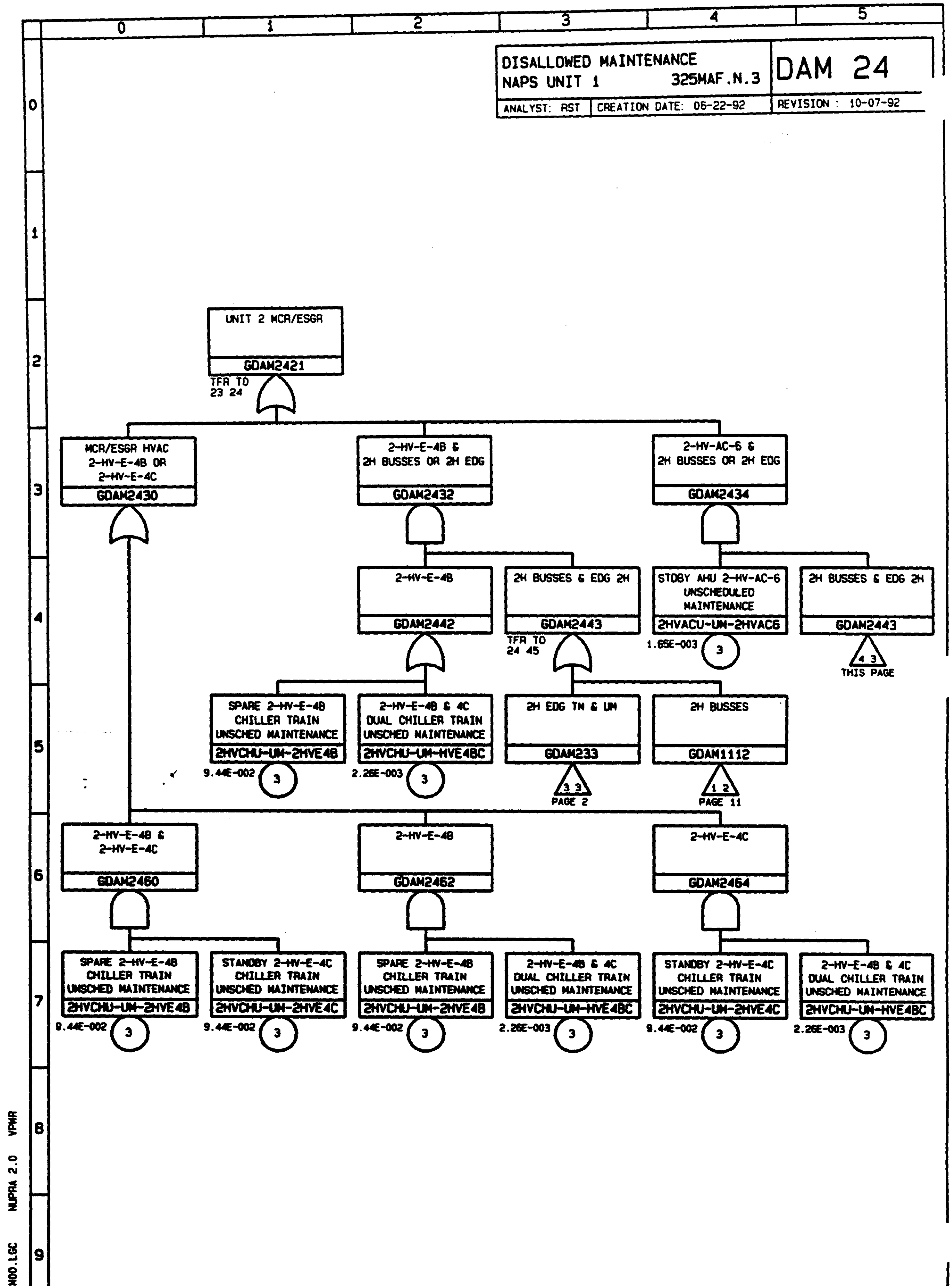


FIGURE B.2-2 (Continued)

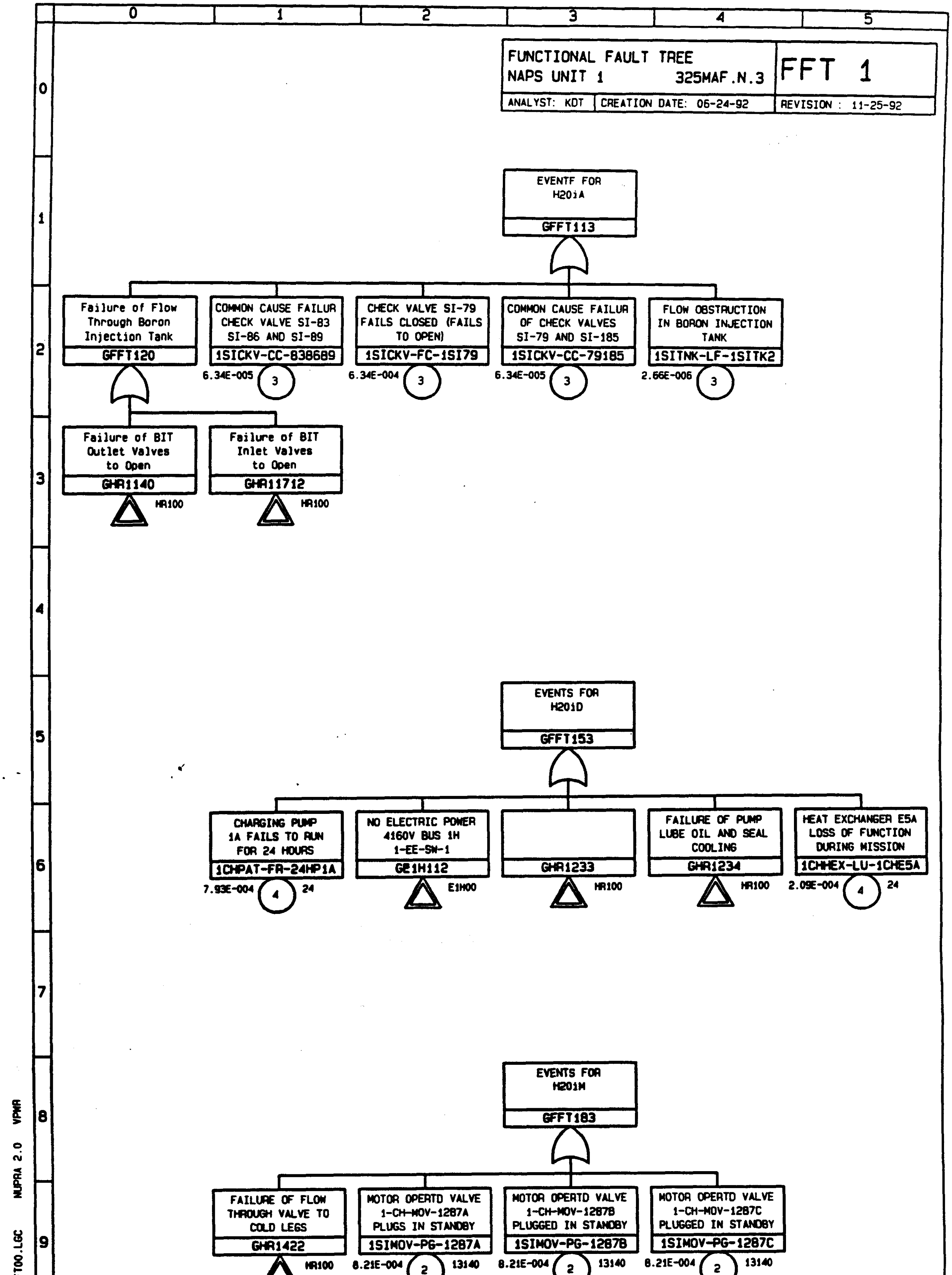
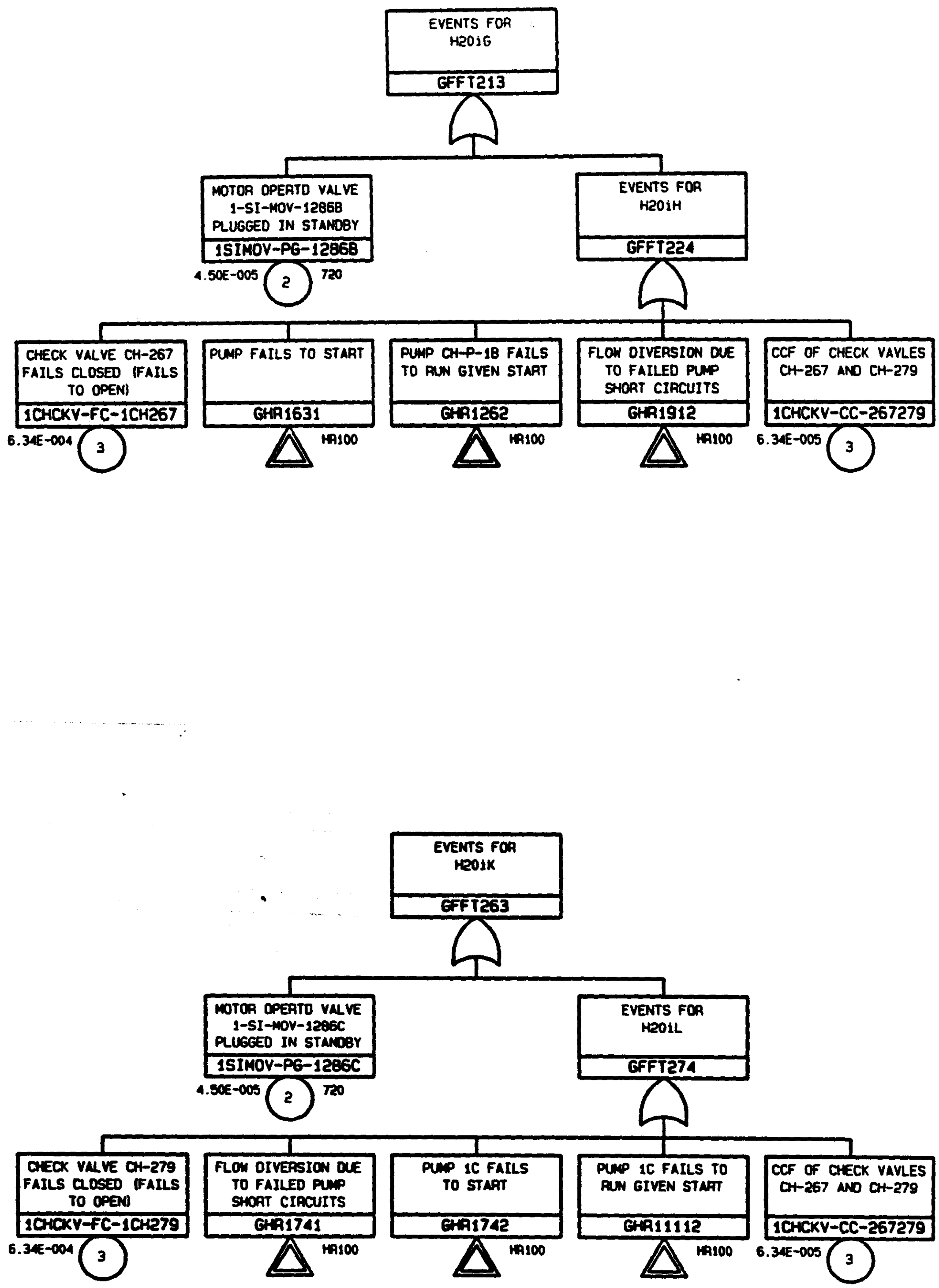


FIGURE B.2-3
FUNCTIONAL FAULT TREE

FUNCTIONAL FAULT TREE NAPS UNIT 1 325MAF.N.3	FFT 2
ANALYST: KDT | CREATION DATE: 06-24-92	REVISION : 11-25-92



FFT00.LGC NUPRA 2.0 VPNR

FIGURE B.2-3 (Continued)

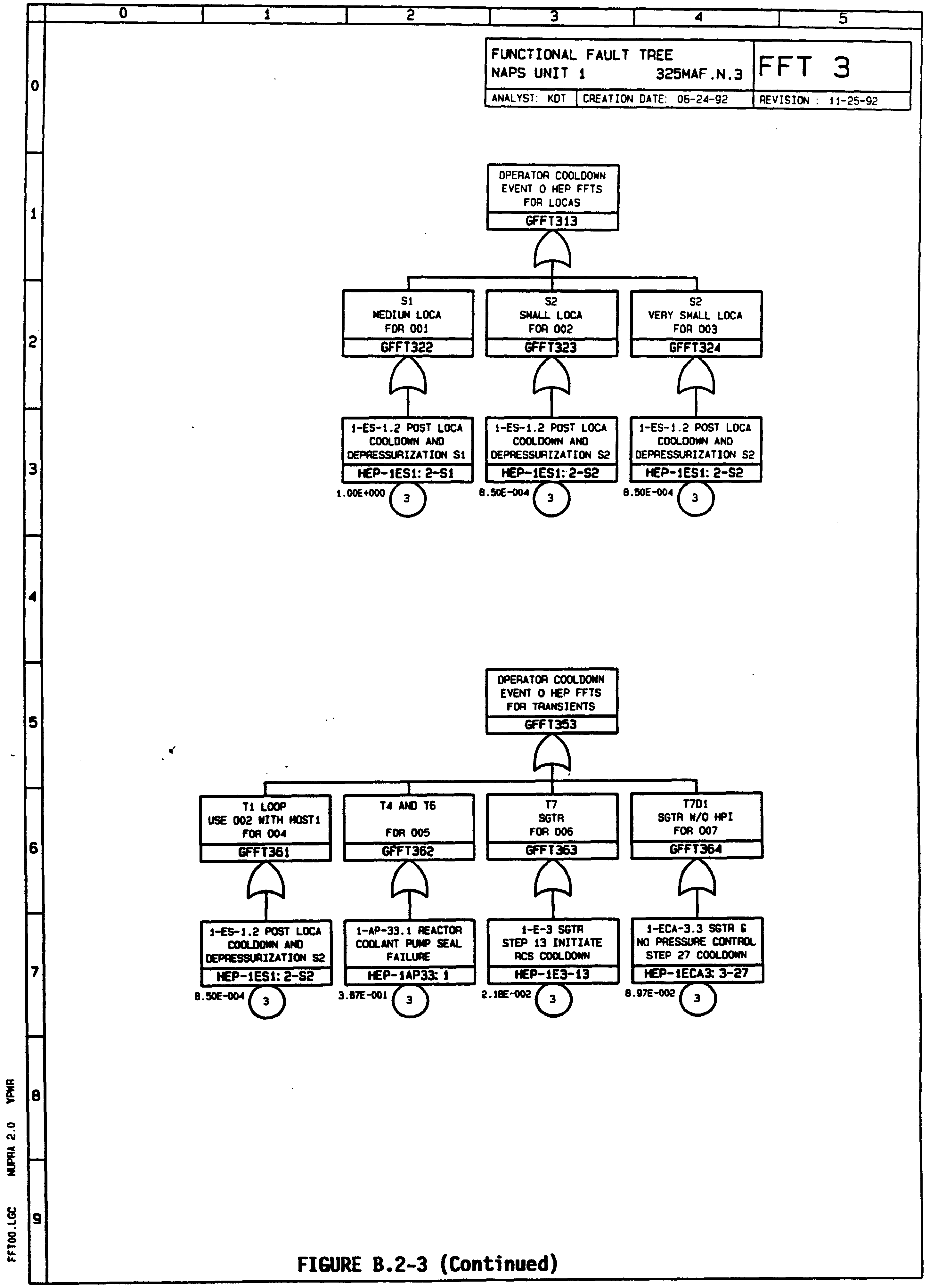


FIGURE B.2-3 (Continued)

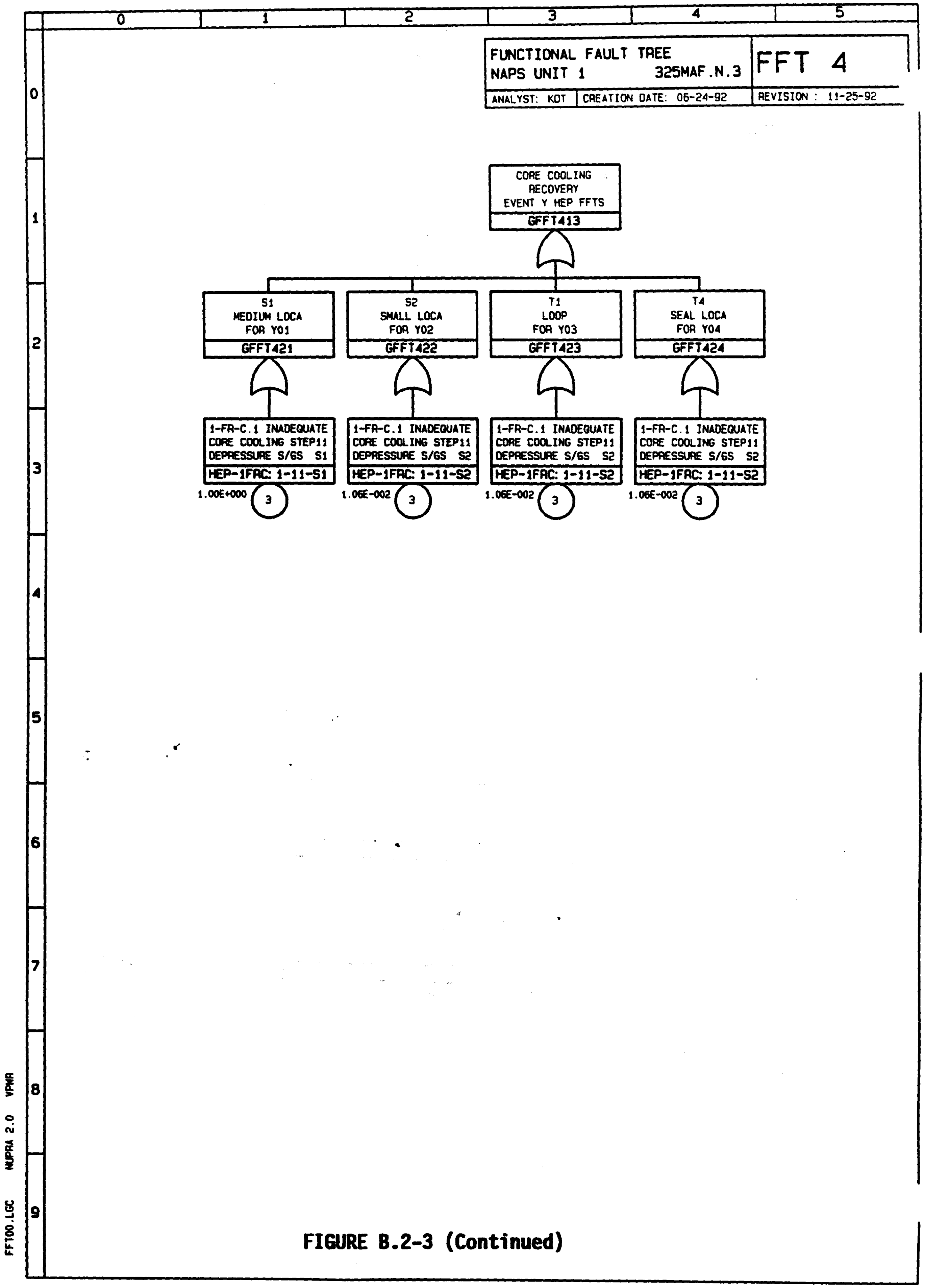
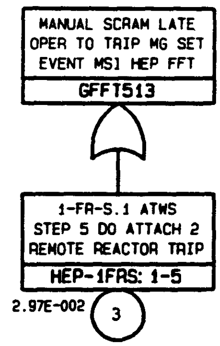


FIGURE B.2-3 (Continued)

FUNCTIONAL FAULT TREE
NAPS UNIT 1 325MAF.N.3

FFT 5

ANALYST: KDT	CREATION DATE: 06-24-92	REVISION : 11-25-92



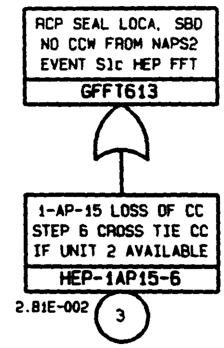
FFT00.LGC NUPRA 2.0 VPWR

FIGURE B.2-3 (Continued)

FUNCTIONAL FAULT TREE
NAPS UNIT 1 325MAF.N.3

FFT 6

ANALYST: KDT | CREATION DATE: 06-24-92 | REVISION : 11-25-92



FFT00.LGC NUPRA 2.0 VPWR

FIGURE B.2-3 (Continued)

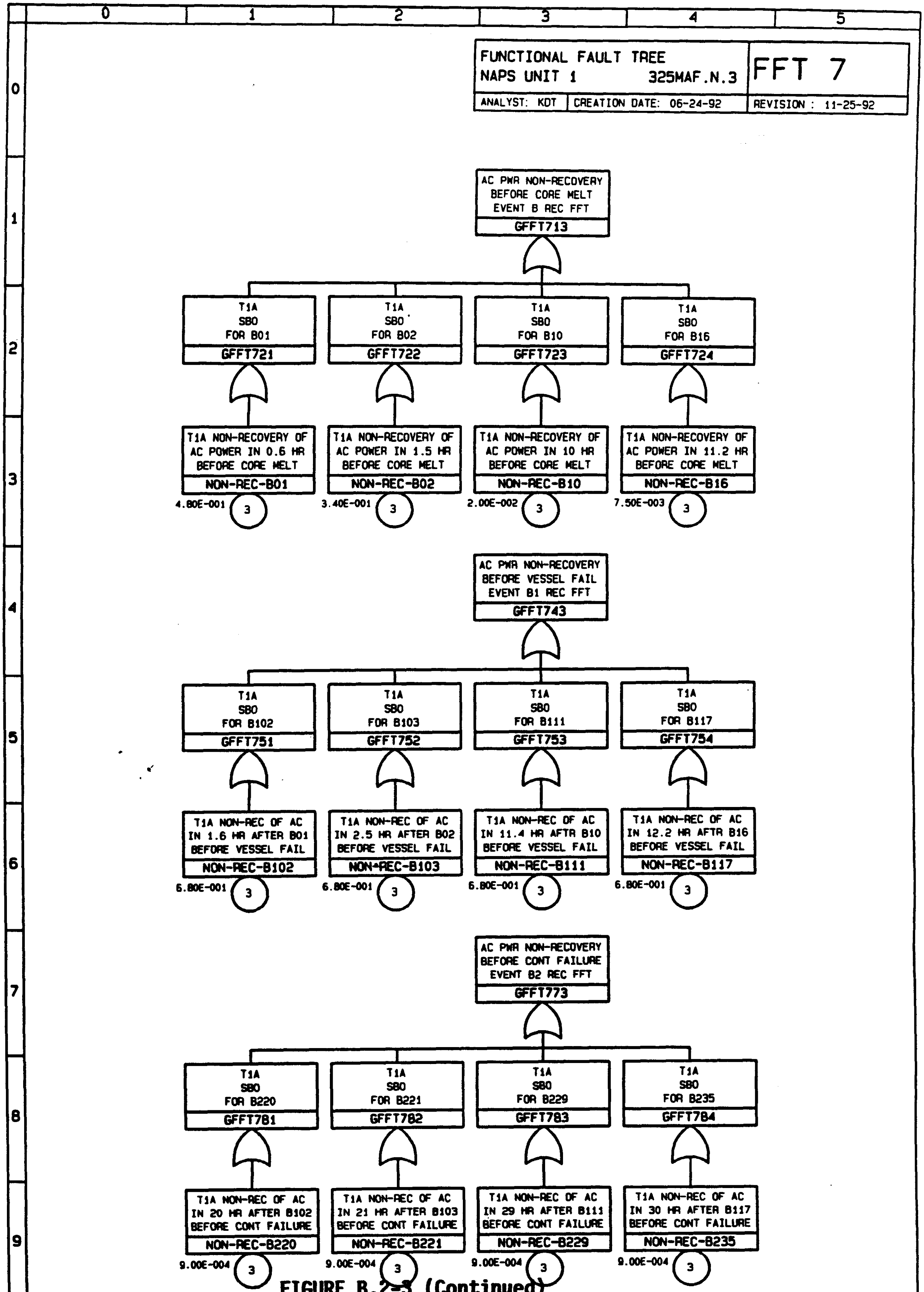
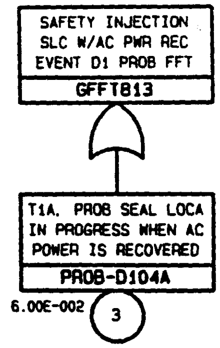


