

TORNADO HAZARD REVIEW
SAN ONOFRE UNIT 1
FINAL REPORT

Prepared for:
Southern California Edison Company

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LIST OF ACRONYMS

AC	Alternating current
ADV	Atmospheric dump valve
AFW	Auxiliary feedwater
AFWAS	Auxiliary feedwater actuation system
AFWST	Auxiliary feedwater storage tank
CCW	Component cooling water
CDF	Core damage frequency
CRS	Containment Spray and Recirculation System
DC	Direct current
EOI	Emergency operating instruction
EPRI	Electric Power Research Institute
FCV	Flow control valve
ISA	Instrument service air
LOCA	Loss of coolant accident
LOOP	Loss of offsite power
MOV	Motor operated valve
MSRV	Main steam relief valve
MSS	Main steam system
NRC	Nuclear Regulatory Commission
PORV	Power operated relief valve
PRA	Probabilistic risk assessment
PWR	Pressurized water reactor
RCP	Reactor coolant pump
RCS	Reactor coolant system
RHR	Residual heat removal
RPS	Reactor protection system
RWST	Refueling water storage tank
SCE	Southern California Edison
SEP	Systematic Evaluation Program
SIS	Safety injection system
SONGS1	San Onofre Nuclear Generating Station, Unit 1
SWC	Saltwater cooling
UFSAR	Updated Final Safety Analysis Report
VCC	Volume control and charging
VCT	Volume control tank

1.0 INTRODUCTION AND SUMMARY

San Onofre Nuclear Generating Station, Unit 1 (SONGS 1), operated by Southern California Edison Company (SCE), has unresolved issues associated with Systematic Evaluation Program (SEP) Topics III-2 and III-4A regarding "Wind and Tornado Loadings" and "Tornado Missiles", respectively. The purpose of this evaluation is to quantify the tornado risk at SONGS and demonstrate the low probability of core damage due to a tornado initiated event. In addition, the safety benefit of implementing modifications for tornado protection is examined. This will provide a basis for resolution and consequent closeout of these SEP topics for SONGS 1.

Section 2.0 provides the methodology and assumptions used to perform the risk assessment. Sections 3.0 and 4.0 provide descriptions of the plant systems and structures considered. Section 5.0 provides a presentation and analysis of the tornado risk assessment results.

1.1 Background

In General Design Criterion 2, 10 CFR 50 requires that structures, systems, and components important to safety be designed to withstand the effects of natural phenomena, including tornados. Additional guidance in Regulatory Guides 1.76 and 1.117 require consideration of wind and tornado loadings, including tornado pressure drop and tornado missile loading. The physical separation of redundant or alternate shutdown systems and components does not provide protection against the effects of tornados and tornado-generated missiles because of the large number and random direction of potential missiles.

NRC SEP Topic evaluation II-2.A "Severe Weather Phenomena", ^[1] recommended that the design straight windspeed of 75 miles per hour (mph) is acceptable for the site and

that a tornado with a 10^{-7} per year frequency (a tornado windspeed of 260 mph and Δp of 1.5 psi) should be the design basis.

The NRC concluded in their evaluation for SEP Topic III-2^[2,3] that some of the SONGS 1 structures are capable of withstanding the effects of tornado winds and tornado generated missile impacts. Components located within these structures are protected from tornado related damage. These structures are:

- the Sphere Enclosure Building (including the Sphere),
- the Diesel Generator Building, and
- the Reactor Auxiliary Building (portion below grade).

The following items were identified in the topic evaluation as being vulnerable to tornado winds and/or tornado generated missile impacts:

- Ventilation stack (plant vent stack)---failure of the ventilation stack could affect safety-related structures and components.
- Components not enclosed in the qualified structures listed above.
- Safety-related structures including the Ventilation Equipment Building, Turbine Building, Reactor Auxiliary Building (above grade), the Control/Administration Building (other than Control Room), and the Fuel Storage Building--failure of these structures could result in the inability to shut down the plant.

In the topic evaluation for SEP Topic III-4.A^[3], the NRC staff identified several components as vulnerable to the effects of tornado missiles. It was the NRC's recommendation that SCE should either ensure that structures and equipment can withstand the design-basis straight wind, tornado wind, and tornado missile loadings or demonstrate that their failure will not prevent reaching a safe shutdown condition.

By letter dated September 17, 1984^[4], SCE provided the NRC with a realistic, site specific tornado hazard analysis and proposed to perform an evaluation of the cost/safety benefit of tornado upgrades. This evaluation was submitted by SCE to the NRC by letter dated October 10, 1986.^[5] In this submittal SCE committed to perform upgrades necessary to provide a path for decay heat removal to ensure safe shutdown after a tornado event. The NRC reviewed the October 10, 1986, submittal and requested additional information to confirm that certain plant features were capable of withstanding tornado wind loadings and missile impacts corresponding to a 10^{-5} per year tornado event.^[18] The additional information was provided to the NRC and included a commitment to the NRC to design modifications for tornado windspeed of 135 mph, which corresponds to a 10^{-5} per year recurrence frequency.

The scope of proposed modifications includes upgrades to the following systems and structures:

- Turbine Building,
- DC Switchgear and Battery Room No. 1,
- Charging Pump Suction Piping from the RWST,
- AC Power Supply to the Charging Pump,
- Seal Water Flow Instrumentation,
- Exposed Cabling for the Neutron Monitors,
- PORV Nitrogen and Power Supply,
- Pressurizer Heater Power Supply,
- RCS Temperature Instrumentation,
- AFW System Piping and Power Supplies,
- Steam Generator Instrumentation,
- Main Steam Dump Valve Controls,
- Station Service Transformer No. 1, and
- Vital Bus No. 5 Components and Systems.

This scope of modifications was then tentatively scheduled in our November 17, 1987 letter to be implemented during the SONGS 1 Cycle 12 refueling outage.

After analyzing the Cycle 12 projects SCE recognized the need to prioritize the tornado modifications relative to the other projects required to obtain a full term operating license (FTOL). In discussions with NRC staff members, SCE expressed concern about the relative importance of the tornado modifications compared to the other FTOL projects, considering the geographical location of SONGS 1. SCE and the NRC staff members both agreed that by quantifying the tornado risk at SONGS 1, it could likely be shown that the tornado modifications would not be necessary. SCE reflected this change in direction in their October 2, 1989 letter stating that the tornado modifications are of low safety significance and that SCE plans to perform an analysis demonstrating that these modifications are not required. The following report presents the results of the analysis performed to quantify the tornado risks at SONGS 1.

1.2 Approach

In order to evaluate the implications of the previously identified tornado related modifications to the safety of SONGS 1, a probabilistic risk evaluation has been performed.

Nuclear plant systems provide a high reliability of safe shutdown for a variety of postulated accident conditions. In some cases, systems provided to support the achievement of safe shutdown are only called upon to function in extremely unlikely conditions. In such cases, it is useful to consider the impact of modifications and design alternatives on a full spectrum of such postulated accidents to assure that the overall net impact of such modifications is understood. Probabilistic risk assessment techniques have been developed for such studies.^[7]

The methodology employed in this study involves the development of a risk model which can be used to determine the effectiveness of plant modifications for tornado protection. By analyzing the various model formulations it is possible to determine the risk for each configuration, and by comparing each result with a base case, determine the overall risk effectiveness of proposed upgrades.

The SONGS 1 control room could represent a potential vulnerability to the effects of tornados. Therefore, a detailed risk evaluation was performed for this area.

1.3 Summary of Results

The SONGS 1 risk model shows a low frequency of core damage ($1.65E-06$ per year) for a tornado initiating event.

The analysis also indicates that implementation of the proposed modifications results in a negligible to very small reduction of the core damage frequency (i.e., approximately $1.0E-06$ per year). The incremental benefit of tornado protection is small even when compared to the already small risk. SCE currently estimates the cost of tornado related upgrades to range from \$10M to \$52M in 1990 dollars for 10^{-5} and 10^{-7} per year recurrence frequency tornado events, respectively. This high cost is much greater than the value of the analyzed incremental risk reduction and calculated incremental cost-benefit of \$1M. The analysis indicates the greatest amount of risk is introduced by the fact that the tornado event causes a loss of offsite power or other plant trip. Because the tornado modifications will not prevent a loss of offsite power or other plant trip or mitigate their effects, the impact of the modifications on core damage risk is not significant. Therefore, modifications to SONGS 1 for tornado protection are deemed unnecessary due to a low calculated core damage frequency, small risk reduction, and low cost-benefit.

2.0 TORNADO RISK ASSESSMENT METHODOLOGY

A plant specific PRA methodology has been used to evaluate the SONGS 1 vulnerability to tornado winds and tornado generated missiles. This methodology can be used to determine the overall plant vulnerability to tornado hazards and quantify the risk reduction associated with the implementation of tornado protection upgrades.

This analysis involves the following steps:

- Quantification of the tornado wind hazard probability.
- Quantification of the probability of tornado missile impact on vulnerable structures and components.
- Identification of the structure and component fragilities.
- Determination of the structure and component failure probability.
- Quantification of the plant tornado hazard-related reliability.
- Quantification of plant tornado hazard-related reliability considering tornado protection modifications.

The effects of tornados on plant designs can be divided into two potential impacts: wind related failures (wind and differential pressure loads acting on plant structures) and tornado missile related failures. Tornado wind loads can be evaluated in terms of the fragility of components and structures over the range of windspeeds predicted in tornados. For SONGS 1, a site with a majority of its components exposed, the fragility of plant structures is also of interest for components and power and control raceways attached to exterior walls. The methodology used in evaluating tornado wind effects on plant structures is summarized in Section 2.2.

The likelihood of tornado missile impacts on vulnerable areas of the plant is considered for structures, exposed portions of the secondary systems, the onsite electrical system,

offsite power supply equipment, and the cooling water supplies (i.e., auxiliary feedwater storage tank (AFWST) and refueling water storage tank (RWST)). An overview of the methodology used in assessing the likelihood of tornado missile impact on plant structures is presented in Section 2.3.

2.1 Tornado Hazard Evaluation

The cumulative recurrence frequency of a spectrum of tornado windspeed intensities for a tornado strike at SONGS 1 represents the SONGS 1 tornado hazard. A commonly understood definition of tornado intensity is the Fujita or F-scale tornado windspeed intensity relationship developed by Dr. Theodore Fujita of the University of Chicago. The explanation of the F-scale intensity relationship and the chosen source of the SONGS 1 tornado hazard data is provided in the following subsections.

2.1.1 F-Scale Intensity Relationship

The Fujita "F" intensity scale developed by Dr. Theodore Fujita is a classification based on increasing intensity from F' 0 to F' 6, with each level corresponding to a range of tornado windspeeds. These windspeeds are^[8]:

Table 1
Fujita F-Scale Intensity Relationship

F-scale	F' 0	F' 1	F' 2	F' 3	F' 4	F' 5	F' 6
Windspeed (mph)	<72	73-112	113-157	158-206	207-260	261-318	318-380

This tornado classification is based on observations of damage rather than direct measurements of windspeed and, therefore, is subject to some uncertainty. The frequency values presented in Table 2 for each F-scale are based on the average

windspeed for the intensity (e.g., 93 mph for F' 1, 134 for F' 2, 182 for F' 3, 234 for F' 4 and 290 for F' 5).

In actuality the distribution of possible wind speeds for severe storms and tornados is a continuous function in which the frequency of winds of a particular speed are highest at low speeds, decrease approximately linearly over the mid-range, and approach zero for speeds beyond the physical limitations of stable or unstable wind functions. This distribution is fully addressed by treating five discrete wind speed ranges, each characterized by the average wind speed of the range. Selecting an upper and lower value would either induce conservatism (or non-conservatism) unnecessarily, or result in a discrete set of points which approximates the distribution less completely.

2.1.2 SONGS 1 Tornado Hazard

As part of SCE's efforts to resolve SEP Topics III-2, Wind and Tornado Loadings, and III-4.A, Tornado Missiles, SCE provided the NRC^[4] with a site specific analysis of the tornado wind hazard. The tornado wind hazard used an evaluation by Dr. Theodore Fujita to establish a realistic tornado hazard curve for SONGS 1. The evaluation considered primarily those tornado events that occurred within a one-mile band along the southern California coast region in establishing this realistic hazard rate.

The NRC review of the Fujita study, documented in Reference 6, resulted in an alternative formulation of the SONGS 1 tornado and straight wind hazard curve. A study was also performed for the NRC by Dr. J. R. McDonald^[9]. The NRC staff indicated in Reference 6 that it would use the results of the NRC staff's own study in resolving SEP Topics III-2 and III-4.A for SONGS 1. This curve was judged to be equivalent to the 95% confidence limit established in the McDonald study.

For the PRA model documented here, a number of sources were consulted to confirm the tornado hazard frequency for SONGS 1. These sources included regulatory

reports^[10,11], Electric Power Research Institute (EPRI) reports^[12,13,14], the NRC studies for SONGS 1^[6,9] and an SCE site specific study of the SONGS 1 tornado hazard performed for SCE by T. Fujita^[4]. The latter two sources are more applicable due to their regional and site specific nature. These reports were used to establish the tornado hazard frequency for this risk evaluation.

The determination of an exact quantitative frequency of tornado occurrence for the SONGS 1 site is difficult for two primary reasons:

- 1) Tornadoes are infrequent occurrences. This translates to a small data base from which conclusions regarding even more infrequent recurrence frequencies must be drawn.
- 2) Tornadoes are only included in a data base if they are observed and reported. Unlike many other extreme weather events and naturally occurring threats which impact a wider area or can be measured remotely (seismograph, radar, etc.), tornadoes may go unrecorded.

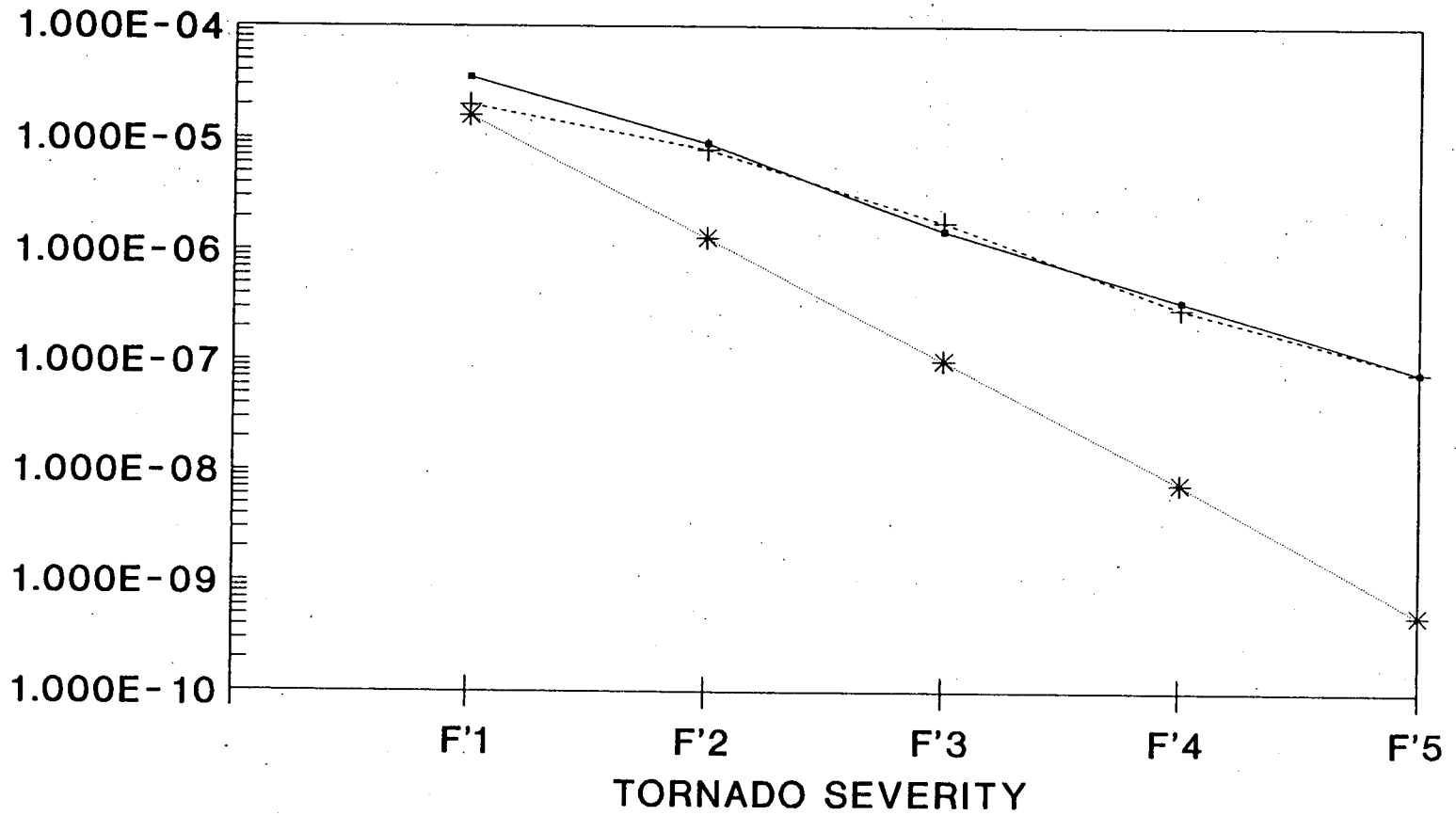
Both of these factors affect the uncertainty of the SONGS 1 tornado hazard frequency.

When considering the potential impacts of tornadoes on plant structures at SONGS 1, it is necessary to consider only those tornadoes with Fujita scale severity of F' 1, or greater. Tornadoes classified as less severe than F' 1 are not of sufficient size nor duration to present a significant hazard. The F' 6 tornado classification is not considered a credible (i.e., less than $1.0E-9$ year⁻¹ occurrence frequency) event for SONGS 1. Therefore, this study does not consider the F' 0 and F' 6 tornado classifications and will focus on the assessment of the SONGS 1 vulnerability to F' 1 to F' 5 tornado events.

The three sources^[4,6,9] considered applicable to SONGS 1 were evaluated for consistency and to quantify the uncertainty in establishing the tornado hazard frequency for SONGS 1. The frequency for each F-scale is provided in Table 2 and shown on Figure 1. These frequencies were taken at the mean (or average) windspeed for each F-scale (i.e., 93 mph for F' 1, 135 mph for F' 2, etc.). In every case the number for the F' 5 frequency

COMPARISON OF SONGS 1 TORNADO HAZARD CURVES

FREQUENCY (YR⁻¹)



—■— NRC STUDY -+- MCDONALD * SCE STUDY (FUJITA)

Figure 1.

was taken from an extrapolation of the results, and in the case of the SCE study (Fujita's results) the F' 4 value is an extrapolated number as well.

Table 2
SONGS 1 Tornado Hazard Frequency Data

Source	Frequency of Occurrence (yr ⁻¹)					Total
	F' 1	F' 2	F' 3	F' 4	F' 5	
NRC Study ^[6]	3.5E-05	9.0E-06	1.5E-06	3.5E-07	8.0E-08	4.6E-05
McDonald ^[9]	2.0E-05	8.0E-06	1.8E-06	3.0E-07	8.0E-08	3.0E-05
SCE (Fujita) Study ^[4]	1.6E-05	1.3E-06	1.0E-07	7.7E-09	5.0E-10	1.7E-05

It is noted that the NRC study (6) and the McDonald study (9), both used larger regions in determining their hazard frequencies (e.g., a ten mile coastal band in the case of Reference 9) than the Fujita study which used a one mile band. The data collected for the San Onofre regional study is dominated by the occurrence of coastal and waterspout tornados which typically have a lower intensity than the inland desert tornados. The NRC and McDonald studies considered the higher intensity inland tornados resulting in a hazard skewed towards the higher intensity events (i.e. F' 4 and F' 5). The Fujita study is considered to be the most appropriate source for this risk assessment due to its detailed treatment of the regional area of the plant site. However, for conservatism the NRC study has been used in this risk assessment.

2.2 Tornado Wind

The methodology utilized in this study for the evaluation of wind effects on structures is based on the concept of component fragility. The fragility or vulnerability of a component

is defined as the conditional probability of its failure given a specific hazard. In the case of tornados, one of the hazards considered is wind loading.

NUREG/CR-2300^[7] includes an equation for the quantification of component fragility based on the wind loading applied and the capacity of the component. The form of the equation is as follows:

$$\text{fragility} = f' = \Phi \left[\frac{\ln(V/C) + \beta_{C,U} \Phi^{-1}(Q)}{\beta_{C,R}} \right]$$

where $\Phi(*)$ is the standard Gaussian cumulative distribution function, V is a given wind loading (mph), C is the components capacity to withstand wind loadings (mph), $\beta_{C,U}$ and $\beta_{C,R}$ are the standard deviation due to uncertainty in component capacity and standard deviation due to random variations in wind loading, respectively. Q is the probability that the true component fragility is less than f' , and $\Phi^{-1}(*)$ is the inverse of the standard Gaussian cumulative distribution function (i.e., $\text{arc } \Phi(*)$).

As described in NUREG/CR-2300, the structural capacity of a structure, C, can be taken as one and one-half times the design windspeed (i.e., design basis wind loadings contain approximately 50% margin). For the purposes of this study, which uses best estimate values, a value of 0.50 is used for Q to calculate the median value of f' and $\Phi^{-1}(0.50) = 0.0$. NUREG/CR-2300 develops values for the standard deviation factors of 0.38 and 0.25 for $\beta_{C,U}$ and $\beta_{C,R}$ respectively. Substituting in these values, the fragility equation simplifies to:

$$f' = \Phi \left[\frac{\ln \frac{V}{1.5 \cdot V_d}}{0.25} \right]$$

where: V_d = the design windspeed capacity for the structure (mph)

Using this simple equation, best estimate fragility curves can be developed to quantify the component failure probability over the range of wind speeds expected in tornados.

In the quantification of wind related hazards, the vulnerable SONGS 1 structures are evaluated for tornado winds. These structures and their safety significance are further described in Section 4.0. Table 3 lists these structures and their wind loading design bases as extracted from analyses reviewed in Reference 2. From these values the failure probability is calculated for each of the five tornado classifications.

Table 3

SONGS 1 Structural Fragility Input Data

Structure	Tornado Design Wind Capacity
Turbine Building	104 mph
Fuel Storage Building	133 mph
Control Building	260 mph
Ventilation Equipment	158 mph
Battery Room No. 1	140 mph

Other SONGS 1 structures, such as the sphere enclosure building (enclosing the containment) and the diesel generator building are specifically designed to withstand

tornado winds up to 260 mph which corresponds to a recurrence frequency of 10^{-7} per year. Therefore, these structures are not considered to fail in the SONGS 1 plant reliability model.

2.3 Tornado Missile Impacts

Missiles generated during tornado events can result in damage to plant facilities and equipment. The probability of such missile damage is dependent upon several variables, such as tornado intensity, the surface area of the target, and the number and type of missiles. This risk assessment includes a comprehensive treatment of the frequency of damage to exposed components and structures required for safe shutdown by tornado missiles.

As previously indicated some SONGS 1 structures are designed for tornado missile impacts. These structures are (1) the Sphere Enclosure Building (including the Sphere), (2) the Diesel Generator Building, and (3) the Reactor Auxiliary Building (portion below grade). Other structures, such as the control building and the electrical containment penetration modules have been shown by analysis^[2,5] to be resistant to tornado missile impacts. Components located within these structures are protected from tornado missiles. The cables outside of containment up to the electrical penetration modules are vulnerable to tornado effects. Other SONGS 1 components and structures could be adversely affected by tornado missiles. These structures include transmission towers, switchyard structures, masonry walls, and components not specifically designed to be protected from tornado hazards (such as tanks, pumps, valves, and controls). Those components located within structures which are not resistant to tornado missile impacts are also treated as exposed targets.

2.3.1 Missile Risk Methodology

EPRI report NP-768, "Tornado Missile Risk Analysis"^[12] provides the basis necessary to determine the tornado missile risk to plant facilities and equipment. The data presented in the EPRI report is based on numerous tornado missile computer simulations for the plants studied, and provides the probability of a missile hit for any square foot of plant area per missile per tornado. The EPRI simulations used the TORMIS computer code, a state of the art model of tornado missile injection, flight and impact dynamics. These simulations were used to calculate the mean probability of a hit to all exposed vertical surfaces on the plant site (based on a given tornado severity and the missile population within 2000 feet of the site). The EPRI results compiled approximately 10,000 simulations to generate average probability densities. These average numbers were used to generate the missile strike probability values presented in Table 4. In this analysis, the calculated hit probability is conservatively applied to all horizontal and vertical exposed target surfaces. For those components located behind or within structures that are not resistant to tornado missile impacts, the EPRI calculated hit probability is applied to the projected area of the component. The tornado missile induced failure probability of a component or structure is conservatively modeled as the hit probability (i.e., missile impact equals component failure or function loss).

Table 4

EPRI Average Missile Strike Probabilities Given a Tornado

Tornado Intensity	Missile-Strike Probability Per Unit Area/Tornado/Missile
F' 2	3.57×10^{-11}
F' 3	9.06×10^{-11}
F' 4	6.05×10^{-11} [1.14×10^{-10}]*
F' 5	1.39×10^{-10}

* Interpolated value to be used in this analysis. (It is noted this is approximately twice the EPRI value.)

The average missile strike probabilities developed from the EPRI studies has an apparent discontinuity at F' 4. This discontinuity is not discussed in the EPRI report, but is apparently the result of a change in the tornado missile injection, transport, and flight characteristics at the F' 4 intensity. Since it is not clear whether site specific details for the plant site studied contributed to this discontinuity, the missile strike probability for the F' 4 tornado intensity has been conservatively interpolated from the F' 3 and F' 5 values.

These generic probabilities can be applied specifically to the SONGS 1 plant after determining the population of missiles available on the SONGS 1 site.

2.3.2 Tornado Missile Survey

A tornado missile survey was conducted to develop an estimate of the number of tornado missiles available at the SONGS 1 plant. This survey consisted of a thorough walkthrough of the area within a 2000 foot radius of the SONGS 1 containment. This radius was selected because the EPRI report^[12] indicated the likelihood of missile pickup and transport beyond 2000 feet is negligible.

Since at any one time the plant site may contain a very large number of items, a general classification was used to categorize the missile population. The following is a description of the types or classes along with an explanation of the level of conservatism applied to the results of the walkthrough.

1. 55 gallon drum - This category includes trash cans and radwaste barrels. The number of drums is multiplied by 3 to account for counting errors and potential missiles within these containers.
2. Small Trash Bin - This category includes small debris boxes and similar containers. The number of bins is multiplied by 25 to account for items within these containers.
3. Large Trash Bin - This category includes large debris boxes and similar containers. The number of bins is multiplied by 50 to account for items within these containers.

4. Wood - This category includes large pieces of wood - 2 in. x 4 in. x 10 feet and larger. Wooden members 6 in. x 6 in. and larger but shorter than 10 feet are also counted here.
5. Small Wood - This category includes those pieces of wood too small to be considered under item 4 above. The number is multiplied by 2 to account for potential counting errors.
6. Pallets - This category tracks the number of pallets. The number is multiplied by 2 to account for potential counting errors.
7. Structural Steel - This category includes large structural members and pipe sections.
8. Large Wood Boxes - This category includes the number of the large wooden boxes typically used to enclose fuel handling tools. The number is increased by 25% to account for potential counting errors.
9. Gas Bottles - This category includes the number of compressed gas bottles that appear to be secured in a manner not capable of withstanding tornado winds. This number is increased by 25% to account for potential counting errors.
10. Scaffold - This category tracks the number of scaffold sections, connector tubes, and planks. The number is increased by 25% to account for potential counting errors.
11. Vehicles - This category is an estimate of the number of non-moving vehicles. The number is based on the number of parked vehicles noted in marked parking spaces within the defined boundary.
12. Utility Poles - This category is the estimated number of wooden power poles and lighting standards.
13. Trees - This category is the estimated number of trees within the defined boundary.

The results of the walkthrough are provided in Table 5. The total number of missiles considered is applicable for two reasons: 1) The EPRI report simulated a number of plants, each of which had an average of 5500 missiles considered to impact plant structures. However, SONGS 1 has a large number of exposed components that are not protected within structures, and 2) The EPRI report considered only missiles in elevated

locations. Elevated missiles are generally the only missiles in a position to become airborne with sufficient velocity to damage structures. Because this risk assessment did not model missile injection and flight dynamics to a level of detail equivalent to the EPRI study and SONGS 1 has many individual components (targets) vulnerable to damage, all SONGS 1 missiles are used. A majority of the missiles identified at the SONGS site are at grade level. For this reason the missile population used in the analysis is conservative.

Table 5
SONGS 1 Missile Survey Results

Item No	Description	Number
1	55 Gallon Drum	2,400
2	Small Trash Bin	3,050
3	Large Trash Bin	3,150
4	Wood	650
5	Misc. Small Wood	160
6	Pallets	310
7	Structural Steel	335
8	Large Wood Boxes	30
9	Gas Bottles	180
10	Scaffold	4,375
11	Vehicles	600
12	Utility Poles	300
13	Trees	500
Total Missile Population		16,040

2.3.3 Calculation of Missile Strike Probability

The EPRI study indicates that F' 1 tornados are not capable of generating missiles. For all other tornado intensities (F' 2 to F' 5), the missile strike probability is calculated by combining the missile population from Table 5 with the frequencies of missile strike probability per unit area/tornado/missile provided in Section 2.3.1. Therefore, the probability of a missile strike on some target surface area at SONGS 1 per square foot given that a tornado occurs is shown in Table 6 for each of the five tornado intensities.

Table 6

SONGS 1 Missile Strike Probabilities Given a Tornado

Tornado Intensity	Missile-Strike Probability For SONGS 1 (missile hits per square foot per tornado)
F' 1	1.00×10^{-9} *
F' 2	5.73×10^{-7}
F' 3	1.45×10^{-6}
F' 4	1.83×10^{-6}
F' 5	2.23×10^{-6}

The probability of a missile hit and consequent damage to any SONGS 1 component or structural target to be evaluated can now be determined. Using areas of exposure to missile hit for structures and equipment necessary to achieve post-trip safe shutdown, individual component and system failure probabilities can be calculated. The probability that a component or structure is unavailable due to tornado missile impacts is equal to the probability of a tornado occurring multiplied by the appropriate value from Table 6

* As stated above, the EPRI study indicates that F' 1 tornados are not capable of generating missiles. Therefore, for this study it is assumed that the F' 1 missile strike probability per square foot of area is 1.0×10^{-9} .

times the exposure area. The results of the walkthroughs to determine these exposed areas and specific system vulnerabilities to tornado missile effects are provided in Section 3.0.

2.4 Plant Reliability Model

A plant model was developed to account for the unique characteristics of a tornado risk assessment. Each of the major steps involved in developing the plant reliability model is discussed below.

The frequency of tornado-induced core damage is modeled in a conservative and simplified manner. Based on a review of the results of past PRA studies on tornados and other external event risks for other plants, it is concluded that the dominant plant core damage risks are likely to be related to loss of AC power. Typically, offsite power supplies are not tornado resistant. Thus, the occurrence of a tornado may result in a loss of offsite power event. Due to the unique impact of a loss of offsite power scenario, this possibility is explicitly modeled.

2.4.1 Initiating Event Definition

For the purposes of this analysis per the guidance of Reference 7, the entire spectrum of NUREG-2300 initiating events are assumed to be generally encompassed by the following three categories. In performing the risk analysis, a direct evaluation of each UFSAR^[16] Chapter 15 accident type has not been performed. It is common for a PRA to address a set of sequences or accident types as a class. The risk analysis includes consideration of tornado induced loss of power, normal transients, and LOCA. This treatment is consistent with normal PRA practice and is deemed to encompass the Chapter 15 accidents.

1. Loss of Off-Site Power (LOOP)
2. Other Plant Trips
3. Loss of Reactor Coolant System Inventory

Failure to trip is not considered because its probability (between $1.0E-04$ and $1.0E-05$ per demand) is so low that it does not affect this analysis.

Category 1: Loss of Off-Site Power (LOOP)

This initiating event is included to model the susceptibility of the offsite power system to tornado events. SONGS 1 has multiple offsite power supplies, but all are provided through a common right of way and switchyard. Further, the offsite power transmission lines leaving the switchyard are not designed for tornado winds and the switchyard is not protected from tornado missiles. Utilizing the wind fragility and tornado missile methodologies previously described, it is possible to calculate the likelihood of loss of offsite power for individual tornado severities. LOOP initiated by tornado induced failures in the offsite power grid, that do not impact the plant site, are bounded by the normal LOOP initiator frequency, and are not considered in this assessment.

Category 2: Other Plant Trips (PT)

A simplifying assumption is made that a plant trip always occurs for a tornado hazard of F¹ or greater. Any tornado not calculated to cause a loss of offsite power is, therefore, assumed to cause a plant trip.

Category 3: Loss of Reactor Coolant System Inventory (LOCA)

LOCA is not explicitly treated as an initiator. The probability of LOCA events occurring due to tornado damage or random events is addressed by conservatively assuming the loss of critical safety functions and the loss of pressure integrity of any portion of the RCS

system exposed or vulnerable to tornado damage causes core damage. All components of the reactor coolant system are protected against tornado damage by the sphere enclosure building or other structures. Consequently, tornado-induced LOCAs are not expected to occur.

Independent LOCAs of SONGS 1 have a frequency of about $2.7E-02$ per year, or $7.3E-05$ per day, for the 24 hour mission time analyzed in this study. Combined with a tornado frequency of $4.6E-05$ per year, one can conservatively estimate the frequency of core damage to be below $3.4E-09$. Therefore, the exclusion of LOCA-induced core damage is acceptable.

Initiator Frequencies

The initiator values given for the LOOP and PT are a combination of the LOOP or plant trip frequency given a tornado and the tornado occurrence frequencies. The values for the LOOP event given a tornado occurs were calculated based on the combined area of the SONGS switchyard and the lines and towers from the switchyard to SONGS 1, and using the tornado missile strike probabilities shown in Table 6 in Section 2.3.3. Other tornado induced loss of offsite power events that do not impact the SONGS 1 plant site are bounded by the normal LOOP case, as the plant equipment would not be affected. The values shown for a plant trip given a tornado are the complement (i.e., one minus LOOP) of the value for the LOOP initiator.

The initiator frequencies for each tornado intensity level are as follows:

Table 7

Event Initiator Frequency Data

F-Scale	F' 1	F' 2	F' 3	F' 4	F' 5
Tornado Frequency	3.5E-05	9.0E-06	1.5E-06	3.5E-07	8.0E-08
LOOP Given Tornado	.17	.21	.53	.66	.82
Plant Trip Given Tornado	.83	.79	.47	.34	.18
LOOP Initiator	6.0E-06	1.9E-06	8.0E-07	2.3E-07	6.6E-08
Plant Trip (PT) Initiator	2.9E-05	7.1E-06	7.0E-07	1.2E-07	1.4E-08

2.4.2 Critical Safety Functions

The event sequences above were developed based on a logical representation of systems needed to ensure the following "critical safety functions":

1. Reactivity Control
2. RCS Inventory Control
3. RCS Pressure Control
4. Decay Heat Removal

Each of the above critical safety functions was reviewed with respect to wind/tornado events with off-site power loss assumed for the LOOP case. Based on a plant inspection and initial missile damage evaluations, tornado events have the potential for making one or more of these safety functions unavailable as a result of missile damage to system components, associated electrical power circuits, instrument air supplies, instrumentation, and controls. Therefore, the tornado resistance design review began by determining a minimum set of plant systems available and necessary for plant shutdown. These

systems were chosen on the basis of absolute need and include the reactor coolant (RCS), auxiliary feedwater (AFW), main steam (MSS) and volume control and charging (VCC) systems.

Reactivity Control

Reactivity control is initially provided by the reactor trip function of the reactor protection system (RPS). The trip function is assumed to occur because the frequency of a tornado coupled with a failure to trip is low. As the RCS is cooled down, the required shutdown margin is maintained by injecting borated water from the refueling water storage tank (RWST). This water is supplied by the charging pumps through the normal charging flowpath and the reactor coolant pump seals.

Primary Coolant Inventory Control

The primary coolant inventory is controlled by limiting reactor coolant pump seal (RCP) leakage while injecting a sufficient amount of water through the normal charging path and RCP seals to maintain pressurizer level and compensate for shrinkage during cooldown. With the technical specification minimum required concentration of boric acid in the RWST, the water injected for primary coolant inventory control exceeds that required to maintain adequate shutdown margin for reactivity control.

Under postulated tornado damage conditions, the seal water return path may become isolated. Therefore, any leakage through the seals will pressurize the seal water return header, activate relief valve RV-2004 and be discharged to the RCS drain tank. Should this occur, seal injection and seal cooling to the RCPs will be unavailable until the charging pump is energized. Westinghouse Electric Corporation has evaluated the effect on RCS integrity of a postulated fire which would disable seal cooling.^[15] This evaluation shows that the reactor coolant pump seals could be expected to survive for up to 2½

hours without materially changing the leakage rate of the seals. This is sufficient time for the operators to properly align the charging system.

Primary Coolant Pressure Control

Primary coolant pressure is controlled by regulating the cooldown rate using the atmospheric dump valves. The heat loss from the pressurizer is sufficiently low that during the initial hours of RCS cooldown, the pressurizer heaters are not necessary to maintain adequate system pressure.

Decay Heat Removal

Decay heat is removed from the core by natural circulation through one or more steam generators. Heat is transferred to the feedwater in one or more steam generators. Steam is generated and released under the control of the atmospheric dump valves. Water is supplied to the steam generator(s) by the auxiliary feedwater (AFW) system.

The decay heat removal system is required to remove a sufficient amount of heat from the reactor coolant system for the 24 hour assumed event duration. Water stored in the auxiliary feedwater and condensate storage tanks is supplied to the steam generators by the auxiliary feedwater pumps. Flow to each steam generator is controlled by the auxiliary feedwater flow control valves.

For the few minutes following reactor/turbine trip that it will take to initiate operation of the auxiliary feedwater pump, RCS temperature will be controlled at 600°F by the heat removed through the production of steam from the initial inventory of water stored in the steam generators and escaping through the atmospheric dump valves or the safety relief valves outside containment, if actuated. After the auxiliary feedwater pumps are started and flows are established to recover normal steam generator levels, the cooldown of the RCS is controlled by the power-operated atmospheric steam dump valves (ADVs). The

ADVs are controlled to increase the flow of steam from the steam generators, resulting in a reduction in steam generator pressure to a point that will allow the safety relief valves to close. The steam flow through the ADVs is then adjusted to establish an RCS cooldown rate of 25°F/hr, while feedwater flow is adjusted to maintain steam generator level.

Electrical Systems

As stated in the discussion of initiating events, tornado events may result in complete loss of offsite power. Therefore, all systems may have to be powered from on-site emergency power systems.

The on-site emergency power systems include the emergency diesel generator systems, 125 volt DC battery systems and the 4160 volt (4kV) and 480 volt distribution systems. The onsite distribution systems will be required for both the LOOP and the PT case.

The systems used to achieve all of the above critical functions and their success criteria are described in greater detail in Section 3.0.

2.4.3 System Fault Trees

The fault trees constructed to model SONGS 1 tornado susceptibility are provided in Appendix B. These trees are taken from a previous partial-PRA performed for SONGS 1 and modified to take into account tornado related vulnerabilities. Generally, the trees model the system functions as taken from the SONGS 1 design documents and as further described in Section 3.0. The basic event probabilities shown on the Appendix B fault trees are for the base case tornado initiating event in which no tornado induced system failures are postulated. The basic events were developed as described in Section 2.5.

2.4.4 Event Trees

Event trees were developed for the LOOP and Other Plant Trips (hereafter abbreviated as "Plant Trip" or PT) cases. The event trees are provided in Appendix A. The system fault trees provided in Appendix B were linked to these event trees. The event trees were analyzed for F' 1 to F' 5 tornado initiating events. The fault tree basic event probabilities for tornado induced system functional failures were varied based on the development of structural fragility and missile impact considerations for the F' 1 to F' 5 tornado cases.

2.4.5 Tornado Related Basic Event Development

The system models require the development of basic event probabilities for structural and component failure given tornado wind loadings and missile impacts. A plant inspection was performed to identify and locate all of the system components required to perform a function during a tornado event. The vulnerability of a particular system to tornado related damage was quantified in terms of the combined total exposed surface area of the system components. The exposed surface area for a given component or group of components (target) was determined by developing tornado missile "windows" of vulnerability. These "windows" were placed around each target such that all credible missile entry paths passed through these windows. It is noted that in some configurations one or more of these windows may be shielded by equipment or a structure that precludes missile passage. The total surface area of the non-shielded "windows" is the total exposed surface area for the target used in generating the tornado missile strike probabilities.

The following guidelines and assumptions were used in developing the target areas.

1. The instrument air system is exposed to the tornado hazard at multiple locations throughout the plant. Based on its significant vulnerability to tornado wind loading and missile impacts, the instrument air system is assumed to have a failure probability of 1.0 during a tornado event.

2. The nitrogen system is a backup to instrument air. This system uses a bank of bottles (2 or more) dedicated to a single or group of like components. Therefore, failure of this system is assumed to be primarily missile related and a generic exposure area to missile damage of 100 ft² was assumed.
3. The AC and DC power systems were reviewed in detail to determine the routing of all cables within the distribution systems and the interface with specific system components. The review was performed using conduit and raceway schedules, conduit and raceway plans and elevation drawings, and was augmented with actual inspections to verify raceway and conduit, routing and layout. Routings were grouped into larger targets when the raceways were within 5'-0" of each other or were attached to the same structure. The 5'-0" was determined based on a qualitative review of the average size of the missile population provided in Table 5. In this manner common cause failure due to structural fragility or missile failures could be identified.
4. The failure probability of the component and saltwater cooling systems was evaluated based on the failure of each system due to random causes, gross vulnerability to tornado missiles, and gross vulnerability to tornado wind effects. This simplified model is shown on page 27 of the charging system fault tree in Appendix B.
5. The control system cables and actuation signal systems were treated in a manner similar to the AC and DC power systems.
6. Mechanical system tornado vulnerability was determined by analyzing to exposed portions of the systems such as piping, tanks, pumps, valves and instrumentation.

Spurious Actuation and Hot Shorts - Tornado wind or missile induced damage to electrical raceways and cables typically result in the loss of component function due to open or short circuit conditions. In this assessment, credit is taken for circuit protective devices to isolate individual failed circuits. Therefore, the availability of control power for breaker tripping is included in the system models.

Tornado induced damage to electrical raceways and cables causing spurious actuation of components is based on the vulnerability of the associated control cable. Failures of

the control circuit were evaluated to determine whether spurious open or close signals could occur. Hot shorts, however, were not considered to be a credible mechanism for causing spurious component actuation. The likelihood of a tornado missile impacting a raceway and causing a hot short between an energized circuit and a de-energized circuit without causing a short circuit small enough to be neglected.

Structural Failure - The structural fragility related failures were assumed to impact the conduits or raceways penetrating the walls or supported by the walls. Other components were also assumed "failed", if attached to the walls.

Mission Time - The LOOP initiating event frequency assumes the LOOP is for a 24 hour duration. The median duration of a weather related LOOP for all nuclear plants is 1 to 2 hours with a maximum recorded duration of 8 hours 54 minutes^[17]. Losses approaching or exceeding 24 hours are considered to be less likely than the event frequency used in this analysis. Available data shows repair of off-site transmission equipment to restore power is likely in shorter times^[17]. For trips without loss of offsite power, 24 hours is postulated to be sufficient time for multiple actions to be undertaken to increase the ability to cope with the postulated event. For these reasons, a 24 hour mission time is conservative for this analysis.

The basic events developed by the guidelines and assumptions presented above were input into the fault trees and tracked in a database for each tornado hazard level F'1 to F'5.

2.5 Evaluation of Upgrades

The plant tornado risk model can be analyzed to develop a quantitative assessment of the frequency of core damage resulting from a tornado strike to the SONGS 1 plant site. A quantification of the benefit of the tornado protection modifications can be determined by adjusting the model to reflect such modifications and determining the reduced core

damage frequency. If modifications provide tornado protection, the component failures associated with tornado effects (wind and missile damage) are reduced to an insignificant value (essentially zero). Comparison of the base case core damage frequency without the modifications to the previous results with the modifications yields the quantitative benefit in terms of core damage frequency.

3.0 SHUTDOWN SYSTEM DESCRIPTIONS

SONGS 1 is a 450 MWe pressurized water reactor (PWR). As with most PWRs it has a general set of post trip functions necessary to achieve and maintain safe shutdown. Since one of the basic assumptions of this risk evaluation is that a plant trip is expected to occur for any postulated tornado of an intensity of F' 1 or greater, the post trip functions and the systems required to fulfill these functions are within the scope of this evaluation.

The following SONGS 1 abnormal operating instructions (AOIs) and emergency operating instructions (EOIs) were reviewed to determine the post-trip plant functions and operator actions necessary to achieve safe shutdown:

EOI SO1-1.0-10	Reactor Trip or Safety Injection
EOI SO1-1.0-60	Loss of All AC Power
EOI SO1-1.0-61	Loss of All AC Power Recovery
AOI SO1-2.7-2	Plant Shutdown Using the Dedicated Shutdown System
AOI SO1-10-7	Dedicated Safe Shutdown System Operation
AOI SO1-2.1-8	Reactor Coolant Pump Seal Trouble
AOI SO1-2.1-10	Component Cooling Water System Malfunction
AOI SO1-2.7-4	Alternate Shutdown for Fire in the Yard Area

As previously stated in Section 2.4.2, the general categories of post-trip functions are primary system reactivity and inventory control, pressure control, and decay heat removal. The post trip functions are provided by various plant systems. These systems are the reactor coolant system, volume control and charging system, auxiliary feedwater systems, main steam system, onsite power (AC and DC) systems, instrument air system, and nitrogen and control systems. These systems were inspected as part of a plant walkthrough to establish the areas that are exposed to possible tornado wind or missile damage. The configuration, method of operation, success criteria and fault tree modeling assumptions of each system is described below. The system-level fault trees are provided in Appendix B.

3.1 Reactor Coolant System

The primary function of the reactor coolant system (RCS) during tornado related shutdown sequences is to maintain pressure boundary integrity and core cooling. The core cooling function involves the transfer of decay heat to the main steam system via the steam generators. This transfer of heat can be satisfied with or without the reactor coolant pumps (RCPs) operating (i.e., utilization of natural circulation). The pressure boundary integrity function involves the ability to maintain control of all potential fluid flow paths so that a potential loss of coolant inventory does not exceed the volume control and charging system (VCC) make up capability.

The RCS is enclosed within a containment sphere and the sphere enclosure building. As described in Section 1.1, the sphere enclosure building is designed to withstand the effects of a tornado event. This includes both tornado wind loadings and missile impacts. Therefore, only those portions of the RCS or interfacing systems that penetrate the structure and are exposed to tornado missiles are susceptible to failure. A review of the P&IDs and a plant walkdown was conducted to identify active and passive components whose failure could compromise the core cooling functions or RCS integrity.

The review found that all of the potential leakage paths outside of containment were either already being evaluated as part of another system or were protected from the tornado hazard. Therefore, a detailed fault tree for the RCS is not required. However, several other plant systems are required to support the RCS function. Those systems are discussed in the following sections.

RCS instrumentation has been previously evaluated and found to have exposed cables that are vulnerable to tornado missile damage.^[5] The exposed cables are located in the east and west containment penetration areas. Tornado related damage to both areas must occur before all RCS instrumentation is lost. The probability of a missile strike in one of the penetration areas can be estimated using Table 6 and the exposed area.

Assuming an F15 tornado occurs and considering the 1000 sq. ft. of exposed area for the penetration, the strike probability is 2.2×10^{-3} . Therefore, the probability of a missile strike in both penetration areas is approximately 5×10^{-6} . Combining this failure probability with the frequency of a tornado occurrence results in an overall failure frequency that is less than 10^{-10} per year. This frequency is insignificant and justifies neglecting the RCS instrumentation tornado vulnerabilities. Other instrumentation vulnerabilities are assumed to be enveloped by the associated system's tornado vulnerability or by the failure probability developed above.

3.2 Volume Control and Charging System

3.2.1 System Function

For purposes of this assessment, the volume control and charging system (VCC) has the following primary functions:

- Maintain proper inventory in the reactor coolant system (RCS) during all phases of operation.
- Provide a means of injecting borated water for reactivity control.
- Provide seal water to the reactor coolant pumps (RCP).

3.2.2 System Configuration

The volume control and charging system consists of a volume control tank, charging pumps, heat exchangers, and valves to check, isolate and regulate charging flow. A simplified diagram of the system is shown in Figure 2. Borated water supply for the VCC is normally maintained by the volume control tank (VCT). The VCT is configured with an isolation valve to permit alternate borated water supply from the refueling water storage tank (RWST) through three parallel isolation valves. Flow through manual isolation valves serves either of the two charging pumps during normal operation. Flow from the charging

pumps supplies the RCP seal water cooling circuit and the reactor coolant system along independent paths.

A portion of the seal water delivered to the reactor coolant pump seals is normally returned to the volume control and charging system. The seal water return path includes an isolation valve for containment isolation and a heat exchanger to cool the returned seal water. Seal water from the heat exchanger is either directed to the charging pump suction line downstream of the VCT or returned to the VCT through two excess letdown control valves.

Charging pump discharge to the reactor coolant system is regulated by a flow control valve. Coolant from the flow control valve passes through a regenerative heat exchanger before flowing through the cold leg of RCS Loop A or through the auxiliary pressurizer spray path to the reactor coolant system.

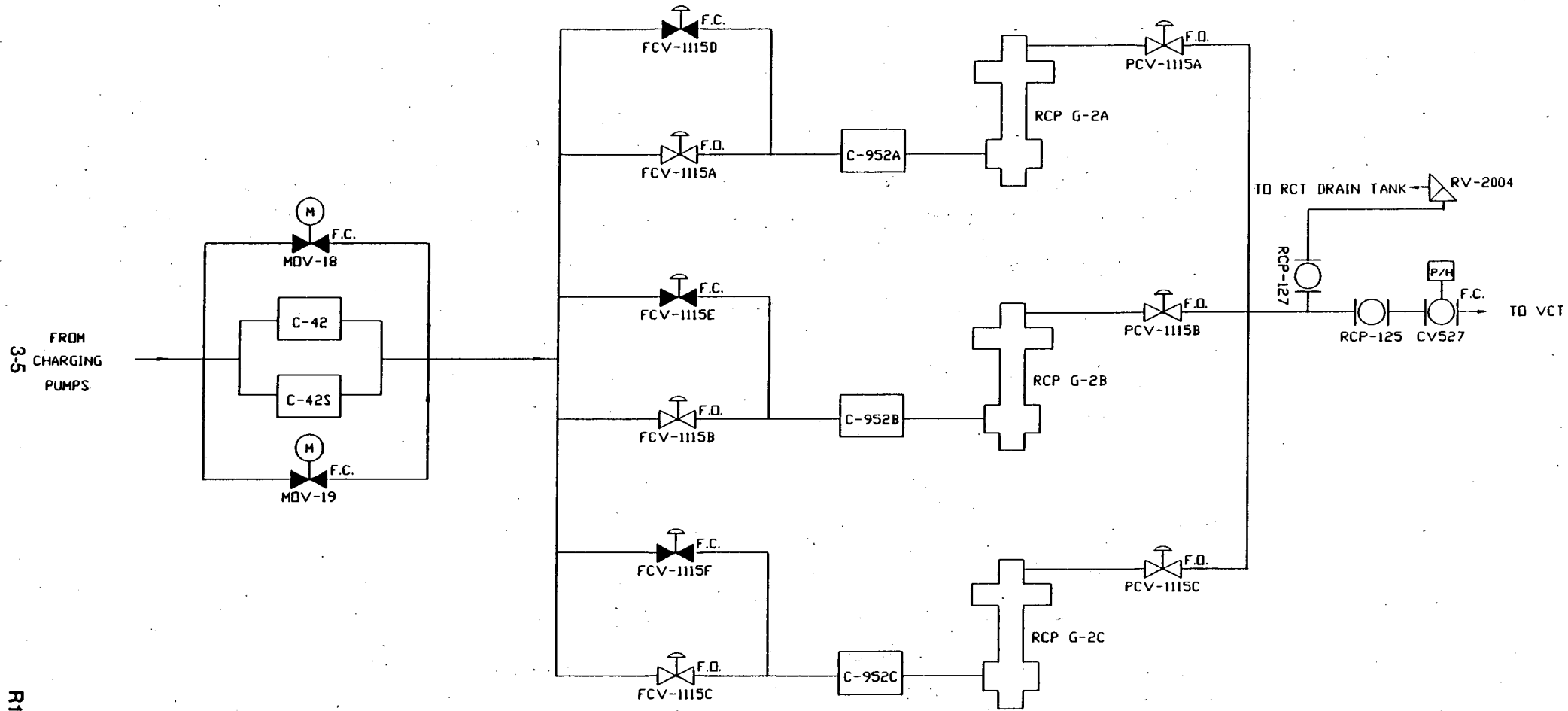
3.2.3 System Operation

Two charging pumps and a charging test pump normally take suction from the VCT through the VCT isolation valve MOV-1100C. The VCT accommodates excess letdown from the reactor coolant system during changes in power level and supplies demineralized, borated water to the charging pumps.

Each charging pump discharges through a discharge check valve and manual isolation valve. The three independent pump trains join at two common headers supplying two flow paths. One flow path provides flow to the seal water circuit and the other feeds the RCS through the charging line.

FIGURE 2 (Sheet 1 of 3)

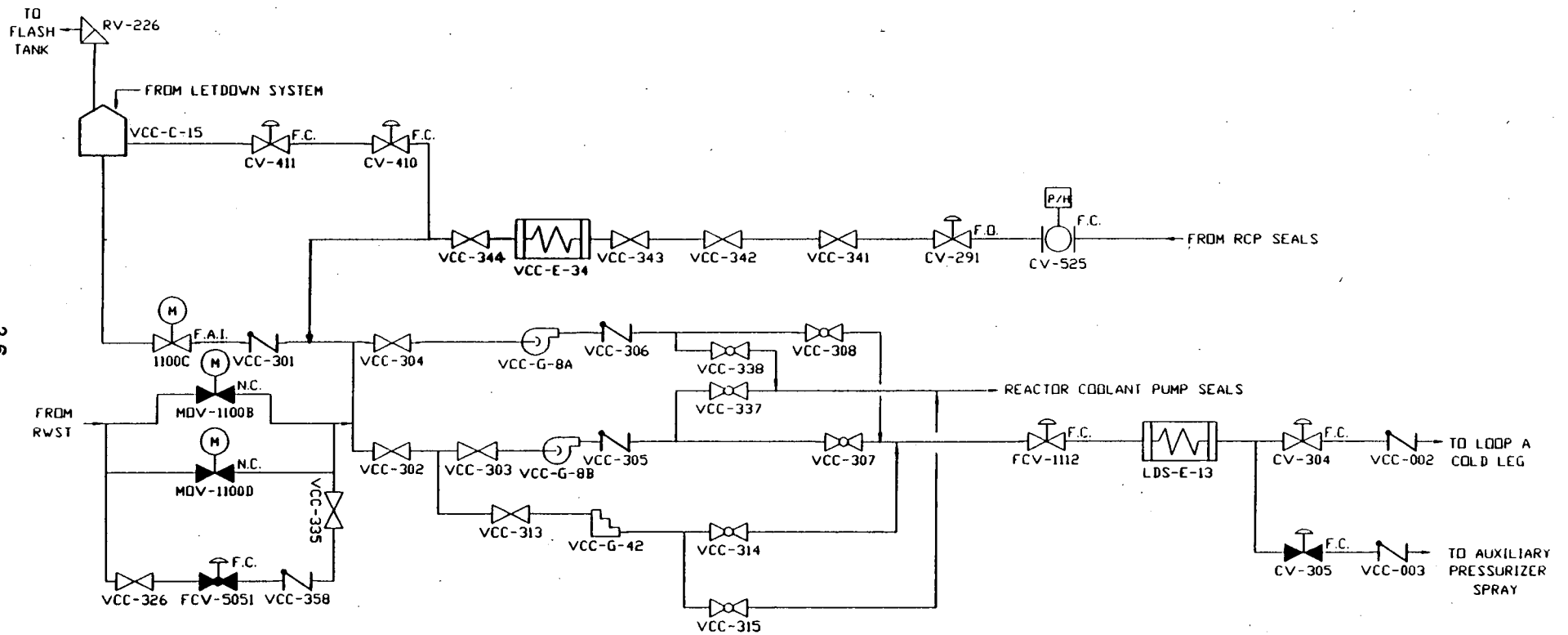
VOLUME CONTROL AND CHARGING SYSTEM



3-5

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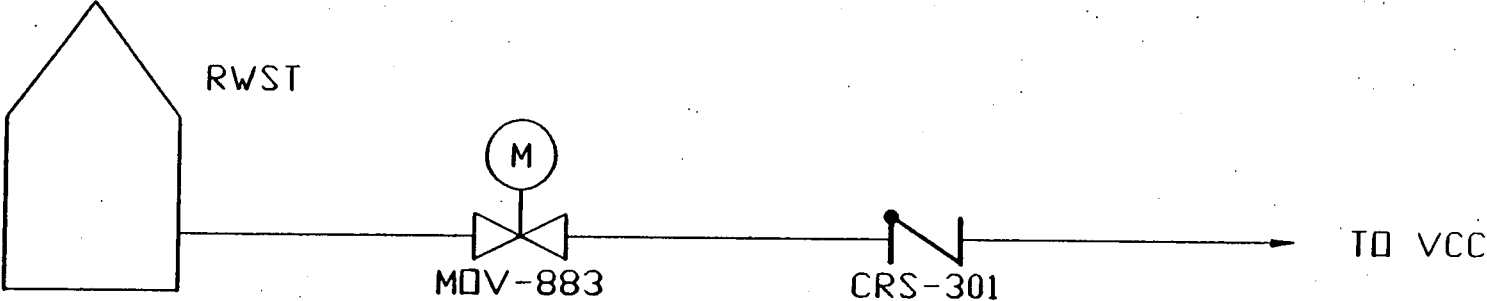
FIGURE 2 (Sheet 2 of 3)
 VOLUME CONTROL AND CHARGING SYSTEM



3-6

R108-89-14-02C

FIGURE 2 (Sheet 3 of 3)
VOLUME CONTROL AND CHARGING SYSTEM



3-7

R108-89-14-02C

Under certain operating conditions, charging pump suction is taken from the RWST through either MOV-1100B or MOV-1100D. The RWST provides a reservoir of borated water for accident mitigating functions of the VCC. Normal flow to the charging pumps from the RWST is delivered by the motor-operated valves. MOV-1100B and 1100D are interlocked with the VCT isolation valve in a manner that causes MOV-1100C to close when MOV-1100B and 1100D open and a low-low level VCT condition is detected.

The VCC system supplies filtered water for reactor coolant pump (RCP) sealing, lubrication and cooling through the RCP seal water system (Figure 2, sheet 2). Flow from the charging pumps passes through seal water manifold filters which rejoin at a common header. Two motor-operated valves provide independent paths to bypass the manifold filters for cold leg injection and recirculation. Each of the three seal water trains is supplied by parallel flow control valves from the common header. The primary flow control paths through FCV-1115A, FCV-1115B and FCV-1115C normally provide coolant to each RCP seal. If flow demand exceeds capacity of the primary flow control valves, then FCV-1115D, FCV-1115E and FCV-1115F supply additional flow. Flow from these FCVs is supplied to the RCP seals after passing through a secondary seal supply filter.

3.2.4 Success Criteria

Success of the volume control and charging (VCC) system is dependent upon operation of essential elements of the VCC concurrent with support systems necessary to provide borated water from the refueling water storage tank to the RCS for reactivity control and reactor coolant system inventory makeup. Such a system alignment crosses system boundaries of the RCP and containment spray and recirculation system (CRS) which are not discussed or modeled separately. The VCC, RCP and CRS configuration necessary for success in this scenario will be referred to simply as the Charging System.

The risk of tornado-induced failure of the system is limited to portions of the charging system and supporting systems exposed to tornado winds and tornado-induced missiles.

With the exception of the RWST and exposed piping, the charging system is protected by tornado resistant structures (i.e., the basement of the auxiliary building). Support systems for the charging system which may not survive tornado impacts include the instrument air system and the component cooling water (CCW) system. The AC and DC power systems, which also support the charging system consist of exposed electrical raceways and equipment which are analyzed.

Success for the charging system in the tornado scenario requires transfer of adequate RCS makeup from the refueling water storage tank. This success criterion requires that:

- One of the two charging pumps starts and operates for 24 hours;
- The operator successfully realigns the charging pump suction from the volume control tank to the refueling water storage tank;
- A flow path from the operating charging pump discharge to the reactor coolant system through any pump seal or the normal charging loop is available.

The adequacy of RCS makeup assumes no additional path of coolant loss is developed during the tornado recovery. Loss of seal water flow to the reactor coolant pumps for a 24 hour period is not expected, given the pumps would not be operated after plant trip and plant cool down will be accomplished by natural circulation. The RCP seals are expected to successfully withstand the loss of CCW for the short period of time required to establish charging flow. No thermal effects on the seals are anticipated.

3.2.5 Modeling Assumptions

The modeling assumptions used to develop the system fault tree are listed below:

- Charging pump lube oil cooling is accomplished by E-908/909 fan cooling. Operator action to start fan E-908 is addressed in SO1-2.7-2, however, action to operate E-909 is not covered by the abnormal operating instructions.

- The boric acid system is unavailable due to tornado related damage to the boric acid tank. Since the VCT does not have adequate capacity to makeup RCS shrinkage due to cooling, no credit is taken for its availability. The only source of borated water credited is the RWST.
- Fail open valves are assumed to fail in the open position unless they are impacted by a missile or they experience a control circuit failure. Similarly, fail close valves are assumed to fail closed.
- The RWST is vulnerable only to tornado missile damage. Tornado missile damage of the RWST is evaluated as described in Section 2.4.3. The RWST can withstand tornado wind loadings for all windspeeds considered in this assessment.^[5]
- Since the reactor coolant pump seals have a nominal expected resistance to significant leakage for 2.5 hours without seal water cooling, failure of flow to any RCP seal results in significant leakage, but not system failure, as the resultant expected seal leakage (70 gpm)^[15] is not in excess of charging system capacity nor does it significantly challenge containment over the 24 hour mission time.
- Passive device random failures (e.g., heat exchanger leakage, random pipe failures) are not modeled.
- The nitrogen supplies for valves with nitrogen backup are sufficient for the 24 hour mission time.

3.3 Auxiliary Feedwater System

3.3.1 System Function

The auxiliary feedwater (AFW) system is a safety related system which has the following two primary functions:

- Provide feedwater to the steam generators during abnormal or emergency conditions following a loss of main feedwater.
- Provide feedwater to the steam generators during normal startup, normal shutdown, and hot standby conditions.

In addition, the AFW system can be used to provide a means of filling and venting the main feedwater system or to provide a means of filling the steam generators while in Modes 5 or 6.

3.3.2 System Configuration

The Auxiliary Feedwater (AFW) System consists of three pumps, an AFW storage tank, flow control valves, check valves, and various instrumentation. The system is divided into two independent and redundant trains. Each train is capable of providing the required flow to the steam generators to achieve and maintain the RCS in a hot standby condition. A simplified diagram of the system is shown in Figure 3.

Two of the AFW pumps are electric motor driven while the third is steam turbine driven. One of the motor driven pumps is designated as the dedicated safe shutdown (DSD) AFW pump, and functions as the train B AFW pump. The remaining two pumps are the redundant train A pumps. Each pump is provided with individual suction lines to the auxiliary feedwater storage tank. The discharge lines are interconnected via check valves such that any single pump can supply auxiliary feedwater to any or all of the steam generators.

Independent and redundant trains of instrumentation are provided for monitoring steam generator levels and for generating actuation signals to the AFW components. AFW flow to each of the steam generators is controlled by independent and redundant flow control valves. This configuration of components is such that a single train of AFW components is capable of providing controlled AFW flow to the three steam generators.

A minimum flow recirculation line is provided from the discharge of each AFW pump back to the auxiliary feedwater storage tank. These recirculation lines provide a minimum flow during periods of little or no flow for pump cooling.

FIGURE 3 (Sheet 1 of 2)

AUXILIARY FEEDWATER SYSTEM

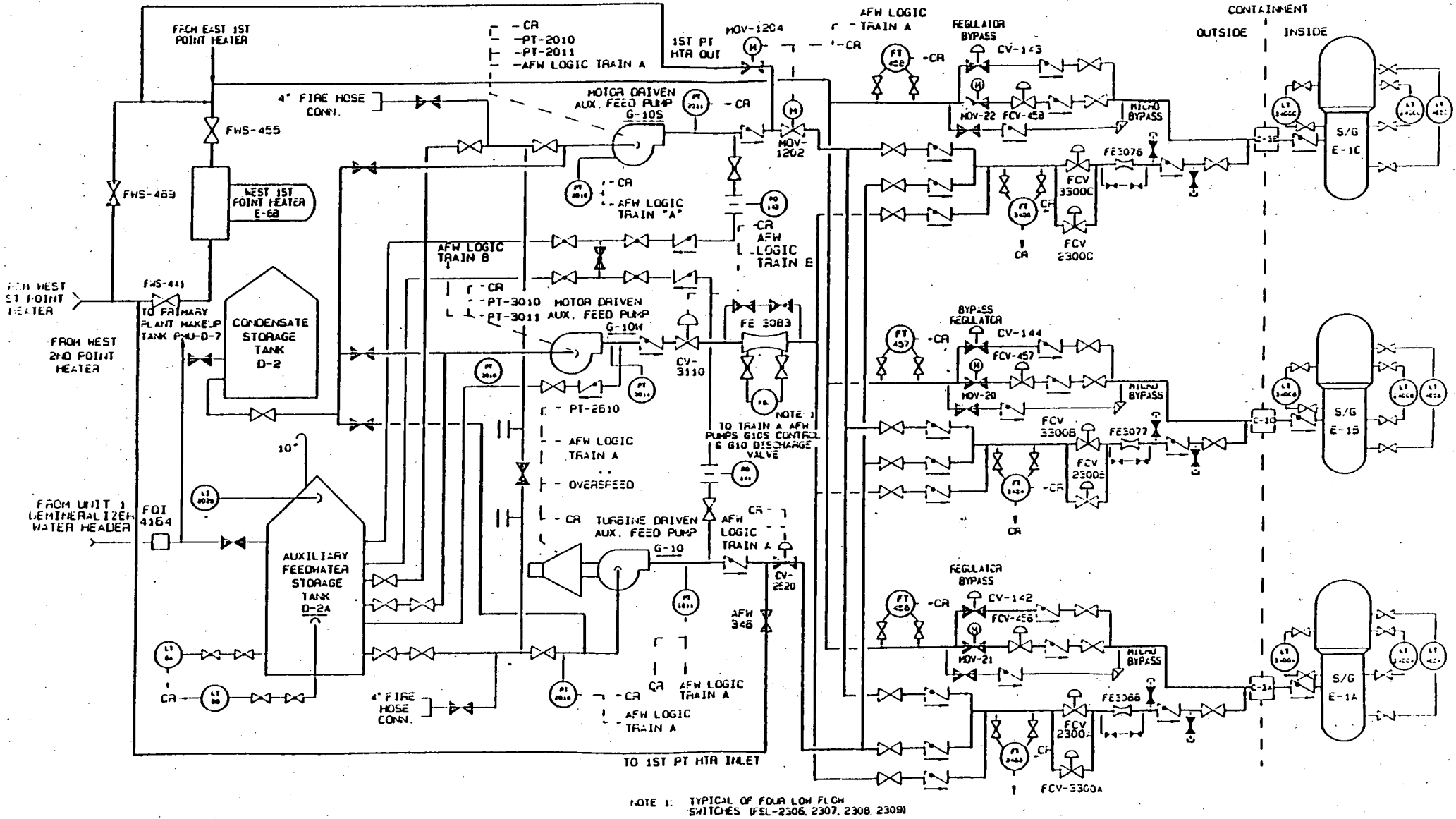
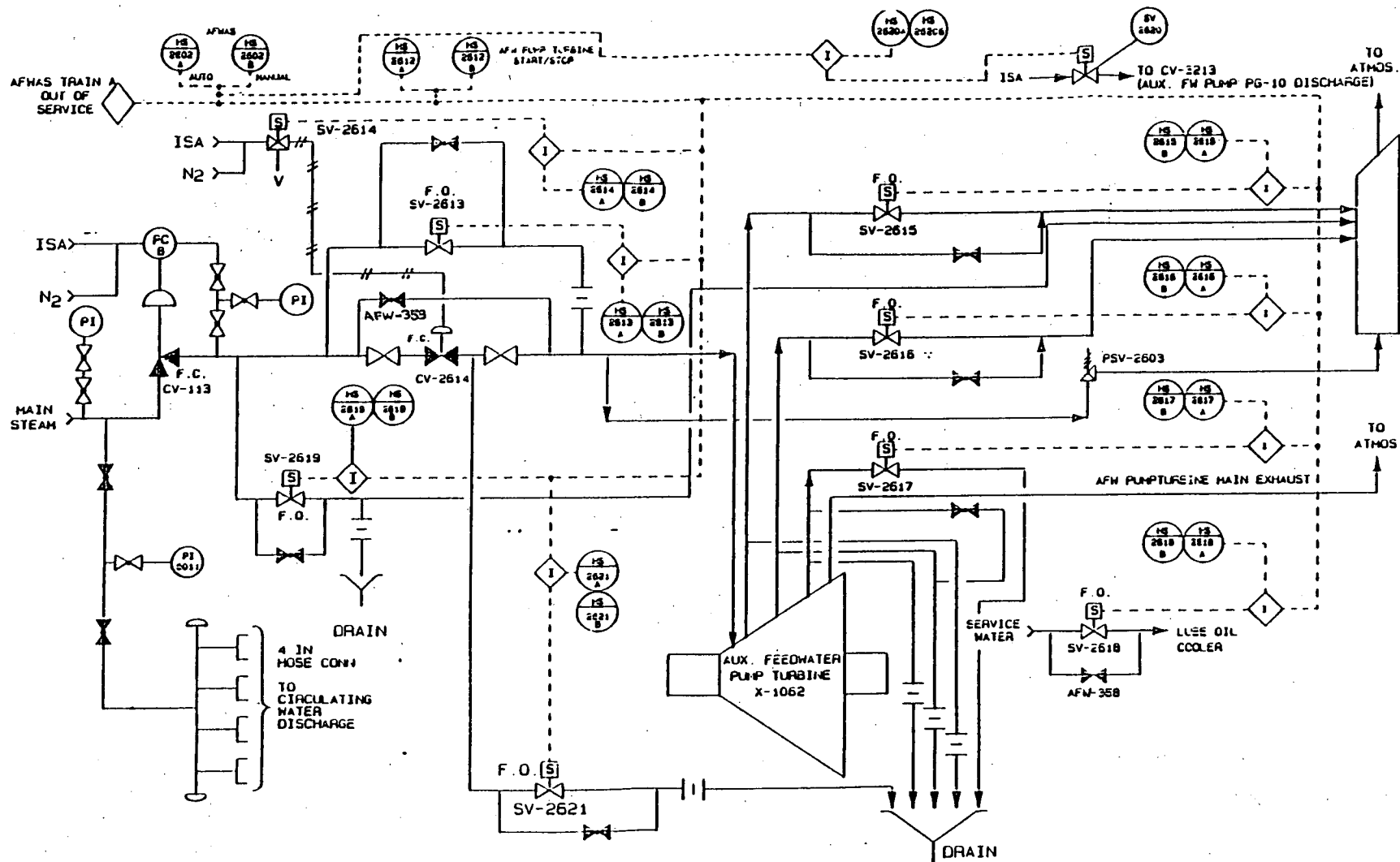


Figure 3 (Sheet 2 of 2)
 AUXILIARY FEEDWATER SYSTEM



3.3.3 System Operation

During normal operation the system is in standby with the suction from all three pumps aligned to the AFWST and all three discharge paths from each pump aligned to supply each steam generator. All the valves in these flowpaths are open except for the pump discharge isolation valves, feedwater regulating valves, and related check valves.

Each pump has its own auto-manual switch on the AFW control panel which must be in the "auto" position for the pump to respond to an AFW actuation signal (AFWAS), open its discharge isolation valve, and open all the feedwater regulating valves which are preset to the full open position until the operator takes manual control to regulate steam generator level as desired.

Each pump, its discharge isolation valves, and regulating valves can also be manually started or opened with individual manual push button switches on the AFW control panel.

3.3.4 Success Criteria

In response to a tornado or high wind initiating event, loss of offsite power is highly probable. Following a loss of offsite power or other plant trip initiated by a tornado, tornado missile, or high winds; at least one AFW train is required to function successfully for the 24 hour mission time with the following success criteria:

- One AFWAS train must successfully actuate either manually or automatically.
- One of the three actuated pumps must start and run for 24 hours.
- The AFW storage tank flow path to at least one of the operable AFW pumps must be available with sufficient water for the 24 hour mission time.
- The discharge from one of the operable AFW pumps must be delivered to at least one of the steam generators.

- The following valves must open and remain open or operable in the operable pump discharge flow path: pump discharge valve, pump isolation valve, pump check valves, feedwater regulating valve, steam generator isolation valves, and steam generator check valves.
- The support systems and power supplies for the operable pump and backup discharge flow path must be available and operate for 24 hours.

The support systems for the AFW system include AC power, DC power, AFWAS, main steam system, and nitrogen. The AFW system is not dependent on component cooling water, salt water cooling, safety injection, or any room ventilation or cooling. Compressed air from the instrument air system is not required since a nitrogen backup is provided.

3.3.5 Modeling Assumptions

The major modeling assumptions used to develop the system fault trees are listed below:

- Flow diversion of AFW to the main feedwater system is included as a single basic event which includes several valve failures.
- Flow diversion within the AFW system is not specifically modeled since it would require multiple check valve failures and failure of isolation valve CV-3110, which is normally closed.
- Recovery of the motor-driven pumps after failure to start/run and recovery of the turbine-driven pump after failure to run are not included in the model, however, recovery of the turbine-driven pump after failure to start due to overspeed trips is included in the basic event data.
- Electrical failure of the auxiliary feedwater regulating valve controllers or loss of compressed air is assumed to cause the valve to fail in the closed direction. This results in loss of all auxiliary feedwater and is a conservative assumption.
- Backup sources of water to the suction of the AFW pumps other than the AFW tank are not modeled (e.g., fire water or reservoir).

- Overfilling of the steam generators and flooding of the main steam lines is not assumed to result in failure of the steam system integrity, but is assumed to fail the turbine-driven pump.
- Overheating of the AFW pumps due to failure of the minimum flow recirculation lines is not included in the model since deadheading of the pumps cannot occur unless there is a discharge path failure which would result in failure to accomplish the systems function regardless of the pump's status.
- Service water cooling and room cooling is not included in the model since they are not required for system success.
- Credit is taken for manual operator action of bypass valve AFW-353 to provide sufficient steam supply to the turbine driven AFW pump.

3.3.6 Fault Tree Model

The system fault tree for the AFW system is based on the success criteria defined in Section 3.3.4. The analysis modeling assumptions are listed above and are provided in Appendix B. The failure modes involving electrical cables, cable trays, or conduits are discussed in Section 3.5 of this report.

The mechanical or non-electrical tornado related failure modes are modeled with basic event failures of piping areas which could include piping sections, valves, or major components, such as pumps.

3.4 Main Steam System

3.4.1 System Function

The main steam system (MSS) has the following post-trip shutdown functions:

- Provide control of the RCS cooldown via the use of the atmospheric dump valves.
- Provide steam flow to the turbine driven auxiliary feedwater pump.

Additionally, for the purpose of this evaluation, it must retain functional integrity to assure that an uncontrolled cooldown necessitating safety injection does not occur.

3.4.2 System Configuration

The main steam system is a single train system inside containment because there is a common header for all three steam generators in the process flow path. The main steam header exits the containment through two penetrations, resulting in a two train system outside containment. Each steam header has a relief header with five main steam relief valves (MSRVs) and two atmospheric dump valves (ADVs). Also, the west steam header, exiting containment through penetration 2-J-1, provides steam to AFW pump G-10. A simplified MSS diagram is shown in Figure 4.

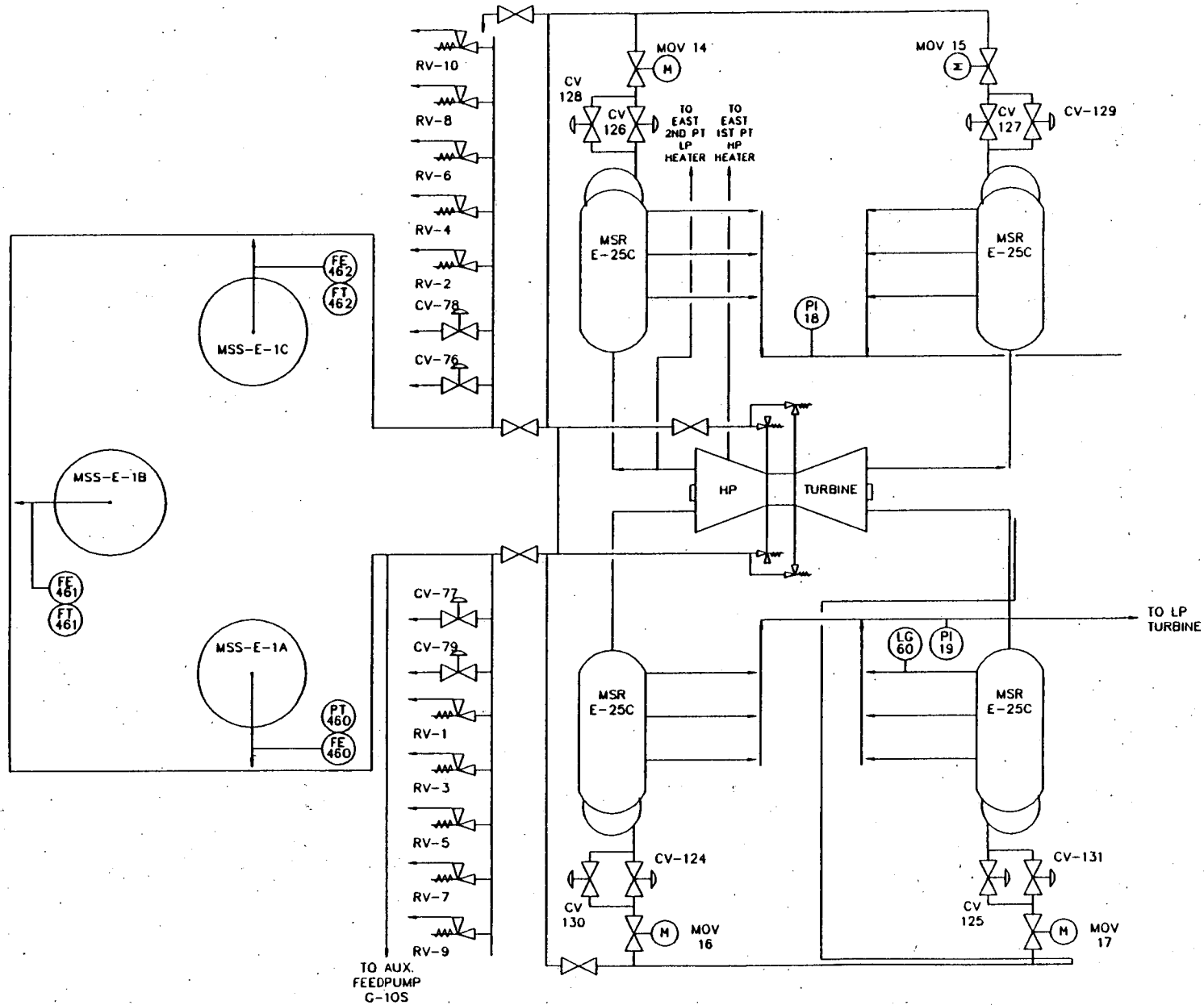
3.4.3 Shutdown Operation

When a plant trip occurs, the main steam stop valves and reheat MOVs close so that steam flow is diverted to the condenser via CV-3 and CV-4 or to the main steam relief system (ADVs and MSRVs). In this manner secondary system pressure can be controlled. For purposes of tornado related shutdown, CV-3 and CV-4 are assumed to fail in the closed position on loss of instrument air. Therefore, to retain secondary control for cooldown, the ADV function must be retained. This includes the function of the solenoid valves used for control of the ADVs.

The steam generator blowdown system is of interest in maintaining the pressure boundary integrity of the MSS. The blowdown system exits containment on the northwest corner and has a vertical exposure to tornado missile effects. The blowdown isolation valves CV-100A and CV-100B fail closed on loss of instrument air. Due to horizontal protection provided by adjacent shield walls, such a missile strike failure is not postulated. The majority of the MSS piping is located within the turbine building and is considered to be protected from tornado generated missiles by the turbine deck. The steam relief headers and valves are exposed but can withstand tornado loadings and missile impacts without loss of integrity or function.^[5]

FIGURE 4 (Sheet 1 of 2)

MAIN STEAM SYSTEM



3-18

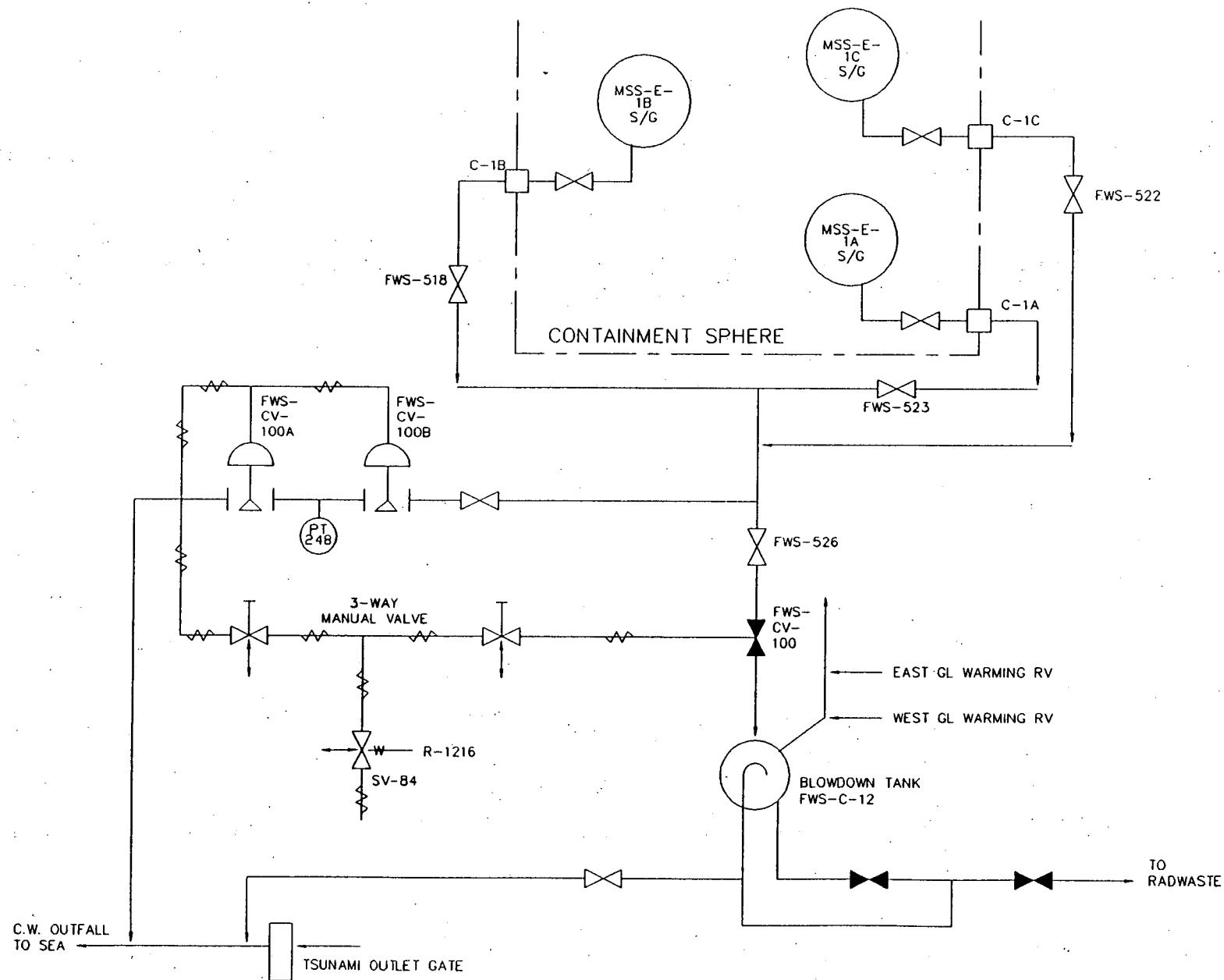
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However, the ADVs could lose function due to a tornado missile strike to the power supplies of their solenoid valves or the nitrogen bottles and are considered in the analysis.