FIGURE B.2-3 (Continued)

FUNCTIONAL FAULT TREE NAPS UNIT 1 325MAF.N.3		FFT 8
ANALYST: KDT	CREATION DATE: 06-24-92	REVISION : 11-25-92



FFT00.LGC NUPRA 2.0 VPWR

FIGURE B.2-3 (Continued)

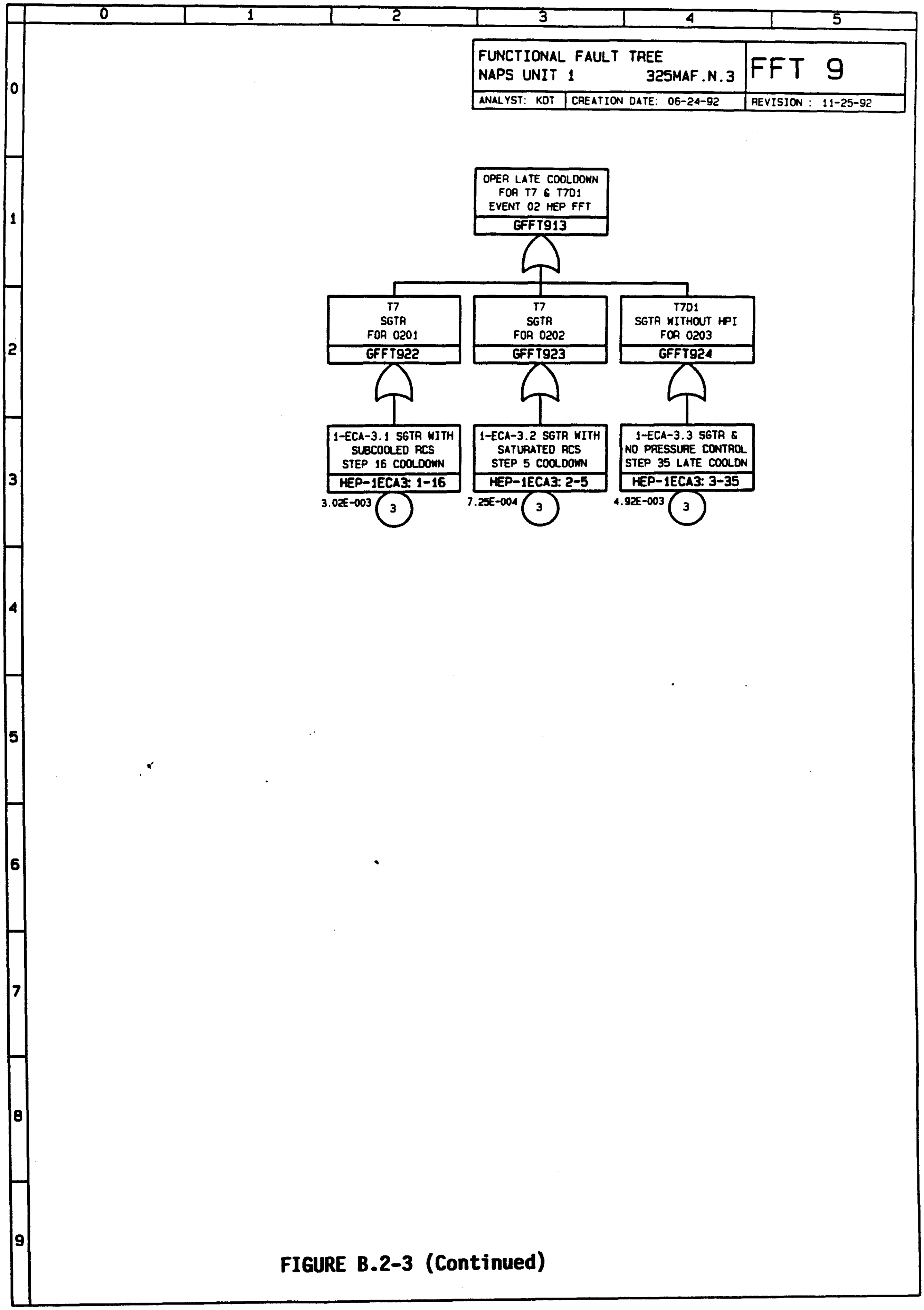


FIGURE B.2-3 (Continued)

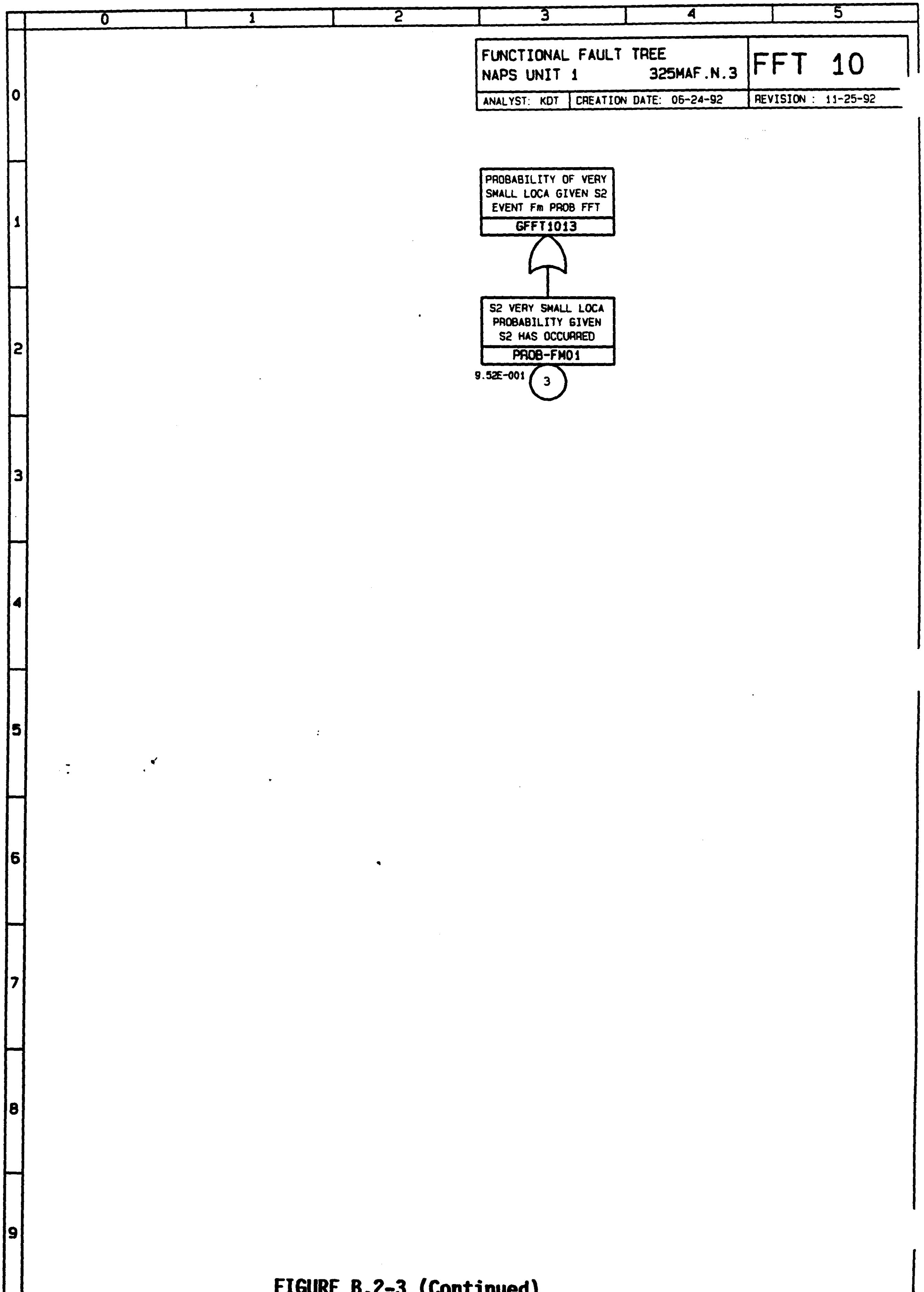
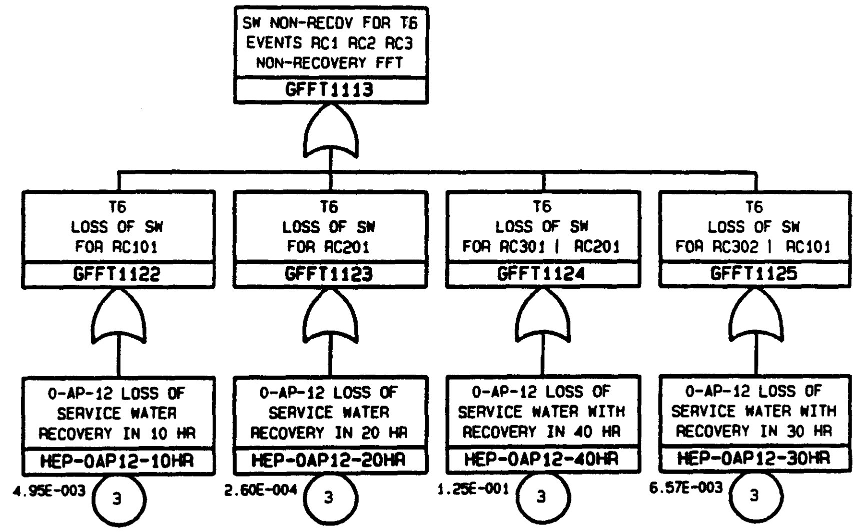


FIGURE B.2-3 (Continued)

FUNCTIONAL FAULT TREE
NAPS UNIT 1 325MAF.N.3

FFT 11

ANALYST: KDT | CREATION DATE: 06-24-92 | REVISION : 11-25-92



FFT00.LGC NUPRA 2.0 VPWR

FIGURE B.2-3 (Continued)

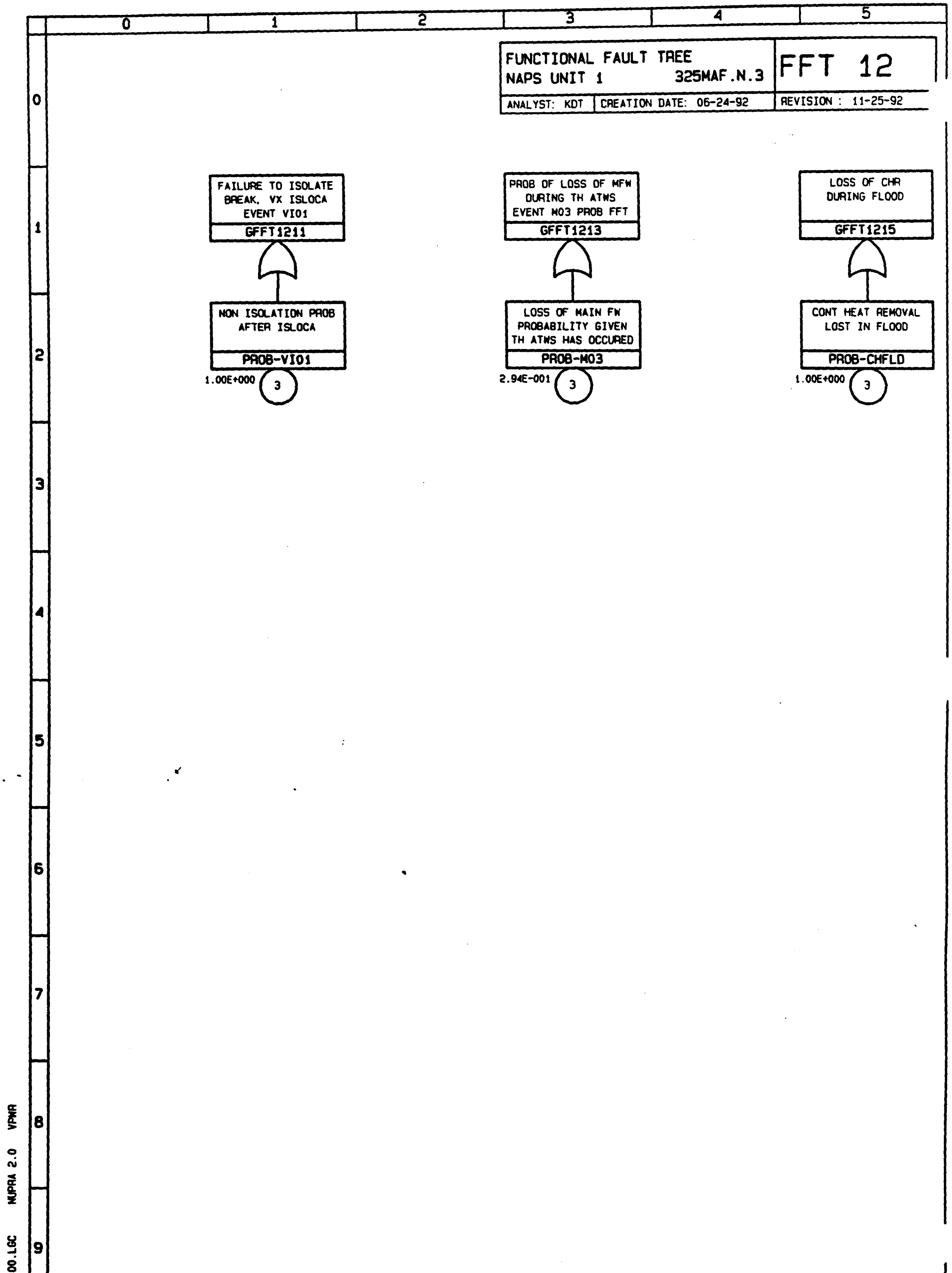


FIGURE B.2-3 (Continued)

FUNCTIONAL FAULT TREE NAPS UNIT 1 325MAF.N.3		FFT 13
ANALYST: KDT	CREATION DATE: 06-24-92	REVISION : 11-25-92

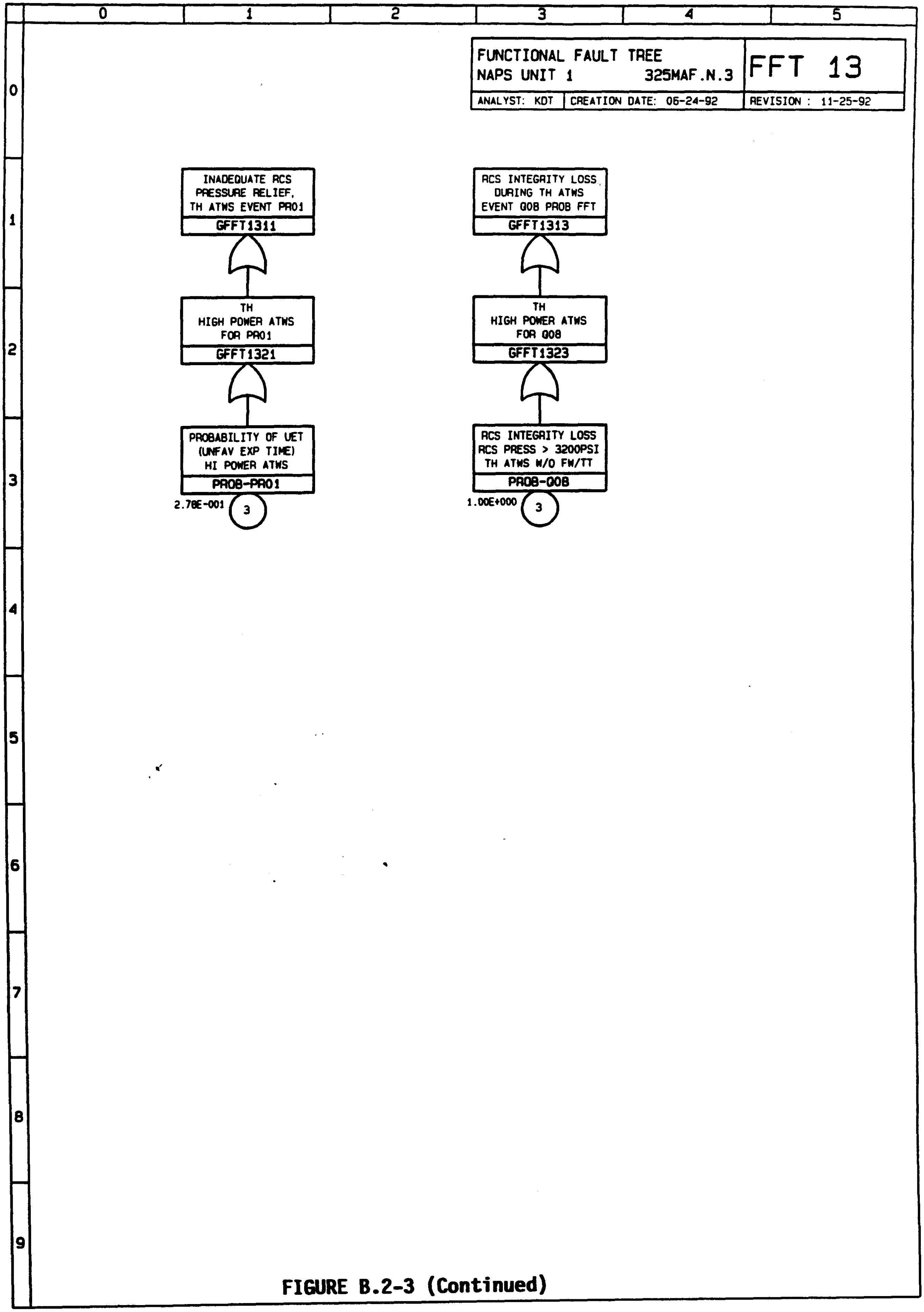


FIGURE B.2-3 (Continued)

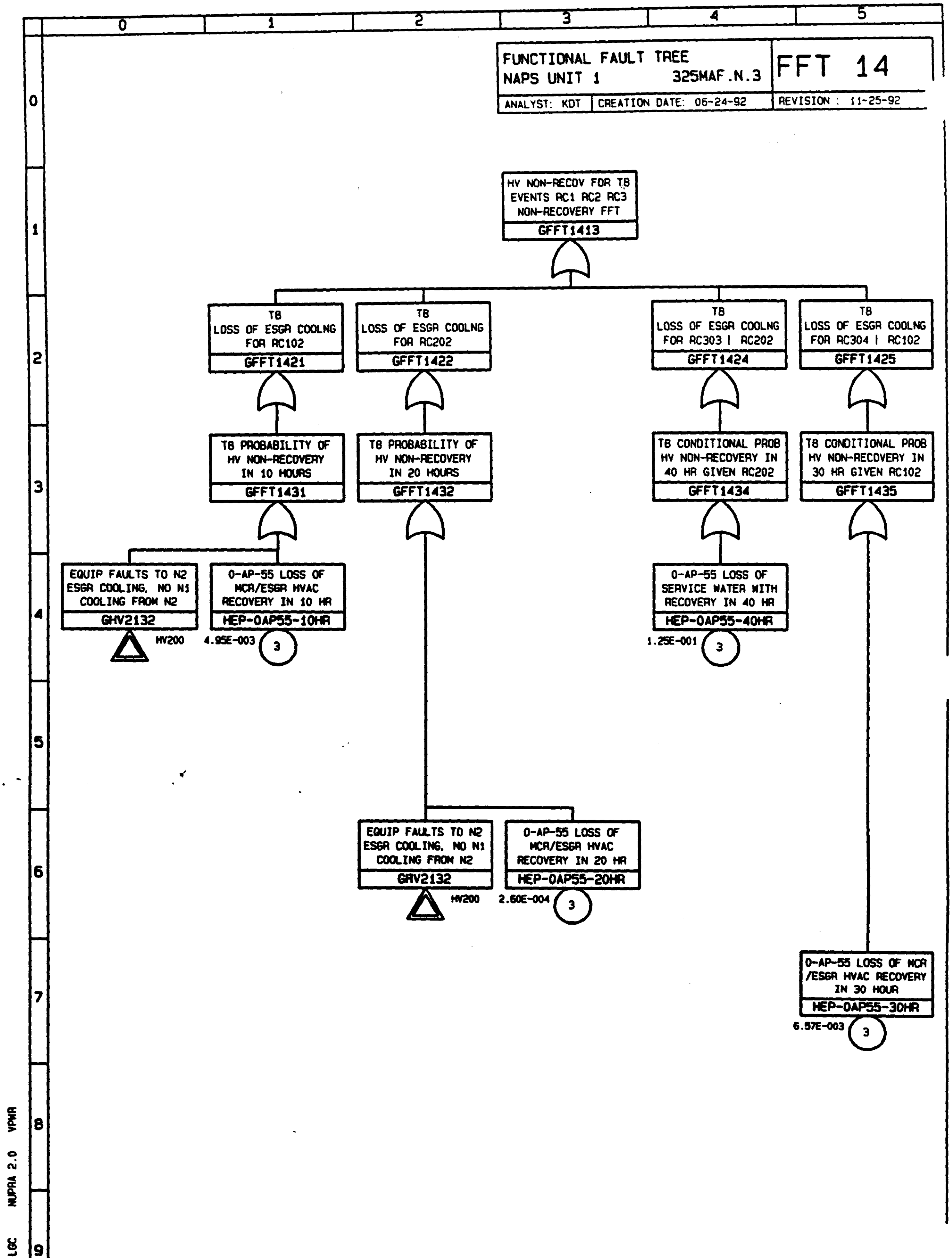


FIGURE B.2-3 (Continued)

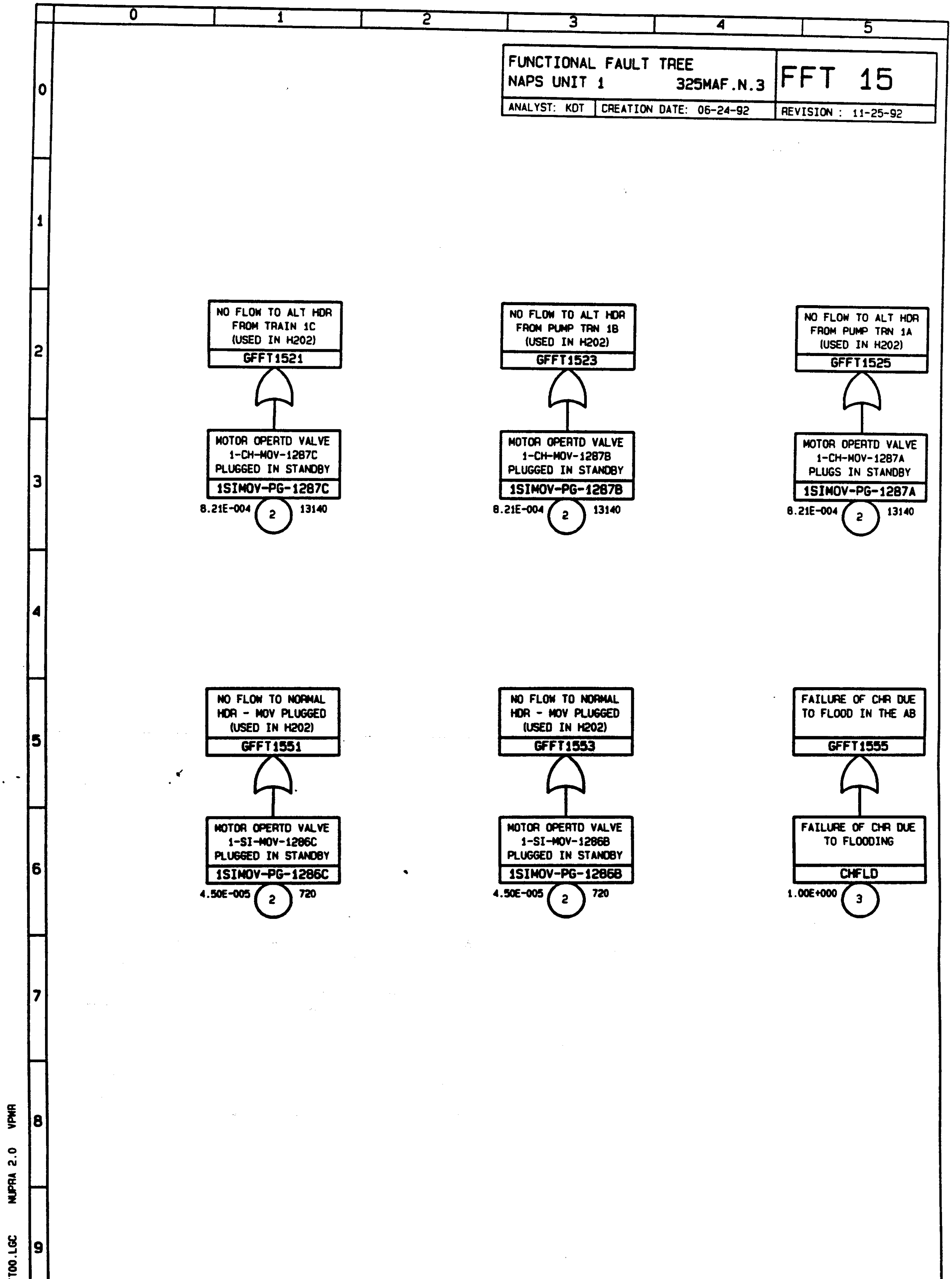


FIGURE B.2-3 (Continued)