3.4.4 Success Criteria

The MSS function will be successful if one ADV retains the ability to open and close for the 24 hour mission time, and the steam generator blowdown piping does not fail due to tornado missile damage.

3.4.5 Modeling Assumptions

The major modeling assumptions used to develop MSS fault trees are as follows:

- The main stop valves are assumed to operate.
- The main steam relief valves (not ADVs) are qualified to withstand the effects of a tornado^[5] and are, therefore, available for steam relief capability immediately following plant trip.
- Steam generator blowdown is assumed to be isolated post-trip on loss of air.
- MSS piping is protected from or resistant to tornado wind and missile effects.^[5]

3.5 AC and DC Power Systems

3.5.1 System Function

The AC power system is designed to provide reliable electrical power during all modes of station operation including shutdown conditions. The DC power system provides a reliable source of DC power for use with various plant instrumentation, DC-operated equipment, and control power for all circuit breaker operations. The DC power system also provides power to the 120 V AC vital power buses via inverters.

For the tornado hazards evaluation, the AC and DC power systems are required to provide electrical power to the components and instrumentation necessary to achieve safe shutdown.

3.5.2 System Configuration

The electrical distribution system at SONGS 1 consists of the 230 kV AC switchyard system, the 4160 V AC system, the 480 V AC system, the 120 V AC system, the onsite AC power system (composed of the emergency diesel generators and dedicated shutdown diesel generator) and a 125 V DC system. Figure 5 is a simplified one-line diagram of the AC power system. Figure 6 is a simplified one-line diagram of the DC and vital bus power system. The 125 V DC system is composed of two independent train aligned 125 V DC systems for plant critical functions.

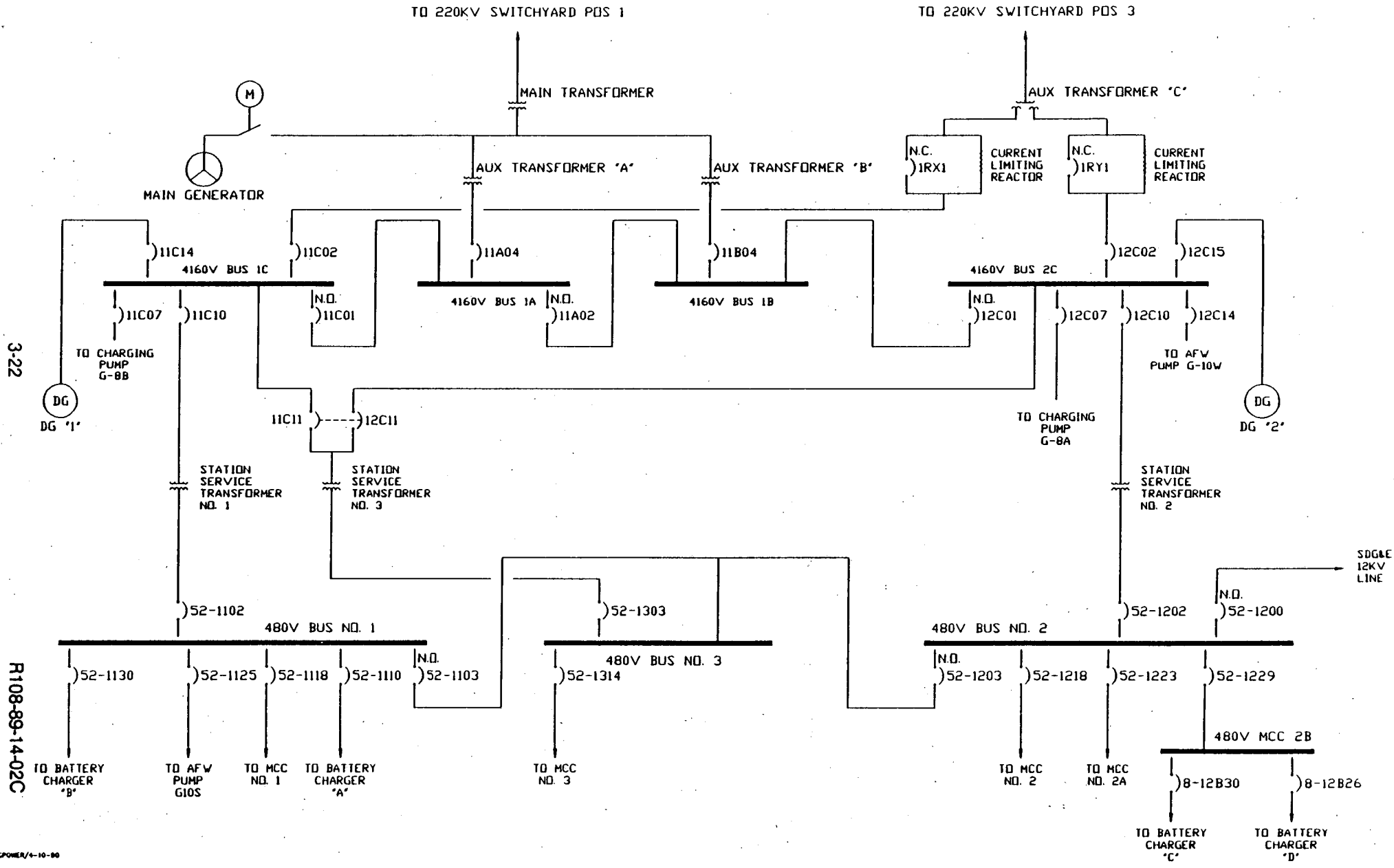
3.5.3 System Operation

SONGS 1 is located at the point of interconnection between Southern California Edison's 230 kV system and San Diego Gas and Electric's 230 kV system. Plant connections to the switchyard are provided by a connection to auxiliary transformer C and by a connection through the main generator step-up transformer to auxiliary transformers A and B. During normal operation, the power source for auxiliary transformers A and B is the main generator, but power can be delivered to the plant from the switchyard via this path if a second supply is required.

The 4160 V AC system consists of four buses 1A, 1B, 1C and 2C. Buses 1A and 1B are normally fed from the 18 kV output of the main generator. These buses are powered by auxiliary transformers A and B, and do not power components that are required for the safe shutdown of the plant. Buses 1C and 2C are normally fed from the 230 kV

Figure 5

Onsite AC Power System Simplified One-Line Diagram



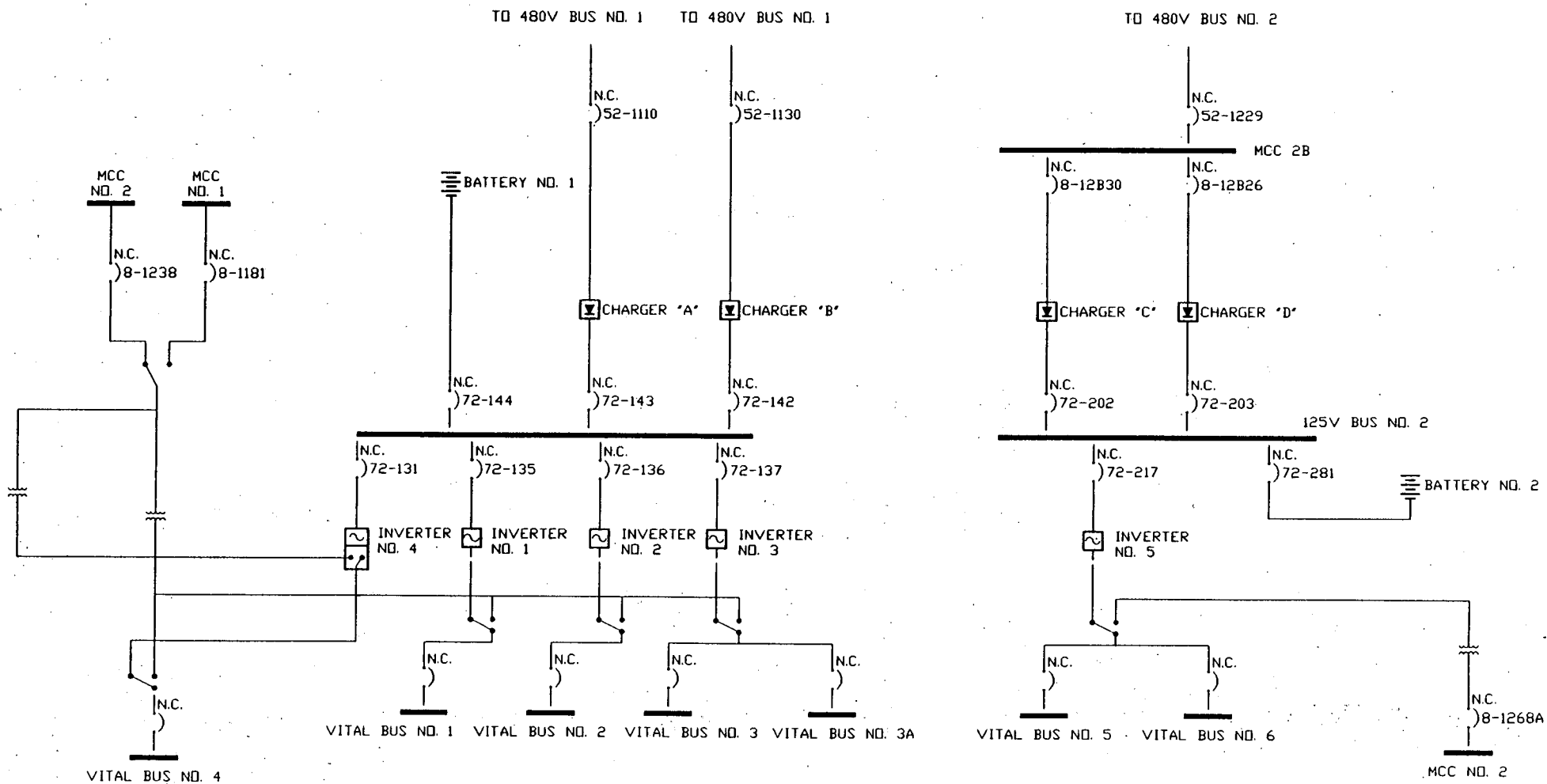
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Figure 6
Simplified One-Line Diagram
Onsite DC and AC Vital Power System

3-23

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switchyard via auxiliary transformer C. These buses provide the redundant power sources for both normal operation and safe shutdown system components. They also provide power for the 480 V system via station service transformers 1, 2 and 3.

The 480 V AC power system consists of buses and motor-control centers as illustrated in Figure 5. These 480 V buses supply power primarily to safety related equipment.

Two redundant diesel generators provide an immediate onsite backup 4160 V AC power source in the event that offsite power sources cannot be made available. Diesel generators 1 and 2 are connected through circuit breakers to 4160 V buses 1C and 2C, respectively. Power is supplied to the 480 V buses from 4160 V buses 1C and 2C through station service transformers 1 and 2. This alignment provides train separation for safe shutdown equipment.

Either diesel generator is capable of providing sufficient power for safety related systems required for normal and emergency/accident conditions. The diesel generators are automatically started on a loss of offsite power, a safety injection signal (SIS), or a SIS incident with a LOOP. The diesel generators are automatically loaded on a combined SISLOOP event. Only buses 1 and 2 and selected components are automatically re-energized when power is restored. The diesel generator auxiliaries are provided by systems that are powered by 4160 V AC buses 1C and 2C. Therefore, when 4160 V AC power is restored after diesel start, diesel generator auxiliaries are immediately available.

SONGS 1 also has a dedicated shutdown system (DSD) which has the capability to energize certain plant equipment via manual transfer switches. The DSD consists of an independent diesel generator and distribution system. The system is designed with sufficient capacity to energize charging pump G-8A, AFW pump G-10W, a portion of the group D pressurizer heaters, and various control valves and instruments. The DSD diesel generator is designed to be capable of starting without support of the normal onsite emergency power sources or offsite power.

The 125 V DC system provides power to each of two independent load trains. Each system contains a battery and two chargers. Only one charger is required to provide power from an AC train to the associated 125 V DC bus. Power for the chargers is supplied from 480 V switchgear 1 for DC system No. 1 and MCC 2B for DC system No. 2. Since the batteries have a finite storage capacity, the DC power system has a long-term dependency upon the AC power system.

3.5.4 Success Criteria

Following a tornado initiating event, the AC and DC power systems are necessary to provide power to various components required to achieve safe shutdown. Success will be achieved if the following events occur:

- One or both emergency diesel generators start and run, if required, for a 24 hour mission time, and
- 4 kV components receive power from any available bus, and
- 480 V components receive power from their required bus, and
- DC buses and battery chargers are available for the required 24 hour mission time, and
- Control power to the switchgear breakers is available for breaker operation.

3.5.5 Modeling Assumptions

The modeling assumptions used to develop the AC and DC fault trees are as follows:

- The offsite power system is susceptible to tornado related failures. These failures range from wind induced failure of the transmission lines to missile impacts on the switchyard and auxiliary transformers. The tornado related failure rate of the offsite power system includes the switchyard, the connections to the auxiliary transformers, the

transformers themselves, and the secondary side connections to the 4kV switchgear buses.

- The two diesel generators and their supporting auxiliaries are located in the diesel generator building which is designed to withstand tornado events. In addition, the wiring from and to the emergency diesel generator building is routed underground and is not subject to tornado related failures. As such, the onsite emergency power system is not subject to tornado related failures.
- The dedicated shutdown diesel generator and switchgear are susceptible to tornado related missile hazards. The failure probability is determined based on the total exposed surface area of the two structures.
- The south and west wall of the 480 V switchgear room, the south and west turbine building walls and the ventilation equipment building are constructed of masonry block and are considered susceptible to wind related tornado failure. The wind induced failure of these walls is assumed to cause the failure of any raceway or component physically attached to or penetrating these walls.
- 480 V MCC bus no. 2 is located in the 480 V switchgear room and is susceptible to tornado related missile hazards with a failure rate based on the projected area of the MCC onto the south wall of the room.
- Station service transformers 1, 2 and 3 are susceptible to tornado related missile hazards. Their failure probability is based on the total exposed surface area of the transformers, and their associated cables.
- The 4 kV switchgear room is considered protected from tornado related failures due to its design and location.
- Battery system no. 2 is located within the diesel generator building and is considered to be protected from tornado hazards.
- Battery system no. 1 components are located in the southeast corner of the control administration building and have a failure rate based on the total surface area of the east wall of the battery room.
- Exposed raceways containing power and control cabling necessary for the operation of safe shutdown components are considered susceptible to tornado missile effects. The failure rates for these

raceways are determined based on the exposed raceway surface area. The surface area dimensions include an additional 5 feet in each direction for conservatism.

- Overcurrent protective devices are functional.
- Tornado induced damage to cables have the potential to cause open circuits or short circuit conditions; however, the probability of concurrent random breaker failure is very low and can be neglected.
- Hot shorts between energized and de-energized circuits will not occur unless a short circuit condition also exists.

Spurious Actuation and Hot Shorts - Tornado wind or missile induced damage to electrical raceways and cables typically result in the loss of component function due to open or short circuit conditions. In this assessment, credit is taken for circuit protective devices to isolate individual failed circuits. Therefore, the availability of control power for breaker tripping is included in the system models.

Tornado induced damage to electrical raceways and cables causing spurious actuation of components is evaluated based on the vulnerability of the associated control cable. Failures of the control circuit are evaluated to determine whether spurious open or close signals could occur. Hot shorts, however, are not considered to be a credible mechanism for causing spurious component actuation. The likelihood of a tornado missile impacting a raceway and causing a hot short between an energized circuit and a de-energized circuit without causing a short circuit is small enough to be neglected.

3.6 Instrument Air and Nitrogen Systems

The instrument service air (ISA) system is a plant wide network of air lines supplied by three air compressors and air receivers at the south end of the turbine building. The ISA serves a support function to various valves and isolation devices around the plant. Therefore, its function and potential exposure to tornado wind and missile effects is plant wide and for purposes of this model its failure probability will be assumed at 1.0.

The nitrogen system is a discrete system of safety-related pressurized nitrogen bottles to backup the ISA for each component supported. A bank of 2 or more nitrogen bottles is provided for valves located throughout the plant. This configuration lends itself to a lower system wide vulnerability, as the failure of any one bank only impacts the component served by that bank. A nominal exposure of 100 ft² was used for exposure of each nitrogen bank to tornado missile effects. The nitrogen system is configured to passively operate in the event that instrument air normally provided to the component served by the nitrogen bank drops below the regulated pressure of that nitrogen bank. These configurations have very few components and success is achieved for the nitrogen system if it survives tornado missile impacts.

4.0 PLANT STRUCTURES DESCRIPTION

SONGS 1 has structures that have been previously analyzed and found to be capable of withstanding the effects of tornado winds and missile impacts.^[2,3] These structures are:

- (1) the Sphere Enclosure Building (including the Sphere),
- (2) the Diesel Generator Building, and
- (3) the Reactor Auxiliary Building (portion below grade).

Tornado related damage to components located within these structures is not considered to be credible. SONGS 1 also has structures that contain or support components required to function during a tornado event that are not designed to withstand the effects of tornado winds and missile impacts. All structures important to safety have been determined to have adequate venting.

In general, masonry structures offer little or no protection against tornado missiles. As such, those components located within masonry structures are treated as exposed when assessing tornado missile impact. The following provides a brief description of these structures and some detail regarding their importance to plant safety. A simplified plan view of SONGS 1 structures is provided in Figure 7.

4.1 Control Building

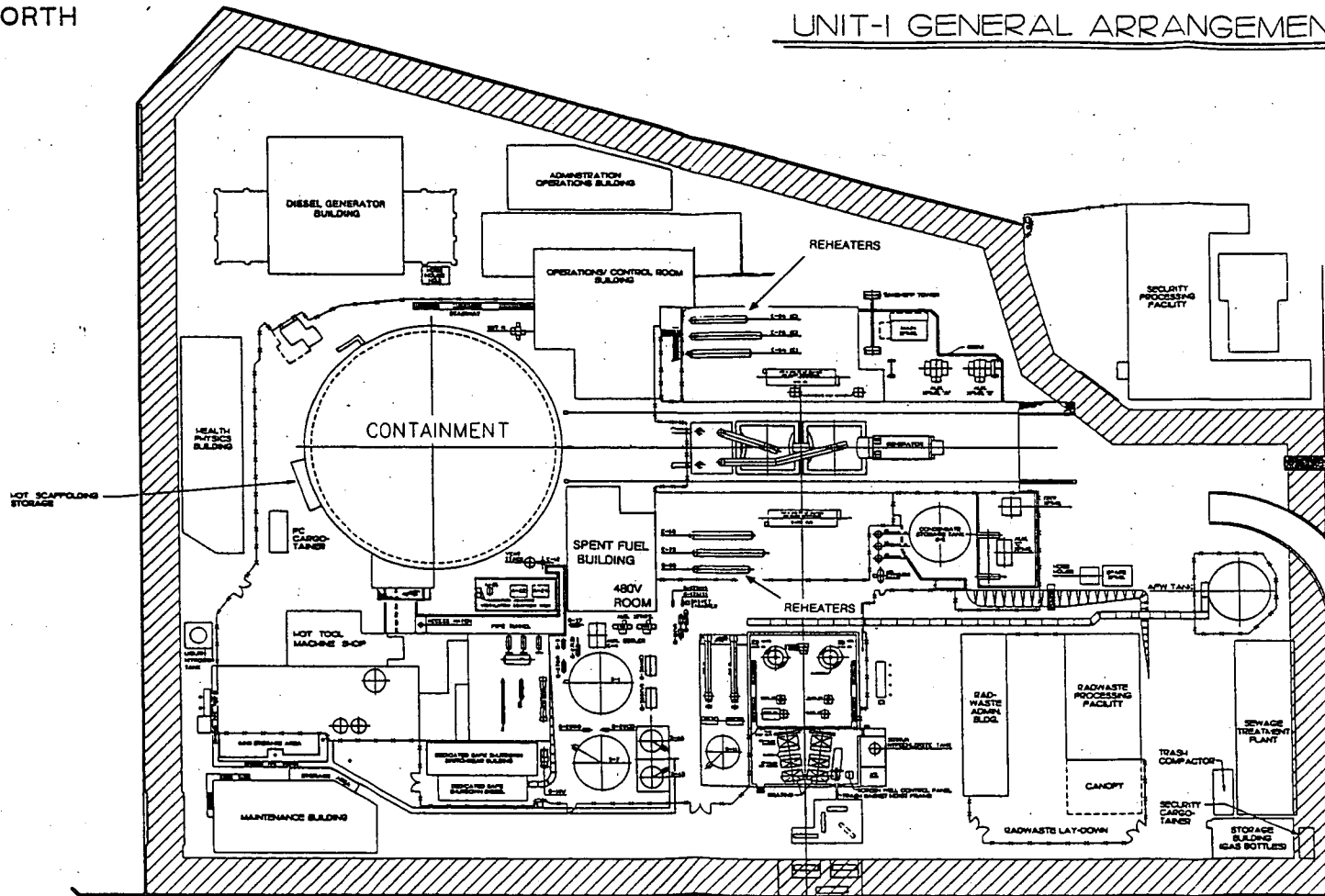
The control building includes the control room, the 4 kV room and battery room no. 1. These rooms are oriented such that the control room is directly over the 4 kV room, which is partially below grade, and the battery room is at grade adjacent to the control room and 4 kV room. The control building is constructed of reinforced concrete and reinforced masonry. The walls provide varying degrees of protection from tornado wind and missile impacts. The primary areas of interest include the battery room reinforced



NORTH

UNIT-1 GENERAL ARRANGEMENT

Figure 7



masonry wall and the control room because portions of these structures are vulnerable to missile damage at the higher intensity events.

The control room has been analyzed and is vulnerable only to potentially damaging missile impact at the higher windspeeds of F' 4 and F' 5. Given the importance of this structure for the successful shutdown of the plant following a tornado, a special evaluation was performed in addition to the scope of the plant reliability model. The detailed risk evaluation of the control room portion of the control building is provided in Section 5.4.

The 4kV room is located directly below the control room partially below grade. This room has been determined in previous analyses^[2,3] to provide adequate protection from tornado wind and missile effects. Therefore, no further consideration is necessary as part of this risk assessment.

Battery room no. 1 is located at grade on the southeast portion of the control building. It is susceptible to both tornado wind and missile related failures and houses DC power equipment necessary to support shutdown systems. The tornado related vulnerability of this room is treated as described in Section 3.5.5.

4.2 Turbine Building

The turbine building is constructed of structural steel with a concrete top deck and reinforced masonry walls. This structure houses the main steam system components, the train A auxiliary feedwater system pumps, the instrument service air system compressors and air receivers, the safety injection system and power and control cable routings along the exterior walls.

The main steam system components located in and protected by the turbine building are the steam bypass valves (CV-3 and 4), reheater isolation valves (MOV-14, 15, 16 and 17), and the main steam stop valves (PV1650 and 1651). These components are located

such that the top deck of the building precludes tornado missile damage. The steam relief capability provided by the ADVs and MSRVs, is located in an exposed location at the north end of the turbine building adjacent to the containment structure.

The train A auxiliary feedwater (AFW) pumps are located at grade on the west side of the turbine building. They are located in the shadow of an equipment access door so that they are not protected horizontally from tornado missile impact. The AFW piping from the AFWST to the pumps and from the pumps to the flow control FCVs is located primarily in a tornado protected trench. The third AFW pump, G-10W, is located adjacent to the DSD structure, to the southwest of the reactor auxiliary building.

The active components of the instrument service air system are located in and adjacent to the turbine building. As previously stated in Section 3.6, this system is vulnerable to tornado related failure and is assumed to be damaged during a tornado.

The turbine building also supports a large number of conduits attached to the exterior west wall. Thus, certain shutdown systems depend on this structure which has a relatively low resistance to tornado wind related failure as noted in Table 3 in Section 2.2.

4.3 Ventilation Equipment Building

This structure is constructed of reinforced masonry. The ventilation equipment building does not house any components necessary for shutdown but conduits containing cabling for essential systems are attached to the exterior of the building. Therefore, failure of this structure could impact shutdown capability.

4.4 Plant Vent Stack

A previous SCE analysis^[2] has shown the plant vent stack is not susceptible to tornado wind related failure. SCE also performed additional analyses to assess vortex shedding

concern and concluded this phenomenon is not a concern for windspeeds less than 260 mph (F' 4). Therefore, no further analysis is necessary for the vent stack.

5.0 RESULTS AND CONCLUSIONS

The preceding sections have dealt with the development of a plant reliability model to determine if SONGS 1 should be upgraded to withstand the effects of tornado wind and missile loadings. The following subsections provide a summary and discussion of the results of the SONGS 1 tornado risk evaluation. Based on this probabilistic risk assessment, an upgrade of SONGS 1 beyond its current configuration is not cost beneficial. A discussion of the most significant design related improvement is presented in Section 5.5.

5.1 Risk Assessment Results

Application of the methodology in Section 2.0 yielded a calculated tornado hazard induced core damage frequency (CDF) for SONGS 1. As shown in Table 8 and on the event tree plots shown in Appendix A, the total tornado related contribution to CDF, as conservatively modeled, is $1.65E-06 \text{ year}^{-1}$. This represents a very small portion of the total CDF for Unit 1 of approximately $1E-4 \text{ year}$ and does not present a significant or undue hazard to the public health and safety.

Table 8

Calculated Tornado Core Damage Frequencies (year^{-1})

	Tornado F-Scale				
	F'1	F'2	F'3	F'4	F'5
LOOP Contribution	2.49E-07	1.44E-07	2.43E-07	1.81E-07	6.60E-08
PT Contribution	1.87E-07	2.90E-07	1.87E-07	9.00E-08	1.40E-08
Total LOOP Contribution	= 8.83E-07				
Total Plant Trip Contribution	= 7.68E-07				
Total Calculated CDF	= 1.65E-06				

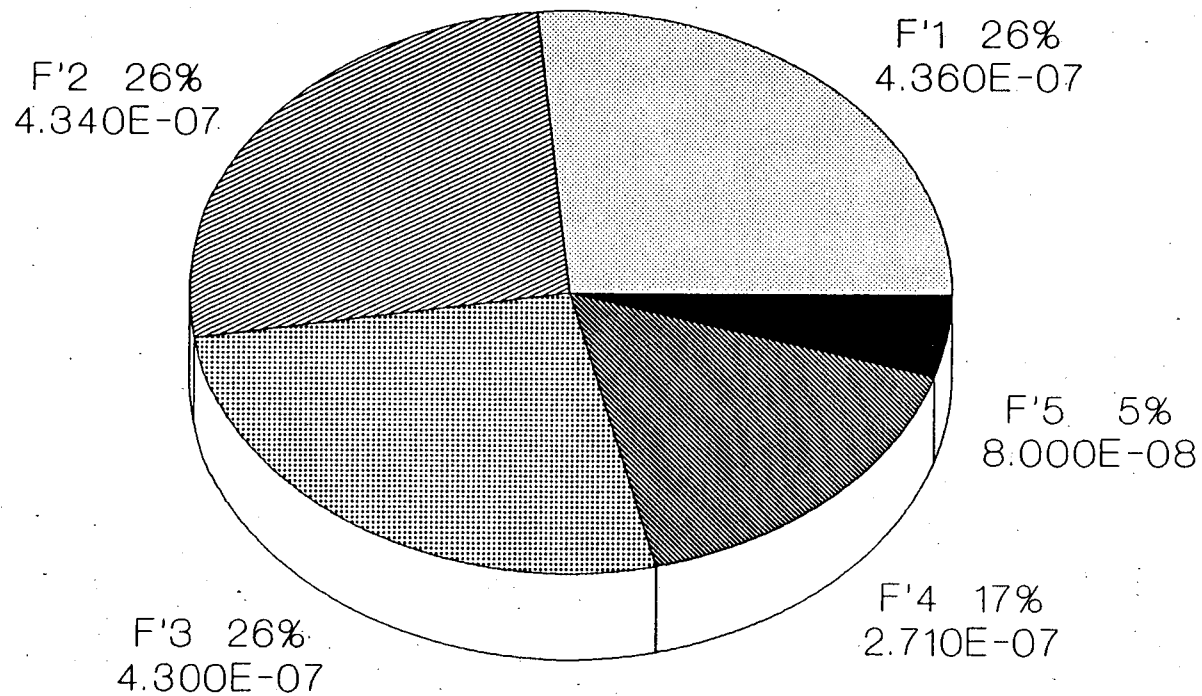
The analyses contain numerous conservatisms in the assessment of tornado impacts on the plant. In all cases where clear technical evidence was unavailable to provide calculational bases, conservative assumptions were made for the likelihood and consequence of tornado impacts. These modeling conservatisms have resulted in a conservatively high core damage frequency.

The analysis did not include explicit evaluation of uncertainty. There are numerous sources of uncertainty inherent in risk evaluations. Component failure rates vary by a factor of three to ten. Tornado frequency of occurrence is expected to vary by a factor of five to ten. The treatment of missile failure likelihood and wind induced failures are conservative. In addition, the potential for recovery of failed equipment is not included. It is believed that the results are subject to uncertainty which is far less in the direction of underestimating the risk (the real value is higher than calculated) than in the direction of overestimating the risk due to the large conservatism in the analysis. The uncertainty may be on the order of a factor of 10 in the direction of increased risk and a factor of 100 in the direction of lower risk. The results are thereby expected to have a conservative bias.

5.1.1 Analysis of Event Results

A review of the core damage frequencies, given in Table 8 and as illustrated in Figure 8, indicates that the greatest contribution to the overall risk comes from the F'1 and F'2 events. This is primarily due to the fact that as the intensity increases, the frequency of tornado occurrence decreases at an exponential rate. The effect of this is apparent at the F'3 intensity and shows up at the F'4 and F'5 levels where the system failure probabilities are assumed to be 1.0.

SONGS 1 TORNADO HAZARD CMF TORNADO SEVERITY CONTRIBUTION



5.1.2 Analysis of System Response Results

The system fault tree results provided in the cutset and importance summaries in Appendices C and D can be evaluated to determine the dominant event contributors to each system failure. As expected, for the lower intensity tornado events the onsite AC power system failures generally dominate for the LOOP event initiator. The operator actions tend to dominate the importance for the PT event initiator for the F' 1 and F' 2 tornado events. In all cases, as the tornado intensity increases from F' 3 to F' 5, the tornado related basic events become more dominant. A brief synopsis of the analysis results for each system is provided below.

Charging (VCC) System

For the lower intensity tornado events, F' 1, F' 2 and F' 3, the dominant tornado failure is the missile related failure of the suction piping from the RWST to the charging pumps. As the tornado intensity increases from F' 3 to F' 5, the wind related failure of the 480V room wall, causing loss of power to charging pump components, increases in dominance. This is in addition to the common cause failure of the onsite emergency diesel generators which has a significant importance for all loss of power event initiators.

MSS (Secondary Pressure Control) System

The operation of the atmospheric dump valves (ADVs) for secondary pressure control is dominated for all events by AC and DC power dependencies. For loss of offsite power, this includes the onsite emergency diesel generator(s) failure to start and run. For trip cases this involves raceway failure. The tornado related failure that becomes dominant as the intensity increases is the failure of cabling through the penetration areas to the control solenoid valves for the ADVs.

Auxiliary Feedwater (AFW) System

The AFW system results are conservative due to a modeling assumption that significantly simplified the system model. AFW pump G-10S (the train A motor driven pump) was assumed to be unavailable. Limited sensitivity analyses to determine the effect of this assumption on the solution indicates a 20% conservatism or over-prediction of system failure for the base case. This effect would be expected to be less for the LOOP initiator as the tornado related failures begin to dominate at the higher tornado intensities.

The analysis of the system results for the AFW system indicates a great dependence on the raceways that fail when the 480V room masonry wall fails due to tornado wind loadings. As the tornado intensity increases from F' 2 to F' 5, the wind related failure of the ventilation equipment building, and the conduits attached on its walls increases in its contribution to the calculated system failure frequency. As with the other systems, the AFW system has a dependency on the common cause failure of the onsite emergency and DSD diesel generators for the LOOP event initiator.

5.1.3 Analysis of Base Case Results

In order to understand the maximum potential effect of upgrading plant structures, systems and components for tornado protection, a "base case" configuration is evaluated. As previously introduced in Section 2.5, this "base case" assumes that all tornado related vulnerabilities identified and developed in this assessment, except for LOOP, do not exist. This has the same effect as protecting all of the vulnerable components with tornado resistant structures. This base case is created by setting all of the tornado related basic event probabilities to zero. The calculated core damage frequency (CDF) is shown in Table 9 below and on the event trees in Appendix A.

Table 9

Calculated Base Case Core Damage Frequencies (year⁻¹)

	Tornado F-Scale				
	F'1	F'2	F'3	F'4	F'5
LOOP Contribution	2.43E-07	7.67E-08	2.94E-08	9.28E-09	2.65E-09
PT Contribution	1.74E-07	4.27E-08	4.21E-09	7.19E-10	9.14E-11
Total Base Case LOOP Contribution		= 3.61E-07			
Total Base Case Plant Trip Contribution		= 2.22E-07			
Total Calculated Base Case CDF		= 5.83E-07			

Comparison of the base case results to the tornado CDF results in Table 8 indicates that the maximum expected CDF reduction expected from the proposed system upgrades would be approximately 1E-06 year⁻¹. This is a small incremental reduction.

5.2 Cost Benefit Analysis

The reduction in SONGS 1 CDF presented in 5.1.3 above can be quantified in terms of cost-benefit to the public health and safety. Reference 19 provides guidance for estimating public health and safety cost-benefit in terms of person-rem benefit per event. Using the high estimate of 1.0E08 person-rem per event and the estimated CDF reduction of 1.0E-06 per year, a benefit of 100 person-rem per year is estimated. Reference 19 also cites an NRC safety goal of \$1000 per person-rem avoided. This equates to a \$100,000 annual benefit to the public health and safety. Consideration of the 12 year operating life of SONGS 1 subsequent to the planned 1992 implementation of tornado modifications, a total benefit of approximately \$1M is estimated. This is compared to the estimated upgrade costs of \$10M to \$52M for the 10⁻⁵ and 10⁻⁷ per year recurrence tornado events.

5.3 Operator Actions

One manual operator action not currently addressed in the operating instructions was credited in this assessment to mitigate the consequences of a tornado at SONGS 1. The following action is credited and will be incorporated into SONGS 1 procedures as appropriate.

- o Recovery of lube oil cooling for charging pump G-8B, by operating lube oil cooler fan E-909

5.4 Control Building Evaluation

The SONGS 1 control building houses the control room on the upper level. Previous analyses^[2] have shown the structure to be resistant to tornado wind loadings. With the exception of the east wall and portions of the roof, the building is also considered resistant to tornado missile effects. The east wall and roof are constructed of 9 inch and 7-1/2 inch reinforced concrete, respectively. These two portions of the structure are susceptible to damage from heavier missiles (i.e. utility poles, trees and vehicles). For each of these areas an area-specific missile strike probability can be generated.

East Wall - The wall area is approximately 1020 ft². Using section 2.0 methodology and a subset of the Table 5 missile population consisting of the 600 vehicles, 300 utility poles and 500 trees for a total missile subset population of 1,400, the following damaging missile strike probabilities are calculated:

Table 10

Control Building East Wall Damaging
Missile Strike Probabilities (per tornado)

F-Scale	F'1	F'2	F'3	F'4	F'5
Missile Strike Probability	1.02E-06	5.10E-05	1.29E-04	1.63E-04	1.98E-04

The combination of these results for each tornado intensity with the recurrence frequency for each event results in a total damaging missile strike frequency of 7.62E-10 per year. It is, therefore, concluded that the frequency of damage to the east wall of the control room is acceptably low and does not significantly impact the core damage frequency.

Control Room Roof - The control room roof area susceptible to damage is approximately 2010 ft². Using the section 2.0 methodology and the same subset of the missile population used for the east wall yields the following damaging missile strike probabilities:

Table 11

Control Room Roof Damaging
Missile Strike Probabilities (per tornado)

F-Scale	F'1	F'2	F'3	F'4	F'5
Missile Strike Probability	2.01E-06	1.01E-04	2.54E-04	3.2E-04	3.9E-04

The combination of these results with the occurrence frequency for each event results in a total damaging missile strike frequency of 1.50E-09 per year. It is, therefore, concluded that the probability of damage to the control room roof is acceptably low and does not significantly impact the core damage frequency.

Based on the results presented above for the control room east wall and control room roof there exists a $2.27E-09$ per year frequency of a damaging tornado missile strike for the SONGS 1 control room structure. Given this low probability, it is judged that modifications to this structure are not necessary. This conclusion is based on conservative data that include F' 1 to F' 3 effects. However, only the higher tornado windspeeds (F' 4 and F' 5) contribute to failures by potentially damaging missiles being picked up with sufficient energy to damage the control room roof or east wall.

5.5 Tornado Upgrade Risk Evaluation

A review of analyses results was performed to determine the relative importance of tornado related system failures on the calculated CDF. A review of the cutset and importance summaries in Appendices C and D reveals that in the case of the charging and AFW systems, the tornado wind related failure of the 480V room wall or the ventilation equipment building affects safe shutdown system reliability. These failures impact a number of power and control cabling routed in cable trays attached to the walls of these structures.

No individual tornado related structural failures were analyzed in detail to quantitatively determine the impact on system reliability. A review of the cutset and importance summaries indicates the following relative ranking of tornado related basic events:

- Rupture of the suction piping to the charging pumps from the RWST caused by tornado missiles.
- Failure of the conduits on the control building roof that support AFW system operation due to tornado missiles.

The above listing does not reflect a specific need to perform upgrades to mitigate these failures, but can be used to rank upgrades according to their potential safety benefit. Given the importance of the results, it is estimated that the 480V room wall and ventilation

equipment building failures, and their consequent conduit and raceway failures represent over half of the unmitigated tornado risk at SONGS 1.

5.6 Conclusions

A tornado related plant risk assessment has concluded the following:

- SONGS 1 site has a low tornado event recurrence frequency.

The discussion of the SONGS 1 tornado hazard in Section 2.1 concluded that regardless of the technical source used, SONGS 1 is situated in a geographic region and specific area which does not generally experience severe tornado events (i.e., F' 4 and F' 5) and overall does not have a high tornado recurrence frequency. As this is the postulated initiating event, it has a direct effect on the results of the risk assessment.

- The tornado hazard for SONGS 1 does not have a significant contribution to core damage frequency.

The calculated core damage frequency (CDF) resulting from a tornado occurrence at the SONGS 1 plant site is 1.65E-06 per year. Therefore, it is extremely unlikely that core damage will occur due to a tornado initiating event during the plant life.

- Tornado generated missiles do not significantly contribute to the calculated CDF. The tornado related wind failure of selected masonry structures is the significant contributor to this small frequency.

A review of the analyzed results concludes that tornado missile impact related failures do not significantly contribute to the calculated CDF. The major contributor to tornado failures is the wind induced failure of specific masonry walls or buildings. This result was not expected given the large number of exposed components at SONGS 1, but the analysis concluded the AC and DC power systems have specific vulnerability to wind related wall failures.

- The \$10M to \$52M cost to upgrade SONGS 1 to the 10^{-5} to 10^{-7} per year recurrence frequency tornado events is not commensurate with the small value of risk reduction achieved by these modifications.

A limited value impact assessment, using a high estimate value of $1.0E08$ person-rem/event from Reference 19, the NRC's suggested safety goal of \$1000 per person-rem^[19], and the $1.06E-06$ CDF change presented in Section 5.1, yields a calculated annual cost benefit of \$100,000 for implementation of SONGS 1 upgrades to withstand the effects of tornado events at the plant site. A calculation of the benefit of performing these modifications in the SONGS 1 Cycle 12 refueling outage in 1992 and accounting for the benefit of subsequent years, concludes the value to SONGS 1 in monetary worth is approximately \$1M. Therefore, the \$10M to \$52M costs of the SONGS 1 upgrade are not cost beneficial, and exceed this calculated benefit by one to two orders of magnitude.

6.0 REFERENCES

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2. Letter, Walt Paulson (NRC) to R. Dietch (SCE), SEP Topic III-2, "Wind and Tornado Loadings," San Onofre Nuclear Generating Station, Unit 1, dated February 1, 1983.
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4. Letter, M.O. Medford (SCE) to W.A. Paulson (NRC), SEP Topics III-2 and III-4.A, "Wind and Tornado Loadings, and Tornado Missiles," dated September 17, 1984.
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15. Letter, L. E. Elder (W), to Jack L. Rainsberry (SCE), San Onofre Nuclear Generating Station, Unit 1, RCP Seal Integrity - Fire Protection, dated September 18, 1985.
16. Updated Final Safety Analysis Report (UFSAR), San Onofre Nuclear Generating Station, Unit 1.
17. NSAC 111, "Losses of Off-Site Power at U.S. Nuclear Power Plants, All Years Through 1986," Nuclear Safety Analysis Center, dated May 1987.
18. Letter, John O. Bradfute (NRC) to K. P. Baskin (SCE), Summary of Meeting Held 25 September 1987 Regarding Wind and Tornado Loadings and Design Criteria, dated October 6, 1987.
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APPENDIX A

SONGS 1 TORNADO EVENT TREES

SONGS 1 REPSONSE TO F1 TORNADO INDUCED LOOP

F1 TORNADO INDUCED LOSS OF OFFSITE POWER	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	NUMBER	SEQUENCE DESIGNATION	ACCIDENT CLASS	FREQUENCY
LF1	RCS	MSS	AFW				
				1	LF1	SAFE	
				2	LF1-AFW	DAMAGE	3.02E-09
				3	LF1-MSS	DAMAGE	2.48E-08
				4	LF1-RCS	DAMAGE	2.21E-07

SONGS 1 RESPONSE TO F1 TORNADO INDUCED PLANT TRIP

F1 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	NUMBER	SEQUENCE DESIGNATION	ACCIDENT CLASS	SEQUENCE PROBABILITY		
TF1	RCS	MSS	AFW						
				1	TF1	SAFE			
				2	TF1-AFW	DAMAGE	1.46E-08		
				3	TF1-MSS	DAMAGE	5.54E-09		
				4	TF1-RCS	DAMAGE	1.67E-07		
REBECA (C) ERIN Engineering and Research, Inc. Version 1.0				Filename: TNDTF1		Date: 04-16-90		Total Probability: 1.87E-07	

SONGS 1 RESPONSE TO F2 TORNADO INDUCED LOOP

F2 TORNADO INDUCED LOSS OF OFFSITE POWER LF2	RCS MAKEUP RCS	SECONDARY PRESSURE CONTROL MSS	AUXILIARY FEEDWATER AFW	NUMBER	SEQUENCE DESIGNATION	ACCIDENT	FREQUENCY
<p>The diagram illustrates a fault tree starting with 'F2 TORNADO INDUCED LOSS OF OFFSITE POWER' (LF2). This event branches into four paths: <ul style="list-style-type: none"> Path 1: Leads directly to 'SAFE'. Path 2: Passes through 'AUXILIARY FEEDWATER' (AFW) to 'DAMAGE' with a frequency of 2.88E-08. Path 3: Passes through 'SECONDARY PRESSURE CONTROL' (MSS) to 'DAMAGE' with a frequency of 9.06E-09. Path 4: Passes through 'RCS MAKEUP' (RCS) to 'DAMAGE' with a frequency of 1.06E-07. </p>				1	LF2	SAFE	
				2	LF2-AFW	DAMAGE	2.88E-08
				3	LF2-MSS	DAMAGE	9.06E-09
				4	LF2-RCS	DAMAGE	1.06E-07

SONGS 1 RESPONSE TO F2 TORNADO INDUCED PLANT TRIP

F2 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	NUMBER	SEQUENCE DESIGNATION	ACCIDENT	SEQUENCE		
TF2	RCS	MSS	AFW						
				1	TF2	SAFE			
				2	TF2-AFW	DAMAGE	1.08E-07		
				3	TF2-MSS	DAMAGE	5.82E-09		
				4	TF2-RCS	DAMAGE	1.76E-07		
REBECA (C) ERIN Engineering and Research, Inc. Version 1.0				Filename: TNDTF2		Date: 04-16-90		Total Probability: 2.90E-07	

SONGS 1 RESPONSE TO F3 TORNADO INDUCED LOOP

F3 TORNADO INDUCED LOSS OF OFFSITE POWER LF3	RCS MAKEUP RCS	SECONDARY PRESSURE CONTROL MSS	AUXILIARY FEEDWATER AFW	NUMBER	SEQUENCE DESIGNATION	ACCIDENT	FREQUENCY
<p>The diagram is a fault tree starting with the event 'F3 TORNADO INDUCED LOSS OF OFFSITE POWER' (LF3). From this event, four distinct paths emerge, each leading to a specific accident sequence. The paths are: 1) Directly to 'SAFE' (Sequence 1). 2) Through 'AUXILIARY FEEDWATER' (AFW) to 'DAMAGE' (Sequence 2). 3) Through 'SECONDARY PRESSURE CONTROL' (MSS) to 'DAMAGE' (Sequence 3). 4) Through 'RCS MAKEUP' (RCS) to 'DAMAGE' (Sequence 4).</p>				1	LF3	SAFE	
				2	LF3-AFW	DAMAGE	1.18E-07
				3	LF3-MSS	DAMAGE	4.59E-09
				4	LF3-RCS	DAMAGE	1.20E-07

SONGS 1 RESPONSE TO F3 TORNADO INDUCED PLANT TRIP

F3 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	NUMBER	SEQUENCE DESIGNATION	ACCIDENT	SEQUENCE PROBABILITY
TF3	RCS	MSS	AFW				
				1	TF3	SAFE	
				2	TF3-AFW	DAMAGE	1.03E-07
				3	TF3-MSS	DAMAGE	1.25E-09
				4	TF3-PCS	DAMAGE	8.26E-08
REBECA (C) ERIN Engineering and Research, Inc. Version 1.0 Filename: TNDF3 Date: 04-16-90 Total Probability: 1.87E-07							

SONGS 1 RESPONSE TO F4 TORNADO INDUCED LOOP

F4 TORNADO INDUCED LOSS OF OFFSITE POWER LF4	RCS MAKEUP RCS	SECONDARY PRESSURE CONTROL MSS	AUXILIARY FEEDWATER AFW	NUMBER	SEQUENCE DESIGNATION	ACCIDENT CLASS	FREQUENCY
				1	LF4	SAFE	
				2	LF4-AFW	DAMAGE	1.17E-07
				3	LF4-MSS	DAMAGE	1.41E-09
				4	LF4-RCS	DAMAGE	6.27E-08

SONGS 1 RESPONSE TO F4 TORNADO INDUCED PLANT TRIP

F4 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	NUMBER	SEQUENCE DESIGNATION	ACCIDENT	FREQUENCY
TF4	RCS	MSS	AFW				
				1	TF4	SAFE	
				2	TF4-AFW	DAMAGE	6.11E-08
				3	TF4-MSS	DAMAGE	2.64E-10
				4	TF4-RCS	DAMAGE	2.86E-08

SONGS 1 RESPONSE TO F5 TORNADO INDUCED LOOP

F5 TORNADO INDUCED LOSS OF OFFSITE POWER LFS	RCS MAKEUP RCS	SECONDARY PRESSURE CONTROL MSS	AUXILIARY FEEDWATER AFW	NUMBER	SEQUENCE DESIGNATION	ACCIDENT CLASS	FREQUENCY
				1	LFS	SAFE	
				2	LFS-AFW	DAMAGE	4.69E-08
				3	LFS-MSS	DAMAGE	2.20E-09
				4	LFS-RCS	DAMAGE	1.69E-08

SONGS 1 RESPONSE TO F5 TORNADO INDUCED PLANT TRIP

F5 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	NUMBER	SEQUENCE DESIGNATION	ACCIDENT CLASS	FREQUENCY
TF5	RCS	MSS	AFW				
				1	TF5	SAFE	
				2	TF5-AFW	DAMAGE	1.05E-08
				3	TF5-MSS	DAMAGE	3.53E-11
				4	TF5-RCS	DAMAGE	3.46E-09

SONGS 1 RESPONSE TO F1 TORNADO - BASE CASE LOOP

F1 TORNADO INDUCED LOSS OF OFFSITE POWER LB1	RCS MAKEUP RCS	SECONDARY PRESSURE CONTROL MSS	AUXILIARY FEEDWATER AFW	NUMBER	SEQUENCE DESIGNATION	ACCLASST IDENT	FREQUENCY
				1	LB1	SAFE	
				2	LB1-AFW	DAMAGE	2.42E-09
				3	LB1-MSS	DAMAGE	1.06E-08
				4	LB1-RCS	DAMAGE	2.19E-07

SONGS 1 RESPONSE TO F1 TORNADO - BASE CASE TRIP

F1 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	N U M B E R	S E Q U E N C E D E S I G N A T I O N	A C C I D E N T	F R E Q U E N C Y		
TB1	RCS	MSS	AFW						
				1	TB1	SAFE			
				2	TB1-AFW	DAMAGE	1.17E-08		
				3	TB1-MSS	DAMAGE	5.51E-09		
				4	TB1-RCS	DAMAGE	1.57E-07		
REBECA (C) ERIN Engineering and Research, Inc. Version 1.0				Filename: TNDTB1		Date: 04-16-90		Total Probability: 1.74E-07	

SONGS 1 RESPONSE TO F2 TORNADO - BASE CASE LOOP

F2 TORNADO INDUCED LOSS OF OFFSITE POWER LB2	RCS MAKEUP RCS	SECONDARY PRESSURE CONTROL MSS	AUXILIARY FEEDWATER AFW	NUMBER	SEQUENCE DESIGNATION	ACCIDENT	FREQUENCY	
				1	LB2	SAFE		
				2	LB2-AFW	DAMAGE	7.68E-10	
				3	LB2-MSS	DAMAGE	6.73E-09	
				4	LB2-RCS	DAMAGE	6.92E-08	
REBECA (C) ERIN Engineering and Research, Inc. Version 1.0					Filename: 'TNDLB2'		Date: 04-16-90	
							Total Probability: 7.67E-08	

SONGS 1 RESPONSE TO F2 TORNADO - BASE CASE TRIP

F2 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	NUMBER	SEQUENCE DESIGNATION	ACCIDENT CLASSIFICATION	FREQUENCY
TB2	RCS	MSS	AFW				
				1	TB2	SAFE	
				2	TB2-AFW	DAMAGE	2.87E-09
				3	TB2-MSS	DAMAGE	1.34E-09
				4	TB2-RCS	DAMAGE	3.85E-08
REBECA (C) ERIN Engineering and Research, Inc. Version 1.0 Filename: 'TNDTB2' Date: 04-16-90 Total Probability: 4.27E-08							

SONGS 1 RESPONSE TO F3 TORNADO - BASE CASE LOOP

F3 TORNADO INDUCED LOSS OF OFFSITE POWER LB3	RCS MAKEUP RCS	SECONDARY PRESSURE CONTROL MSS	AUXILIARY FEEDWATER AFW	N U M B E R	S E Q U E N C E D E S I G N A T I O N	A C C I D E N T	F R E Q U E N C Y
				1	LB3	SAFE	
				2	LB3-AFW	DAMAGE	0.00E+00
				3	LB3-MSS	DAMAGE	3.23E-10
				4	LB3-RCS	DAMAGE	2.91E-08

SONGS 1 RESPONSE TO F3 TORNADO - BASE CASE TRIP

F3 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	N U M B E R	S E Q U E N C E D E S I G N A T I O N	A C C I D E N T	F R E Q U E N C Y
TB3	RCS	MSS	AFW				
<p>The diagram is a fault tree starting from the event 'F3 TORNADO INDUCED PLANT TRIP' (TB3). It branches into four paths:</p> <ul style="list-style-type: none"> Path 1: Leads to 'SAFE' with a frequency of 0. Path 2: Involves 'AFW' (Auxiliary Feedwater) and results in 'DAMAGE' with a frequency of $2.83E-10$. Path 3: Involves 'MSS' (Secondary Pressure Control) and results in 'DAMAGE' with a frequency of $1.29E-10$. Path 4: Involves 'RCS' (RCS Makeup) and results in 'DAMAGE' with a frequency of $3.80E-09$. 				1	TB3	SAFE	
				2	TB3-AFW	DAMAGE	$2.83E-10$
				3	TB3-MSS	DAMAGE	$1.29E-10$
				4	TB3-RCS	DAMAGE	$3.80E-09$

SONGS 1 RESPONSE TO F4 TORNADO - BASE CASE LOOP

F4 TORNADO INDUCED LOSS OF OFFSITE POWER LB4	RCS MAKEUP RCS	SECONDARY PRESSURE CONTROL MSS	AUXILIARY FEEDWATER AFW	NUMBER	SEQUENCE DESIGNATION	ACCIDENT	FREQUENCY
				1	LB4	SAFE	
				2	LB4-AFW	DAMAGE	9.29E-11
				3	LB4-MSS	DAMAGE	8.07E-10
				4	LB4-RCS	DAMAGE	8.38E-09

SONGS 1 RESPONSE TO F4 TORNADO - BASE CASE TRIP

F4 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	NUMBER	SEQUENCE DESIGNATION	ACCIDENT	FREQUENCY
TB4	RCS	MSS	AFW				
<pre> graph TD TB4[TB4] --- TB4_AFW[TB4-AFW] TB4 --- TB4_MSS[TB4-MSS] TB4 --- TB4_RCS[TB4-RCS] TB4_AFW --- TB4_MSS TB4_AFW --- TB4_RCS TB4_MSS --- TB4_RCS TB4_RCS --- TB4_RCS </pre>				1	TB4	SAFE	
				2	TB4-AFW	DAMAGE	4.85E-11
				3	TB4-MSS	DAMAGE	2.21E-11
				4	TB4-RCS	DAMAGE	6.48E-10
REBECA (C) ERIN Engineering and Research, Inc. Version 1.0				Filename: TNDTB4	Date: 04-16-90	Total Probability: 7.19E-10	

SONGS 1 RESPONSE TO F5 TORNADO - BASE CASE LOOP

F5 TORNADO INDUCED LOSS OF OFFSITE POWER LBS	RCS MAKEUP RCS	SECONDARY PRESSURE CONTROL MSS	AUXILIARY FEEDWATER AFW	NUMBER	SEQUENCE DESIGNATION	ACCIDENT CLASS	FREQUENCY
<p>The diagram is a fault tree starting with 'LBS' at the top. It branches into four paths: 1) 'SAFE', 2) 'LBS-AFW' (Damage, 2.42E-11), 3) 'LBS-MSS' (Damage, 2.22E-10), and 4) 'LBS-RCS' (Damage, 2.40E-09). The paths for MSS and RCS are more complex, involving intermediate components not explicitly labeled in the table headers.</p>				1	LBS	SAFE	
				2	LBS-AFW	DAMAGE	2.42E-11
				3	LBS-MSS	DAMAGE	2.22E-10
				4	LBS-RCS	DAMAGE	2.40E-09

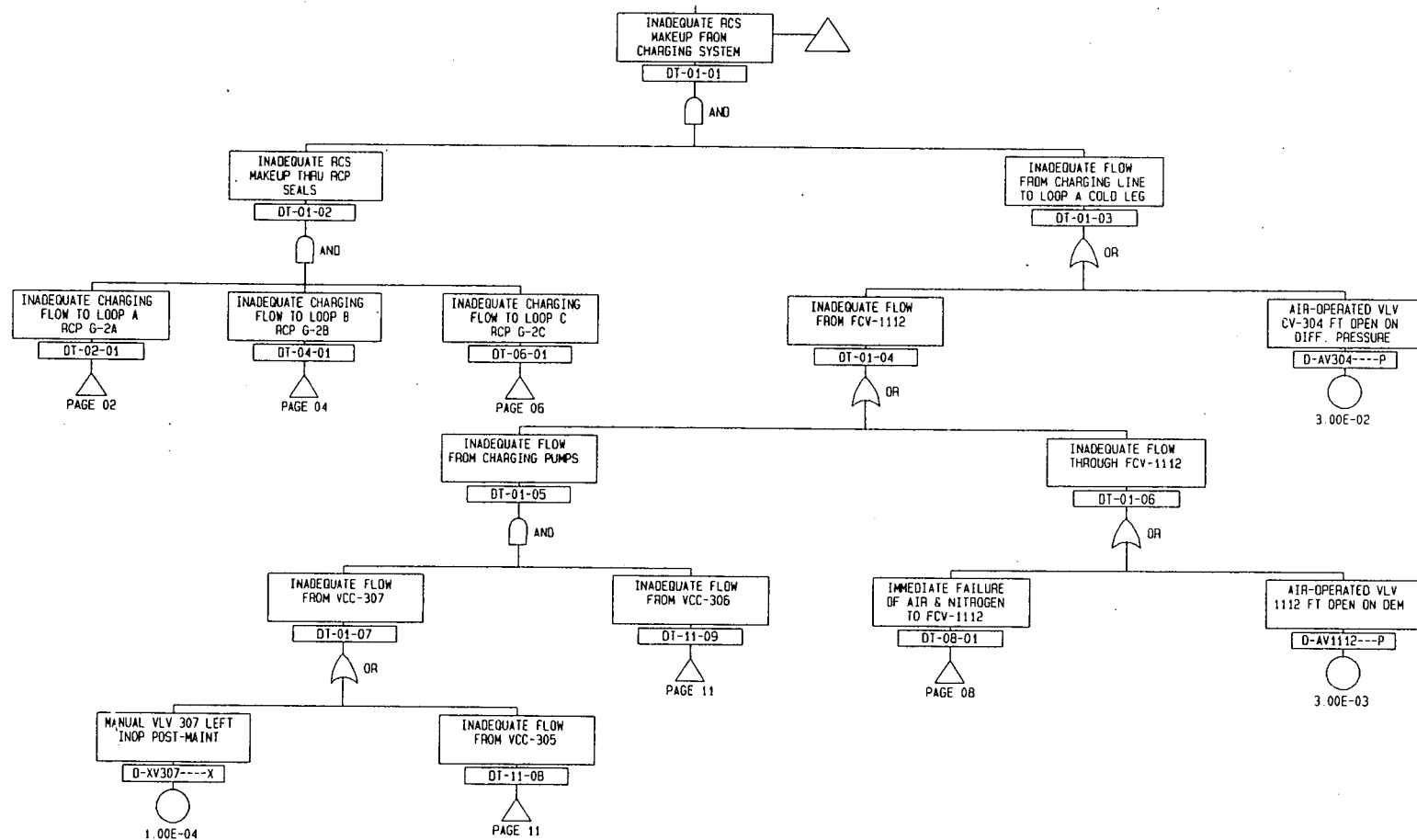
SONGS 1 RESPONSE TO F5 TORNADO - BASE CASE TRIP

F5 TORNADO INDUCED PLANT TRIP	RCS MAKEUP	SECONDARY PRESSURE CONTROL	AUXILIARY FEEDWATER	NUMBER	SEQUENCE DESIGNATION	ACCIDENT CLASS	FREQUENCY		
T85	RCS	MSS	AFW						
<pre> graph TD T85[T85] --- T85_AFW[T85-AFW] T85 --- T85_MSS[T85-MSS] T85 --- T85_RCS[T85-RCS] </pre>				1	T85	SAFE			
				2	T85-AFW	DAMAGE	1.71E-11		
				3	T85-MSS	DAMAGE	1.09E-13		
				4	T85-RCS	DAMAGE	7.42E-11		
REBECA (C) ERIN Engineering and Research, Inc. Version 1.0				Filename: TNDT85		Date: 04-16-90		Total Probability: 9.14E-11	

APPENDIX B

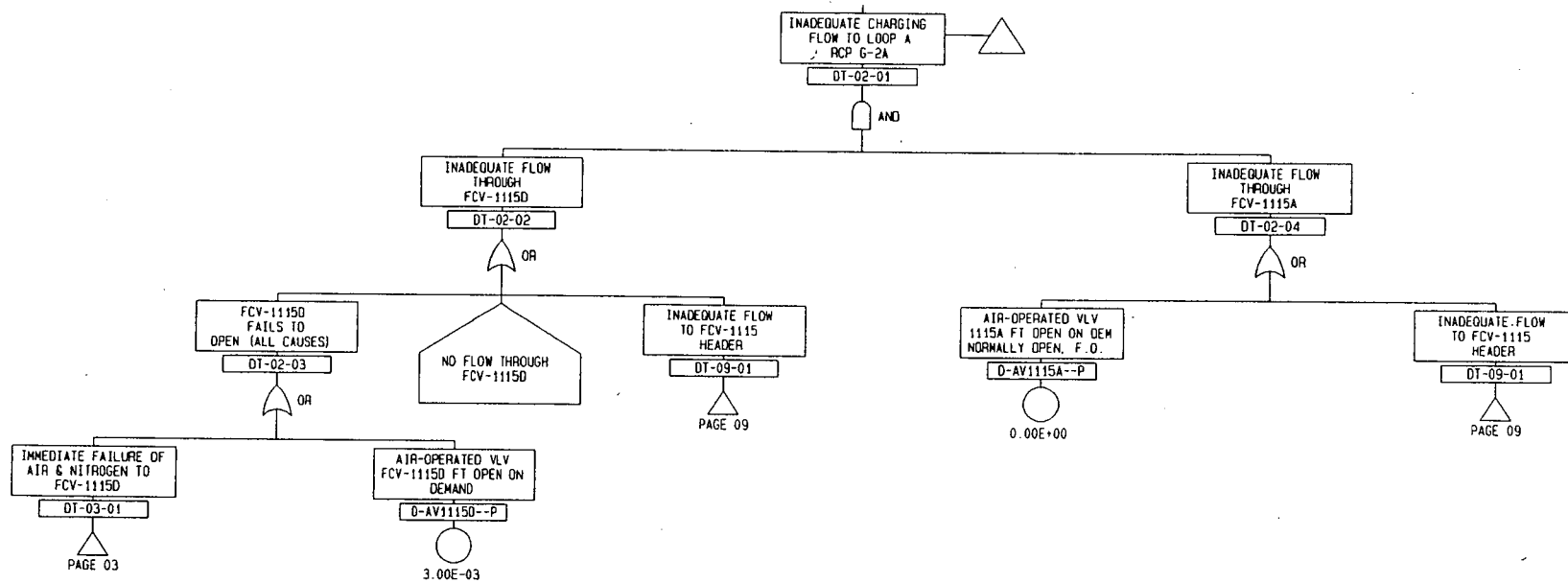
SONGS 1 SYSTEM FAULT TREES

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS

08-21-1990


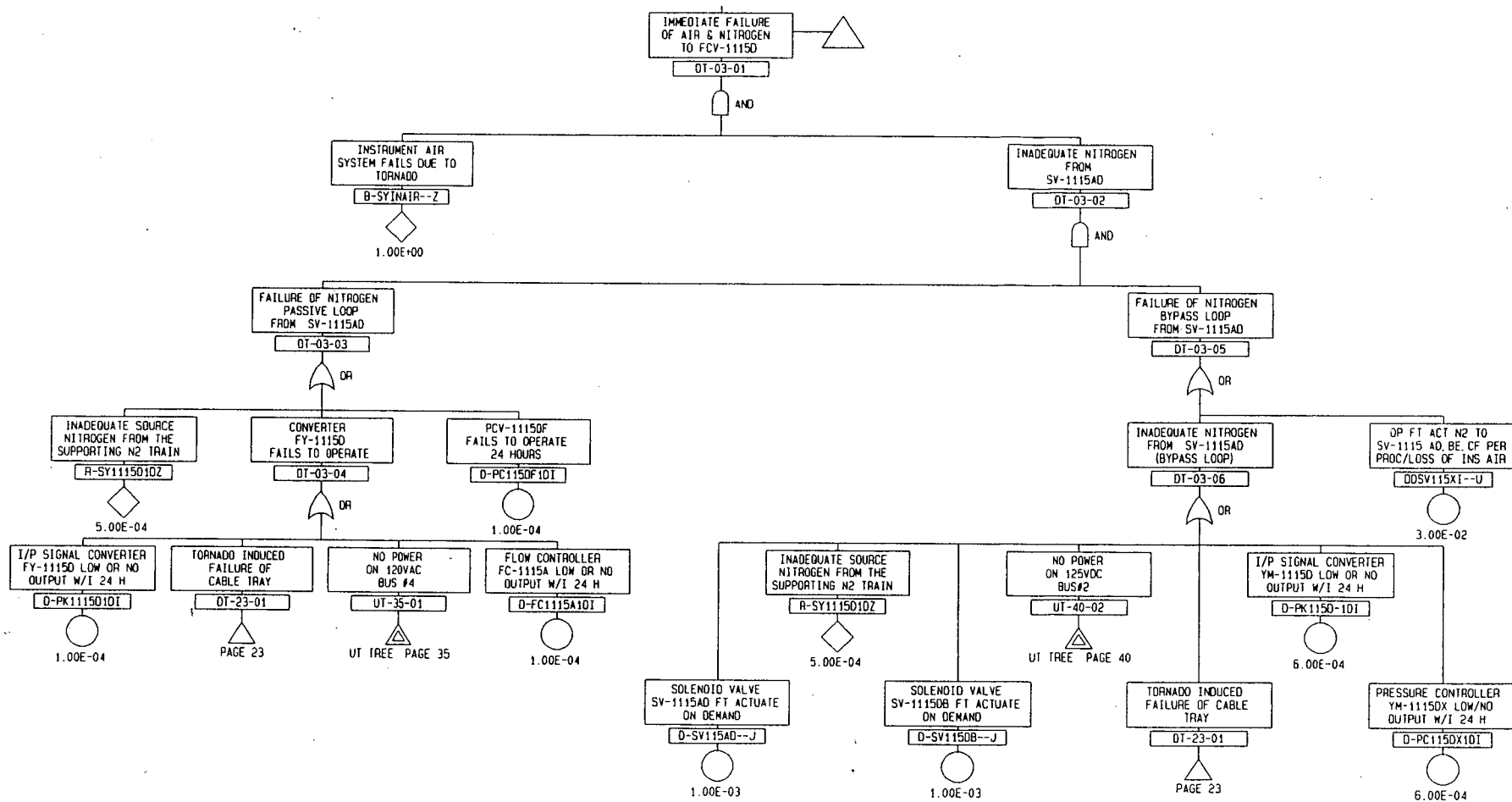
ADEQUATE RCS MAKEUP FOR POST-TRIP SUCCESS RECHARGING IS PASSED THROUGH THE RCP SEALS TO THE LOOP COLD LEG. MAKEUP IS ALSO AVAILABLE FROM THE CHARGING LINE TO LOOP A COLD LEG.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



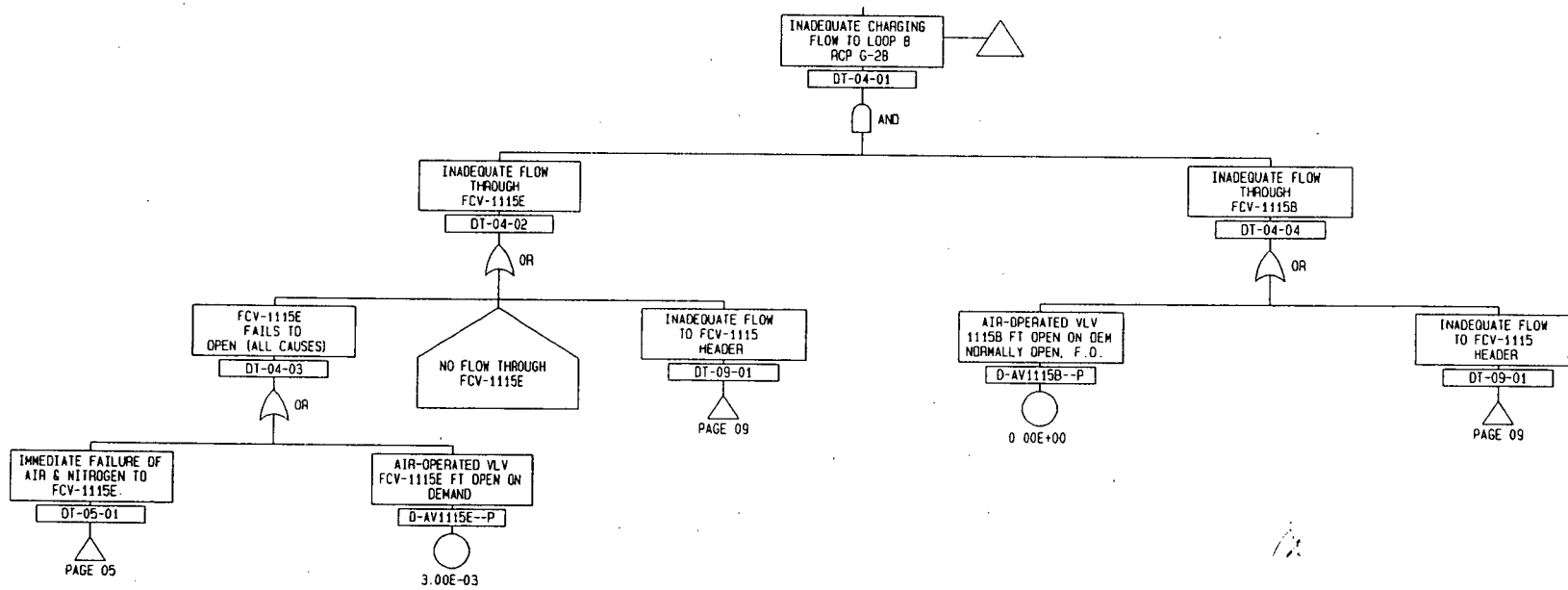
GATE DT-02-02 IS TRUED SINCE N.O..F.O. FCV-1115A IS OPEN.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



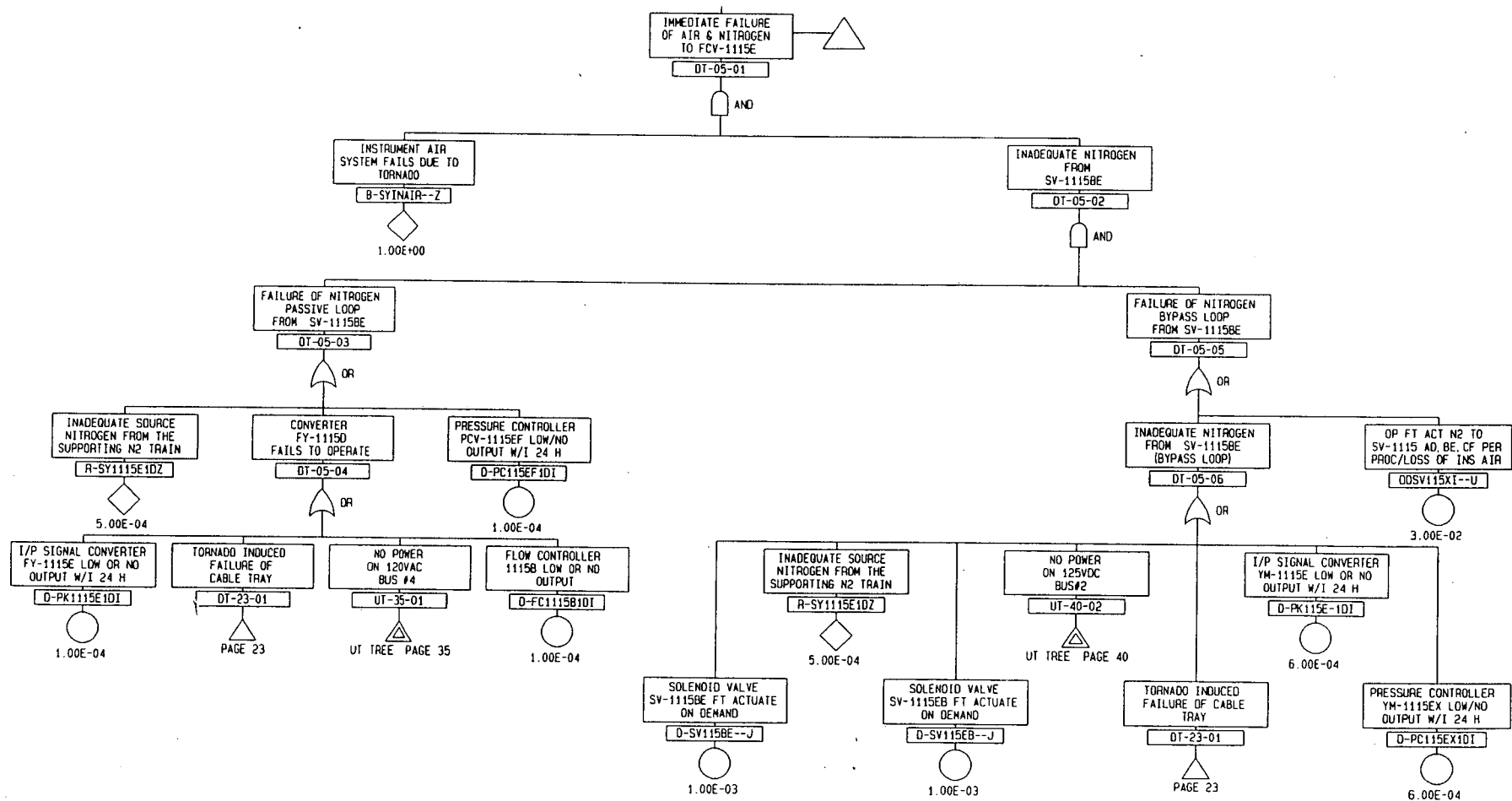
Basic event DOSV1115X1-U is referred to as SV-1115AD not modeled for passive nitrogen loop.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



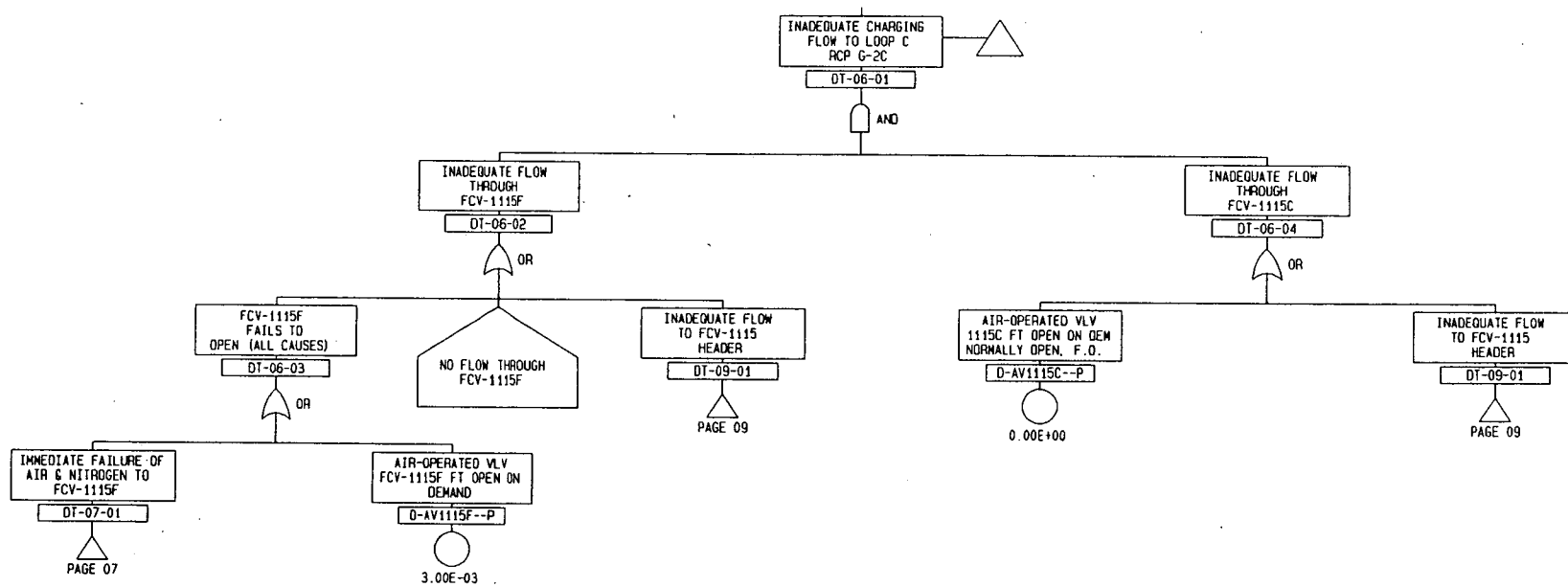
GATE DT-04-02 IS TRUED SINCE N.O., F.O. FCV-1115B IS OPEN.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



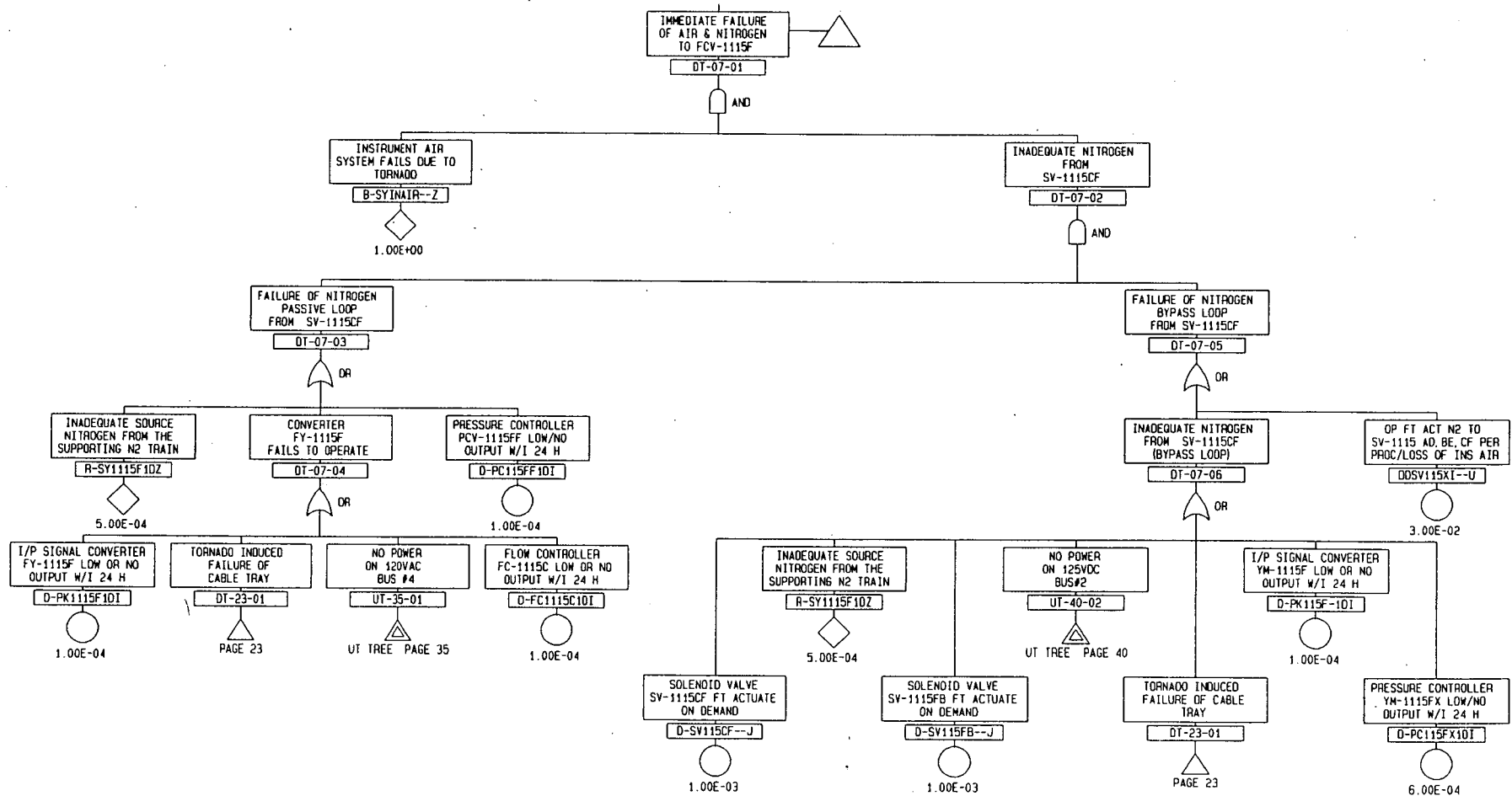
Basic event DDSV1115XI-U refers to SV-1115BE not modeled for passive nitrogen loop.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



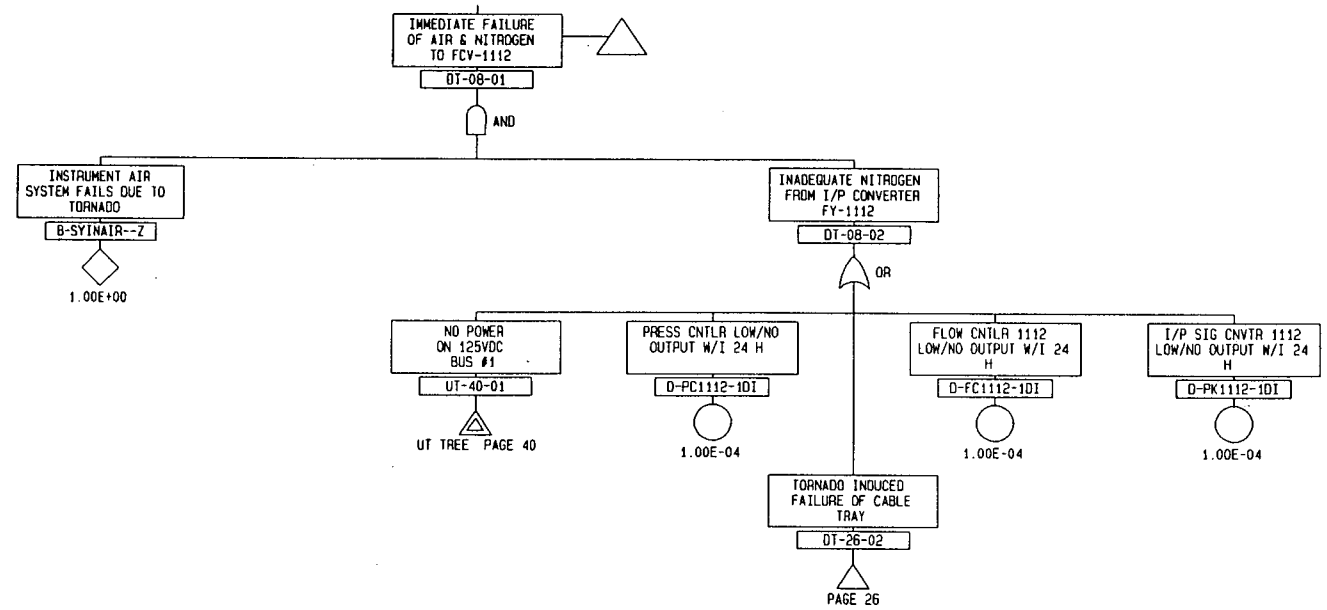
GATE DT-06-02 IS TRUED SINCE N.O., F.O. FCV-1115C IS OPEN.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



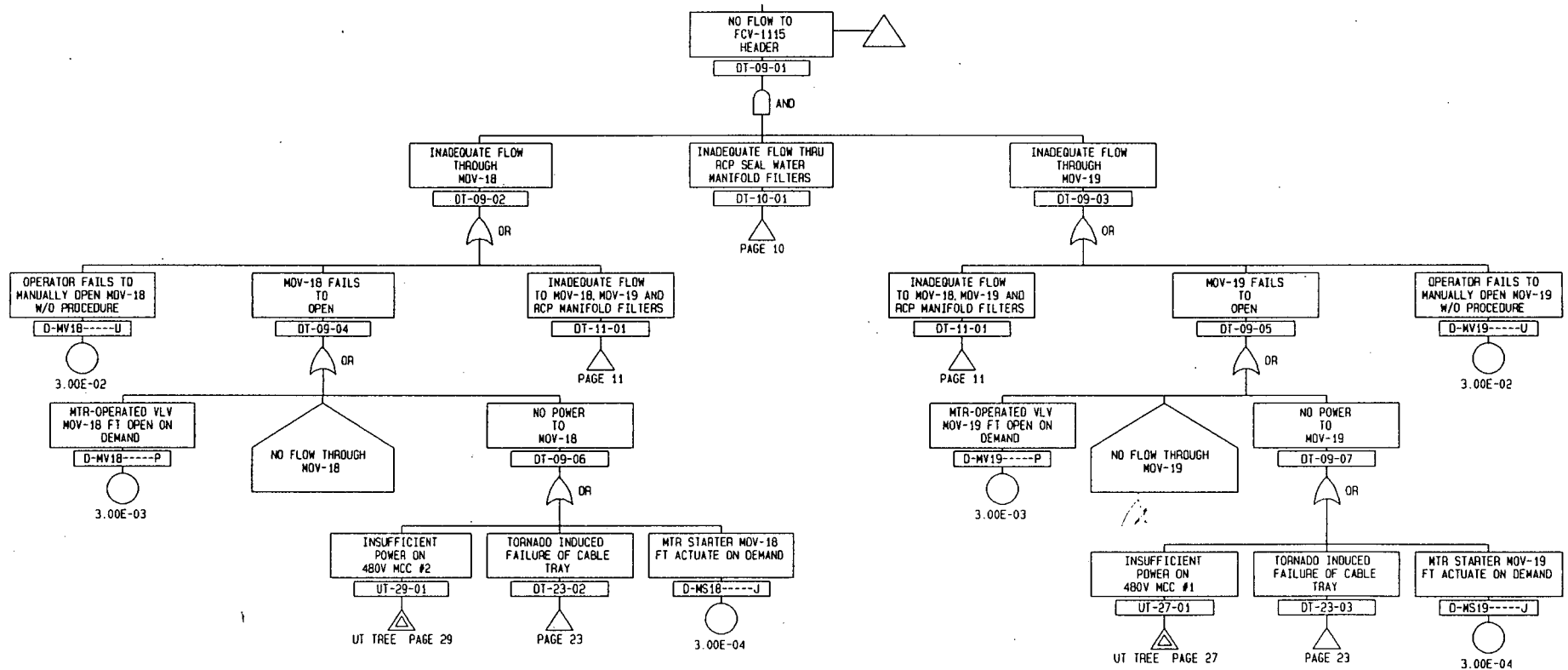
Based on the event description, the failure is referred to as 'INADEQUATE NITROGEN FROM SV-1115CF'. The event is defined as 'INADEQUATE NITROGEN FROM SV-1115CF'.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



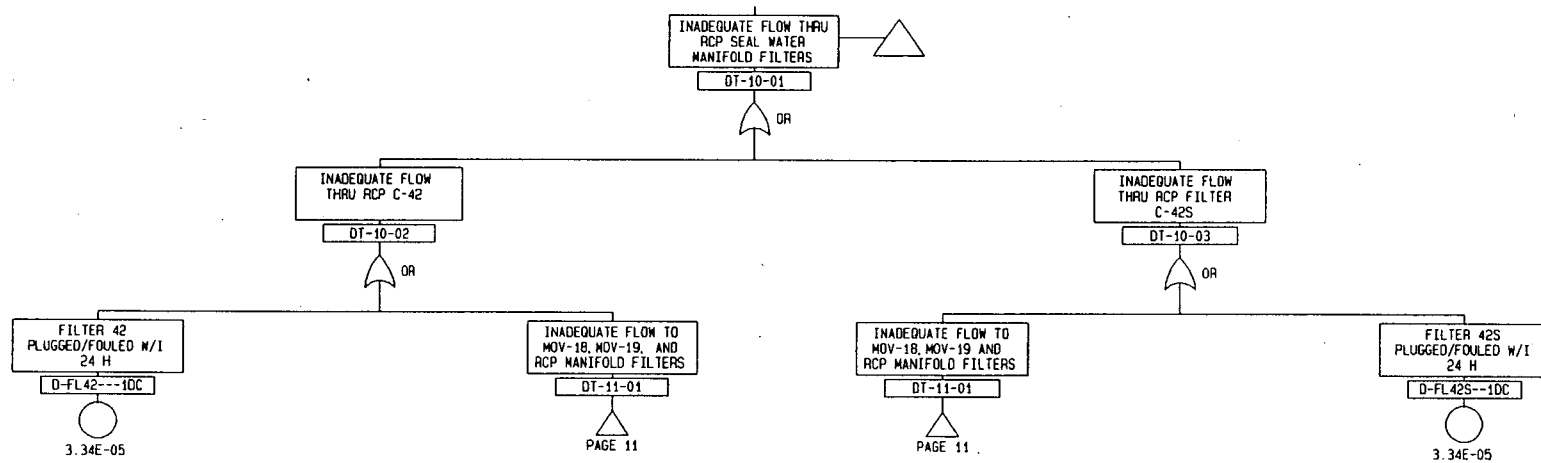
MANUAL CONTROL WITH FY-5112 LOST ON LOSS OF INSTRUMENT AIR.
 FY-1112 & SV-1112 FAIL IN FLOW PATH POSITIONED TOWARD
 FY-1112

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990

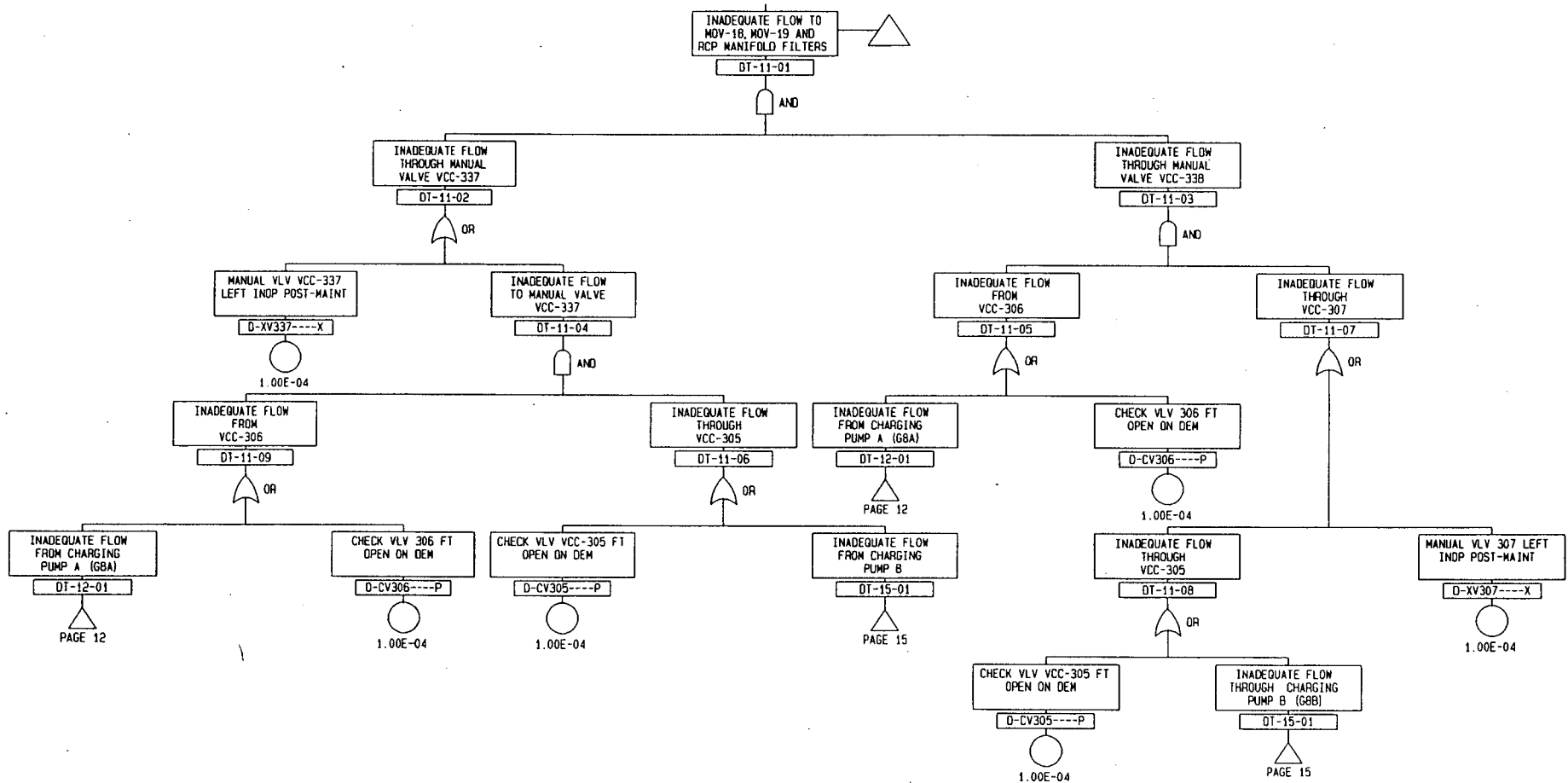


NO FLOW TO FCV-1115 HEADER (DT-09-01) AND
 INADEQUATE FLOW THROUGH MOV-18 (DT-09-02) OR
 INADEQUATE FLOW THRU RCP SEAL WATER MANIFOLD FILTERS (DT-10-01) OR
 INADEQUATE FLOW THROUGH MOV-19 (DT-09-03) OR
 OPERATOR FAILS TO MANUALLY OPEN MOV-18 W/O PROCEDURE (D-MV18-U) 3.00E-02
 MOV-18 FAILS TO OPEN (DT-09-04) OR
 MTR-OPERATED VLV MOV-18 FT OPEN ON DEMAND (D-MV18-P) 3.00E-03
 NO FLOW THROUGH MOV-18
 NO POWER TO MOV-18 (DT-09-06) OR
 INSUFFICIENT POWER ON 480V MCC #2 (UT-29-01) UT TREE PAGE 29
 TORNADO INDUCED FAILURE OF CABLE TRAY (DT-23-02) PAGE 23
 MTR STARTER MOV-18 FT ACTUATE ON DEMAND (D-MS18-J) 3.00E-04
 INADEQUATE FLOW TO MOV-18, MOV-19 AND RCP MANIFOLD FILTERS (DT-11-01) PAGE 11
 PAGE 10
 INADEQUATE FLOW THROUGH MOV-19 (DT-09-03) OR
 INADEQUATE FLOW TO MOV-18, MOV-19 AND RCP MANIFOLD FILTERS (DT-11-01) PAGE 11
 MTR-OPERATED VLV MOV-19 FT OPEN ON DEMAND (D-MV19-P) 3.00E-03
 NO FLOW THROUGH MOV-19
 NO POWER TO MOV-19 (DT-09-07) OR
 INSUFFICIENT POWER ON 480V MCC #1 (UT-27-01) UT TREE PAGE 27
 TORNADO INDUCED FAILURE OF CABLE TRAY (DT-23-03) PAGE 23
 MTR STARTER MOV-19 FT ACTUATE ON DEMAND (D-MS19-J) 3.00E-04
 MOV-19 FAILS TO OPEN (DT-09-05) OR
 OPERATOR FAILS TO MANUALLY OPEN MOV-19 W/O PROCEDURE (D-MV19-U) 3.00E-02

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



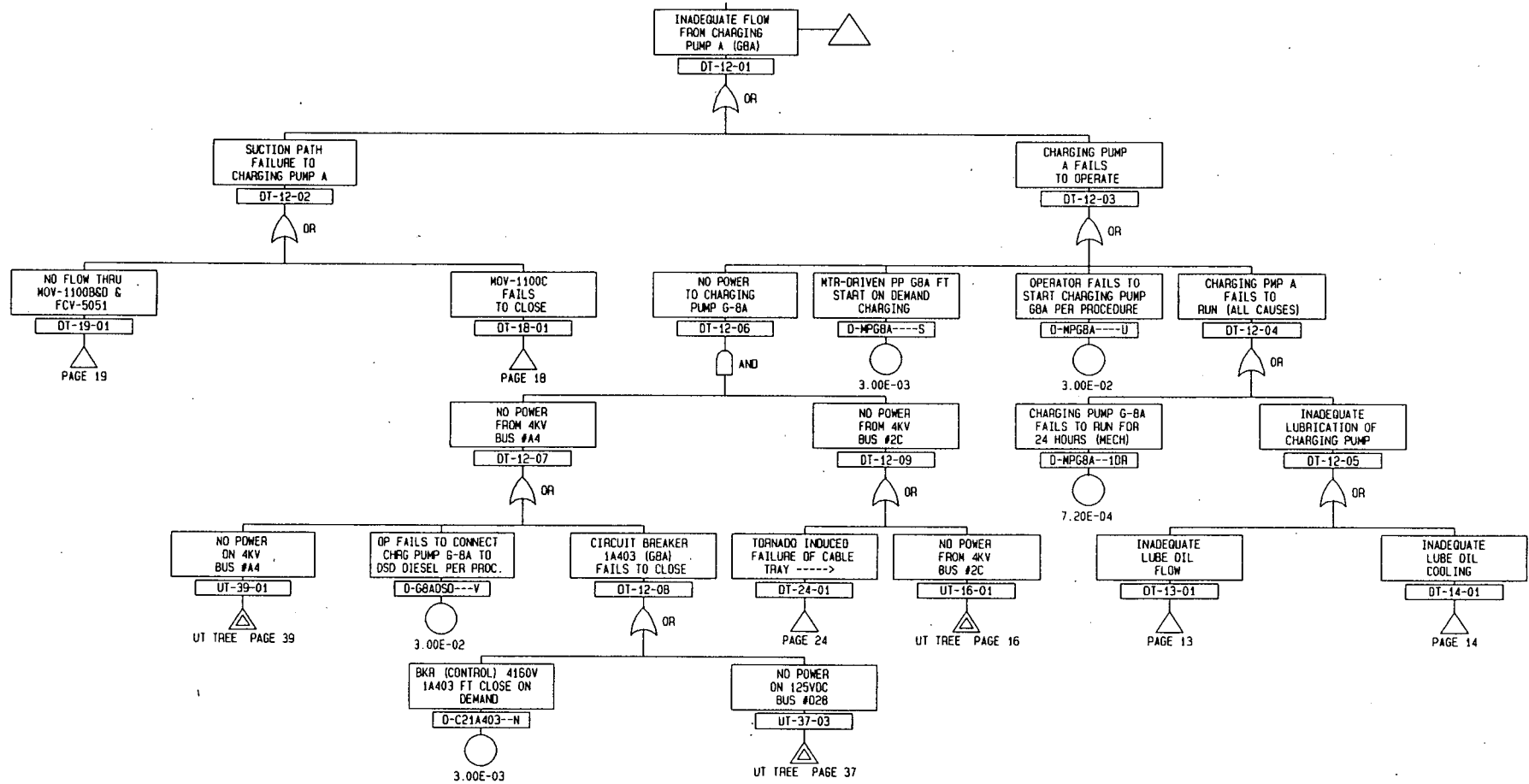
SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



ASSUMES PUMP G-8A NORMALLY OPERATING. NO CREDIT TAKEN FOR TEST PUMP G-42.

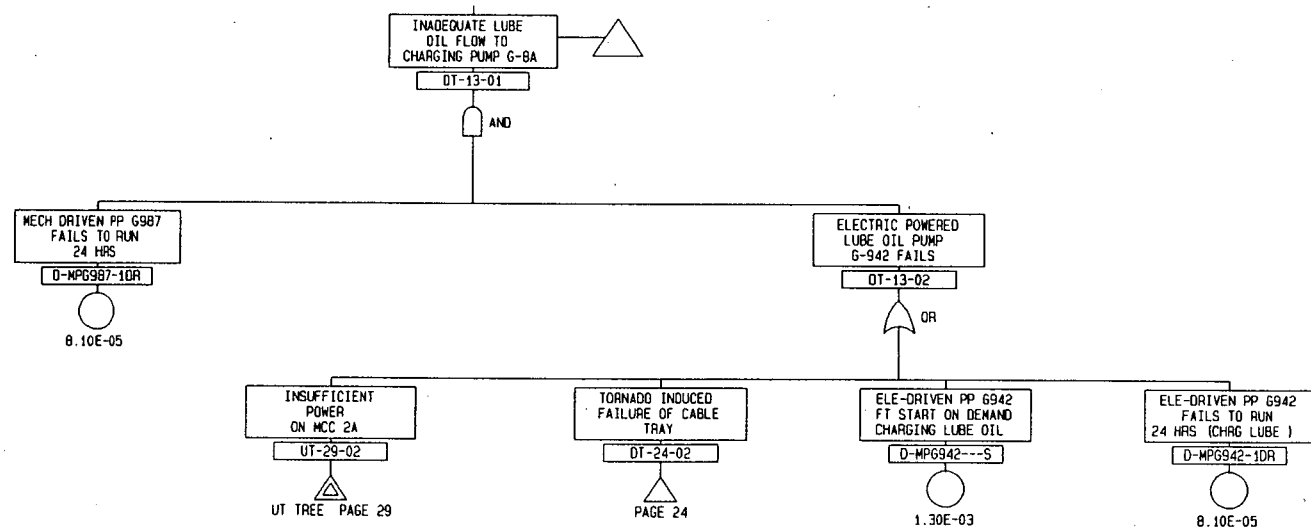
SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS

08-21-1990

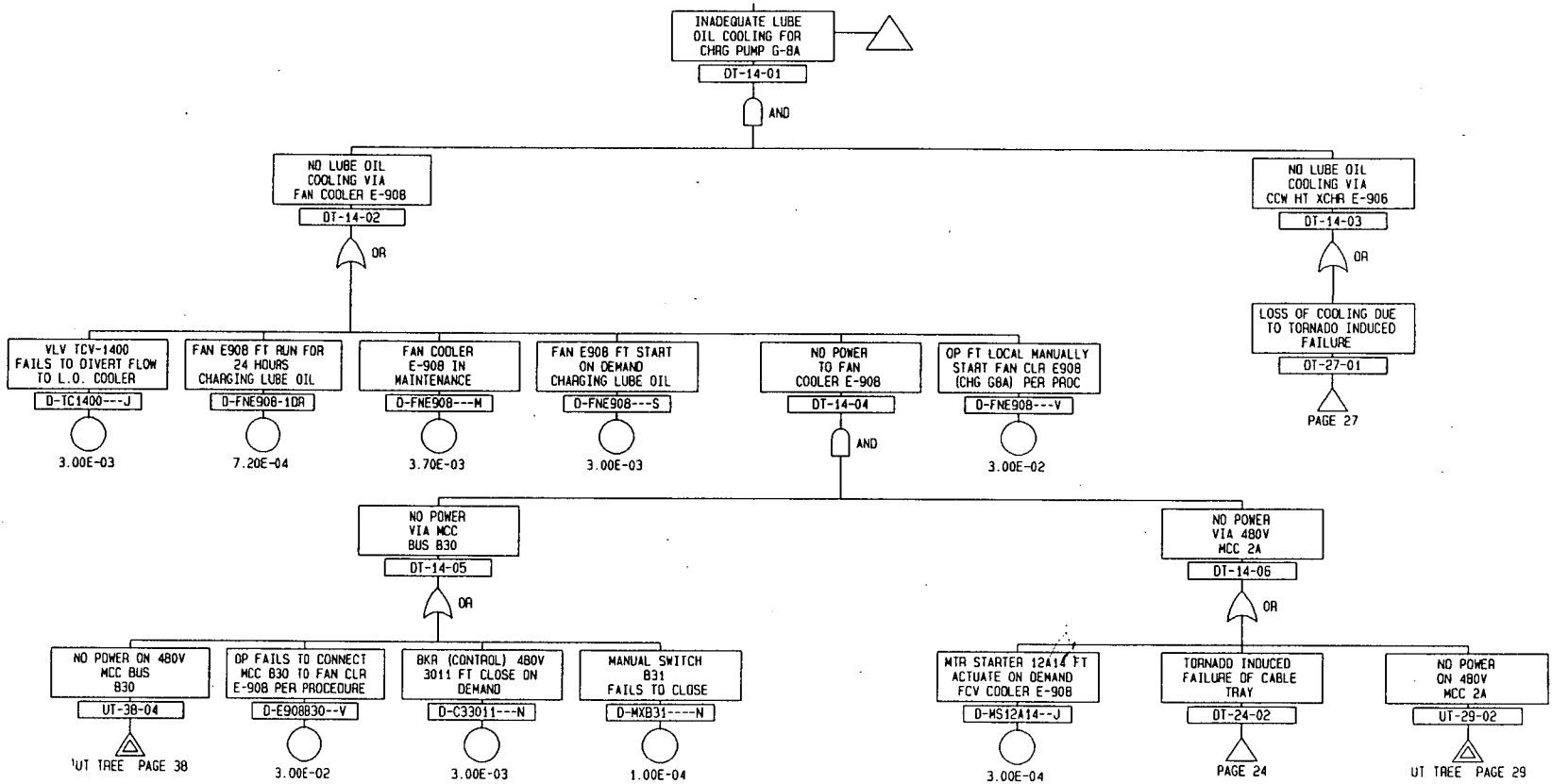


NO EOI FOR THE OPERATOR ACTION REFERRED TO IN BASIC EVENT
 NO GBA DSD - V. D-MPGBA - U. ARE PROTECTED.
 CABLE TRAYS TO DSD POWER (BUS #A4, #028) ARE PROTECTED.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



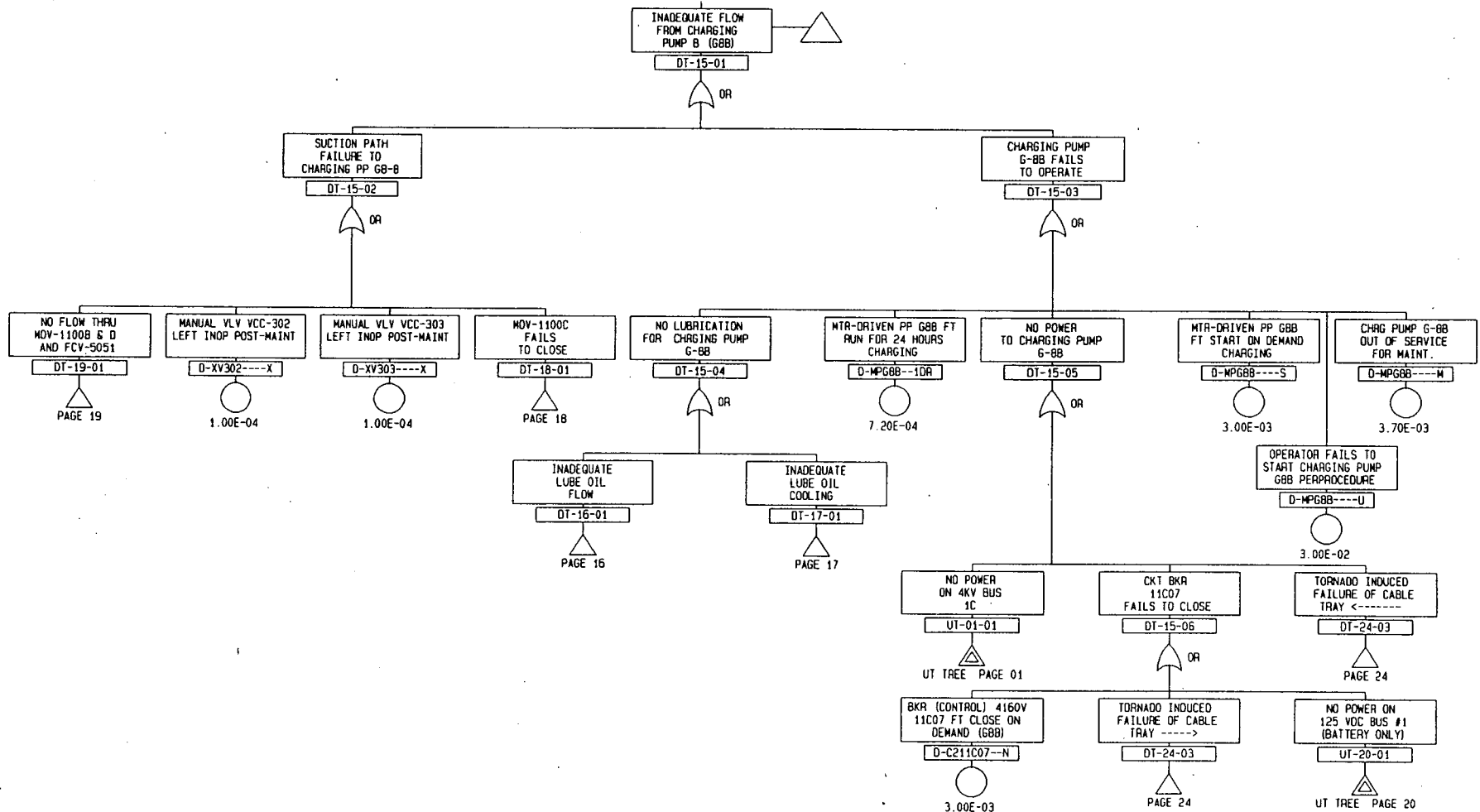
SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



CABLE TRAY TO MCC BUS 830 PROTECTED (DSD)

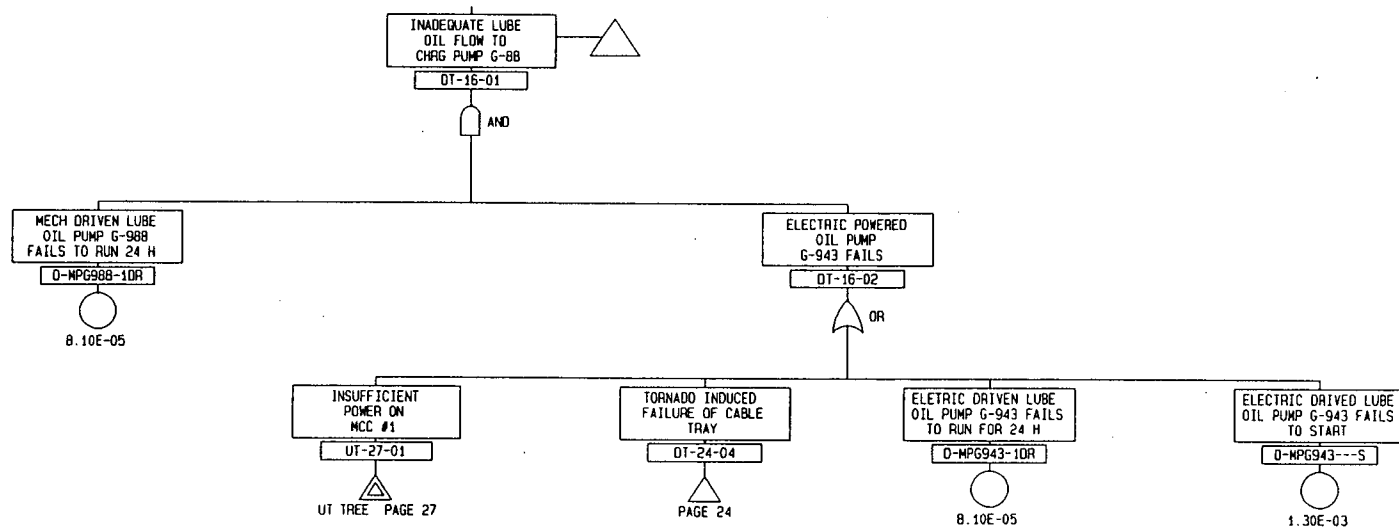
SONGS1 - CHARGING SYSTEM FAULT TREE - TORNAO ANALYSIS

08-21-1990

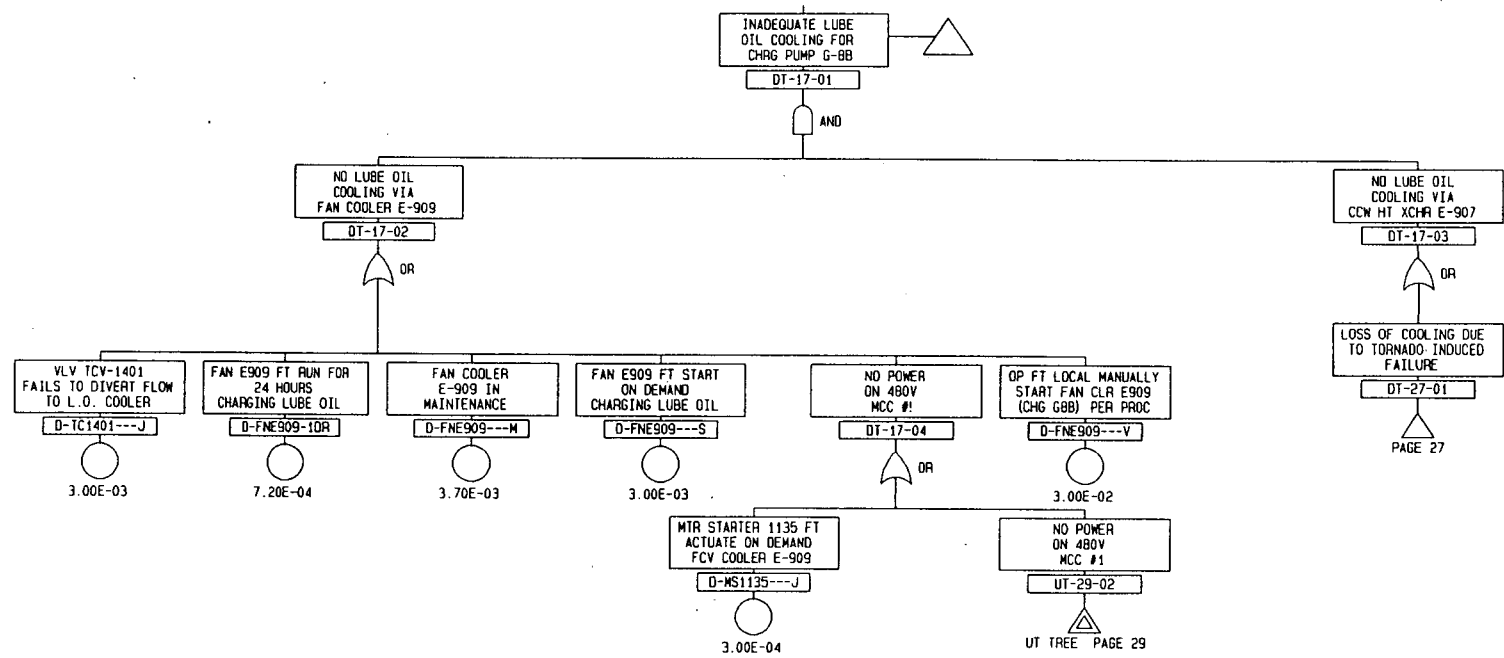


D-MPG8B----U REFERS TO SO1-1.0-61. STEP 14A.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990

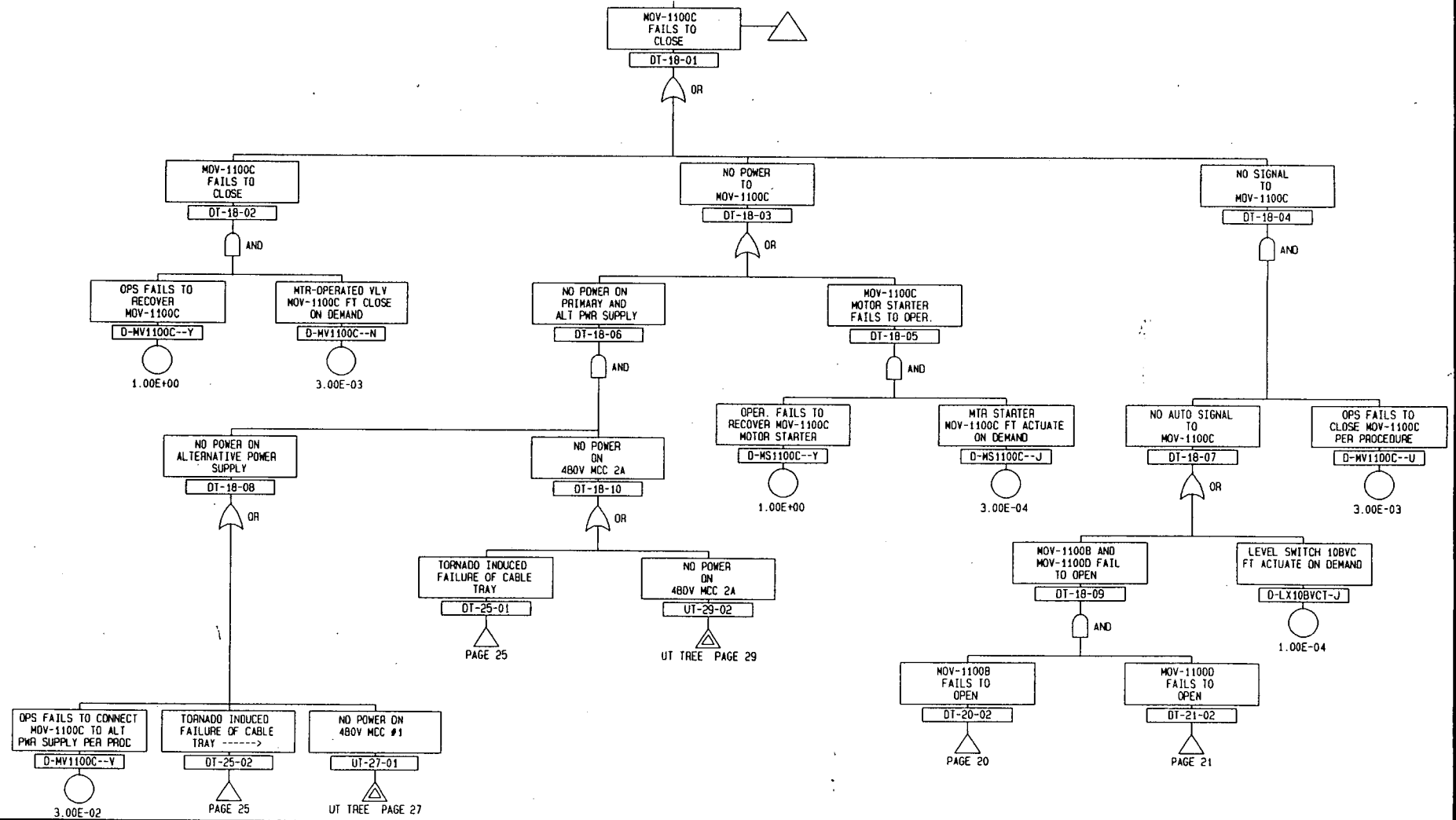


SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



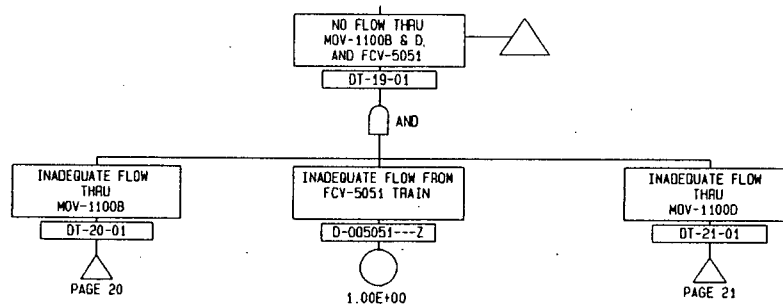
CABLE TRAY FROM MCC#1 TO FAN COOLER E-909 .PROTECTED.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



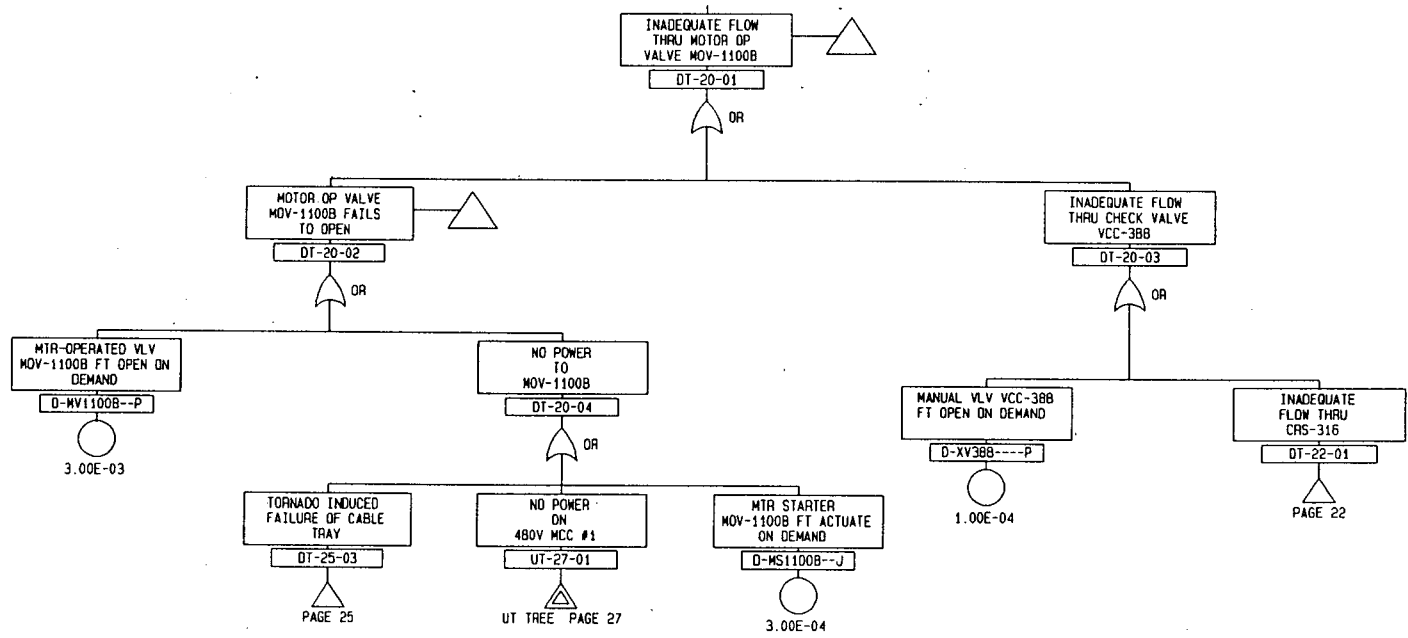
BASIC EVENT D-MV1100C--U REFERS TO PROCEDURE SO1-1.6-2.
 RESPONSE TO LOW SYSTEM INVENTORY. GATE DD-15-06:
 MOV-1100C NORMALLY ALIGNED TO MCC 2A PER SO1-4-6.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990

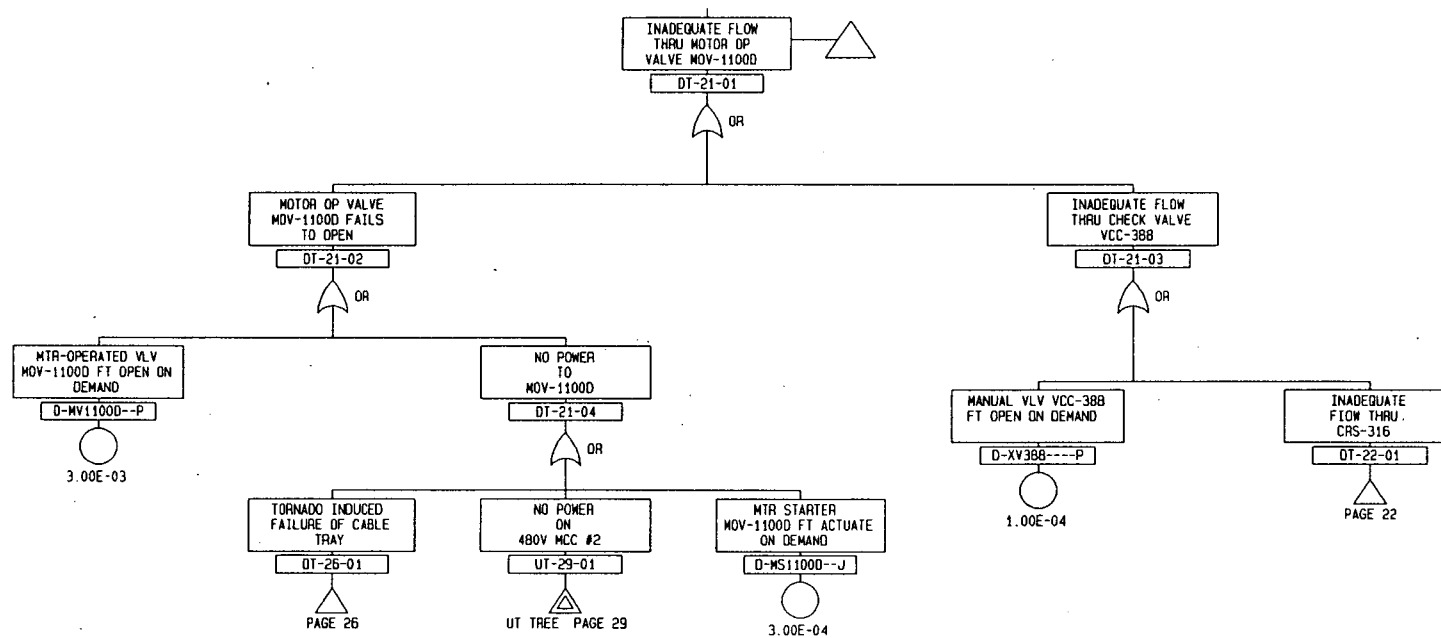


D-005051 TRAIN: 1500 CREDIT FOR 300 MINUTES OF REPAIR. A THOROUGH PROVIDED BY
 ACCUMULATED: 1100B OR D WITH 300 MINUTES TO REPAIR. A THOROUGH WOULD NEED TO
 MANUALLY OPERATE 1100B OR D WITH 300 MINUTES TO REPAIR. A THOROUGH WOULD NEED TO

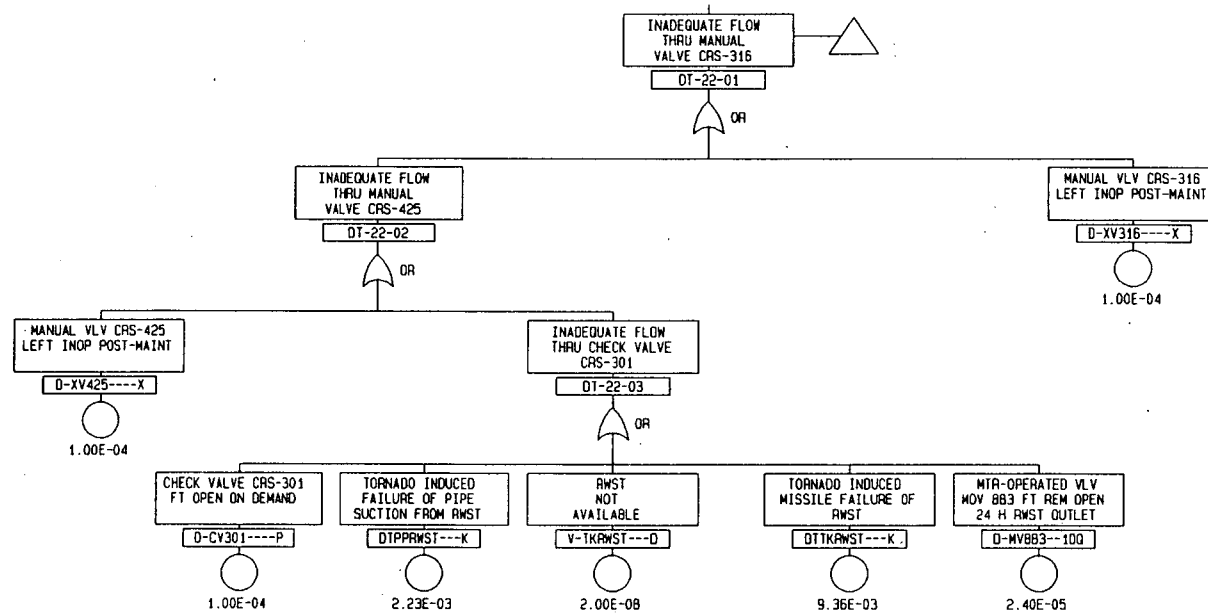
SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



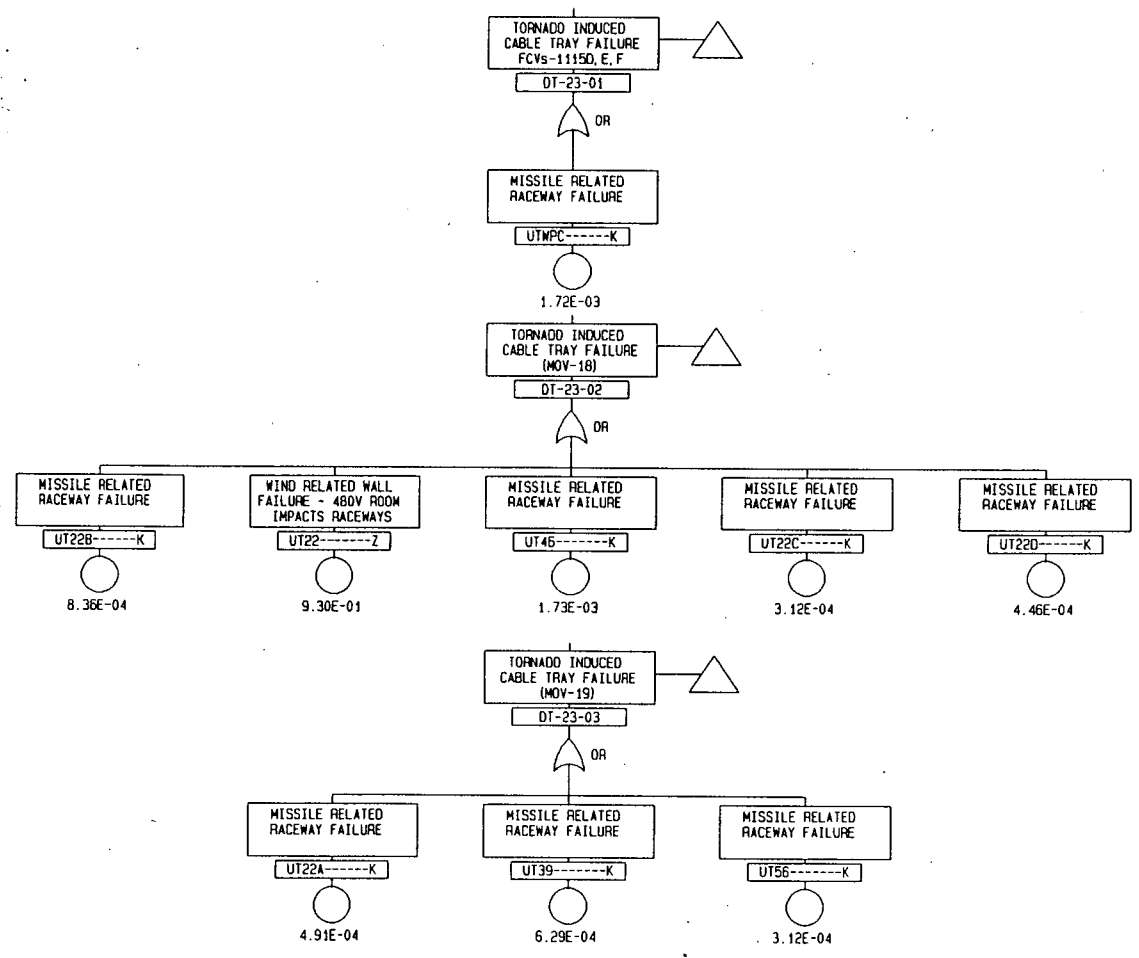
SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990

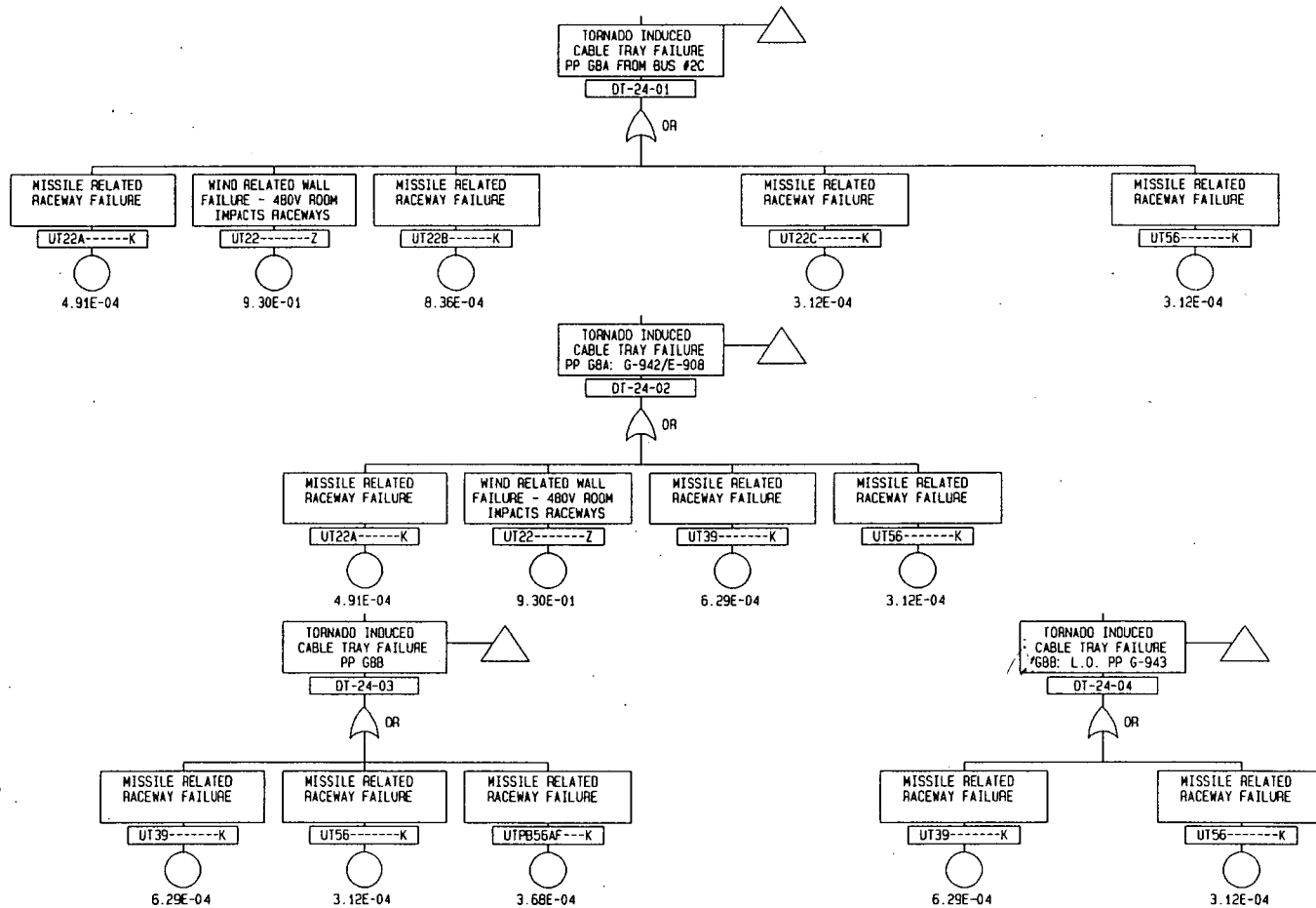


SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



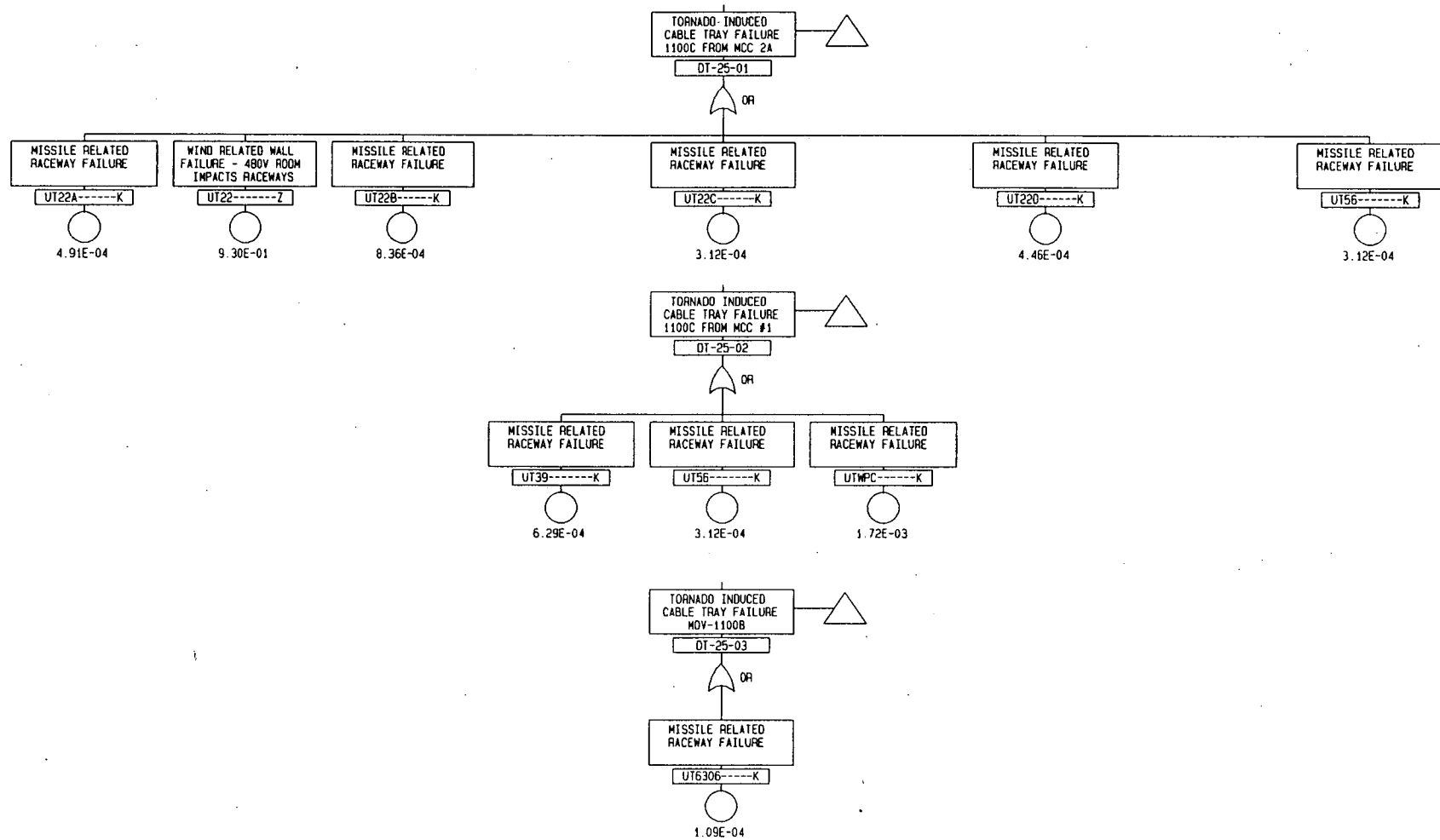
UT22B-----Z PERTAINS TO SAME FAILURE OF 22C AND 22D.

SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990

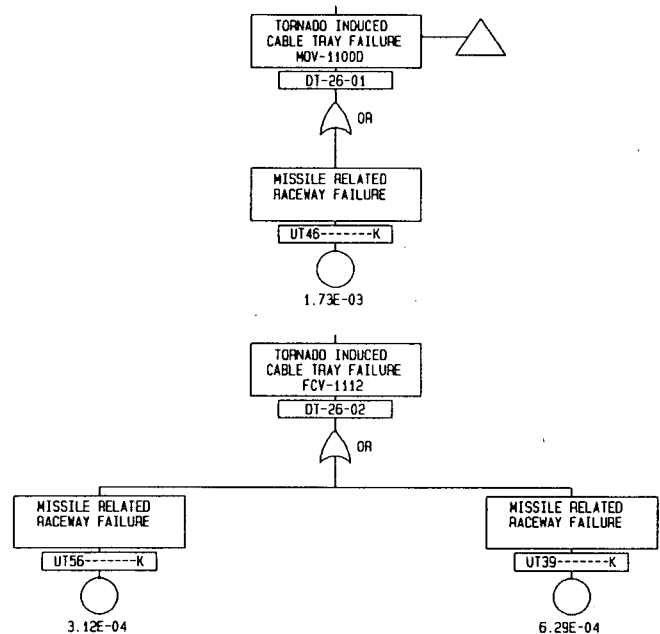


UT22A----Z PERTAINS TO SAME FAILURE AS UT2.2B AND UT22C.

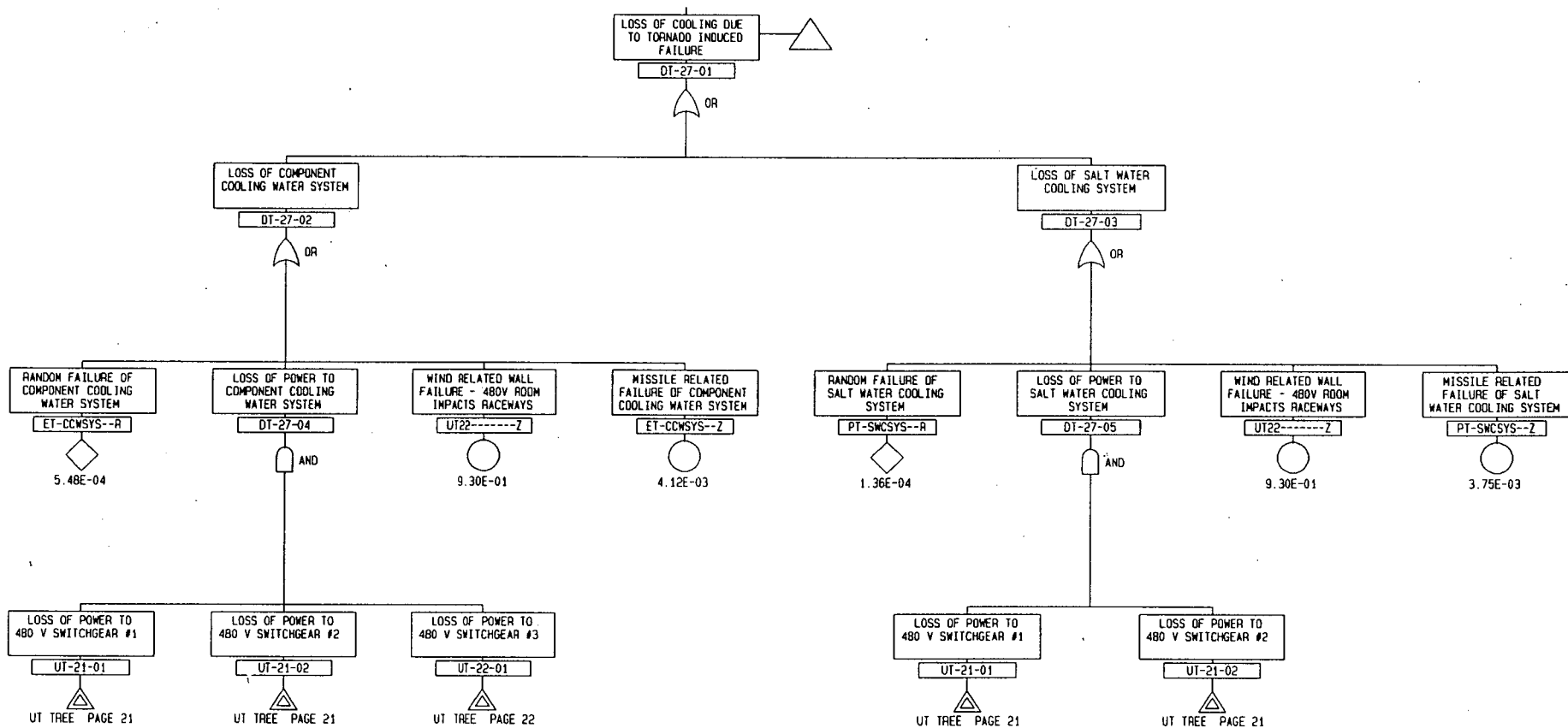
SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



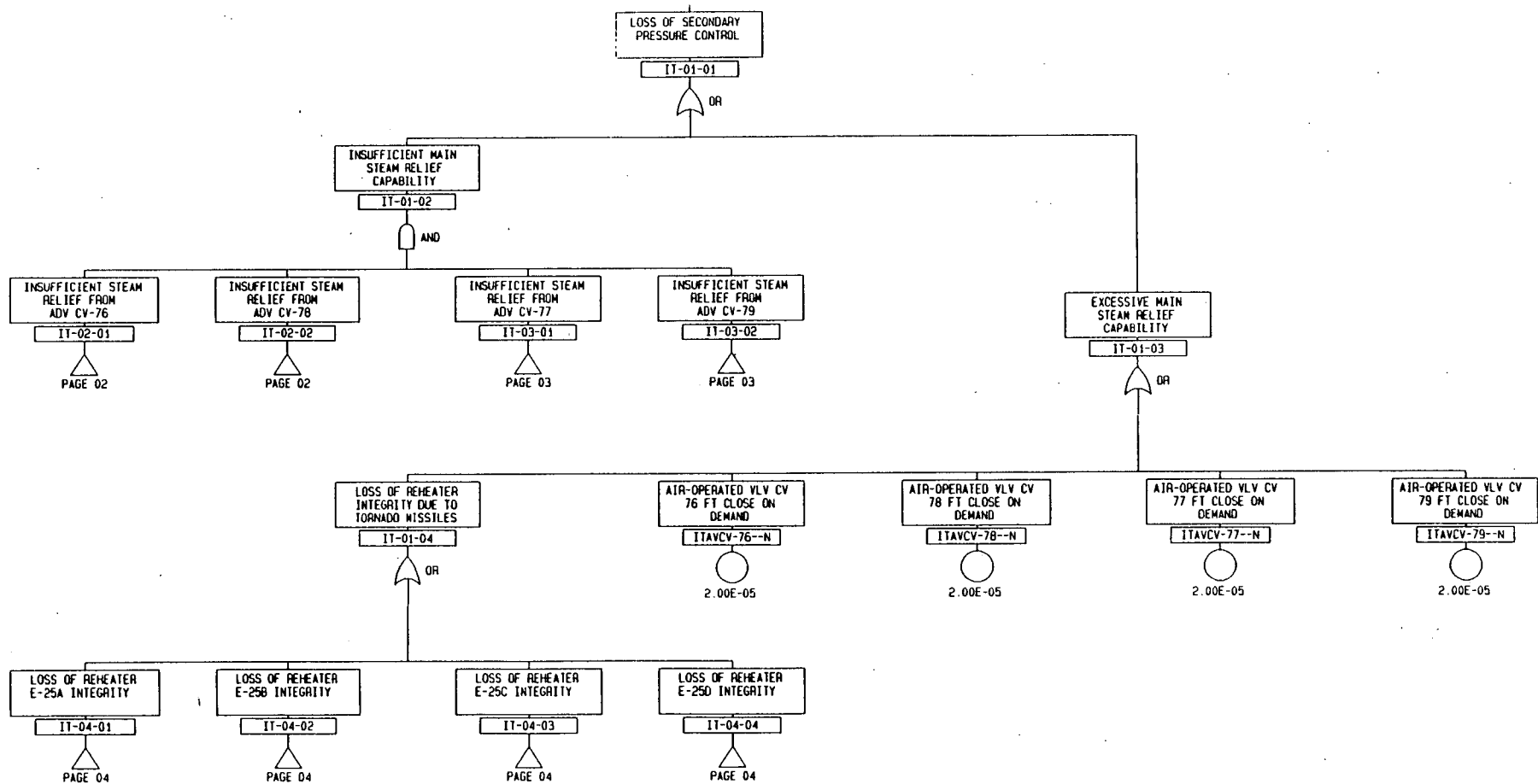
UT220A-----K PERTAINS TO SAME EVENT AS UT22B, UT22C, AND
UT220 WIND FAILURE



SONGS1 - CHARGING SYSTEM FAULT TREE - TORNADO ANALYSIS 08-21-1990



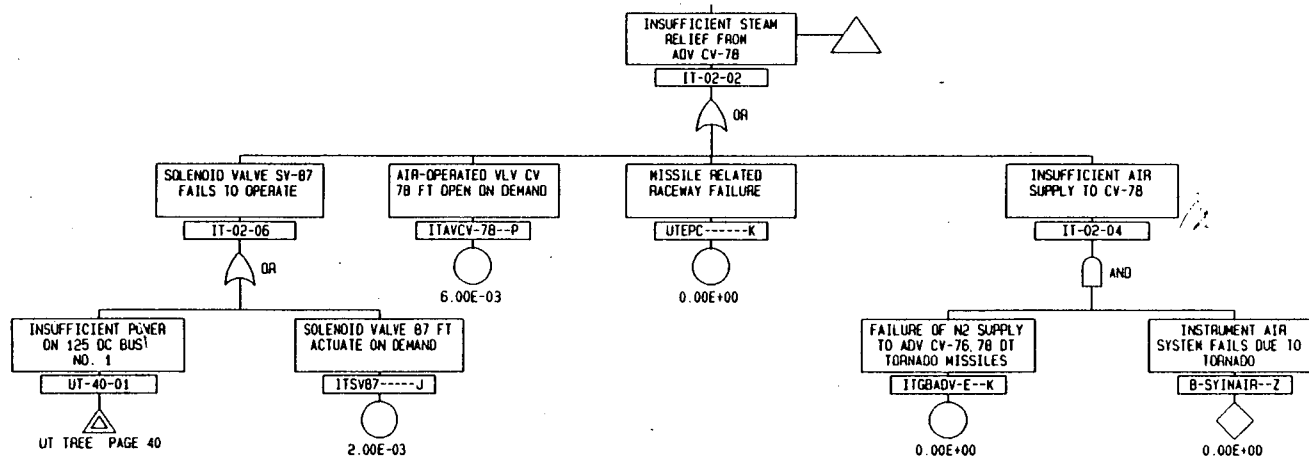
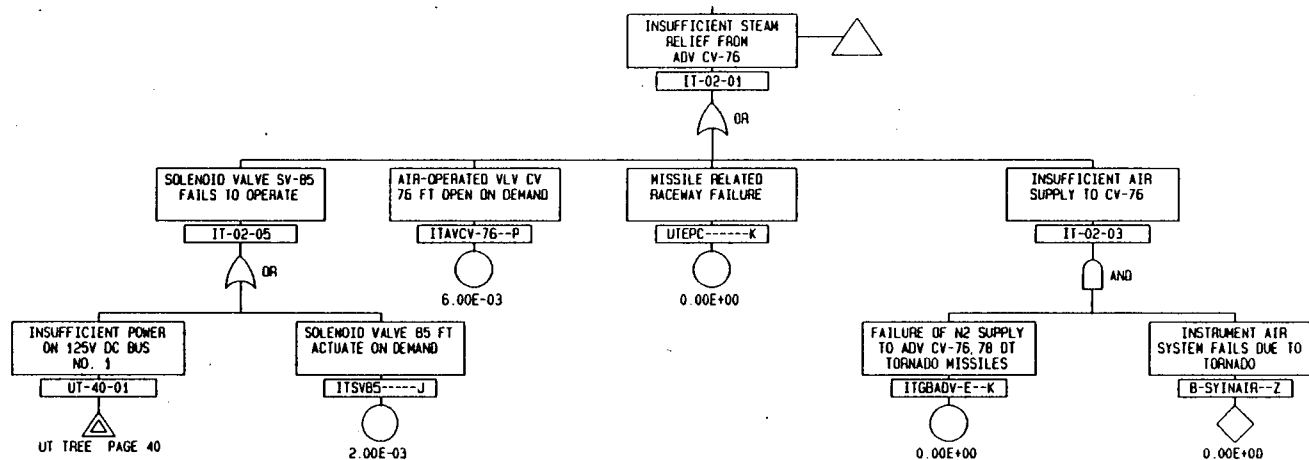
SECONDARY SYSTEM FAULT TREE - TORNADO ANALYSIS



The frequency values for all demand related failures for the ADV's are multiplied by 2 to account for multiple demands.

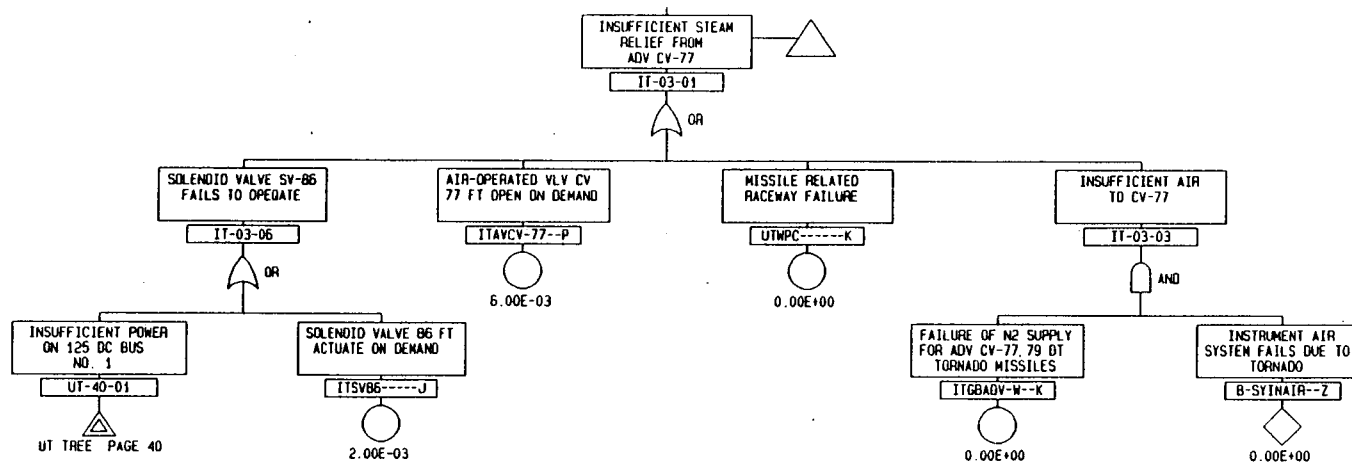
04-11-1990

SECONDARY SYSTEM FAULT TREE - TORNADO ANALYSIS

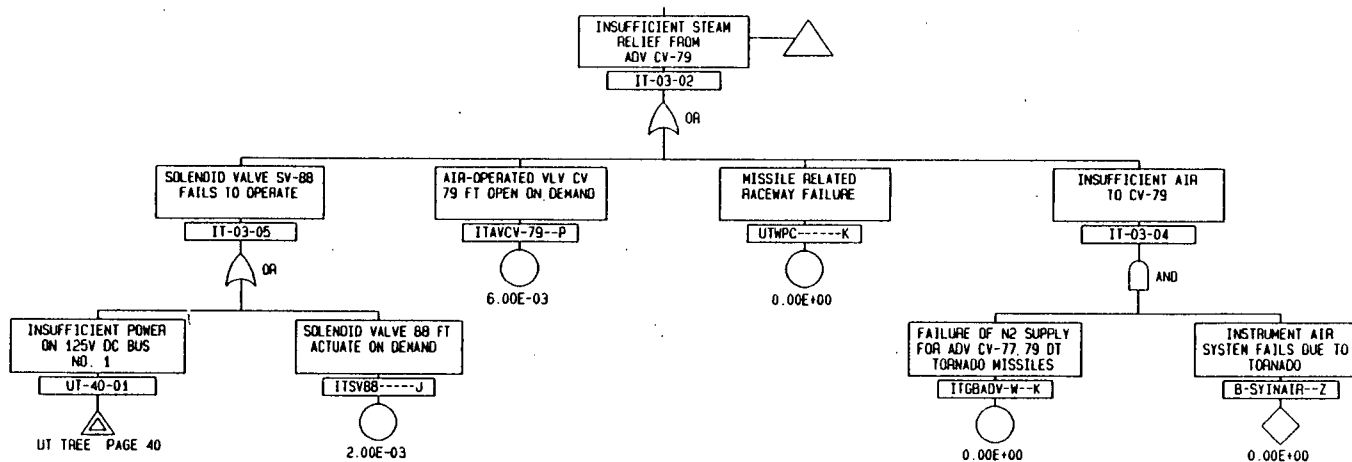


04-13-1990

SECONDARY SYSTEM FAULT TREE - TORNADO ANALYSIS



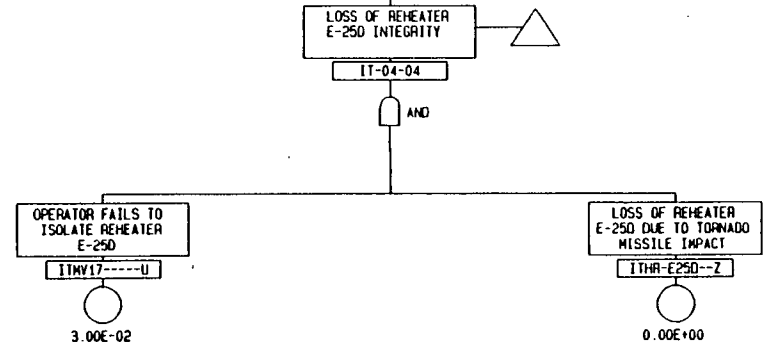
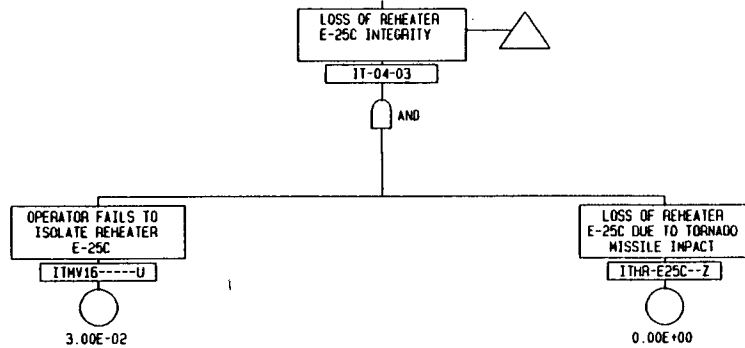
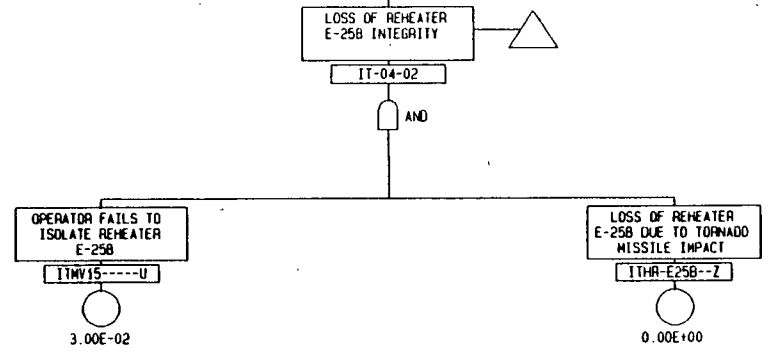
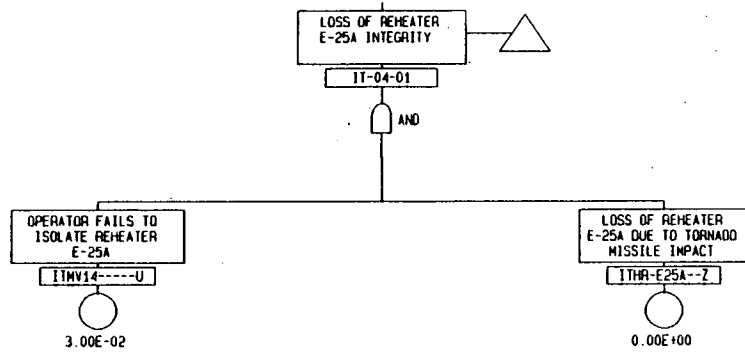
UT TREE PAGE 40

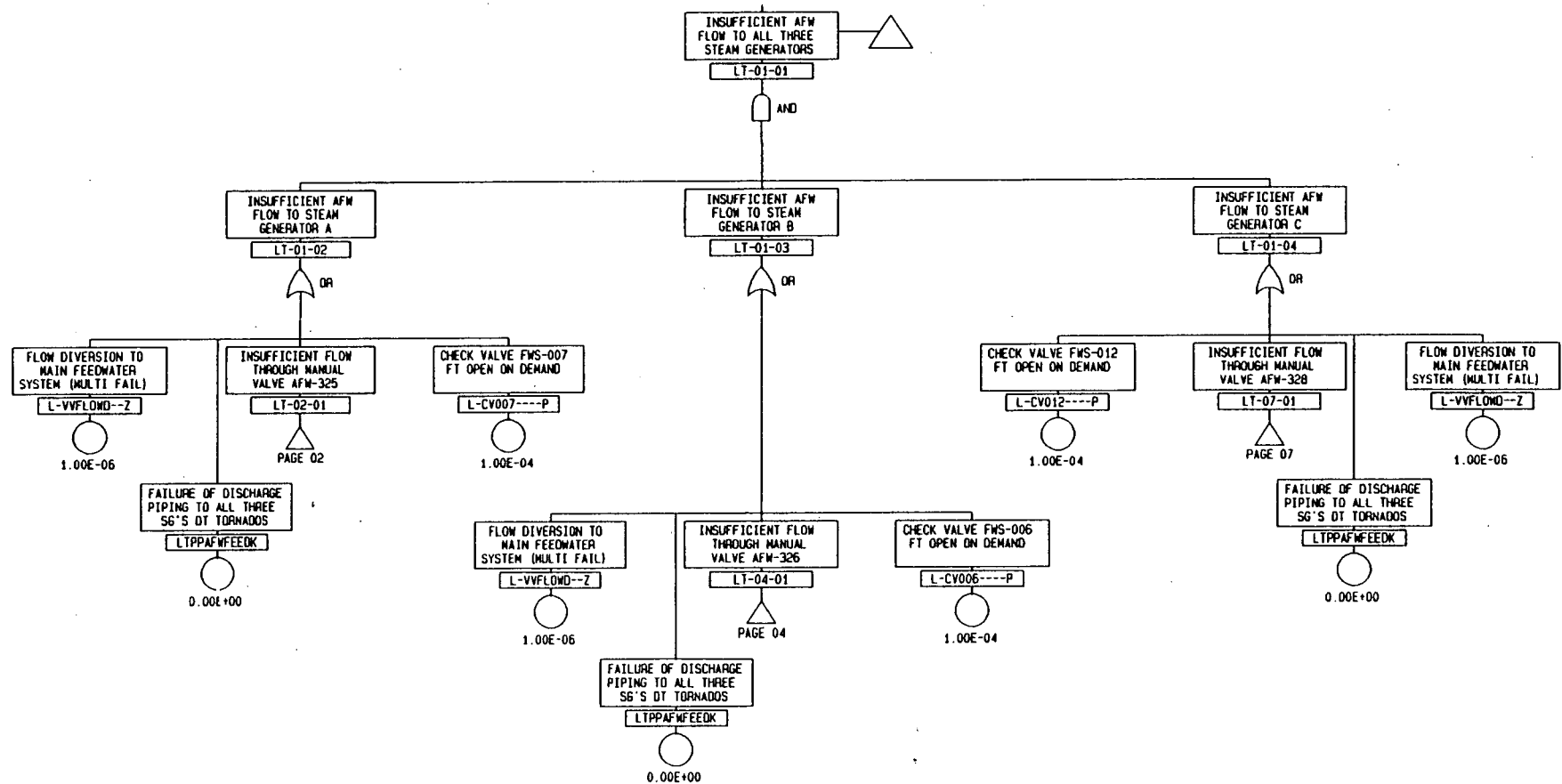


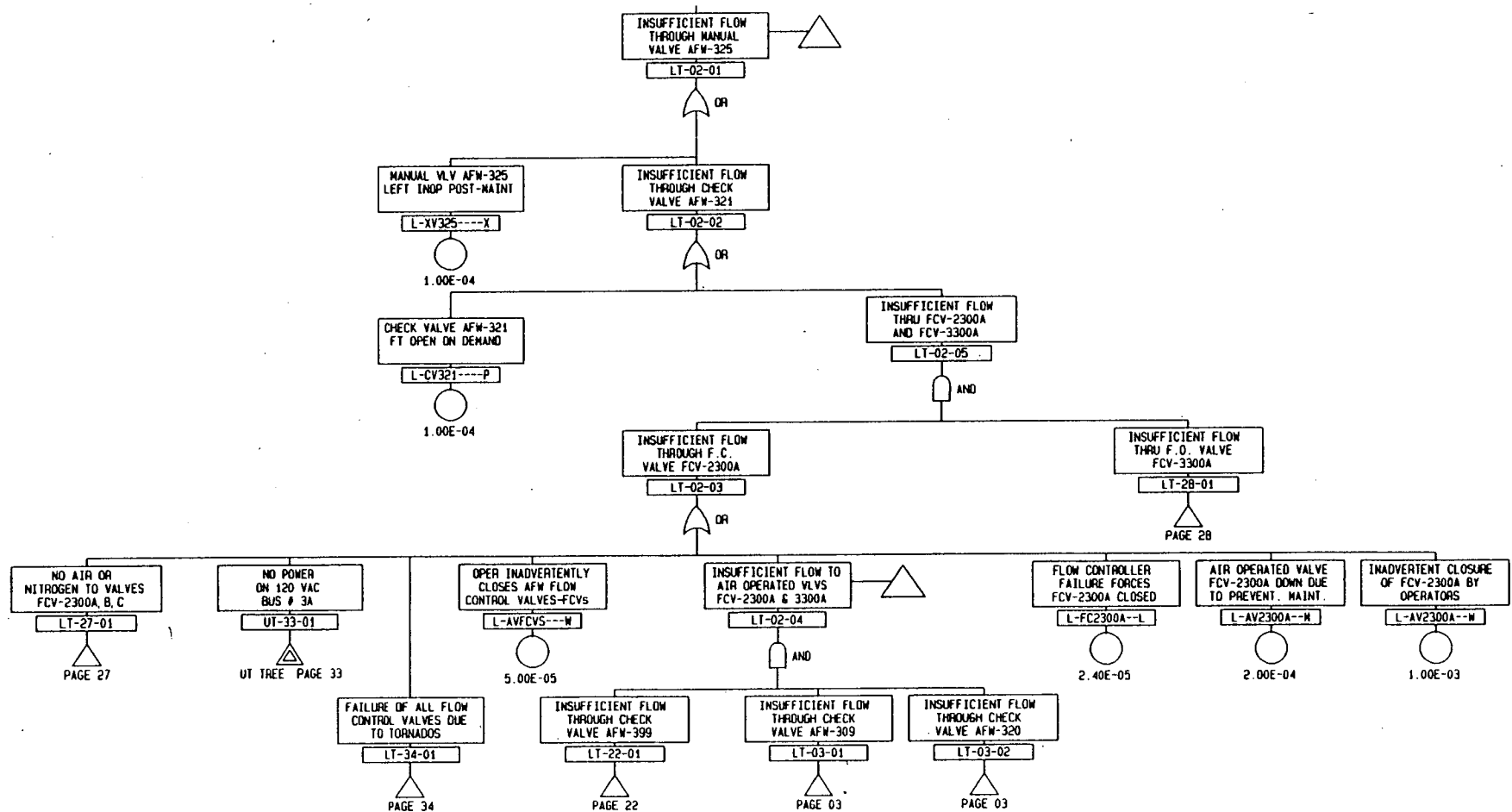
UT TREE PAGE 40

04-13-1990

SECONDARY SYSTEM FAULT TREE - TORNADO ANALYSIS

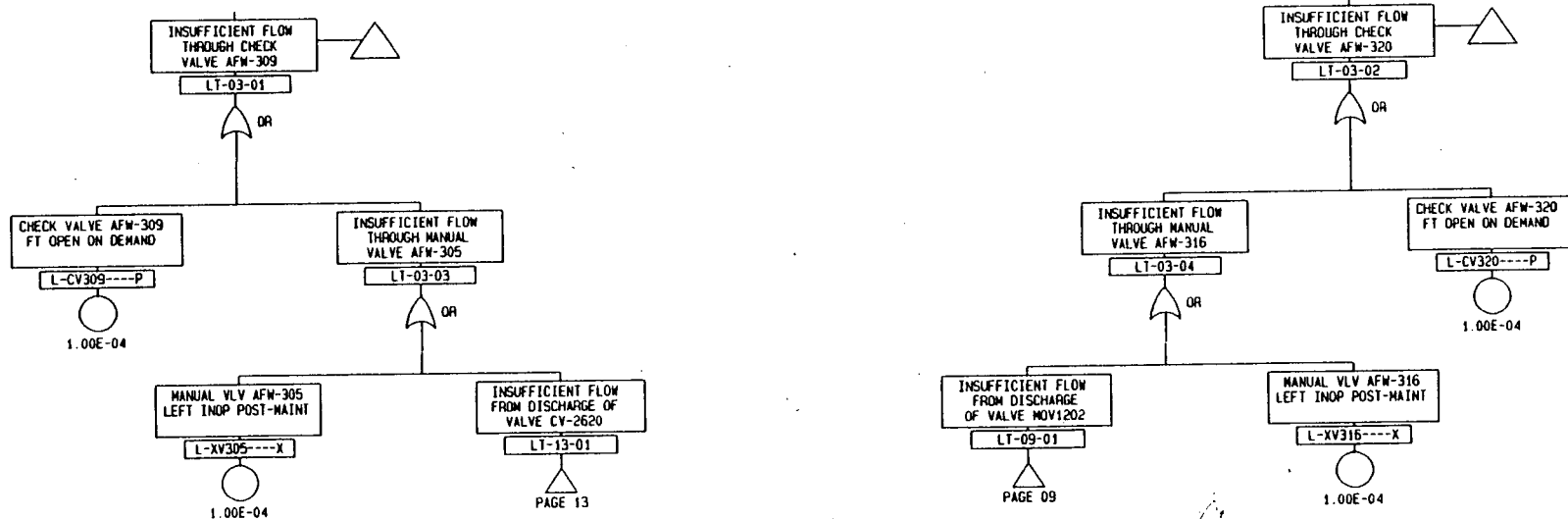




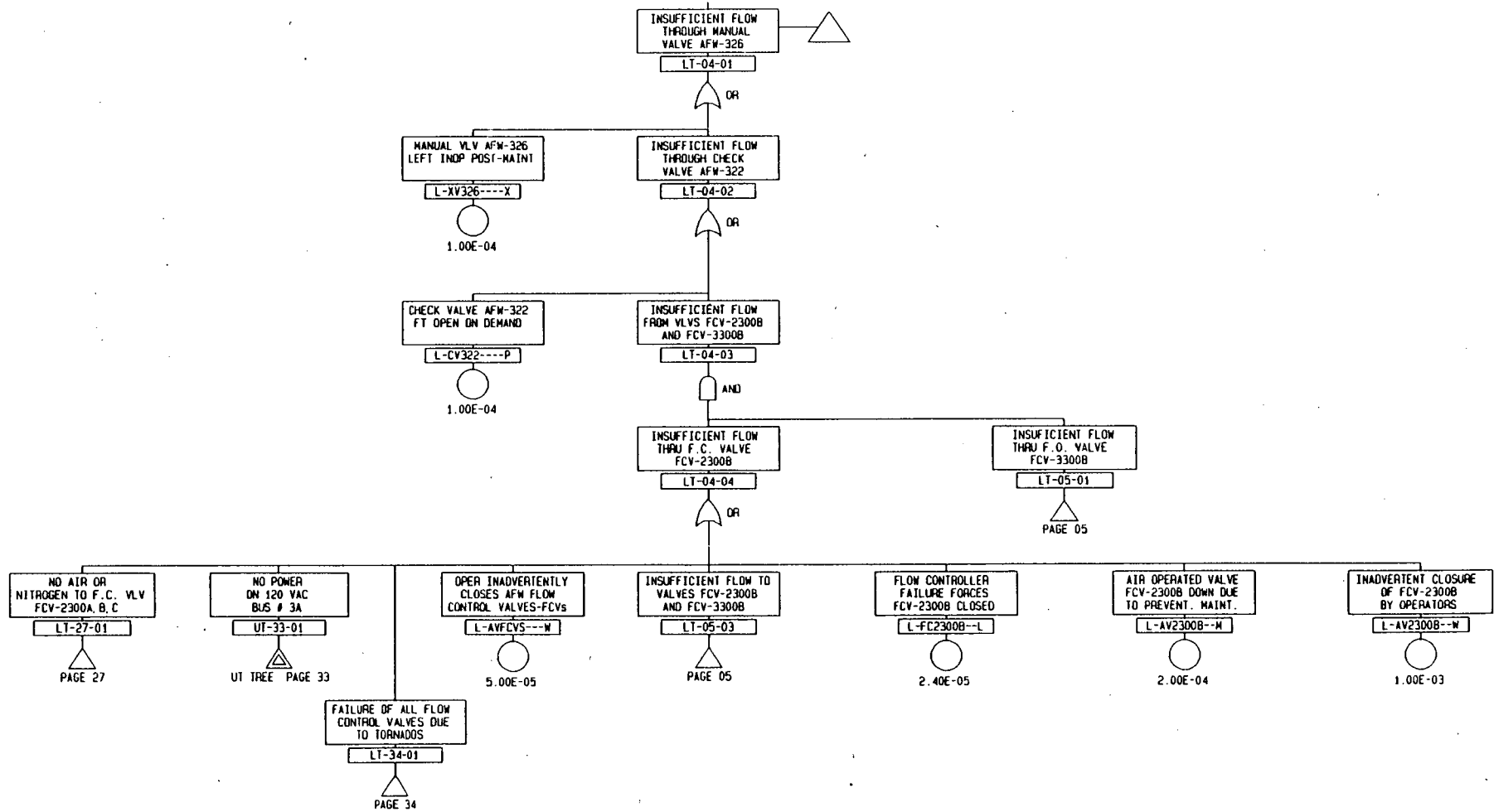


L-AVFCVS---W uses SO1-1.0-10, Rev. 3, "Reactor Trip on Safety Injection", step 30.