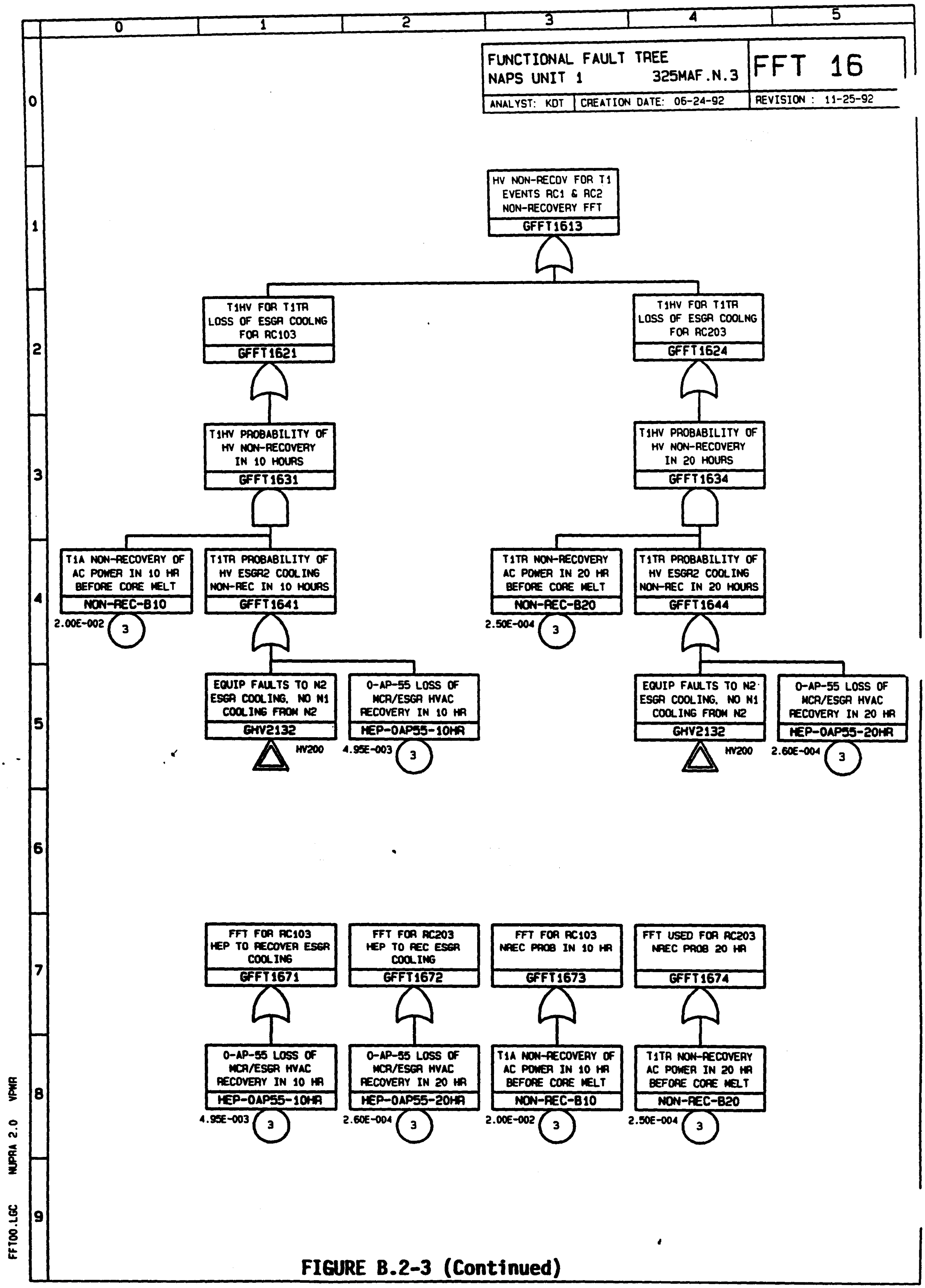
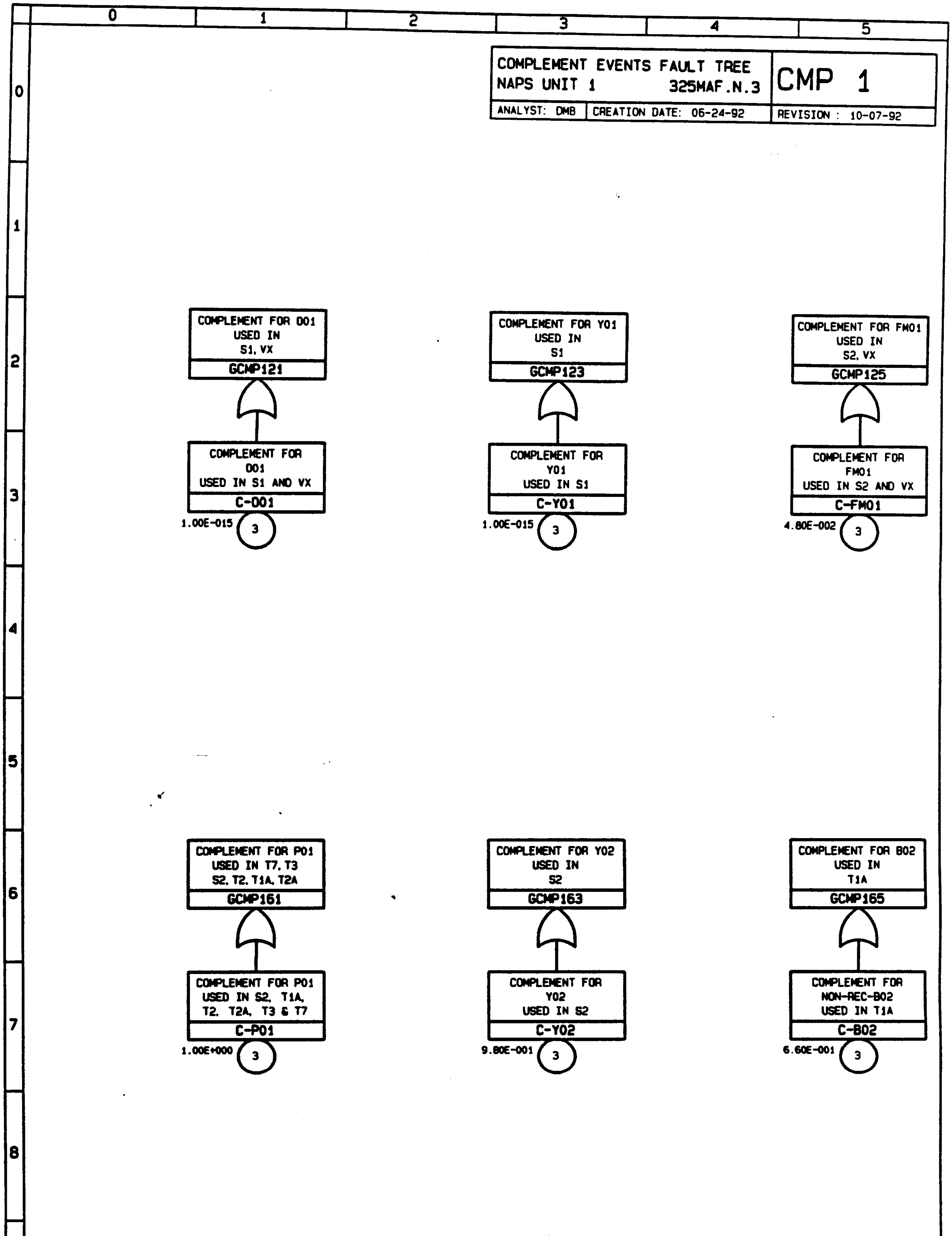


FIGURE B.2-3 (Continued)



COMPO.LGC NUPRA 2.0 VPWR

FIGURE B.2-4
COMPLEMENT EVENTS

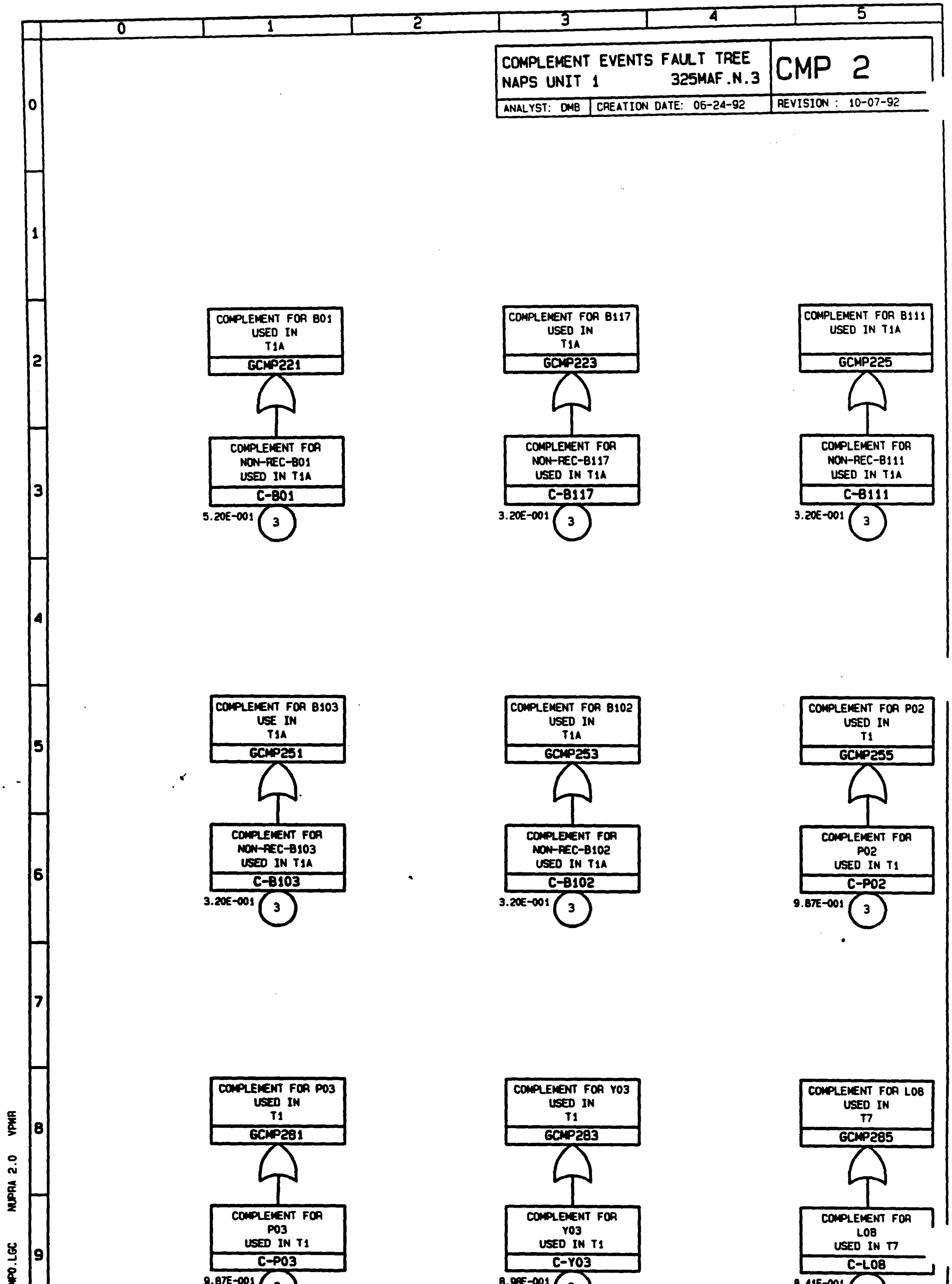
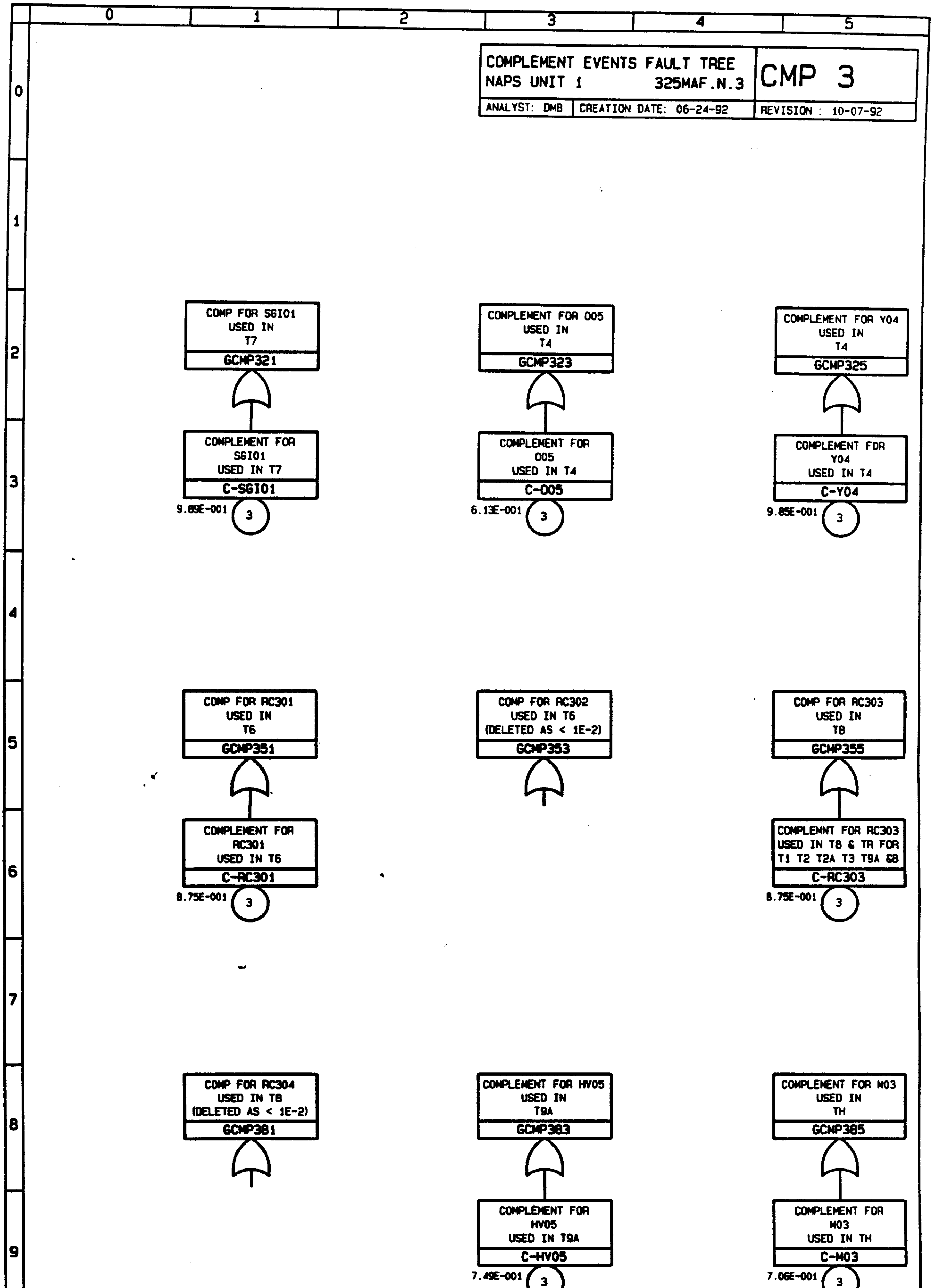


FIGURE B.2-4 (Continued)



COMPO.LGC NUPRA 2.0 VPNR

FIGURE B.2-4 (Continued)

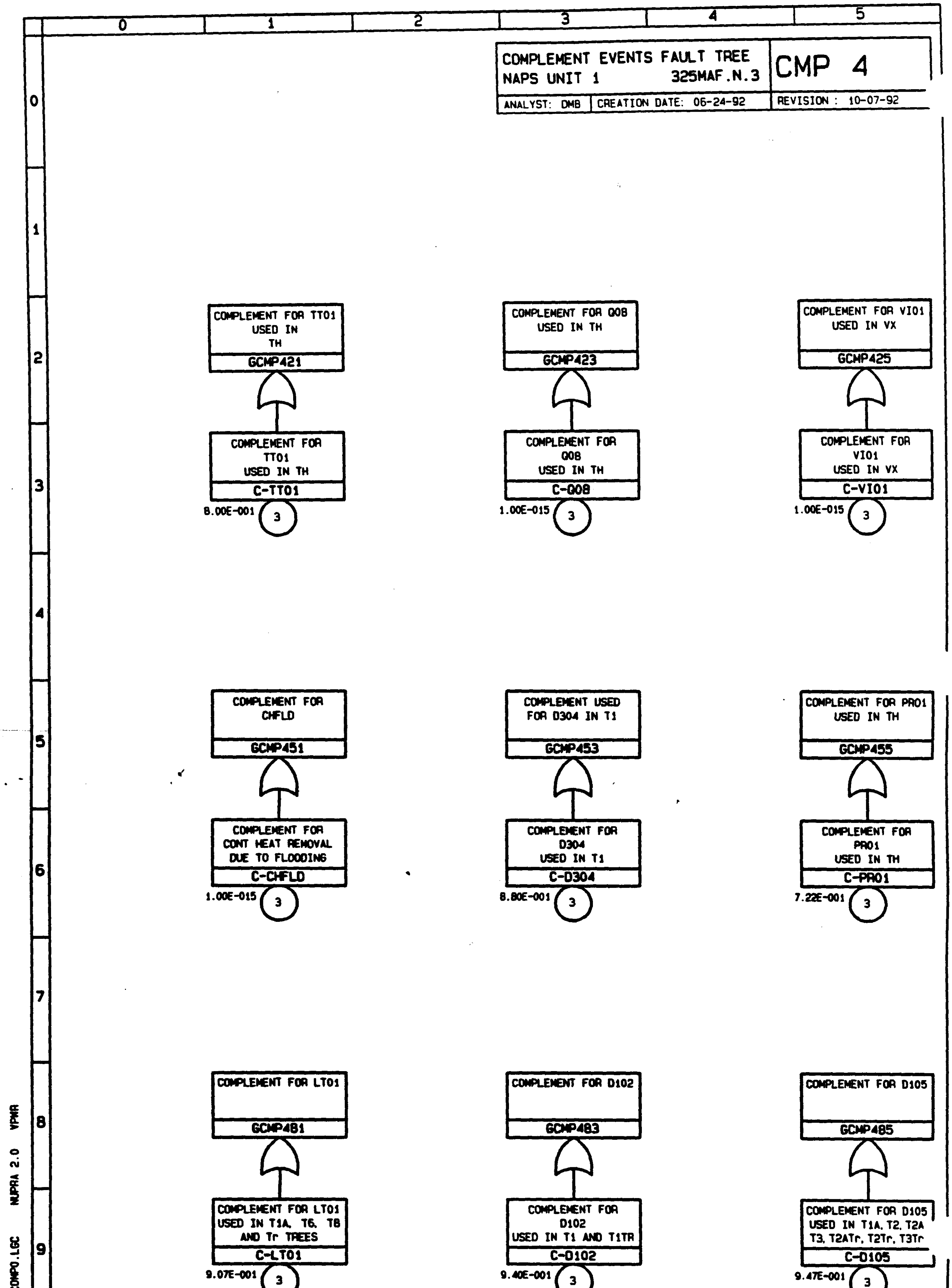


FIGURE B.2-4 (Continued)