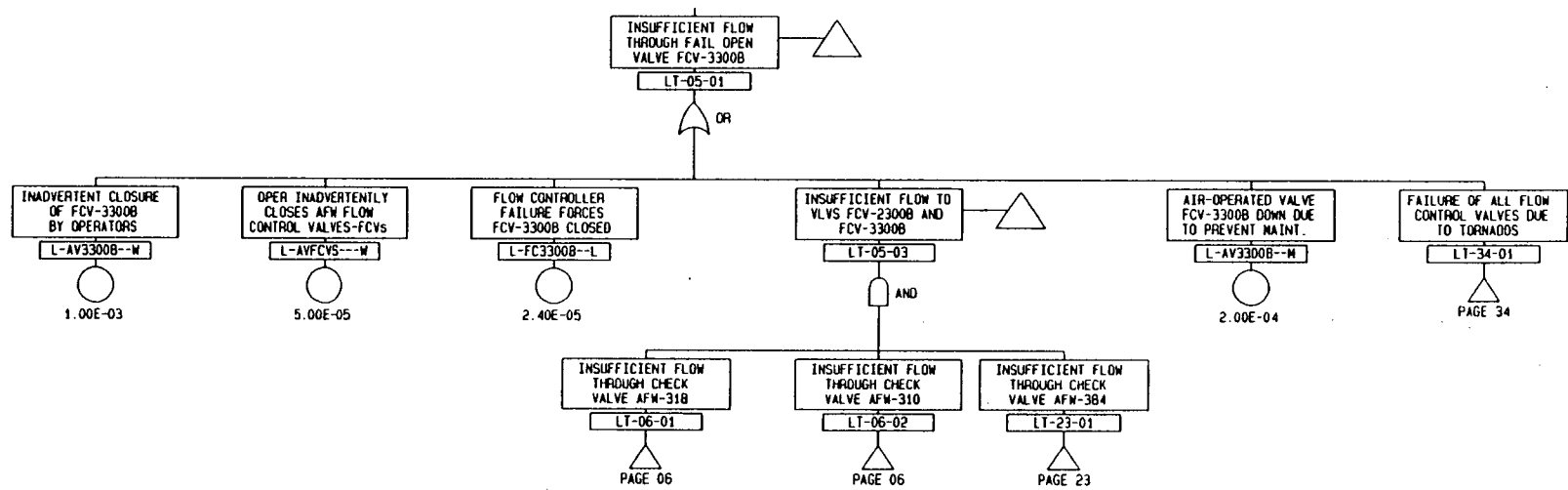
04-16-1990

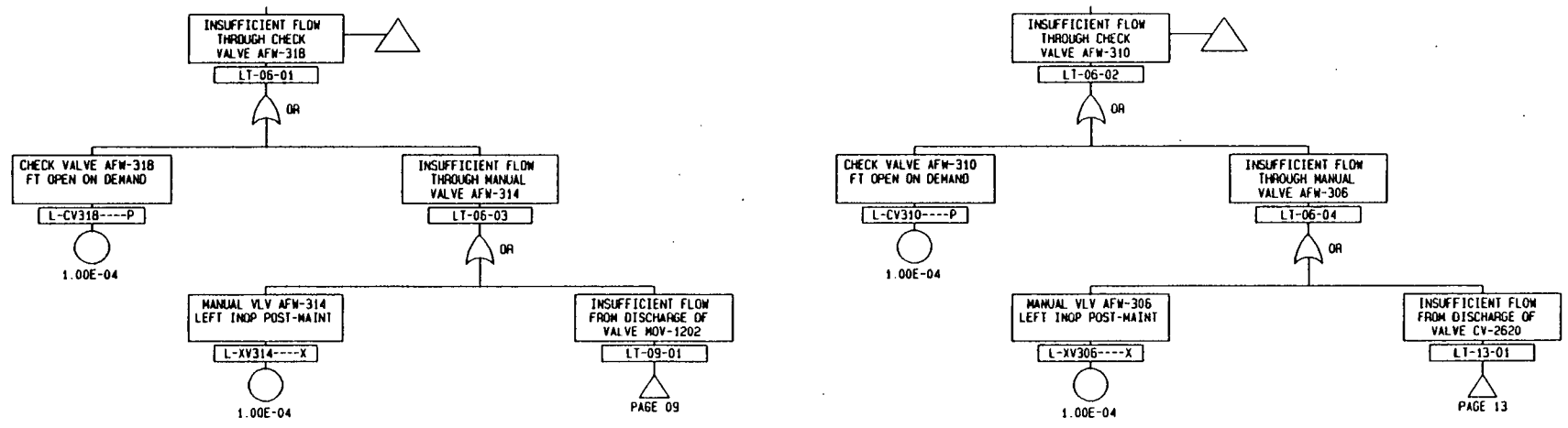


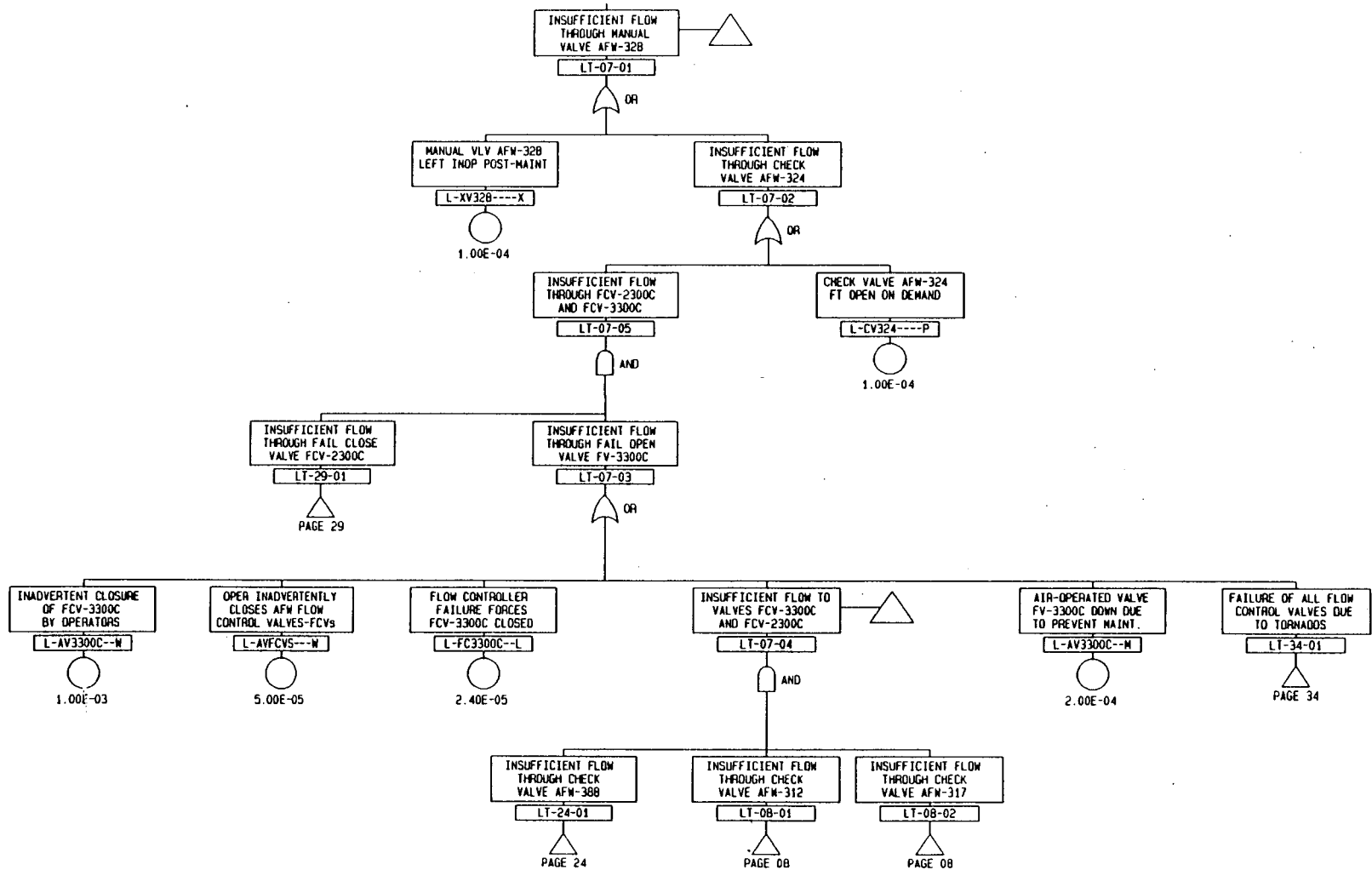
04-11-1990

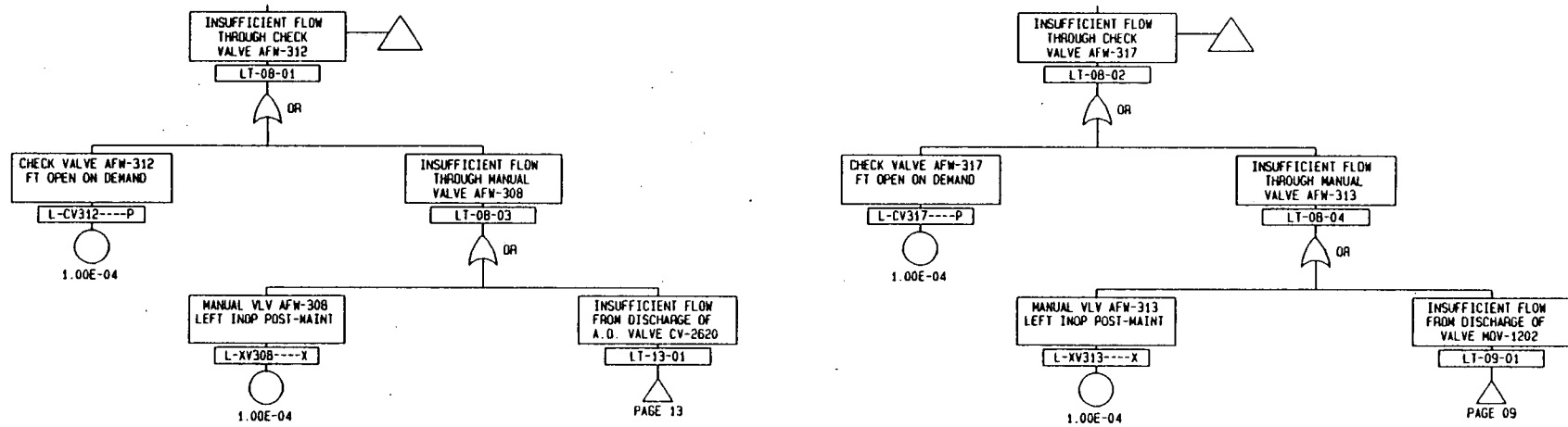


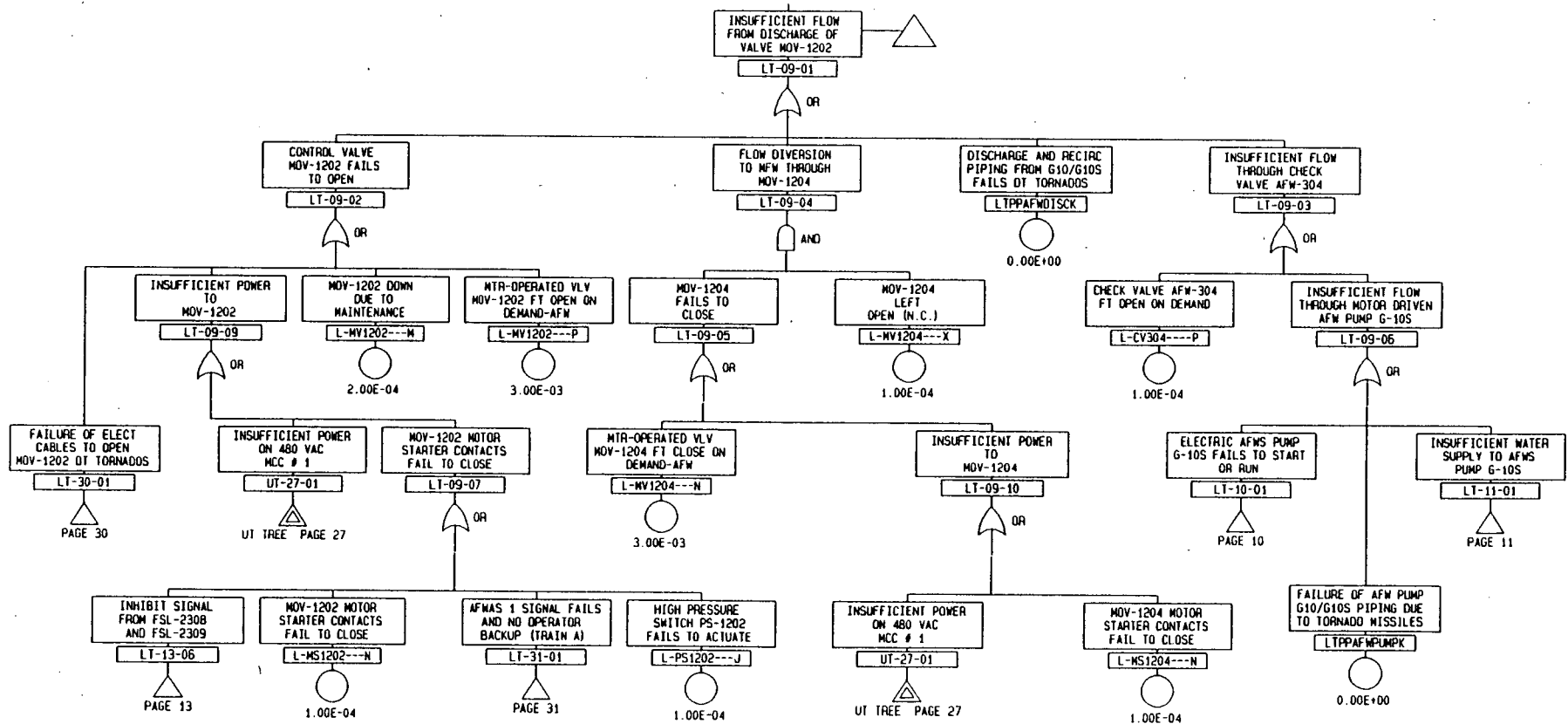
04-11-1990





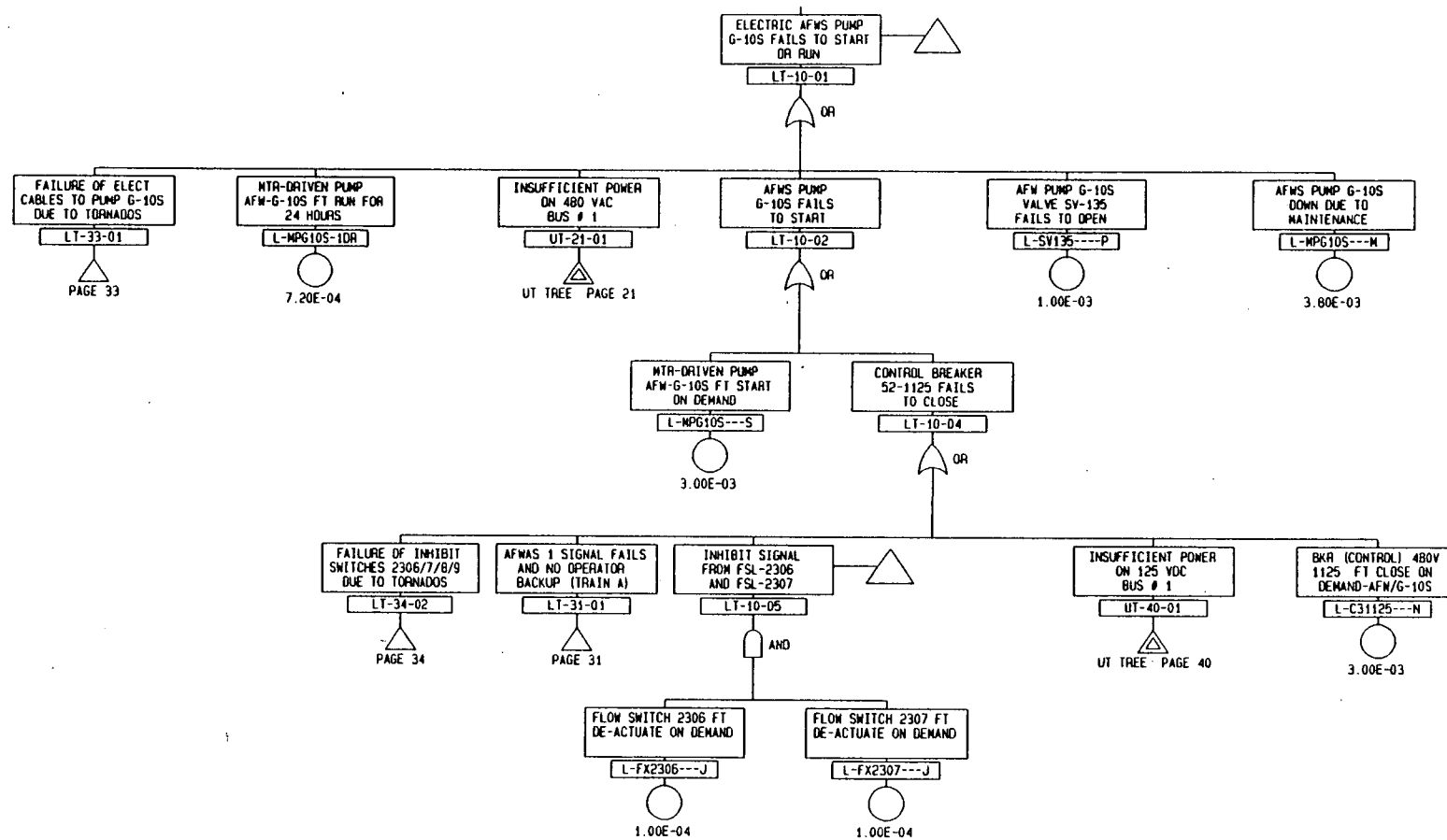


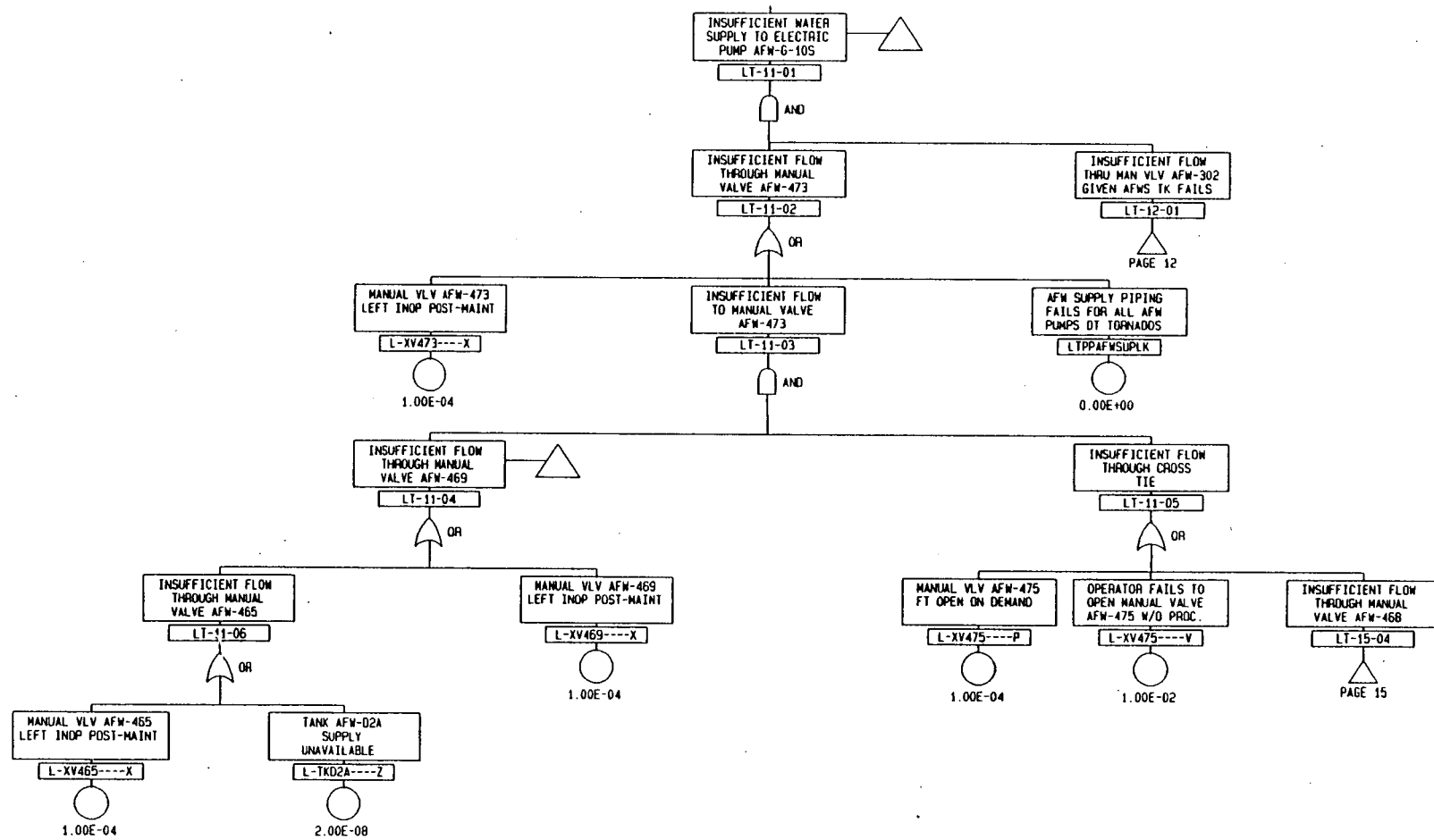


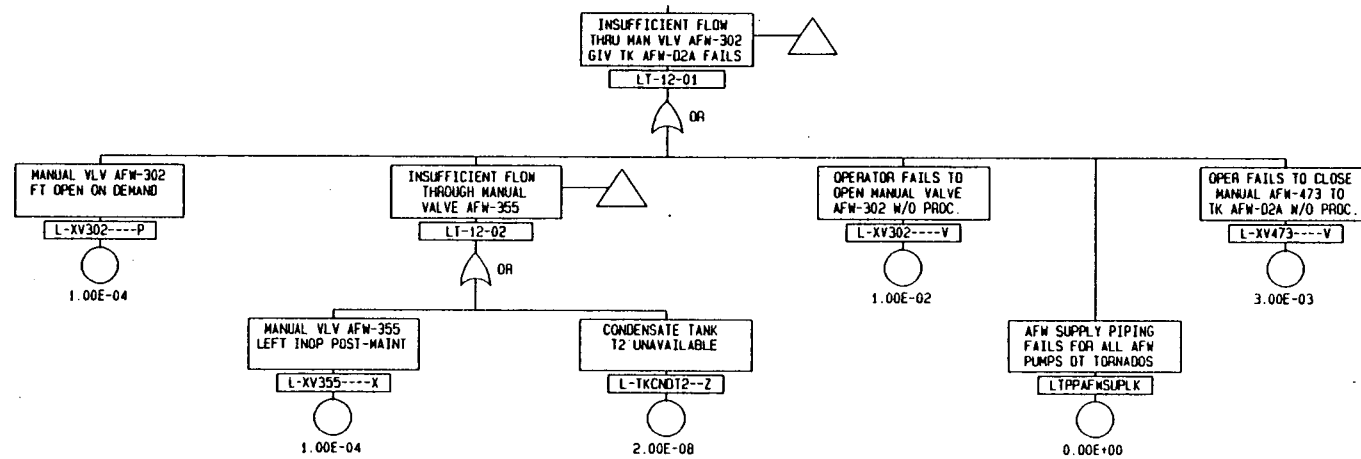


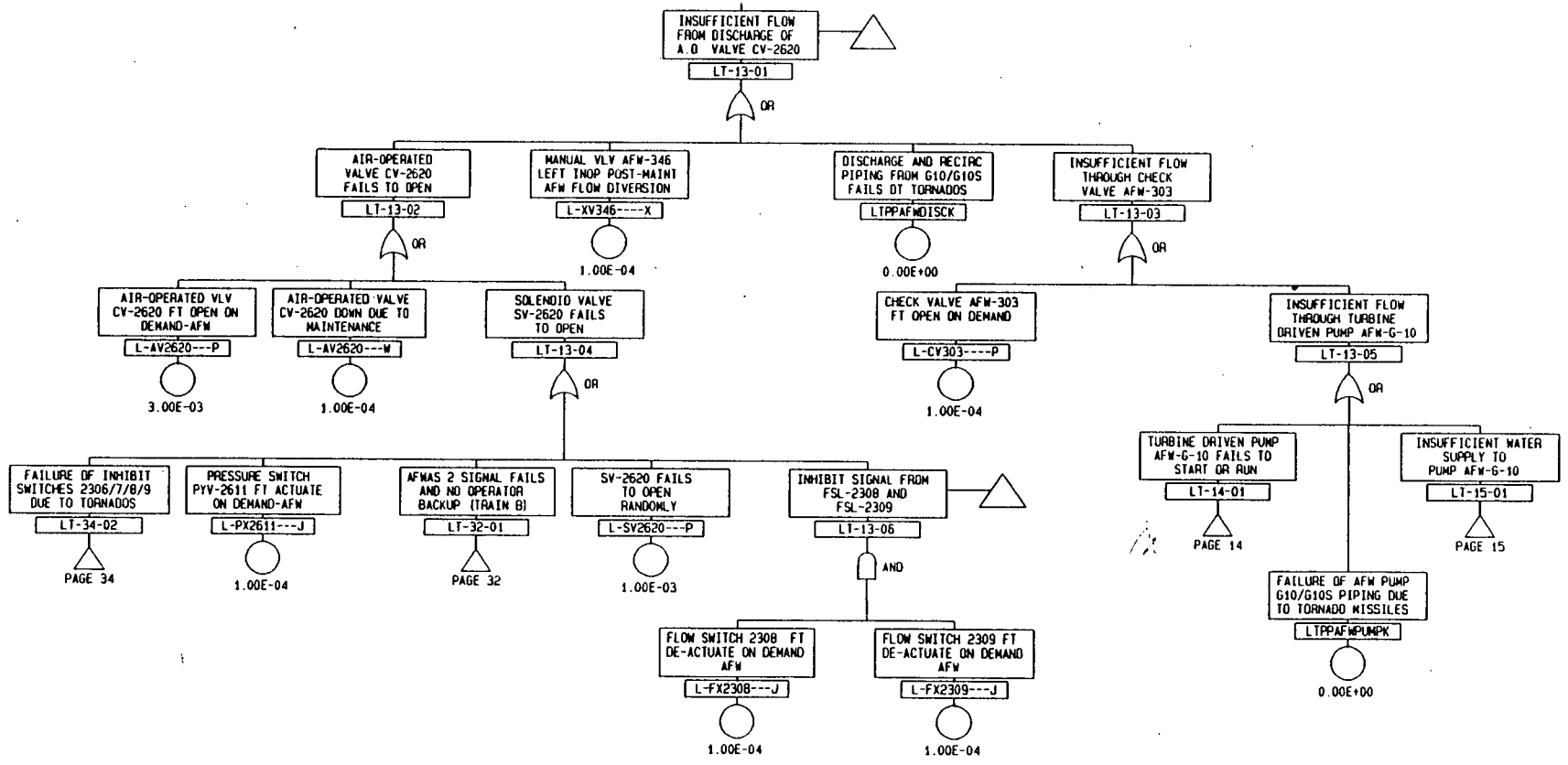
Gate WAUST-09-05: MOV-1204 closes automatically on receipt of a signal or "sequencer 1" signal. Failure of MOV-1204 to close will be annunciated in the control room.

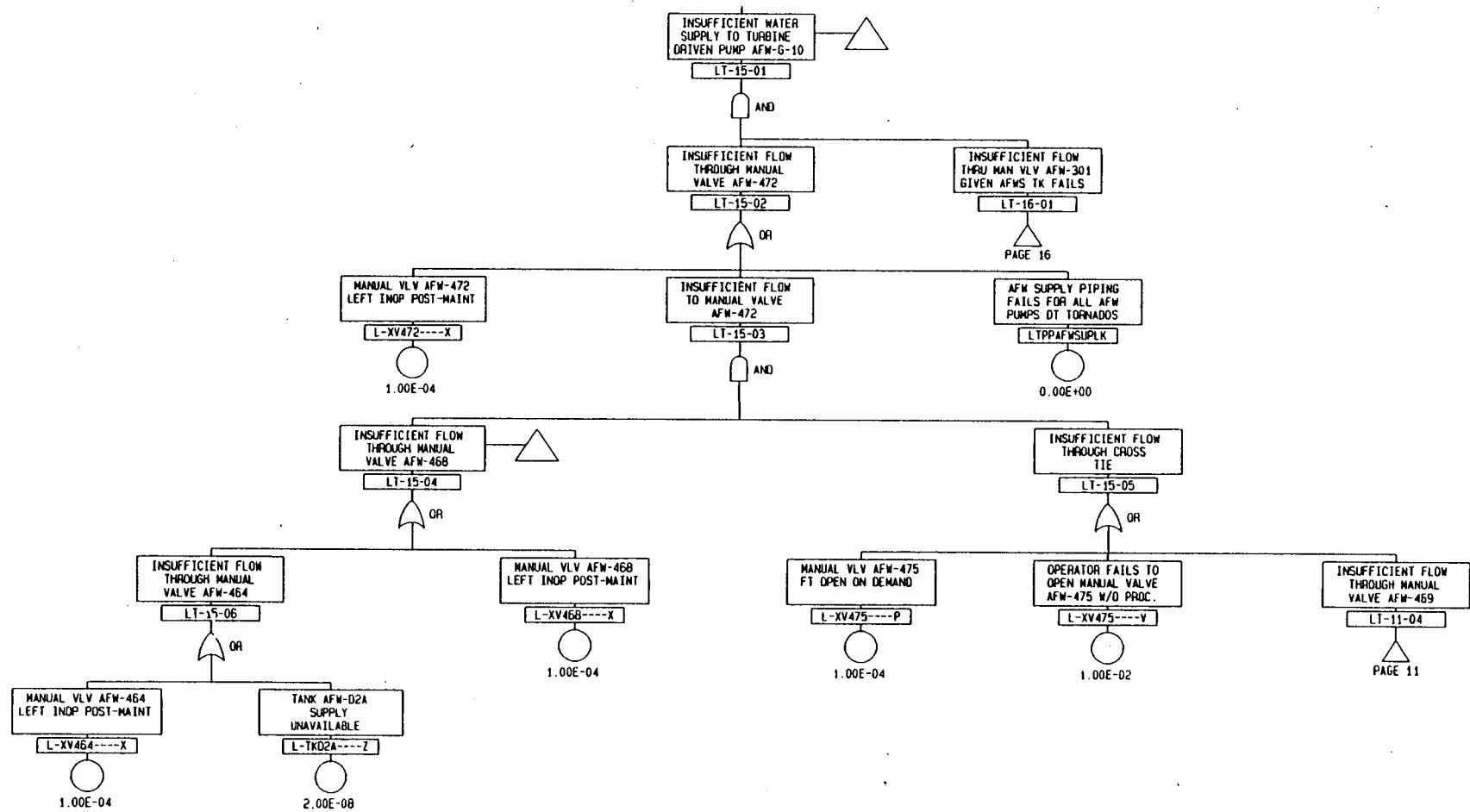
04-11-1990

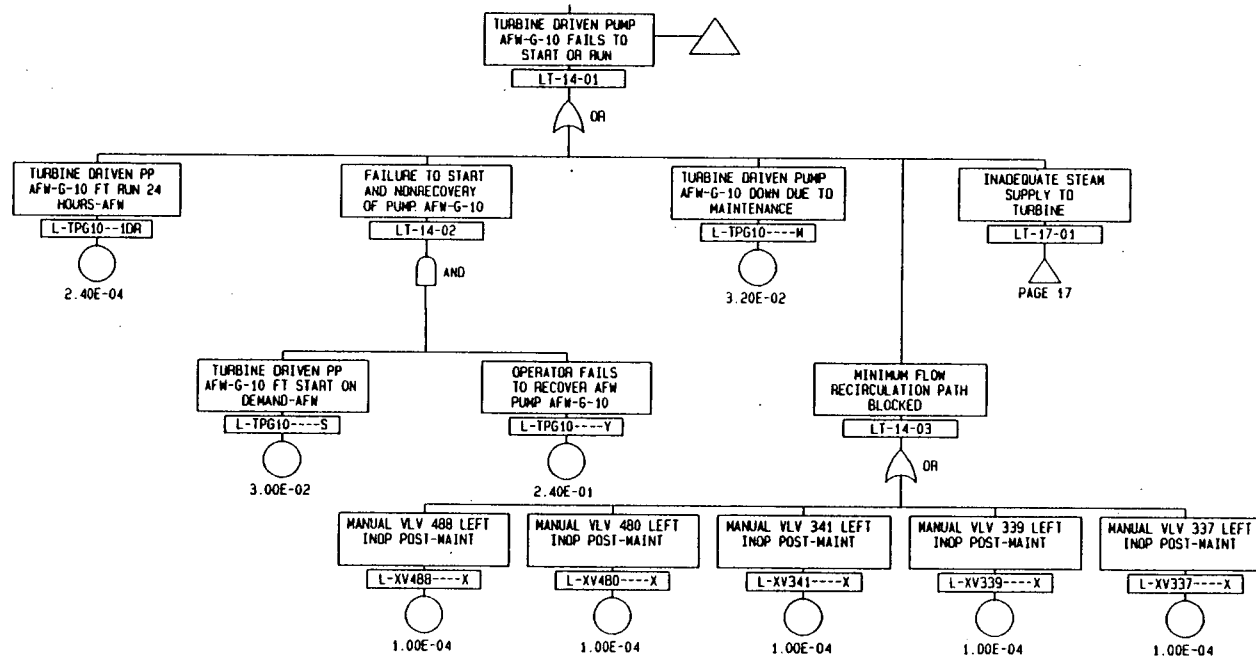


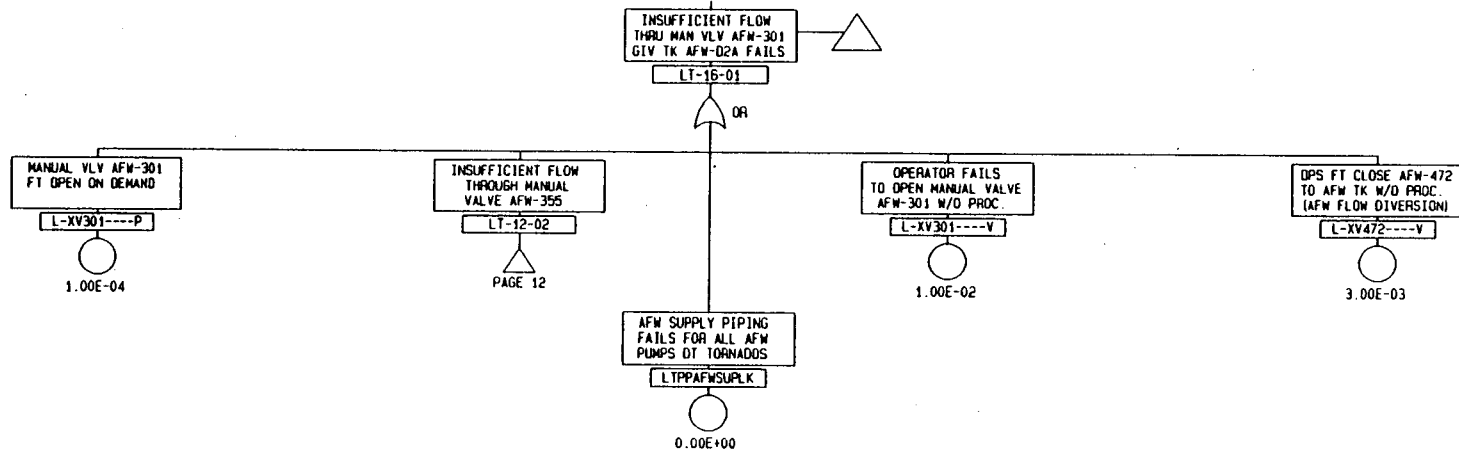


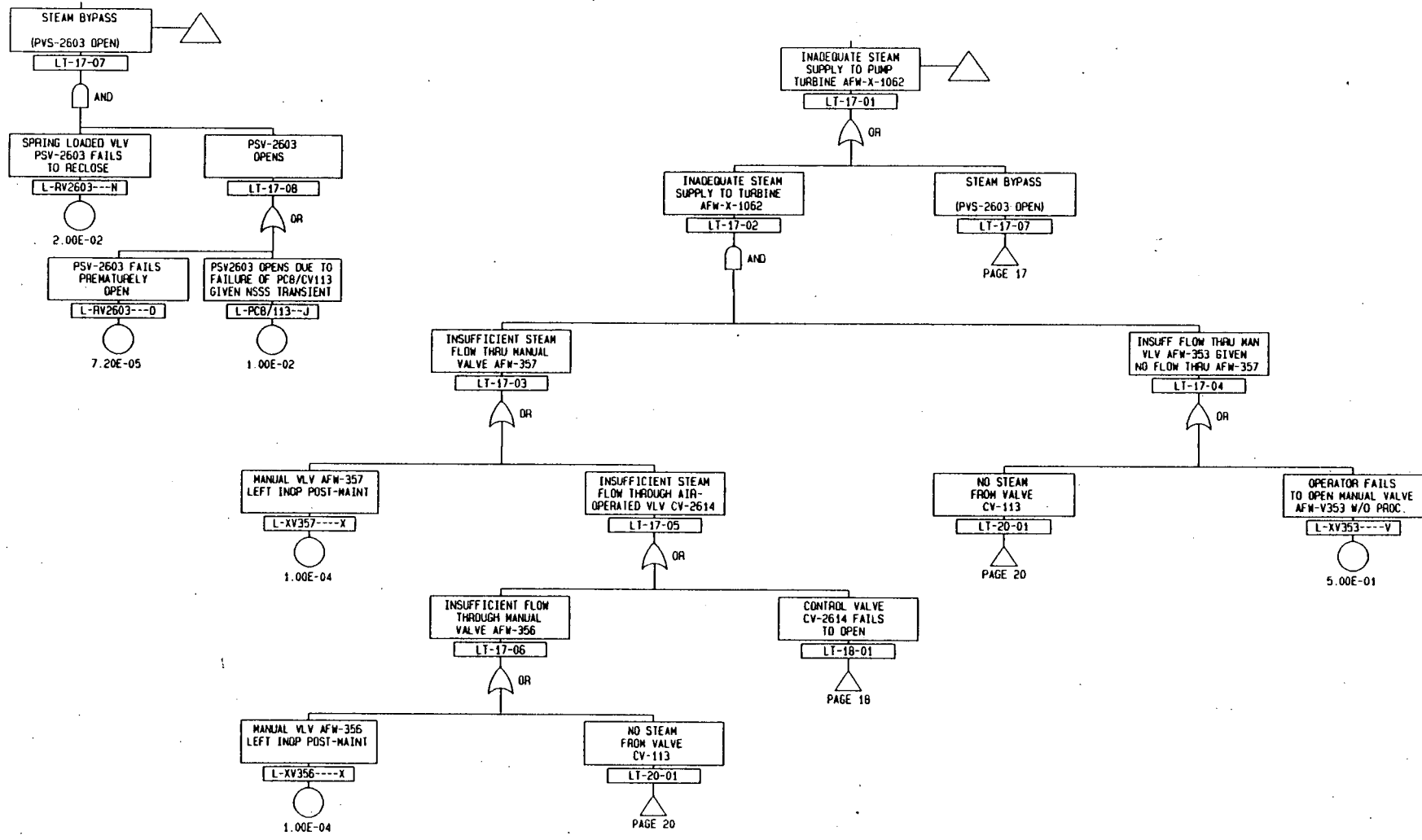


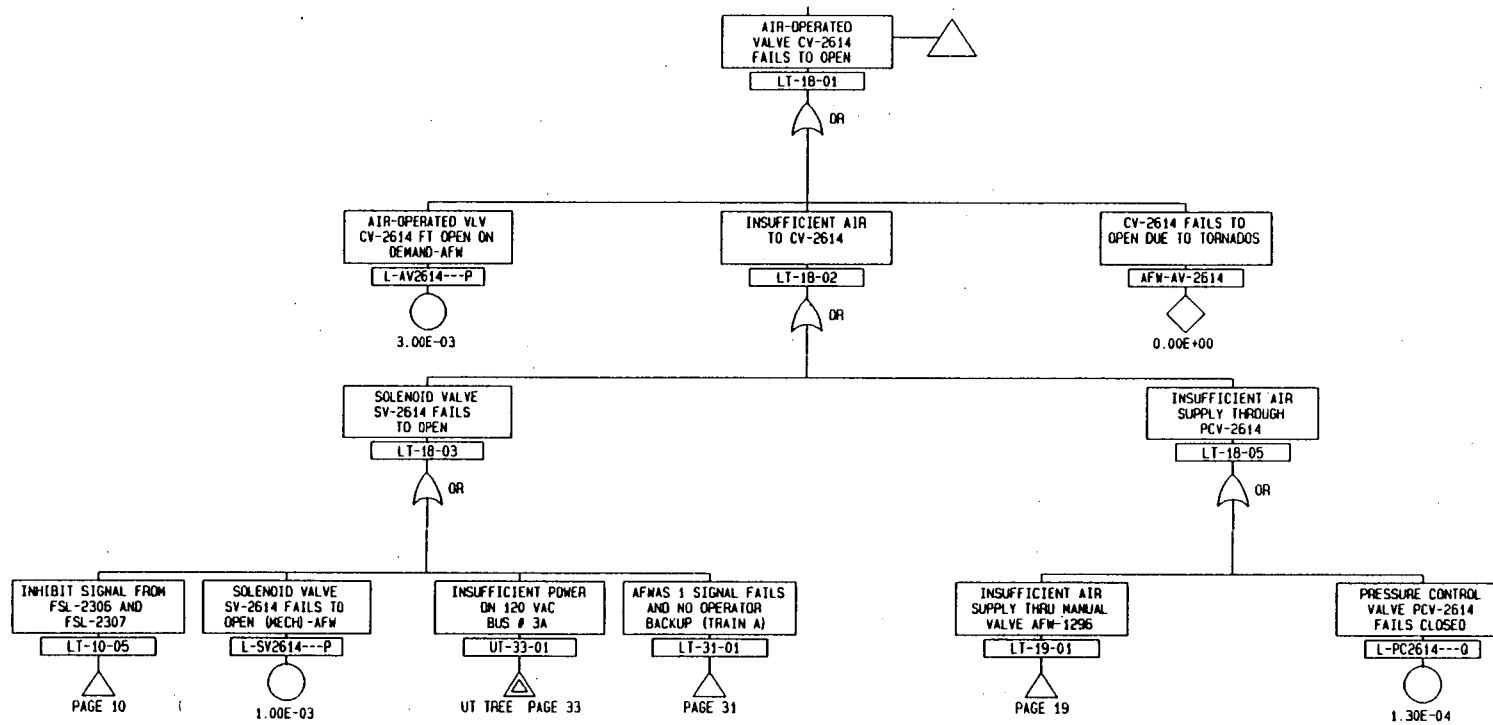


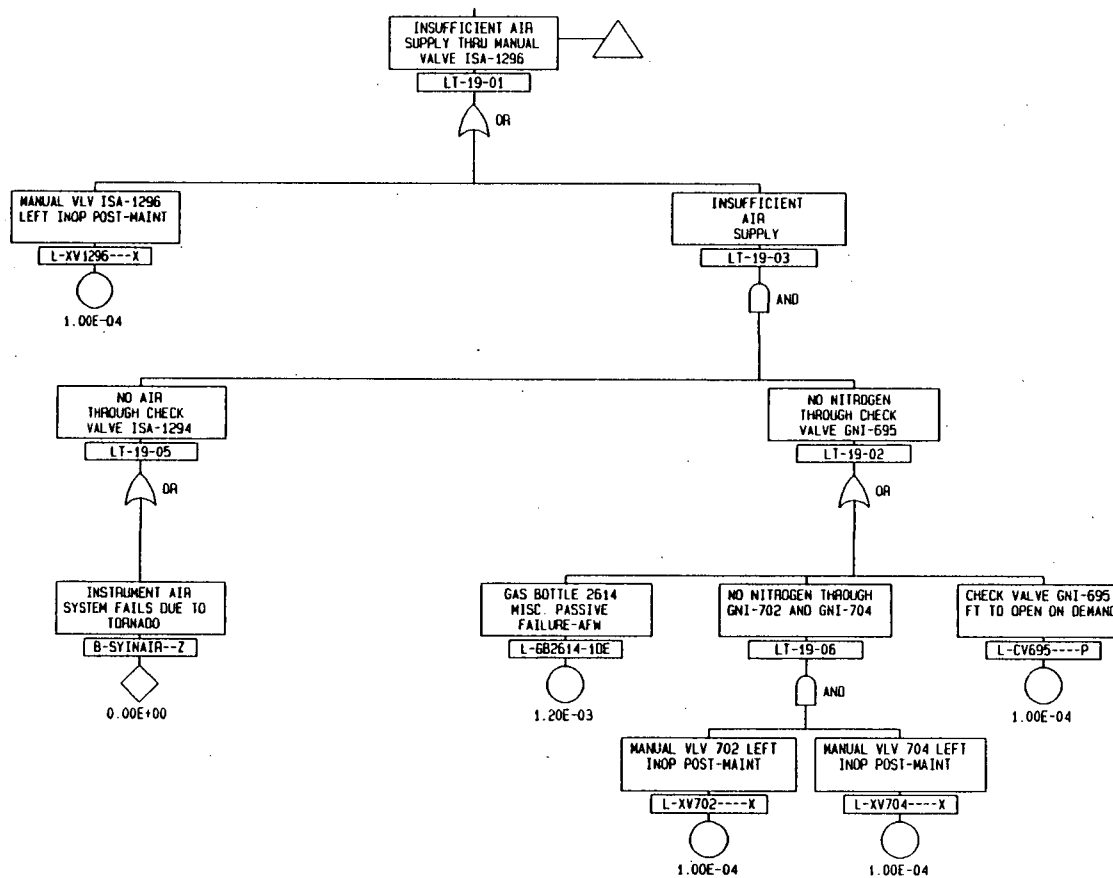




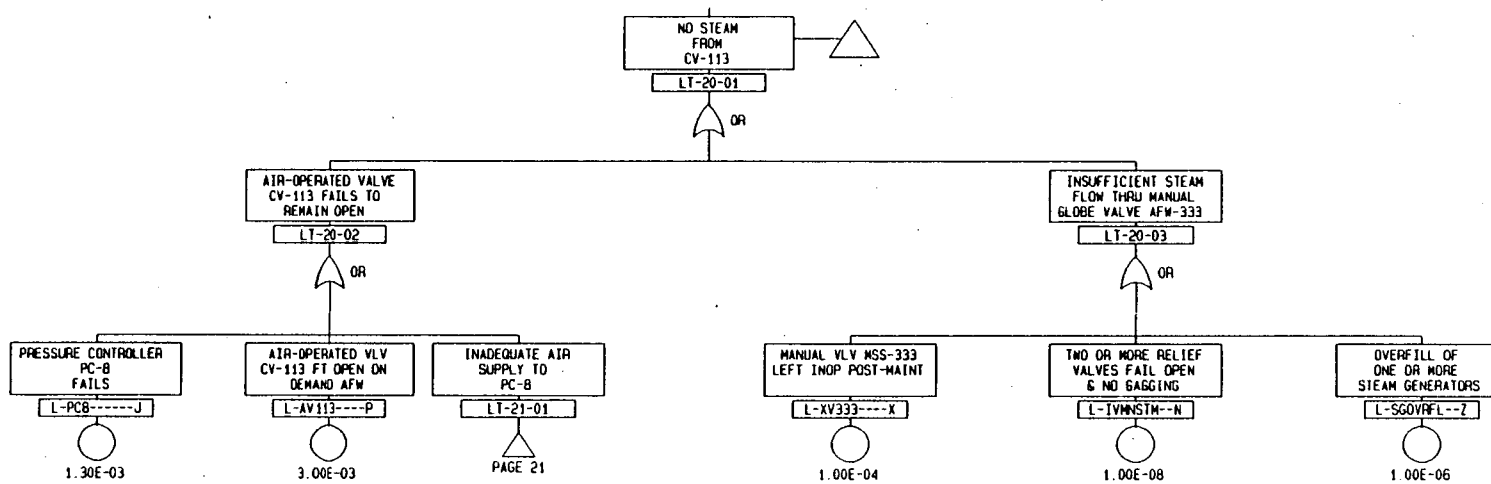


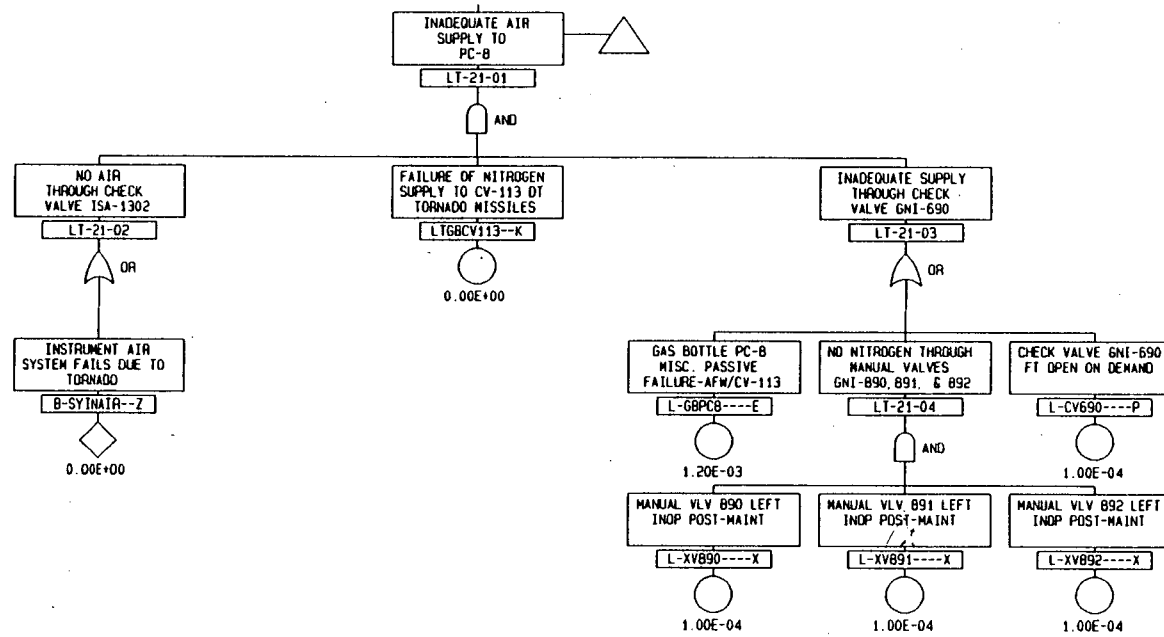


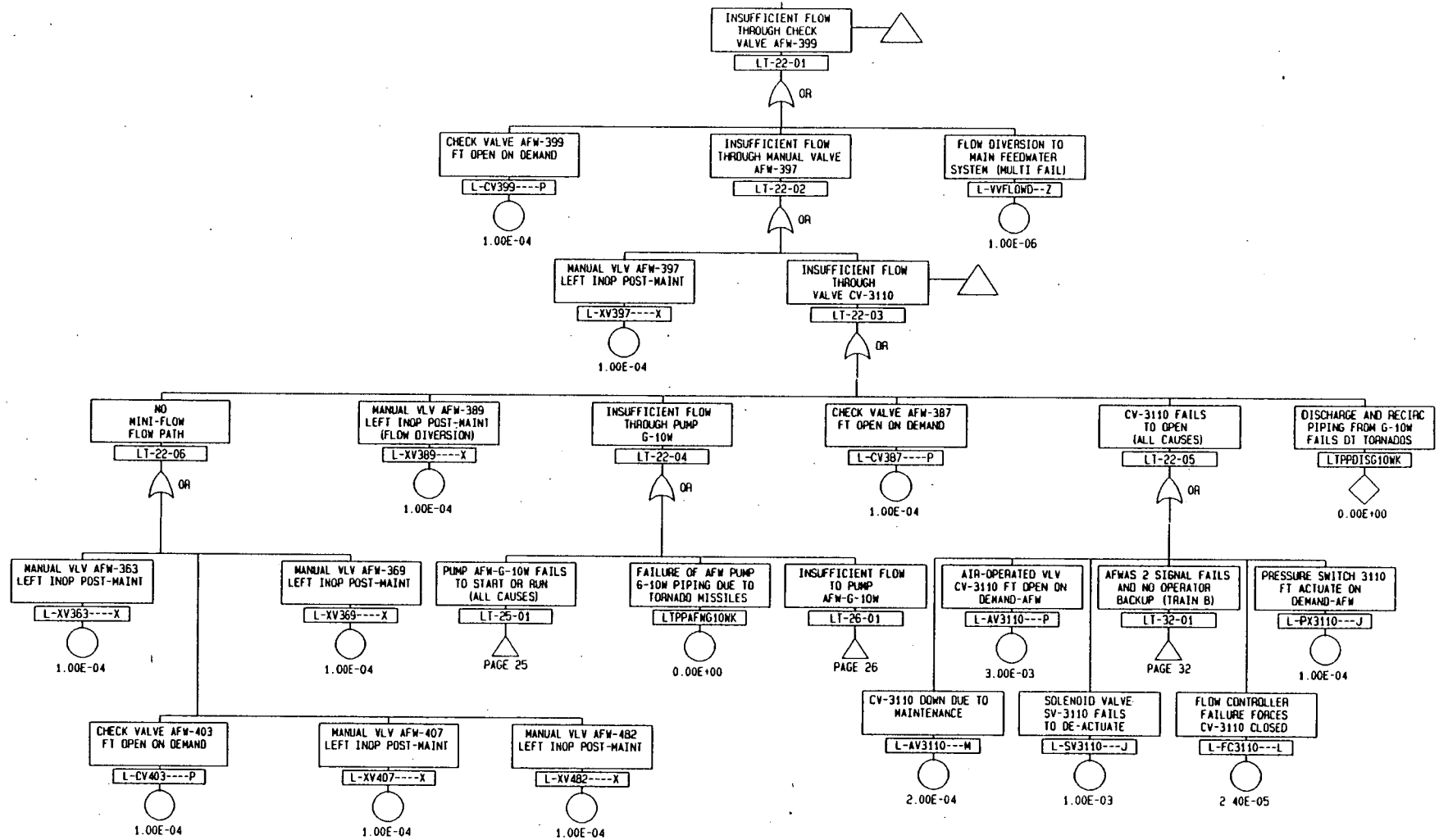




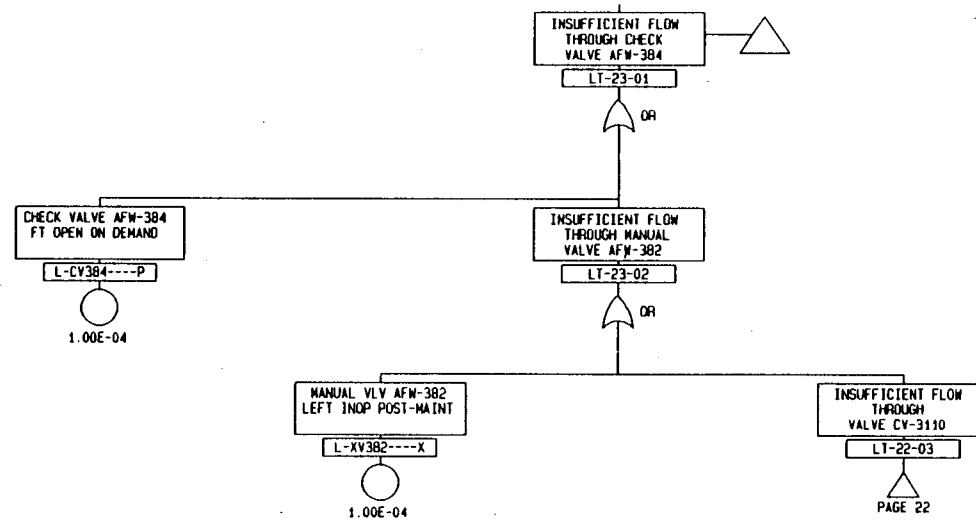
04-11-1990

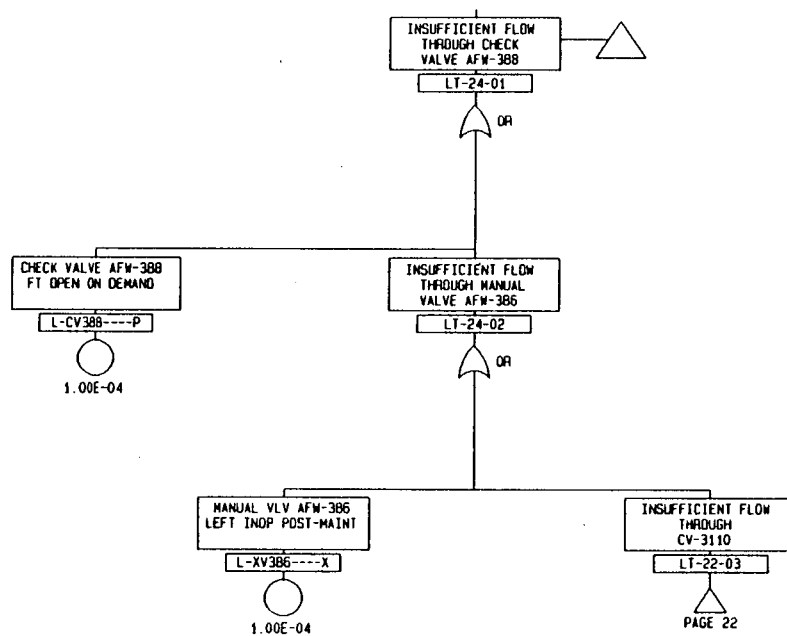


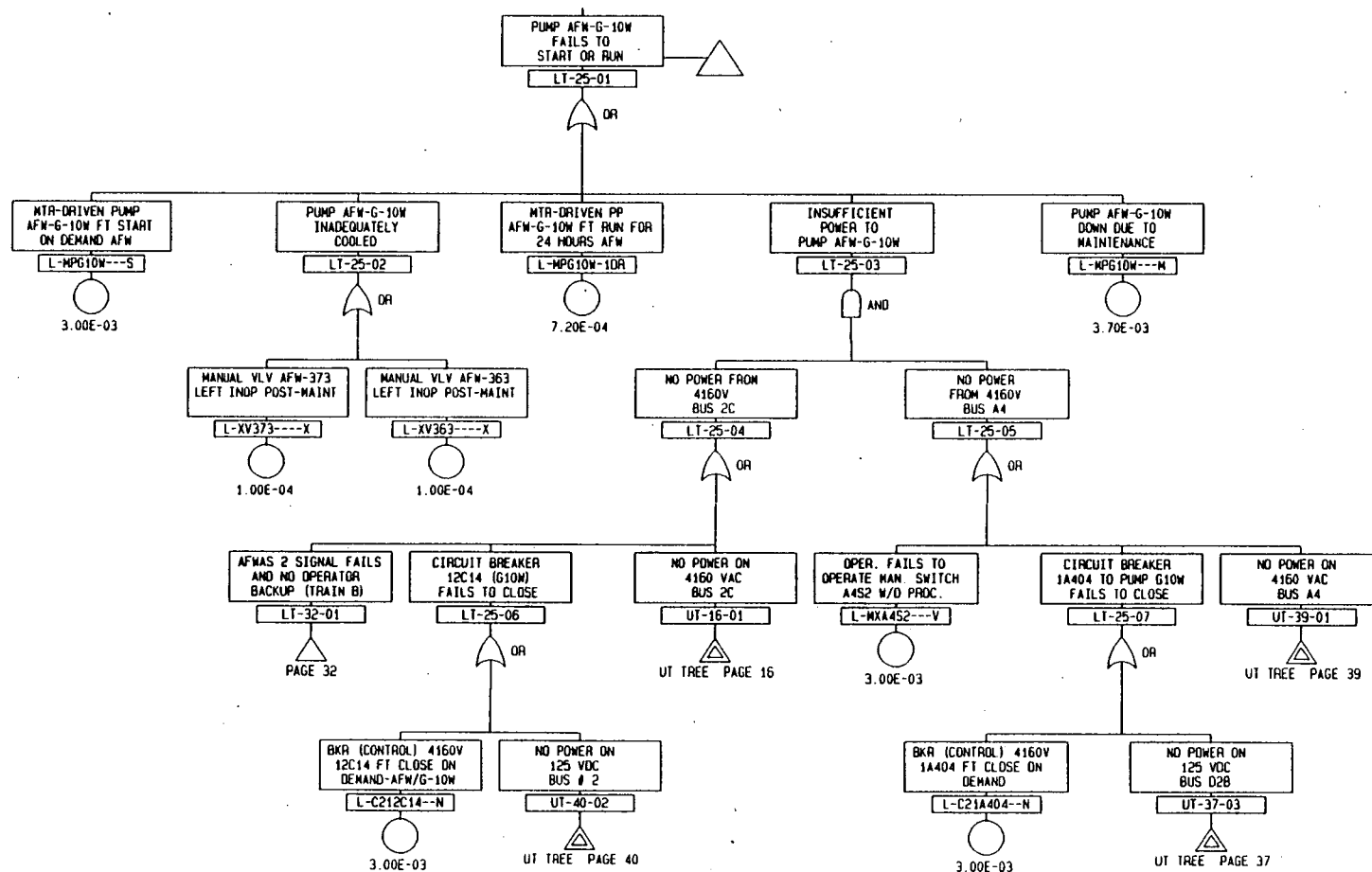


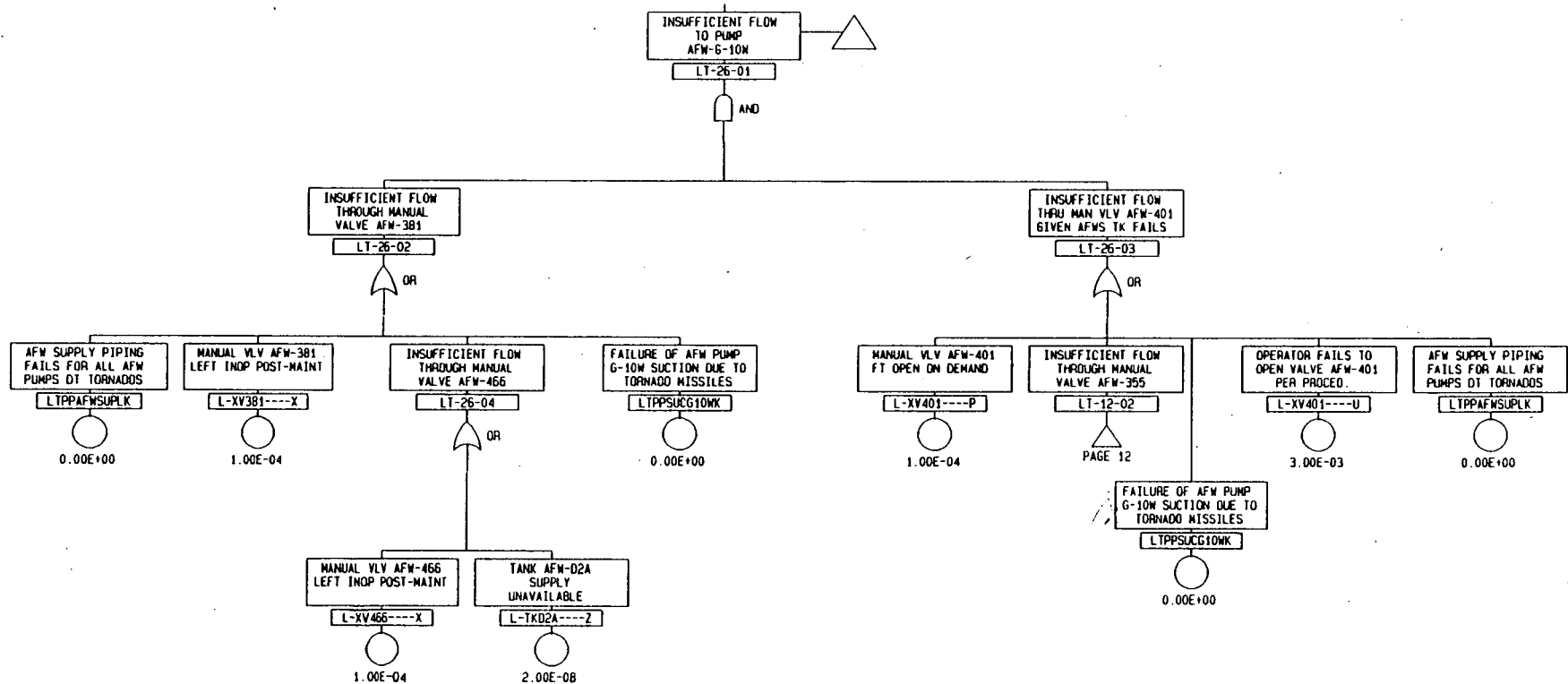


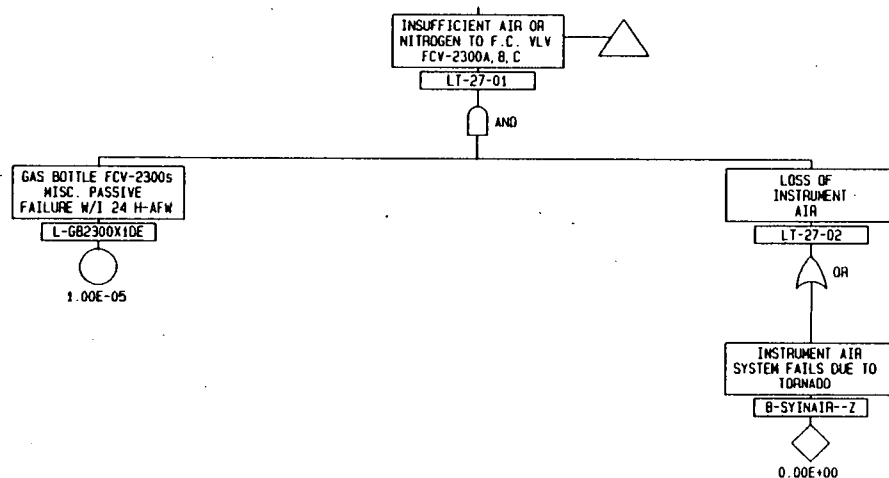
04-11-1990

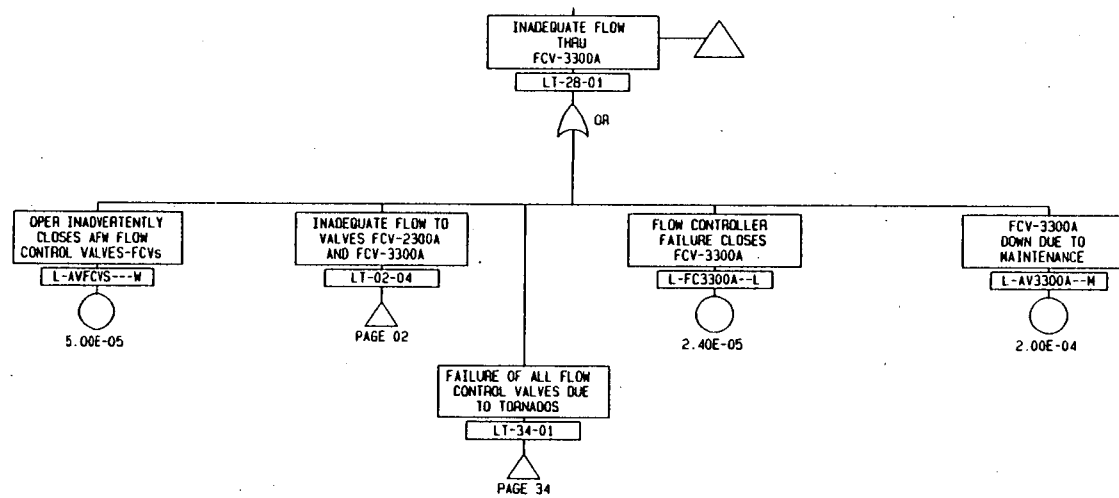


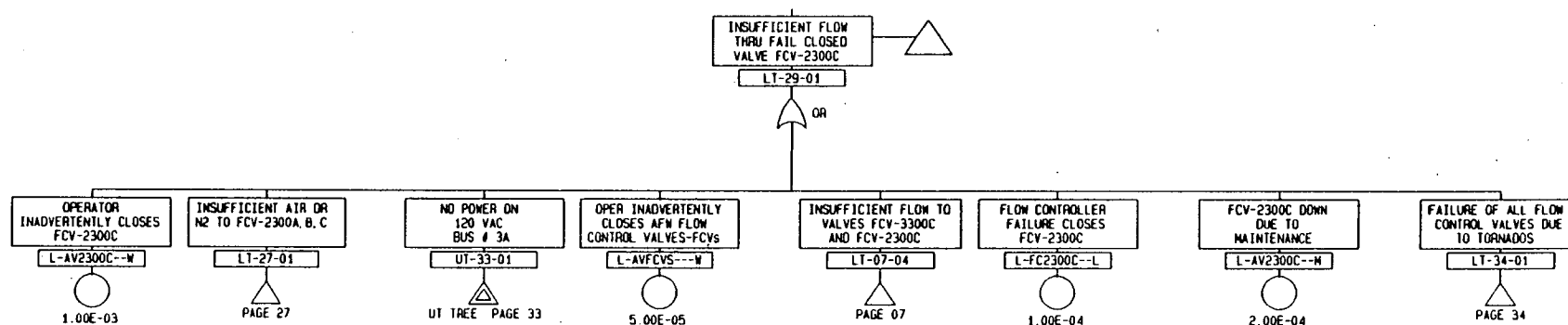


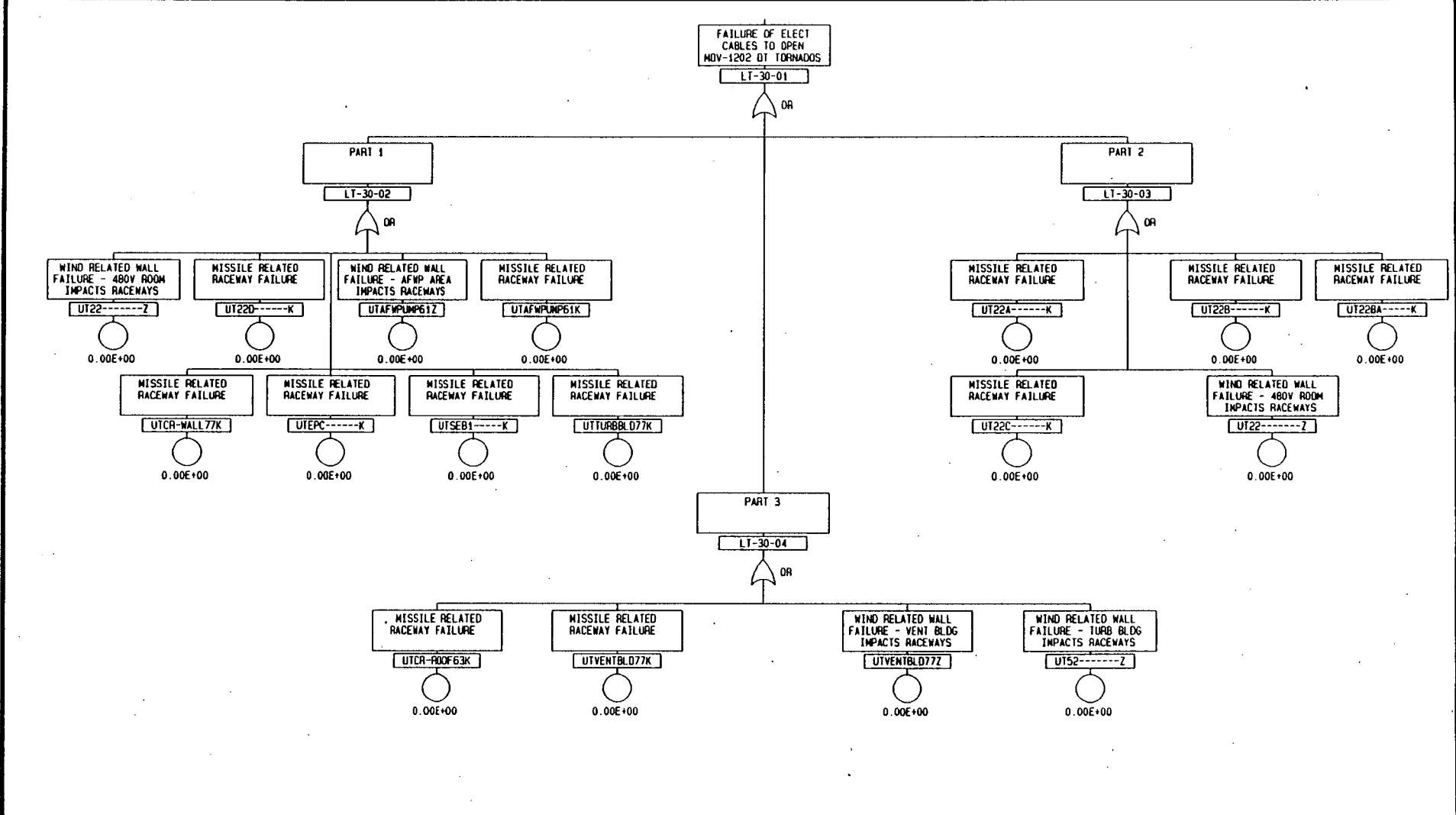


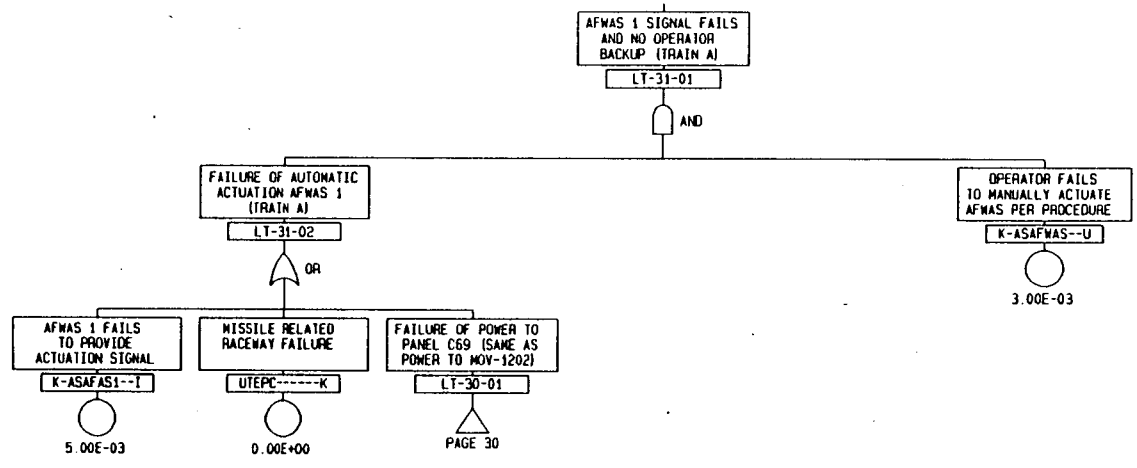


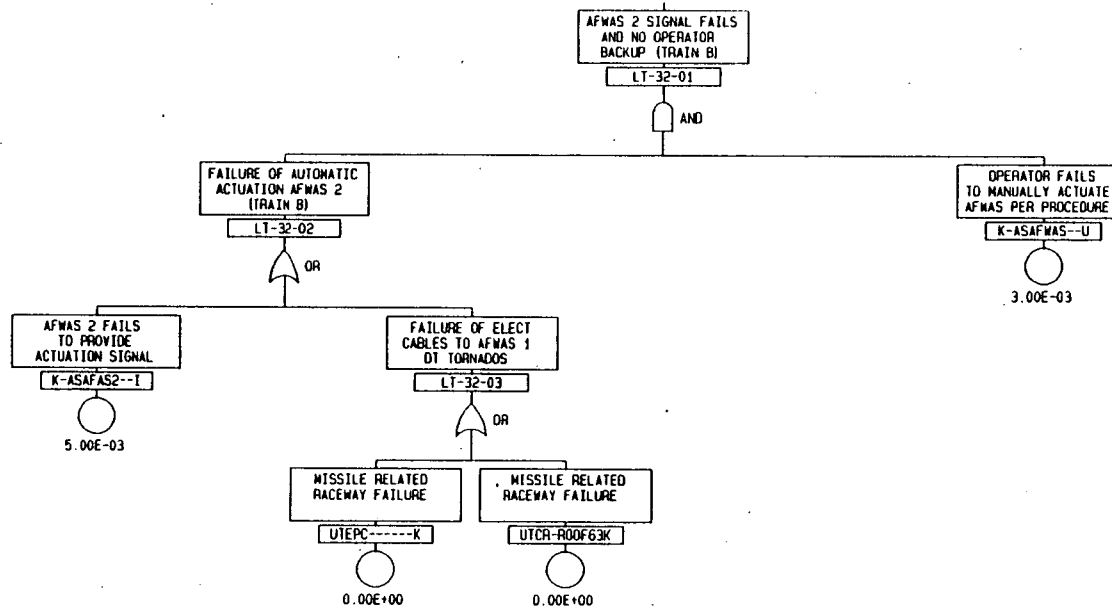


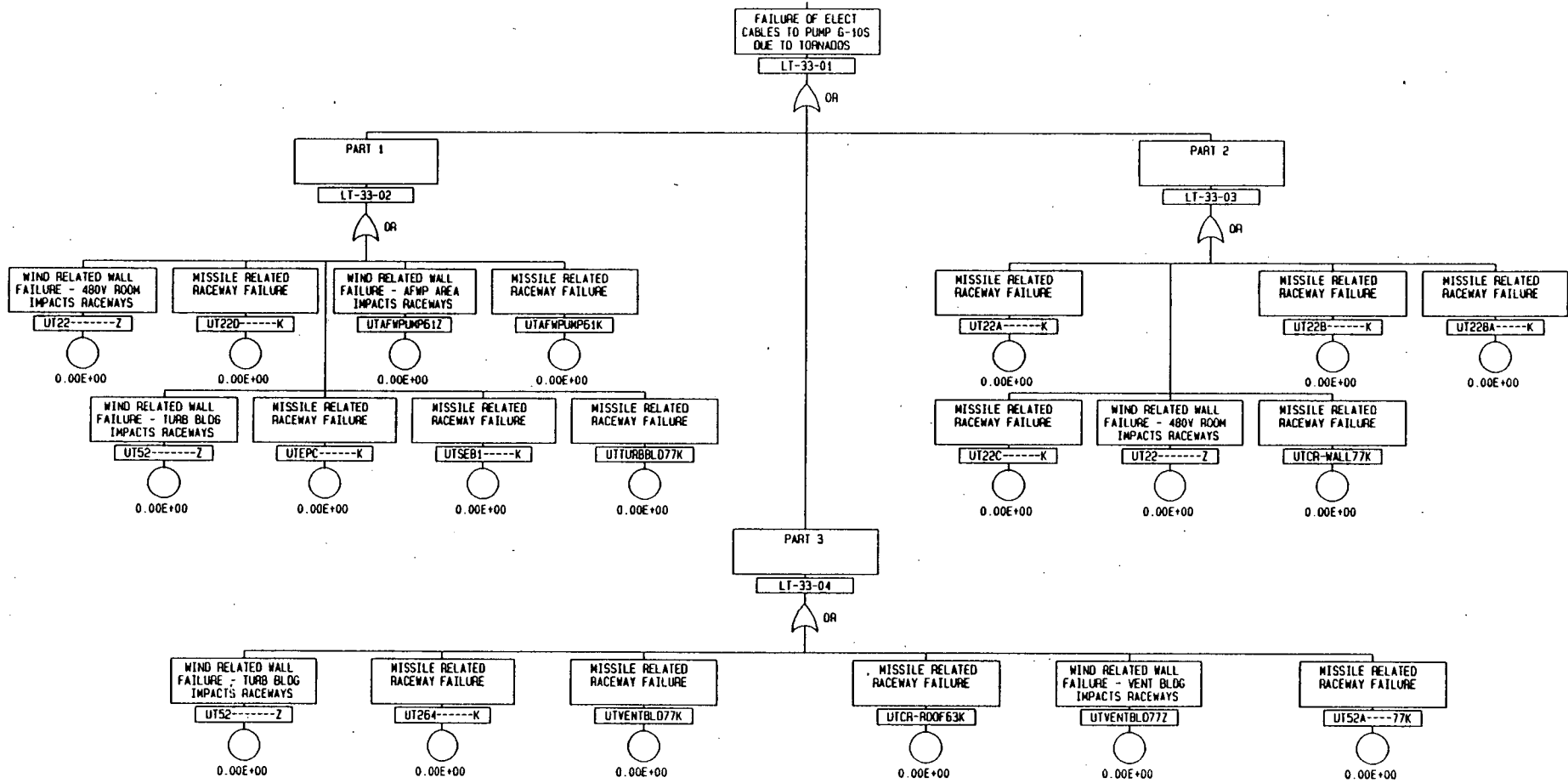




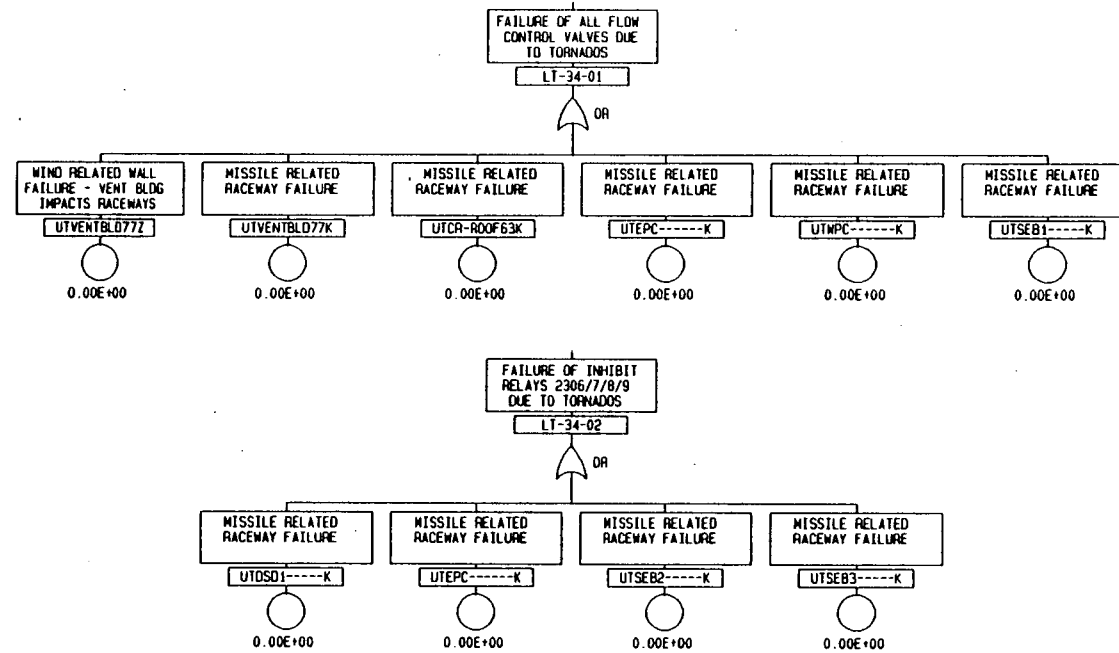


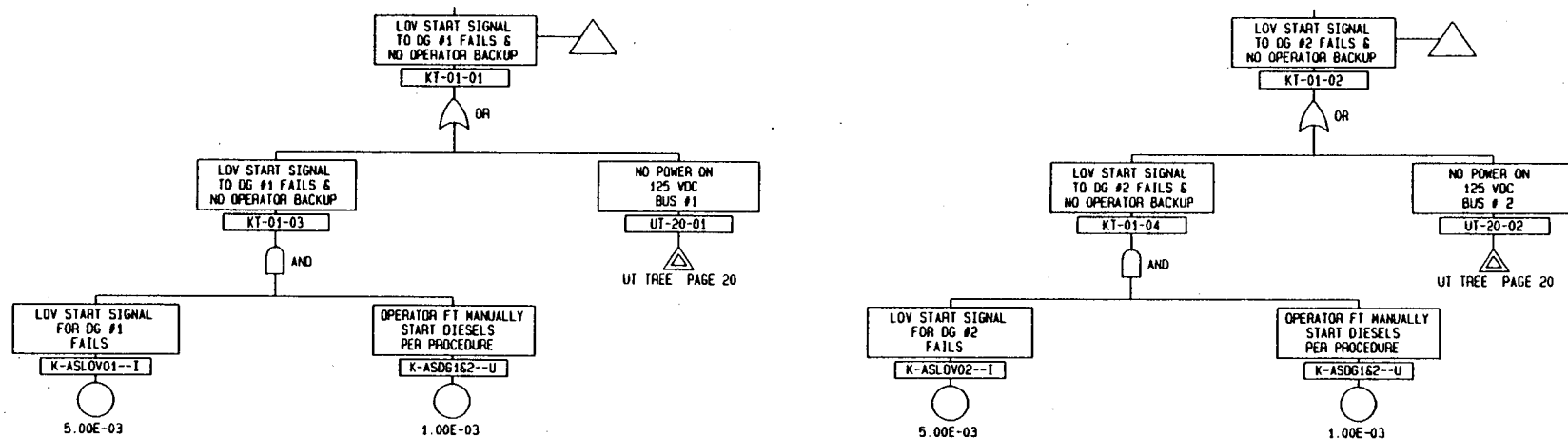






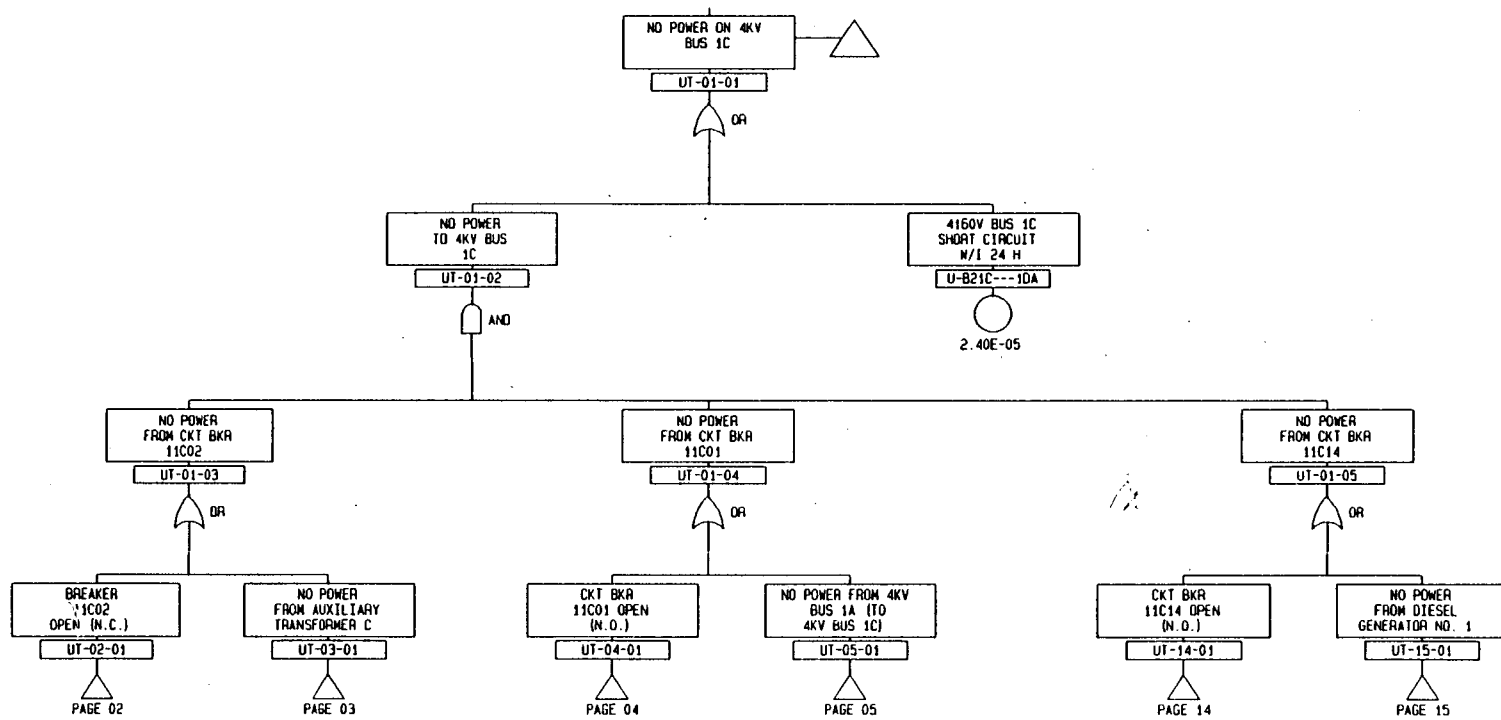
04-11-1990

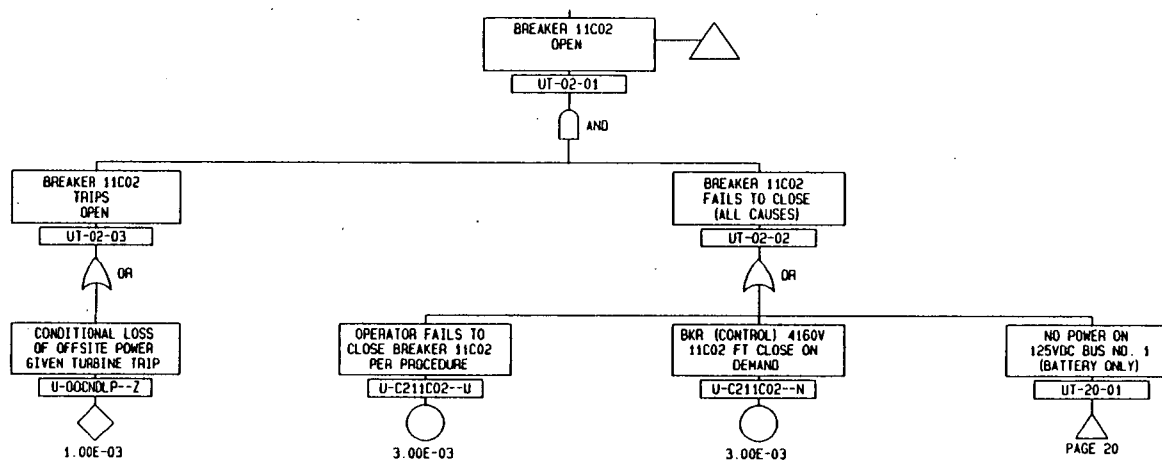




LOV - LOSS OF VOLTAGE ACTUATION SIGNAL

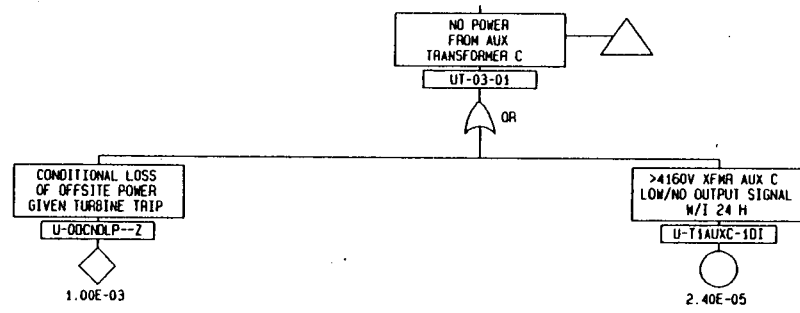
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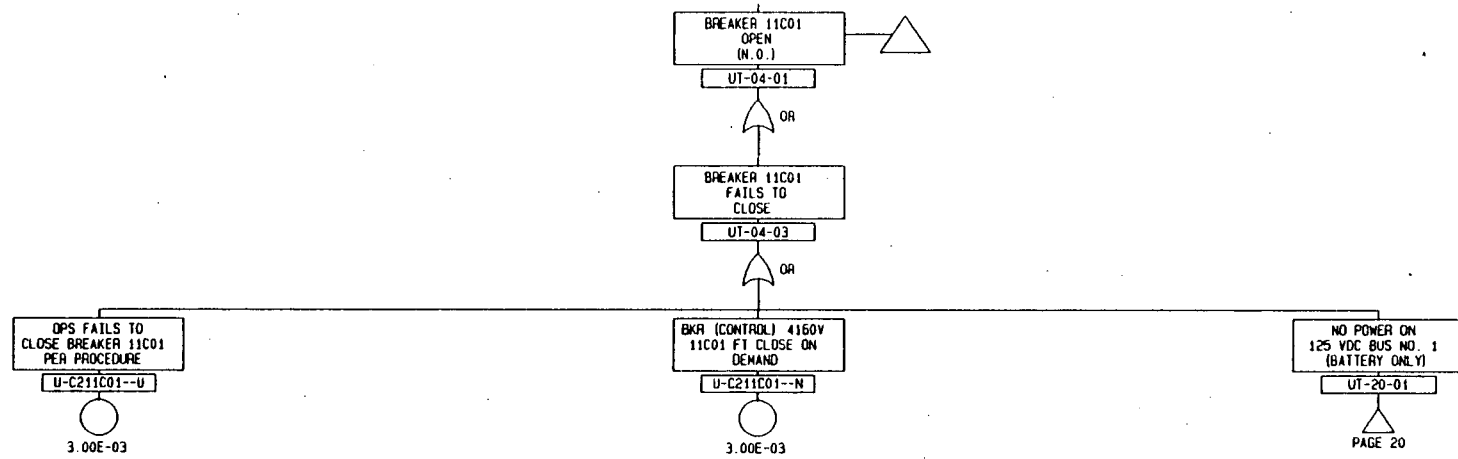




Basic event 'U-C211C02--U' based on SO1-1,0-60. "Loss of All AC Power," Step 3D.

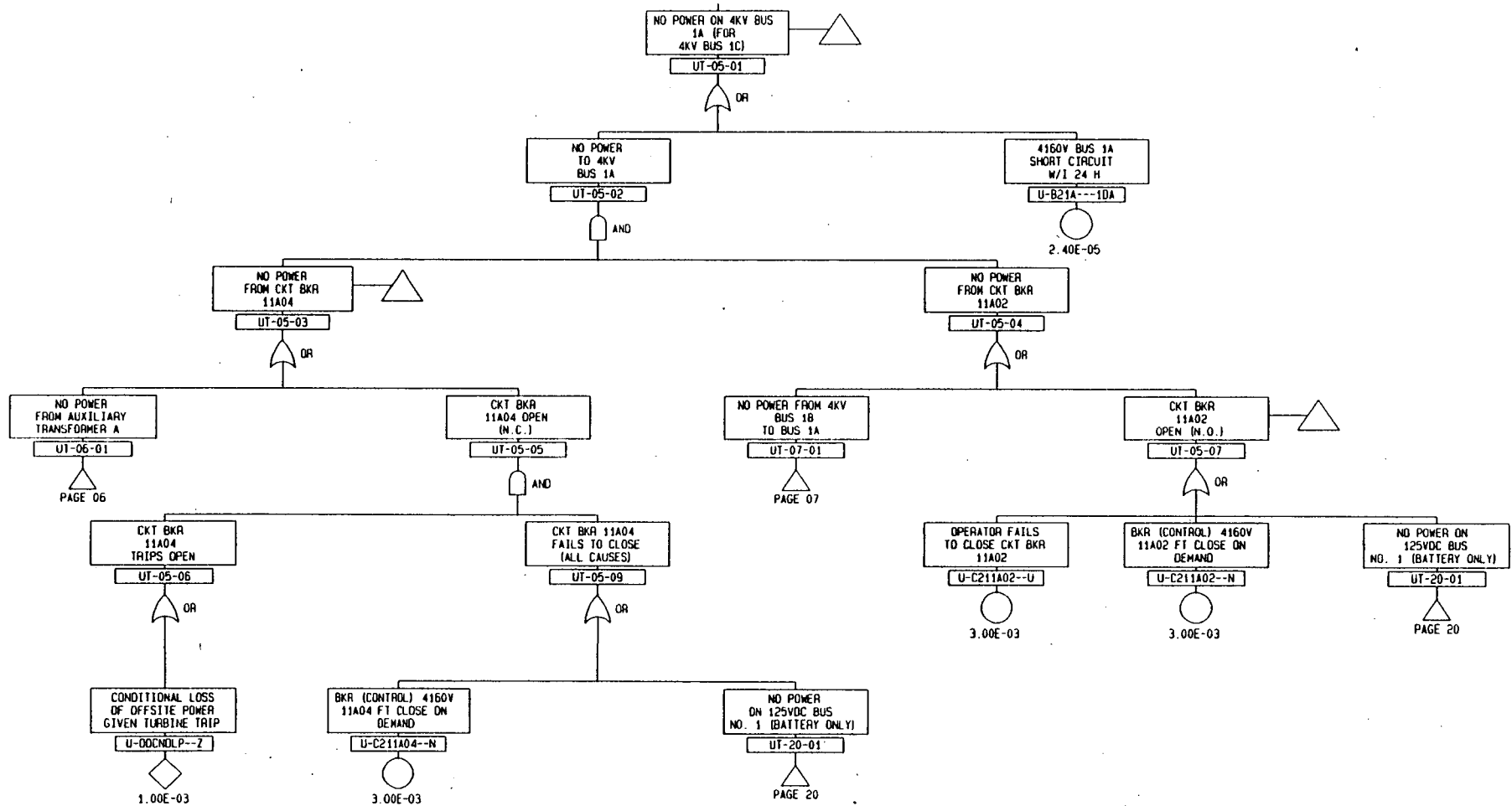
04-11-1990





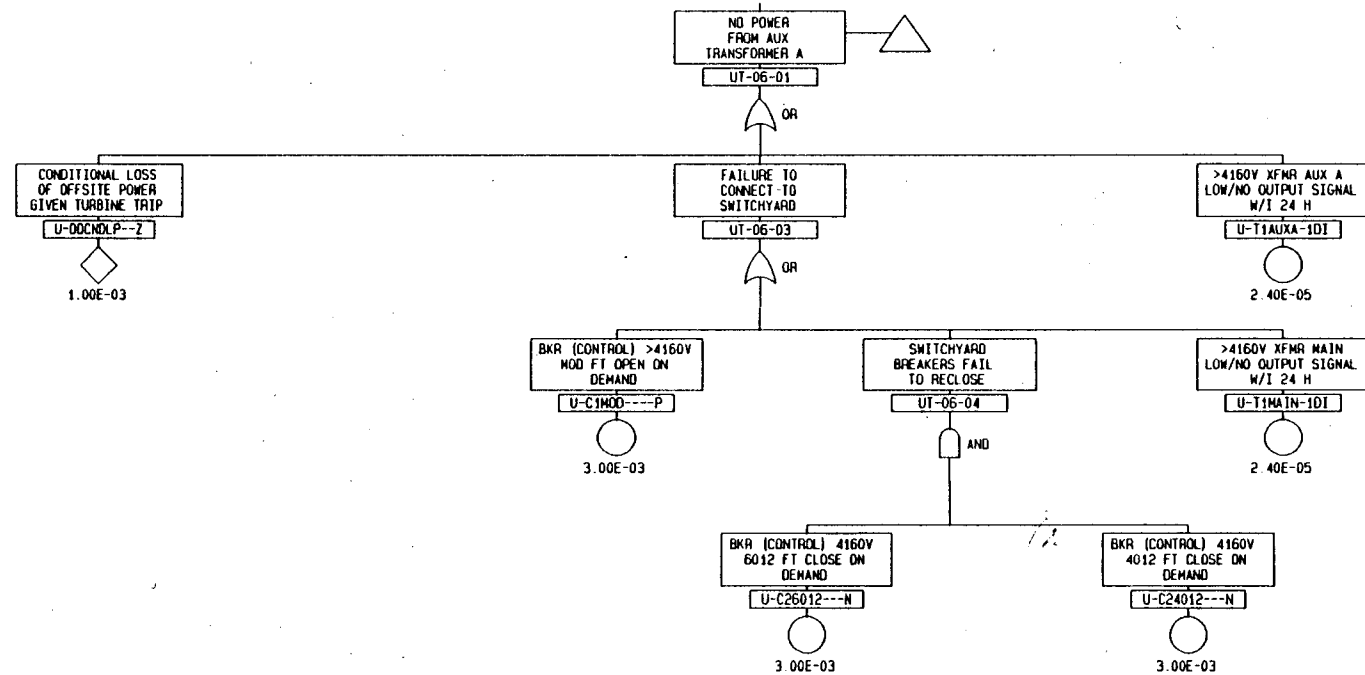
(U1) CKX IDA SS SHI OSI I-CT C SS 01-1-00-00-00-00 L-LOCA and O.P. for PLOP and LMFW.
 (U2) CKX IDA SS SHI OSI I-CT C SS 01-1-00-00-00-00 4kV Sys Operations, Power Step A-6.6

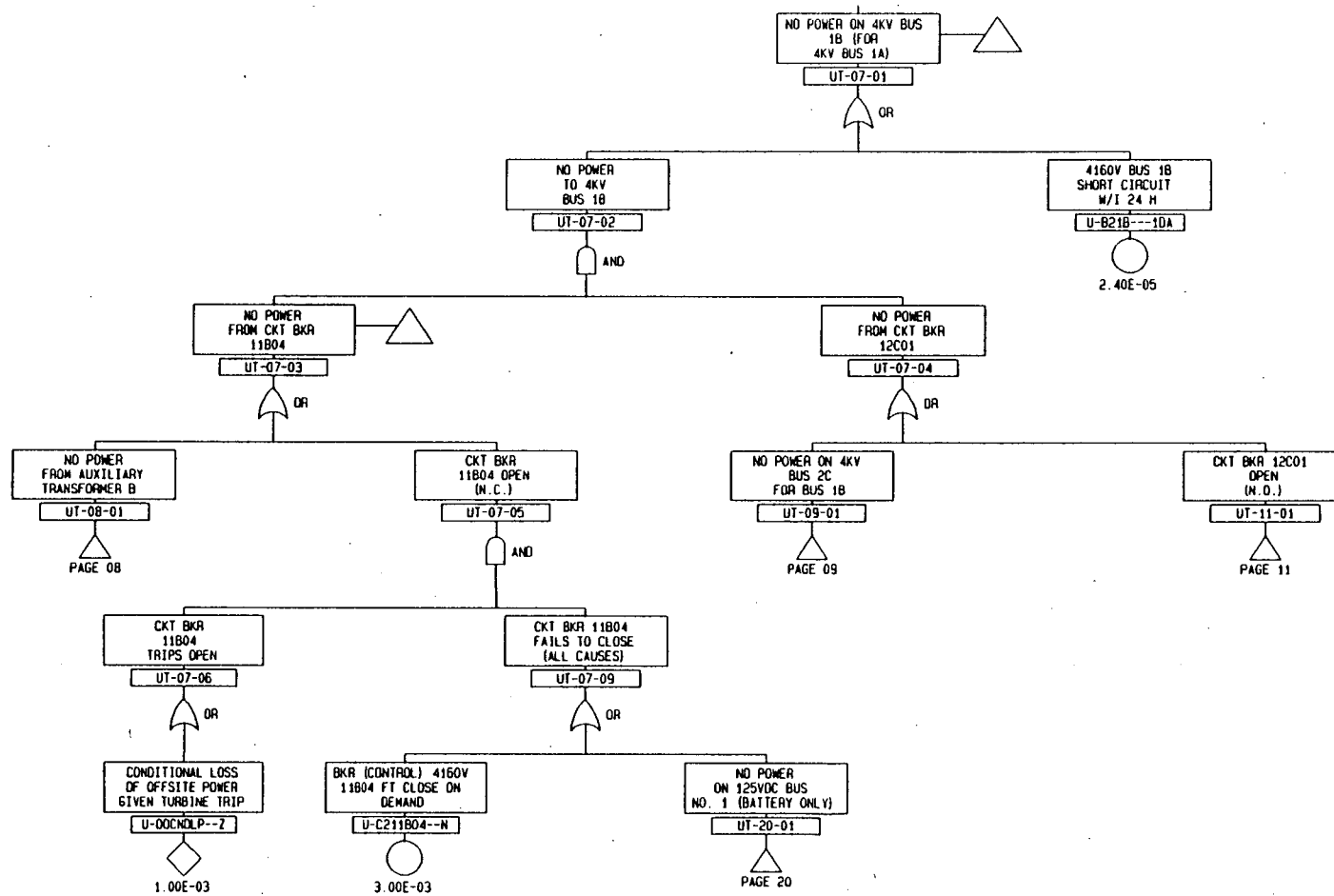
04-11-1990

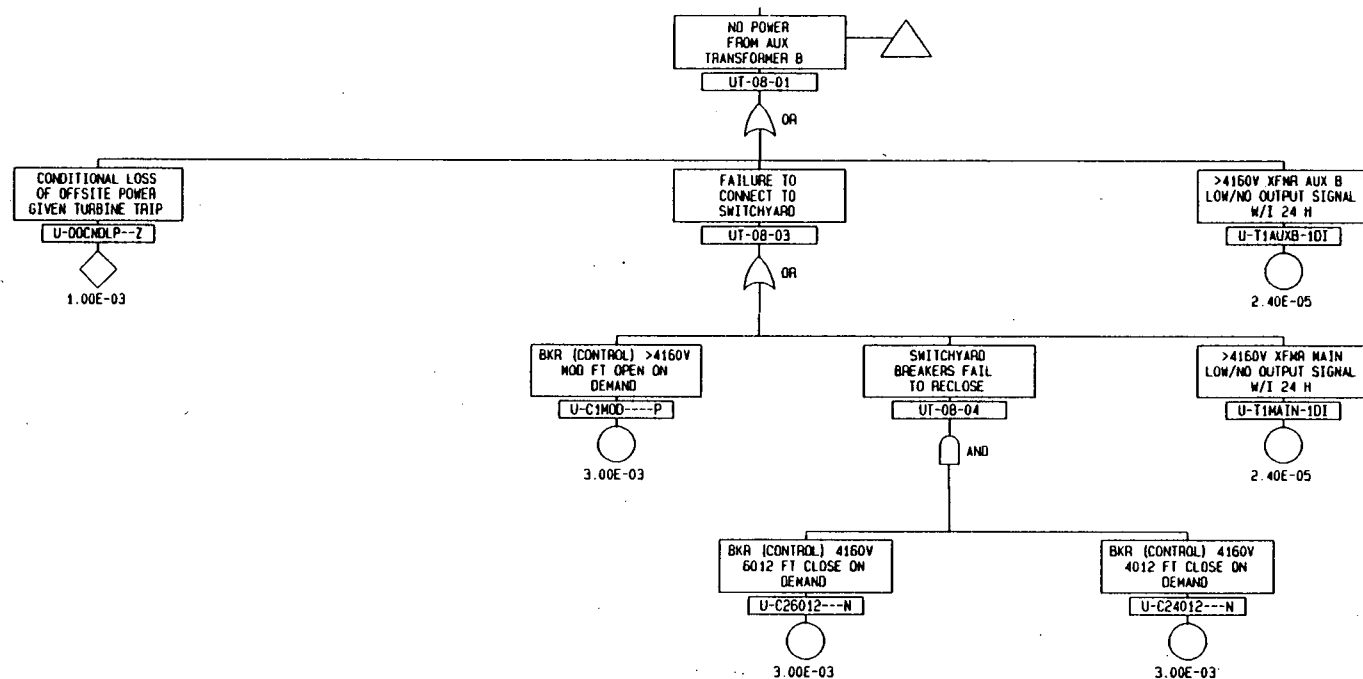


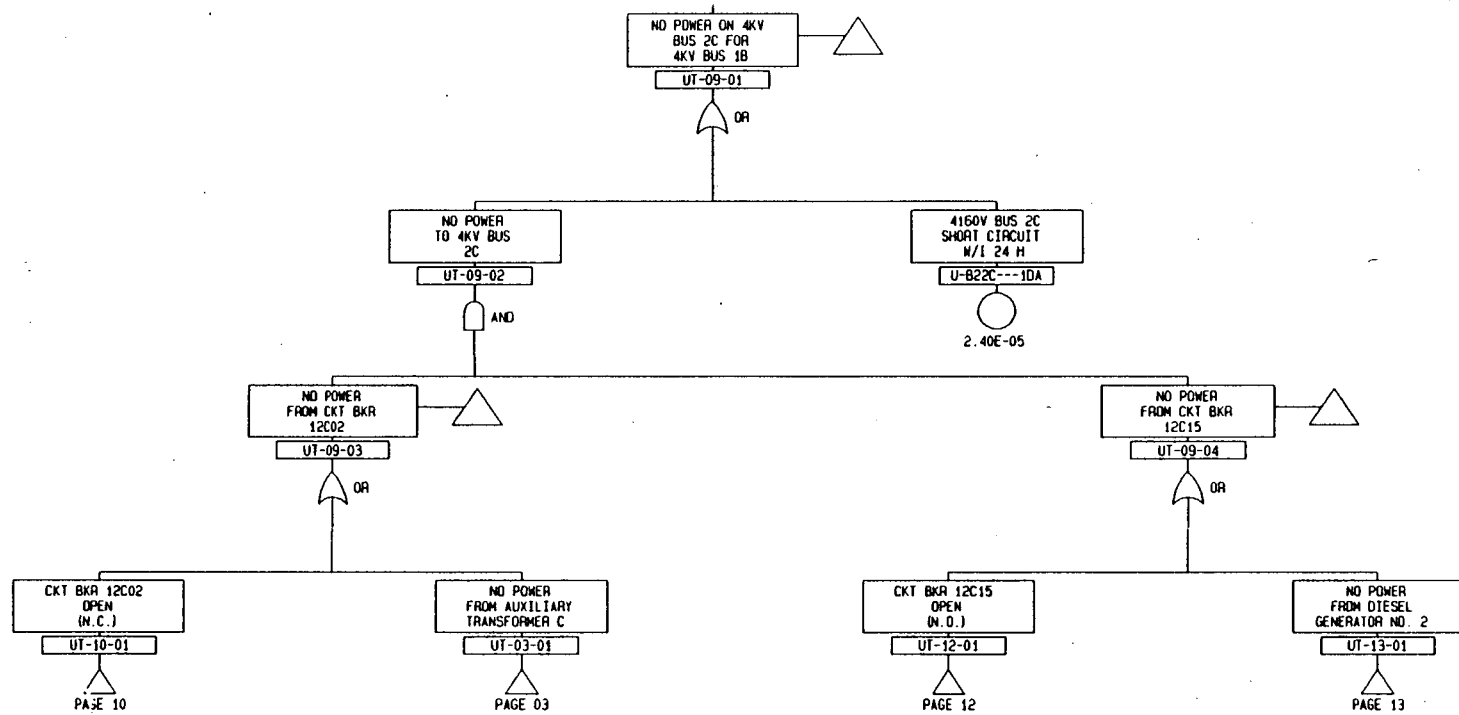
U-C211A02--U, S01-9-2, "4kV System Operations," Rev 1, TCN 9
 Step 6.6.4

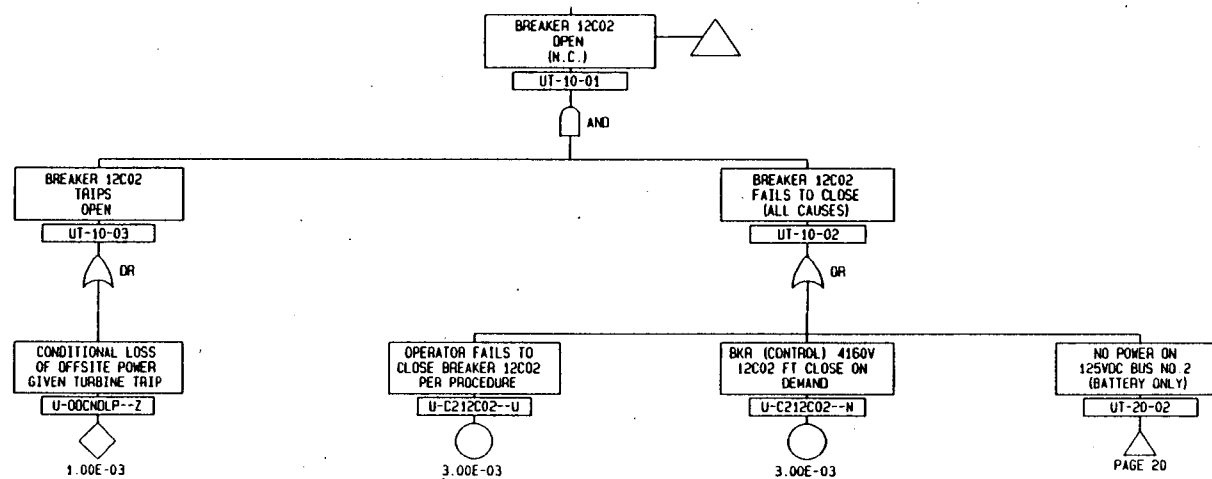
04-11-1990

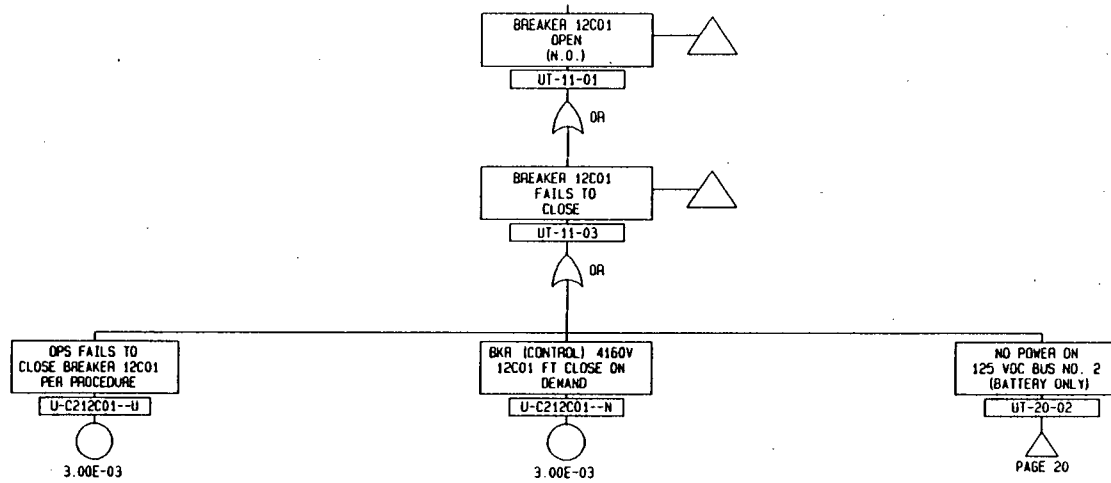


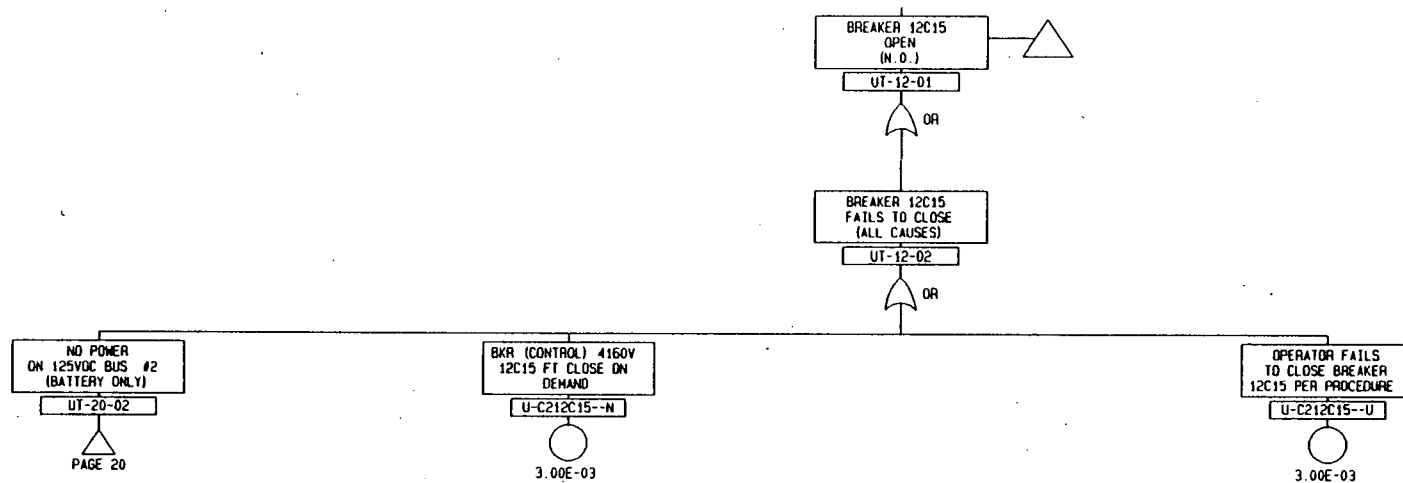






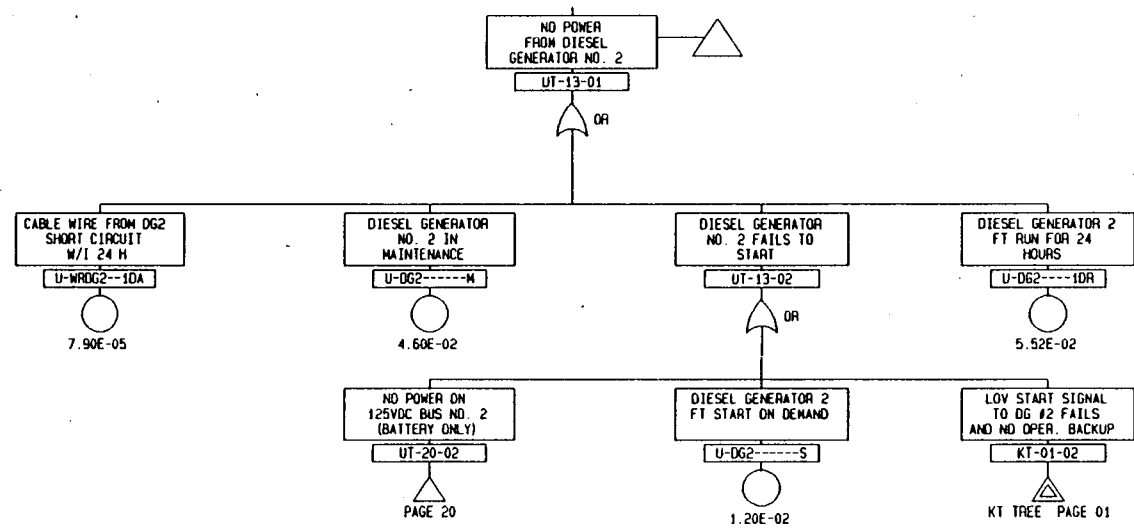


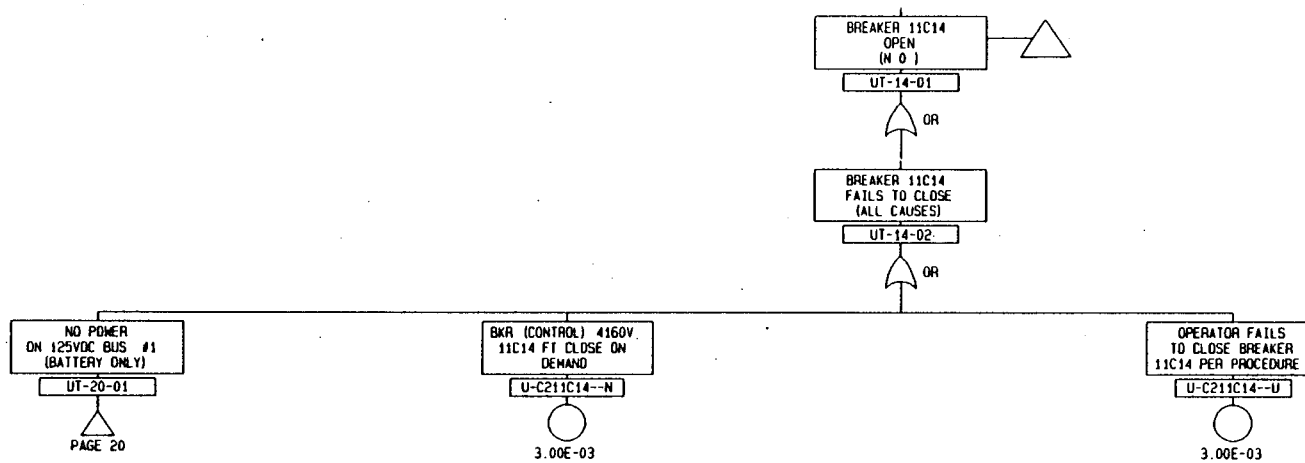




1) KDASSIS----T Uses 1.0 for LOCA and 0.0 for LOP and LMFW.
 2) U-C212C15--U, SO1-1.0-80, "Loss of AC Pwr." Rev. 6.
 Step 8.

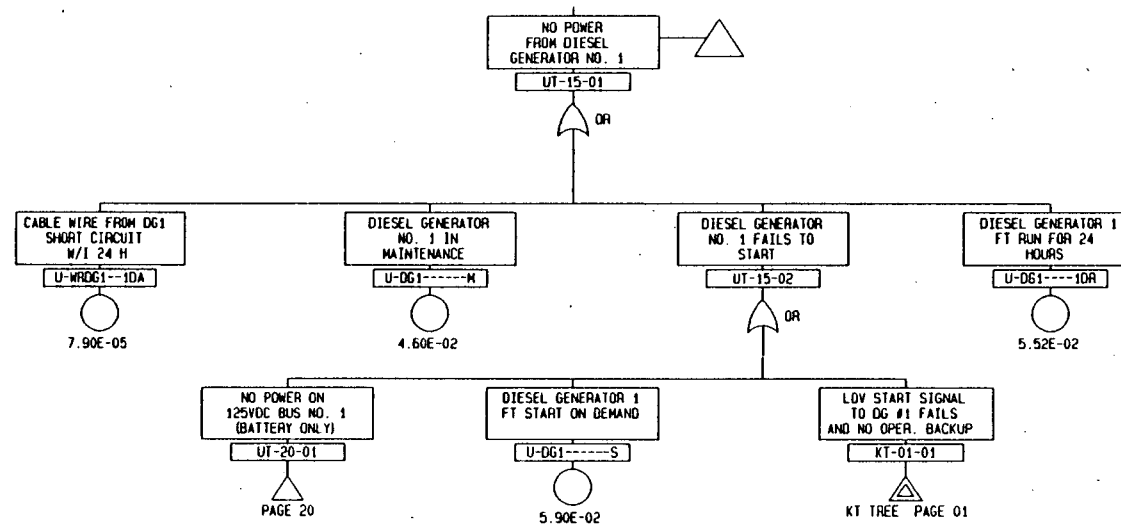
04-11-1990

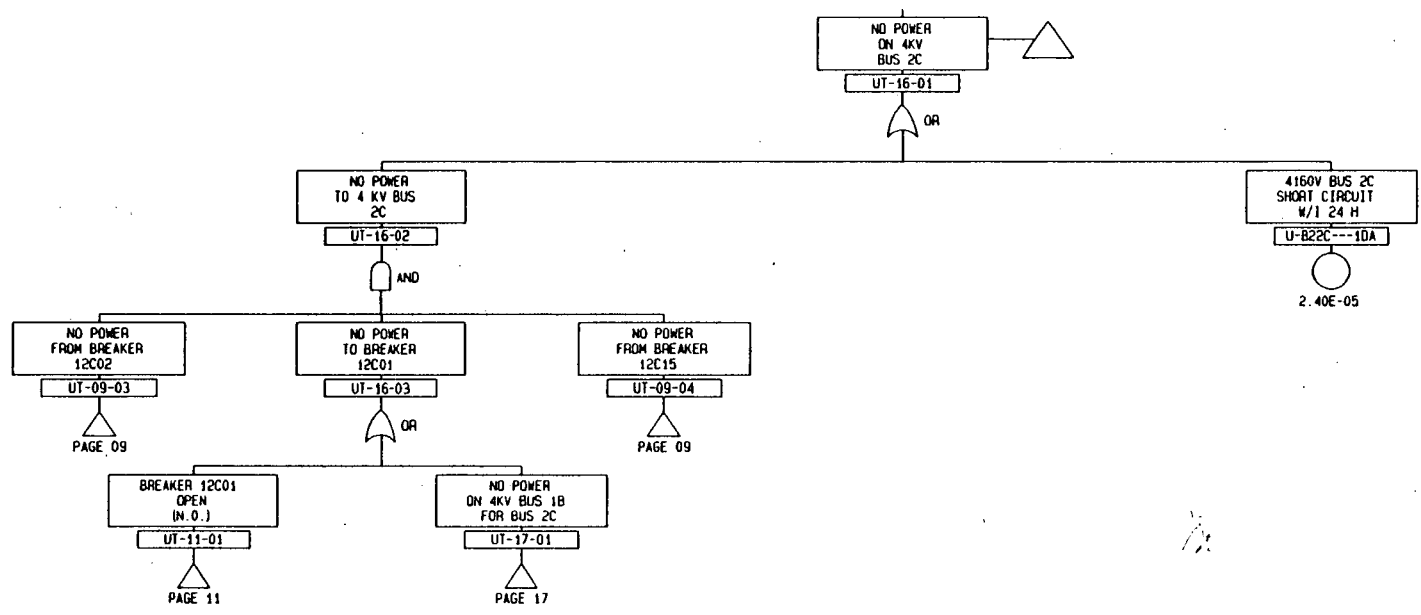


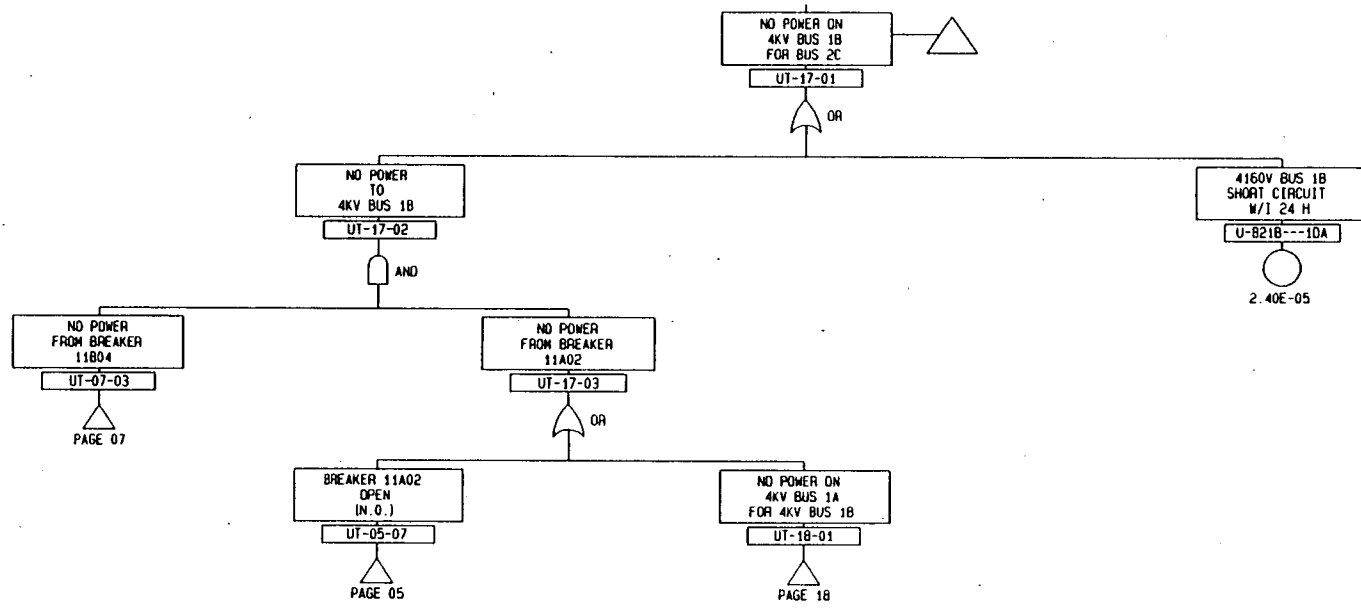


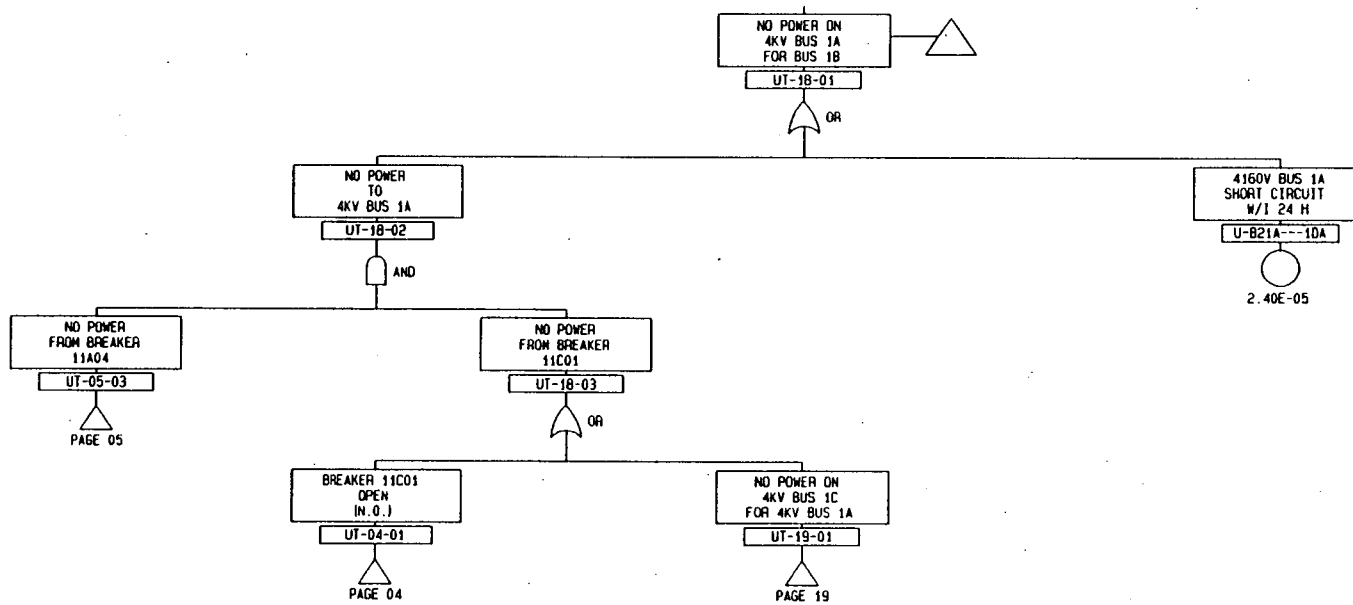
1) SKIDAWSON - - - - -T, Uses 1.0 for LOCA and 0.0 for LOP and LMFV.
 2) SCDAS 11C14 - - - - -U, S01-1.0-60, "Loss of All AC Power." Rev. 6.

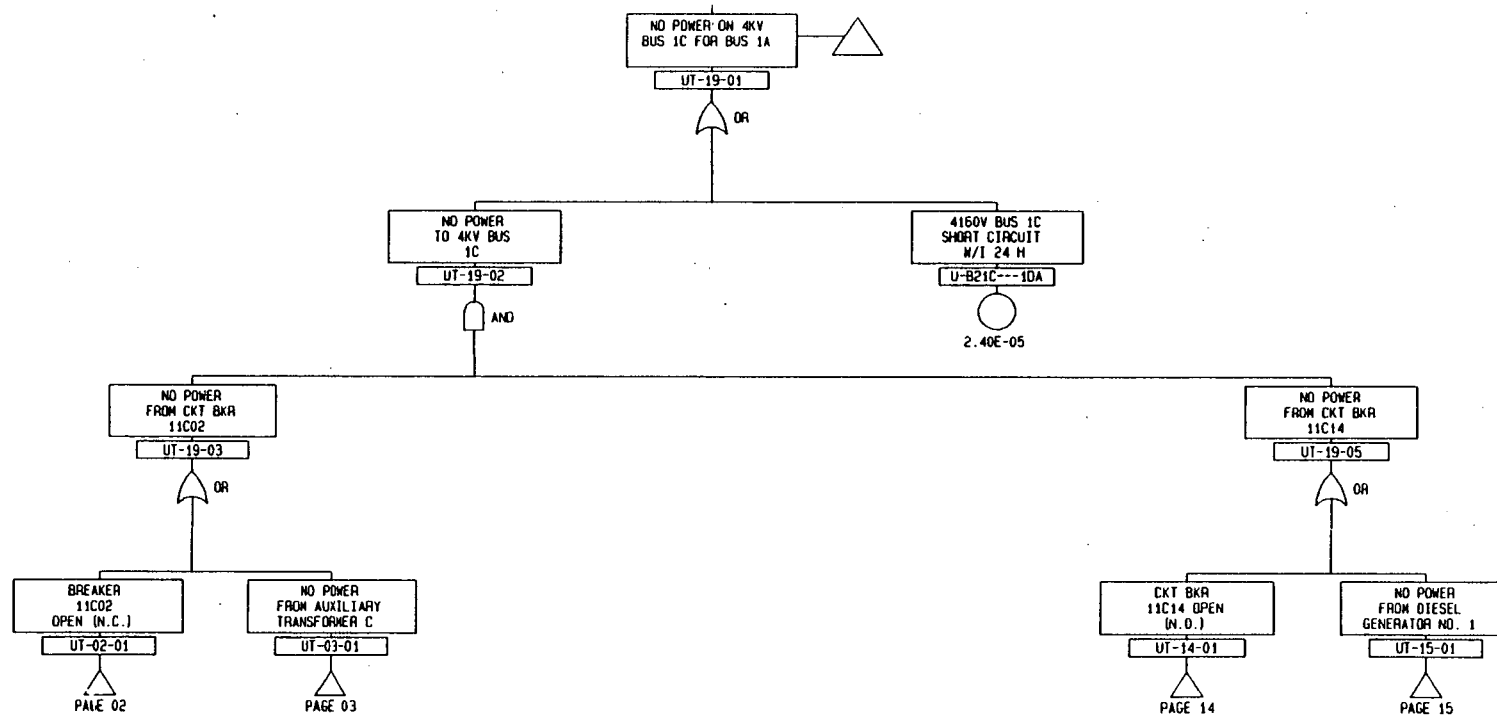
04-11-1990

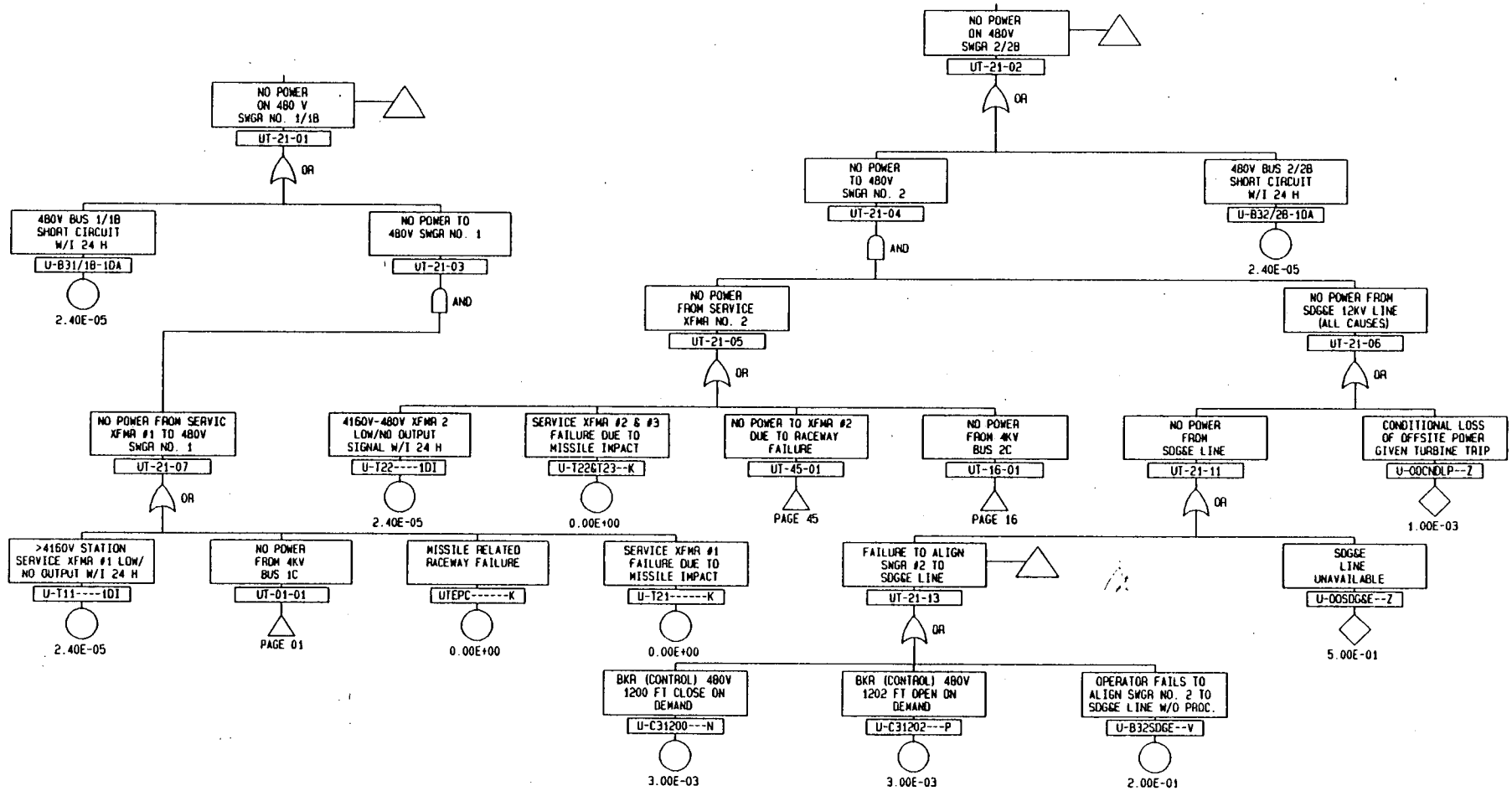






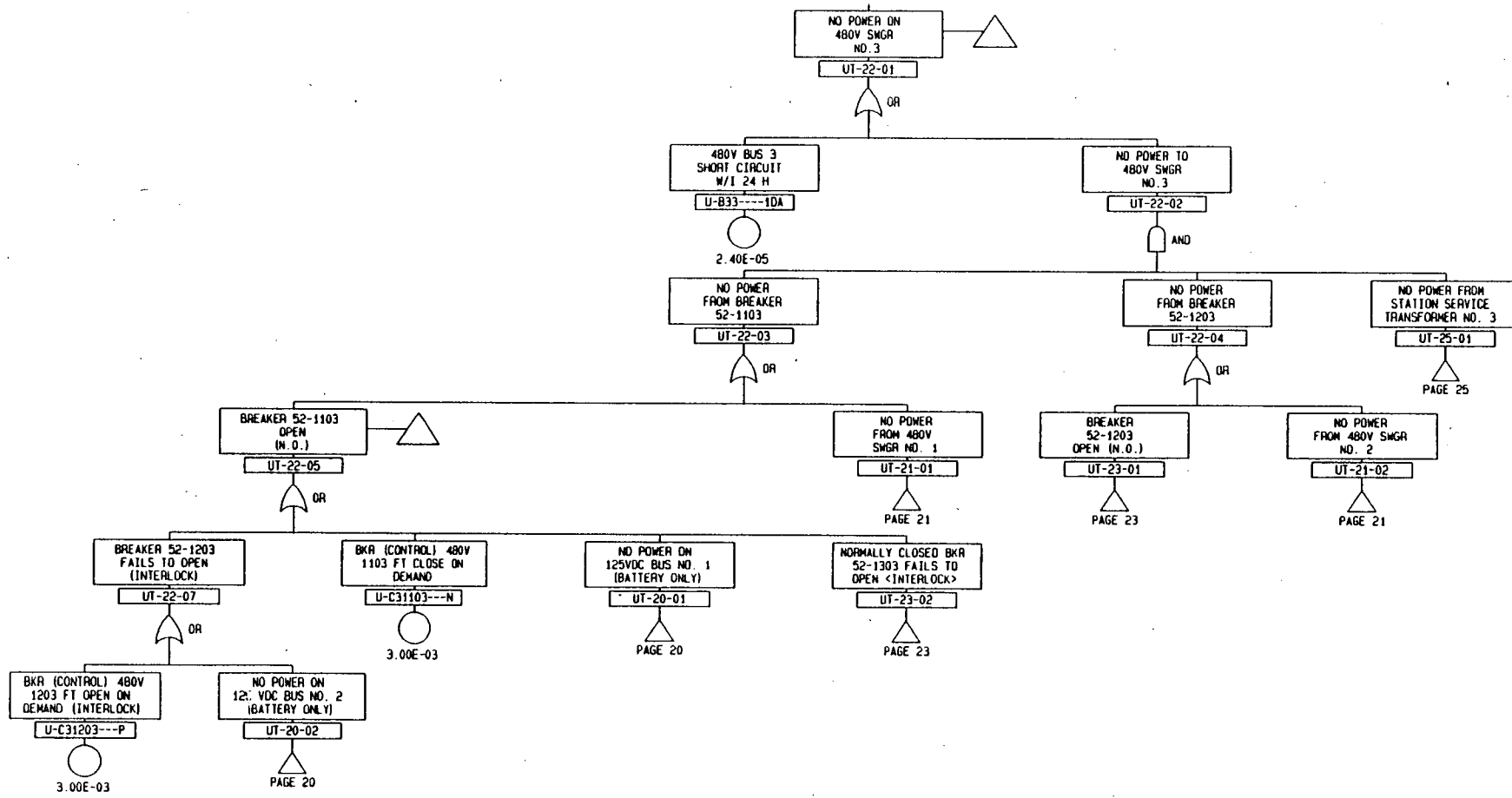






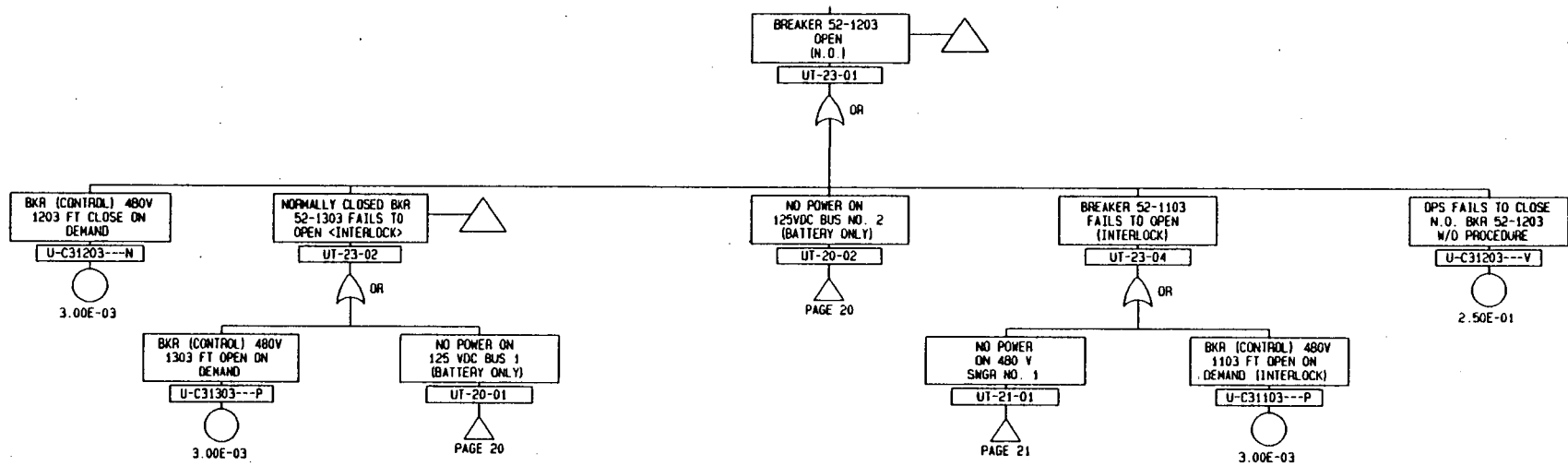
For conservative simplification, no credit for Service Transformer No. 3.

04-11-1990



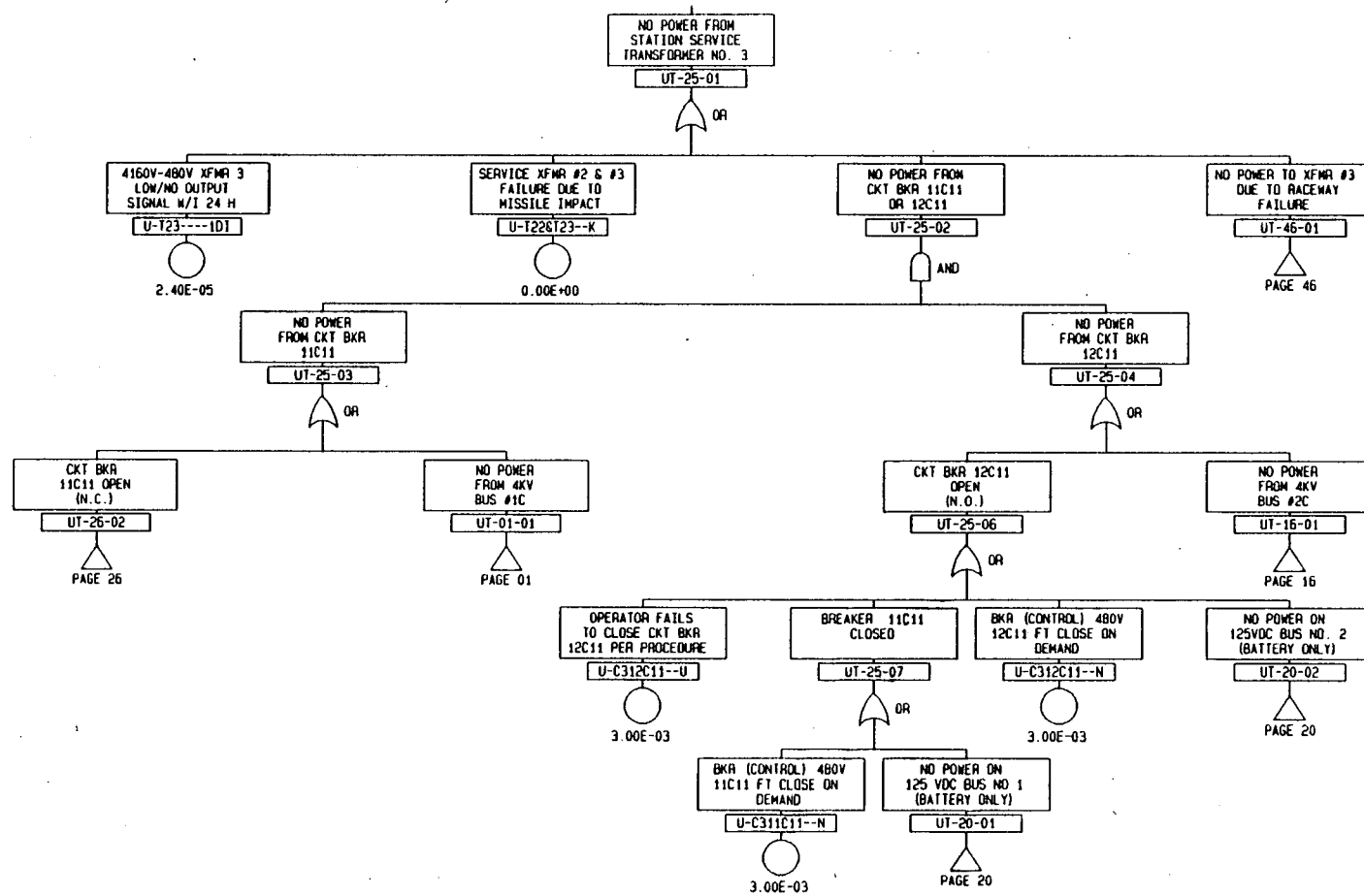
1) U-CV1103---V. SO1-1.0-10. "Safety Injection or Reactor Trip." Rev 5. Operator is not guided by procedure to connect SWGR 3 to Train A or B.

04-11-1990



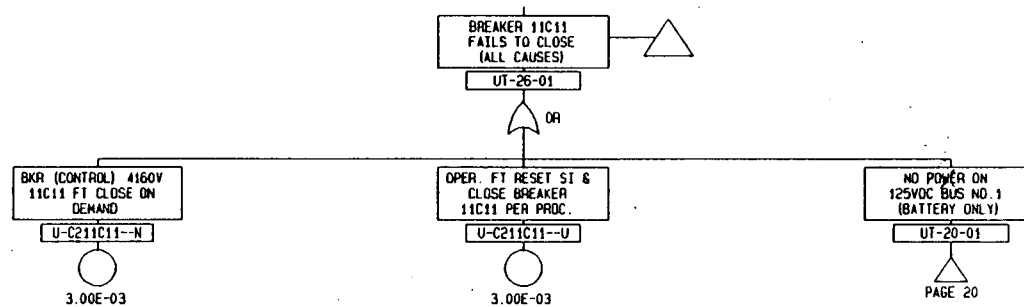
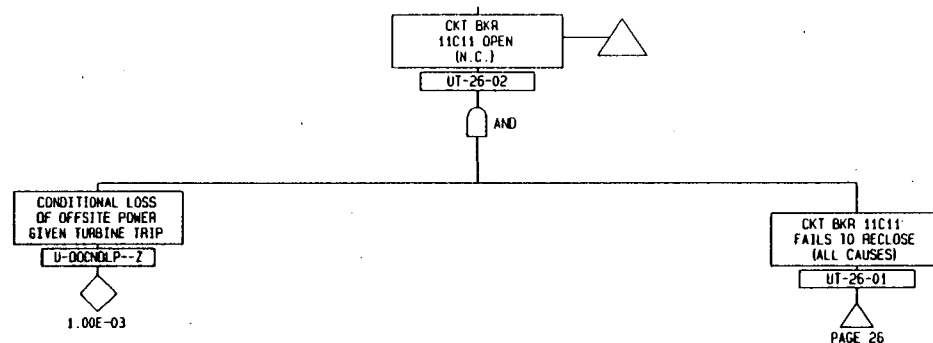
- 1) U-C31303---U, SO1-1.0-10. "Reactor Trip, or Safety Injection." Rev 15, Step 15.C.
- 2) This page left intentionally blank

04-16-1990

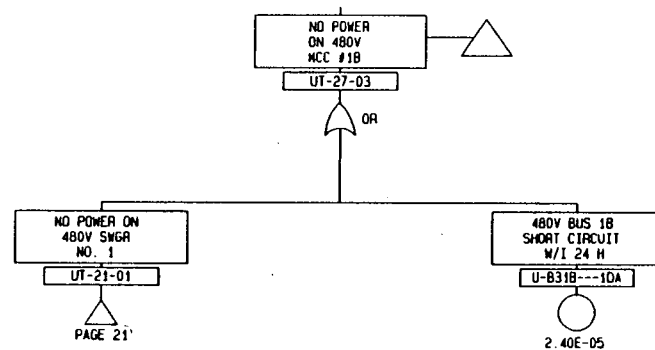
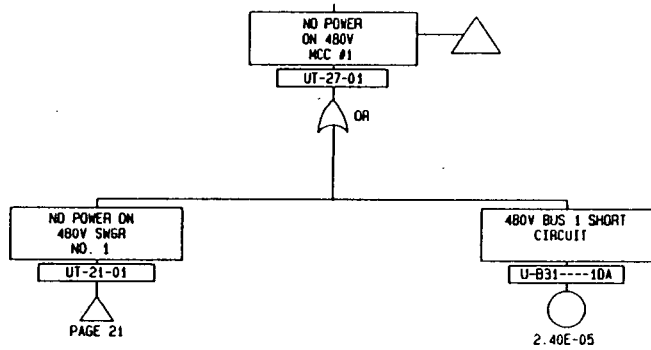


1) U-C312C11--U. SO1-9-3. "480 V System Operations. Rev. 2. TCN. 12. Section D. Step 6.3.7.

04-11-1990

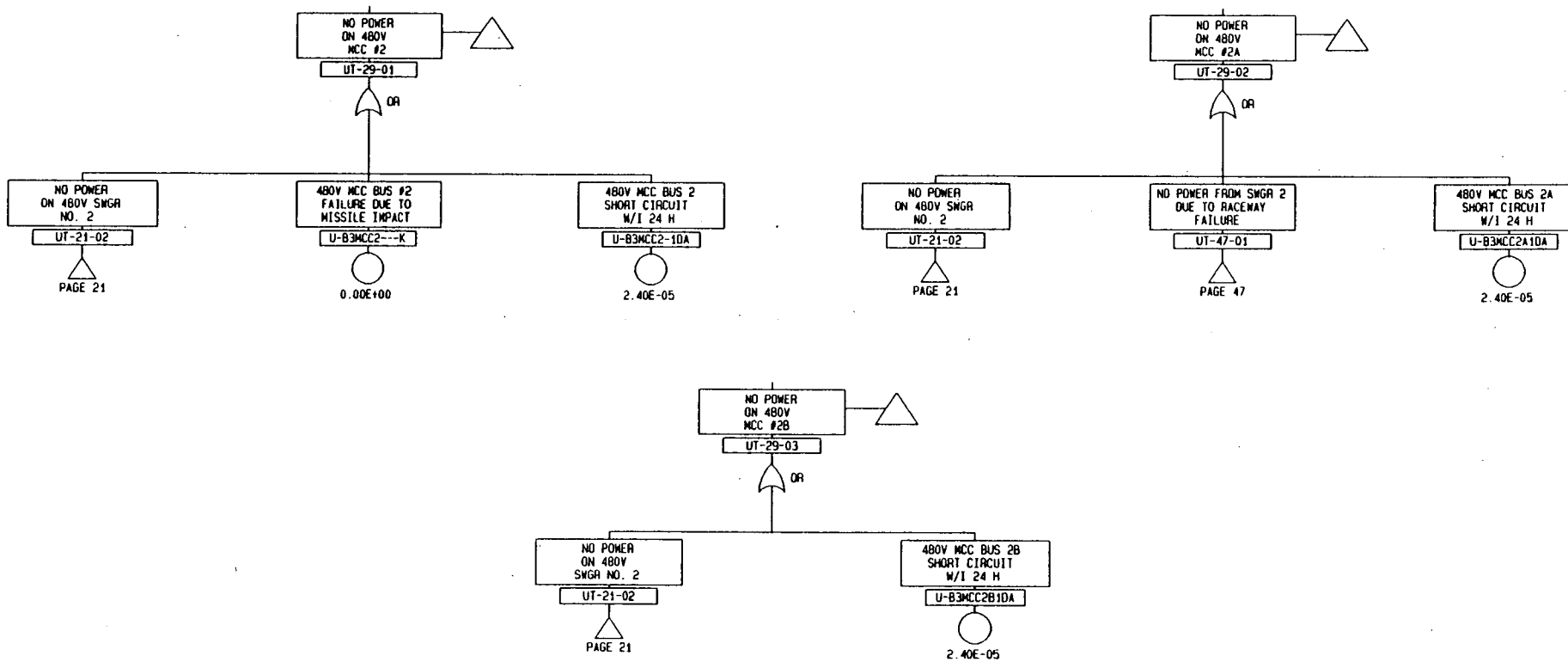


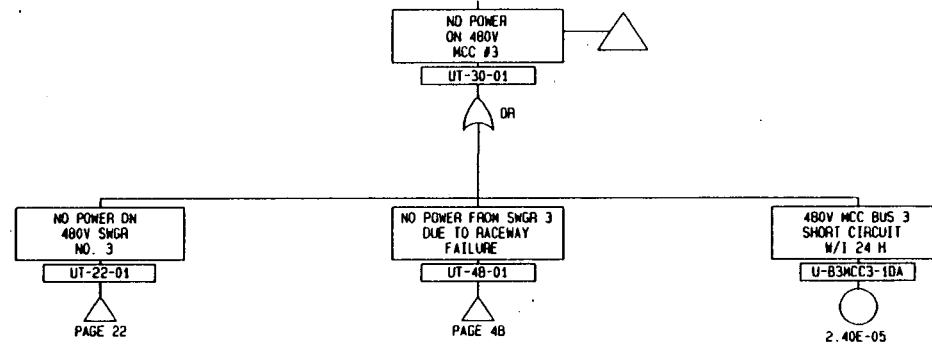
1) U-C211C11--U, SO1-1.0-10, "Reactor Trip on Safety Injection," Rev. 5, Step 14 & 15.