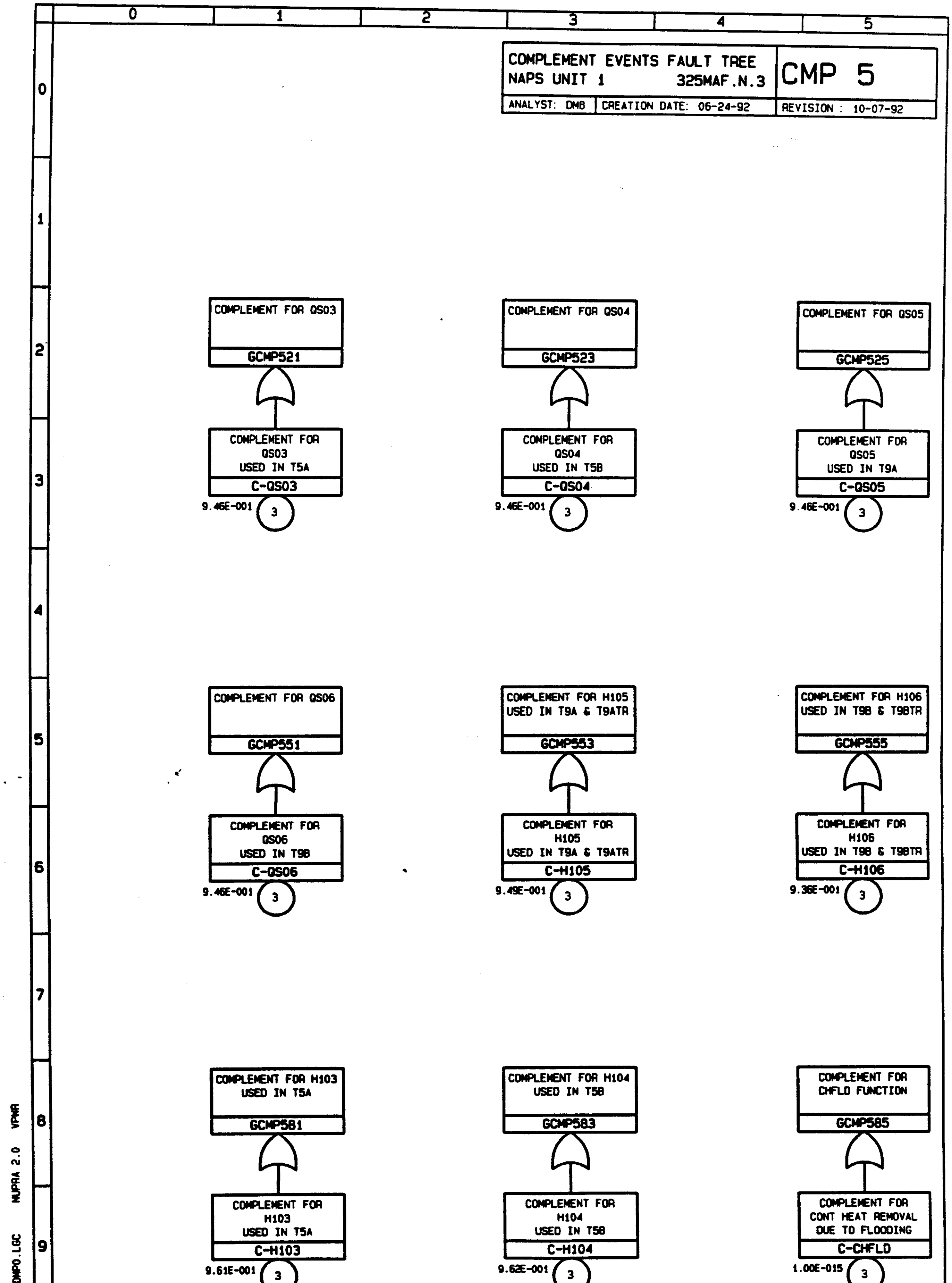
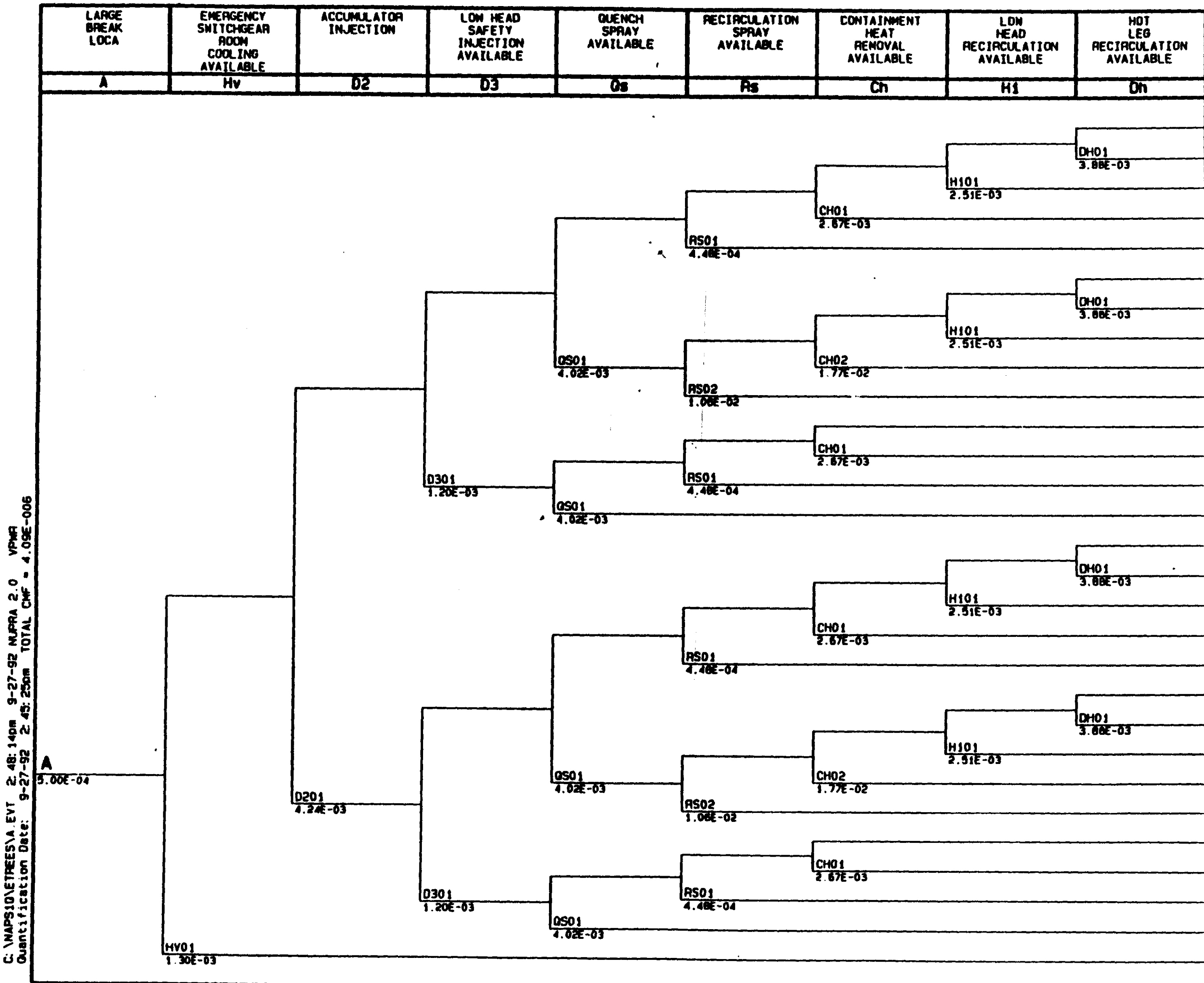


FIGURE B.2-4 (Continued)



SEQ #	SEQUENCE DESCRIPTOR	POS #	FREQUENCY
P01	A	OK	
P02	ADh	12	5.17E-07
P03	AH1	13	8.26E-07
P04	ACh	1	1.60E-08
P05	ARs	2	4.28E-09
P06	AQs	OK	
P07	AQsDh	12	1.69E-09
P08	AQsH1	13	1.90E-09
P09	AQsCh	1	7.54E-11
P10	AQsRs	2	1.21E-10
P11	AD3	13	5.88E-07
P12	AD3Ch	13	8.41E-10
P13	AD3Rs	13	2.24E-10
P14	AD3Qs	13	1.81E-09
P15	AD2	12	2.12E-06
P16	AD2Dh	12	2.07E-09
P17	AD2H1	13	2.73E-09
P18	AD2Ch	1	6.52E-11
P19	AD2Rs	2	1.57E-11
P20	AD2Qs	12	7.68E-09
P21	AD2QsDh	12	0.00E+00
P22	AD2QsH1	13	0.00E+00
P23	AD2QsCh	1	0.00E+00
P24	AD2QsRs	2	0.00E+00
P25	AD2D3	13	2.28E-09
P26	AD2D3Ch	13	0.00E+00
P27	AD2D3Rs	13	0.00E+00
P28	AD2D3Qs	13	0.00E+00
P29	AHv	1R	3.38E-07 TB

FIGURE B.2-A
LARGE BREAK LOSS OF COOLANT ACCIDENT EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

A: LARGE BREAK LOSS OF COOLANT ACCIDENT EVENT TREE

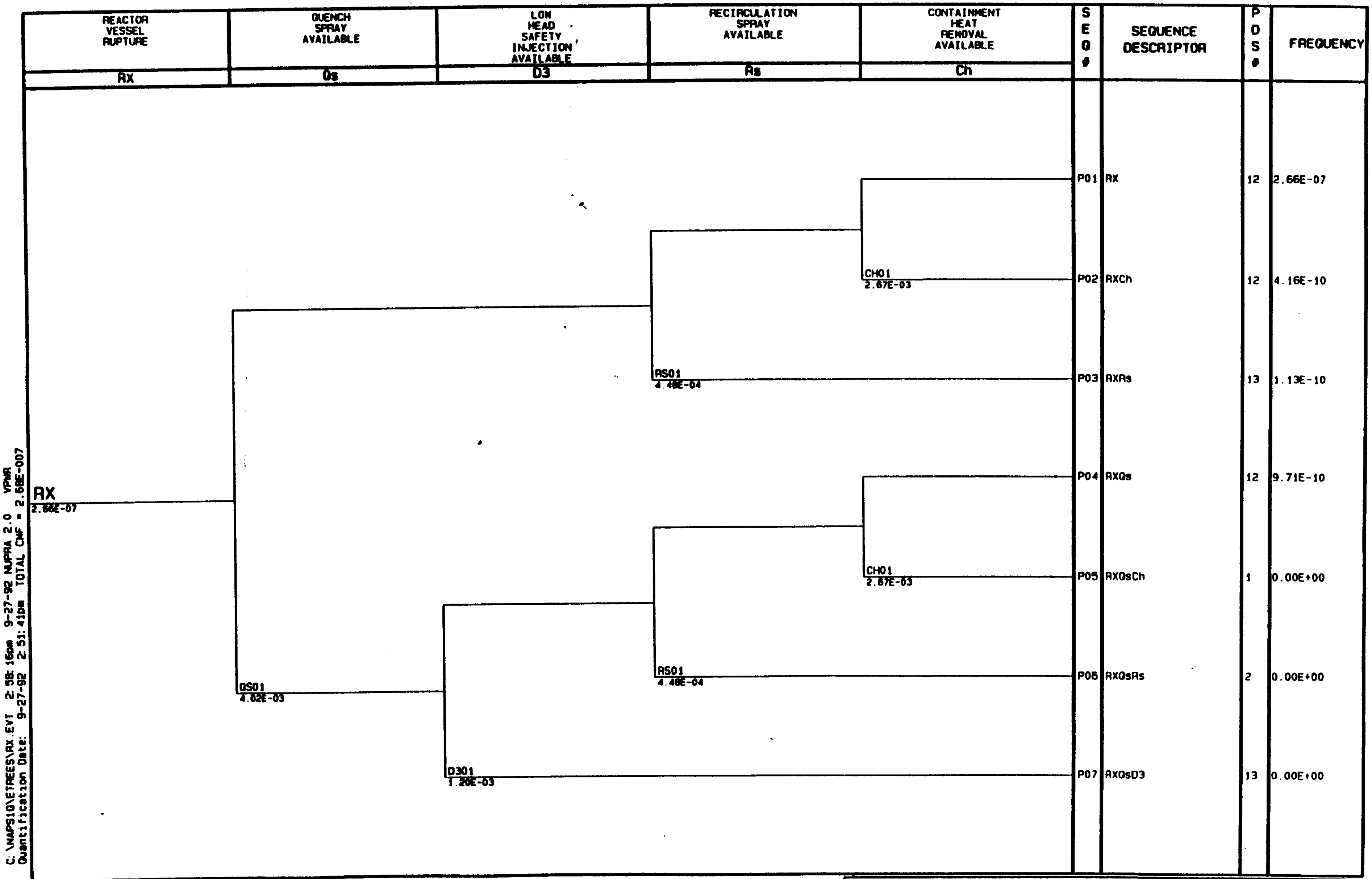
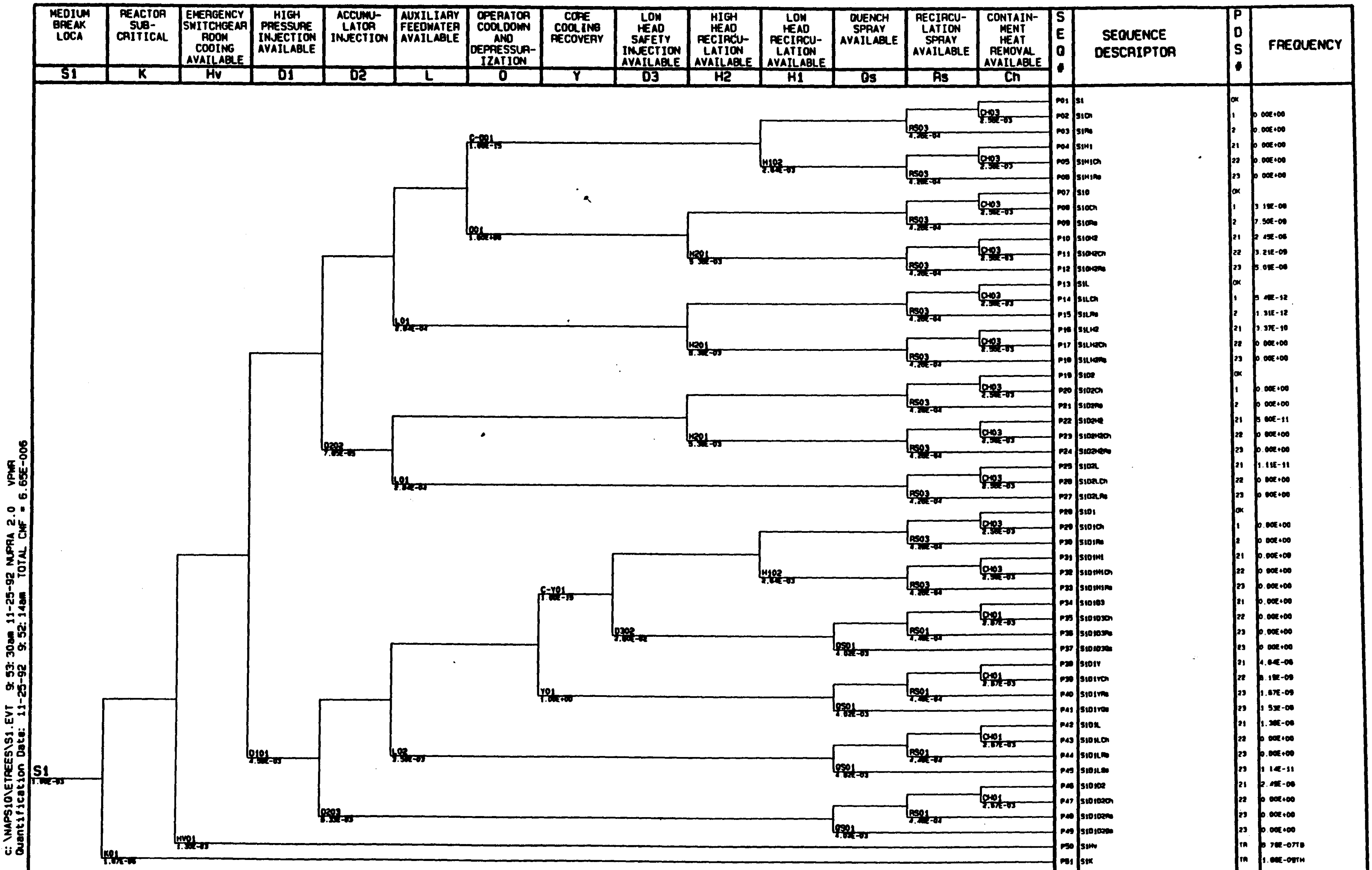


FIGURE B.2-RX
REACTOR VESSEL RUPTURE EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

RX: REACTOR VESSEL RUPTURE EVENT TREE



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

S1: MEDIUM BREAK LOSS OF COOLANT ACCIDENT EVENT TREE

FIGURE B.2-S1
MEDIUM BREAK LOSS OF COOLANT ACCIDENT EVENT TREE

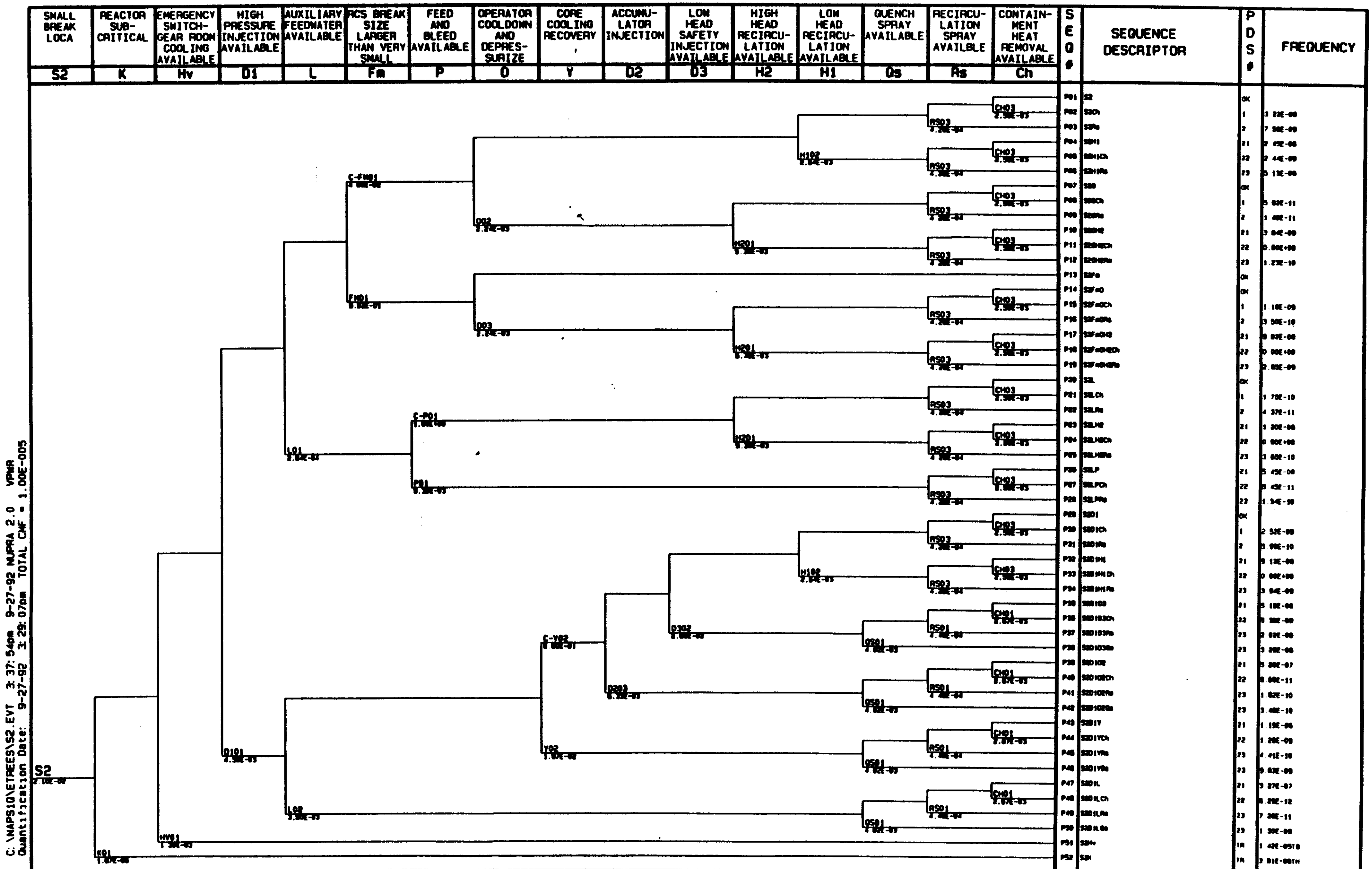


FIGURE B.2-S2
SMALL BREAK LOSS OF COOLANT ACCIDENT EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION
S2: SMALL BREAK LOSS OF COOLANT ACCIDENT EVENT TREE

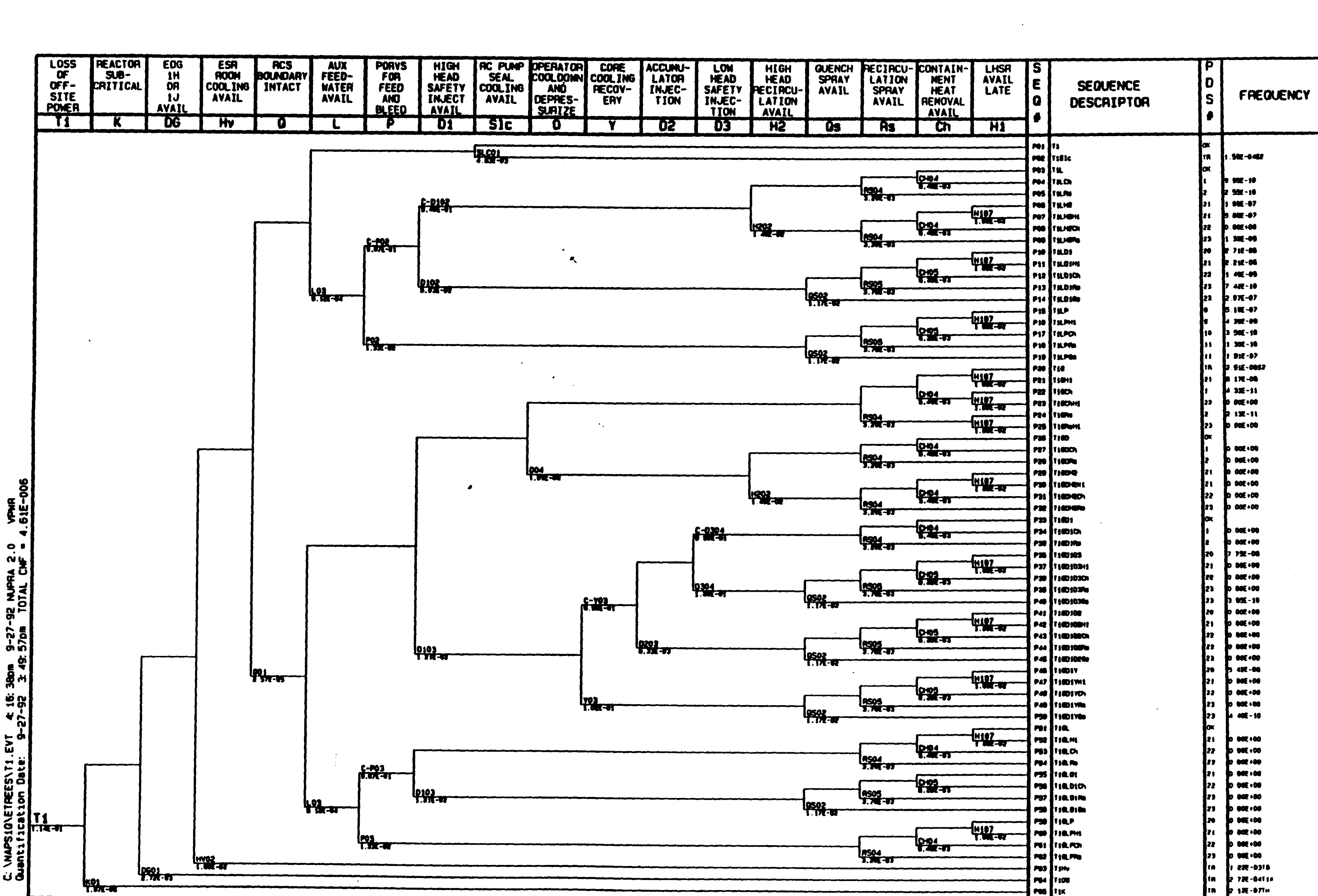
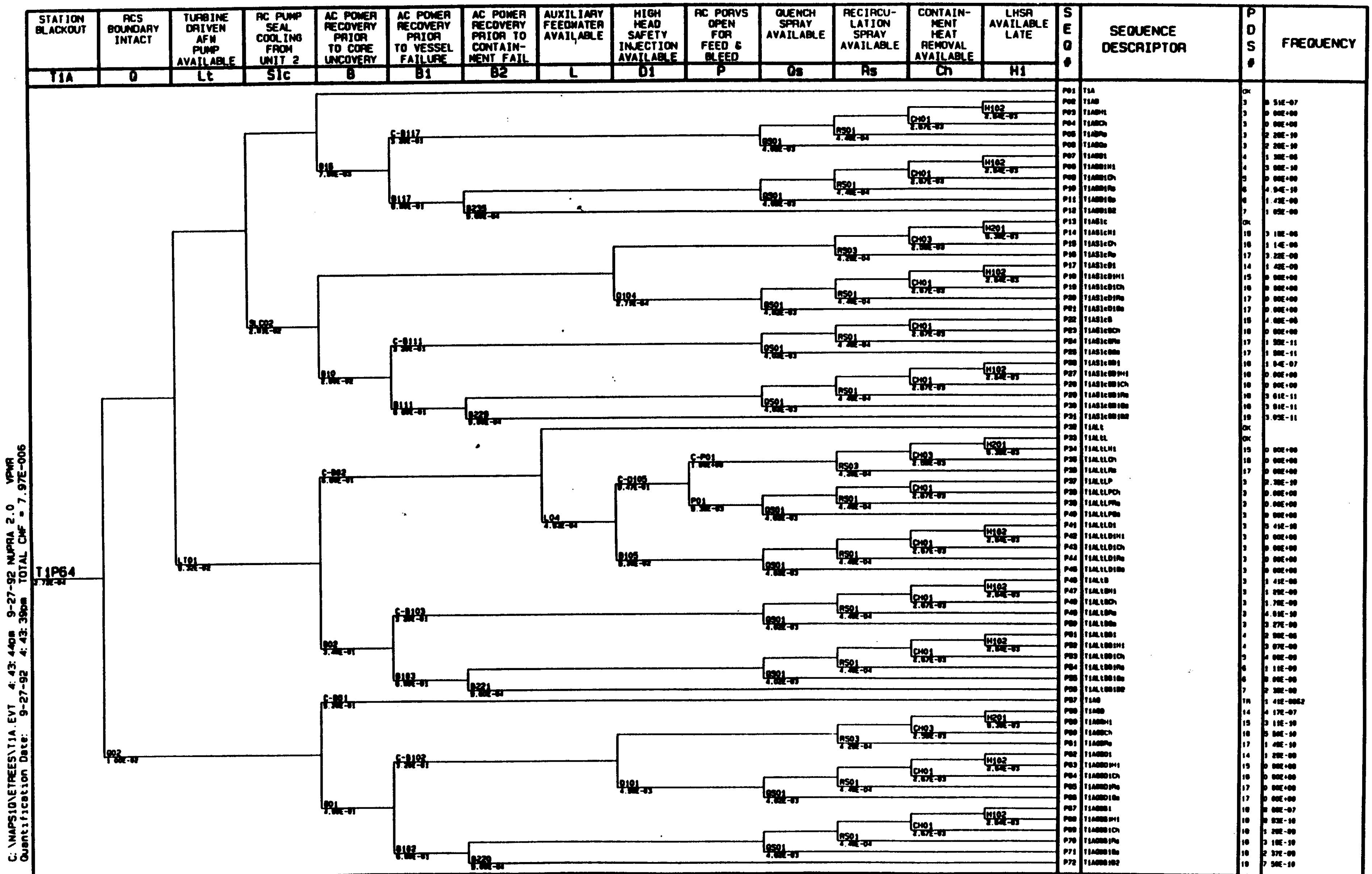


FIGURE B.2-T1
LOSS OF OFFSITE POWER EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

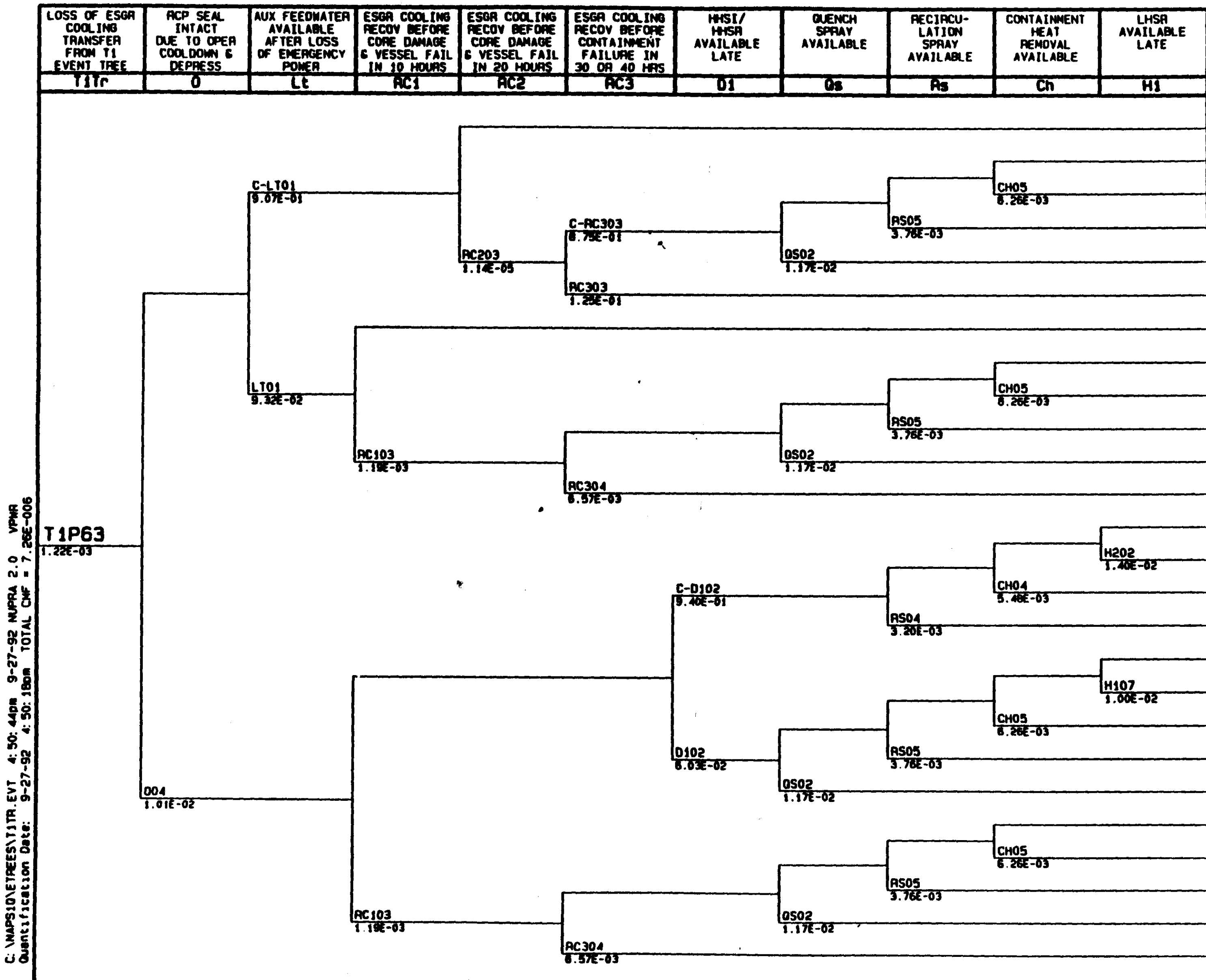
T1: LOSS OF OFFSITE POWER EVENT TREE



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T1A: STATION BLACKOUT EVENT TREE
TRANSFER FROM T1 LOSS OF OFFSITE POWER

FIGURE B.2-T1Tr
LOSS OF EMERGENCY SWITCHGEAR FROM COOLING TRANSFER FROM T1 LOSS OF OFFSITE POWER EVENT TREE

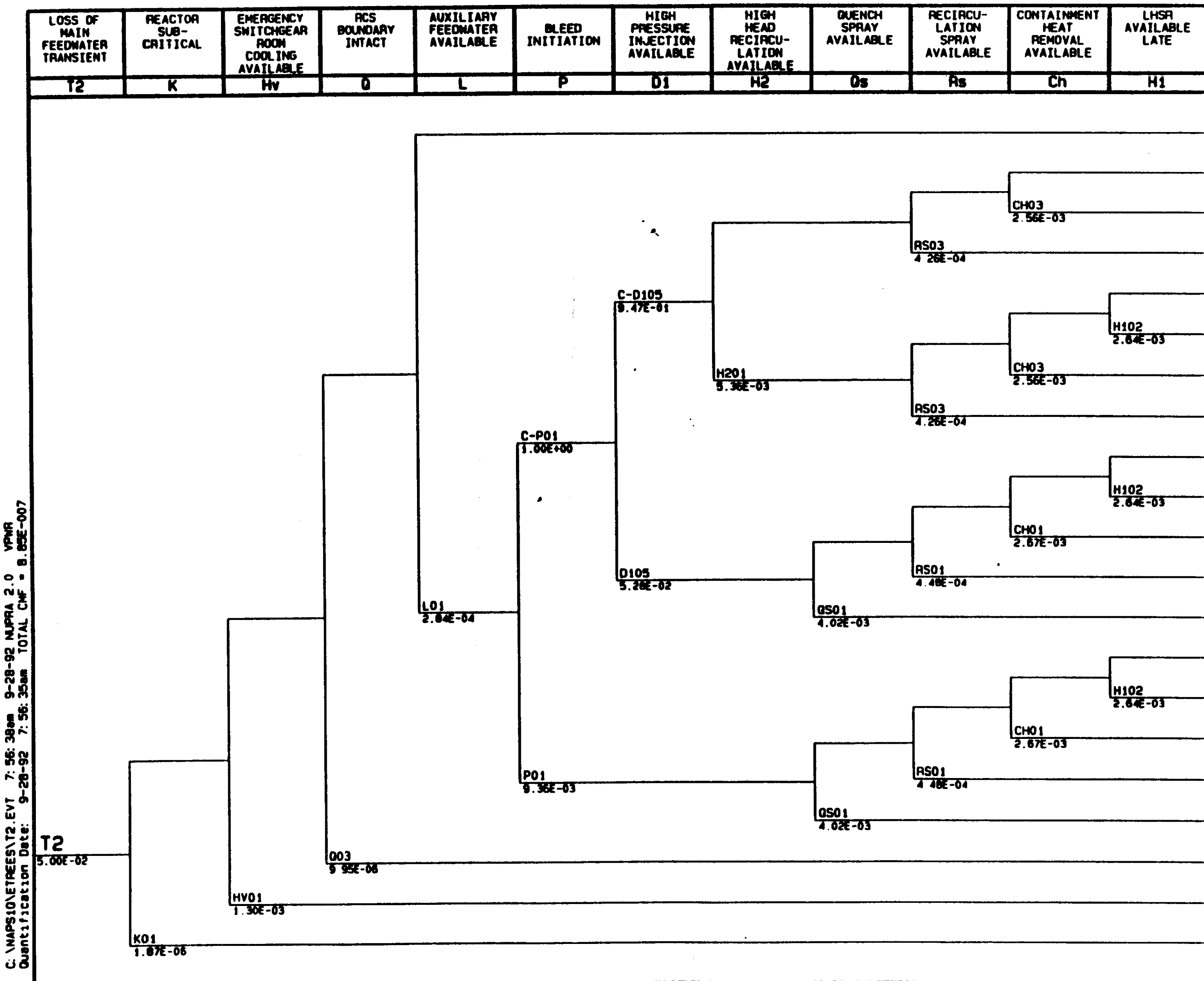


SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T1Tr	OK	
P02	T1TrRC2	4	0.00E+00
P03	T1TrRC2Ch	5	0.00E+00
P04	T1TrRC2Rs	6	0.00E+00
P05	T1TrRC2Qs	6	0.00E+00
P06	T1TrRC2RC3	7	0.00E+00
P07	T1TrLt	OK	
P08	T1TrLtRC1	4	1.29E-09
P09	T1TrLtRC1Ch	5	6.05E-10
P10	T1TrLtRC1Rs	6	0.00E+00
P11	T1TrLtRC1Qs	6	0.00E+00
P12	T1TrLtRC1RC3	7	0.00E+00
P13	T1TrO	OK	
P14	T1TrOH1	21	1.01E-06
P15	T1TrOCh	22	4.28E-09
P16	T1TrORs	23	1.10E-08
P17	T1TrOD1	20	4.00E-06
P18	T1TrOD1H1	21	3.82E-10
P19	T1TrOD1Ch	22	1.20E-08
P20	T1TrOD1Rs	23	0.00E+00
P21	T1TrOD1Qs	23	2.22E-06
P22	T1TrORC1	18	5.15E-10
P23	T1TrORC1Ch	18	0.00E+00
P24	T1TrORC1Rs	18	0.00E+00
P25	T1TrORC1Qs	18	0.00E+00
P26	T1TrORC1RC3	19	0.00E+00

FIGURE B.2-T1A
STATION BLACKOUT EVENT TREE TRANSFER FROM T1 LOSS OF OFFSITE POWER

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T1Tr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T1 LOSS OF OFFSITE POWER EVENT TREE

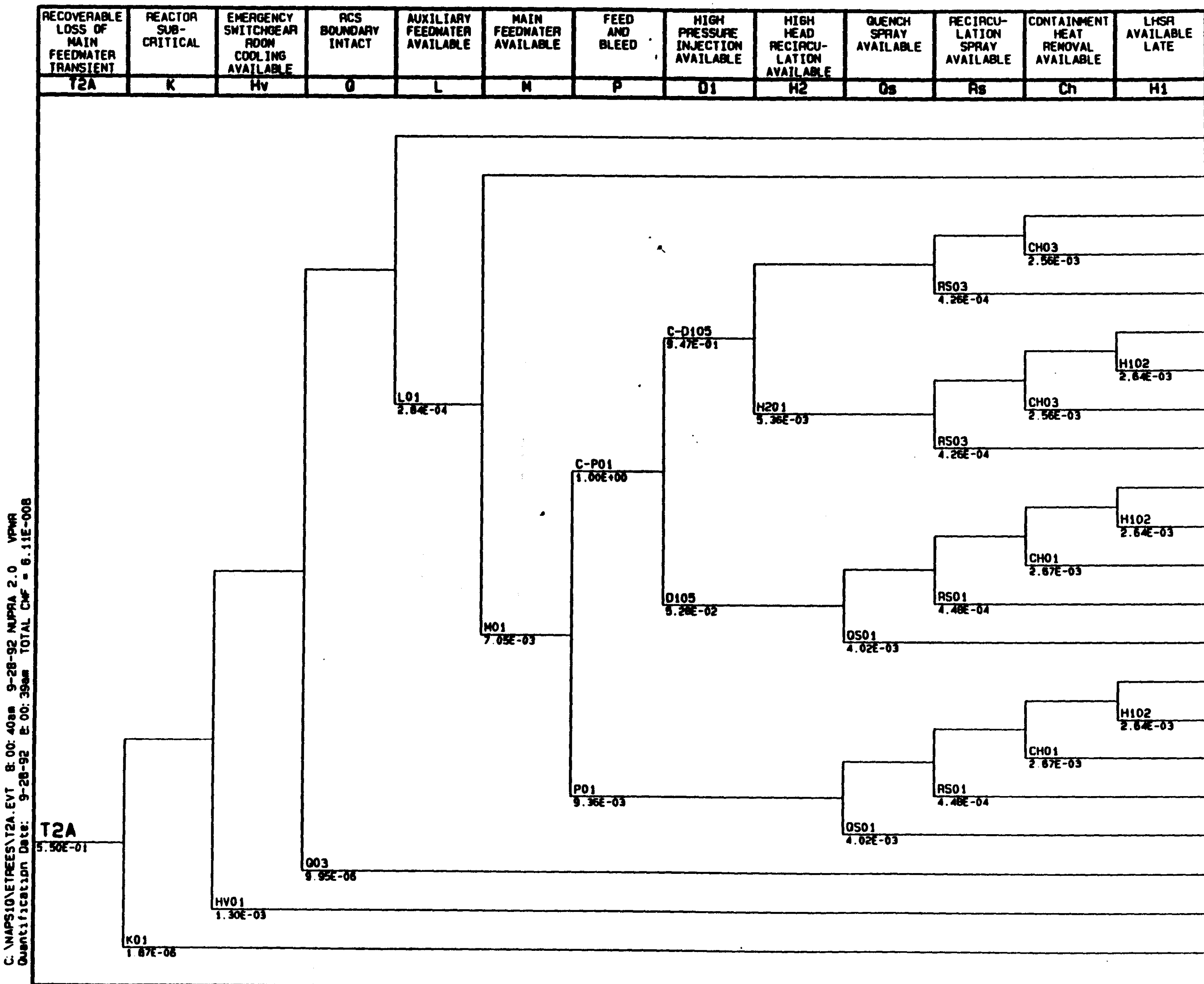


SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T2	OK	
P02	T2L	OK	
P03	T2LCh	1	3.94E-10
P04	T2LRs	2	9.38E-11
P05	T2LH2	21	2.28E-09
P06	T2LH2H1	21	2.43E-08
P07	T2LH2Ch	22	0.00E+00
P08	T2LH2Rs	23	8.24E-10
P09	T2LD1	20	7.22E-07
P10	T2LD1H1	21	2.16E-09
P11	T2LD1Ch	22	8.98E-10
P12	T2LD1Rs	23	2.53E-10
P13	T2LD1Qs	23	1.42E-09
P14	T2LP	8	1.30E-07
P15	T2LPH1	9	1.44E-10
P16	T2LPCh	10	1.54E-10
P17	T2LPRs	11	4.53E-11
P18	T2LPQs	11	3.26E-10
P19	T2Q	TR	4.97E-07S2
P20	T2Hv	TR	3.38E-05T8
P21	T2K	TR	9.32E-08TH

FIGURE B.2-T2
LOSS OF MAIN FEEDWATER EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T2: LOSS OF MAIN FEEDWATER EVENT TREE



SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T2A	OK	
P02	T2AL	OK	
P03	T2ALM	OK	
P04	T2ALMCh	1	0.00E+00
P05	T2ALMRs	2	3.37E-12
P06	T2ALMH2	21	1.90E-11
P07	T2ALMH2H1	21	4.69E-10
P08	T2ALMH2Ch	22	0.00E+00
P09	T2ALMH2Rs	23	2.84E-09
P10	T2ALMD1	20	4.55E-08
P11	T2ALMD1H1	21	0 00E+00
P12	T2ALMD1Ch	22	0.00E+00
P13	T2ALMD1Rs	23	0 00E+00
P14	T2ALMD1Qs	23	0.00E+00
P15	T2ALMP	8	1.23E-08
P16	T2ALMPH1	9	0.00E+00
P17	T2ALMPCh	10	0.00E+00
P18	T2ALMPRs	11	0.00E+00
P19	T2ALMPQs	11	0.00E+00
P20	T2AQ	TR	5.47E-06S2
P21	T2AHv	TR	3.72E-04T8
P22	T2AK	TR	1.03E-06TH

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T2A: RECOVERABLE LOSS OF MAIN FEEDWATER EVENT TREE

FIGURE B.2-T2Tr
LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T2 LOSS OF MAIN FEEDWATER EVENT TREE

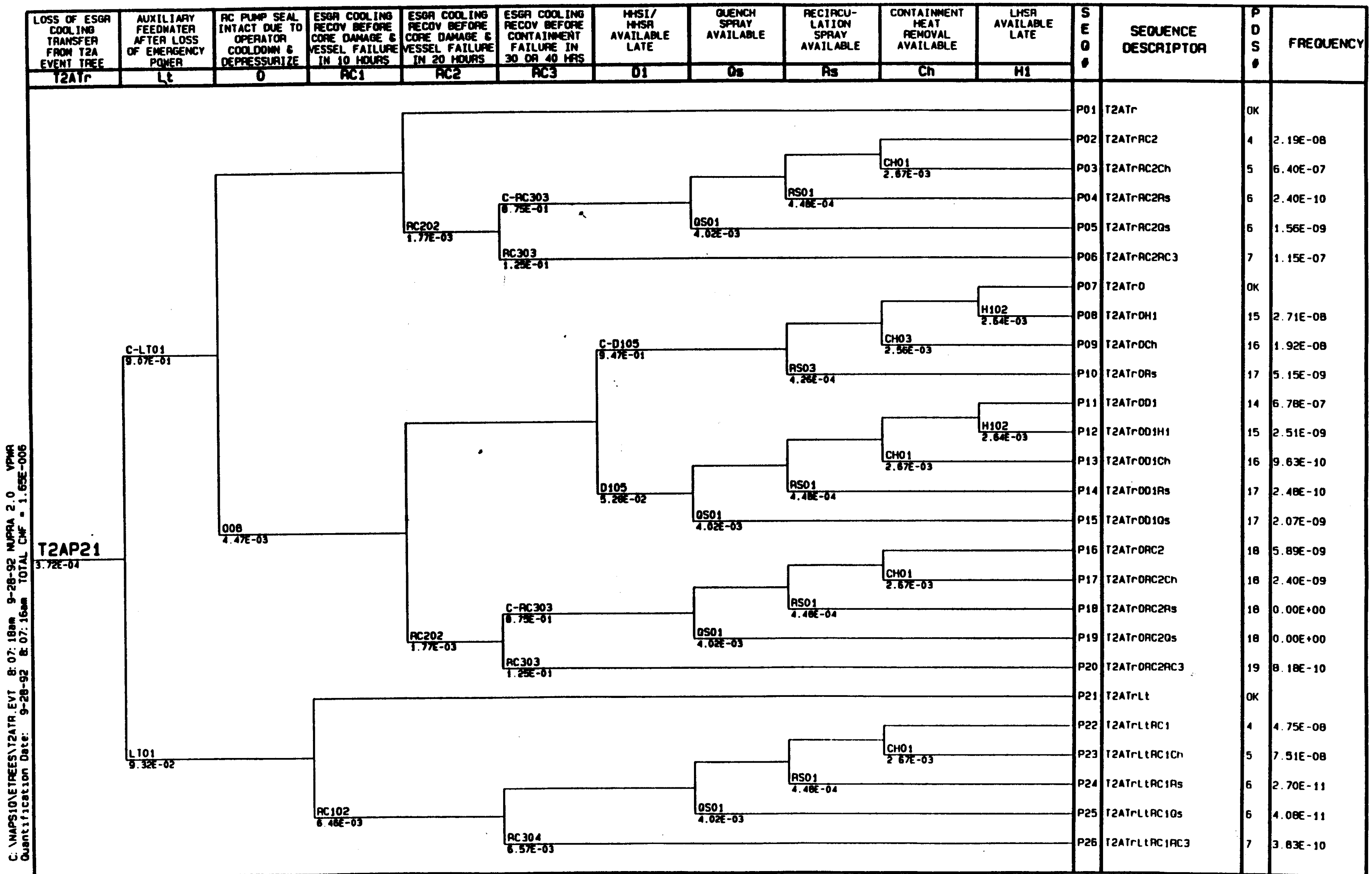
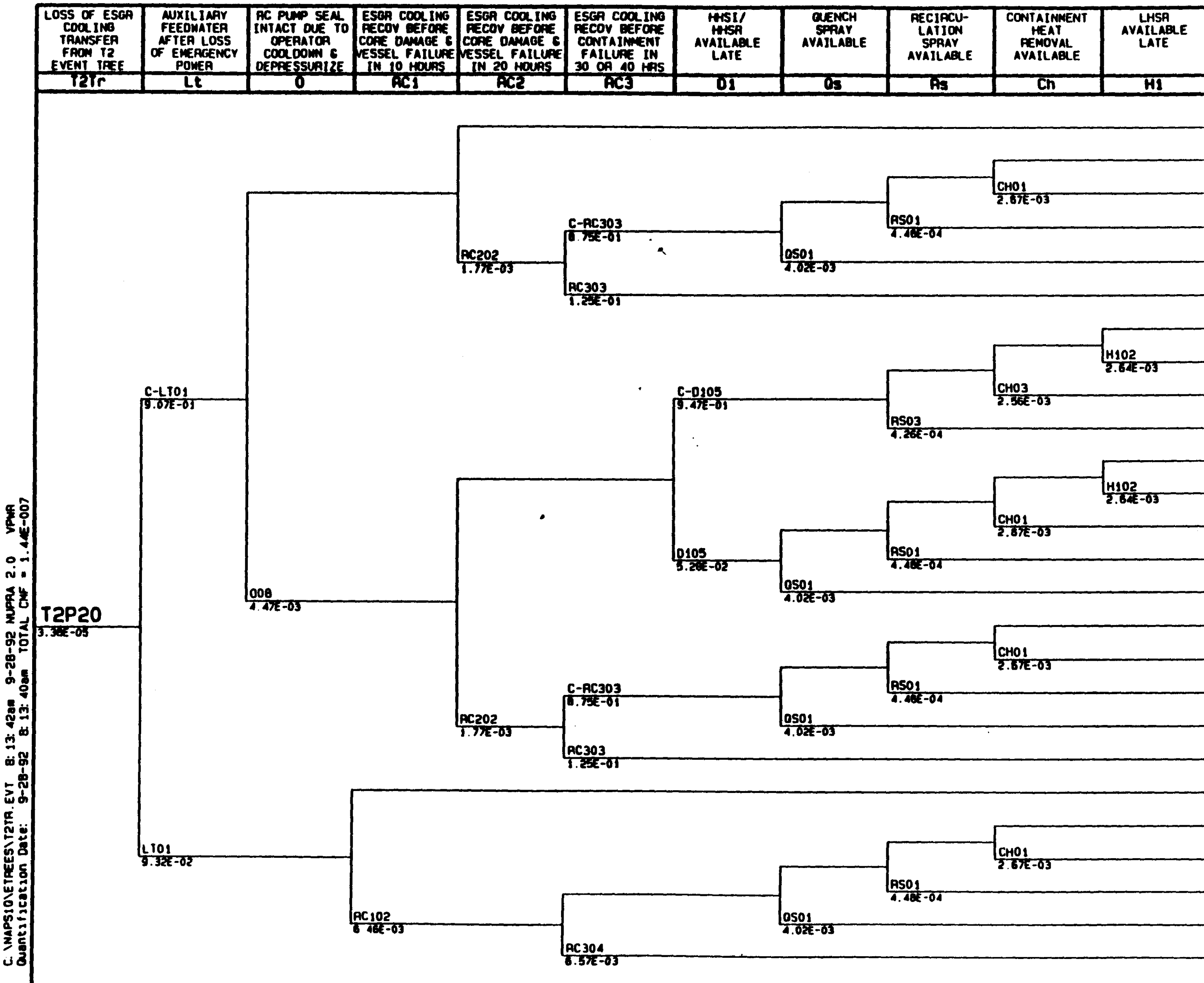


FIGURE B.2-T2A
RECOVERABLE LOSS OF MAIN FEEDWATER EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T2ATr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING
TRANSFER FROM T2A RECOVERABLE LOSS OF MAIN FW EVENT TREE