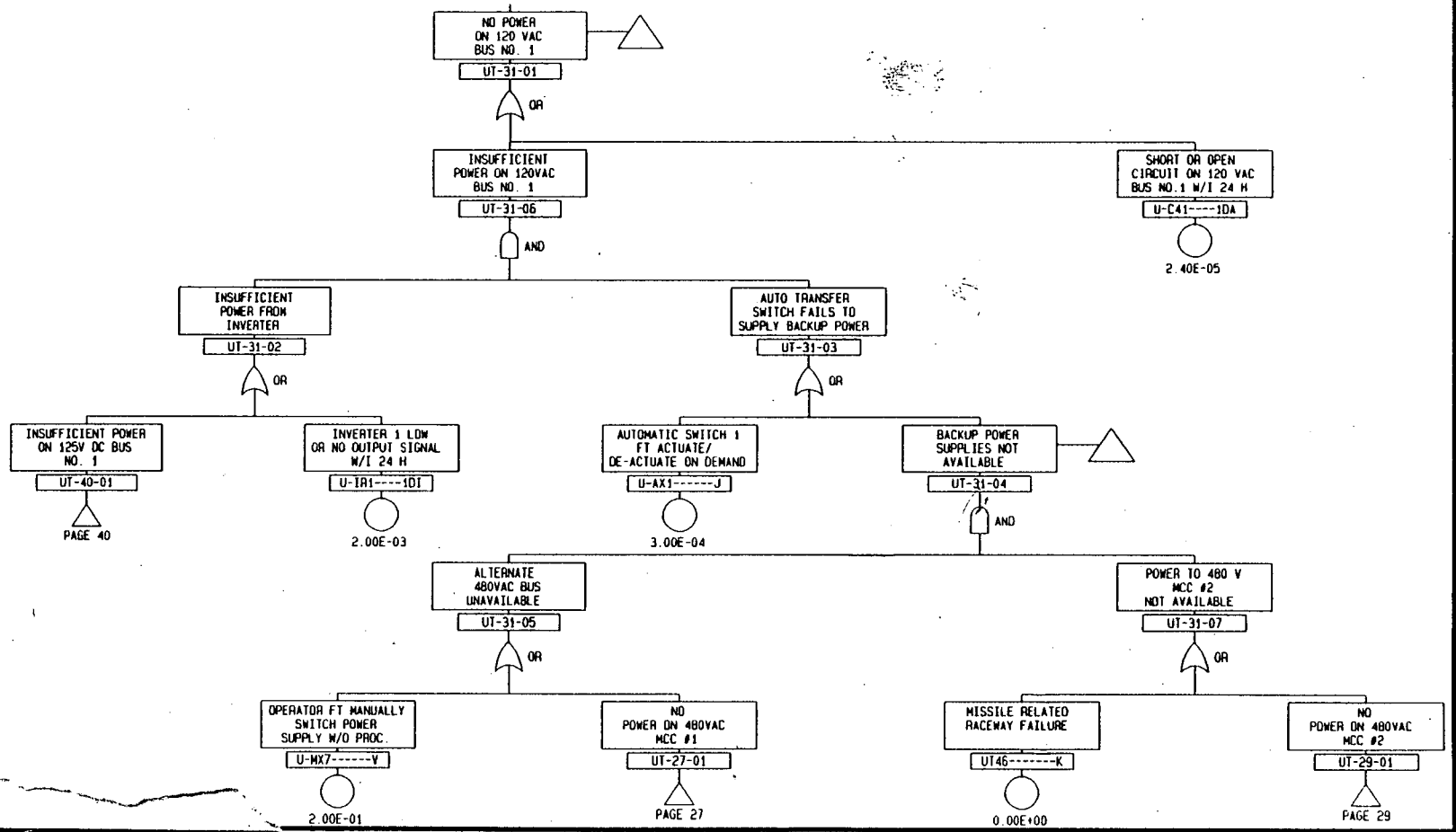


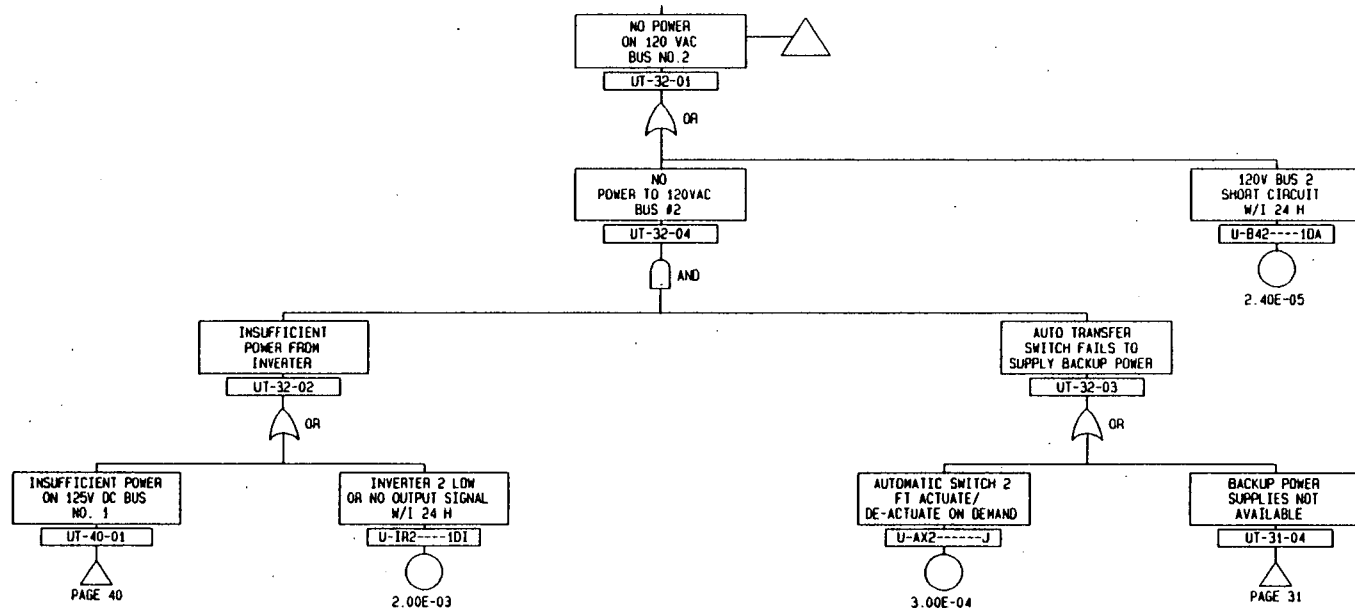
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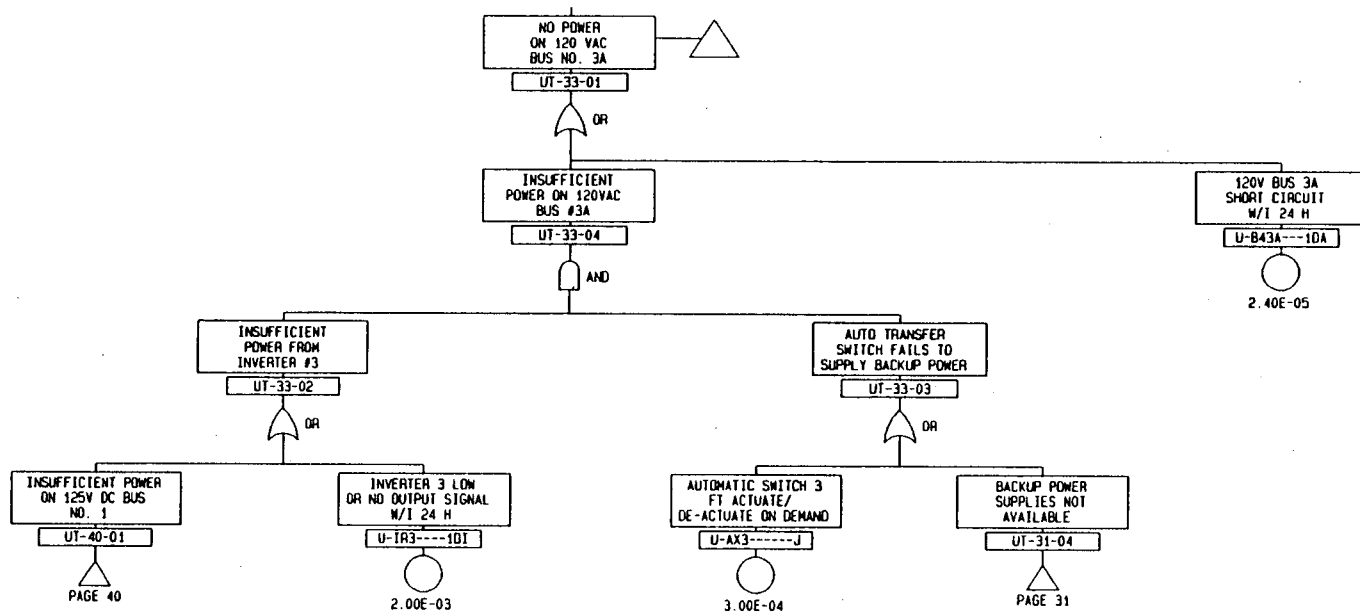
04-16-1990

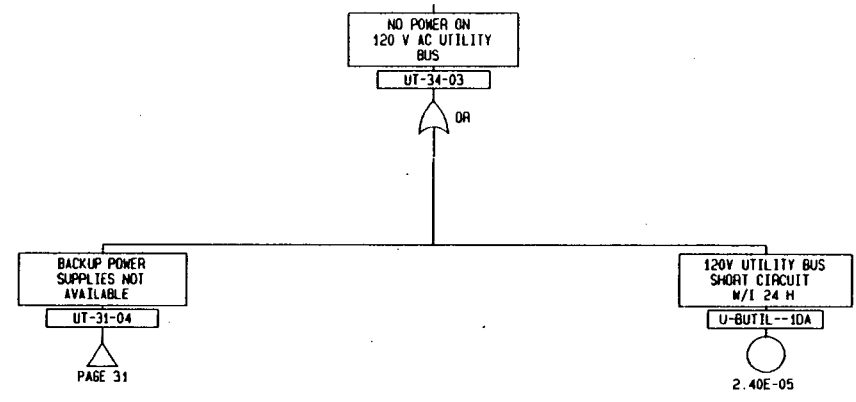


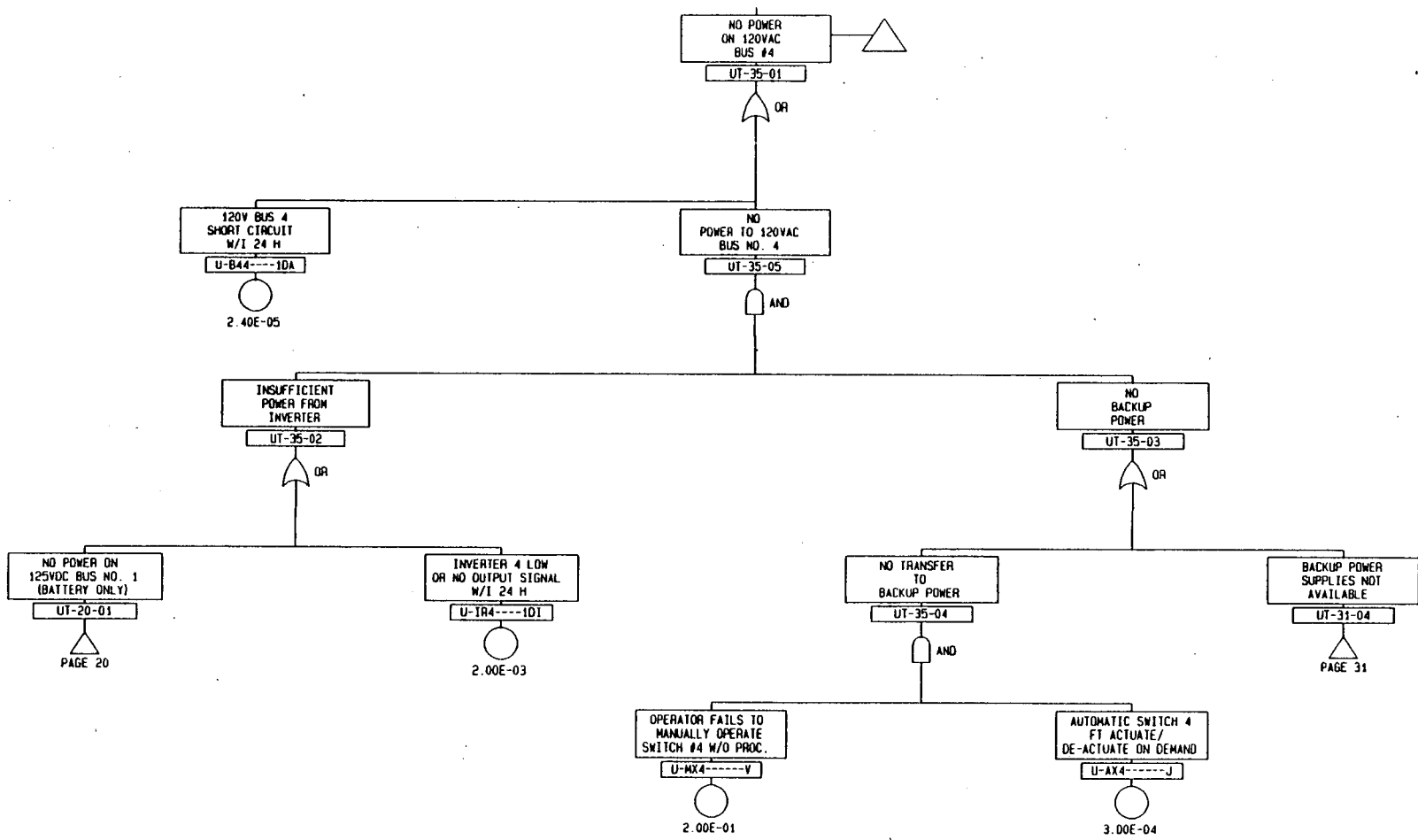


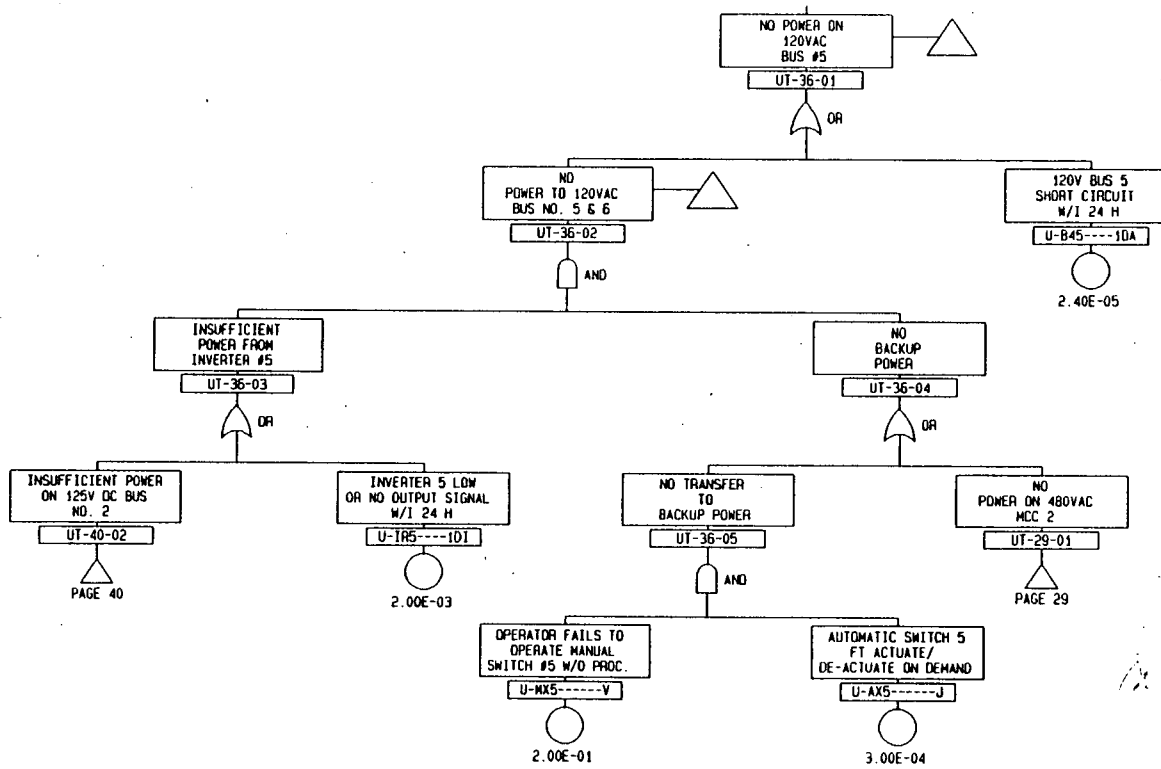


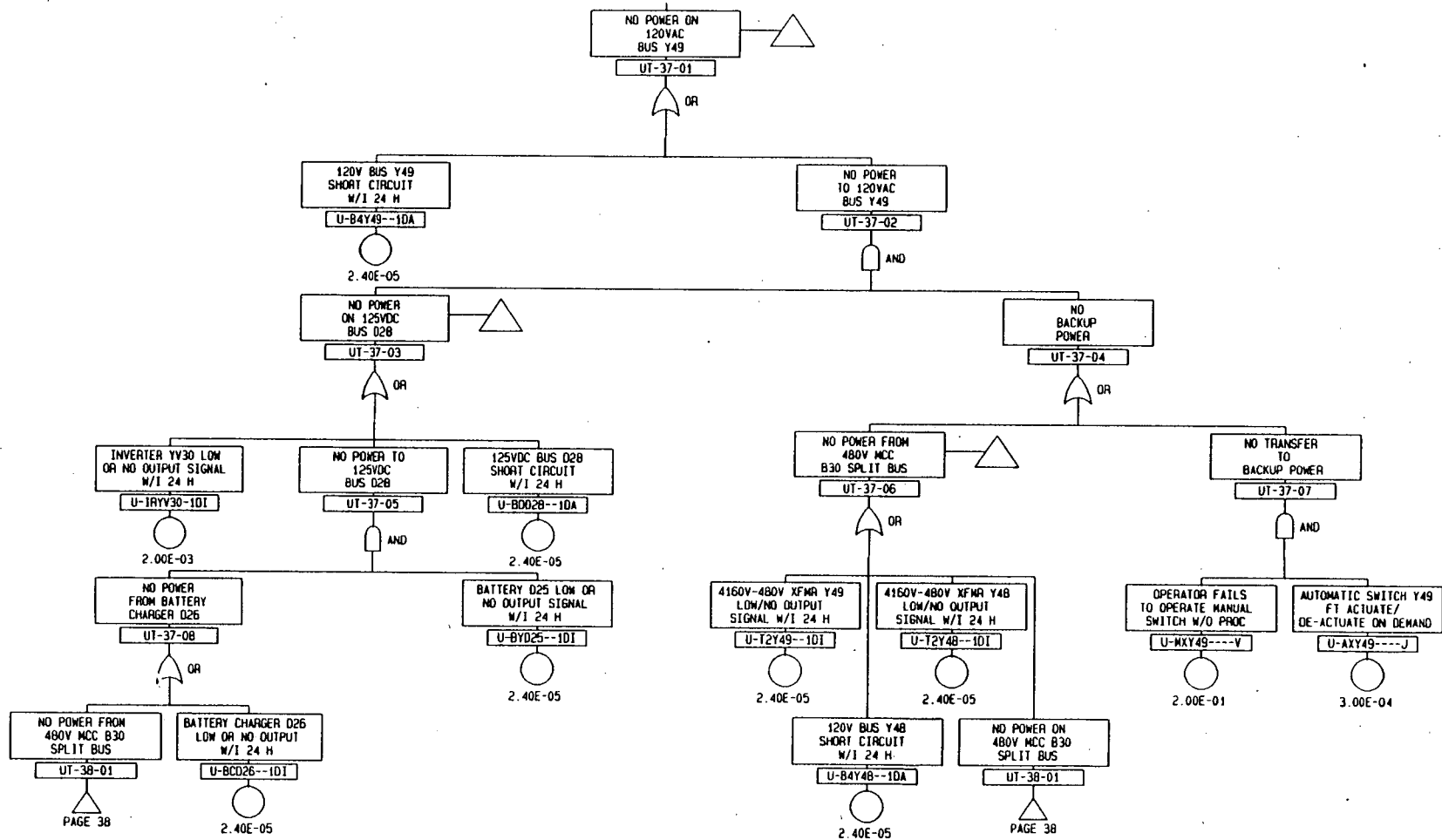


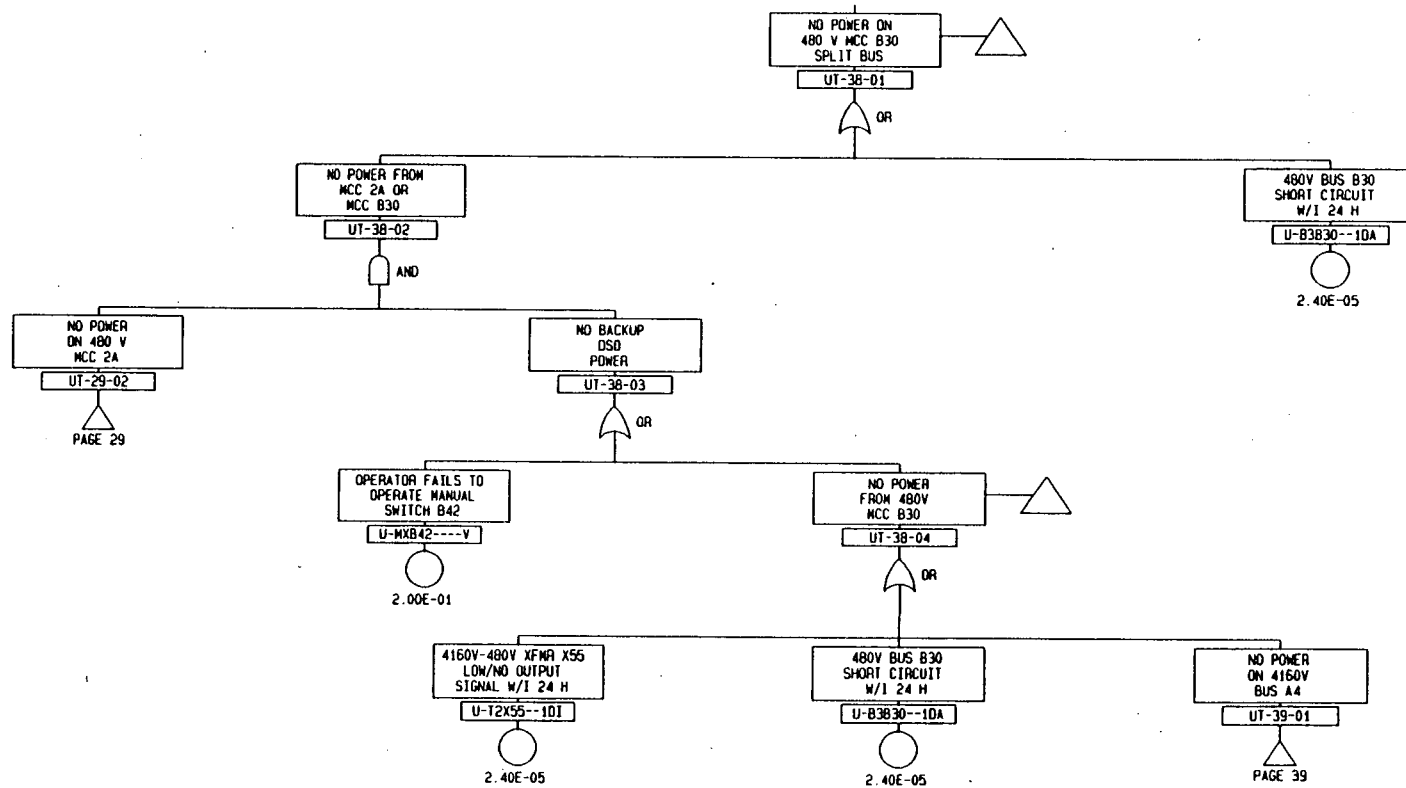


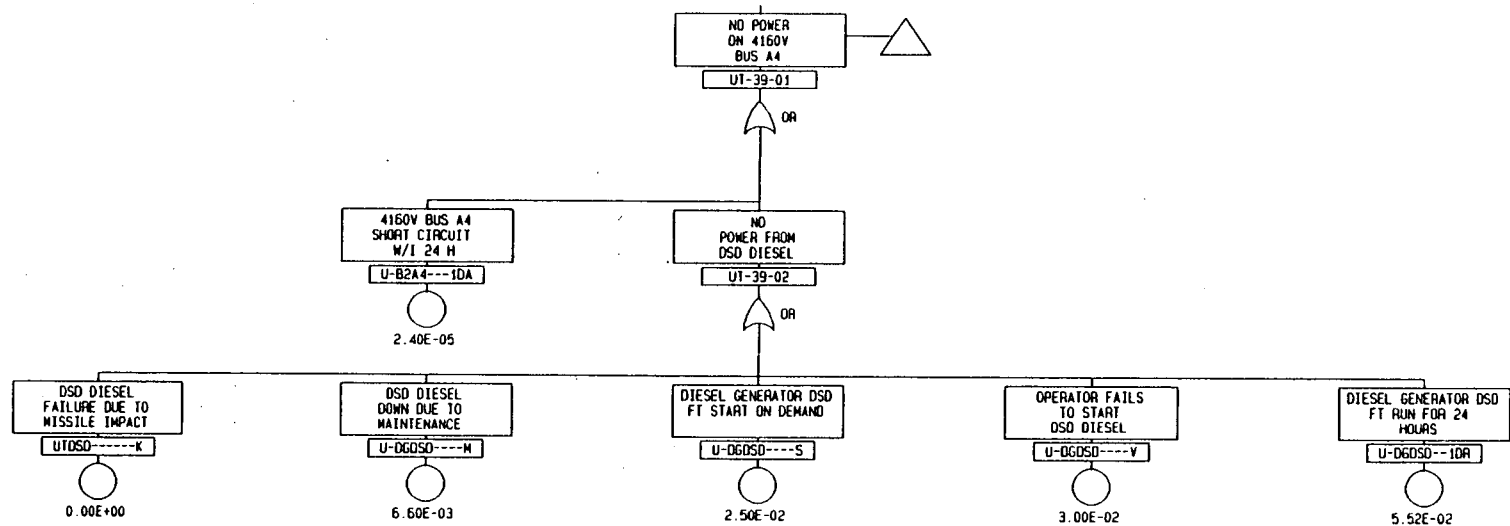






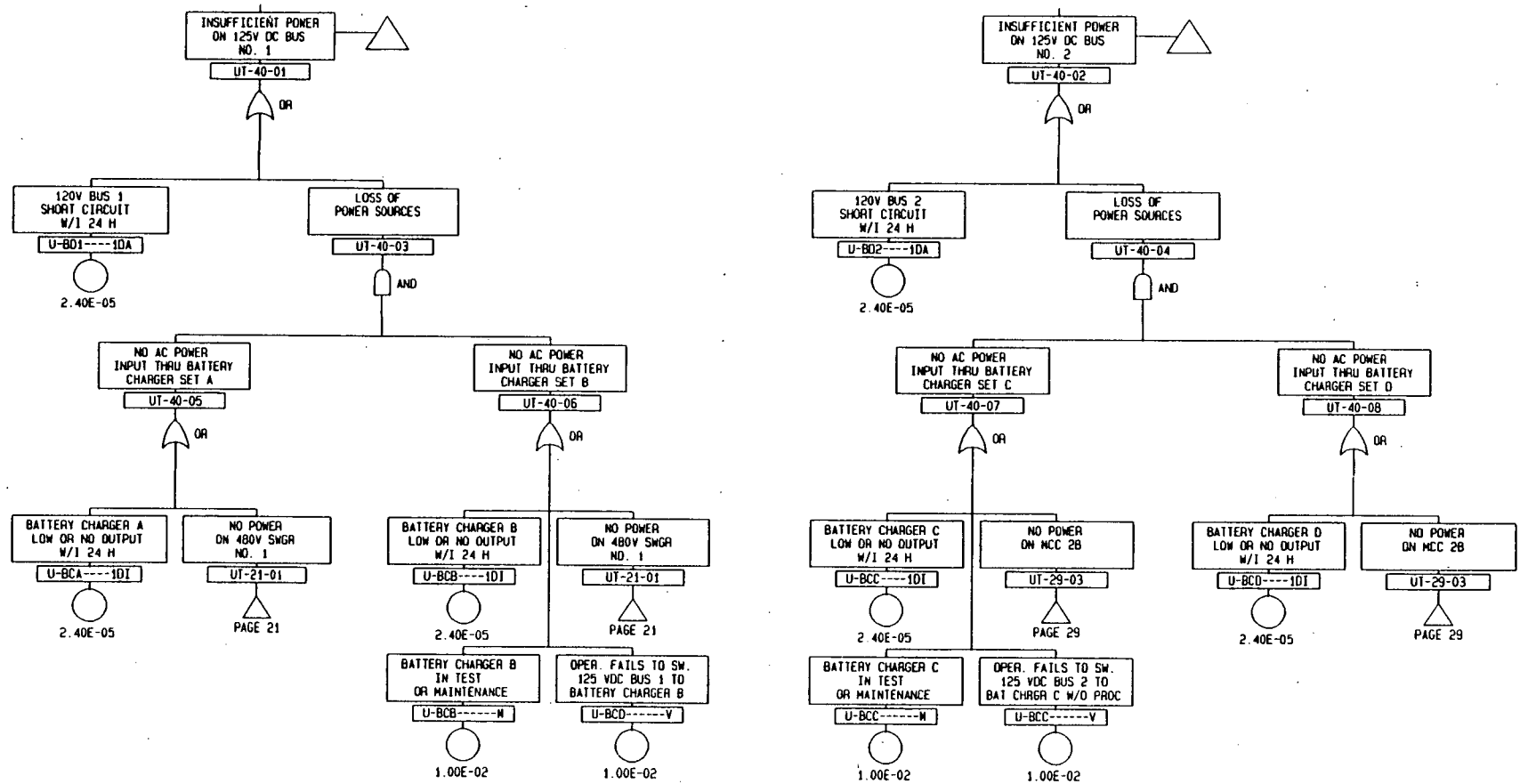




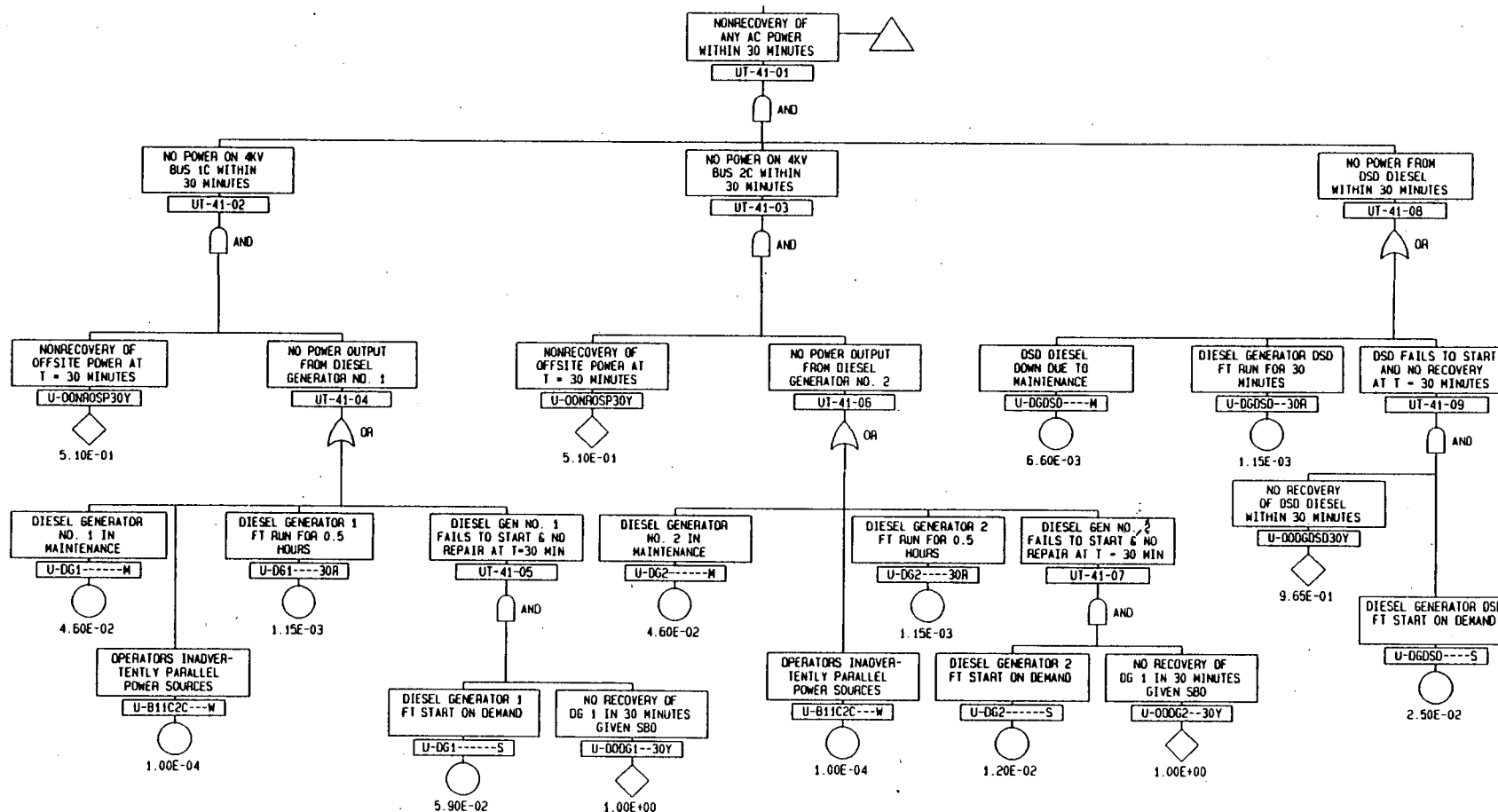


U-DGDSD-----V refers to S01-1.0-60, "Loss of All AC Power", step 15.

04-11-1990

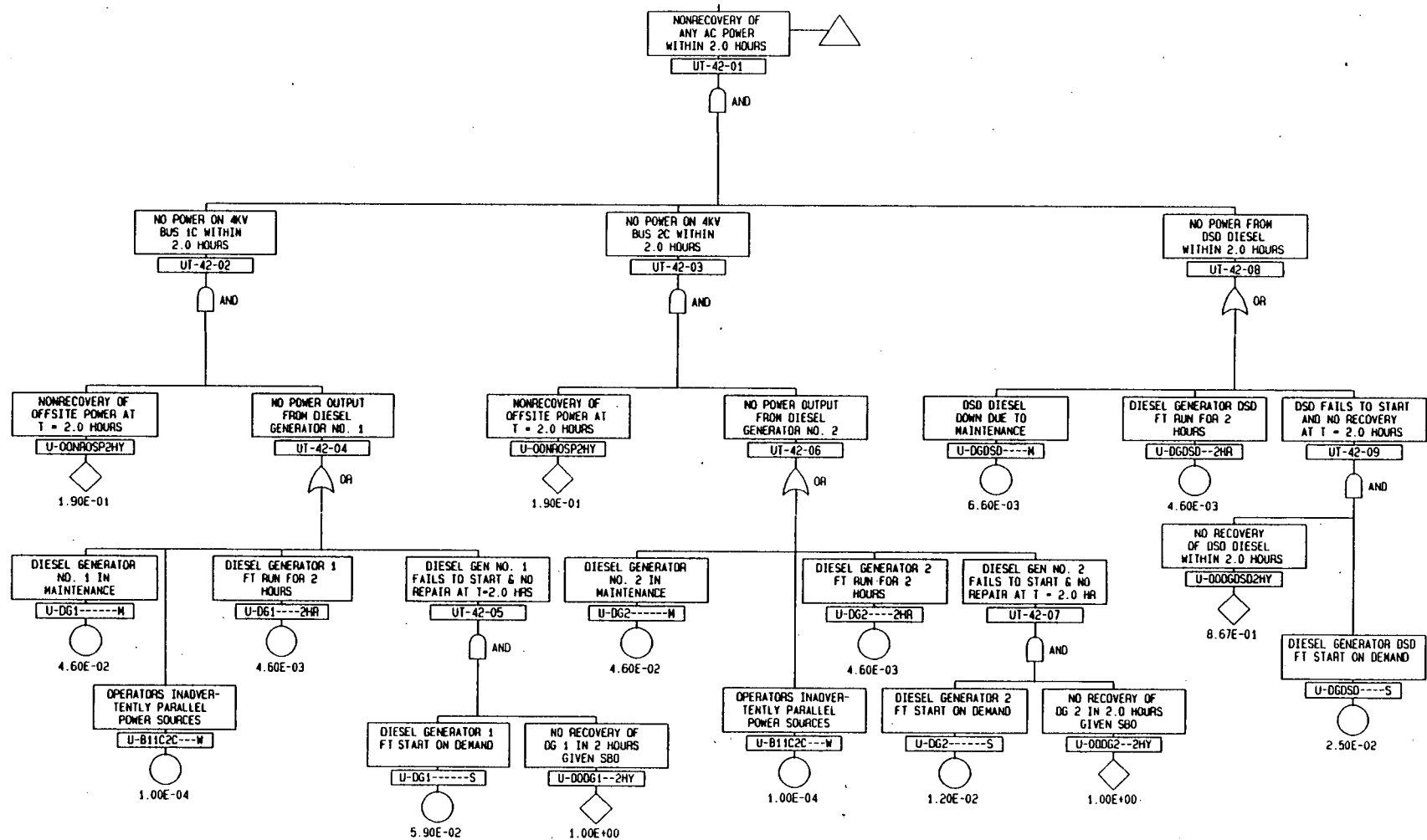


1) See remarks on Page 20.



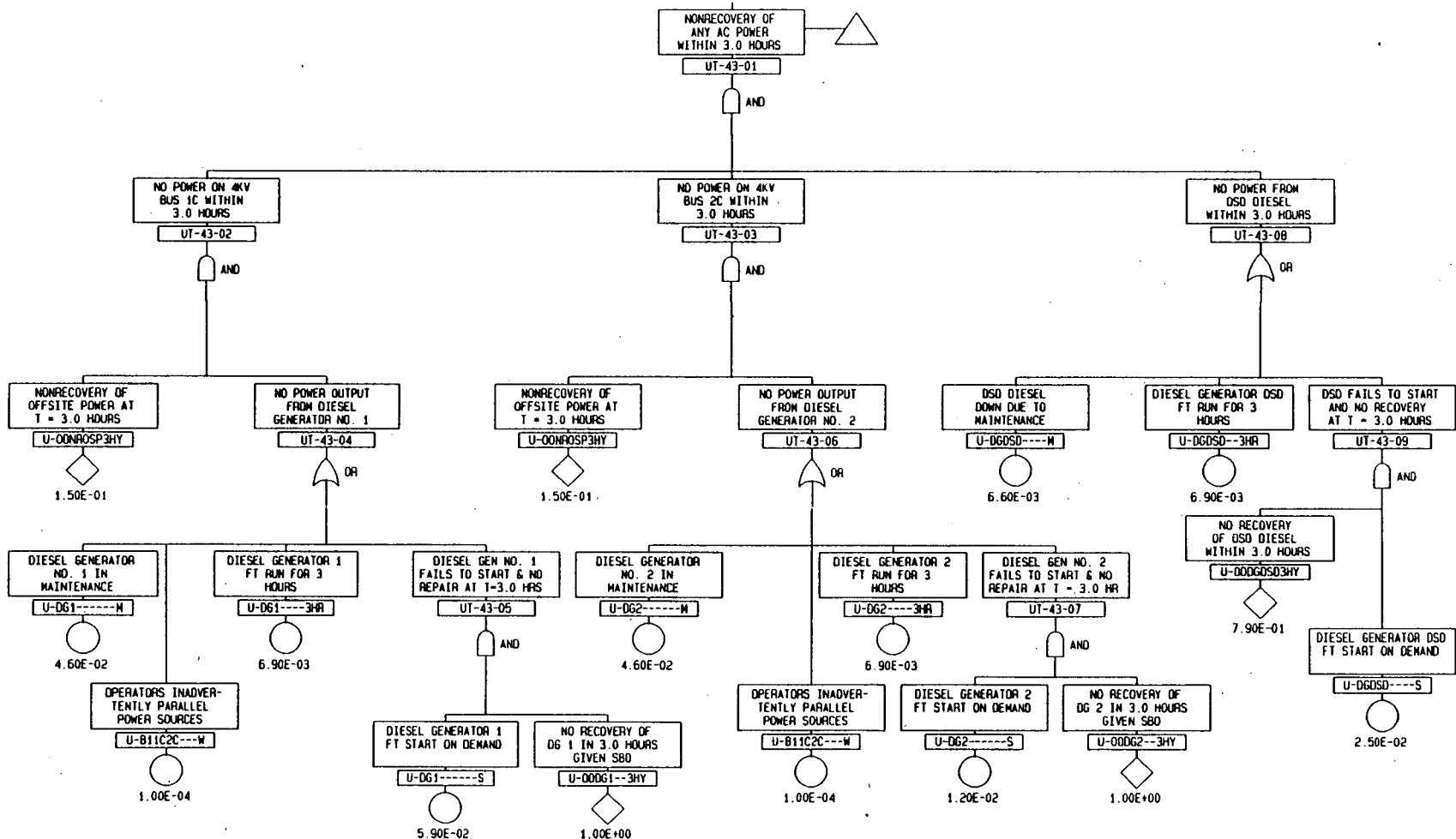
Used for Station Blackout only.

04-11-1990



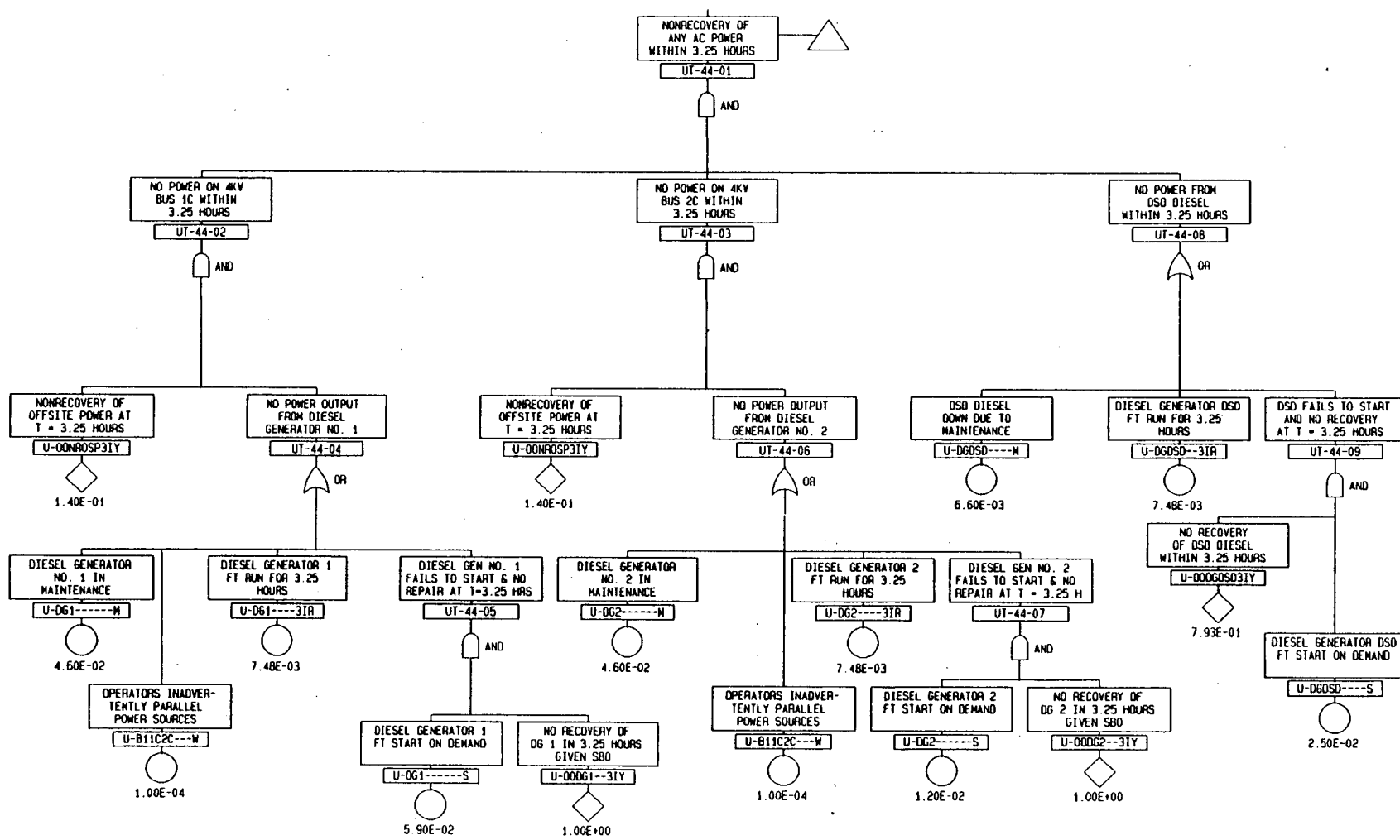
Used for Station Blackout only.

04-11-1990



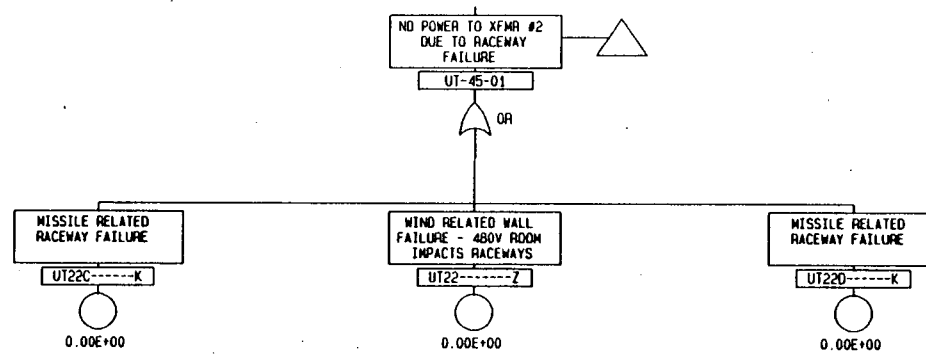
Used for Station Blackout only.

04-11-1990

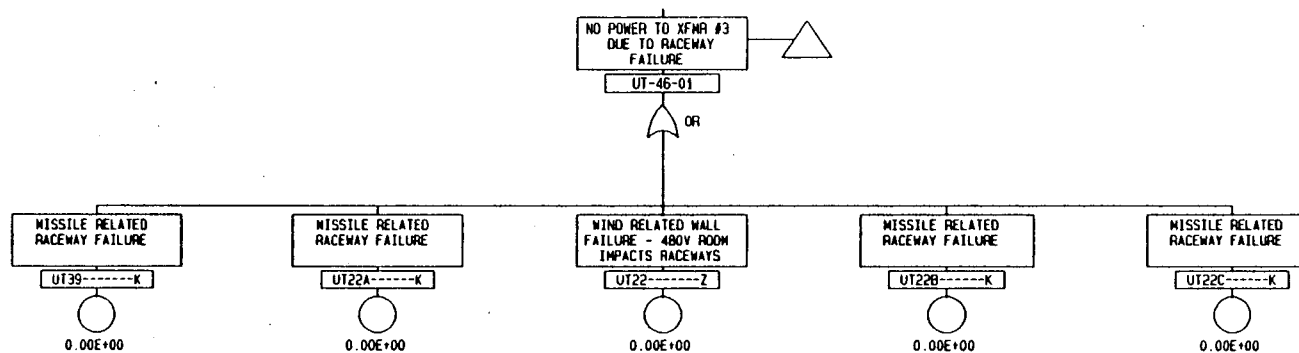


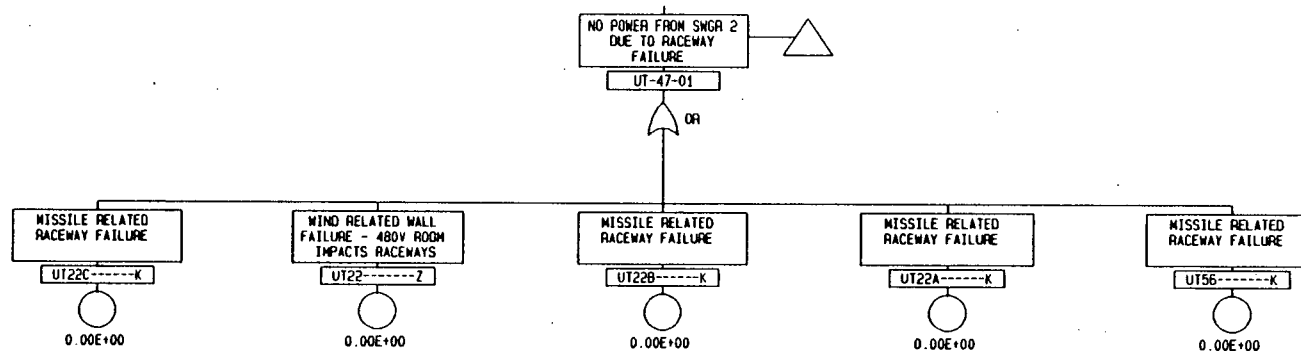
Used for Station Blackout only.

04-11-1990

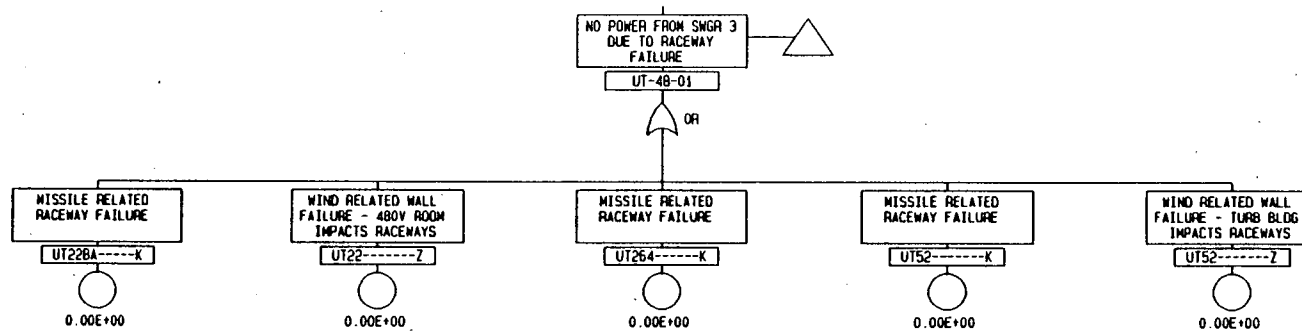


04-11-1990





04-11-1990



APPENDIX C

SYSTEM CUTSET SUMMARIES

Charging System Cutset Summary

Base Case - LOOP

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability
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1	2.654E-01	9.671E-03
---	-----------	-----------

U-DGCC0001-R 9.671E-03 - COMMON CAUSE FAILURE -DG-R --> 1 AND 2

2	2.137E-01	7.788E-03
---	-----------	-----------

U-DGCC0002-S 7.788E-03 - COMMON CAUSE FAILURE -DG-S --> 1 AND 2

3	8.939E-02	3.257E-03
---	-----------	-----------

U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

4	8.234E-02	3.000E-03
---	-----------	-----------

D-MV1100C--N 3.000E-03 - MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y 1.000E+00 - OPS FAILS TO RECOVER MOV-1100C

5	7.449E-02	2.714E-03
---	-----------	-----------

U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

6	6.969E-02	2.539E-03
---	-----------	-----------

U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

6	6.969E-02	2.539E-03
---	-----------	-----------

U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

7	2.470E-02	9.000E-04
---	-----------	-----------

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

8	1.818E-02	6.624E-04
---	-----------	-----------

U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND

9	1.515E-02	5.520E-04
---	-----------	-----------

U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability
------	-------------------	--------------------

10	8.481E-03	3.090E-04
----	-----------	-----------

U-C2CC0002-N 3.090E-04 - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15

11	8.234E-03	3.000E-04
----	-----------	-----------

D-MS1100C--J 3.000E-04 - MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MS1100C--Y 1.000E+00 - OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER

12	4.858E-03	1.770E-04
----	-----------	-----------

U-C212C15--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND

12	4.858E-03	1.770E-04
----	-----------	-----------

U-C212C15--N 3.000E-03 - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND

13	4.545E-03	1.656E-04
----	-----------	-----------

U-C212C15--N 3.000E-03 - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

13	4.545E-03	1.656E-04
----	-----------	-----------

U-C211C14--N 3.000E-03 - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

13	4.545E-03	1.656E-04
----	-----------	-----------

U-C212C15--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

13	4.545E-03	1.656E-04
----	-----------	-----------

U-C211C14--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

14	3.788E-03	1.380E-04
----	-----------	-----------

U-C211C14--N 3.000E-03 - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

14	3.788E-03	1.380E-04
----	-----------	-----------

U-C212C15--N 3.000E-03 - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE

System-level Cutset Report for TNDDLBA Data File

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability
------	----------------------	-----------------------

14 3.788E-03 1.380E-04

U-C212C15--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE

14 3.788E-03 1.380E-04

U-C211C14--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

15 3.047E-03 1.110E-04

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----M 3.700E-03 - CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.

16 2.745E-03 1.000E-04

D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV316----X 1.000E-04 - MANUAL VLV CRS-316 LEFT INOP POST-MAINT

16 2.745E-03 1.000E-04

D-CV301----P 1.000E-04 - CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN

16 2.745E-03 1.000E-04

D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV388----P 1.000E-04 - MANUAL VLV VCC-388 FT OPEN ON DEMAND

16 2.745E-03 1.000E-04

D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV425----X 1.000E-04 - MANUAL VLV CRS-425 LEFT INOP POST-MAINT

17 2.470E-03 9.000E-05

D-C211C07--N 3.000E-03 - BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE

17 2.470E-03 9.000E-05

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----S 3.000E-03 - MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
17	2.470E-03	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
18	9.881E-04	3.600E-05	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
18	9.881E-04	3.600E-05	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
19	6.587E-04	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
20	5.928E-04	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
20	5.928E-04	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
21	3.384E-04	1.233E-05	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
21	3.384E-04	1.233E-05	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
22	3.047E-04	1.110E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----M	3.700E-03	- CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability	
23	2.470E-04	9.000E-06	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
23	2.470E-04	9.000E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-MV1100D--P	3.000E-03	- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-Q05051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
23	2.470E-04	9.000E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
23	2.470E-04	9.000E-06	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
23	2.470E-04	9.000E-06	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
23	2.470E-04	9.000E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
24	1.457E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
24	1.457E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
24	1.457E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability	
24	1.457E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
24	1.457E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
24	1.457E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
25	1.364E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability	
25	1.364E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
25	1.364E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
26	1.279E-04	4.659E-06	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-WRDG2--1DA	7.896E-05	- CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability	
27	1.196E-04	4.359E-06	
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
	U-WRDG1--1DA	7.896E-05	- CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
27	1.196E-04	4.359E-06	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-WRDG2--1DA	7.896E-05	- CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
28	1.136E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability	
28	1.136E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
28	1.136E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
29	9.969E-05	3.632E-06	
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-WRDG1--1DA	7.896E-05	- CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
29	9.969E-05	3.632E-06	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-WRDG2--1DA	7.896E-05	- CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability	
30	8.398E-05	3.060E-06	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	PT-SWCSYS--R	1.360E-04	- RANDOM FAILURE OF SALT WATER COOLING SYSTEM
30	8.398E-05	3.060E-06	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	PT-SWCSYS--R	1.360E-04	- RANDOM FAILURE OF SALT WATER COOLING SYSTEM
31	8.234E-05	3.000E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV302----X	1.000E-04	- MANUAL VLV VCC-302 LEFT INOP POST-MAINT
31	8.234E-05	3.000E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV303----X	1.000E-04	- MANUAL VLV VCC-303 LEFT INOP POST-MAINT
31	8.234E-05	3.000E-06	
	D-CV305----P	1.000E-04	- CHECK VLV VCC-305 FT OPEN ON DEM
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
31	8.234E-05	3.000E-06	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
32	7.312E-05	2.664E-06	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
33	5.928E-05	2.160E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
33	5.928E-05	2.160E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability	
33	5.928E-05	2.160E-06	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
34	4.174E-05	1.521E-06	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
35	3.886E-05	1.416E-06	
	U-B22C---1DA	2.400E-05	- 4160V BUS 2C SHORT CIRCUIT W/I 24 H
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
36	3.636E-05	1.325E-06	
	U-B21C---1DA	2.400E-05	- 4160V BUS 1C SHORT CIRCUIT W/I 24 H
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
36	3.636E-05	1.325E-06	
	U-B22C---1DA	2.400E-05	- 4160V BUS 2C SHORT CIRCUIT W/I 24 H
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
37	3.384E-05	1.233E-06	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
37	3.384E-05	1.233E-06	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
37	3.384E-05	1.233E-06	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
38	3.030E-05	1.104E-06	
	U-B22C---1DA	2.400E-05	- 4160V BUS 2C SHORT CIRCUIT W/I 24 H
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE

System-level Cutset Report for TNDDTLBA Data File

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:02:18

Rank	Cutset Importance	Cutset Probability
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38	3.030E-05	1.104E-06
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U-B21C---1DA 2.400E-05 - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

39	2.964E-05	1.080E-06
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
U-C211A02--U 3.000E-03 - OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND

39	2.964E-05	1.080E-06
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
U-C212C01--N 3.000E-03 - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND

Charging System Cutset Summary

Base Case - PT

Top Event: DT-01-01 Top Event Probability: 5.156E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 14:56:15

Rank	Cutset Importance	Cutset Probability
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1	5.819E-01	3.000E-03
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D-MV1100C--N 3.000E-03 - MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y 1.000E+00 - OPS FAILS TO RECOVER MOV-1100C

2	1.746E-01	9.000E-04
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

3	5.819E-02	3.000E-04
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D-MS1100C--J 3.000E-04 - MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MS1100C--Y 1.000E+00 - OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER

4	2.153E-02	1.110E-04
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----M 3.700E-03 - CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.

5	1.940E-02	1.000E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV388----P 1.000E-04 - MANUAL VLV VCC-388 FT OPEN ON DEMAND

5	1.940E-02	1.000E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV425----X 1.000E-04 - MANUAL VLV CRS-425 LEFT INOP POST-MAINT

5	1.940E-02	1.000E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV316----X 1.000E-04 - MANUAL VLV CRS-316 LEFT INOP POST-MAINT

5	1.940E-02	1.000E-04
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D-CV301----P 1.000E-04 - CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN

6	1.746E-02	9.000E-05
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D-C211C07--N 3.000E-03 - BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE

Top Event: DT-01-01 Top Event Probability: 5.156E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 14:56:15

Rank	Cutset Importance	Cutset Probability	
6	1.746E-02	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
6	1.746E-02	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
7	4.655E-03	2.400E-05	
	D-MV883--10Q	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
8	4.189E-03	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
8	4.189E-03	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
9	2.391E-03	1.233E-05	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
9	2.391E-03	1.233E-05	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
10	2.153E-03	1.110E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
11	1.876E-03	9.671E-06	
	U-DGCC0001-R	9.671E-03	- COMMON CAUSE FAILURE -DG-R --> 1 AND 2
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Top Event: DT-01-01 Top Event Probability: 5.156E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 14:56:15

Rank	Cutset Importance	Cutset Probability	
12	1.746E-03	9.000E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
12	1.746E-03	9.000E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
12	1.746E-03	9.000E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-MV1100D--P	3.000E-03	- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
13	6.317E-04	3.257E-06	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	5.935E-04	3.060E-06	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	PT-SWCSYS--R	1.360E-04	- RANDOM FAILURE OF SALT WATER COOLING SYSTEM
14	5.935E-04	3.060E-06	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	PT-SWCSYS--R	1.360E-04	- RANDOM FAILURE OF SALT WATER COOLING SYSTEM
15	5.819E-04	3.000E-06	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
15	5.819E-04	3.000E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV302----X	1.000E-04	- MANUAL VLV VCC-302 LEFT INOP POST-MAINT
15	5.819E-04	3.000E-06	
	D-CV305----P	1.000E-04	- CHECK VLV VCC-305 FT OPEN ON DEM
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE

Top Event: DT-01-01 Top Event Probability: 5.156E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 14:56:15

Rank	Cutset Importance	Cutset Probability	
15	5.819E-04	3.000E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV303----X	1.000E-04	- MANUAL VLV VCC-303 LEFT INOP POST-MAINT
16	5.264E-04	2.714E-06	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	5.167E-04	2.664E-06	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
18	4.925E-04	2.539E-06	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	4.925E-04	2.539E-06	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	4.189E-04	2.160E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
19	4.189E-04	2.160E-06	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
19	4.189E-04	2.160E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
20	2.949E-04	1.521E-06	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM

System-level Cutset Report for TNDDTTBA Data File

Top Event: DT-01-01 Top Event Probability: 5.156E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 14:56:15

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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21	2.391E-04	1.233E-06
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D-FNE908---S 3.000E-03 - FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
ET-CCWSYS--R 5.480E-04 - RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM

21	2.391E-04	1.233E-06
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D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
D-TC1400---J 3.000E-03 - VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
ET-CCWSYS--R 5.480E-04 - RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM

21	2.391E-04	1.233E-06
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D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
ET-CCWSYS--R 5.480E-04 - RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM

Charging System Cutset Summary

F' 1 Tornado - LOOP

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability	
1	2.628E-01	9.671E-03	U-DGCC0001-R 9.671E-03 - COMMON CAUSE FAILURE -DG-R --> 1 AND 2
2	2.116E-01	7.788E-03	U-DGCC0002-S 7.788E-03 - COMMON CAUSE FAILURE -DG-S --> 1 AND 2
3	8.850E-02	3.257E-03	U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
4	8.153E-02	3.000E-03	D-MV1100C--N 3.000E-03 - MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND D-MV1100C--Y 1.000E+00 - OPS FAILS TO RECOVER MOV-1100C
5	7.375E-02	2.714E-03	U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE
6	6.900E-02	2.539E-03	U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
6	6.900E-02	2.539E-03	U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE
7	2.446E-02	9.000E-04	D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE D-MPG8B----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
8	1.800E-02	6.624E-04	U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND
9	1.500E-02	5.520E-04	U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability
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10	8.397E-03	3.090E-04
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U-C2CC0002-N 3.090E-04 - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15

11	8.153E-03	3.000E-04
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D-MS1100C--J 3.000E-04 - MTR STARTER MOV-1100C FT ACTUATE ON DEMAND

D-MS1100C--Y 1.000E+00 - OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER

12	4.810E-03	1.770E-04
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U-C212C15--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE

U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND

12	4.810E-03	1.770E-04
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U-C212C15--N 3.000E-03 - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND

U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND

13	4.500E-03	1.656E-04
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U-C212C15--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE

U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

13	4.500E-03	1.656E-04
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U-C211C14--N 3.000E-03 - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND

U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

13	4.500E-03	1.656E-04
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U-C212C15--N 3.000E-03 - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND

U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

13	4.500E-03	1.656E-04
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U-C211C14--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE

U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

14	3.750E-03	1.380E-04
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U-C211C14--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE

U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

14	3.750E-03	1.380E-04
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U-C212C15--N 3.000E-03 - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND

U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability	
14	3.750E-03	1.380E-04	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
14	3.750E-03	1.380E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
15	3.016E-03	1.110E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
16	2.718E-03	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV425----X	1.000E-04	- MANUAL VLV CRS-425 LEFT INOP POST-MAINT
16	2.718E-03	1.000E-04	
	D-CV301----P	1.000E-04	- CHECK VALVE CRS-301 FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
16	2.718E-03	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV388----P	1.000E-04	- MANUAL VLV VCC-388 FT OPEN ON DEMAND
16	2.718E-03	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV316----X	1.000E-04	- MANUAL VLV CRS-316 LEFT INOP POST-MAINT
17	2.446E-03	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
17	2.446E-03	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability
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17	2.446E-03	9.000E-05
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D-C211C07--N 3.000E-03 - BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8A-----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE

18	1.650E-03	6.072E-05
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U-DGSD--1DR 5.520E-02 - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UT22-----Z 1.100E-03 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

19	9.783E-04	3.600E-05
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U-C211C14--U 3.000E-03 - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND

19	9.783E-04	3.600E-05
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U-C211C14--N 3.000E-03 - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND

20	9.000E-04	3.312E-05
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U-BY1-----Z 6.000E-04 - BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

21	8.968E-04	3.300E-05
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D-FNE908---V 3.000E-02 - OP FT LOCAL MANUALLY START FAN CLR E908 (CHRG G8A) PER PROC
UT22-----Z 1.100E-03 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

21	8.968E-04	3.300E-05
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D-G8ADSD---V 3.000E-02 - OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
UT22-----Z 1.100E-03 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

21	8.968E-04	3.300E-05
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
UT22-----Z 1.100E-03 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

21	8.968E-04	3.300E-05
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D-E908B30--V 3.000E-02 - OPER FT CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
UT22-----Z 1.100E-03 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability	
21	8.968E-04	3.300E-05	
	U-DGSD----V	3.000E-02	- OPERATOR FAILS TO START DSD DIESEL
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	8.968E-04	3.300E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	7.500E-04	2.760E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
23	7.473E-04	2.750E-05	
	U-DGSD----S	2.500E-02	- DIESEL GENERATOR DSD FT START ON DEMAND
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
24	6.522E-04	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
25	5.870E-04	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
25	5.870E-04	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
26	4.892E-04	1.800E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
27	3.016E-04	1.110E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.

Top Event: DT-01-01 Top Event Probability: 3.680E-02
Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability	
28	2.446E-04	9.000E-06	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
28	2.446E-04	9.000E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-MV1100D--P	3.000E-03	- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
28	2.446E-04	9.000E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
28	2.446E-04	9.000E-06	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
28	2.446E-04	9.000E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
28	2.446E-04	9.000E-06	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
29	1.973E-04	7.260E-06	
	U-DGSD----M	6.600E-03	- DSD DIESEL DOWN DUE TO MAINTENANCE
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
30	1.957E-04	7.200E-06	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
31	1.443E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability	
31	1.443E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
31	1.443E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
31	1.443E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
31	1.443E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
31	1.443E-04	5.310E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
32	1.350E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
32	1.350E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
32	1.350E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability	
32	1.350E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
32	1.350E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
32	1.350E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
32	1.350E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
32	1.350E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
32	1.350E-04	4.968E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
32	1.350E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
32	1.350E-04	4.968E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

System-level Cutset Report for TNDDTLF1 Data File

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability
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32 1.350E-04 4.968E-06

D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
U-C211C01--U 3.000E-03 - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

33 1.266E-04 4.659E-06

U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND
U-WRDG2--1DA 7.896E-05 - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H

34 1.184E-04 4.359E-06

U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-WRDG1--1DA 7.896E-05 - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H

34 1.184E-04 4.359E-06

U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-WRDG2--1DA 7.896E-05 - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H

35 1.125E-04 4.140E-06

D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
U-C211C01--N 3.000E-03 - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

35 1.125E-04 4.140E-06

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
U-C211C01--U 3.000E-03 - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE

35 1.125E-04 4.140E-06

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
U-C212C01--N 3.000E-03 - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE

35 1.125E-04 4.140E-06

D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
U-C211A02--U 3.000E-03 - OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability	
35	1.125E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
35	1.125E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
35	1.125E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
35	1.125E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
35	1.125E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
35	1.125E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
35	1.125E-04	4.140E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
35	1.125E-04	4.140E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability	
36	1.106E-04	4.070E-06	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
37	9.871E-05	3.632E-06	
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-WRDG1--1DA	7.896E-05	- CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
37	9.871E-05	3.632E-06	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-WRDG2--1DA	7.896E-05	- CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
38	8.968E-05	3.300E-06	
	D-C33011---N	3.000E-03	- BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
38	8.968E-05	3.300E-06	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
38	8.968E-05	3.300E-06	
	D-C21A403--N	3.000E-03	- BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
38	8.968E-05	3.300E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
38	8.968E-05	3.300E-06	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
38	8.968E-05	3.300E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDDTLF1 Data File

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:38:12

Rank	Cutset Importance	Cutset Probability
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39	8.153E-05	3.000E-06
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-XV303----X 1.000E-04 - MANUAL VLV VCC-303 LEFT INOP POST-MAINT

39	8.153E-05	3.000E-06
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-XV302----X 1.000E-04 - MANUAL VLV VCC-302 LEFT INOP POST-MAINT

39	8.153E-05	3.000E-06
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D-CV305----P 1.000E-04 - CHECK VLV VCC-305 FT OPEN ON DEM
D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE

Charging System Cutset Summary

F' 1 Tornado - PT

System-level Cutset Report for TNDTTF1 Data File

Top Event: DT-01-01 Top Event Probability: 5.456E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:30:37

Rank	Cutset Importance	Cutset Probability
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1	5.499E-01	3.000E-03
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D-MV1100C--N 3.000E-03 - MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y 1.000E+00 - OPS FAILS TO RECOVER MOV-1100C

2	1.650E-01	9.000E-04
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

3	5.499E-02	3.000E-04
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D-MS1100C--J 3.000E-04 - MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MS1100C--Y 1.000E+00 - OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER

4	2.034E-02	1.110E-04
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----M 3.700E-03 - CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.

5	1.833E-02	1.000E-04
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D-CV301----P 1.000E-04 - CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN

5	1.833E-02	1.000E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV316----X 1.000E-04 - MANUAL VLV CRS-316 LEFT INOP POST-MAINT

5	1.833E-02	1.000E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV425----X 1.000E-04 - MANUAL VLV CRS-425 LEFT INOP POST-MAINT

5	1.833E-02	1.000E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV388----P 1.000E-04 - MANUAL VLV VCC-388 FT OPEN ON DEMAND

6	1.650E-02	9.000E-05
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D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MPG8B----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

System-level Cutset Report for TNDDTTF1 Data File

Top Event: DT-01-01 Top Event Probability: 5.456E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:30:37

Rank	Cutset Importance	Cutset Probability	
6	1.650E-02	9.000E-05	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
6	1.650E-02	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
7	1.113E-02	6.072E-05	
	U-DGDSD--1DR	5.520E-02	- DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	6.048E-03	3.300E-05	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHRG G8A) PER PROC
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	6.048E-03	3.300E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	6.048E-03	3.300E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	6.048E-03	3.300E-05	
	D-E908B30--V	3.000E-02	- OPER FT CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	6.048E-03	3.300E-05	
	U-DGDSD----V	3.000E-02	- OPERATOR FAILS TO START DSD DIESEL
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	6.048E-03	3.300E-05	
	D-G8ADSD---V	3.000E-02	- OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 5.456E-03
Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:30:37

Rank	Cutset Importance	Cutset Probability	
9	5.040E-03	2.750E-05	
	U-DGDS-----S	2.500E-02	- DIESEL GENERATOR DSD FT START ON DEMAND
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	4.399E-03	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
11	3.959E-03	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
11	3.959E-03	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
12	3.299E-03	1.800E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
13	2.034E-03	1.110E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
14	1.773E-03	9.671E-06	
	U-DGCC0001-R	9.671E-03	- COMMON CAUSE FAILURE -DG-R --> 1 AND 2
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	1.650E-03	9.000E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
15	1.650E-03	9.000E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING

Top Event: DT-01-01 Top Event Probability: 5.456E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:30:37

Rank	Cutset Importance	Cutset Probability	
15	1.650E-03	9.000E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-MV1100D--P	3.000E-03	- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
16	1.331E-03	7.260E-06	
	U-DGSD----M	6.600E-03	- DSD DIESEL DOWN DUE TO MAINTENANCE
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	7.460E-04	4.070E-06	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
18	6.048E-04	3.300E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
18	6.048E-04	3.300E-06	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
18	6.048E-04	3.300E-06	
	D-C33011---N	3.000E-03	- BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
18	6.048E-04	3.300E-06	
	D-C21A403--N	3.000E-03	- BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
18	6.048E-04	3.300E-06	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
19	5.969E-04	3.257E-06	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Top Event: DT-01-01 Top Event Probability: 5.456E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:30:37

Rank	Cutset Importance	Cutset Probability	
20	5.499E-04	3.000E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV303----X	1.000E-04	- MANUAL VLV VCC-303 LEFT INOP POST-MAINT
20	5.499E-04	3.000E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV302----X	1.000E-04	- MANUAL VLV VCC-302 LEFT INOP POST-MAINT
20	5.499E-04	3.000E-06	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
20	5.499E-04	3.000E-06	
	D-CV305----P	1.000E-04	- CHECK VLV VCC-305 FT OPEN ON DEM
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
21	4.974E-04	2.714E-06	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
22	4.883E-04	2.664E-06	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----M	3.700E-03	- CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
23	4.654E-04	2.539E-06	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
23	4.654E-04	2.539E-06	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
24	4.030E-04	2.199E-06	
	U-IRYV30-1DI	1.999E-03	- INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	1.100E-03	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDDTTF1 Data File

Top Event: DT-01-01 Top Event Probability: 5.456E-03

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:30:37

Rank	Cutset Importance	Cutset Probability
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25	3.959E-04	2.160E-06
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D-C211C07--N 3.000E-03 - BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8A--1DR 7.200E-04 - CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)

25	3.959E-04	2.160E-06
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D-MPG8A--1DR 7.200E-04 - CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
D-MPG8B----S 3.000E-03 - MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING

25	3.959E-04	2.160E-06
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D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MPG8B--1DR 7.200E-04 - MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING

26	3.299E-04	1.800E-06
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D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
U-BY1-----Z 6.000E-04 - BATTERY 1 FAILURE DUE TO MISSILE IMPACT

27	3.024E-04	1.650E-06
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D-MV1100B--P 3.000E-03 - MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-OOSDG&E--Z 5.000E-01 - SDG&E LINE UNAVAILABLE
UT22-----Z 1.100E-03 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Charging System Outset Summary

F' 2 Tornado - LOOP

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability	
1	1.753E-01	9.671E-03	
	U-DGCC0001-R	9.671E-03	- COMMON CAUSE FAILURE -DG-R --> 1 AND 2
2	1.412E-01	7.788E-03	
	U-DGCC0002-S	7.788E-03	- COMMON CAUSE FAILURE -DG-S --> 1 AND 2
3	5.904E-02	3.257E-03	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
4	5.504E-02	3.036E-03	
	U-DGSD--1DR	5.520E-02	- DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
5	5.438E-02	3.000E-03	
	D-MV1100C--N	3.000E-03	- MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
	D-MV1100C--Y	1.000E+00	- OPS FAILS TO RECOVER MOV-1100C
6	4.920E-02	2.714E-03	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
7	4.603E-02	2.539E-03	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
7	4.603E-02	2.539E-03	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
8	4.369E-02	2.410E-03	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTTKRWST---K	2.410E-03	- TORNADO INDUCED MISSILE FAILURE OF RWST
9	2.991E-02	1.650E-03	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability
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9 2.991E-02 1.650E-03

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

9 2.991E-02 1.650E-03

D-G8ADSD---V 3.000E-02 - OP FAILS TO CONNECT CHR G PUMP G-8A TO DSD DIESEL W/ PROC.
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

9 2.991E-02 1.650E-03

D-E908B30--V 3.000E-02 - OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

9 2.991E-02 1.650E-03

D-FNE908---V 3.000E-02 - OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

9 2.991E-02 1.650E-03

U-DGSD----V 3.000E-02 - OPERATOR FAILS TO START DSD DIESEL
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

10 2.493E-02 1.375E-03

U-DGSD----S 2.500E-02 - DIESEL GENERATOR DSD FT START ON DEMAND
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

11 1.632E-02 9.000E-04

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

12 1.201E-02 6.624E-04

U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND

13 1.039E-02 5.730E-04

D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
DTPRWST---K 5.730E-04 - TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWSTJ

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability	
14	1.001E-02	5.520E-04	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
15	6.580E-03	3.630E-04	
	U-DGSD----M	6.600E-03	- DSD DIESEL DOWN DUE TO MAINTENANCE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	5.602E-03	3.090E-04	
	U-C2CC0002-N	3.090E-04	- COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
17	5.438E-03	3.000E-04	
	D-MS1100C--J	3.000E-04	- MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
	D-MS1100C--Y	1.000E+00	- OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
18	3.689E-03	2.035E-04	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
19	3.209E-03	1.770E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
19	3.209E-03	1.770E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
20	3.002E-03	1.656E-04	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
20	3.002E-03	1.656E-04	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
20	3.002E-03	1.656E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

System-level Cutset Report for TNDDTLF2 Data File

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability	
20	3.002E-03	1.656E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
21	2.991E-03	1.650E-04	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	2.991E-03	1.650E-04	
	D-C21A403--N	3.000E-03	- BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	2.991E-03	1.650E-04	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	2.991E-03	1.650E-04	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	2.991E-03	1.650E-04	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	2.991E-03	1.650E-04	
	D-C33011---N	3.000E-03	- BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	2.502E-03	1.380E-04	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
22	2.502E-03	1.380E-04	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability	
22	2.502E-03	1.380E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
22	2.502E-03	1.380E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
23	2.012E-03	1.110E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
24	1.993E-03	1.099E-04	
	U-IRYV30-1DI	1.999E-03	- INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
25	1.813E-03	1.000E-04	
	D-CV301----P	1.000E-04	- CHECK VALVE CRS-301 FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
25	1.813E-03	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV388----P	1.000E-04	- MANUAL VLV VCC-388 FT OPEN ON DEMAND
25	1.813E-03	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV316----X	1.000E-04	- MANUAL VLV CRS-316 LEFT INOP POST-MAINT
25	1.813E-03	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV425----X	1.000E-04	- MANUAL VLV CRS-425 LEFT INOP POST-MAINT
26	1.632E-03	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

Top Event: DT-01-01 Top Event Probability: 5.516E-02
Flag Set: DTLOOP
This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability	
26	1.632E-03	9.000E-05	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
26	1.632E-03	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
27	1.545E-03	8.525E-05	
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTDSD-----K	1.550E-03	- DSD DIESEL FAILURE DUE TO MISSILE IMPACT
28	1.454E-03	8.020E-05	
	UT56-----K	8.020E-05	- MISSILE RELATED RACEWAY FAILURE
29	7.179E-04	3.960E-05	
	D-FNE908-1DR	7.200E-04	- FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
29	7.179E-04	3.960E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
30	6.526E-04	3.600E-05	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
30	6.526E-04	3.600E-05	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
31	6.004E-04	3.312E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
32	5.982E-04	3.300E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 5.516E-02
Flag Set: DTLOOP
This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability	
33	5.003E-04	2.760E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
34	4.397E-04	2.426E-05	
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTWPC-----K	4.410E-04	- MISSILE RELATED RACEWAY FAILURE
35	4.351E-04	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
36	3.916E-04	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
36	3.916E-04	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
37	3.430E-04	1.892E-05	
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTEPC-----K	3.440E-04	- MISSILE RELATED RACEWAY FAILURE
38	3.263E-04	1.800E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
39	2.991E-04	1.650E-05	
	D-MS1100B--J	3.000E-04	- MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
40	2.802E-04	1.545E-05	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT6306-----K	2.810E-04	- MISSILE RELATED RACEWAY FAILURE

System-level Cutset Report for TNDTLF2 Data File

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability	
41	2.104E-04	1.161E-05	
	U-T21-----K	2.110E-04	- SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
42	2.012E-04	1.110E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----M	3.700E-03	- CHR9 PUMP G-8B OUT OF SERVICE FOR MAINT.
43	1.765E-04	9.735E-06	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
43	1.765E-04	9.735E-06	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
43	1.765E-04	9.735E-06	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
43	1.765E-04	9.735E-06	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
43	1.765E-04	9.735E-06	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
43	1.765E-04	9.735E-06	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability	
44	1.713E-04	9.450E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-T22&T23--K	3.150E-04	- SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
45	1.651E-04	9.108E-06	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	1.651E-04	9.108E-06	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	1.651E-04	9.108E-06	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	1.651E-04	9.108E-06	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	1.651E-04	9.108E-06	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	1.651E-04	9.108E-06	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
46	1.632E-04	9.000E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING

System-level Cutset Report for TNDTLF2 Data File

Top Event: DT-01-01 Top Event Probability: 5.516E-02
Flag Set: DTLOOP
This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability	
46	1.632E-04	9.000E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
46	1.632E-04	9.000E-06	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
46	1.632E-04	9.000E-06	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
46	1.632E-04	9.000E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-MV1100D--P	3.000E-03	- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
46	1.632E-04	9.000E-06	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
47	1.605E-04	8.855E-06	
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT39-----K	1.610E-04	- MISSILE RELATED RACEWAY FAILURE
48	1.376E-04	7.590E-06	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
48	1.376E-04	7.590E-06	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
48	1.376E-04	7.590E-06	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDTFL2 Data File

Top Event: DT-01-01 Top Event Probability: 5.516E-02
Flag Set: DTLOOP
This file was created on 8-21-1990 at 15:53:39

Rank	Cutset Importance	Cutset Probability
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- 48 1.376E-04 7.590E-06
U-C212C01--U 3.000E-03 - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
- 48 1.376E-04 7.590E-06
U-C211C01--U 3.000E-03 - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
- 48 1.376E-04 7.590E-06
U-C211C01--N 3.000E-03 - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
- 49 1.305E-04 7.200E-06
U-BY1-----Z 6.000E-04 - BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-DG2-----S 1.200E-02 - DIESEL GENERATOR 2 FT START ON DEMAND
- 50 1.169E-04 6.450E-06
D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
UT22B-----K 2.150E-04 - MISSILE RELATED RACEWAY FAILURE
- 51 9.970E-05 5.500E-06
D-CV306----P 1.000E-04 - CHECK VLV 306 FT OPEN ON DEM
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
- 51 9.970E-05 5.500E-06
D-MXB31----N 1.000E-04 - MANUAL SWITCH B31 FAILS TO CLOSE
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
- 52 9.626E-05 5.310E-06
D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
U-C211A02--N 3.000E-03 - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND

System-level Cutset Report for TNDDTLF2 Data File

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:53:39

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
52	9.626E-05	5.310E-06

- D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
- U-C212C01--U 3.000E-03 - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
- U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND

Charging System Outset Summary

F' 2 Tornado - PT

Top Event: DT-01-01 Top Event Probability: 2.417E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:44:15

Rank	Cutset Importance	Cutset Probability	
1	1.256E-01	3.036E-03	
	U-DGSD--1DR	5.520E-02	- DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	1.241E-01	3.000E-03	
	D-MV1100C--N	3.000E-03	- MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
	D-MV1100C--Y	1.000E+00	- OPS FAILS TO RECOVER MOV-1100C
3	9.970E-02	2.410E-03	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTKRWST---K	2.410E-03	- TORNADO INDUCED MISSILE FAILURE OF RWST
4	6.826E-02	1.650E-03	
	U-DGSD----V	3.000E-02	- OPERATOR FAILS TO START DSD DIESEL
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
4	6.826E-02	1.650E-03	
	D-E908B30--V	3.000E-02	- OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
4	6.826E-02	1.650E-03	
	D-G8ADSD---V	3.000E-02	- OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
4	6.826E-02	1.650E-03	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
4	6.826E-02	1.650E-03	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
4	6.826E-02	1.650E-03	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDTTF2 Data File

Top Event: DT-01-01 Top Event Probability: 2.417E-02
Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:44:15

Rank	Cutset Importance	Cutset Probability	
5	5.688E-02	1.375E-03	
	U-DGSD----S	2.500E-02	- DIESEL GENERATOR DSD FT START ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
6	3.723E-02	9.000E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
7	2.370E-02	5.730E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTPPRWST---K	5.730E-04	- TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWSTJ
8	1.502E-02	3.630E-04	
	U-DGSD----M	6.600E-03	- DSD DIESEL DOWN DUE TO MAINTENANCE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.241E-02	3.000E-04	
	D-MS1100C--J	3.000E-04	- MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
	D-MS1100C--Y	1.000E+00	- OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
10	8.418E-03	2.035E-04	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
11	6.826E-03	1.650E-04	
	D-C33011---N	3.000E-03	- BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
11	6.826E-03	1.650E-04	
	D-C21A403--N	3.000E-03	- BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
11	6.826E-03	1.650E-04	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.417E-02
Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:44:15

Rank	Cutset Importance	Cutset Probability	
11	6.826E-03	1.650E-04	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
11	6.826E-03	1.650E-04	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	4.592E-03	1.110E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
13	4.548E-03	1.099E-04	
	U-IRYV30-1DI	1.999E-03	- INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	4.137E-03	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV425----X	1.000E-04	- MANUAL VLV CRS-425 LEFT INOP POST-MAINT
14	4.137E-03	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV316----X	1.000E-04	- MANUAL VLV CRS-316 LEFT INOP POST-MAINT
14	4.137E-03	1.000E-04	
	D-CV301----P	1.000E-04	- CHECK VALVE CRS-301 FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
14	4.137E-03	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV388----P	1.000E-04	- MANUAL VLV VCC-388 FT OPEN ON DEMAND
15	3.723E-03	9.000E-05	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE

Top Event: DT-01-01 Top Event Probability: 2.417E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:44:15

Rank	Cutset Importance	Cutset Probability	
15	3.723E-03	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
15	3.723E-03	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
16	3.527E-03	8.525E-05	
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTDSD-----K	1.550E-03	- DSD DIESEL FAILURE DUE TO MISSILE IMPACT
17	3.413E-03	8.250E-05	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-00SDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
18	3.318E-03	8.020E-05	
	UT56-----K	8.020E-05	- MISSILE RELATED RACEWAY FAILURE
19	1.638E-03	3.960E-05	
	D-FNE908-1DR	7.200E-04	- FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
19	1.638E-03	3.960E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
20	1.365E-03	3.300E-05	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-B32SDGE--V	2.000E-01	- OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	1.003E-03	2.426E-05	
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTWPC-----K	4.410E-04	- MISSILE RELATED RACEWAY FAILURE

System-level Cutset Report for TNDDTTF2 Data File

Top Event: DT-01-01 Top Event Probability: 2.417E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:44:15

Rank	Cutset Importance	Cutset Probability	
22	9.928E-04	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
23	8.935E-04	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B---U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
23	8.935E-04	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
24	7.827E-04	1.892E-05	
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTEPC-----K	3.440E-04	- MISSILE RELATED RACEWAY FAILURE
25	7.446E-04	1.800E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
26	4.801E-04	1.161E-05	
	U-T21-----K	2.110E-04	- SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
27	4.592E-04	1.110E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B---M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
28	4.001E-04	9.671E-06	
	U-DGCC0001-R	9.671E-03	- COMMON CAUSE FAILURE -DG-R --> 1 AND 2
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
29	3.723E-04	9.000E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING

Top Event: DT-01-01 Top Event Probability: 2.417E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:44:15

Rank	Cutset Importance	Cutset Probability
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29	3.723E-04	9.000E-06
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D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MPG8B----S 3.000E-03 - MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING

29	3.723E-04	9.000E-06
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D-MV1100B--P 3.000E-03 - MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-MV1100D--P 3.000E-03 - MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN

30	3.663E-04	8.855E-06
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UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UT39-----K 1.610E-04 - MISSILE RELATED RACEWAY FAILURE

31	3.413E-04	8.250E-06
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D-MS1100B--J 3.000E-04 - MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-OOSDG&E--Z 5.000E-01 - SDG&E LINE UNAVAILABLE
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

32	3.197E-04	7.727E-06
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-OOSDG&E--Z 5.000E-01 - SDG&E LINE UNAVAILABLE
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UT6306-----K 2.810E-04 - MISSILE RELATED RACEWAY FAILURE

33	2.668E-04	6.450E-06
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
UT22B-----K 2.150E-04 - MISSILE RELATED RACEWAY FAILURE

34	2.275E-04	5.500E-06
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D-CV306----P 1.000E-04 - CHECK VLV 306 FT OPEN ON DEM
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

34	2.275E-04	5.500E-06
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D-MXB31----N 1.000E-04 - MANUAL SWITCH B31 FAILS TO CLOSE
UT22-----Z 5.500E-02 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.417E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:44:15

Rank	Cutset Importance	Cutset Probability	
35	1.998E-04	4.830E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT39-----K	1.610E-04	- MISSILE RELATED RACEWAY FAILURE
36	1.955E-04	4.725E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-OOSDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	U-T22&T23--K	3.150E-04	- SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
37	1.843E-04	4.455E-06	
	D-MPG987-1DR	8.100E-05	- MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
38	1.564E-04	3.780E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22A-----K	1.260E-04	- MISSILE RELATED RACEWAY FAILURE
39	1.427E-04	3.450E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22D-----K	1.150E-04	- MISSILE RELATED RACEWAY FAILURE
40	1.365E-04	3.300E-06	
	D-MS1100B--J	3.000E-04	- MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-B32SDGE--V	2.000E-01	- OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
41	1.347E-04	3.257E-06	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
42	1.279E-04	3.091E-06	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-B32SDGE--V	2.000E-01	- OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT6306-----K	2.810E-04	- MISSILE RELATED RACEWAY FAILURE

Top Event: DT-01-01 Top Event Probability: 2.417E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:44:15

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
43	1.241E-04	3.000E-06	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
43	1.241E-04	3.000E-06	
	D-CV305----P	1.000E-04	- CHECK VLV VCC-305 FT OPEN ON DEM
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
43	1.241E-04	3.000E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV302----X	1.000E-04	- MANUAL VLV VCC-302 LEFT INOP POST-MAINT
43	1.241E-04	3.000E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV303----X	1.000E-04	- MANUAL VLV VCC-303 LEFT INOP POST-MAINT
44	1.173E-04	2.835E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UTPB56AF---K	9.450E-05	- MISSILE RELATED RACEWAY FAILURE
45	1.123E-04	2.714E-06	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
46	1.102E-04	2.664E-06	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
47	1.050E-04	2.539E-06	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
47	1.050E-04	2.539E-06	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Top Event: DT-01-01 Top Event Probability: 2.417E-02

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:44:15

Rank	Cutset Importance	Cutset Probability	
48	9.953E-05	2.406E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22C-----K	8.020E-05	- MISSILE RELATED RACEWAY FAILURE
49	8.935E-05	2.160E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
49	8.935E-05	2.160E-06	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
49	8.935E-05	2.160E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
50	7.819E-05	1.890E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-B32SDGE--V	2.000E-01	- OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
	U-T22&T23--K	3.150E-04	- SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
51	7.446E-05	1.800E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
52	5.498E-05	1.329E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT46-----K	4.430E-04	- MISSILE RELATED RACEWAY FAILURE
53	5.461E-05	1.320E-06	
	U-B3B30--1DA	2.400E-05	- 480V BUS B30 SHORT CIRCUIT W/I 24 H
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
53	5.461E-05	1.320E-06	
	U-B31/1B-1DA	2.400E-05	- 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDTTF2 Data File

Top Event: DT-01-01 Top Event Probability: 2.417E-02
Flag Set: DTLOOP
This file was created on 8-21-1990 at 15:44:15

Rank	Cutset Importance	Cutset Probability	
53	5.461E-05	1.320E-06	
	U-BDD28--1DA	2.400E-05	- 125VDC BUS D28 SHORT CIRCUIT W/I 24 H
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
53	5.461E-05	1.320E-06	
	U-T2X55--1DI	2.400E-05	- 4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
53	5.461E-05	1.320E-06	
	U-T11----1DI	2.400E-05	- >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
53	5.461E-05	1.320E-06	
	U-B31----1DA	2.400E-05	- 480V BUS 1 SHORT CIRCUIT
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
53	5.461E-05	1.320E-06	
	U-B21C---1DA	2.400E-05	- 4160V BUS 1C SHORT CIRCUIT W/I 24 H
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
53	5.461E-05	1.320E-06	
	U-B2A4---1DA	2.400E-05	- 4160V BUS A4 SHORT CIRCUIT W/I 24 H
	UT22-----Z	5.500E-02	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
54	4.269E-05	1.032E-06	
	D-MV1100D--P	3.000E-03	- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UTEPC-----K	3.440E-04	- MISSILE RELATED RACEWAY FAILURE

Charging System Cutset Summary

F'3 Tornado - LOOP

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability
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1	1.368E-01	1.932E-02
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U-DGSD--1DR 5.520E-02 - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	7.433E-02	1.050E-02
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	7.433E-02	1.050E-02
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D-FNE908---V 3.000E-02 - OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	7.433E-02	1.050E-02
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D-G8ADSD---V 3.000E-02 - OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	7.433E-02	1.050E-02
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U-DGSD----V 3.000E-02 - OPERATOR FAILS TO START DSD DIESEL
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	7.433E-02	1.050E-02
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D-E908B30--V 3.000E-02 - OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	7.433E-02	1.050E-02
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

3	6.846E-02	9.671E-03
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U-DGCC0001-R 9.671E-03 - COMMON CAUSE FAILURE -DG-R --> 1 AND 2

4	6.194E-02	8.750E-03
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U-DGSD----S 2.500E-02 - DIESEL GENERATOR DSD FT START ON DEMAND
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

5	5.513E-02	7.788E-03
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U-DGCC0002-S 7.788E-03 - COMMON CAUSE FAILURE -DG-S --> 1 AND 2

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability
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6	4.318E-02	6.100E-03
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
DTTKRWST---K 6.100E-03 - TORNADO INDUCED MISSILE FAILURE OF RWST

7	2.305E-02	3.257E-03
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U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

8	2.124E-02	3.000E-03
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D-MV1100C--N 3.000E-03 - MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y 1.000E+00 - OPS FAILS TO RECOVER MOV-1100C

9	1.921E-02	2.714E-03
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U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

10	1.797E-02	2.539E-03
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U-DG1----1DR 5.520E-02 - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG2-----M 4.600E-02 - DIESEL GENERATOR NO. 2 IN MAINTENANCE

10	1.797E-02	2.539E-03
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U-DG1-----M 4.600E-02 - DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

11	1.635E-02	2.310E-03
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U-DGDSD----M 6.600E-03 - DSD DIESEL DOWN DUE TO MAINTENANCE
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

12	1.026E-02	1.450E-03
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
DTPPRWST---K 1.450E-03 - TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST

13	9.712E-03	1.372E-03
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UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UTDSD-----K 3.920E-03 - DSD DIESEL FAILURE DUE TO MISSILE IMPACT

System-level Cutset Report for TNDTFL3 Data File

Top Event: DT-01-01 Top Event Probability: 1.413E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability	
14	9.167E-03	1.295E-03	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	7.433E-03	1.050E-03	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	7.433E-03	1.050E-03	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	7.433E-03	1.050E-03	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	7.433E-03	1.050E-03	
	D-C33011---N	3.000E-03	- BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	7.433E-03	1.050E-03	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	7.433E-03	1.050E-03	
	D-C21A403--N	3.000E-03	- BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	6.371E-03	9.000E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
17	4.953E-03	6.997E-04	
	U-IRYV30-1DI	1.999E-03	- INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDDTLF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability	
18	4.689E-03	6.624E-04	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
19	3.907E-03	5.520E-04	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
20	2.775E-03	3.920E-04	
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTWPC-----K	1.120E-03	- MISSILE RELATED RACEWAY FAILURE
21	2.187E-03	3.090E-04	
	U-C2CC0002-N	3.090E-04	- COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
22	2.160E-03	3.052E-04	
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTEPC-----K	8.720E-04	- MISSILE RELATED RACEWAY FAILURE
23	2.124E-03	3.000E-04	
	D-MS1100C--J	3.000E-04	- MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
	D-MS1100C--Y	1.000E+00	- OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
24	1.784E-03	2.520E-04	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
24	1.784E-03	2.520E-04	
	D-FNE908-1DR	7.200E-04	- FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
25	1.764E-03	2.492E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT6306-----K	7.120E-04	- MISSILE RELATED RACEWAY FAILURE

System-level Cutset Report for TNDTLF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability	
26	1.487E-03	2.100E-04	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
27	1.437E-03	2.030E-04	
	UT56-----K	2.030E-04	- MISSILE RELATED RACEWAY FAILURE
28	1.326E-03	1.872E-04	
	U-T21-----K	5.350E-04	- SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
29	1.253E-03	1.770E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
29	1.253E-03	1.770E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
30	1.172E-03	1.656E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
30	1.172E-03	1.656E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
30	1.172E-03	1.656E-04	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
30	1.172E-03	1.656E-04	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
31	1.016E-03	1.435E-04	
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT39-----K	4.100E-04	- MISSILE RELATED RACEWAY FAILURE

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability	
32	9.769E-04	1.380E-04	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
32	9.769E-04	1.380E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
32	9.769E-04	1.380E-04	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
32	9.769E-04	1.380E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
33	7.857E-04	1.110E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----M	3.700E-03	- CHRNG PUMP G-8B OUT OF SERVICE FOR MAINT.
34	7.433E-04	1.050E-04	
	D-MS1100B--J	3.000E-04	- MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
35	7.079E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV388----P	1.000E-04	- MANUAL VLV VCC-388 FT OPEN ON DEMAND
35	7.079E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV316----X	1.000E-04	- MANUAL VLV CRS-316 LEFT INOP POST-MAINT
35	7.079E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV425----X	1.000E-04	- MANUAL VLV CRS-425 LEFT INOP POST-MAINT

Top Event: DT-01-01 Top Event Probability: 1.413E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability	
35	7.079E-04	1.000E-04	
	D-CV301----P	1.000E-04	- CHECK VALVE CRS-301 FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
36	6.371E-04	9.000E-05	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
36	6.371E-04	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
36	6.371E-04	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
37	4.385E-04	6.195E-05	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
37	4.385E-04	6.195E-05	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
37	4.385E-04	6.195E-05	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
37	4.385E-04	6.195E-05	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability	
37	4.385E-04	6.195E-05	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
37	4.385E-04	6.195E-05	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
38	4.269E-04	6.030E-05	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	ET-CCWSYS--Z	2.680E-03	- MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM
38	4.269E-04	6.030E-05	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	ET-CCWSYS--Z	2.680E-03	- MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM
39	4.103E-04	5.796E-05	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
39	4.103E-04	5.796E-05	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
39	4.103E-04	5.796E-05	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
39	4.103E-04	5.796E-05	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability	
39	4.103E-04	5.796E-05	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
39	4.103E-04	5.796E-05	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
40	3.886E-04	5.490E-05	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	PT-SWCSYS--Z	2.440E-03	- MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM
40	3.886E-04	5.490E-05	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	PT-SWCSYS--Z	2.440E-03	- MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM
41	3.419E-04	4.830E-05	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
41	3.419E-04	4.830E-05	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
41	3.419E-04	4.830E-05	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
41	3.419E-04	4.830E-05	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability	
41	3.419E-04	4.830E-05	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
41	3.419E-04	4.830E-05	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
42	2.548E-04	3.600E-05	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
42	2.548E-04	3.600E-05	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
43	2.478E-04	3.500E-05	
	D-MXB31----N	1.000E-04	- MANUAL SWITCH B31 FAILS TO CLOSE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
43	2.478E-04	3.500E-05	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
44	2.344E-04	3.312E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2-----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
45	2.007E-04	2.835E-05	
	D-MPG987-1DR	8.100E-05	- MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
46	1.954E-04	2.760E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE

System-level Cutset Report for TNDTLF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.413E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:08:00

Rank	Cutset Importance	Cutset Probability	
47	1.699E-04	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
48	1.697E-04	2.397E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-T22&T23--K	7.990E-04	- SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
49	1.529E-04	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
49	1.529E-04	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
50	1.274E-04	1.800E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
51	1.157E-04	1.635E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22B-----K	5.450E-04	- MISSILE RELATED RACEWAY FAILURE
52	8.728E-05	1.233E-05	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
52	8.728E-05	1.233E-05	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
53	8.707E-05	1.230E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT39-----K	4.100E-04	- MISSILE RELATED RACEWAY FAILURE

System-level Cutset Report for TNDDTLF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.413E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:08:00

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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54	7.857E-05	1.110E-05
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D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MPG8B----M 3.700E-03 - CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.