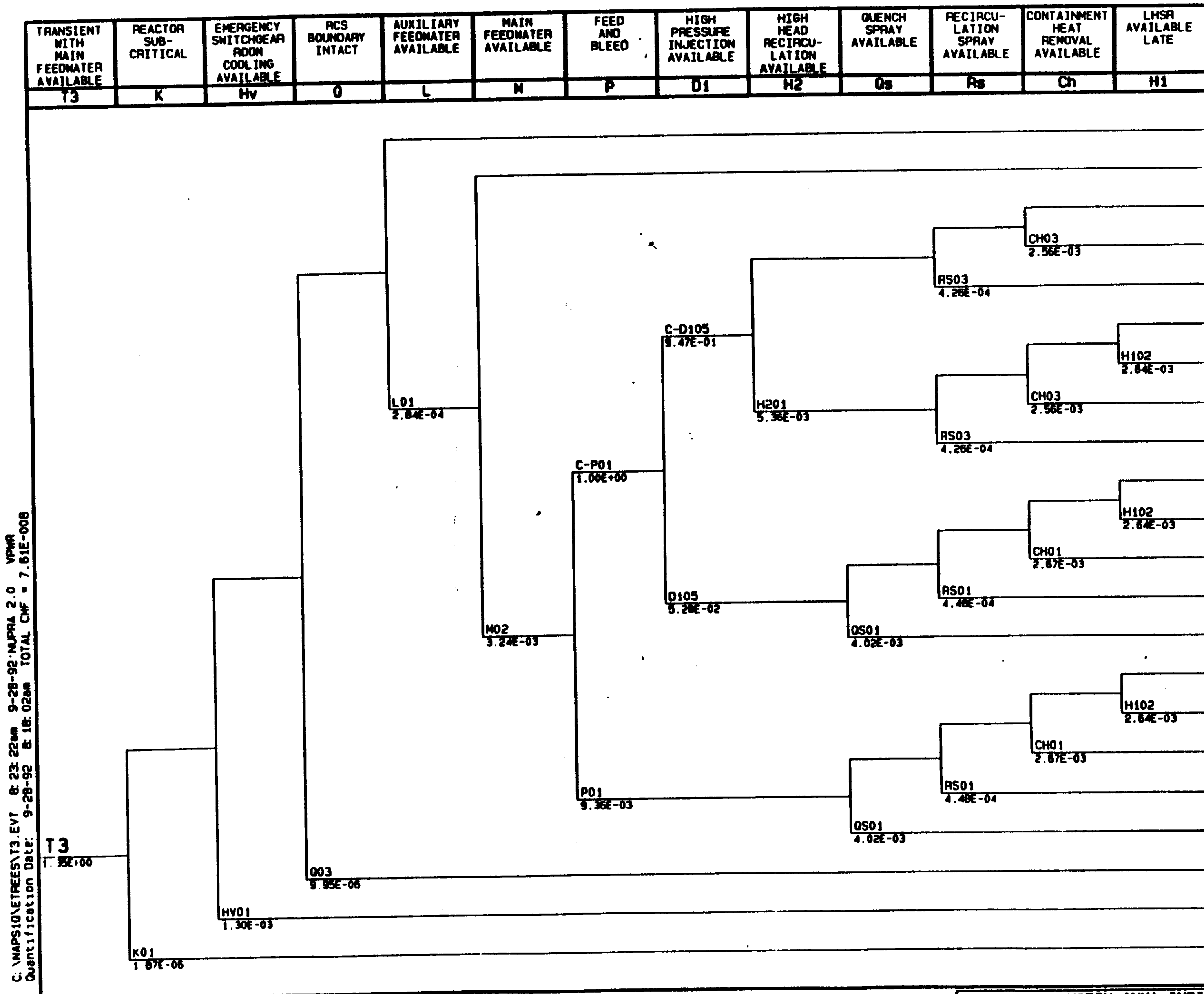


SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T2Tr	OK	
P02	T2TrRC2	4	1.29E-09
P03	T2TrRC2Ch	5	5.82E-08
P04	T2TrRC2Rs	6	2.15E-11
P05	T2TrRC2Qs	6	1.42E-10
P06	T2TrRC2RC3	7	8.32E-09
P07	T2TrO	OK	
P08	T2TrOH1	15	2.45E-09
P09	T2TrOCh	16	1.74E-09
P10	T2TrORs	17	4.67E-10
P11	T2TrOD1	14	6.06E-08
P12	T2TrOD1H1	15	2.28E-10
P13	T2TrOD1Ch	16	8.75E-11
P14	T2TrOD1Rs	17	2.10E-11
P15	T2TrOD1Qs	17	1.87E-10
P16	T2TrORC2	18	5.31E-10
P17	T2TrORC2Ch	18	2.17E-10
P18	T2TrORC2Rs	18	0.00E+00
P19	T2TrORC2Qs	18	0.00E+00
P20	T2TrORC2RC3	19	7.43E-11
P21	T2TrLt	OK	
P22	T2TrLtRC1	4	2.91E-09
P23	T2TrLtRC1Ch	5	6.82E-09
P24	T2TrLtRC1Rs	6	0.00E+00
P25	T2TrLtRC1Qs	6	0.00E+00
P26	T2TrLtRC1RC3	7	3.35E-11

FIGURE B.2-T2ATr
LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING
TRANSFER FROM T2A RECOVERABLE LOSS OF MAIN FW EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T2Tr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T2 LOSS OF MAIN FEEDWATER EVENT TREE

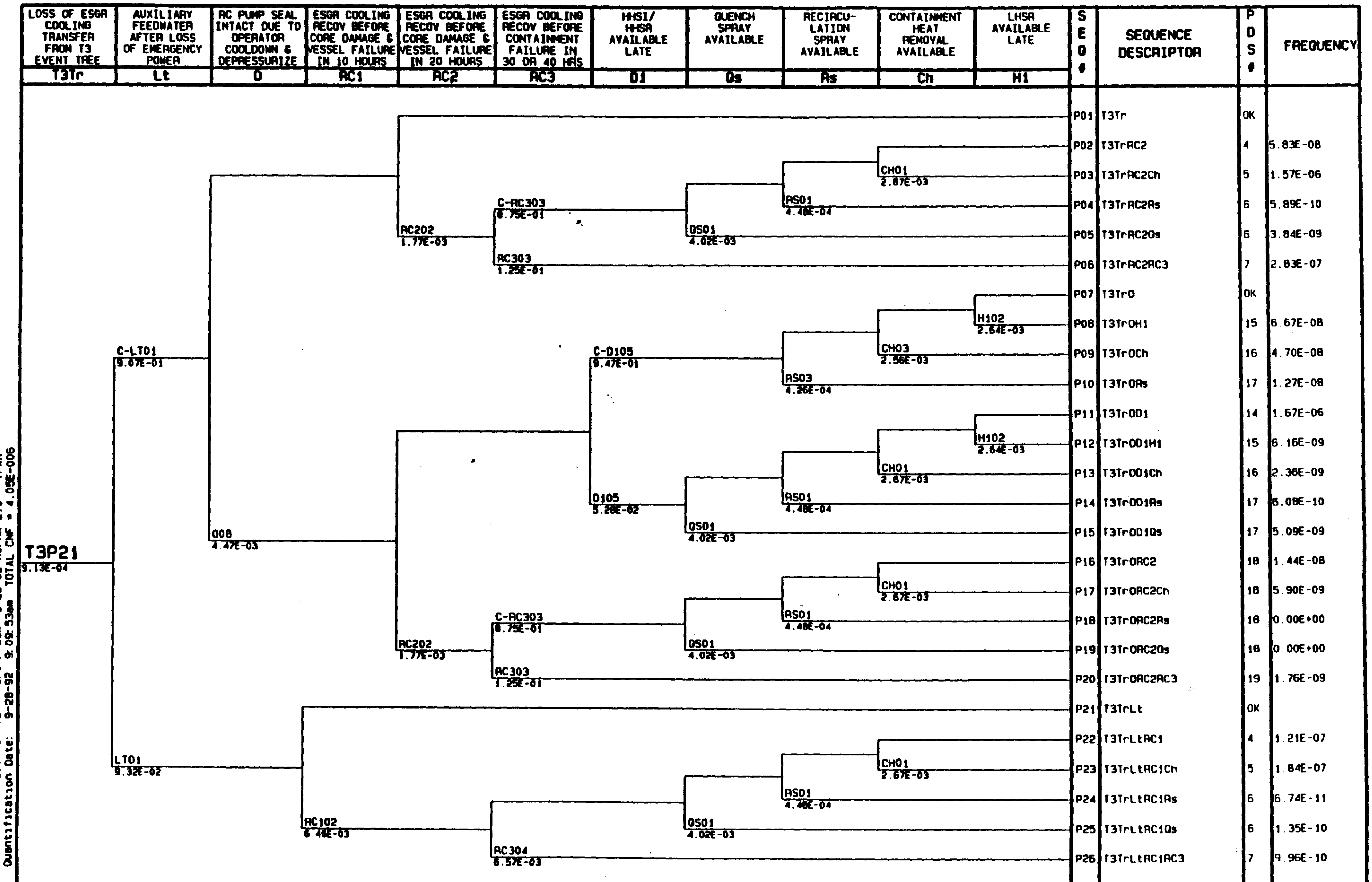


SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T3	OK	
P02	T3L	OK	
P03	T3LM	OK	
P04	T3LMCh	1	0.00E+00
P05	T3LMRs	2	3.04E-12
P06	T3LMH2	21	4.66E-11
P07	T3LMH2H1	21	1.15E-09
P08	T3LMH2Ch	22	0.00E+00
P09	T3LMH2Rs	23	6.97E-09
P10	T3LMD1	20	4.87E-08
P11	T3LMD1H1	21	0.00E+00
P12	T3LMD1Ch	22	0.00E+00
P13	T3LMD1Rs	23	0 00E+00
P14	T3LMD1Qs	23	0.00E+00
P15	T3LMP	8	1.92E-08
P16	T3LMPH1	9	0.00E+00
P17	T3LMPCh	10	0.00E+00
P18	T3LMPRs	11	0.00E+00
P19	T3LMPQs	11	0.00E+00
P20	T3Q	TR	1.34E-05S2
P21	T3Hv	TR	9.13E-04T8
P22	T3K	TR	2.52E-06TH

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T3: TRANSIENT WITH MAIN FEEDWATER AVAILABLE EVENT TREE

FIGURE B.2-T3
TRANSIENT WITH MAIN FEEDWATER AVAILABLE EVENT TREE

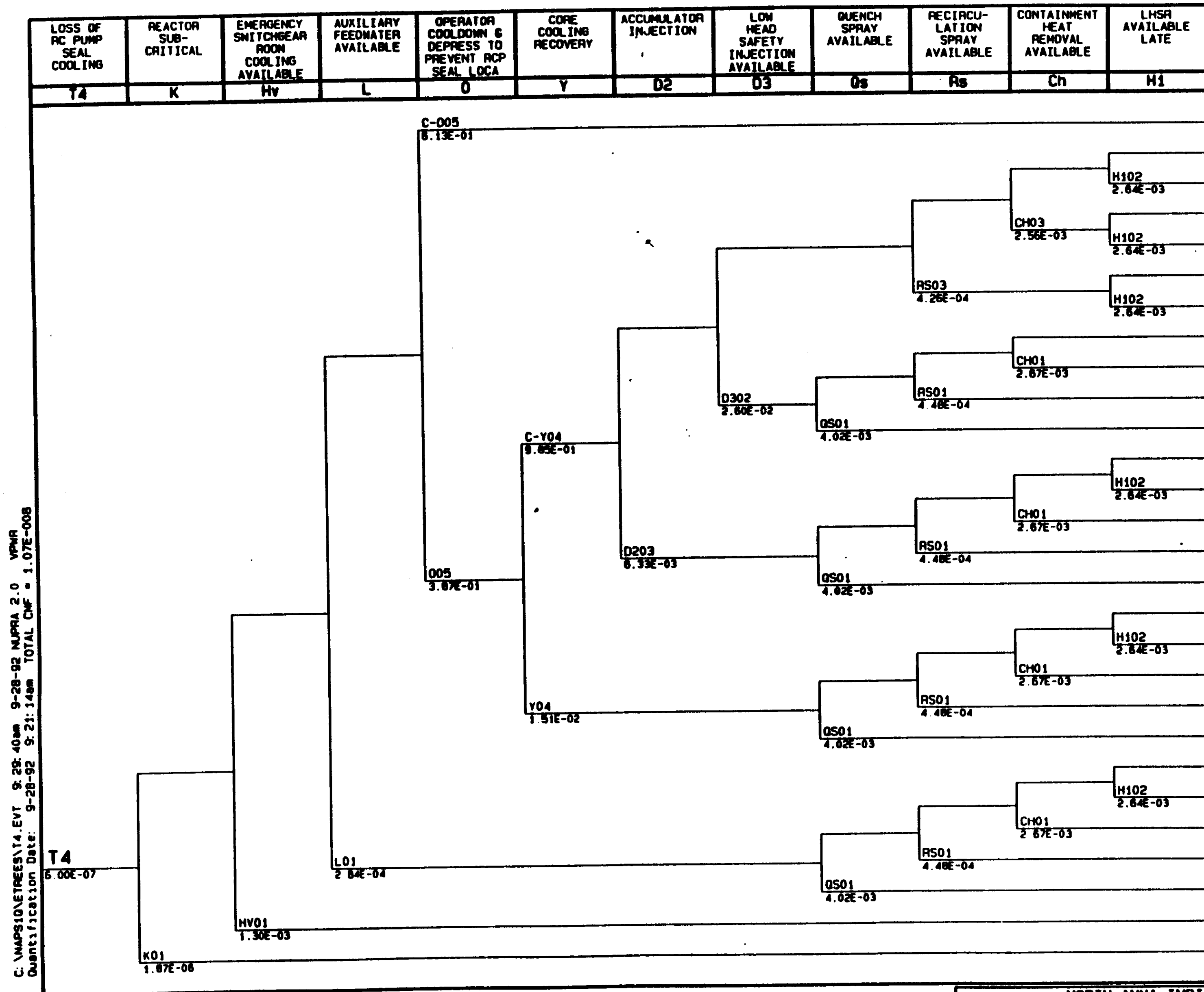


C:\NAPS10\ETREES\T3TR.EVT 9:14:42am 9-28-92 NUPRA 2.0 VPWR
Quantification Date: 9-28-92 9:09:53am TOTAL CMF = 4.05E-006

FIGURE B.2-T3Tr
LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T3 TRANSIENT WITH MFW AVAILABLE EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T3Tr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T3 TRANSIENT WITH MFW AVAILABLE EVENT TREE

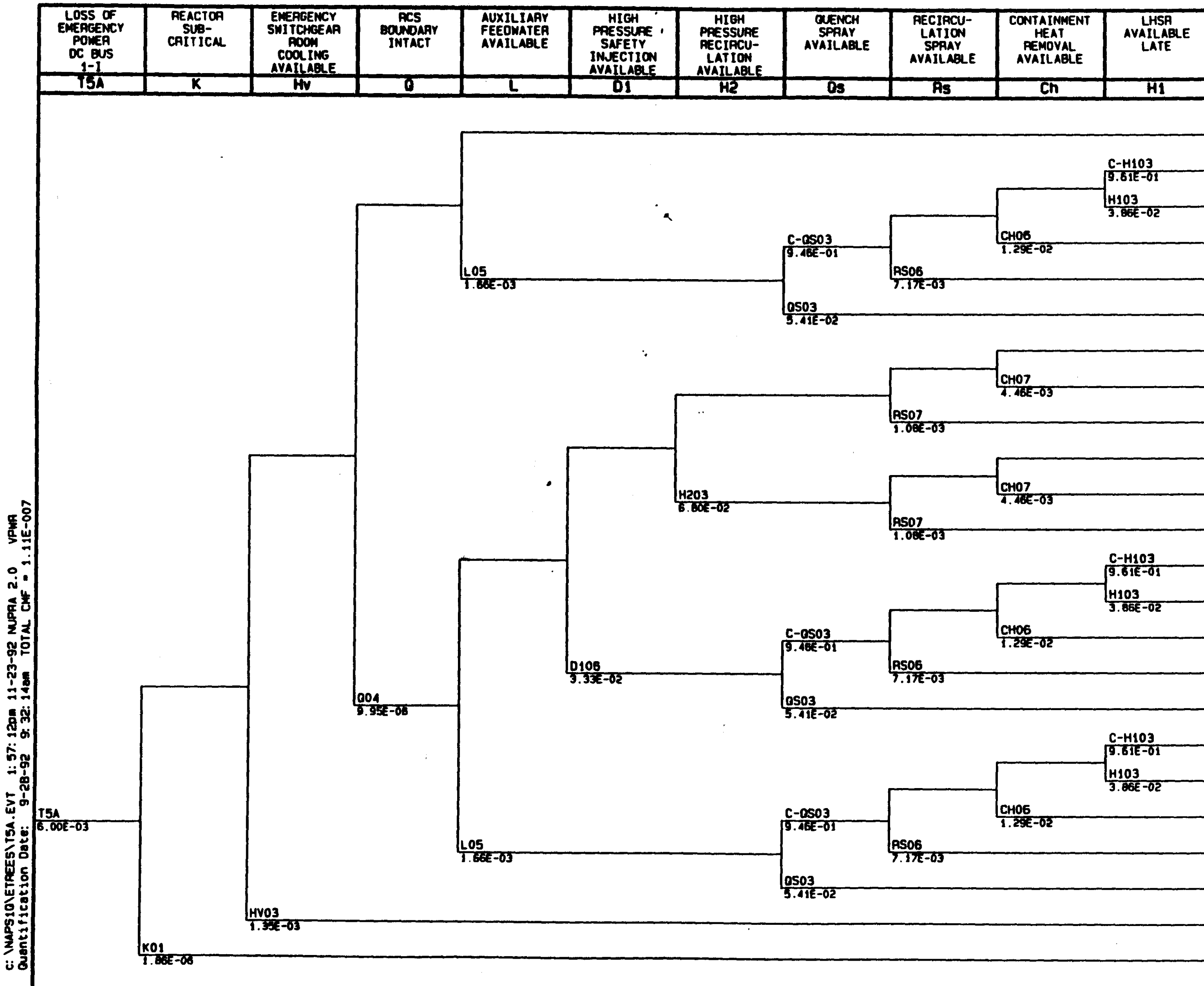


SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T4	OK	
P02	T4O	OK	
P03	T4OH1	21	2.12E-10
P04	T4OCh	1	7.13E-12
P05	T4OChH1	22	0.00E+00
P06	T4ORs	2	1.71E-12
P07	T4ORsH1	23	1.14E-11
P08	T4OD3	21	5.84E-09
P09	T4OD3Ch	22	0.00E+00
P10	T4OD3Rs	23	0.00E+00
P11	T4OD3Qs	23	0.00E+00
P12	T4OD2	20	1.45E-09
P13	T4OD2H1	21	0.00E+00
P14	T4OD2Ch	22	0.00E+00
P15	T4OD2Rs	23	0.00E+00
P16	T4OD2Qs	23	0.00E+00
P17	T4OY	20	3.06E-09
P18	T4OYH1	21	0.00E+00
P19	T4OYCh	22	0.00E+00
P20	T4OYRs	23	0.00E+00
P21	T4OYQs	23	0 00E+00
P22	T4L	8	1.43E-10
P23	T4LH1	9	0.00E+00
P24	T4LCh	10	0.00E+00
P25	T4LRs	11	0.00E+00
P26	T4LQs	11	0.00E+00
P27	T4Hv	1R	2.82E-10TB
P28	T4K	1R	0 00E+00TH

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T4: LOSS OF REACTOR COOLANT PUMP SEAL COOLING EVENT TREE

FIGURE B.2-T4
LOSS OF REACTOR COOLANT PUMP SEAL COOLING EVENT TREE

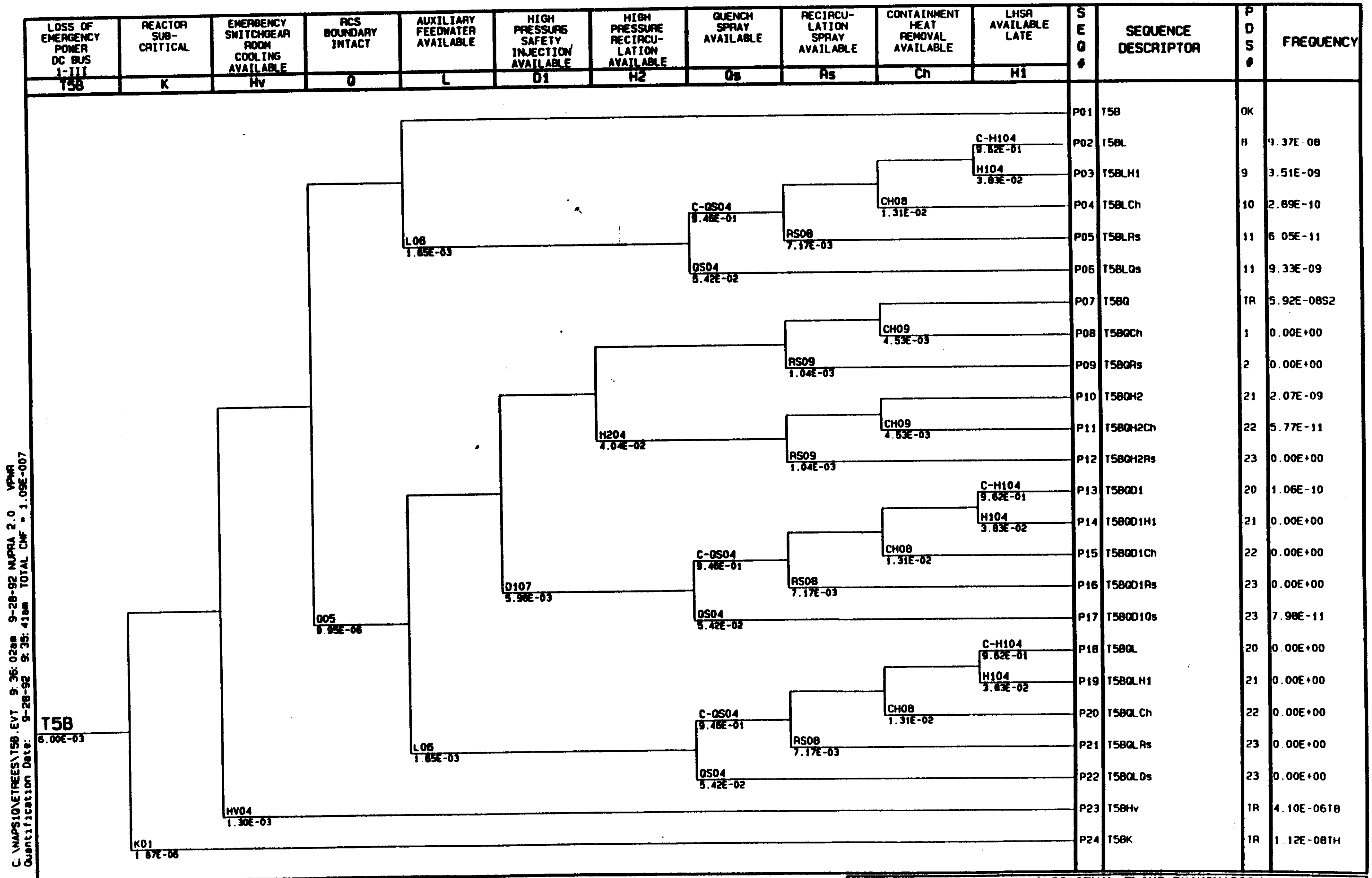


SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T5A	OK	
P02	T5AL	8	9.36E-08
P03	T5ALH1	9	3.56E-09
P04	T5ALCh	10	2.89E-10
P05	T5ALRs	11	6.05E-11
P06	T5ALQs	11	9.63E-09
P07	T5AQ	TR	5.92E-08S2
P08	T5AQCh	1	0.00E+00
P09	T5AQRs	2	0.00E+00
P10	T5AQH2	21	1.98E-09
P11	T5AQH2Ch	22	1.76E-10
P12	T5AQH2Rs	23	0.00E+00
P13	T5AQD1	20	1.53E-09
P14	T5AQD1H1	21	0.00E+00
P15	T5AQD1Ch	22	0.00E+00
P16	T5AQD1Rs	23	0.00E+00
P17	T5AQD1Qs	23	1.42E-10
P18	T5AQL	20	0.00E+00
P19	T5AQLH1	21	0.00E+00
P20	T5AQLCh	22	0.00E+00
P21	T5AQLRs	23	0.00E+00
P22	T5AQLQs	23	0.00E+00
P23	T5AHv	TR	4.36E-06T8
P24	T5AK	TR	1.12E-08TH