55	6.796E-05	9.600E-06
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
UT22A-----K 3.200E-04 - MISSILE RELATED RACEWAY FAILURE

Charging System Cutset Summary

F' 3 Tornado - PT

System-level Cutset Report for TNDTTF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability
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1	1.728E-01	1.932E-02
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U-DGSD--1DR 5.520E-02 - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	9.389E-02	1.050E-02
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U-DGSD----V 3.000E-02 - OPERATOR FAILS TO START DSD DIESEL
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	9.389E-02	1.050E-02
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	9.389E-02	1.050E-02
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D-E908B30--V 3.000E-02 - OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	9.389E-02	1.050E-02
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D-G8ADSD---V 3.000E-02 - OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	9.389E-02	1.050E-02
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D-FNE908---V 3.000E-02 - OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	9.389E-02	1.050E-02
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

3	7.824E-02	8.750E-03
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U-DGSD----S 2.500E-02 - DIESEL GENERATOR DSD FT START ON DEMAND
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

4	5.455E-02	6.100E-03
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
DTTKRWST---K 6.100E-03 - TORNADO INDUCED MISSILE FAILURE OF RWST

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability	
5	2.683E-02	3.000E-03	
	D-MV1100C--N	3.000E-03	- MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
	D-MV1100C--Y	1.000E+00	- OPS FAILS TO RECOVER MOV-1100C
6	2.066E-02	2.310E-03	
	U-DGDSD----M	6.600E-03	- DSD DIESEL DOWN DUE TO MAINTENANCE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
7	1.297E-02	1.450E-03	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTPRWST---K	1.450E-03	- TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWSTJ
8	1.227E-02	1.372E-03	
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTDSD-----K	3.920E-03	- DSD DIESEL FAILURE DUE TO MISSILE IMPACT
9	1.158E-02	1.295E-03	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	9.389E-03	1.050E-03	
	D-C21A403--N	3.000E-03	- BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	9.389E-03	1.050E-03	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	9.389E-03	1.050E-03	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	9.389E-03	1.050E-03	
	D-C33011---N	3.000E-03	- BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability	
10	9.389E-03	1.050E-03	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
11	8.048E-03	9.000E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
12	6.256E-03	6.997E-04	
	U-IRYV30-1DI	1.999E-03	- INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
13	4.694E-03	5.250E-04	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-O05051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-OOSDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	3.505E-03	3.920E-04	
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTWPC-----K	1.120E-03	- MISSILE RELATED RACEWAY FAILURE
15	2.729E-03	3.052E-04	
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTEPC-----K	8.720E-04	- MISSILE RELATED RACEWAY FAILURE
16	2.683E-03	3.000E-04	
	D-MS1100C--J	3.000E-04	- MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
	D-MS1100C--Y	1.000E+00	- OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
17	2.253E-03	2.520E-04	
	D-FNE908-1DR	7.200E-04	- FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	2.253E-03	2.520E-04	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 1.118E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability
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18	1.878E-03	2.100E-04
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D-MV1100B--P 3.000E-03 - MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-B32SDGE--V 2.000E-01 - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

19	1.815E-03	2.030E-04
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UT56-----K 2.030E-04 - MISSILE RELATED RACEWAY FAILURE

20	1.674E-03	1.872E-04
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U-T21-----K 5.350E-04 - SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

21	1.283E-03	1.435E-04
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UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UT39-----K 4.100E-04 - MISSILE RELATED RACEWAY FAILURE

22	1.114E-03	1.246E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-00SDG&E--Z 5.000E-01 - SDG&E LINE UNAVAILABLE
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UT6306-----K 7.120E-04 - MISSILE RELATED RACEWAY FAILURE

23	9.925E-04	1.110E-04
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----M 3.700E-03 - CHRNG PUMP G-8B OUT OF SERVICE FOR MAINT.

24	8.942E-04	1.000E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV388----P 1.000E-04 - MANUAL VLV VCC-388 FT OPEN ON DEMAND

24	8.942E-04	1.000E-04
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D-CV301----P 1.000E-04 - CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN

24	8.942E-04	1.000E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV316----X 1.000E-04 - MANUAL VLV CRS-316 LEFT INOP POST-MAINT

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability
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24	8.942E-04	1.000E-04
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
D-XV425----X 1.000E-04 - MANUAL VLV CRS-425 LEFT INOP POST-MAINT

25	8.048E-04	9.000E-05
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D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MPG8B----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

25	8.048E-04	9.000E-05
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----S 3.000E-03 - MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING

25	8.048E-04	9.000E-05
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D-C211C07--N 3.000E-03 - BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE

26	5.392E-04	6.030E-05
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D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
ET-CCWSYS--Z 2.680E-03 - MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM

26	5.392E-04	6.030E-05
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D-FNE908---V 3.000E-02 - OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
ET-CCWSYS--Z 2.680E-03 - MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM

27	4.909E-04	5.490E-05
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D-FNE908---V 3.000E-02 - OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
PT-SWCSYS--Z 2.440E-03 - MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM

27	4.909E-04	5.490E-05
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D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
PT-SWCSYS--Z 2.440E-03 - MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability
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28 4.694E-04 5.250E-05

D-MS1100B--J 3.000E-04 - MTR STARTER MOV-1100B FT. ACTUATE ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-OOSDG&E--Z 5.000E-01 - SDG&E LINE UNAVAILABLE
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

29 4.457E-04 4.984E-05

D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-B32SDGE--V 2.000E-01 - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UT6306-----K 7.120E-04 - MISSILE RELATED RACEWAY FAILURE

30 3.130E-04 3.500E-05

D-CV306----P 1.000E-04 - CHECK VLV 306 FT OPEN ON DEM
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

30 3.130E-04 3.500E-05

D-MXB31----N 1.000E-04 - MANUAL SWITCH B31 FAILS TO CLOSE
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

31 2.535E-04 2.835E-05

D-MPG987-1DR 8.100E-05 - MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
UT22-----Z 3.500E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

32 2.146E-04 2.400E-05

D-MV883--1DQ 2.400E-05 - MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN

33 1.931E-04 2.160E-05

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B--1DR 7.200E-04 - MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING

33 1.931E-04 2.160E-05

D-MPG8A--1DR 7.200E-04 - CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
D-MPG8B----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

System-level Cutset Report for TNDTTF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability	
34	1.878E-04	2.100E-05	
	D-MS1100B--J	3.000E-04	- MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-B32SDGE--V	2.000E-01	- OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
35	1.610E-04	1.800E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
36	1.462E-04	1.635E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22B-----K	5.450E-04	- MISSILE RELATED RACEWAY FAILURE
37	1.103E-04	1.233E-05	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
37	1.103E-04	1.233E-05	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	ET-CCWSYS--R	5.480E-04	- RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
38	1.100E-04	1.230E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT39-----K	4.100E-04	- MISSILE RELATED RACEWAY FAILURE
39	1.072E-04	1.198E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	U-OOSDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	U-T22&T23--K	7.990E-04	- SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
40	9.925E-05	1.110E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----M	3.700E-03	- CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.

System-level Cutset Report for TNDTTF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.118E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability	
41	8.648E-05	9.671E-06	
	U-DGCC0001-R	9.671E-03	- COMMON CAUSE FAILURE -DG-R --> 1 AND 2
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
42	8.584E-05	9.600E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22A-----K	3.200E-04	- MISSILE RELATED RACEWAY FAILURE
43	8.048E-05	9.000E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A-----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
43	8.048E-05	9.000E-06	
	D-MPG8A-----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B-----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
43	8.048E-05	9.000E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-MV1100D--P	3.000E-03	- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
44	7.806E-05	8.730E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22D-----K	2.910E-04	- MISSILE RELATED RACEWAY FAILURE
45	7.511E-05	8.400E-06	
	U-BDD28--1DA	2.400E-05	- 125VDC BUS D28 SHORT CIRCUIT W/I 24 H
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	7.511E-05	8.400E-06	
	U-T2X55--1DI	2.400E-05	- 4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	7.511E-05	8.400E-06	
	U-B31/1B-1DA	2.400E-05	- 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDDTTF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability	
45	7.511E-05	8.400E-06	
	U-B2A4---1DA	2.400E-05	- 4160V BUS A4 SHORT CIRCUIT W/I 24 H
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	7.511E-05	8.400E-06	
	U-B21C---1DA	2.400E-05	- 4160V BUS 1C SHORT CIRCUIT W/I 24 H
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	7.511E-05	8.400E-06	
	U-T11----1D1	2.400E-05	- >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	7.511E-05	8.400E-06	
	U-B31----1DA	2.400E-05	- 480V BUS 1 SHORT CIRCUIT
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
45	7.511E-05	8.400E-06	
	U-B3B30--1DA	2.400E-05	- 480V BUS B30 SHORT CIRCUIT W/I 24 H
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
46	6.650E-05	7.437E-06	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	ET-CCWSYS--Z	2.680E-03	- MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM
47	6.438E-05	7.200E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UTPB56AF---K	2.400E-04	- MISSILE RELATED RACEWAY FAILURE
48	6.055E-05	6.771E-06	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	PT-SWCSYS--Z	2.440E-03	- MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM
49	5.446E-05	6.090E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
	UT22C-----K	2.030E-04	- MISSILE RELATED RACEWAY FAILURE

System-level Cutset Report for TNDTTF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability
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50 5.392E-05 6.030E-06

D-FNE908---S 3.000E-03 - FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
ET-CCWSYS--Z 2.680E-03 - MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM

50 5.392E-05 6.030E-06

D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
D-TC1400---J 3.000E-03 - VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
ET-CCWSYS--Z 2.680E-03 - MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM

50 5.392E-05 6.030E-06

D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
ET-CCWSYS--Z 2.680E-03 - MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM

51 4.909E-05 5.490E-06

D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
PT-SWCSYS--Z 2.440E-03 - MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM

51 4.909E-05 5.490E-06

D-FNE908---S 3.000E-03 - FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
PT-SWCSYS--Z 2.440E-03 - MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM

51 4.909E-05 5.490E-06

D-FNE909---V 7.500E-01 - OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
D-TC1400---J 3.000E-03 - VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
PT-SWCSYS--Z 2.440E-03 - MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM

52 4.287E-05 4.794E-06

D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
U-B32SDGE--V 2.000E-01 - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
U-T22&T23--K 7.990E-04 - SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT

53 3.004E-05 3.360E-06

D-MV1100B--P 3.000E-03 - MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
UT46-----K 1.120E-03 - MISSILE RELATED RACEWAY FAILURE

System-level Cutset Report for TNDTTF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability	
54	2.912E-05	3.257E-06	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
55	2.817E-05	3.150E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-C31202---P	3.000E-03	- BKR (CONTROL) 480V 1202 FT OPEN ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
55	2.817E-05	3.150E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-C31200---N	3.000E-03	- BKR (CONTROL) 480V 1200 FT CLOSE ON DEMAND
	UT22-----Z	3.500E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
56	2.736E-05	3.060E-06	
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	D-MPG8A---U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	PT-SWCSYS--R	1.360E-04	- RANDOM FAILURE OF SALT WATER COOLING SYSTEM
56	2.736E-05	3.060E-06	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	D-FNE909---V	7.500E-01	- OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
	PT-SWCSYS--R	1.360E-04	- RANDOM FAILURE OF SALT WATER COOLING SYSTEM
57	2.683E-05	3.000E-06	
	D-CV305----P	1.000E-04	- CHECK VLV VCC-305 FT OPEN ON DEM
	D-MPG8A---U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
57	2.683E-05	3.000E-06	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	D-MPG8B---U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
57	2.683E-05	3.000E-06	
	D-MPG8A---U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV302----X	1.000E-04	- MANUAL VLV VCC-302 LEFT INOP POST-MAINT

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 15:58:56

Rank	Cutset Importance	Cutset Probability	
57	2.683E-05	3.000E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-XV303----X	1.000E-04	- MANUAL VLV VCC-303 LEFT INOP POST-MAINT
58	2.427E-05	2.714E-06	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
59	2.382E-05	2.664E-06	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----M	3.700E-03	- CHRNG PUMP G-8B OUT OF SERVICE FOR MAINT.
60	2.339E-05	2.616E-06	
	D-MV1100D--P	3.000E-03	- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UTEPC-----K	8.720E-04	- MISSILE RELATED RACEWAY FAILURE
61	2.271E-05	2.539E-06	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
61	2.271E-05	2.539E-06	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Charging System Cutset Summary

F' 4 Tornado - LOOP

Top Event: DT-01-01 Top Event Probability: 2.412E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
1	1.693E-01	4.085E-02	
	U-DGSD--1DR	5.520E-02	- DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.204E-02	2.220E-02	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.204E-02	2.220E-02	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.204E-02	2.220E-02	
	D-G8ADSD---V	3.000E-02	- OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.204E-02	2.220E-02	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.204E-02	2.220E-02	
	D-E908B30--V	3.000E-02	- OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 PER PROCEDURE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.204E-02	2.220E-02	
	U-DGSD----V	3.000E-02	- OPERATOR FAILS TO START DSD DIESEL
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
3	7.670E-02	1.850E-02	
	U-DGSD----S	2.500E-02	- DIESEL GENERATOR DSD FT START ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
4	4.009E-02	9.671E-03	
	U-DGCC0001-R	9.671E-03	- COMMON CAUSE FAILURE -DG-R --> 1 AND 2
5	3.229E-02	7.788E-03	
	U-DGCC0002-S	7.788E-03	- COMMON CAUSE FAILURE -DG-S --> 1 AND 2

Top Event: DT-01-01 Top Event Probability: 2.412E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
6	3.184E-02	7.680E-03	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTTKRWST---K	7.680E-03	- TORNADO INDUCED MISSILE FAILURE OF RWST
7	2.025E-02	4.884E-03	
	U-DGDSD----M	6.600E-03	- DSD DIESEL DOWN DUE TO MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	1.516E-02	3.656E-03	
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTDSD-----K	4.940E-03	- DSD DIESEL FAILURE DUE TO MISSILE IMPACT
9	1.350E-02	3.257E-03	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
10	1.244E-02	3.000E-03	
	D-MV1100C--N	3.000E-03	- MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
	D-MV1100C--Y	1.000E+00	- OPS FAILS TO RECOVER MOV-1100C
11	1.135E-02	2.738E-03	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	1.125E-02	2.714E-03	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
13	1.053E-02	2.539E-03	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
13	1.053E-02	2.539E-03	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

System-level Cutset Report for TNDTLF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.412E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
14	9.204E-03	2.220E-03	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	9.204E-03	2.220E-03	
	D-C21A403--N	3.000E-03	- BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	9.204E-03	2.220E-03	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	9.204E-03	2.220E-03	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	9.204E-03	2.220E-03	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	9.204E-03	2.220E-03	
	D-C33011---N	3.000E-03	- BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	7.587E-03	1.830E-03	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTPRWST---K	1.830E-03	- TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST
16	6.133E-03	1.479E-03	
	U-IRYV30-1DI	1.999E-03	- INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	4.326E-03	1.043E-03	
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTWPC-----K	1.410E-03	- MISSILE RELATED RACEWAY FAILURE

Top Event: DT-01-01 Top Event Probability: 2.412E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
18	3.731E-03	9.000E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
19	3.375E-03	8.140E-04	
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTPC-----K	1.100E-03	- MISSILE RELATED RACEWAY FAILURE
20	2.749E-03	6.630E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT6306-----K	8.960E-04	- MISSILE RELATED RACEWAY FAILURE
20	2.746E-03	6.624E-04	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
21	2.288E-03	5.520E-04	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
22	2.209E-03	5.328E-04	
	D-FNE908-1DR	7.200E-04	- FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	2.209E-03	5.328E-04	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
23	2.065E-03	4.980E-04	
	U-T21-----K	6.730E-04	- SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
24	1.841E-03	4.440E-04	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.412E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
25	1.583E-03	3.818E-04	
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT39-----K	5.160E-04	- MISSILE RELATED RACEWAY FAILURE
26	1.281E-03	3.090E-04	
	U-C2CC0002-N	3.090E-04	- COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
27	1.244E-03	3.000E-04	
	D-MS1100C--J	3.000E-04	- MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
	D-MS1100C--Y	1.000E+00	- OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
28	1.061E-03	2.560E-04	
	UT56-----K	2.560E-04	- MISSILE RELATED RACEWAY FAILURE
29	9.204E-04	2.220E-04	
	D-MS1100B--J	3.000E-04	- MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
30	7.338E-04	1.770E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
30	7.338E-04	1.770E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
31	6.865E-04	1.656E-04	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
31	6.865E-04	1.656E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1-----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
31	6.865E-04	1.656E-04	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

System-level Cutset Report for TNDDTLF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.412E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
31	6.865E-04	1.656E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
32	5.721E-04	1.380E-04	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
32	5.721E-04	1.380E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
32	5.721E-04	1.380E-04	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
32	5.721E-04	1.380E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
33	5.430E-04	1.310E-04	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	5.430E-04	1.310E-04	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	5.430E-04	1.310E-04	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	5.430E-04	1.310E-04	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.412E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
33	5.430E-04	1.310E-04	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	5.430E-04	1.310E-04	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	5.080E-04	1.225E-04	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	5.080E-04	1.225E-04	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	5.080E-04	1.225E-04	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	5.080E-04	1.225E-04	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	5.080E-04	1.225E-04	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	5.080E-04	1.225E-04	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.412E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
35	4.602E-04	1.110E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----M	3.700E-03	- CHR9 PUMP G-8B OUT OF SERVICE FOR MAINT.
36	4.234E-04	1.021E-04	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
36	4.234E-04	1.021E-04	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
36	4.234E-04	1.021E-04	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
36	4.234E-04	1.021E-04	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
36	4.234E-04	1.021E-04	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
36	4.234E-04	1.021E-04	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
37	4.146E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV425----X	1.000E-04	- MANUAL VLV CRS-425 LEFT INOP POST-MAINT

Top Event: DT-01-01 Top Event Probability: 2.412E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
37	4.146E-04	1.000E-04	
	D-CV301----P	1.000E-04	- CHECK VALVE CRS-301 FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
37	4.146E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV316----X	1.000E-04	- MANUAL VLV CRS-316 LEFT INOP POST-MAINT
37	4.146E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV388----P	1.000E-04	- MANUAL VLV VCC-388 FT OPEN ON DEMAND
38	3.731E-04	9.000E-05	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
38	3.731E-04	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
38	3.731E-04	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
39	3.068E-04	7.400E-05	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
39	3.068E-04	7.400E-05	
	D-MXB31----N	1.000E-04	- MANUAL SWITCH 831 FAILS TO CLOSE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
40	2.485E-04	5.994E-05	
	D-MPG987-1DR	8.100E-05	- MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.412E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
41	1.492E-04	3.600E-05	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
41	1.492E-04	3.600E-05	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
42	1.373E-04	3.312E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
43	1.256E-04	3.030E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-T22&T23--K	1.010E-03	- SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
44	1.144E-04	2.760E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
45	9.950E-05	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
46	8.955E-05	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
46	8.955E-05	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
47	8.457E-05	2.040E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22B-----K	6.800E-04	- MISSILE RELATED RACEWAY FAILURE

System-level Cutset Report for TNDTLF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.412E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:28:22

Rank	Cutset Importance	Cutset Probability	
48	7.462E-05	1.800E-05	
	D-MPG8A-----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
49	7.363E-05	1.776E-05	
	U-BDD28--1DA	2.400E-05	- 125VDC BUS D28 SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
49	7.363E-05	1.776E-05	
	U-B21C---1DA	2.400E-05	- 4160V BUS 1C SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
49	7.363E-05	1.776E-05	
	U-T11----1DI	2.400E-05	- >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
49	7.363E-05	1.776E-05	
	U-B31----1DA	2.400E-05	- 480V BUS 1 SHORT CIRCUIT
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
49	7.363E-05	1.776E-05	
	U-B3B30--1DA	2.400E-05	- 480V BUS B30 SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
49	7.363E-05	1.776E-05	
	U-B2A4---1DA	2.400E-05	- 4160V BUS A4 SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
49	7.363E-05	1.776E-05	
	U-T2X55--1DI	2.400E-05	- 4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
49	7.363E-05	1.776E-05	
	U-B31/1B-1DA	2.400E-05	- 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDDTLF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.412E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:28:22

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
50	6.418E-05	1.548E-05

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
UT39-----K 5.160E-04 - MISSILE RELATED RACEWAY FAILURE

Charging System Cutset Summary

F' 4 Tornado - PT

Top Event: DT-01-01 Top Event Probability: 2.137E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:19:25

Rank	Cutset Importance	Cutset Probability
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1	1.911E-01	4.085E-02
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U-DGSD--1DR 5.520E-02 - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.039E-01	2.220E-02
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U-DGSD---V 3.000E-02 - OPERATOR FAILS TO START DSD DIESEL
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.039E-01	2.220E-02
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.039E-01	2.220E-02
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D-E908B30--V 3.000E-02 - OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 PER PROCEDURE
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.039E-01	2.220E-02
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D-G8ADSD---V 3.000E-02 - OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.039E-01	2.220E-02
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D-FNE908---V 3.000E-02 - OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.039E-01	2.220E-02
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D-MPG8A---U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

3	8.657E-02	1.850E-02
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U-DGSD----S 2.500E-02 - DIESEL GENERATOR DSD FT START ON DEMAND
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

4	3.594E-02	7.680E-03
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
DTTKRWST---K 7.680E-03 - TORNADO INDUCED MISSILE FAILURE OF RWST

Top Event: DT-01-01 Top Event Probability: 2.137E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:19:25

Rank	Cutset Importance	Cutset Probability	
5	2.285E-02	4.884E-03	
	U-DGDSD----M	6.600E-03	- DSD DIESEL DOWN DUE TO MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
6	1.711E-02	3.656E-03	
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTDSD-----K	4.940E-03	- DSD DIESEL FAILURE DUE TO MISSILE IMPACT
7	1.404E-02	3.000E-03	
	D-MV1100C--N	3.000E-03	- MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
	D-MV1100C--Y	1.000E+00	- OPS FAILS TO RECOVER MOV-1100C
8	1.281E-02	2.738E-03	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.039E-02	2.220E-03	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.039E-02	2.220E-03	
	D-C21A403--N	3.000E-03	- BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.039E-02	2.220E-03	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.039E-02	2.220E-03	
	D-C33011---N	3.000E-03	- BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.039E-02	2.220E-03	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDTTF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.137E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:19:25

Rank	Cutset Importance	Cutset Probability	
10	8.564E-03	1.830E-03	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTPRWST---K	1.830E-03	- TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST
11	6.922E-03	1.479E-03	
	U-IRYV30-1DI	1.999E-03	- INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	5.194E-03	1.110E-03	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-OOSDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
13	4.883E-03	1.043E-03	
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTWPC-----K	1.410E-03	- MISSILE RELATED RACEWAY FAILURE
14	4.212E-03	9.000E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
15	3.809E-03	8.140E-04	
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTEPC-----K	1.100E-03	- MISSILE RELATED RACEWAY FAILURE
16	2.493E-03	5.328E-04	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	2.493E-03	5.328E-04	
	D-FNE908-1DR	7.200E-04	- FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	2.330E-03	4.980E-04	
	U-T21-----K	6.730E-04	- SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.137E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:19:25

Rank	Cutset Importance	Cutset Probability
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18 2.078E-03 4.440E-04

D-MV1100B--P 3.000E-03 - MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-B32SDGE--V 2.000E-01 - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

19 1.787E-03 3.818E-04

UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UT39-----K 5.160E-04 - MISSILE RELATED RACEWAY FAILURE

20 1.551E-03 3.315E-04

D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-00SDG&E--Z 5.000E-01 - SDG&E LINE UNAVAILABLE
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UT6306-----K 8.960E-04 - MISSILE RELATED RACEWAY FAILURE

21 1.404E-03 3.000E-04

D-MS1100C--J 3.000E-04 - MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MS1100C--Y 1.000E+00 - OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER

22 1.198E-03 2.560E-04

UT56-----K 2.560E-04 - MISSILE RELATED RACEWAY FAILURE

23 6.205E-04 1.326E-04

D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-B32SDGE--V 2.000E-01 - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UT6306-----K 8.960E-04 - MISSILE RELATED RACEWAY FAILURE

24 5.194E-04 1.110E-04

D-MS1100B--J 3.000E-04 - MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-00SDG&E--Z 5.000E-01 - SDG&E LINE UNAVAILABLE
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

24 5.194E-04 1.110E-04

D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----M 3.700E-03 - CHRGR PUMP G-8B OUT OF SERVICE FOR MAINT.

Top Event: DT-01-01 Top Event Probability: 2.137E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:19:25

Rank	Cutset Importance	Cutset Probability	
25	4.680E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV388----P	1.000E-04	- MANUAL VLV VCC-388 FT OPEN ON DEMAND
25	4.680E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV316----X	1.000E-04	- MANUAL VLV CRS-316 LEFT INOP POST-MAINT
25	4.680E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV425----X	1.000E-04	- MANUAL VLV CRS-425 LEFT INOP POST-MAINT
25	4.680E-04	1.000E-04	
	D-CV301----P	1.000E-04	- CHECK VALVE CRS-301 FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
26	4.212E-04	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
26	4.212E-04	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
26	4.212E-04	9.000E-05	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
27	3.463E-04	7.400E-05	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
27	3.463E-04	7.400E-05	
	D-MXB31----N	1.000E-04	- MANUAL SWITCH B31 FAILS TO CLOSE
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDDTTF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.137E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:19:25

Rank	Cutset Importance	Cutset Probability	
28	2.805E-04	5.994E-05	
	D-MPG987-1DR	8.100E-05	- MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
29	2.078E-04	4.440E-05	
	D-MS1100B--J	3.000E-04	- MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-B32SDGE--V	2.000E-01	- OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
30	1.123E-04	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
31	1.011E-04	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
31	1.011E-04	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
32	9.546E-05	2.040E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22-----K	6.800E-04	- MISSILE RELATED RACEWAY FAILURE
33	8.423E-05	1.800E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
34	8.311E-05	1.776E-05	
	U-T2X55--1DI	2.400E-05	- 4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	8.311E-05	1.776E-05	
	U-B31----1DA	2.400E-05	- 480V BUS 1 SHORT CIRCUIT
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.137E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:19:25

Rank	Cutset Importance	Cutset Probability	
34	8.311E-05	1.776E-05	
	U-BDD28--1DA	2.400E-05	- 125VDC BUS D28 SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	8.311E-05	1.776E-05	
	U-T11----1DI	2.400E-05	- >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	8.311E-05	1.776E-05	
	U-B2A4---1DA	2.400E-05	- 4160V BUS A4 SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	8.311E-05	1.776E-05	
	U-B3B30--1DA	2.400E-05	- 480V BUS B30 SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	8.311E-05	1.776E-05	
	U-B31/1B-1DA	2.400E-05	- 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	8.311E-05	1.776E-05	
	U-B21C---1DA	2.400E-05	- 4160V BUS 1C SHORT CIRCUIT W/I 24 H
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
35	7.244E-05	1.548E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT39-----K	5.160E-04	- MISSILE RELATED RACEWAY FAILURE
36	7.089E-05	1.515E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-OOSDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	U-T22&T23--K	1.010E-03	- SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
37	5.644E-05	1.206E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22A-----K	4.020E-04	- MISSILE RELATED RACEWAY FAILURE

Top Event: DT-01-01 Top Event Probability: 2.137E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:19:25

Rank	Cutset Importance	Cutset Probability	
38	5.194E-05	1.110E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----M	3.700E-03	- CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
39	5.138E-05	1.098E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22D-----K	3.660E-04	- MISSILE RELATED RACEWAY FAILURE
40	4.526E-05	9.671E-06	
	U-DGCC0001-R	9.671E-03	- COMMON CAUSE FAILURE -DG-R --> 1 AND 2
	U-OOCNDLP--Z	1.000E-03	- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
41	4.240E-05	9.060E-06	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UTPB56AF---K	3.020E-04	- MISSILE RELATED RACEWAY FAILURE
42	4.212E-05	9.000E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-MV1100D--P	3.000E-03	- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
42	4.212E-05	9.000E-06	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
42	4.212E-05	9.000E-06	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
43	3.594E-05	7.680E-06	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22C-----K	2.560E-04	- MISSILE RELATED RACEWAY FAILURE
44	3.117E-05	6.660E-06	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-C31202---P	3.000E-03	- BKR (CONTROL) 480V 1202 FT OPEN ON DEMAND
	UT22-----Z	7.400E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDTTF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.137E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:19:25

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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44	3.117E-05	6.660E-06
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D-MV1100B--P 3.000E-03 - MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-C31200---N 3.000E-03 - BKR (CONTROL) 480V 1200 FT CLOSE ON DEMAND
UT22-----Z 7.400E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

45	2.836E-05	6.060E-06
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
U-B32SDGE--V 2.000E-01 - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
U-T22&T23--K 1.010E-03 - SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT

46	1.993E-05	4.260E-06
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D-MV1100B--P 3.000E-03 - MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
UT46-----K 1.420E-03 - MISSILE RELATED RACEWAY FAILURE

Charging System Cutset Summary

F' 5 Tornado - LOOP

System-level Cutset Report for TNDDTLF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
1	1.786E-01	5.134E-02	
	U-DGDS--1DR	5.520E-02	- DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.707E-02	2.790E-02	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.707E-02	2.790E-02	
	D-FNE908---V	3.000E-02	- OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.707E-02	2.790E-02	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.707E-02	2.790E-02	
	U-DGDS----V	3.000E-02	- OPERATOR FAILS TO START DSD DIESEL
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.707E-02	2.790E-02	
	D-G8ADSD---V	3.000E-02	- OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL PER PROC.
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
2	9.707E-02	2.790E-02	
	D-E908B30--V	3.000E-02	- OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 PER PROCEDURE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
3	8.089E-02	2.325E-02	
	U-DGDS----S	2.500E-02	- DIESEL GENERATOR DSD FT START ON DEMAND
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
4	3.365E-02	9.671E-03	
	U-DGCC0001-R	9.671E-03	- COMMON CAUSE FAILURE -DG-R --> 1 AND 2
5	3.256E-02	9.360E-03	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTTKRWST---K	9.360E-03	- TORNADO INDUCED MISSILE FAILURE OF RWST

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability
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6	2.710E-02	7.788E-03
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U-DGCC0002-S 7.788E-03 - COMMON CAUSE FAILURE -DG-S --> 1 AND 2

7	2.136E-02	6.138E-03
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U-DGDS0----M 6.600E-03 - DSD DIESEL DOWN DUE TO MAINTENANCE

UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

8	1.948E-02	5.599E-03
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UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

UTDSD-----K 6.020E-03 - DSD DIESEL FAILURE DUE TO MISSILE IMPACT

9	1.197E-02	3.441E-03
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D-FNE908---M 3.700E-03 - FAN COOLER E-908 IN MAINTENANCE

UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

10	1.133E-02	3.257E-03
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U-DG1-----S 5.900E-02 - DIESEL GENERATOR 1 FT START ON DEMAND

U-DG2----1DR 5.520E-02 - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

11	1.044E-02	3.000E-03
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D-MV1100C--N 3.000E-03 - MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND

D-MV1100C--Y 1.000E+00 - OPS FAILS TO RECOVER MOV-1100C

12	9.707E-03	2.790E-03
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D-C21A403--N 3.000E-03 - BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND

UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

12	9.707E-03	2.790E-03
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D-MPG8A----S 3.000E-03 - MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING

UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

12	9.707E-03	2.790E-03
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D-C33011---N 3.000E-03 - BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND

UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDTLF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
12	9.707E-03	2.790E-03	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	9.707E-03	2.790E-03	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	9.707E-03	2.790E-03	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
13	9.442E-03	2.714E-03	
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
14	8.834E-03	2.539E-03	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
14	8.834E-03	2.539E-03	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
15	7.759E-03	2.230E-03	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTPPRWST---K	2.230E-03	- TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST
16	6.468E-03	1.859E-03	
	U-IRV30-1DI	1.999E-03	- INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	5.565E-03	1.600E-03	
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTWPC-----K	1.720E-03	- MISSILE RELATED RACEWAY FAILURE

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
18	4.336E-03	1.246E-03	
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTEPC-----K	1.340E-03	- MISSILE RELATED RACEWAY FAILURE
19	3.131E-03	9.000E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
20	2.653E-03	7.626E-04	
	U-T21-----K	8.200E-04	- SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	2.330E-03	6.696E-04	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	2.330E-03	6.696E-04	
	D-FNE908-1DR	7.200E-04	- FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	2.305E-03	6.624E-04	
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
23	2.035E-03	5.850E-04	
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT39-----K	6.290E-04	- MISSILE RELATED RACEWAY FAILURE
24	1.941E-03	5.580E-04	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
25	1.920E-03	5.520E-04	
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
26	1.085E-03	3.120E-04	
	UT56-----K	3.120E-04	- MISSILE RELATED RACEWAY FAILURE

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
27	1.075E-03	3.090E-04	
	U-C2CC0002-N	3.090E-04	- COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
28	1.044E-03	3.000E-04	
	D-MS1100C--J	3.000E-04	- MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
	D-MS1100C--Y	1.000E+00	- OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
29	9.707E-04	2.790E-04	
	D-MS1100B--J	3.000E-04	- MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
30	6.158E-04	1.770E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
30	6.158E-04	1.770E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
31	5.761E-04	1.656E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
31	5.761E-04	1.656E-04	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
31	5.761E-04	1.656E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
31	5.761E-04	1.656E-04	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

Top Event: DT-01-01 Top Event Probability: 2.874E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
32	5.727E-04	1.646E-04	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	5.727E-04	1.646E-04	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	5.727E-04	1.646E-04	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	5.727E-04	1.646E-04	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	5.727E-04	1.646E-04	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	5.727E-04	1.646E-04	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----S	5.900E-02	- DIESEL GENERATOR 1 FT START ON DEMAND
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	5.358E-04	1.540E-04	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	5.358E-04	1.540E-04	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
33	5.358E-04	1.540E-04	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	5.358E-04	1.540E-04	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	5.358E-04	1.540E-04	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	5.358E-04	1.540E-04	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----1DR	5.520E-02	- DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
34	4.801E-04	1.380E-04	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
34	4.801E-04	1.380E-04	
	U-C212C15--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
34	4.801E-04	1.380E-04	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
34	4.801E-04	1.380E-04	
	U-C212C15--N	3.000E-03	- BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE

System-level Cutset Report for TNDDTLF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.874E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
35	4.465E-04	1.283E-04	
	U-C211A02--U	3.000E-03	- OPERATOR FAILS TO CLOSE CKT BKR 11A02
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
35	4.465E-04	1.283E-04	
	U-C211C01--N	3.000E-03	- BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
35	4.465E-04	1.283E-04	
	U-C212C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
35	4.465E-04	1.283E-04	
	U-C212C01--N	3.000E-03	- BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
35	4.465E-04	1.283E-04	
	U-C211A02--N	3.000E-03	- BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
35	4.465E-04	1.283E-04	
	U-C211C01--U	3.000E-03	- OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
	U-DG1-----M	4.600E-02	- DIESEL GENERATOR NO. 1 IN MAINTENANCE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
36	3.862E-04	1.110E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----M	3.700E-03	- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
37	3.527E-04	1.014E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT6306-----K	1.090E-04	- MISSILE RELATED RACEWAY FAILURE

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
38	3.479E-04	1.000E-04	
	D-CV301----P	1.000E-04	- CHECK VALVE CRS-301 FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
38	3.479E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV388----P	1.000E-04	- MANUAL VLV VCC-388 FT OPEN ON DEMAND
38	3.479E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV425----X	1.000E-04	- MANUAL VLV CRS-425 LEFT INOP POST-MAINT
38	3.479E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV316----X	1.000E-04	- MANUAL VLV CRS-316 LEFT INOP POST-MAINT
39	3.236E-04	9.300E-05	
	D-MXB31----N	1.000E-04	- MANUAL SWITCH B31 FAILS TO CLOSE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
39	3.236E-04	9.300E-05	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
40	3.131E-04	9.000E-05	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
40	3.131E-04	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
40	3.131E-04	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING

System-level Cutset Report for TNDDTLF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.874E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
41	2.621E-04	7.533E-05	
	D-MPG987-1DR	8.100E-05	- MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
42	1.284E-04	3.690E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-T22&T23--K	1.230E-03	- SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
43	1.252E-04	3.600E-05	
	U-C211C14--N	3.000E-03	- BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
43	1.252E-04	3.600E-05	
	U-C211C14--U	3.000E-03	- OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
	U-DG2-----S	1.200E-02	- DIESEL GENERATOR 2 FT START ON DEMAND
44	1.152E-04	3.312E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2----1DR	5.520E-02	- DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
45	9.602E-05	2.760E-05	
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
	U-DG2-----M	4.600E-02	- DIESEL GENERATOR NO. 2 IN MAINTENANCE
46	8.726E-05	2.508E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22B-----K	8.360E-04	- MISSILE RELATED RACEWAY FAILURE
47	8.350E-05	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
48	7.765E-05	2.232E-05	
	U-T2X55--1DI	2.400E-05	- 4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDTFL5 Data File

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

Rank	Cutset Importance	Cutset Probability	
48	7.765E-05	2.232E-05	
	U-B31----1DA	2.400E-05	- 480V BUS 1 SHORT CIRCUIT
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
48	7.765E-05	2.232E-05	
	U-B2A4---1DA	2.400E-05	- 4160V BUS A4 SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
48	7.765E-05	2.232E-05	
	U-T11----1DI	2.400E-05	- >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
48	7.765E-05	2.232E-05	
	U-B21C---1DA	2.400E-05	- 4160V BUS 1C SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
48	7.765E-05	2.232E-05	
	U-B3B30--1DA	2.400E-05	- 480V BUS B30 SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
48	7.765E-05	2.232E-05	
	U-BDD28--1DA	2.400E-05	- 125VDC BUS D28 SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
48	7.765E-05	2.232E-05	
	U-B31/1B-1DA	2.400E-05	- 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
49	7.515E-05	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
49	7.515E-05	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE

System-level Cutset Report for TNDDTLF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:44:55

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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50	6.565E-05	1.887E-05
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
UT39-----K 6.290E-04 - MISSILE RELATED RACEWAY FAILURE

51	6.262E-05	1.800E-05
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
U-BY1-----Z 6.000E-04 - BATTERY 1 FAILURE DUE TO MISSILE IMPACT

Charging System Cutset Summary

F' 5 Tornado - PT

System-level Cutset Report for TNDDTTF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.611E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:31:59

Rank	Cutset Importance	Cutset Probability
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1	1.966E-01	5.134E-02
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U-DGSD--1DR 5.520E-02 - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.069E-01	2.790E-02
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D-MPG8A----U 3.000E-02 - OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.069E-01	2.790E-02
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U-DGSD----V 3.000E-02 - OPERATOR FAILS TO START DSD DIESEL
UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.069E-01	2.790E-02
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D-E908B30--V 3.000E-02 - OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 PER PROCEDURE
UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.069E-01	2.790E-02
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D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.069E-01	2.790E-02
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D-G8ADSD---V 3.000E-02 - OP FAILS TO CONNECT CHR G-8A TO DSD DIESEL PER PROC.
UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

2	1.069E-01	2.790E-02
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D-FNE908---V 3.000E-02 - OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

3	8.906E-02	2.325E-02
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U-DGSD----S 2.500E-02 - DIESEL GENERATOR DSD FT START ON DEMAND
UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

4	3.585E-02	9.360E-03
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D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
DTTKRWST---K 9.360E-03 - TORNADO INDUCED MISSILE FAILURE OF RWST

System-level Cutset Report for TNDDTTF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.611E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:31:59

Rank	Cutset Importance	Cutset Probability	
5	2.351E-02	6.138E-03	
	U-DGDS0----M	6.600E-03	- DSD DIESEL DOWN DUE TO MAINTENANCE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
6	2.145E-02	5.599E-03	
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTDSD-----K	6.020E-03	- DSD DIESEL FAILURE DUE TO MISSILE IMPACT
7	1.318E-02	3.441E-03	
	D-FNE908---M	3.700E-03	- FAN COOLER E-908 IN MAINTENANCE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	1.149E-02	3.000E-03	
	D-MV1100C--N	3.000E-03	- MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
	D-MV1100C--Y	1.000E+00	- OPS FAILS TO RECOVER MOV-1100C
9	1.069E-02	2.790E-03	
	D-C33011---N	3.000E-03	- BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.069E-02	2.790E-03	
	D-C21A403--N	3.000E-03	- BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.069E-02	2.790E-03	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.069E-02	2.790E-03	
	D-FNE908---S	3.000E-03	- FAN E908 FT START ON DEMAND CHARGING LUBE OIL
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	1.069E-02	2.790E-03	
	D-TC1400---J	3.000E-03	- VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.611E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:31:59

Rank	Cutset Importance	Cutset Probability	
10	8.542E-03	2.230E-03	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	DTPRWST---K	2.230E-03	- TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST
11	7.121E-03	1.859E-03	
	U-IRYV30-1DI	1.999E-03	- INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	6.127E-03	1.600E-03	
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTWPC-----K	1.720E-03	- MISSILE RELATED RACEWAY FAILURE
13	5.343E-03	1.395E-03	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-OOSDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	4.774E-03	1.246E-03	
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UTEPC-----K	1.340E-03	- MISSILE RELATED RACEWAY FAILURE
15	3.447E-03	9.000E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
16	2.921E-03	7.626E-04	
	U-T21-----K	8.200E-04	- SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	2.565E-03	6.696E-04	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	2.565E-03	6.696E-04	
	D-FNE908-1DR	7.200E-04	- FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDDTTF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.611E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:31:59

Rank	Cutset Importance	Cutset Probability	
18	2.241E-03	5.850E-04	
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT39-----K	6.290E-04	- MISSILE RELATED RACEWAY FAILURE
19	2.137E-03	5.580E-04	
	D-MV1100B--P	3.000E-03	- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-O05051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-B32SDGE--V	2.000E-01	- OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
20	1.195E-03	3.120E-04	
	UT56-----K	3.120E-04	- MISSILE RELATED RACEWAY FAILURE
21	1.149E-03	3.000E-04	
	D-MS1100C--J	3.000E-04	- MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
	D-MS1100C--Y	1.000E+00	- OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
22	5.343E-04	1.395E-04	
	D-MS1100B--J	3.000E-04	- MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
	D-O05051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-O0SDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
23	4.252E-04	1.110E-04	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----M	3.700E-03	- CHRNG PUMP G-8B OUT OF SERVICE FOR MAINT.
24	3.830E-04	1.000E-04	
	D-CV301----P	1.000E-04	- CHECK VALVE CRS-301 FT OPEN ON DEMAND
	D-O05051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
24	3.830E-04	1.000E-04	
	D-O05051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV388----P	1.000E-04	- MANUAL VLV VCC-388 FT OPEN ON DEMAND
24	3.830E-04	1.000E-04	
	D-O05051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV316----X	1.000E-04	- MANUAL VLV CRS-316 LEFT INOP POST-MAINT

Top Event: DT-01-01 Top Event Probability: 2.611E-01
Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:31:59

Rank	Cutset Importance	Cutset Probability	
24	3.830E-04	1.000E-04	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	D-XV425----X	1.000E-04	- MANUAL VLV CRS-425 LEFT INOP POST-MAINT
25	3.562E-04	9.300E-05	
	D-CV306----P	1.000E-04	- CHECK VLV 306 FT OPEN ON DEM
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
25	3.562E-04	9.300E-05	
	D-MXB31----N	1.000E-04	- MANUAL SWITCH B31 FAILS TO CLOSE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
26	3.447E-04	9.000E-05	
	D-MPG8A----S	3.000E-03	- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
26	3.447E-04	9.000E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B----S	3.000E-03	- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
26	3.447E-04	9.000E-05	
	D-C211C07--N	3.000E-03	- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
27	2.885E-04	7.533E-05	
	D-MPG987-1DR	8.100E-05	- MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
28	2.137E-04	5.580E-05	
	D-MS1100B--J	3.000E-04	- MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-B32SDGE--V	2.000E-01	- OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
29	1.941E-04	5.069E-05	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-OOSDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT6306-----K	1.090E-04	- MISSILE RELATED RACEWAY FAILURE

System-level Cutset Report for TNDDTTF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.611E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:31:59

Rank	Cutset Importance	Cutset Probability	
30	9.607E-05	2.508E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22B-----K	8.360E-04	- MISSILE RELATED RACEWAY FAILURE
31	9.193E-05	2.400E-05	
	D-MV883--1DQ	2.400E-05	- MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
32	8.550E-05	2.232E-05	
	U-BDD28--1DA	2.400E-05	- 125VDC BUS D28 SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	8.550E-05	2.232E-05	
	U-T2X55--1DI	2.400E-05	- 4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	8.550E-05	2.232E-05	
	U-B3B30--1DA	2.400E-05	- 480V BUS B30 SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	8.550E-05	2.232E-05	
	U-B31/1B-1DA	2.400E-05	- 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	8.550E-05	2.232E-05	
	U-T11----1DI	2.400E-05	- >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	8.550E-05	2.232E-05	
	U-B21C---1DA	2.400E-05	- 4160V BUS 1C SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	8.550E-05	2.232E-05	
	U-B2A4---1DA	2.400E-05	- 4160V BUS A4 SHORT CIRCUIT W/I 24 H
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-level Cutset Report for TNDDTTF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.611E-01
Flag Set: DTLOOP
This file was created on 8-21-1990 at 16:31:59

Rank	Cutset Importance	Cutset Probability	
32	8.550E-05	2.232E-05	
	U-B31----1DA	2.400E-05	- 480V BUS 1 SHORT CIRCUIT
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	8.274E-05	2.160E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	D-MPG8B--1DR	7.200E-04	- MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
33	8.274E-05	2.160E-05	
	D-MPG8A--1DR	7.200E-04	- CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
	D-MPG8B----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
34	7.766E-05	2.027E-05	
	D-005051---Z	1.000E+00	- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-B32SDGE--V	2.000E-01	- OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
	UT22-----Z	9.300E-01	- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
	UT6306-----K	1.090E-04	- MISSILE RELATED RACEWAY FAILURE
35	7.228E-05	1.887E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UT39-----K	6.290E-04	- MISSILE RELATED RACEWAY FAILURE
36	7.067E-05	1.845E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	U-OOSDG&E--Z	5.000E-01	- SDG&E LINE UNAVAILABLE
	U-T22&T23--K	1.230E-03	- SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
37	6.895E-05	1.800E-05	
	D-MPG8A----U	3.000E-02	- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	U-BY1-----Z	6.000E-04	- BATTERY 1 FAILURE DUE TO MISSILE IMPACT
38	5.642E-05	1.473E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22A-----K	4.910E-04	- MISSILE RELATED RACEWAY FAILURE
39	5.125E-05	1.338E-05	
	D-MV1100C--V	3.000E-02	- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22D-----K	4.460E-04	- MISSILE RELATED RACEWAY FAILURE

Top Event: DT-01-01 Top Event Probability: 2.611E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:31:59

Rank	Cutset Importance	Cutset Probability	
40	4.252E-05	1.110E-05	
	D-MPG8A----S 3.000E-03		- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----M 3.700E-03		- CHR G PUMP G-8B OUT OF SERVICE FOR MAINT.
41	4.229E-05	1.104E-05	
	D-MPG8A----U 3.000E-02		- OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
	UTPB56AF---K 3.680E-04		- MISSILE RELATED RACEWAY FAILURE
42	3.704E-05	9.671E-06	
	U-DGCC0001-R 9.671E-03		- COMMON CAUSE FAILURE -DG-R --> 1 AND 2
	U-OOCNDLP--Z 1.000E-03		- CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
43	3.585E-05	9.360E-06	
	D-MV1100C--V 3.000E-02		- OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
	UT22C-----K 3.120E-04		- MISSILE RELATED RACEWAY FAILURE
44	3.447E-05	9.000E-06	
	D-C211C07--N 3.000E-03		- BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
	D-MPG8A----S 3.000E-03		- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
44	3.447E-05	9.000E-06	
	D-MV1100B--P 3.000E-03		- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-MV1100D--P 3.000E-03		- MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
	D-005051---Z 1.000E+00		- INADEQUATE FLOW FROM FCV-5051 TRAIN
44	3.447E-05	9.000E-06	
	D-MPG8A----S 3.000E-03		- MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
	D-MPG8B----S 3.000E-03		- MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
45	3.206E-05	8.370E-06	
	D-MV1100B--P 3.000E-03		- MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
	D-005051---Z 1.000E+00		- INADEQUATE FLOW FROM FCV-5051 TRAIN
	U-C31202---P 3.000E-03		- BKR (CONTROL) 480V 1202 FT OPEN ON DEMAND
	UT22-----Z 9.300E-01		- WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Top Event: DT-01-01 Top Event Probability: 2.611E-01

Flag Set: DTLOOP

This file was created on 8-21-1990 at 16:31:59

Rank	Cutset Importance	Cutset Probability
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45 3.206E-05 8.370E-06

D-MV1100B--P 3.000E-03 - MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
U-C31200---N 3.000E-03 - BKR (CONTROL) 480V 1200 FT CLOSE ON DEMAND
UT22-----Z 9.300E-01 - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

46 2.827E-05 7.380E-06

D-MV1100C--V 3.000E-02 - OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
U-B32SDGE--V 2.000E-01 - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
U-T22&T23--K 1.230E-03 - SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT

47 1.988E-05 5.190E-06

D-MV1100B--P 3.000E-03 - MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-005051---Z 1.000E+00 - INADEQUATE FLOW FROM FCV-5051 TRAIN
UT46-----K 1.730E-03 - MISSILE RELATED RACEWAY FAILURE

MSS Cutset Summary

Base Case - LOOP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.281E+00	.967E-02	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2
2	.226E+00	.779E-02	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2
3	.947E-01	.326E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
4	.789E-01	.271E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
5	.738E-01	.254E-02	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
5	.738E-01	.254E-02	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
6	.193E-01	.662E-03	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
7	.160E-01	.552E-03	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
8	.898E-02	.309E-03	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
9	.515E-02	.177E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND

System-level Cutset Report for TNDITLBA Data File
Top Event: IT-01-01 Top Event Probability: 3.440E-02
This file was created on 4-13-1990 at 07:57:43

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
9	.515E-02	.177E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
9	.515E-02	.177E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
9	.515E-02	.177E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
9	.515E-02	.177E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
9	.515E-02	.177E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
9	.515E-02	.177E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
9	.515E-02	.177E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
10	.481E-02	.166E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
10	.481E-02	.166E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

This file was created on 4-13-1990 at 07:57:43

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
10	.481E-02	.166E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
10	.481E-02	.166E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
10	.481E-02	.166E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
10	.481E-02	.166E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
10	.481E-02	.166E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
10	.481E-02	.166E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
10	.481E-02	.166E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
10	.481E-02	.166E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
11	.401E-02	.138E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
11	.401E-02	.138E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
11	.401E-02	.138E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
11	.401E-02	.138E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
11	.401E-02	.138E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
11	.401E-02	.138E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
11	.401E-02	.138E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
11	.401E-02	.138E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
11	.401E-02	.138E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
11	.401E-02	.138E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
12	.105E-02	.360E-04	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
12	.105E-02	.360E-04	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
13	.698E-03	.240E-04	U-T11----1D1 - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
13	.698E-03	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
13	.698E-03	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
13	.698E-03	.240E-04	U-BD1----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H
14	.581E-03	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
14	.581E-03	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
14	.581E-03	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
14	.581E-03	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
15	.262E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND

Rank	Cutset Importance	Cutset Probability
15	.262E-03	.900E-05
	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE	
15	.262E-03	.900E-05
	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND	
15	.262E-03	.900E-05
	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND	
15	.262E-03	.900E-05
	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--N - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE	
15	.262E-03	.900E-05
	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND	
15	.262E-03	.900E-05
	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE	
15	.262E-03	.900E-05
	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE	
15	.262E-03	.900E-05
	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE	
15	.262E-03	.900E-05
	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE	

Rank	Cutset Importance	Cutset Probability	
15	.262E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
15	.262E-03	.900E-05	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
15	.262E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
15	.262E-03	.900E-05	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
15	.262E-03	.900E-05	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
16	.135E-03	.466E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
17	.127E-03	.436E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
17	.127E-03	.436E-05	U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
18	.106E-03	.363E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
18	.106E-03	.363E-05	U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
19	.436E-04	.150E-05	U-BY1----1JI - BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
19	.436E-04	.150E-05	U-BD1----1JA - 120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
20	.412E-04	.142E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
20	.412E-04	.142E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
20	.412E-04	.142E-05	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
21	.385E-04	.132E-05	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
21	.385E-04	.132E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
21	.385E-04	.132E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
22	.321E-04	.110E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
22	.321E-04	.110E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		
22	.321E-04	.110E-05	
	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		

MSS Cutset Summary

Base Case - PT

Rank	Cutset Importance	Cutset Probability	
1	.114E+00	.240E-04	U-T11----1DI - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
1	.114E+00	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
1	.114E+00	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
1	.114E+00	.240E-04	U-BD1----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H
2	.947E-01	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
2	.947E-01	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
2	.947E-01	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
2	.947E-01	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
3	.458E-01	.967E-05	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
4	.369E-01	.779E-05	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
5	.154E-01	.326E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
6	.128E-01	.271E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
7	.120E-01	.254E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
7	.120E-01	.254E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
8	.314E-02	.662E-06	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
9	.261E-02	.552E-06	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.146E-02	.309E-06	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
11	.114E-02	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCD-----V - OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
11	.114E-02	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCB-----M - BATTERY CHARGER B IN TEST OR MAINTENANCE

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Rank	Cutset Importance	Cutset Probability	
12	.838E-03	.177E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.838E-03	.177E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.838E-03	.177E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.838E-03	.177E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.838E-03	.177E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.838E-03	.177E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.838E-03	.177E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.838E-03	.177E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
13	.784E-03	.166E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.784E-03	.166E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.784E-03	.166E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.784E-03	.166E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.784E-03	.166E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.784E-03	.166E-06	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.784E-03	.166E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.784E-03	.166E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Rank	Cutset Importance	Cutset Probability
13	.784E-03	.166E-06
	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
13	.784E-03	.166E-06
	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
14	.653E-03	.138E-06
	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
14	.653E-03	.138E-06
	U-C212C15--M - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
14	.653E-03	.138E-06
	U-C211A02--M - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
14	.653E-03	.138E-06
	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
14	.653E-03	.138E-06
	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
14	.653E-03	.138E-06
	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	

Rank	Cutset Importance	Cutset Probability	
14	.653E-03	.138E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.653E-03	.138E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.653E-03	.138E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.653E-03	.138E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.170E-03	.360E-07	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.170E-03	.360E-07	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
16	.426E-04	.900E-08	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
16	.426E-04	.900E-08	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.426E-04	.900E-08	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.221E-04	.466E-08	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
18	.206E-04	.436E-08	U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
18	.206E-04	.436E-08	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H

Rank	Cutset Importance	Cutset Probability	
19	.201E-04	.425E-08	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-T1AUXC-1DI - >4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
19	.201E-04	.425E-08	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-T1AUXC-1DI - >4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
20	.188E-04	.397E-08	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-T1AUXC-1DI - >4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
20	.188E-04	.397E-08	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-T1AUXC-1DI - >4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
21	.172E-04	.363E-08	U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--2 - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
21	.172E-04	.363E-08	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--2 - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
22	.157E-04	.331E-08	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-T1AUXC-1DI - >4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
22	.157E-04	.331E-08	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-T1AUXC-1DI - >4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H

MSS Cutset Summary

F' 1 Tornado - LOOP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.277E+00	.967E-02	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2
2	.223E+00	.779E-02	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2
3	.931E-01	.326E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
4	.776E-01	.271E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
5	.726E-01	.254E-02	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
5	.726E-01	.254E-02	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
6	.189E-01	.662E-03	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
7	.172E-01	.600E-03	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT
8	.158E-01	.552E-03	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
9	.883E-02	.309E-03	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
10	.506E-02	.177E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
10	.506E-02	.177E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
10	.506E-02	.177E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
10	.506E-02	.177E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
10	.506E-02	.177E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
10	.506E-02	.177E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
10	.506E-02	.177E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
10	.506E-02	.177E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
11	.473E-02	.166E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
11	.473E-02	.166E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
11	.473E-02	.166E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
11	.473E-02	.166E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
11	.473E-02	.166E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
11	.473E-02	.166E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
11	.473E-02	.166E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
11	.473E-02	.166E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
11	.473E-02	.166E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
11	.473E-02	.166E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
12	.395E-02	.138E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
12	.395E-02	.138E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
12	.395E-02	.138E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
12	.395E-02	.138E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
12	.395E-02	.138E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
12	.395E-02	.138E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
12	.395E-02	.138E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
12	.395E-02	.138E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
12	.395E-02	.138E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE

System-level Cutset Report for TNDITLF1 Data File
Top Event: IT-01-01 Top Event Probability: 3.498E-02
This file was created on 4-13-1990 at 07:49:46

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
12	.395E-02	.138E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
13	.103E-02	.360E-04	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
13	.103E-02	.360E-04	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
14	.686E-03	.240E-04	U-BD1----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H
14	.686E-03	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
14	.686E-03	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
14	.686E-03	.240E-04	U-T11----1DI - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
15	.572E-03	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
15	.572E-03	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
15	.572E-03	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
15	.572E-03	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
16	.257E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
16	.257E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
16	.257E-03	.900E-05	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
16	.257E-03	.900E-05	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
16	.257E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
16	.257E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
16	.257E-03	.900E-05	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
16	.257E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
16	.257E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND

Rank	Cutset Importance	Cutset Probability	
16	.257E-03	.900E-05	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
16	.257E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
16	.257E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
16	.257E-03	.900E-05	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
16	.257E-03	.900E-05	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
16	.257E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
17	.133E-03	.466E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
18	.125E-03	.436E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
18	.125E-03	.436E-05	U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
19	.104E-03	.363E-05	U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
19	.104E-03	.363E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
20	.429E-04	.150E-05	U-BD1----1JA - 120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
20	.429E-04	.150E-05	U-BY1----1JI - BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
21	.405E-04	.142E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
21	.405E-04	.142E-05	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
21	.405E-04	.142E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
22	.379E-04	.132E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
22	.379E-04	.132E-05	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
22	.379E-04	.132E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS

This file was created on 4-13-1990 at 07:49:46

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
23	.316E-04	.110E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
23	.316E-04	.110E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
23	.316E-04	.110E-05	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE

MSS Cutset Summary

F' 1 Tornado - PT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.113E+00	.240E-04	U-T11----1D1 - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
1	.113E+00	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
1	.113E+00	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
1	.113E+00	.240E-04	U-BD1----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H
2	.944E-01	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
2	.944E-01	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
2	.944E-01	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
2	.944E-01	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
3	.457E-01	.967E-05	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
4	.368E-01	.779E-05	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
5	.154E-01	.326E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
6	.128E-01	.271E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
7	.120E-01	.254E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
7	.120E-01	.254E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
8	.313E-02	.662E-06	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
9	.283E-02	.600E-06	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.261E-02	.552E-06	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
11	.146E-02	.309E-06	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.113E-02	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCB-----M - BATTERY CHARGER B IN TEST OR MAINTENANCE

Rank	Cutset Importance	Cutset Probability	
12	.113E-02	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCD-----V - OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
13	.836E-03	.177E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.836E-03	.177E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.836E-03	.177E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.836E-03	.177E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.836E-03	.177E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.836E-03	.177E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.836E-03	.177E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
13	.836E-03	.177E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.782E-03	.166E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.782E-03	.166E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.782E-03	.166E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.782E-03	.166E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.782E-03	.166E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.782E-03	.166E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.782E-03	.166E-06	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

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Rank	Cutset Importance	Cutset Probability	
14	.782E-03	.166E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.782E-03	.166E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.782E-03	.166E-06	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.651E-03	.138E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.651E-03	.138E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.651E-03	.138E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.651E-03	.138E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.651E-03	.138E-06	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
15	.651E-03	.138E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.651E-03	.138E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.651E-03	.138E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.651E-03	.138E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.651E-03	.138E-06	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.170E-03	.360E-07	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.170E-03	.360E-07	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.680E-04	.144E-07	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT U-T1AUXC-1D1 - >4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
18	.425E-04	.900E-08

U-C211C14--U = OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C212C15--U - OP

MSS Cutset Summary

F' 2 Tornado - LOOP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.272E+00	.967E-02	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2
2	.219E+00	.779E-02	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2
3	.915E-01	.326E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
4	.763E-01	.271E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
5	.714E-01	.254E-02	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
5	.714E-01	.254E-02	U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
6	.186E-01	.662E-03	U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
7	.169E-01	.600E-03	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT
8	.155E-01	.552E-03	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
9	.967E-02	.344E-03	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
10	.868E-02	.309E-03	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
11	.593E-02	.211E-03	U-T21-----K - SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
12	.497E-02	.177E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.497E-02	.177E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.497E-02	.177E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.497E-02	.177E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.497E-02	.177E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.497E-02	.177E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.497E-02	.177E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.497E-02	.177E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
13	.465E-02	.166E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.465E-02	.166E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
13	.465E-02	.166E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.465E-02	.166E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.465E-02	.166E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.465E-02	.166E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.465E-02	.166E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.465E-02	.166E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.465E-02	.166E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
13	.465E-02	.166E-03	
			U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
14	.388E-02	.138E-03	
			U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.388E-02	.138E-03	
			U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.388E-02	.138E-03	
			U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.388E-02	.138E-03	
			U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
14	.388E-02	.138E-03	
			U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.388E-02	.138E-03	
			U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.388E-02	.138E-03	
			U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.388E-02	.138E-03	
			U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE

System-level Cutset Report for TNDITLF2 Data File
Top Event: IT-01-01 Top Event Probability: 3.559E-02
This file was created on 4-13-1990 at 07:45:23

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
14	.388E-02	.138E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT. BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.388E-02	.138E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
15	.101E-02	.360E-04	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
15	.101E-02	.360E-04	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
16	.674E-03	.240E-04	U-BD1----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H
16	.674E-03	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
16	.674E-03	.240E-04	U-T11----1DI - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
16	.674E-03	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
17	.562E-03	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
17	.562E-03	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
17	.562E-03	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
17	.562E-03	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
18	.531E-03	.189E-04	ITHR-E25D--Z - LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT ITMV17-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25D
18	.531E-03	.189E-04	ITHR-E25B--Z - LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT ITMV15-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25B
18	.531E-03	.189E-04	ITHR-E25A--Z - LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT ITMV14-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25A
18	.531E-03	.189E-04	ITHR-E25C--Z - LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT ITMV16-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25C
19	.253E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.253E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
19	.253E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
19	.253E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
19	.253E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
19	.253E-03	.900E-05	
			U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
19	.253E-03	.900E-05	
			U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.253E-03	.900E-05	
			U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.253E-03	.900E-05	
			U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
19	.253E-03	.900E-05	
			U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
19	.253E-03	.900E-05	
			U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
19	.253E-03	.900E-05	
			U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
19	.253E-03	.900E-05	
			U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.253E-03	.900E-05	
			U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
19	.253E-03	.900E-05	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
20	.131E-03	.466E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
21	.122E-03	.436E-05	U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
21	.122E-03	.436E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
22	.102E-03	.363E-05	U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
22	.102E-03	.363E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
23	.422E-04	.150E-05	U-BD1----1JA - 120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
23	.422E-04	.150E-05	U-BY1----1JI - BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
24	.398E-04	.142E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
24	.398E-04	.142E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
24	.398E-04	.142E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND		
25	.372E-04	.132E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS		
25	.372E-04	.132E-05	
	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H		
	U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS		
25	.372E-04	.132E-05	
	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H		
	U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS		
26	.310E-04	.110E-05	
	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		
26	.310E-04	.110E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		
26	.310E-04	.110E-05	
	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		

MSS Cutset Summary

F' 2 Tornado - PT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.408E+00	.344E-03	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
2	.251E+00	.211E-03	U-T21-----K - SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
3	.285E-01	.240E-04	U-T11-----1DI - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
3	.285E-01	.240E-04	U-BD1-----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H
3	.285E-01	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
3	.285E-01	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
4	.237E-01	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
4	.237E-01	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
4	.237E-01	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
4	.237E-01	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
5	.224E-01	.189E-04	ITHR-E25A--Z - LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT ITMV14-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25A

Rank	Cutset Importance	Cutset Probability	
5	.224E-01	.189E-04	ITHR-E25B--Z - LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT ITMV15-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25B
5	.224E-01	.189E-04	ITHR-E25C--Z - LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT ITMV16-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25C
5	.224E-01	.189E-04	ITHR-E25D--Z - LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT ITMV17-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25D
6	.115E-01	.967E-05	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
7	.925E-02	.779E-05	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
8	.387E-02	.326E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
9	.322E-02	.271E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.301E-02	.254E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.301E-02	.254E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
11	.786E-03	.662E-06	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.712E-03	.600E-06	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.655E-03	.552E-06	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.367E-03	.309E-06	U-C2CC002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.285E-03	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCD-----V - OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
15	.285E-03	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCB-----M - BATTERY CHARGER B IN TEST OR MAINTENANCE
16	.210E-03	.177E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.210E-03	.177E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Rank	Cutset Importance	Cutset Probability	
16	.210E-03	.177E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.210E-03	.177E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.210E-03	.177E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.210E-03	.177E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.210E-03	.177E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.210E-03	.177E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.197E-03	.166E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.197E-03	.166E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Rank	Cutset Importance	Cutset Probability	
17	.197E-03	.166E-06	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.197E-03	.166E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.197E-03	.166E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.197E-03	.166E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.197E-03	.166E-06	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.197E-03	.166E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.197E-03	.166E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.197E-03	.166E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
18	.164E-03	.138E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.164E-03	.138E-06	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.164E-03	.138E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.164E-03	.138E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.164E-03	.138E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.164E-03	.138E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.164E-03	.138E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.164E-03	.138E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

System-level Cutset Report for TNDITTF2 Data File
Top Event: IT-01-01 Top Event Probability: 8.423E-04
This file was created on 4-13-1990 at 07:43:20

Rank	Cutset Importance	Cutset Probability	
18	.164E-03	.138E-06	
			U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
			U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
			U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.164E-03	.138E-06	
			U-C211C14--M - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
			U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
			U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.427E-04	.360E-07	
			U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
			U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
			U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.427E-04	.360E-07	
			U-C211C14--M - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
			U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
			U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

MSS Cutset Summary

F'3 Tornado - LOOP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.265E+00	.967E-02	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2
2	.213E+00	.779E-02	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2
3	.892E-01	.326E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
4	.743E-01	.271E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
5	.695E-01	.254E-02	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
5	.695E-01	.254E-02	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
6	.239E-01	.872E-03	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
7	.181E-01	.662E-03	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
8	.164E-01	.600E-03	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT
9	.151E-01	.552E-03	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
10	.146E-01	.535E-03	U-T21-----K - SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
11	.846E-02	.309E-03	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
12	.485E-02	.177E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.485E-02	.177E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.485E-02	.177E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.485E-02	.177E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.485E-02	.177E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.485E-02	.177E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.485E-02	.177E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.485E-02	.177E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
13	.453E-02	.166E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.453E-02	.166E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
13	.453E-02	.166E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.453E-02	.166E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.453E-02	.166E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.453E-02	.166E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.453E-02	.166E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.453E-02	.166E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.453E-02	.166E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
13	.453E-02	.166E-03	
			U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
14	.378E-02	.138E-03	
			U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.378E-02	.138E-03	
			U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.378E-02	.138E-03	
			U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.378E-02	.138E-03	
			U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
14	.378E-02	.138E-03	
			U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.378E-02	.138E-03	
			U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.378E-02	.138E-03	
			U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.378E-02	.138E-03	
			U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
14	.378E-02	.138E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.378E-02	.138E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
15	.131E-02	.480E-04	ITHR-E25B--Z - LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT ITMV15-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25B
15	.131E-02	.480E-04	ITHR-E25C--Z - LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT ITMV16-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25C
15	.131E-02	.480E-04	ITHR-E25D--Z - LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT ITMV17-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25D
15	.131E-02	.480E-04	ITHR-E25A--Z - LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT ITMV14-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25A
16	.986E-03	.360E-04	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
16	.986E-03	.360E-04	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
17	.657E-03	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
17	.657E-03	.240E-04	U-BD1----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
17	.657E-03	.240E-04	U-821C---1DA = 4160V BUS 1C SHORT CIRCUIT W/I 24 H
17	.657E-03	.240E-04	U-T11----1DI - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
18	.548E-03	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
18	.548E-03	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
18	.548E-03	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
18	.548E-03	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
19	.246E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.246E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
19	.246E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
19	.246E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
19	.246E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE

Rank	Cutset Importance	Cutset Probability
19	.246E-03	.900E-05
	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND	
19	.246E-03	.900E-05
	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE	
19	.246E-03	.900E-05
	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE	
19	.246E-03	.900E-05
	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE	
19	.246E-03	.900E-05
	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND	
19	.246E-03	.900E-05
	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE	
19	.246E-03	.900E-05
	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND	
19	.246E-03	.900E-05
	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE	
19	.246E-03	.900E-05
	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND	

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Rank	Cutset Importance	Cutset Probability	
19	.246E-03	.900E-05	U-C211A02--N - BKR.(CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--N - BKR.(CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
20	.128E-03	.466E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
21	.119E-03	.436E-05	U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
21	.119E-03	.436E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
22	.995E-04	.363E-05	U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
22	.995E-04	.363E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
23	.411E-04	.150E-05	U-BD1----1JA - 120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
23	.411E-04	.150E-05	U-BY1----1JI - BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
24	.388E-04	.142E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
24	.388E-04	.142E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
24	.388E-04	.142E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND		
25	.363E-04	.132E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS		
25	.363E-04	.132E-05	
	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H		
	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS		
25	.363E-04	.132E-05	
	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H		
	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS		
26	.302E-04	.110E-05	
	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		
26	.302E-04	.110E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		
26	.302E-04	.110E-05	
	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		

MSS Cutset Summary

F' 3 Tornado - PT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.482E+00	.872E-03	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
2	.296E+00	.535E-03	U-T21-----K - SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
3	.265E-01	.480E-04	ITHR-E25A--Z - LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT ITMV14-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25A
3	.265E-01	.480E-04	ITHR-E25D--Z - LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT ITMV17-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25D
3	.265E-01	.480E-04	ITHR-E25B--Z - LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT ITMV15-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25B
3	.265E-01	.480E-04	ITHR-E25C--Z - LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT ITMV16-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25C
4	.133E-01	.240E-04	U-T11-----1D1 - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
4	.133E-01	.240E-04	U-BD1-----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H
4	.133E-01	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
4	.133E-01	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
5	.110E-01	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
5	.110E-01	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
5	.110E-01	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
5	.110E-01	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
6	.534E-02	.967E-05	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
7	.430E-02	.779E-05	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
8	.180E-02	.326E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
9	.150E-02	.271E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.140E-02	.254E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.140E-02	.254E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
11	.366E-03	.662E-06	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.331E-03	.600E-06	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.305E-03	.552E-06	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.171E-03	.309E-06	U-C2CC0002-M - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.133E-03	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCD-----V - OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
15	.133E-03	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCB-----M - BATTERY CHARGER B IN TEST OR MAINTENANCE
16	.978E-04	.177E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.978E-04	.177E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
16	.978E-04	.177E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.978E-04	.177E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.978E-04	.177E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.978E-04	.177E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.978E-04	.177E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.978E-04	.177E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.915E-04	.166E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.915E-04	.166E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
17	.915E-04	.166E-06	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.915E-04	.166E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.915E-04	.166E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.915E-04	.166E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.915E-04	.166E-06	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.915E-04	.166E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.915E-04	.166E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.915E-04	.166E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Rank	Cutset Importance	Cutset Probability	
18	.897E-04	.162E-06	
			B-SYINAIR--Z - INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO ITGBADV-E--K - FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
19	.762E-04	.138E-06	
			U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.762E-04	.138E-06	
			U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.762E-04	.138E-06	
			U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.762E-04	.138E-06	
			U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.762E-04	.138E-06	
			U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.762E-04	.138E-06	
			U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.762E-04	.138E-06	
			U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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19	.762E-04	.138E-06
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U-C211C01--U - OPS-FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