FIGURE B.2-T5A
LOSS OF EMERGENCY POWER DC BUS 1-I EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T5A: LOSS OF EMERGENCY POWER DC BUS 1-I EVENT TREE

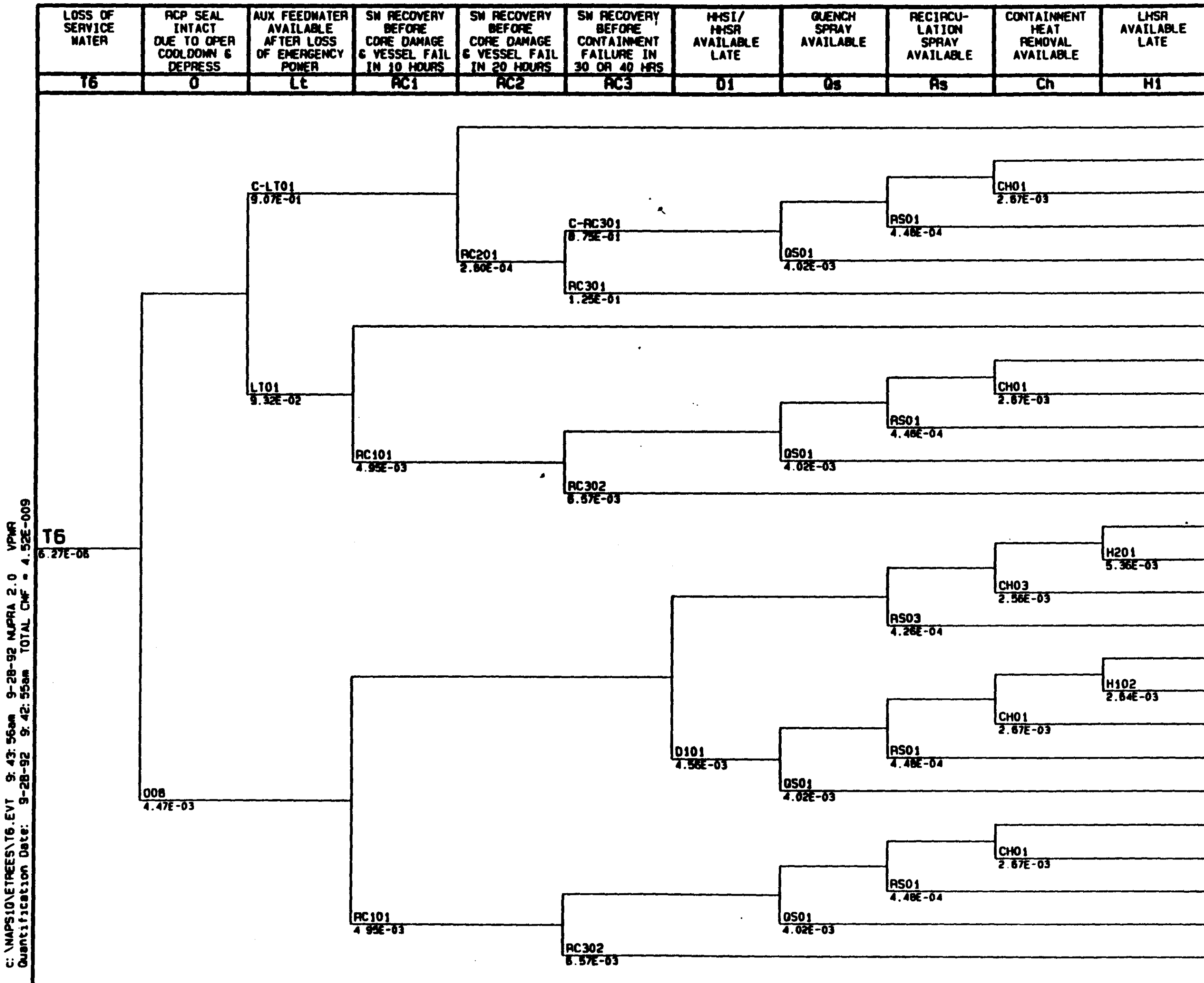


SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T5B	OK	
P02	T5BL	8	1.37E-08
P03	T5BLH1	9	3.51E-09
P04	T5BLCh	10	2.89E-10
P05	T5BLRs	11	6 05E-11
P06	T5BLQs	11	9.33E-09
P07	T5BQ	TR	5.92E-08S2
P08	T5BQCh	1	0.00E+00
P09	T5BQRs	2	0.00E+00
P10	T5BQH2	21	2.07E-09
P11	T5BQH2Ch	22	5.77E-11
P12	T5BQH2Rs	23	0.00E+00
P13	T5BQD1	20	1.06E-10
P14	T5BQD1H1	21	0.00E+00
P15	T5BQD1Ch	22	0.00E+00
P16	T5BQD1Rs	23	0.00E+00
P17	T5BQD1Qs	23	7.98E-11
P18	T5BQL	20	0.00E+00
P19	T5BQLH1	21	0.00E+00
P20	T5BQLCh	22	0.00E+00
P21	T5BQLRs	23	0.00E+00
P22	T5BQLQs	23	0.00E+00
P23	T5BHv	TR	4.10E-06T8
P24	T5BK	TR	1.12E-08TH

FIGURE B.2-T5B
LOSS OF EMERGENCY POWER DC BUS 1-III EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T5B: LOSS OF EMERGENCY POWER DC BUS 1-III EVENT TREE



SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T6	OK	
P02	T6RC2	4	1.29E-09
P03	T6RC2Ch	5	0.00E+00
P04	T6RC2Rs	6	0.00E+00
P05	T6RC2Qs	6	0.00E+00
P06	T6RC2RC3	7	1.85E-10
P07	T6Lt	OK	
P08	T6LtRC1	4	2.89E-09
P09	T6LtRC1Ch	5	0.00E+00
P10	T6LtRC1Rs	6	0.00E+00
P11	T6LtRC1Qs	6	0.00E+00
P12	T6LtRC1RC3	7	1.17E-11
P13	T6O	OK	
P14	T6OH1	21	0.00E+00
P15	T6OCh	22	0.00E+00
P16	T6ORs	23	8.16E-12
P17	T6OD1	20	2.50E-11
P18	T6OD1H1	21	0.00E+00
P19	T6OD1Ch	22	0.00E+00
P20	T6OD1Rs	23	0.00E+00
P21	T6OD1Qs	23	0.00E+00
P22	T6ORC1	18	1.08E-10
P23	T6ORC1Ch	18	0.00E+00
P24	T6ORC1Rs	18	0.00E+00
P25	T6ORC1Qs	18	0.00E+00
P26	T6ORC1RC3	19	0.00E+00

FIGURE B.2-T6
LOSS OF SERVICE WATER EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T6: LOSS OF SERVICE WATER EVENT TREE

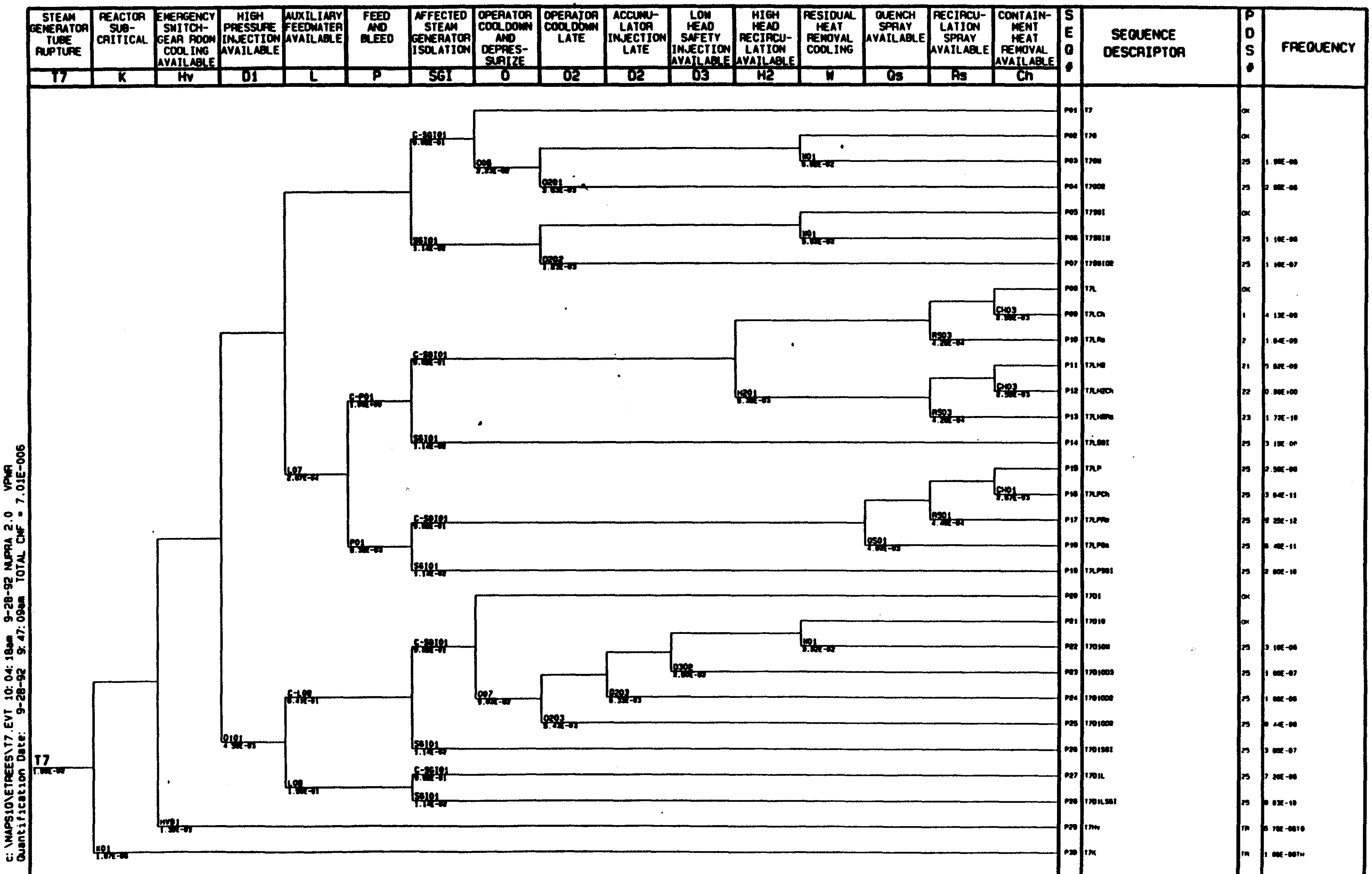


FIGURE B.2-T7
STEAM GENERATOR TUBE RUPTURE EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T7: STEAM GENERATOR TUBE RUPTURE EVENT TREE

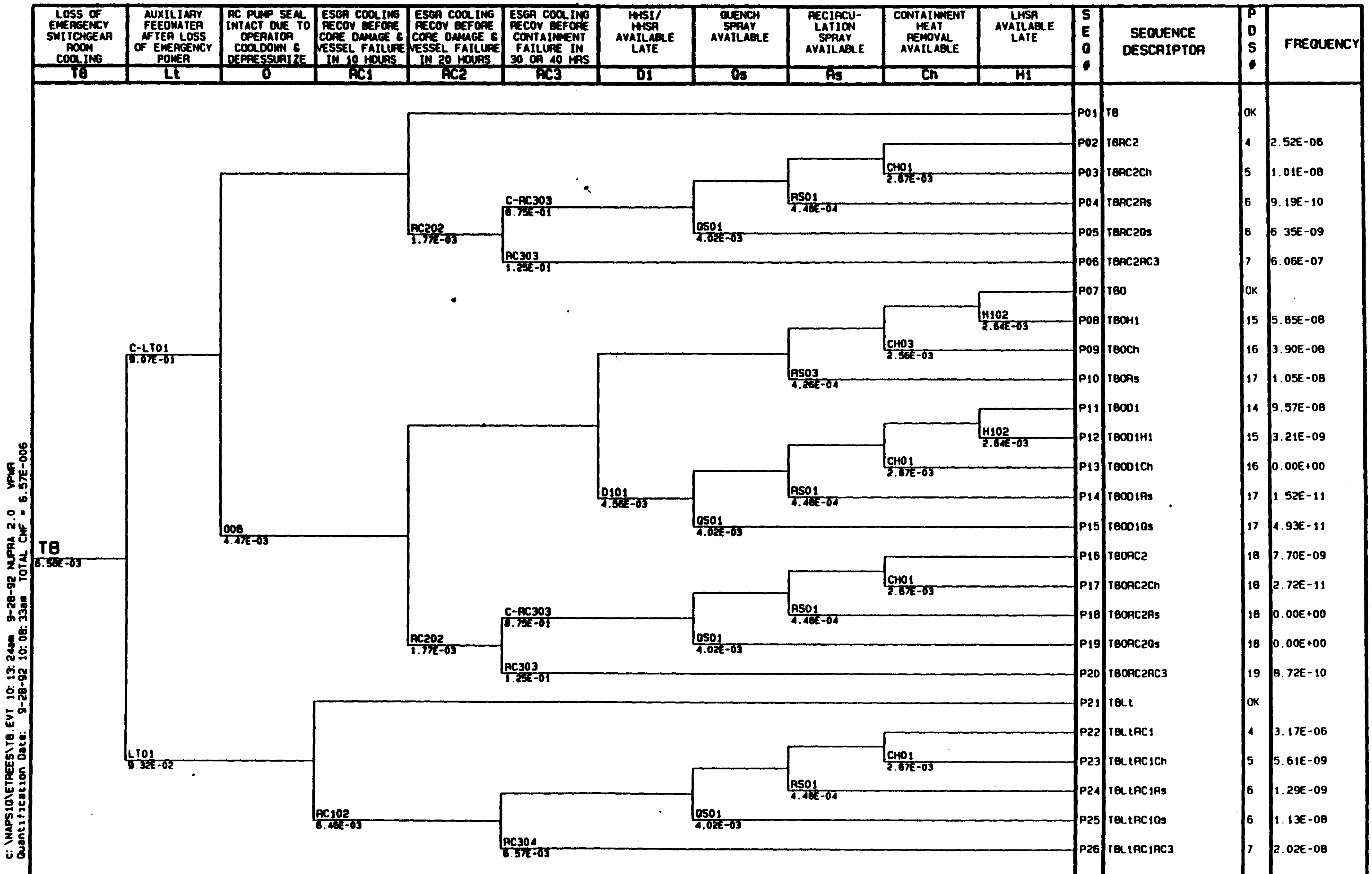
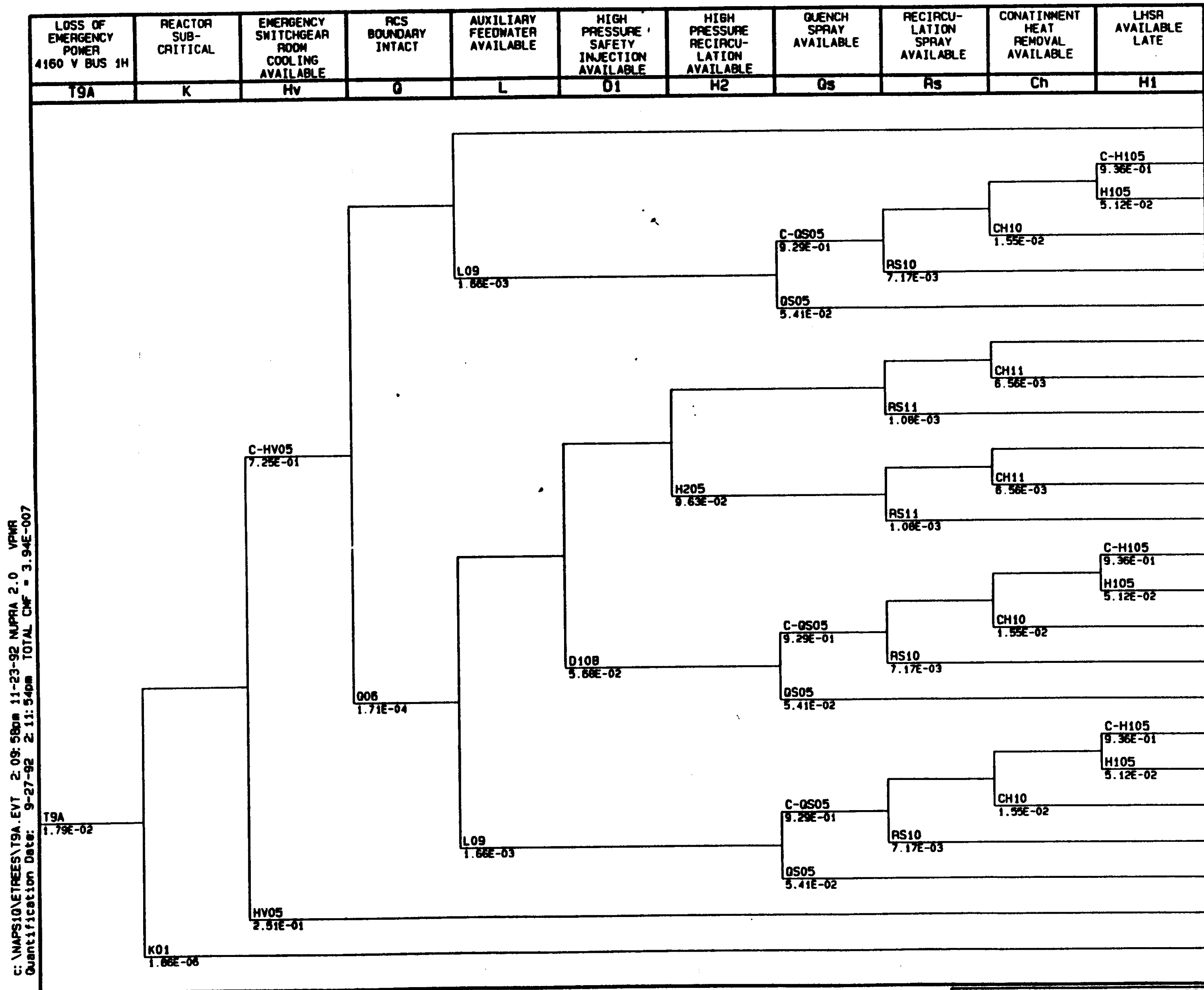


FIGURE B.2-T8
LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T8: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING EVENT TREE

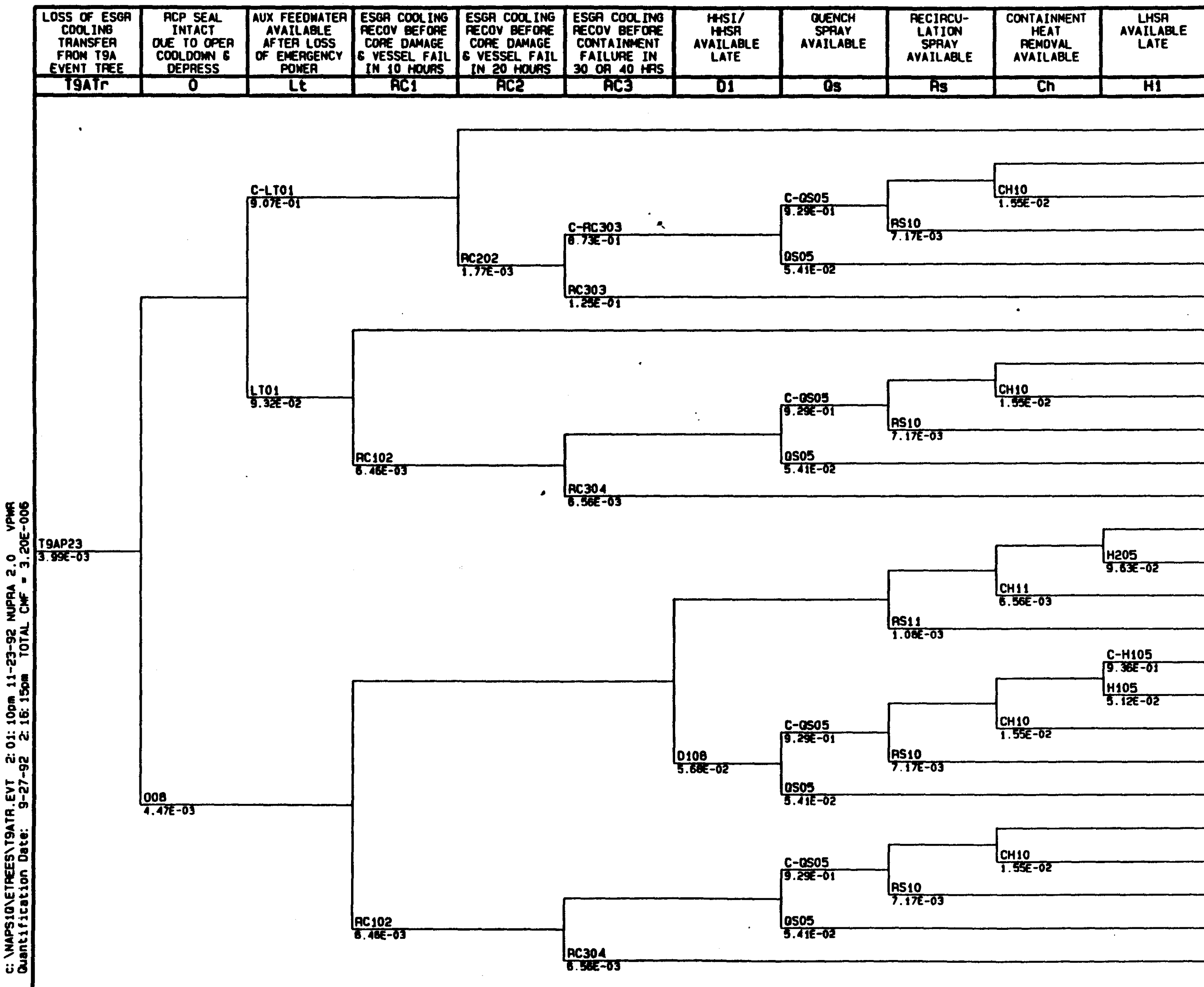


SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T9A	OK	
P02	T9AL	8	1.61E-07
P03	T9ALH1	9	1.64E-09
P04	T9ALCh	10	0.00E+00
P05	T9ALRs	11	0.00E+00
P06	T9ALQs	11	6.05E-09
P07	T9AQ	TR	2.22E-06S2
P08	T9AQCh	1	0.00E+00
P09	T9AQRs	2	0.00E+00
P10	T9AQH2	21	1.27E-07
P11	T9AQH2Ch	22	0.00E+00
P12	T9AQH2Rs	23	0.00E+00
P13	T9AQD1	20	9.57E-08
P14	T9AQD1H1	21	4.14E-10
P15	T9AQD1Ch	22	0.00E+00
P16	T9AQD1Rs	23	0.00E+00
P17	T9AQD1Qs	23	1.84E-09
P18	T9AQL	20	0.00E+00
P19	T9AQLH1	21	0.00E+00
P20	T9AQLCh	22	0.00E+00
P21	T9AQLRs	23	0.00E+00
P22	T9AQLQs	23	0.00E+00
P23	T9AHv	TR	4.00E-03T8
P24	T9AK	TR	3.18E-08TH

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T9A: LOSS OF EMERGENCY POWER 4160 V BUS 1H EVENT TREE

FIGURE B.2-T9A
LOSS OF EMERGENCY POWER 4160 V BUS 1H EVENT TREE



SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T9ATr	OK	
P02	T9ATrRC2	4	8.16E-07
P03	T9ATrRC2Ch	5	1.83E-08
P04	T9ATrRC2Rs	6	0.00E+00
P05	T9ATrRC2Qs	6	1.16E-08
P06	T9ATrRC2RC3	7	1.07E-07
P07	T9ATrLt	OK	
P08	T9ATrLtRC1	4	1.50E-06
P09	T9ATrLtRC1Ch	5	8.08E-10
P10	T9ATrLtRC1Rs	6	0.00E+00
P11	T9ATrLtRC1Qs	6	1.89E-08
P12	T9ATrLtRC1RC3	7	0.00E+00
P13	T9ATrO	OK	
P14	T9ATrOH1	21	3.88E-07
P15	T9ATrOCh	22	0.00E+00
P16	T9ATrORs	23	9.42E-10
P17	T9ATrOD1	20	2.97E-07
P18	T9ATrOD1H1	21	0.00E+00
P19	T9ATrOD1Ch	22	1.66E-08
P20	T9ATrOD1Rs	23	0.00E+00
P21	T9ATrOD1Qs	23	8.77E-09
P22	T9ATrORC1	18	1.97E-08
P23	T9ATrORC1Ch	18	0.00E+00
P24	T9ATrORC1Rs	18	0.00E+00
P25	T9ATrORC1Qs	18	0.00E+00
P26	T9ATrORC1RC3	19	0.00E+00

FIGURE B.2-T9ATr
LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING
TRANSFER FROM T9A LOSS OF 4160 V BUS 1H EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T9ATr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T9A LOSS OF 4160 V BUS 1H EVENT TREE

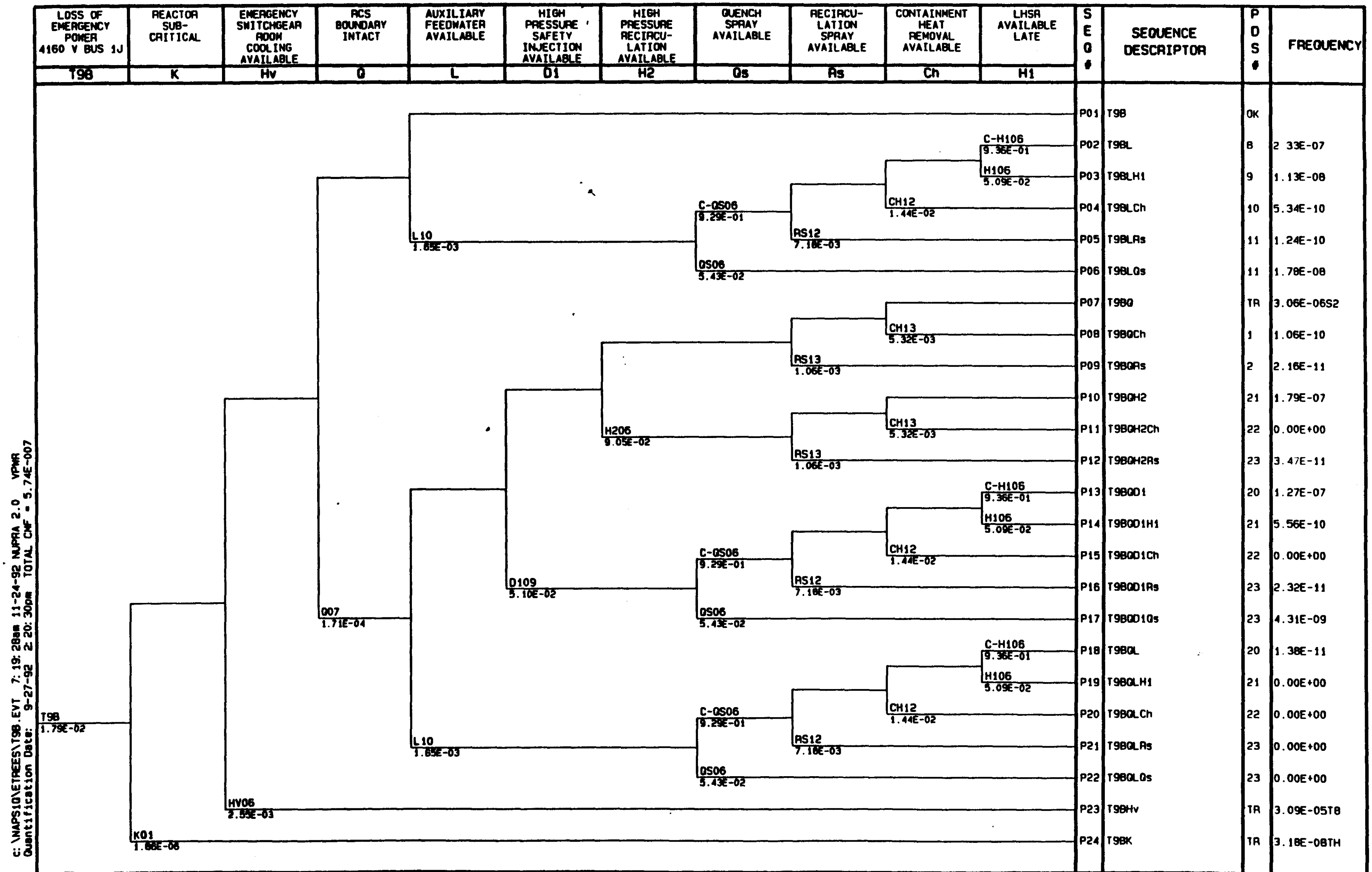
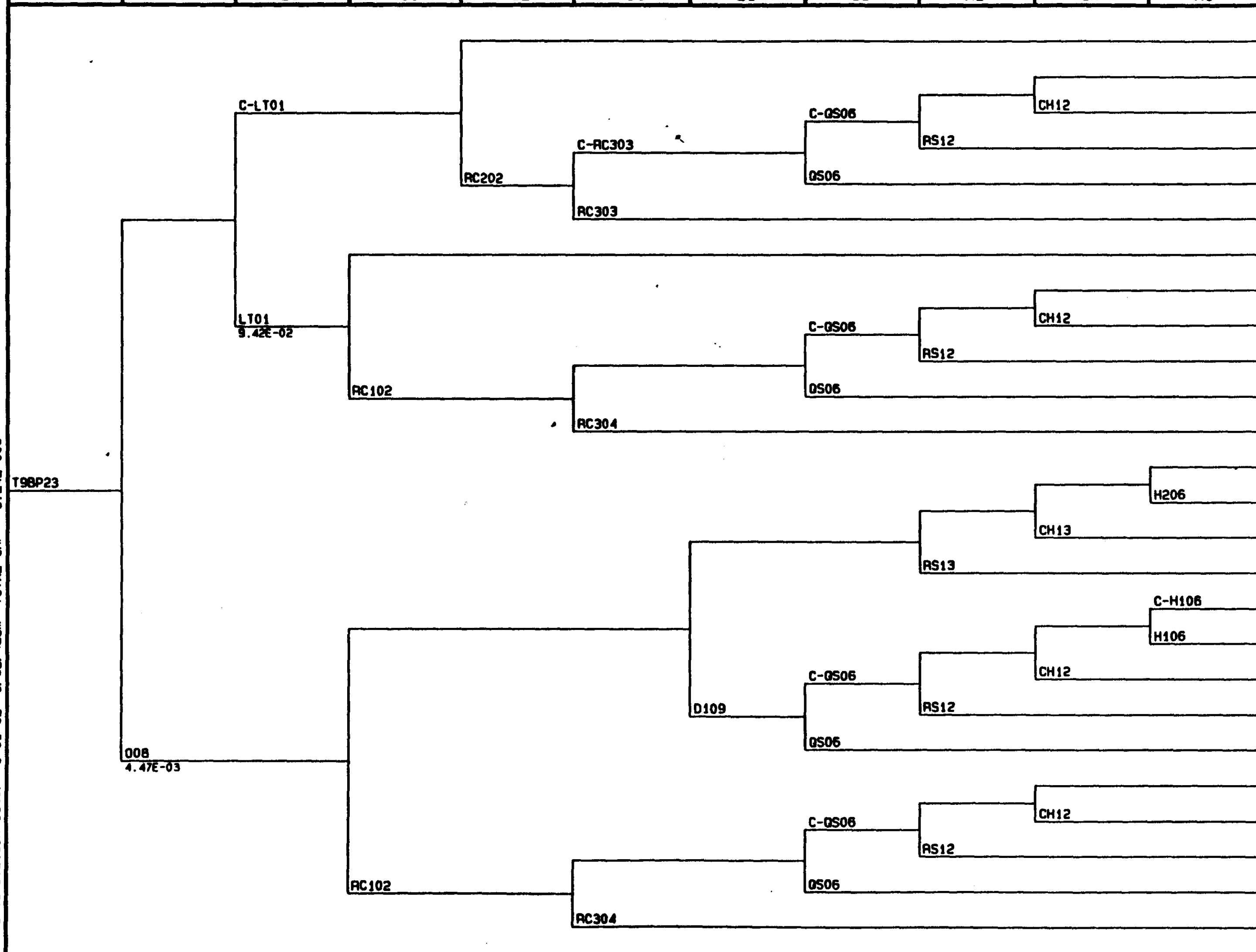


FIGURE B.2-T9B
LOSS OF EMERGENCY POWER 4160 V BUS 1 J EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T9B: LOSS OF EMERGENCY POWER 4160 V BUS 1J EVENT TREE

LOSS OF ESGR COOLING TRANSFER FROM T9B EVENT TREE	RCP SEAL INTACT DUE TO OPER COOLDOWN & DEPRESS	AUX FEEDWATER AVAILABLE AFTER LOSS OF EMERGENCY POWER	ESGR COOLING RECOV BEFORE CORE DAMAGE & VESSEL FAIL IN 10 HOURS	ESGR COOLING RECOV BEFORE CORE DAMAGE & VESSEL FAIL IN 20 HOURS	ESGR COOLING RECOV BEFORE CONTAINMENT FAILURE IN 30 OR 40 HRS	HHSI/ HHSR AVAILABLE LATE	QUENCH SPRAY AVAILABLE	RECIRCU-LATION SPRAY AVAILABLE	CONTAINMENT HEAT REMOVAL AVAILABLE	LHSR AVAILABLE LATE
T9BTr	O	Lt	RC1	RC2	RC3	D1	Qs	Rs	Ch	H1



SEQ #	SEQUENCE DESCRIPTOR	PDS #	FREQUENCY
P01	T9BTr	OK	
P02	T9BTrRC2	4	1.43E-09
P03	T9BTrRC2Ch	5	0.00E+00
P04	T9BTrRC2Rs	6	2.30E-11
P05	T9BTrRC2Qs	6	2.30E-11
P06	T9BTrRC2RC3	7	2.04E-10
P07	T9BTrLt	OK	
P08	T9BTrLtRC1	4	2.71E-09
P09	T9BTrLtRC1Ch	5	0.00E+00
P10	T9BTrLtRC1Rs	6	2.69E-11
P11	T9BTrLtRC1Qs	6	2.69E-11
P12	T9BTrLtRC1RC3	7	1.83E-10
P13	T9BTrO	OK	
P14	T9BTrOH1	21	0.00E+00
P15	T9BTrOCh	22	0.00E+00
P16	T9BTrORs	23	4.37E-10
P17	T9BTrOD1	20	7.49E-11
P18	T9BTrOD1H1	21	0.00E+00
P19	T9BTrOD1Ch	22	0.00E+00
P20	T9BTrOD1Rs	23	0.00E+00
P21	T9BTrOD1Qs	23	0.00E+00
P22	T9BTrORC1	18	1.01E-10
P23	T9BTrORC1Ch	18	0.00E+00
P24	T9BTrORC1Rs	18	0.00E+00
P25	T9BTrORC1Qs	18	0.00E+00
P26	T9BTrORC1RC3	19	0.00E+00

c:\NAPS10\ETREES\T9BTR.EVT 2:02:18pm 11-23-92 NUPRA 2.0 VPWR
Quantification Date: 9-11-92 9:32:42am TOTAL CMF = 5.24E-009

FIGURE B.2-T9BTr
LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING
TRANSFER FROM T9B LOSS OF 4160 V BUS 1J EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T9BTr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T9B LOSS OF 4160 V BUS 1J EVENT TREE

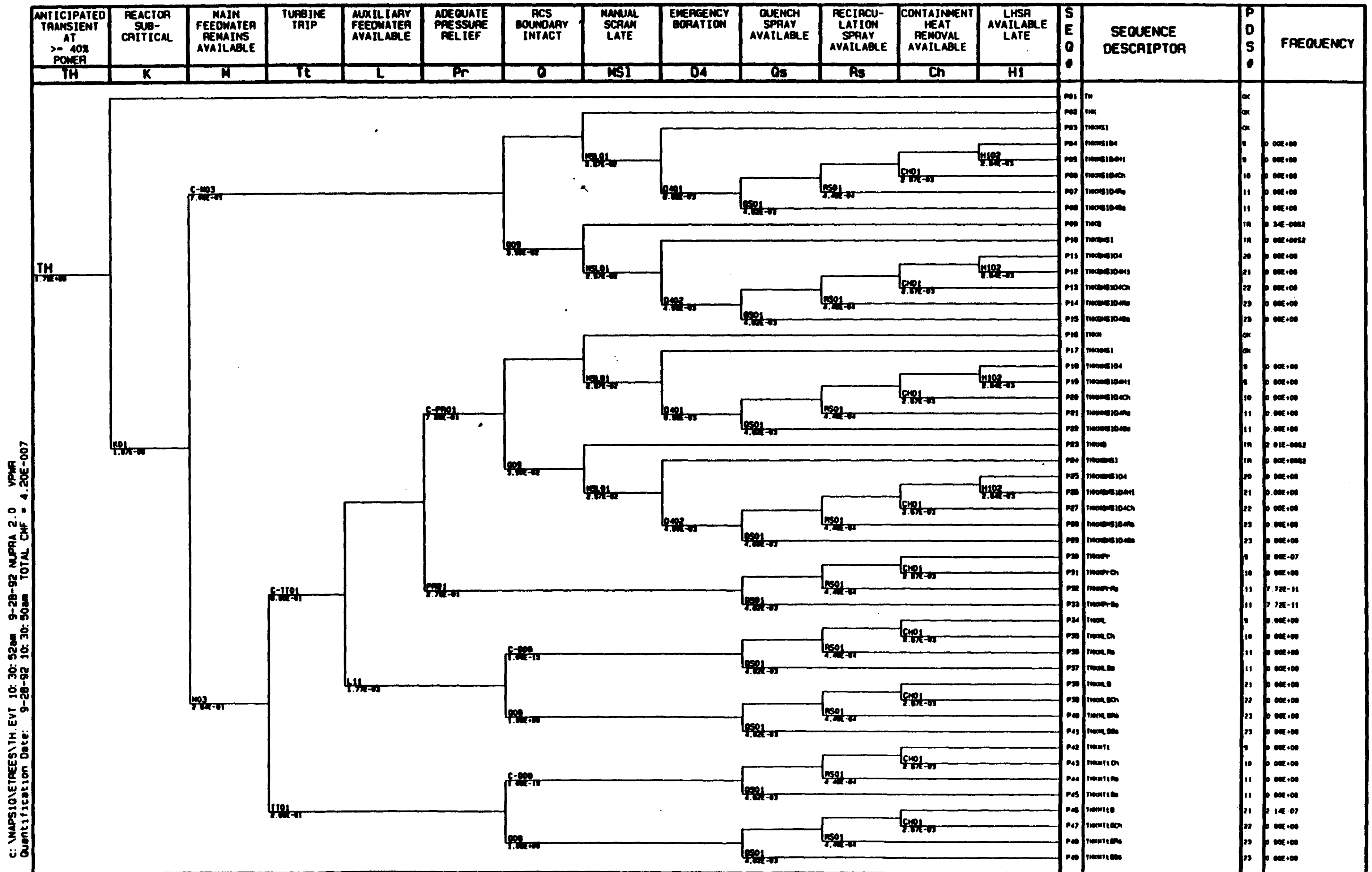


FIGURE B.2-TH
HIGH POWER ATWS EVENT TREE (ANTICIPATED TRANSIENT WITHOUT SCRAM AT 40% OR MORE POWER)

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

TH: HIGH POWER ATWS EVENT TREE
(ANTICIPATED TRANSIENT WITHOUT SCRAM AT 40% OR MORE POWER)

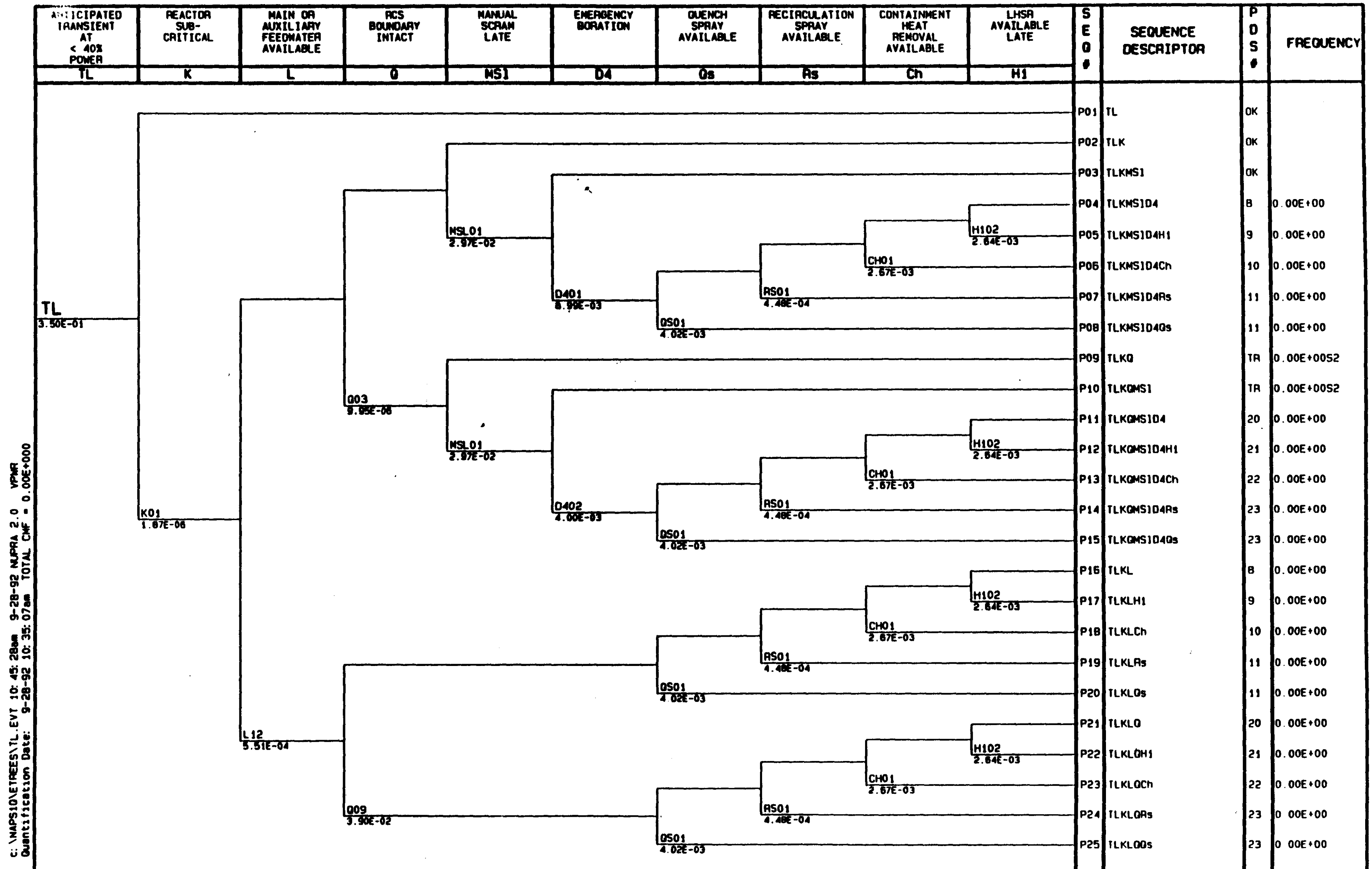


FIGURE B.2-TL
LOW POWER ATWS EVENT TREE (ANTICIPATED TRANSIENT WITHOUT SCRAM, LESS THAN 40% POWER)

NORTH ANNA INDIVIDUAL PLANT EXAMINATION
TL: LOW POWER ATWS EVENT TREE (ANTICIPATED TRANSIENT WITHOUT SCRAM, LESS THAN 40% POWER)

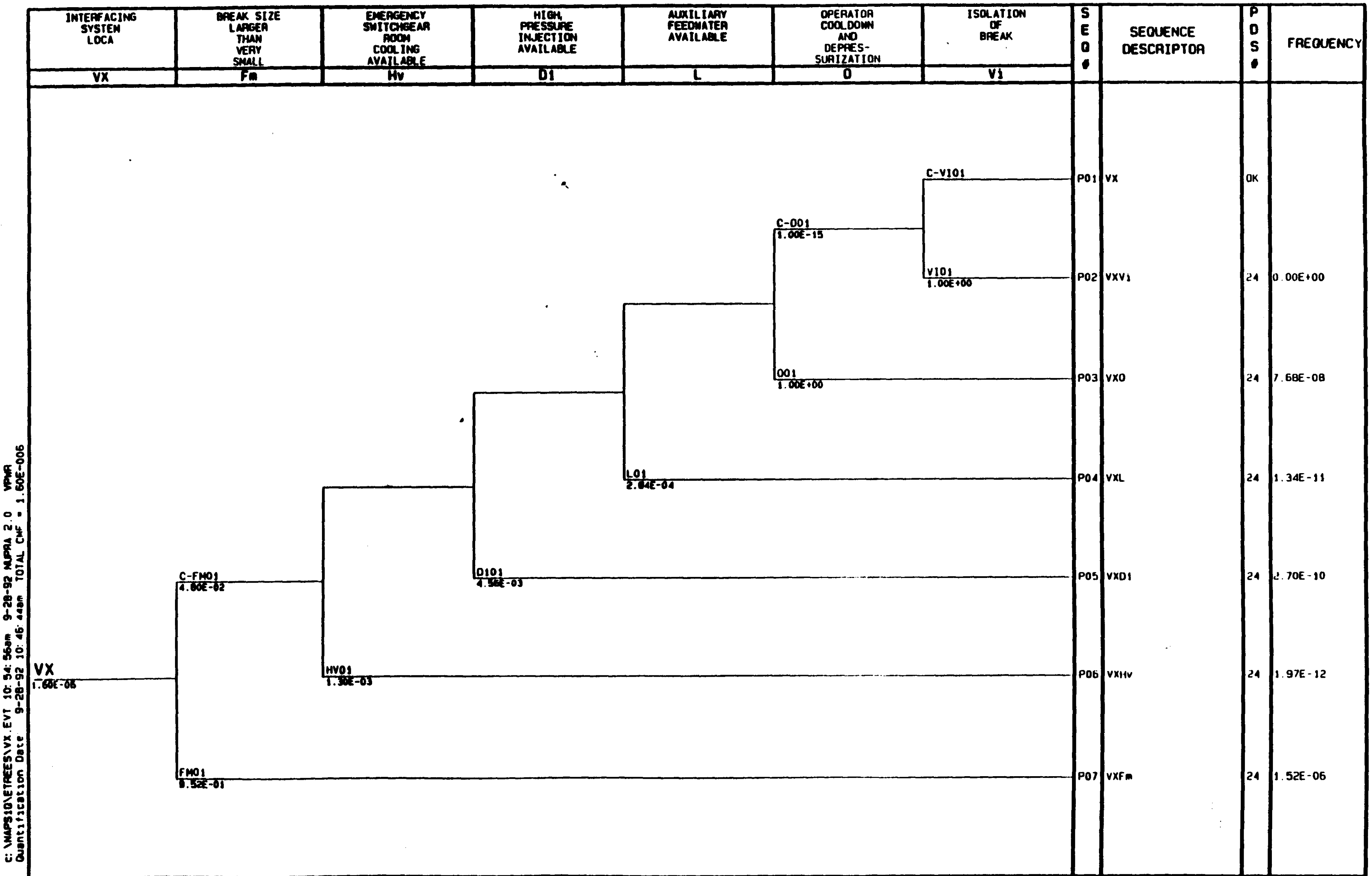


FIGURE B.2-VX
INTERFACING SYSTEM LOCA EVENT TREE

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

VX: INTERFACING SYSTEM LOCA EVENT TREE

Intentionally Left Blank