19	.762E-04	.138E-06
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U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

19	.762E-04	.138E-06
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U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

MSS Cutset Summary

F1 4 Tornado - LOOP

Rank	Cutset Importance	Cutset Probability
1	.262E+00	.967E-02
	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2	
2	.211E+00	.779E-02
	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2	
3	.882E-01	.326E-02
	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS	
4	.735E-01	.271E-02
	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE	
5	.688E-01	.254E-02
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS	
5	.688E-01	.254E-02
	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE	
6	.298E-01	.110E-02
	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE	
7	.182E-01	.673E-03
	U-T21-----K - SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT	
8	.179E-01	.662E-03
	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND	
9	.163E-01	.600E-03
	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT	

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
10	.150E-01	.552E-03	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
11	.837E-02	.309E-03	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
12	.479E-02	.177E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.479E-02	.177E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.479E-02	.177E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.479E-02	.177E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.479E-02	.177E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.479E-02	.177E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.479E-02	.177E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.479E-02	.177E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
13	.449E-02	.166E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.449E-02	.166E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
13	.449E-02	.166E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.449E-02	.166E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.449E-02	.166E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.449E-02	.166E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.449E-02	.166E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.449E-02	.166E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.449E-02	.166E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

Rank	Cutset Importance	Cutset Probability	
13	.449E-02	.166E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
14	.374E-02	.138E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.374E-02	.138E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.374E-02	.138E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.374E-02	.138E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
14	.374E-02	.138E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.374E-02	.138E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.374E-02	.138E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.374E-02	.138E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
14	.374E-02	.138E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.374E-02	.138E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
15	.163E-02	.603E-04	ITHR-E25B--Z - LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT ITMV15-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25B
15	.163E-02	.603E-04	ITHR-E25C--Z - LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT ITMV16-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25C
15	.163E-02	.603E-04	ITHR-E25D--Z - LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT ITMV17-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25D
15	.163E-02	.603E-04	ITHR-E25A--Z - LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT ITMV14-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25A
16	.975E-03	.360E-04	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
16	.975E-03	.360E-04	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
17	.650E-03	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
17	.650E-03	.240E-04	U-BD1----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
17	.650E-03	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
17	.650E-03	.240E-04	U-T11----1DI - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
18	.542E-03	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
18	.542E-03	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
18	.542E-03	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
18	.542E-03	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
19	.244E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.244E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
19	.244E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
19	.244E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
19	.244E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
19	.244E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
19	.244E-03	.900E-05	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.244E-03	.900E-05	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.244E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
19	.244E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
19	.244E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
19	.244E-03	.900E-05	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
19	.244E-03	.900E-05	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.244E-03	.900E-05	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
19	.244E-03	.900E-05	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
20	.126E-03	.466E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
21	.118E-03	.436E-05	U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
21	.118E-03	.436E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
22	.984E-04	.363E-05	U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
22	.984E-04	.363E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
23	.406E-04	.150E-05	U-BD1----1JA - 120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
23	.406E-04	.150E-05	U-BY1----1JI - BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
24	.384E-04	.142E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
24	.384E-04	.142E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
24	.384E-04	.142E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND		
25	.359E-04	.132E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS		
25	.359E-04	.132E-05	
	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H		
	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS		
25	.359E-04	.132E-05	
	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H		
	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS		
26	.299E-04	.110E-05	
	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		
26	.299E-04	.110E-05	
	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		
26	.299E-04	.110E-05	
	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H		
	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE		

MSS Cutset Summary

F' 4 Tornado - PT

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.494E+00	.110E-02	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
2	.302E+00	.673E-03	U-T21-----K - SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
3	.271E-01	.603E-04	ITHR-E25A--Z - LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT ITMV14-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25A
3	.271E-01	.603E-04	ITHR-E25D--Z - LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT ITMV17-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25D
3	.271E-01	.603E-04	ITHR-E25B--Z - LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT ITMV15-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25B
3	.271E-01	.603E-04	ITHR-E25C--Z - LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT ITMV16-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25C
4	.108E-01	.240E-04	U-T11-----1DI - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
4	.108E-01	.240E-04	U-BD1-----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H
4	.108E-01	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
4	.108E-01	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
5	.899E-02	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
5	.899E-02	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
5	.899E-02	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
5	.899E-02	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
6	.435E-02	.967E-05	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
7	.350E-02	.779E-05	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
8	.146E-02	.326E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
9	.122E-02	.271E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.114E-02	.254E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.114E-02	.254E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Rank	Cutset Importance	Cutset Probability	
11	.298E-03	.662E-06	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.270E-03	.600E-06	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.248E-03	.552E-06	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.139E-03	.309E-06	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
15	.116E-03	.258E-06	B-SYINAIR--Z - INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO ITGBADV-E--K - FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
16	.108E-03	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCD-----V - OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
16	.108E-03	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCB-----M - BATTERY CHARGER B IN TEST OR MAINTENANCE
17	.796E-04	.177E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
17	.796E-04	.177E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.796E-04	.177E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.796E-04	.177E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.796E-04	.177E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.796E-04	.177E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.796E-04	.177E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.796E-04	.177E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.744E-04	.166E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
18	.744E-04	.166E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.744E-04	.166E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.744E-04	.166E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.744E-04	.166E-06	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.744E-04	.166E-06	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.744E-04	.166E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.744E-04	.166E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.744E-04	.166E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
18	.744E-04	.166E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.620E-04	.138E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.620E-04	.138E-06	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.620E-04	.138E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.620E-04	.138E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.620E-04	.138E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.620E-04	.138E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
19	.620E-04	.138E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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19	.620E-04	.138E-06
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U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

19	.620E-04	.138E-06
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U-C211A02--M - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

19	.620E-04	.138E-06
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U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

MSS Cutset Summary

F' 5 Tornado - LOOP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.259E+00	.967E-02	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2
2	.209E+00	.779E-02	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2
3	.872E-01	.326E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
4	.727E-01	.271E-02	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
5	.680E-01	.254E-02	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
5	.680E-01	.254E-02	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
6	.359E-01	.134E-02	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
7	.220E-01	.820E-03	U-T21-----K - SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
8	.177E-01	.662E-03	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
9	.161E-01	.600E-03	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
10	.148E-01	.552E-03	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
11	.827E-02	.309E-03	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
12	.474E-02	.177E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.474E-02	.177E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.474E-02	.177E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.474E-02	.177E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.474E-02	.177E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.474E-02	.177E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.474E-02	.177E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
12	.474E-02	.177E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
13	.443E-02	.166E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.443E-02	.166E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
13	.443E-02	.166E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.443E-02	.166E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.443E-02	.166E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.443E-02	.166E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.443E-02	.166E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.443E-02	.166E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
13	.443E-02	.166E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
13	.443E-02	.166E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
14	.370E-02	.138E-03	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.370E-02	.138E-03	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.370E-02	.138E-03	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.370E-02	.138E-03	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
14	.370E-02	.138E-03	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.370E-02	.138E-03	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.370E-02	.138E-03	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.370E-02	.138E-03	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
14	.370E-02	.138E-03	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
14	.370E-02	.138E-03	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
15	.197E-02	.735E-04	ITHR-E25B--Z - LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT ITMV15-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25B
15	.197E-02	.735E-04	ITHR-E25C--Z - LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT ITMV16-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25C
15	.197E-02	.735E-04	ITHR-E25D--Z - LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT ITMV17-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25D
15	.197E-02	.735E-04	ITHR-E25A--Z - LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT ITMV14-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25A
16	.964E-03	.360E-04	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
16	.964E-03	.360E-04	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND
17	.643E-03	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
17	.643E-03	.240E-04	U-BD1----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
17	.643E-03	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
17	.643E-03	.240E-04	U-T11----1DI - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
18	.536E-03	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
18	.536E-03	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
18	.536E-03	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
18	.536E-03	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
19	.241E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.241E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
19	.241E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
19	.241E-03	.900E-05	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
19	.241E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
19	.241E-03	.900E-05	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
19	.241E-03	.900E-05	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.241E-03	.900E-05	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT. CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.241E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
19	.241E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
19	.241E-03	.900E-05	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
19	.241E-03	.900E-05	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
19	.241E-03	.900E-05	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
19	.241E-03	.900E-05	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
19	.241E-03	.900E-05	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
20	.125E-03	.466E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
21	.117E-03	.436E-05	U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
21	.117E-03	.436E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
22	.973E-04	.363E-05	U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-WRDG1--1DA - CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
22	.973E-04	.363E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-WRDG2--1DA - CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
23	.402E-04	.150E-05	U-BD1----1JA - 120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
23	.402E-04	.150E-05	U-BY1----1JI - BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
24	.379E-04	.142E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
24	.379E-04	.142E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
24	.379E-04	.142E-05	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
25	.355E-04	.132E-05	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
25	.355E-04	.132E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
25	.355E-04	.132E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
26	.296E-04	.110E-05	U-B21A---1DA - 4160V BUS 1A SHORT CIRCUIT W/I 24 H U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
26	.296E-04	.110E-05	U-B22C---1DA - 4160V BUS 2C SHORT CIRCUIT W/I 24 H U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
26	.296E-04	.110E-05	U-B21B---1DA - 4160V BUS 1B SHORT CIRCUIT W/I 24 H U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE

MSS Cutset Summary

F' 5 Tornado - PT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.503E+00	.134E-02	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
2	.308E+00	.820E-03	U-T21-----K - SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
3	.276E-01	.735E-04	ITHR-E25A--Z - LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT ITMV14-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25A
3	.276E-01	.735E-04	ITHR-E25D--Z - LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT ITMV17-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25D
3	.276E-01	.735E-04	ITHR-E25B--Z - LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT ITMV15-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25B
3	.276E-01	.735E-04	ITHR-E25C--Z - LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT ITMV16-----U - OPERATOR FAILS TO ISOLATE REHEATER E-25C
4	.901E-02	.240E-04	U-T11----1D1 - >4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
4	.901E-02	.240E-04	U-BD1----1DA - 120V BUS 1 SHORT CIRCUIT W/I 24 H
4	.901E-02	.240E-04	U-B21C---1DA - 4160V BUS 1C SHORT CIRCUIT W/I 24 H
4	.901E-02	.240E-04	U-B31/1B-1DA - 480V BUS 1/1B SHORT CIRCUIT W/I 24 H
5	.751E-02	.200E-04	ITAVCV-76--N - AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
5	.751E-02	.200E-04	ITAVCV-77--N - AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
5	.751E-02	.200E-04	ITAVCV-78--N - AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
5	.751E-02	.200E-04	ITAVCV-79--N - AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
6	.363E-02	.967E-05	U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
7	.292E-02	.779E-05	U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
8	.122E-02	.326E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
9	.102E-02	.271E-05	U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.953E-03	.254E-05	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
10	.953E-03	.254E-05	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Rank	Cutset Importance	Cutset Probability	
11	.249E-03	.662E-06	U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
12	.225E-03	.600E-06	U-BY1-----Z - BATTERY 1 FAILURE DUE TO MISSILE IMPACT U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
13	.207E-03	.552E-06	U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
14	.143E-03	.380E-06	B-SYINAIR--Z - INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO ITGBADV-E--K - FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
15	.116E-03	.309E-06	U-C2CC0002-N - COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15 U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
16	.901E-04	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCD-----V - OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
16	.901E-04	.240E-06	U-BCA----1DI - BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H U-BCB-----M - BATTERY CHARGER B IN TEST OR MAINTENANCE
17	.664E-04	.177E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

This file was created on 4-13-1990 at 07:26:54

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
17	.664E-04	.177E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.664E-04	.177E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.664E-04	.177E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.664E-04	.177E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.664E-04	.177E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.664E-04	.177E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
17	.664E-04	.177E-06	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.622E-04	.166E-06	U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

Rank	Cutset Importance	Cutset Probability	
18	.622E-04	.166E-06	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.622E-04	.166E-06	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.622E-04	.166E-06	U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.622E-04	.166E-06	U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.622E-04	.166E-06	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.622E-04	.166E-06	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.622E-04	.166E-06	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
18	.622E-04	.166E-06	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

This file was created on 4-13-1990 at 07:26:54

Rank	Cutset Importance	Cutset Probability
18	.622E-04	.166E-06
	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
19	.518E-04	.138E-06
	U-C212C15--N - BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
19	.518E-04	.138E-06
	U-C211C14--U - OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
19	.518E-04	.138E-06
	U-C211A02--U - OPERATOR FAILS TO CLOSE CKT BKR 11A02 U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
19	.518E-04	.138E-06
	U-C212C01--N - BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
19	.518E-04	.138E-06
	U-C211C01--N - BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
19	.518E-04	.138E-06
	U-C212C01--U - OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	
19	.518E-04	.138E-06
	U-C212C15--U - OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP	

This file was created on 4-13-1990 at 07:26:54

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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19	.518E-04	.138E-06
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U-C211C01--U - OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

19	.518E-04	.138E-06
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U-C211A02--N - BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

19	.518E-04	.138E-06
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U-C211C14--N - BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-OOCNDLP--Z - CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP

AFWS Cutset Summary

Base Case - LOOP

Rank	Cutset Importance	Cutset Probability	
1	.139E+00	.267E-03	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2 U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
2	.112E+00	.215E-03	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2 U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
3	.756E-01	.145E-03	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2 U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL
4	.630E-01	.121E-03	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DGCC0001-R - COMMON CAUSE FAILURE -DG-R --> 1 AND 2 U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND
5	.608E-01	.117E-03	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DGCC0002-S - COMMON CAUSE FAILURE -DG-S --> 1 AND 2 U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL
6	.500E-01	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
6	.500E-01	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
7	.468E-01	.899E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
8	.390E-01	.749E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-DGDSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
9	.365E-01	.701E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-DGDSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
9	.365E-01	.701E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-DGDSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
10	.260E-01	.500E-04	L-AVFCVS---W - OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
11	.254E-01	.489E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-DGDSD----V - OPERATOR FAILS TO START DSD DIESEL
12	.212E-01	.407E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-DGDSD----V - OPERATOR FAILS TO START DSD DIESEL
12	.212E-01	.407E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-DGDSD----S - DIESEL GENERATOR DSD FT START ON DEMAND

This file was created on 4-12-1990 at 19:18:18

Rank	Cutset Importance	Cutset Probability	
13	.198E-01	.381E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL
13	.198E-01	.381E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL
14	.177E-01	.339E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND
15	.167E-01	.320E-04	L-SV3110---J - SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
16	.165E-01	.317E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND
16	.165E-01	.317E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----M - DIESEL GENERATOR NO. 2 IN MAINTENANCE U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND
17	.139E-01	.266E-04	L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10

Rank	Cutset Importance	Cutset Probability	
18	.120E-01	.230E-04	L-MPG10W-1DR - MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
19	.112E-01	.216E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
19	.112E-01	.216E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
20	.952E-02	.183E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----1DR - DIESEL GENERATOR 1 FT RUN FOR 24 HOURS U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
21	.793E-02	.152E-04	L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC. U-DG1-----M - DIESEL GENERATOR NO. 1 IN MAINTENANCE U-DG2-----S - DIESEL GENERATOR 2 FT START ON DEMAND U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
22	.781E-02	.150E-04	K-ASAFAS2--I - AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL K-ASAFAS--U - OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
23	.578E-02	.111E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
23	.578E-02	.111E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE

System-level Cutset Report for TNDLTLBA Data File
Top Event: LT-01-01 Top Event Probability: 1.920E-03
This file was created on 4-12-1990 at 19:18:18

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
24.	.560E-02	.107E-04

L-XV353----V - OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC.
U-DG1-----S - DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR - DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DGSD----M - DSD DIESEL DOWN DUE TO MAINTENANCE

AFWS Cutset Summary

Base Case - PT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.238E+00	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
1	.238E+00	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
2	.124E+00	.500E-04	L-AVFCVS---W - OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
3	.792E-01	.320E-04	L-SV3110---J - SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
4	.659E-01	.266E-04	L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
5	.570E-01	.230E-04	L-MPG10W-1DR - MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
6	.535E-01	.216E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
6	.535E-01	.216E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
7	.371E-01	.150E-04	K-ASAFAS2--I - AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL K-ASAFWAS--U - OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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8	.275E-01	.111E-04
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L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE

8	.275E-01	.111E-04
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L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE

AFWS Cutset Summary

F' 1 Tornado - LOOP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.198E+00	.100E-03	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.190E+00	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
2	.190E+00	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
3	.992E-01	.500E-04	L-AVFCVS---W - OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVS
4	.635E-01	.320E-04	L-SV3110---J - SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
5	.529E-01	.266E-04	L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
6	.457E-01	.230E-04	L-MPG10W-1DR - MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
7	.429E-01	.216E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
7	.429E-01	.216E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
8	.298E-01	.150E-04	K-ASAFAS2--I - AFWS 2 FAILS TO PROVIDE ACTUATION SIGNAL K-ASAFWAS--U - OPERATOR FAILS TO MANUALLY ACTUATE AFWS PER PROCEDURE
9	.220E-01	.111E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
9	.220E-01	.111E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE

AFWS Cutset Summary

F' 1 Tornado - PT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.198E+00	.100E-03	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.190E+00	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
2	.190E+00	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
3	.992E-01	.500E-04	L-AVFCVS---W - OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
4	.635E-01	.320E-04	L-SV3110---J - SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
5	.529E-01	.266E-04	L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
6	.457E-01	.230E-04	L-MPG10W-1DR - MTR-DRIVEN PP AFW-G-10W FT-RUN FOR 24 HOURS AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
7	.429E-01	.216E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
7	.429E-01	.216E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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8	.298E-01	<u>.150E-04</u>
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K-ASAFAS2--I - AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U - OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE

9	.220E-01	.111E-04
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L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE

9	.220E-01	.111E-04
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L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE

AFWS Cutset Summary

F1 2 Tornado - LOOP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.765E+00	.120E-01	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.547E-01	.859E-03	UTCR-ROOF63K - MISSILE RELATED RACEWAY FAILURE
3	.301E-01	.472E-03	UTSEB1-----K - MISSILE RELATED RACEWAY FAILURE
4	.292E-01	.458E-03	LTPPAFWSUPLK - AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
5	.281E-01	.441E-03	UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
6	.273E-01	.429E-03	UTVENTBLD77K - MISSILE RELATED RACEWAY FAILURE
7	.219E-01	.344E-03	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
8	.619E-02	.972E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	.612E-02	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
9	.612E-02	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
10	.605E-02	.950E-04	LTPPAFWFEEDK - FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS

Rank	Cutset Importance	Cutset Probability
11	.337E-02	.528E-04
	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS	
12	.319E-02	.500E-04
	L-AVFCVS---W - OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs	
13	.280E-02	.440E-04
	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS	
14	.204E-02	.320E-04
	L-SV3110---J - SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE	
15	.170E-02	.266E-04
	L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10	
16	.147E-02	.230E-04
	L-MPG10W-1DR - MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE	
17	.139E-02	.219E-04
	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS	
18	.138E-02	.216E-04
	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10	

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
18	.138E-02	.216E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
19	.956E-03	.150E-04	K-ASAFAS2--I - AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL K-ASAFWAS--U - OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
20	.757E-03	.119E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	.740E-03	.116E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----M - DSD DIESEL DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	.707E-03	.111E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
22	.707E-03	.111E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE

AFWS Cutset Summary

F' 2 Tornado - PT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.770E+00	.120E-01	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.551E-01	.859E-03	UTCR-ROOF63K - MISSILE RELATED RACEWAY FAILURE
3	.303E-01	.472E-03	UTSEB1-----K - MISSILE RELATED RACEWAY FAILURE
4	.294E-01	.458E-03	LTPPAFWSUPLK - AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
5	.283E-01	.441E-03	UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
6	.275E-01	.429E-03	UTVENTBLD77K - MISSILE RELATED RACEWAY FAILURE
7	.221E-01	.344E-03	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
8	.616E-02	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
8	.616E-02	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
9	.609E-02	.950E-04	LTPPAFWFEEDK - FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
10	.321E-02	.500E-04	L-AVFCVS---W - OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs

Rank	Cutset Importance	Cutset Probability	
11	.312E-02	.486E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	.205E-02	.320E-04	L-SV3110---J - SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
13	.171E-02	.266E-04	L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
14	.169E-02	.264E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	.148E-02	.230E-04	L-MPG10W-1DR - MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
16	.141E-02	.220E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	.139E-02	.216E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
17	.139E-02	.216E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10

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Rank	Cutset Importance	Cutset Probability	
18	.125E-02	.194E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
19	.962E-03	.150E-04	K-ASAFAS2--I - AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL K-ASAFAS--U - OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
20	.712E-03	.111E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
20	.712E-03	.111E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
21	.701E-03	.109E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	.677E-03	.106E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGDS-----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

AFWS Cutset Summary

F'3 Tornado - LOOP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.939E+00	.140E+00	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.146E-01	.218E-02	UTCR-ROOF63K - MISSILE RELATED RACEWAY FAILURE
3	.805E-02	.120E-02	UTSEB1-----K - MISSILE RELATED RACEWAY FAILURE
4	.778E-02	.116E-02	LTPPAFWSUPLK - AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
5	.751E-02	.112E-02	UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
6	.731E-02	.109E-02	UTVENTBLD77K - MISSILE RELATED RACEWAY FAILURE
7	.585E-02	.872E-03	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
8	.415E-02	.618E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	.225E-02	.336E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	.188E-02	.280E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Rank	Cutset Importance	Cutset Probability	
11	.162E-02	.241E-03	LTPPAFWFEEDK - FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
12	.933E-03	.139E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
13	.644E-03	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
13	.644E-03	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
14	.507E-03	.756E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGDS----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	.496E-03	.739E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGDS----M - DSD DIESEL DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	.423E-03	.630E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGDS----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	.389E-03	.580E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Rank	Cutset Importance	Cutset Probability
17	.389E-03	.580E-04
	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS	
18	.377E-03	.562E-04
	U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSEB3-----K - MISSILE RELATED RACEWAY FAILURE	
19	.335E-03	.500E-04
	L-AVFCVS---W - OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVS	
20	.295E-03	.439E-04
	L-TPG10---M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTDSD-----K - DSD DIESEL FAILURE DUE TO MISSILE IMPACT	
21	.263E-03	.392E-04
	U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSD01-----K - MISSILE RELATED RACEWAY FAILURE	
22	.225E-03	.336E-04
	L-MXA4S2---V - OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC. L-TPG10---M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS	
22	.225E-03	.336E-04
	L-C21A404--N - BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND L-TPG10---M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS	
23	.215E-03	.320E-04
	L-SV3110---J - SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE L-TPG10---M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE	

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Rank	Cutset Importance	Cutset Probability	
24	.211E-03	.315E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
24	.211E-03	.315E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
25	.205E-03	.306E-04	U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSEB3----K - MISSILE RELATED RACEWAY FAILURE
26	.179E-03	.266E-04	L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
27	.176E-03	.263E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
27	.176E-03	.263E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
28	.171E-03	.255E-04	U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSEB3----K - MISSILE RELATED RACEWAY FAILURE
29	.168E-03	.251E-04	L-PC8-----J - PRESSURE CONTROLLER PC-8 FAILS U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

System-Level Cutset Report for TNDLTLF3 Data File
Top Event: LT-01-01 Top Event Probability: 1.491E-01
This file was created on 4-12-1990 at 16:34:39

Rank	Cutset Importance	Cutset Probability	
30	.157E-03	.234E-04	LTPPAFWPUMPK - FAILURE OF AFW PUMP G10/G10S PIPING DUE TO TORNADO MISSILES U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
31	.155E-03	.230E-04	L-MPG10W-1DR - MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
32	.150E-03	.224E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-IRYV30-1DI - INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	.145E-03	.216E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
33	.145E-03	.216E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
34	.143E-03	.213E-04	U-DGDS----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTDS01-----K - MISSILE RELATED RACEWAY FAILURE
35	.140E-03	.209E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE LTPPSUCG10WK - FAILURE OF AFW PUMP G-10W SUCTION DUE TO TORNADO MISSILES
36	.130E-03	.193E-04	L-SV2620---P - SV-2620 FAILS TO OPEN RANDOMLY U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

This file was created on 4-12-1990 at 16:34:39

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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37	.119E-03	.178E-04
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U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND
UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UTDSD1-----K - MISSILE RELATED RACEWAY FAILURE

38	.112E-03	.166E-04
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L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
U-DGSD----M - DSD DIESEL DOWN DUE TO MAINTENANCE
UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

39	.101E-03	.150E-04
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K-ASAFAS2--I - AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFAS--U - OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE

AFWS Cutset Summary

F' 3 Tornado - PT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.944E+00	.140E+00	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.147E-01	.218E-02	UTCR-ROOF63K - MISSILE RELATED RACEWAY FAILURE
3	.809E-02	.120E-02	UTSEB1-----K - MISSILE RELATED RACEWAY FAILURE
4	.782E-02	.116E-02	LTPPAFWSUPLK - AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
5	.755E-02	.112E-02	UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
6	.735E-02	.109E-02	UTVENTBLD77K - MISSILE RELATED RACEWAY FAILURE
7	.588E-02	.872E-03	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
8	.208E-02	.309E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	.162E-02	.241E-03	LTPPAFWFEEDK - FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
10	.113E-02	.168E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
11	.944E-03	.140E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	.834E-03	.124E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
13	.647E-03	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
13	.647E-03	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
14	.469E-03	.696E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	.453E-03	.672E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	.378E-03	.560E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Rank	Cutset Importance	Cutset Probability	
17	.337E-03	.500E-04	L-AVFCVS---W - OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
18	.255E-03	.378E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
19	.249E-03	.370E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----M - DSD DIESEL DOWN DUE TO MAINTENANCE U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
20	.216E-03	.320E-04	L-SV3110---J - SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
21	.212E-03	.315E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	.195E-03	.290E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	.195E-03	.290E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Rank	Cutset Importance	Cutset Probability	
23	.190E-03	.281E-04	U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSEB3-----K - MISSILE RELATED RACEWAY FAILURE
24	.188E-03	.278E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
25	.180E-03	.266E-04	L-MPG10W---M - PUMP AFW-G-10W DOWN DUE TO MAINTENANCE L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
26	.155E-03	.230E-04	L-MPG10W-1DR - MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
27	.148E-03	.220E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTDSD-----K - DSD DIESEL FAILURE DUE TO MISSILE IMPACT
28	.146E-03	.216E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
28	.146E-03	.216E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10

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Rank	Cutset Importance	Cutset Probability	
29	.141E-03	.209E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE LTPPSUCG10WK - FAILURE OF AFW PUMP G-10W SUCTION DUE TO TORNADO MISSILES
30	.132E-03	.196E-04	U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTDSD1-----K - MISSILE RELATED RACEWAY FAILURE
31	.113E-03	.168E-04	L-MXA4S2---V - OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC. L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
31	.113E-03	.168E-04	L-C21A404--N - BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	.106E-03	.157E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
32	.106E-03	.157E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
33	.103E-03	.153E-04	U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSEB3-----K - MISSILE RELATED RACEWAY FAILURE

This file was created on 4-12-1990 at 16:31:31

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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34	.102E-03	.151E-04
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- L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
- L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
- U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
- U-DGDS-----V - OPERATOR FAILS TO START DSD DIESEL
- UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

35	.101E-03	.150E-04
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- K-ASAFAS2--I - AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
- K-ASAFWAS--U - OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE

36	.997E-04	.148E-04
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- L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
- U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
- U-DGDS-----M - DSD DIESEL DOWN DUE TO MAINTENANCE
- UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

AFWS Cutset Summary

F' 4 Tornado - LOOP

Rank	Cutset Importance	Cutset Probability	
1	.985E+00	.500E+00	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.540E-02	.274E-02	UTCR-ROOF63K - MISSILE RELATED RACEWAY FAILURE
3	.297E-02	.151E-02	UTSEB1-----K - MISSILE RELATED RACEWAY FAILURE
4	.288E-02	.146E-02	LTPPAFWSUPLK - AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
5	.278E-02	.141E-02	UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
6	.270E-02	.137E-02	UTVENTBLD77K - MISSILE RELATED RACEWAY FAILURE
7	.258E-02	.131E-02	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	.217E-02	.110E-02	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
9	.140E-02	.710E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGDS--V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	.117E-02	.592E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGDS--S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Rank	Cutset Importance	Cutset Probability	
11	.599E-03	.304E-03	LTPPAFWFEEDK - FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
12	.579E-03	.294E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
13	.315E-03	.160E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	.308E-03	.156E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----M - DSD DIESEL DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	.262E-03	.133E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	.241E-03	.123E-03	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	.241E-03	.123E-03	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
17	.230E-03	.117E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSD-----K - DSD DIESEL FAILURE DUE TO MISSILE IMPACT

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
18	.206E-03	.105E-03	U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTDS01-----K - MISSILE RELATED RACEWAY FAILURE
19	.189E-03	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
19	.189E-03	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
20	.140E-03	.710E-04	L-C21A404--N - BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
20	.140E-03	.710E-04	L-MXA4S2---V - OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC. L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	.131E-03	.666E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	.131E-03	.666E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	.129E-03	.656E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE LTPPAFWG10WK - FAILURE OF AFW PUMP G-10W PIPING DUE TO TORNADO MISSILES

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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23	.123E-03	.625E-04
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LTPPAFWPUMPK - FAILURE OF AFW PUMP G10/G10S PIPING DUE TO TORNADO MISSILES
U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

24	.112E-03	.568E-04
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U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL
UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UTDSD1----K - MISSILE RELATED RACEWAY FAILURE

25	.109E-03	.555E-04
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L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND
UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

25	.109E-03	.555E-04
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L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND
UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

26	.105E-03	.531E-04
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L-PC8-----J - PRESSURE CONTROLLER PC-8 FAILS
U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

AFWS Cutset Summary

F1 4 Tornado - PT

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.987E+00	.500E+00	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.541E-02	.274E-02	UTCR-ROOF63K - MISSILE RELATED RACEWAY FAILURE
3	.298E-02	.151E-02	UTSEB1-----K - MISSILE RELATED RACEWAY FAILURE
4	.288E-02	.146E-02	LTPPAFWSUPLK - AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
5	.278E-02	.141E-02	UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
6	.270E-02	.137E-02	UTVENTBLD77K - MISSILE RELATED RACEWAY FAILURE
7	.217E-02	.110E-02	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
8	.129E-02	.654E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	.701E-03	.355E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGDS----V - OPERATOR FAILS TO START DSD DIESEL U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	.600E-03	.304E-03	LTPPAFWFEEDK - FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS

Rank	Cutset Importance	Cutset Probability	
11	.584E-03	.296E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	.516E-03	.261E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
13	.290E-03	.147E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	.280E-03	.142E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	.234E-03	.118E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	.189E-03	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
16	.189E-03	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE

Rank	Cutset Importance	Cutset Probability	
17	.158E-03	.799E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
18	.154E-03	.781E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----M - DSD DIESEL DOWN DUE TO MAINTENANCE U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
19	.131E-03	.666E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
20	.129E-03	.656E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE LTPPAFWG10WK - FAILURE OF AFW PUMP G-10W PIPING DUE TO TORNADO MISSILES
21	.121E-03	.613E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
21	.121E-03	.613E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>
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22	.116E-03	.588E-04
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- L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
- L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
- U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
- U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
- UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

23	.115E-03	.585E-04
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- L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
- U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE
- UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
- UTDSD-----K - DSD DIESEL FAILURE DUE TO MISSILE IMPACT

24	.103E-03	.523E-04
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- U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
- U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE
- UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
- UTDSD1-----K - MISSILE RELATED RACEWAY FAILURE

AFWS Cutset Summary

F' 5 Tornado - LOOP

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.995E+00	.790E+00	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.421E-02	.334E-02	UTCR-ROOF63K - MISSILE RELATED RACEWAY FAILURE
3	.232E-02	.184E-02	UTSEB1-----K - MISSILE RELATED RACEWAY FAILURE
4	.223E-02	.177E-02	LTPPAFWSUPLK - AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
5	.217E-02	.172E-02	UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
6	.210E-02	.167E-02	UTVENTBLD77K - MISSILE RELATED RACEWAY FAILURE
7	.207E-02	.164E-02	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
8	.169E-02	.134E-02	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
9	.112E-02	.893E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	.937E-03	.744E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Rank	Cutset Importance	Cutset Probability	
11	.465E-03	.370E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
12	.462E-03	.367E-03	LTPPAFWFEEDK - FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
13	.288E-03	.229E-03	U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSEB3-----K - MISSILE RELATED RACEWAY FAILURE
14	.253E-03	.201E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGDS--1DR - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	.247E-03	.196E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGDS--1DR - DSD DIESEL DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	.226E-03	.179E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTDSD-----K - DSD DIESEL FAILURE DUE TO MISSILE IMPACT
17	.211E-03	.167E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGDS--1DR - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
18	.202E-03	.160E-03	U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSD1-----K - MISSILE RELATED RACEWAY FAILURE

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<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
19	.194E-03	.154E-03	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
19	.194E-03	.154E-03	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
20	.157E-03	.124E-03	U-DGDS----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSEB3-----K - MISSILE RELATED RACEWAY FAILURE
21	.131E-03	.104E-03	U-DGDS----S - DIESEL GENERATOR DSD FT START ON DEMAND UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSEB3-----K - MISSILE RELATED RACEWAY FAILURE
22	.121E-03	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
22	.121E-03	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
23	.120E-03	.950E-04	LTPPAFWPUMPK - FAILURE OF AFW PUMP G10/G10S PIPING DUE TO TORNADO MISSILES U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
24	.112E-03	.893E-04	L-MXA4S2---V - OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC. L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

This file was created on 4-12-1990 at 17:19:09

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
24	.112E-03	.893E-04	L-C21A404--M - BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE UT22-----Z - WIND-RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
25	.110E-03	.870E-04	U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSD1-----K - MISSILE RELATED RACEWAY FAILURE
26	.105E-03	.837E-04	L-AV113----P - AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
26	.105E-03	.837E-04	L-AV2620---P - AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
27	.999E-04	.794E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE LTPPAFWG10WK - FAILURE OF AFW PUMP G-10W PIPING DUE TO TORNADO MISSILES

AFWS Cutset Summary

F' 5 Tornado - PT

<u>Rank</u>	<u>Cutset Importance</u>	<u>Cutset Probability</u>	
1	.995E+00	.790E+00	UTVENTBLD77Z - WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
2	.421E-02	.334E-02	UTCR-ROOF63K - MISSILE RELATED RACEWAY FAILURE
3	.232E-02	.184E-02	UTSEB1-----K - MISSILE RELATED RACEWAY FAILURE
4	.223E-02	.177E-02	LTPPAFWSUPLK - AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
5	.217E-02	.172E-02	UTWPC-----K - MISSILE RELATED RACEWAY FAILURE
6	.210E-02	.167E-02	UTVENTBLD77K - MISSILE RELATED RACEWAY FAILURE
7	.169E-02	.134E-02	UTEPC-----K - MISSILE RELATED RACEWAY FAILURE
8	.104E-02	.821E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
9	.563E-03	.446E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----V - OPERATOR FAILS TO START DSD DIESEL U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
10	.469E-03	.372E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGSD----S - DIESEL GENERATOR DSD FT START ON DEMAND U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

Rank	Cutset Importance	Cutset Probability	
11	.462E-03	.367E-03	LTPPAFWFEEDK - FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
12	.414E-03	.329E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
13	.233E-03	.185E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
14	.225E-03	.179E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
15	.188E-03	.149E-03	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-B32SDGE--V - OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC. U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
16	.144E-03	.114E-03	U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTSEB3-----K - MISSILE RELATED RACEWAY FAILURE
17	.127E-03	.100E-03	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGSD--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS

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Rank	Cutset Importance	Cutset Probability	
18	.124E-03	.982E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-DGDS----M - DSD DIESEL DOWN DUE TO MAINTENANCE U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
19	.121E-03	.960E-04	L-AV3110---P - AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
19	.121E-03	.960E-04	L-MPG10W---S - MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
20	.113E-03	.896E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTDS-----K - DSD DIESEL FAILURE DUE TO MISSILE IMPACT
21	.105E-03	.837E-04	L-TPG10----S - TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW L-TPG10----Y - OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10 U-DGDS----S - DIESEL GENERATOR DSD FT START ON DEMAND U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
22	.101E-03	.801E-04	U-DGDS--1DR - DIESEL GENERATOR DSD FT RUN FOR 24 HOURS U-OOSDG&E--Z - SDG&E LINE UNAVAILABLE UT22-----Z - WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS UTDS1-----K - MISSILE RELATED RACEWAY FAILURE
23	.100E-03	.794E-04	L-TPG10----M - TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE LTPPAFWG10WK - FAILURE OF AFW PUMP G-10W PIPING DUE TO TORNADO MISSILES

APPENDIX D

SYSTEM IMPORTANCE SUMMARIES

Charging System Importance Summary

Base Case - LOOP

System-level Basic Event Report for TNDTLBA Data File

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:02:17

Basic Event	F-V Importance	Event Probability	Description
U-DGCC0001-R	.265	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.214	7.788E-03	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.174	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.169	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.152	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	9.786E-02	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	9.316E-02	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
D-MV1100C--N	8.234E-02	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y	8.234E-02	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MPG8A----U	3.631E-02	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
U-DG2-----S	3.547E-02	1.200E-02	DIESEL GENERATOR 2 FT START ON DEMAND
D-MPG8B----U	2.784E-02	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
U-C212C15--U	1.368E-02	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C15--N	1.344E-02	3.000E-03	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
D-005051---Z	1.188E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
U-C211C14--U	9.814E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	9.567E-03	3.000E-03	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	8.481E-03	3.090E-04	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
D-MS1100C--Y	8.234E-03	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MS1100C--J	8.234E-03	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MPG8B----M	3.424E-03	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
D-MPG8A----S	3.362E-03	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MPG8B----S	2.776E-03	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-C211C07--N	2.776E-03	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-XV316----X	2.745E-03	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-CV301----P	2.745E-03	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-XV425----X	2.745E-03	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV388----P	2.745E-03	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-MV1100C--V	1.678E-03	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
D-FNE909---V	9.880E-04	.750	OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
ET-CCWSYS--R	8.201E-04	5.480E-04	RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
D-MPG8A--1DR	7.845E-04	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
U-C212C01--U	6.753E-04	3.000E-03	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211C01--N	6.753E-04	3.000E-03	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C211A02--N	6.753E-04	3.000E-03	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C01--N	6.753E-04	3.000E-03	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--U	6.753E-04	3.000E-03	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C211C01--U	6.753E-04	3.000E-03	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
D-MV883--1DQ	6.587E-04	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	6.521E-04	7.200E-04	MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
D-FNE908---V	4.224E-04	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
U-WRDG2--1DA	3.472E-04	7.896E-05	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
D-MV1100B--P	2.470E-04	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-MV1100D--P	2.470E-04	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
U-WRDG1--1DA	2.193E-04	7.896E-05	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
PT-SWCSYS--R	1.680E-04	1.360E-04	RANDOM FAILURE OF SALT WATER COOLING SYSTEM
U-B22C---1DA	1.055E-04	2.400E-05	4160V BUS 2C SHORT CIRCUIT W/I 24 H
D-XV303----X	8.234E-05	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT

System-level Basic Event Report for TNDDLBA Data File

Top Event: DT-01-01 Top Event Probability: 3.644E-02

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:02:17

Basic Event	F-V Importance	Event Probability	Description
D-CV305----P	8.234E-05	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
D-XV302----X	8.234E-05	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
D-CV306----P	8.234E-05	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
U-B21C---1DA	6.666E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
D-FNE908---M	4.174E-05	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-FNE908---S	3.384E-05	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-TC1400---J	3.384E-05	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER

Charging System Importance Summary

Base Case - PT

System-level Basic Event Report for TNDTTBA Data File

Top Event: DT-01-01 Top Event Probability: 5.156E-03

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 14:56:14

Basic Event	F-V Importance	Event Probability	Description
D-MV1100C--N	.582	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y	.582	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MPG8A----U	.240	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----U	.197	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
D-005051---Z	8.397E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
D-MS1100C--Y	5.819E-02	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MS1100C--J	5.819E-02	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MPG8B----M	2.420E-02	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
D-MPG8A----S	2.376E-02	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-C211C07--N	1.962E-02	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8B----S	1.962E-02	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-XV388----P	1.940E-02	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-CV301----P	1.940E-02	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-XV425----X	1.940E-02	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV316----X	1.940E-02	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-FNE909---V	6.982E-03	.750	OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
ET-CCWSYS--R	5.795E-03	5.480E-04	RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
D-MPG8A--1DR	5.544E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
D-MV883--1DQ	4.655E-03	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	4.608E-03	7.200E-04	MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
U-OOCNDLP--Z	4.019E-03	1.000E-03	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
D-FNE908---V	2.985E-03	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
U-DGCC0001-R	1.876E-03	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
D-MV1100D--P	1.746E-03	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
D-MV1100B--P	1.746E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
PT-SWCSYS--R	1.187E-03	1.360E-04	RANDOM FAILURE OF SALT WATER COOLING SYSTEM
U-DG1-----S	1.158E-03	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	1.124E-03	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	1.019E-03	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
D-XV303----X	5.819E-04	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
D-XV302----X	5.819E-04	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
D-CV306----P	5.819E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
D-CV305----P	5.819E-04	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
U-DG1----1DR	4.925E-04	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	4.925E-04	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
D-FNE908---M	2.949E-04	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-FNE908---S	2.391E-04	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-TC1400---J	2.391E-04	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER

Charging System Importance Summary

F' 1 Tornado - LOOP

Top Event: DT-01-01 Top Event Probability: 3.680E-02

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:38:10

Basic Event	F-V Importance	Event Probability	Description
U-DGCC0001-R	.263	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.212	7.788E-03	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.173	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.168	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.152	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	9.689E-02	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	9.224E-02	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
D-MV1100C--N	8.153E-02	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y	8.153E-02	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MPG8A----U	3.692E-02	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
U-DG2-----S	3.532E-02	1.200E-02	DIESEL GENERATOR 2 FT START ON DEMAND
D-MPG8B----U	2.757E-02	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
U-C212C15--U	1.360E-02	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C15--N	1.335E-02	3.000E-03	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
D-Q05051---Z	1.190E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
U-C211C14--U	9.717E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	9.472E-03	3.000E-03	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
UT22-----Z	8.683E-03	1.100E-03	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-C2CC0002-N	8.397E-03	3.090E-04	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
D-MS1100C--Y	8.153E-03	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MS1100C--J	8.153E-03	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MPG8A----S	3.434E-03	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MPG8B----M	3.390E-03	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
D-MPG8B----S	2.749E-03	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-C211C07--N	2.749E-03	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-CV301----P	2.718E-03	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-XV316----X	2.718E-03	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-XV388----P	2.718E-03	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-XV425----X	2.718E-03	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-MV1100C--V	2.558E-03	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
U-BY1-----Z	2.530E-03	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-DGSD--1DR	1.650E-03	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-E908B30--V	8.968E-04	3.000E-02	OPER FT CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
D-FNE908---V	8.968E-04	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHRG G8A) PER PROC
D-G8ADSD---V	8.968E-04	3.000E-02	OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
U-DGSD----V	8.968E-04	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
D-MPG8A--1DR	7.768E-04	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
U-DGSD----S	7.473E-04	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
U-C211C01--N	6.687E-04	3.000E-03	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C211A02--N	6.687E-04	3.000E-03	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C01--U	6.687E-04	3.000E-03	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C212C01--N	6.687E-04	3.000E-03	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211C01--U	6.687E-04	3.000E-03	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211A02--U	6.687E-04	3.000E-03	OPERATOR FAILS TO CLOSE CKT BKR 11A02
D-MV883--1DQ	6.522E-04	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	6.457E-04	7.200E-04	MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
U-WRDG2--1DA	3.437E-04	7.896E-05	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
D-MV1100B--P	3.343E-04	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND

System-level Basic Event Report for TNDTFL1 Data File

Top Event: DT-01-01 Top Event Probability: 3.680E-02
Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:38:10

Basic Event	F-V Importance	Event Probability	Description
D-MV1100D--P	2.935E-04	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
U-WRDG1--1DA	2.172E-04	7.896E-05	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-DGDSD----M	1.973E-04	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
D-FNE908---M	1.106E-04	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
U-B22C---1DA	1.045E-04	2.400E-05	4160V BUS 2C SHORT CIRCUIT W/I 24 H
D-TC1400---J	8.968E-05	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-C33011---N	8.968E-05	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
D-C21A403--N	8.968E-05	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-FNE908---S	8.968E-05	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-XV302---X	8.153E-05	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
D-CV305----P	8.153E-05	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
D-XV303---X	8.153E-05	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
D-CV306----P	8.153E-05	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
U-B21C---1DA	6.600E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-IRYV30-1D1	5.976E-05	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H

Charging System Importance Summary

F1 1 Tornado - PT,

System-level Basic Event Report for TNDTTF1 Data File

Top Event: DT-01-01 Top Event Probability: 5.456E-03

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:30:36

Basic Event	F-V Importance	Event Probability	Description
D-MV1100C--N	.550	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y	.550	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MPG8A----U	.233	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MPG8B----U	.186	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
D-005051---Z	7.965E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
UT22-----Z	5.826E-02	1.100E-03	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
D-MS1100C--J	5.499E-02	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MS1100C--Y	5.499E-02	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MPG8A----S	2.316E-02	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MPG8B----M	2.287E-02	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
D-MPG8B----S	1.854E-02	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-C211C07--N	1.854E-02	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-XV425----X	1.833E-02	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV388----P	1.833E-02	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-XV316----X	1.833E-02	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-CV301----P	1.833E-02	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
U-DGSD--1DR	1.113E-02	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-MV1100C--V	6.048E-03	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
D-G8ADSD--V	6.048E-03	3.000E-02	OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
D-FNE908--V	6.048E-03	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHRG G8A) PER PROC
U-DGSD----V	6.048E-03	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
D-E908B30--V	6.048E-03	3.000E-02	OPER FT CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
D-MPG8A--1DR	5.239E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
U-DGSD----S	5.040E-03	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
D-MV883--1DQ	4.399E-03	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	4.355E-03	7.200E-04	MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
U-OOCNDLP--Z	3.798E-03	1.000E-03	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-BY1-----Z	3.629E-03	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
D-MV1100B--P	1.952E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
U-DGCC0001-R	1.773E-03	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
D-MV1100D--P	1.650E-03	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
U-DGSD----M	1.331E-03	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
U-DG1-----S	1.094E-03	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	1.062E-03	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	9.628E-04	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
D-FNE908--M	7.460E-04	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-TC1400---J	6.048E-04	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-C33011---N	6.048E-04	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
D-C21A403--N	6.048E-04	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-FNE908---S	6.048E-04	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-CV305----P	5.499E-04	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
D-XV302---X	5.499E-04	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
D-CV306----P	5.499E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
D-XV303---X	5.499E-04	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
U-DG1----1DR	4.654E-04	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	4.654E-04	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-IRYV30-1DI	4.030E-04	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
U-OOSDG&E--Z	3.024E-04	.500	SDG&E LINE UNAVAILABLE

Charging System Importance Summary

F1 2 Tornado - LOOP

System-level Basic Event Report for TNDTLF2 Data File

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:53:37

Basic Event	F-V Importance	Event Probability	Description
UT22-----Z	.296	5.500E-02	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-DGCC0001-R	.175	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.141	7.788E-03	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.116	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.112	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.101	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	6.562E-02	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
D-005051---Z	6.551E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
U-DG1-----M	6.236E-02	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DGDSD--1DR	5.504E-02	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-MV1100C--N	5.438E-02	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y	5.438E-02	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MPG8A----U	5.404E-02	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
DTTKRWST---K	4.369E-02	2.410E-03	TORNADO INDUCED MISSILE FAILURE OF RWST
D-MV1100C--V	3.148E-02	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
D-FNE908---V	2.991E-02	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
U-DGDSD----V	2.991E-02	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
D-E908B30--V	2.991E-02	3.000E-02	OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
D-G8ADSD---V	2.991E-02	3.000E-02	OP FAILS TO CONNECT CHR G-8A TO DSD DIESEL W/ PROC.
U-DGDSD----S	2.493E-02	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
U-DG2-----S	2.356E-02	1.200E-02	DIESEL GENERATOR 2 FT START ON DEMAND
D-MPG8B----U	1.839E-02	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
DTPPRWST---K	1.039E-02	5.730E-04	TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWSTJ
U-C212C15--U	9.070E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C15--N	8.907E-03	3.000E-03	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-DGDSD----M	6.580E-03	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
U-C211C14--U	6.482E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	6.319E-03	3.000E-03	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	5.602E-03	3.090E-04	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
D-MS1100C--Y	5.438E-03	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MS1100C--J	5.438E-03	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MPG8A----S	5.221E-03	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-FNE908---M	3.689E-03	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-MV1100B--P	3.178E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-C21A403--N	2.991E-03	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-TC1400---J	2.991E-03	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-C33011---N	2.991E-03	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
D-FNE908---S	2.991E-03	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
U-BY1-----Z	2.286E-03	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
D-MPG8B----M	2.262E-03	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
U-IRYV30-1DI	1.993E-03	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
D-MPG8B----S	1.834E-03	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-C211C07--N	1.834E-03	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-XV425----X	1.813E-03	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV316----X	1.813E-03	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-XV388----P	1.813E-03	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-CV301----P	1.813E-03	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
UTDSD-----K	1.545E-03	1.550E-03	DSD DIESEL FAILURE DUE TO MISSILE IMPACT

System-level Basic Event Report for TNDTLF2 Data File

Top Event: DT-01-01 Top Event Probability: 5.516E-02

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:53:37

Basic Event	F-V Importance	Event Probability	Description
UT56-----K	1.454E-03	8.020E-05	MISSILE RELATED RACEWAY FAILURE
D-MPG8A--1DR	1.236E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
U-C212C01--U	9.252E-04	3.000E-03	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211C01--U	9.252E-04	3.000E-03	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211C01--N	9.252E-04	3.000E-03	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C01--N	9.252E-04	3.000E-03	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--U	9.252E-04	3.000E-03	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C211A02--N	9.252E-04	3.000E-03	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
D-FNE908-1DR	7.179E-04	7.200E-04	FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
UTWPC-----K	4.397E-04	4.410E-04	MISSILE RELATED RACEWAY FAILURE
D-MV883--1DQ	4.351E-04	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	4.307E-04	7.200E-04	MTR-DRIVEN PP G88 FT RUN FOR 24 HOURS CHARGING
UTEPC-----K	3.617E-04	3.440E-04	MISSILE RELATED RACEWAY FAILURE
D-MS1100B--J	2.991E-04	3.000E-04	MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
UT6306-----K	2.802E-04	2.810E-04	MISSILE RELATED RACEWAY FAILURE
UT39-----K	2.481E-04	1.610E-04	MISSILE RELATED RACEWAY FAILURE
U-WRDG2--1DA	2.293E-04	7.896E-05	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
D-MV1100D--P	2.145E-04	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
U-T21-----K	2.104E-04	2.110E-04	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
U-T22&T23--K	1.713E-04	3.150E-04	SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
D-CV306-----P	1.541E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
U-WRDG1--1DA	1.449E-04	7.896E-05	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
UT22B-----K	1.169E-04	2.150E-04	MISSILE RELATED RACEWAY FAILURE
D-MXB31-----N	9.970E-05	1.000E-04	MANUAL SWITCH B31 FAILS TO CLOSE
D-MPG987-1DR	8.076E-05	8.100E-05	MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
U-B22C---1DA	6.970E-05	2.400E-05	4160V BUS 2C SHORT CIRCUIT W/I 24 H
UT22A-----K	6.852E-05	1.260E-04	MISSILE RELATED RACEWAY FAILURE
U-B21C---1DA	6.796E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
UT22D-----K	6.254E-05	1.150E-04	MISSILE RELATED RACEWAY FAILURE
D-XV303----X	5.438E-05	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
D-CV305----P	5.438E-05	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
D-XV302----X	5.438E-05	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
UTPB56AF---K	5.139E-05	9.450E-05	MISSILE RELATED RACEWAY FAILURE
UT22C-----K	4.362E-05	8.020E-05	MISSILE RELATED RACEWAY FAILURE
UT46-----K	2.409E-05	4.430E-04	MISSILE RELATED RACEWAY FAILURE
U-BDD28--1DA	2.393E-05	2.400E-05	125VDC BUS D28 SHORT CIRCUIT W/I 24 H
U-T11----1DI	2.393E-05	2.400E-05	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B3830--1DA	2.393E-05	2.400E-05	480V BUS B30 SHORT CIRCUIT W/I 24 H
U-T2X55--1DI	2.393E-05	2.400E-05	4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
U-B2A4---1DA	2.393E-05	2.400E-05	4160V BUS A4 SHORT CIRCUIT W/I 24 H
U-B31----1DA	2.393E-05	2.400E-05	480V BUS 1 SHORT CIRCUIT
U-B31/1B-1DA	2.393E-05	2.400E-05	480V BUS 1/1B SHORT CIRCUIT W/I 24 H

Charging System Importance Summary

F' 2 Tornado - PT

System-level Basic Event Report for TNDTTF2 Data File

Top Event: DT-01-01 Top Event Probability: 2.417E-02

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:44:13

Basic Event	F-V Importance	Event Probability	Description
UT22-----Z	.666	5.500E-02	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
D-005051---Z	.147	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
U-DGSD--1DR	.126	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-MV1100C--N	.124	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y	.124	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MPG8A---U	.120	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
DTKRWST---K	9.970E-02	2.410E-03	TORNADO INDUCED MISSILE FAILURE OF RWST
D-MV1100C--V	6.919E-02	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
D-G8ADSD---V	6.826E-02	3.000E-02	OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
D-FNE908---V	6.826E-02	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
U-DGSD----V	6.826E-02	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
D-E908B30--V	6.826E-02	3.000E-02	OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
U-DGSD----S	5.688E-02	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
D-MPG8B---U	4.197E-02	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
DTPRWST---K	2.370E-02	5.730E-04	TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST]
U-DGSD----M	1.502E-02	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
D-MS1100C--J	1.241E-02	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MS1100C--Y	1.241E-02	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MPG8A----S	1.192E-02	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-FNE908---M	8.418E-03	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-C21A403--N	6.826E-03	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-FNE908---S	6.826E-03	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-C33011---N	6.826E-03	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
D-TC1400---J	6.826E-03	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-MV1100B--P	5.205E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-MPG8B---M	5.161E-03	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
U-IRYV30-1DI	4.548E-03	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
U-OOSDG&E--Z	4.269E-03	.500	SDG&E LINE UNAVAILABLE
D-C211C07--N	4.185E-03	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8B----S	4.185E-03	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-XV388---P	4.137E-03	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-XV425---X	4.137E-03	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV316---X	4.137E-03	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-CV301----P	4.137E-03	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
UTDSD-----K	3.527E-03	1.550E-03	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
UT56-----K	3.318E-03	8.020E-05	MISSILE RELATED RACEWAY FAILURE
D-MPG8A--1DR	2.821E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
U-B32SDGE--V	1.708E-03	.200	OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
D-FNE908-1DR	1.638E-03	7.200E-04	FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
UTWPC-----K	1.003E-03	4.410E-04	MISSILE RELATED RACEWAY FAILURE
D-MV883--1DQ	9.928E-04	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	9.829E-04	7.200E-04	MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
U-OOCNDLP--Z	8.571E-04	1.000E-03	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
UTEPC-----K	8.254E-04	3.440E-04	MISSILE RELATED RACEWAY FAILURE
U-BY1-----Z	8.191E-04	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
UT39-----K	5.661E-04	1.610E-04	MISSILE RELATED RACEWAY FAILURE
U-T21-----K	4.801E-04	2.110E-04	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
D-MS1100B--J	4.778E-04	3.000E-04	MTR STARTER MOV-1100B FT ACTUATE ON DEMAND

System-level Basic Event Report for TNDTTF2 Data File

Top Event: DT-01-01 Top Event Probability: 2.417E-02
Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:44:13

Basic Event	F-V Importance	Event Probability	Description
UT6306-----K	4.475E-04	2.810E-04	MISSILE RELATED RACEWAY FAILURE
D-MV1100D--P	4.150E-04	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
U-DGCC0001-R	4.001E-04	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
D-CV306----P	3.516E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
U-T22&T23--K	2.736E-04	3.150E-04	SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
UT22B-----K	2.668E-04	2.150E-04	MISSILE RELATED RACEWAY FAILURE
U-DG1-----S	2.470E-04	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	2.398E-04	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
D-MXB31----N	2.275E-04	1.000E-04	MANUAL SWITCH B31 FAILS TO CLOSE
U-DG2-----M	2.173E-04	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
D-MPG987-1DR	1.843E-04	8.100E-05	MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
UT22A-----K	1.564E-04	1.260E-04	MISSILE RELATED RACEWAY FAILURE
UT22D-----K	1.427E-04	1.150E-04	MISSILE RELATED RACEWAY FAILURE
D-XV303----X	1.241E-04	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
D-XV302----X	1.241E-04	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
D-CV305----P	1.241E-04	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
UTPB56AF---K	1.173E-04	9.450E-05	MISSILE RELATED RACEWAY FAILURE
U-DG1-----M	1.050E-04	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG1----1DR	1.050E-04	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
UT22C-----K	9.953E-05	8.020E-05	MISSILE RELATED RACEWAY FAILURE
UT46-----K	5.498E-05	4.430E-04	MISSILE RELATED RACEWAY FAILURE
U-T2X55--1DI	5.461E-05	2.400E-05	4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
U-B21C---1DA	5.461E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-B2A4---1DA	5.461E-05	2.400E-05	4160V BUS A4 SHORT CIRCUIT W/I 24 H
U-B31----1DA	5.461E-05	2.400E-05	480V BUS 1 SHORT CIRCUIT
U-B31/1B-1DA	5.461E-05	2.400E-05	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-T11----1DI	5.461E-05	2.400E-05	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B3B30--1DA	5.461E-05	2.400E-05	480V BUS B30 SHORT CIRCUIT W/I 24 H
U-BDD28--1DA	5.461E-05	2.400E-05	125VDC BUS D28 SHORT CIRCUIT W/I 24 H

Charging System Importance Summary

F'3 Tornado - LOOP

System-level Basic Event Report for TNDTLF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:07:58

Basic Event	F-V Importance	Event Probability	Description
UT22-----Z	.718	.350	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-DGSD--1DR	.137	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-MPG8A----U	8.466E-02	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-FNE908---V	7.527E-02	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
D-MV1100C--V	7.521E-02	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
D-G8ADSD---V	7.433E-02	3.000E-02	OP FAILS TO CONNECT CHR G PUMP G-8A TO DSD DIESEL W/ PROC.
D-E908B30--V	7.433E-02	3.000E-02	OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
U-DGSD----V	7.433E-02	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
U-DGCC0001-R	6.846E-02	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
D-005051---Z	6.638E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
U-DGSD----S	6.194E-02	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
U-DGCC0002-S	5.513E-02	7.788E-03	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	4.758E-02	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	4.378E-02	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
DTTKRWST---K	4.318E-02	6.100E-03	TORNADO INDUCED MISSILE FAILURE OF RWST
U-DG2-----M	3.948E-02	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	2.769E-02	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	2.607E-02	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
D-MV1100C--Y	2.124E-02	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MV1100C--N	2.124E-02	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
U-DGSD----M	1.635E-02	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
DTPRWST---K	1.026E-02	1.450E-03	TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST]
UTDSD-----K	9.712E-03	3.920E-03	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
D-FNE908---M	9.278E-03	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
U-DG2-----S	9.200E-03	1.200E-02	DIESEL GENERATOR 2 FT START ON DEMAND
D-MPG8A----S	8.402E-03	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MV1100B--P	7.559E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-FNE908---S	7.523E-03	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-TC1400---J	7.523E-03	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-C21A403--N	7.433E-03	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-C33011---N	7.433E-03	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
D-MPG88---U	7.214E-03	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G88 PERPROCEDURE
U-IRYV30-1DI	4.953E-03	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
U-C212C15--U	3.542E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C15--N	3.478E-03	3.000E-03	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
UTWPC-----K	2.775E-03	1.120E-03	MISSILE RELATED RACEWAY FAILURE
U-C211C14--U	2.665E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	2.601E-03	3.000E-03	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
D-FNE909---V	2.270E-03	.750	OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
U-C2CC0002-N	2.187E-03	3.090E-04	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
UTEPC-----K	2.179E-03	8.720E-04	MISSILE RELATED RACEWAY FAILURE
U-BY1-----Z	2.146E-03	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
D-MS1100C--Y	2.124E-03	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MS1100C--J	2.124E-03	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MPG8A--1DR	2.006E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
D-FNE908-1DR	1.803E-03	7.200E-04	FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
UT6306-----K	1.779E-03	7.120E-04	MISSILE RELATED RACEWAY FAILURE
UT56-----K	1.437E-03	2.030E-04	MISSILE RELATED RACEWAY FAILURE

System-level Basic Event Report for TNDTLF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:07:58

Basic Event	F-V Importance	Event Probability	Description
U-C212C01--N	1.409E-03	3.000E-03	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C212C01--U	1.409E-03	3.000E-03	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211A02--N	1.409E-03	3.000E-03	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C211C01--N	1.409E-03	3.000E-03	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C211C01--U	1.409E-03	3.000E-03	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211A02--U	1.409E-03	3.000E-03	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-T21-----K	1.337E-03	5.350E-04	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
UT39-----K	1.112E-03	4.100E-04	MISSILE RELATED RACEWAY FAILURE
ET-CCWSYS--Z	1.072E-03	2.680E-03	MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM
PT-SWCSYS--Z	9.759E-04	2.440E-03	MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM
D-MPG8B----M	8.832E-04	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
D-MS1100B--J	7.433E-04	3.000E-04	MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
D-C211C07--N	7.161E-04	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8B----S	7.161E-04	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-XV425----X	7.079E-04	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV388----P	7.079E-04	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-CV301----P	7.079E-04	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-XV316----X	7.079E-04	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-CV306----P	2.690E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
D-MXB31----N	2.478E-04	1.000E-04	MANUAL SWITCH B31 FAILS TO CLOSE
ET-CCWSYS--R	2.115E-04	5.480E-04	RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
D-MPG987-1DR	2.007E-04	8.100E-05	MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
U-T22&T23--K	1.866E-04	7.990E-04	SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
D-MV883--1DQ	1.699E-04	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	1.682E-04	7.200E-04	MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
D-MV1100D--P	1.214E-04	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
UT22B-----K	1.157E-04	5.450E-04	MISSILE RELATED RACEWAY FAILURE
U-WRDG2--1DA	8.954E-05	7.896E-05	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-B21C---1DA	7.665E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
UT22A-----K	6.796E-05	3.200E-04	MISSILE RELATED RACEWAY FAILURE
UT22D-----K	6.180E-05	2.910E-04	MISSILE RELATED RACEWAY FAILURE
U-BDD28--1DA	5.946E-05	2.400E-05	125VDC BUS D28 SHORT CIRCUIT W/I 24 H
U-B3830--1DA	5.946E-05	2.400E-05	480V BUS B30 SHORT CIRCUIT W/I 24 H
U-B2A4---1DA	5.946E-05	2.400E-05	4160V BUS A4 SHORT CIRCUIT W/I 24 H
U-T2X55--1DI	5.946E-05	2.400E-05	4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
U-B31----1DA	5.946E-05	2.400E-05	480V BUS 1 SHORT CIRCUIT
U-T11----1DI	5.946E-05	2.400E-05	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B31/1B-1DA	5.946E-05	2.400E-05	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	5.656E-05	7.896E-05	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
UTPB56AF---K	5.097E-05	2.400E-04	MISSILE RELATED RACEWAY FAILURE
PT-SWCSYS--R	4.332E-05	1.360E-04	RANDOM FAILURE OF SALT WATER COOLING SYSTEM
UT22C-----K	4.311E-05	2.030E-04	MISSILE RELATED RACEWAY FAILURE
U-B22C---1DA	2.722E-05	2.400E-05	4160V BUS 2C SHORT CIRCUIT W/I 24 H
UT46-----K	2.378E-05	1.120E-03	MISSILE RELATED RACEWAY FAILURE
D-MV1100C--U	2.230E-05	3.000E-03	OPS FAILS TO CLOSE MOV-1100C PER PROCEDURE
D-XV302----X	2.124E-05	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
D-CV305----P	2.124E-05	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
D-XV303----X	2.124E-05	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
U-BYD25--1DI	1.189E-05	2.400E-05	BATTERY D25 LOW OR NO OUTPUT SIGNAL W/I 24 H

System-Level Basic Event Report for TNDTLF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.413E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:07:58

Basic Event	F-V Importance	Event Probability	Description
U-MXB42----V	1.189E-05	.200	OPERATOR FAILS TO OPERATE MANUAL SWITCH B42

Charging System Importance Summary

F' 3 Tornado - PT

System-level Basic Event Report for TNDTTF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:58:55

Basic Event	F-V Importance	Event Probability	Description
UT22-----Z	.893	.350	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-DGSD--1DR	.173	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-MPG8A----U	.106	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-FNE908---V	9.509E-02	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
D-MV1100C--V	9.440E-02	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY W/ PROC
U-DGSD----V	9.389E-02	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
D-E908B30--V	9.389E-02	3.000E-02	OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 W/ PROCEDURE
D-G8ADSD---V	9.389E-02	3.000E-02	OP FAILS TO CONNECT CHR G PUMP G-8A TO DSD DIESEL W/ PROC.
D-005051---Z	8.015E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
U-DGSD----S	7.824E-02	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
DTKRWST---K	5.455E-02	6.100E-03	TORNADO INDUCED MISSILE FAILURE OF RWST
D-MV1100C--Y	2.683E-02	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MV1100C--N	2.683E-02	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
U-DGSD----M	2.066E-02	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
DTPRWST---K	1.297E-02	1.450E-03	TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWSTJ
UTSD-----K	1.227E-02	3.920E-03	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
D-FNE908---M	1.172E-02	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-MPG8A----S	1.061E-02	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-TC1400---J	9.503E-03	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-FNE908---S	9.503E-03	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-C21A403--N	9.389E-03	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-C33011---N	9.389E-03	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
D-MPG8B----U	9.113E-03	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
D-MV1100B--P	6.772E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
U-OOSDG&E--Z	6.409E-03	.500	SDG&E LINE UNAVAILABLE
U-IRYV30-1DI	6.256E-03	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
UTWPC-----K	3.505E-03	1.120E-03	MISSILE RELATED RACEWAY FAILURE
D-FNE909---V	2.867E-03	.750	OP FT LOCAL MANUALLY START FAN CLR E909 (CRG G8B) PER PROC
UTEPC-----K	2.752E-03	8.720E-04	MISSILE RELATED RACEWAY FAILURE
D-MS1100C--J	2.683E-03	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MS1100C--Y	2.683E-03	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
U-B32SDGE--V	2.554E-03	.200	OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
D-MPG8A--1DR	2.534E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
D-FNE908-1DR	2.278E-03	7.200E-04	FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
UT56-----K	1.815E-03	2.030E-04	MISSILE RELATED RACEWAY FAILURE
U-T21-----K	1.689E-03	5.350E-04	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
UT6306-----K	1.579E-03	7.120E-04	MISSILE RELATED RACEWAY FAILURE
UT39-----K	1.404E-03	4.100E-04	MISSILE RELATED RACEWAY FAILURE
ET-CCWSYS--Z	1.354E-03	2.680E-03	MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM
PT-SWCSYS--Z	1.233E-03	2.440E-03	MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM
D-MPG8B----M	1.116E-03	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
D-MPG8B----S	9.045E-04	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-C211C07--N	9.045E-04	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-XV388----P	8.942E-04	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-XV425----X	8.942E-04	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV316----X	8.942E-04	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-CV301----P	8.942E-04	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-MS1100B--J	6.572E-04	3.000E-04	MTR STARTER MOV-1100B FT ACTUATE ON DEMAND

System-level Basic Event Report for TNDTTF3 Data File

Top Event: DT-01-01 Top Event Probability: 1.118E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 15:58:55

Basic Event	F-V Importance	Event Probability	Description
D-CV306----P	3.398E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
D-MXB31----N	3.130E-04	1.000E-04	MANUAL SWITCH B31 FAILS TO CLOSE
ET-CCWSYS--R	2.672E-04	5.480E-04	RANDOM FAILURE OF COMPONENT COOLING WATER SYSTEM
D-MPG987-1DR	2.535E-04	8.100E-05	MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
D-MV883--1DQ	2.146E-04	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG88--1DR	2.125E-04	7.200E-04	MTR-DRIVEN PP G88 FT RUN FOR 24 HOURS CHARGING
U-OOCNDLP--Z	1.947E-04	1.000E-03	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-BY1-----Z	1.770E-04	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-T22&T23--K	1.608E-04	7.990E-04	SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
UT22B-----K	1.462E-04	5.450E-04	MISSILE RELATED RACEWAY FAILURE
D-MV1100D--P	1.373E-04	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
U-DGCC0001-R	8.648E-05	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
UT22A-----K	8.584E-05	3.200E-04	MISSILE RELATED RACEWAY FAILURE
UT22D-----K	7.806E-05	2.910E-04	MISSILE RELATED RACEWAY FAILURE
U-B21C---1DA	7.511E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-B31/1B-1DA	7.511E-05	2.400E-05	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-T2X55--1DI	7.511E-05	2.400E-05	4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
U-B3B30--1DA	7.511E-05	2.400E-05	480V BUS B30 SHORT CIRCUIT W/I 24 H
U-T11----1DI	7.511E-05	2.400E-05	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-BDD28--1DA	7.511E-05	2.400E-05	125VDC BUS D28 SHORT CIRCUIT W/I 24 H
U-B31----1DA	7.511E-05	2.400E-05	480V BUS 1 SHORT CIRCUIT
U-B2A4---1DA	7.511E-05	2.400E-05	4160V BUS A4 SHORT CIRCUIT W/I 24 H
UTPB56AF---K	6.438E-05	2.400E-04	MISSILE RELATED RACEWAY FAILURE
PT-SWCSYS--R	5.472E-05	1.360E-04	RANDOM FAILURE OF SALT WATER COOLING SYSTEM
UT22C-----K	5.446E-05	2.030E-04	MISSILE RELATED RACEWAY FAILURE
U-DG1-----S	5.339E-05	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	5.183E-05	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	4.697E-05	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
UT46-----K	3.004E-05	1.120E-03	MISSILE RELATED RACEWAY FAILURE
U-C31202---P	2.817E-05	3.000E-03	BKR (CONTROL) 480V 1202 FT OPEN ON DEMAND
U-C31200---N	2.817E-05	3.000E-03	BKR (CONTROL) 480V 1200 FT CLOSE ON DEMAND
D-XV303----X	2.683E-05	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
D-XV302----X	2.683E-05	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
D-CV305----P	2.683E-05	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
U-DG1----1DR	2.271E-05	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	2.271E-05	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-MXB42----V	1.502E-05	.200	OPERATOR FAILS TO OPERATE MANUAL SWITCH B42
U-BYD25--1DI	1.502E-05	2.400E-05	BATTERY D25 LOW OR NO OUTPUT SIGNAL W/I 24 H
D-MV1100C--U	1.408E-05	3.000E-03	OPS FAILS TO CLOSE MOV-1100C PER PROCEDURE

Charging System Importance Summary

F' 4 Tornado - LOOP

Top Event: DT-01-01 Top Event Probability: 2.412E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:28:20

Basic Event	F-V Importance	Event Probability	Description
UT22-----Z	.848	.740	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-DGSD--1DR	.169	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-MPG8A----U	9.753E-02	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MV1100C--V	9.261E-02	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
D-FNE908---V	9.208E-02	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
U-DGSD----V	9.204E-02	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
D-E908B30--V	9.204E-02	3.000E-02	OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 PER PROCEDURE
D-G8ADSD---V	9.204E-02	3.000E-02	OP FAILS TO CONNECT CHRG PUMP G-8A TO DSD DIESEL W/ PROC.
U-DGSD----S	7.670E-02	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
D-005051---Z	5.397E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
U-DGCC0001-R	4.009E-02	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	3.229E-02	7.788E-03	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
DTTKRWST---K	3.184E-02	7.680E-03	TORNADO INDUCED MISSILE FAILURE OF RWST
U-DG1-----S	2.958E-02	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	2.564E-02	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	2.312E-02	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DGSD----M	2.025E-02	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
U-DG1----1DR	1.782E-02	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	1.660E-02	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
UTSD-----K	1.516E-02	4.940E-03	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
D-MV1100C--Y	1.244E-02	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MV1100C--N	1.244E-02	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-FNE908---M	1.135E-02	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-MPG8A----S	9.719E-03	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MV1100B--P	9.303E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-C33011---N	9.204E-03	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
D-C21A403--N	9.204E-03	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-TC1400---J	9.204E-03	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-FNE908---S	9.204E-03	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
DTPRWST---K	7.587E-03	1.830E-03	TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST
U-IRV30-1DI	6.133E-03	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
U-DG2-----S	5.388E-03	1.200E-02	DIESEL GENERATOR 2 FT START ON DEMAND
UTWPC-----K	4.332E-03	1.410E-03	MISSILE RELATED RACEWAY FAILURE
D-MPG8B----U	4.235E-03	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
UTEPC-----K	3.399E-03	1.100E-03	MISSILE RELATED RACEWAY FAILURE
UT6306-----K	2.773E-03	8.960E-04	MISSILE RELATED RACEWAY FAILURE
D-MPG8A--1DR	2.327E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
U-BY1-----Z	2.227E-03	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
D-FNE908-1DR	2.209E-03	7.200E-04	FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
U-C212C15--U	2.074E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-T21-----K	2.073E-03	6.730E-04	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
U-C212C15--N	2.037E-03	3.000E-03	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
UT39-----K	1.654E-03	5.160E-04	MISSILE RELATED RACEWAY FAILURE
U-C211C14--U	1.648E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211A02--U	1.631E-03	3.000E-03	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C212C01--N	1.631E-03	3.000E-03	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211C01--N	1.631E-03	3.000E-03	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C211C01--U	1.631E-03	3.000E-03	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE

System-Level Basic Event Report for TNDTLF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.412E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:28:20

Basic Event	F-V Importance	Event Probability	Description
U-C212C01--U	1.631E-03	3.000E-03	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211A02--N	1.631E-03	3.000E-03	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C211C14--N	1.611E-03	3.000E-03	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	1.281E-03	3.090E-04	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
D-MS1100C--Y	1.244E-03	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MS1100C--J	1.244E-03	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
UT56-----K	1.061E-03	2.560E-04	MISSILE RELATED RACEWAY FAILURE
D-MS1100B--J	9.204E-04	3.000E-04	MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
D-MPG8B----M	5.172E-04	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
D-C211C07--N	4.194E-04	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8B----S	4.194E-04	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-CV301----P	4.146E-04	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-XV388----P	4.146E-04	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-XV425----X	4.146E-04	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV316----X	4.146E-04	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-CV306----P	3.192E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
D-MXB31----N	3.068E-04	1.000E-04	MANUAL SWITCH B31 FAILS TO CLOSE
D-MPG987-1DR	2.485E-04	8.100E-05	MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
U-T22&T23--K	1.487E-04	1.010E-03	SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
D-MV883--1DQ	9.950E-05	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	9.850E-05	7.200E-04	MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
UT22B-----K	8.924E-05	6.800E-04	MISSILE RELATED RACEWAY FAILURE
U-B21C---1DA	8.370E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
D-MV1100D--P	7.797E-05	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
U-BDD28--1DA	7.363E-05	2.400E-05	125VDC BUS D28 SHORT CIRCUIT W/I 24 H
U-T2X55--1DI	7.363E-05	2.400E-05	4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
U-B3830--1DA	7.363E-05	2.400E-05	480V BUS B30 SHORT CIRCUIT W/I 24 H
U-T11----1DI	7.363E-05	2.400E-05	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B31/1B-1DA	7.363E-05	2.400E-05	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-B31----1DA	7.363E-05	2.400E-05	480V BUS 1 SHORT CIRCUIT
U-B2A4---1DA	7.363E-05	2.400E-05	4160V BUS A4 SHORT CIRCUIT W/I 24 H
U-WRDG2--1DA	5.244E-05	7.896E-05	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
UT22D-----K	5.007E-05	3.660E-04	MISSILE RELATED RACEWAY FAILURE
UT22A-----K	5.000E-05	4.020E-04	MISSILE RELATED RACEWAY FAILURE
D-FNE909---V	4.813E-05	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
ET-CCWSYS--Z	3.783E-05	3.380E-03	MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM
UTPB56AF---K	3.756E-05	3.020E-04	MISSILE RELATED RACEWAY FAILURE
D-MV1100C--U	3.586E-05	3.000E-03	OPS FAILS TO CLOSE MOV-1100C PER PROCEDURE
PT-SWCSYS--Z	3.436E-05	3.070E-03	MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM
U-WRDG1--1DA	3.313E-05	7.896E-05	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
UT22C-----K	3.184E-05	2.560E-04	MISSILE RELATED RACEWAY FAILURE
UT46-----K	2.941E-05	1.420E-03	MISSILE RELATED RACEWAY FAILURE
U-B22C---1DA	1.594E-05	2.400E-05	4160V BUS 2C SHORT CIRCUIT W/I 24 H
U-MXB42----V	1.473E-05	.200	OPERATOR FAILS TO OPERATE MANUAL SWITCH B42
U-BYD25--1DI	1.473E-05	2.400E-05	BATTERY D25 LOW OR NO OUTPUT SIGNAL W/I 24 H
D-XV302----X	1.244E-05	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
D-CV305----P	1.244E-05	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
D-XV303----X	1.244E-05	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
U-BD1----1JA	4.602E-06	1.500E-06	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS

System-level Basic Event Report for TNDDTLF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.412E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:28:20

Basic Event	F-V Importance	Event Probability	Description
U-BY1----1JI	4.602E-06	1.500E-06	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
U-B21B---1DA	4.344E-06	2.400E-05	4160V BUS 1B SHORT CIRCUIT W/I 24 H
U-B21A---1DA	4.344E-06	2.400E-05	4160V BUS 1A SHORT CIRCUIT W/I 24 H

Charging System Importance Summary

F' 4 Tornado - PT

System-level Basic Event Report for TNDDTTF4 Data File

Top Event: DT-01-01 Top Event Probability: 2.137E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:19:23

Basic Event	F-V Importance	Event Probability	Description
UT22-----Z	.944	.740	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-DGSD--1DR	.191	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-MPG8A----U	.110	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MV1100C--V	.104	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
D-FNE908---V	.104	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
D-E908B30--V	.104	3.000E-02	OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 PER PROCEDURE
D-G8ADSD---V	.104	3.000E-02	OP FAILS TO CONNECT CHRNG PUMP G-8A TO DSD DIESEL W/ PROC.
U-DGSD----V	.104	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
U-DGSD----S	8.657E-02	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
D-005051---Z	5.667E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
DTTKRWST---K	3.594E-02	7.680E-03	TORNADO INDUCED MISSILE FAILURE OF RWST
U-DGSD----M	2.285E-02	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
UTDSD-----K	1.711E-02	4.940E-03	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
D-MV1100C--N	1.404E-02	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y	1.404E-02	1.00	OPS FAILS TO RECOVER MOV-1100C
D-FNE908---M	1.281E-02	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-MPG8A----S	1.097E-02	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-FNE908---S	1.039E-02	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-C21A403--N	1.039E-02	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-TC1400---J	1.039E-02	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-C33011---N	1.039E-02	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
DTPPRWST---K	8.564E-03	1.830E-03	TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST
D-MV1100B--P	7.433E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
U-OOSDG&E--Z	7.356E-03	.500	SDG&E LINE UNAVAILABLE
U-IRYV30-1DI	6.922E-03	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
UTWPC-----K	4.883E-03	1.410E-03	MISSILE RELATED RACEWAY FAILURE
D-MPG8B----U	4.780E-03	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
UTEPC-----K	3.832E-03	1.100E-03	MISSILE RELATED RACEWAY FAILURE
U-B32SDGE--V	2.940E-03	.200	OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
D-MPG8A--1DR	2.627E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
D-FNE908-1DR	2.493E-03	7.200E-04	FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
U-T21-----K	2.340E-03	6.730E-04	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
UT6306----K	2.209E-03	8.960E-04	MISSILE RELATED RACEWAY FAILURE
UT39-----K	1.866E-03	5.160E-04	MISSILE RELATED RACEWAY FAILURE
D-MS1100C--Y	1.404E-03	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MS1100C--J	1.404E-03	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
UT56-----K	1.198E-03	2.560E-04	MISSILE RELATED RACEWAY FAILURE
D-MS1100B--J	7.272E-04	3.000E-04	MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
D-MPG8B----M	5.838E-04	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
D-C211C07--N	4.734E-04	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8B----S	4.734E-04	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-CV301----P	4.680E-04	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-XV425----X	4.680E-04	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV316----X	4.680E-04	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-XV388----P	4.680E-04	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-CV306----P	3.603E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
D-MXB31----N	3.463E-04	1.000E-04	MANUAL SWITCH B31 FAILS TO CLOSE
D-MPG987-1DR	2.805E-04	8.100E-05	MECH DRIVEN PP G987 FAILS TO RUN 24 HRS

Top Event: DT-01-01 Top Event Probability: 2.137E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:19:23

Basic Event	F-V Importance	Event Probability	Description
D-MV883--1DQ	1.123E-04	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	1.112E-04	7.200E-04	MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
U-OOCNDLP--Z	1.073E-04	1.000E-03	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-T22&T23--K	1.063E-04	1.010E-03	SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
UT22B-----K	1.007E-04	6.800E-04	MISSILE RELATED RACEWAY FAILURE
U-BY1-----Z	9.265E-05	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-B21C---1DA	8.311E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-T2X55--1DI	8.311E-05	2.400E-05	4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
U-B2A4---1DA	8.311E-05	2.400E-05	4160V BUS A4 SHORT CIRCUIT W/I 24 H
U-T11----1DI	8.311E-05	2.400E-05	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-BDD28--1DA	8.311E-05	2.400E-05	125VDC BUS D28 SHORT CIRCUIT W/I 24 H
U-B31----1DA	8.311E-05	2.400E-05	480V BUS 1 SHORT CIRCUIT
U-B31/1B-1DA	8.311E-05	2.400E-05	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-B3B30--1DA	8.311E-05	2.400E-05	480V BUS B30 SHORT CIRCUIT W/I 24 H
D-MV1100D--P	7.958E-05	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
UT22A-----K	5.644E-05	4.020E-04	MISSILE RELATED RACEWAY FAILURE
D-FNE909---V	5.433E-05	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
UT22D-----K	5.138E-05	3.660E-04	MISSILE RELATED RACEWAY FAILURE
U-DGCC0001-R	4.526E-05	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
ET-CCWSYS--Z	4.271E-05	3.380E-03	MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM
UTPB56AF---K	4.240E-05	3.020E-04	MISSILE RELATED RACEWAY FAILURE
U-C31202---P	4.047E-05	3.000E-03	BKR (CONTROL) 480V 1202 FT OPEN ON DEMAND
U-C31200---N	4.047E-05	3.000E-03	BKR (CONTROL) 480V 1200 FT CLOSE ON DEMAND
PT-SWCSYS--Z	3.879E-05	3.070E-03	MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM
UT22C-----K	3.594E-05	2.560E-04	MISSILE RELATED RACEWAY FAILURE
UT46-----K	3.320E-05	1.420E-03	MISSILE RELATED RACEWAY FAILURE
U-DG1-----S	2.794E-05	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	2.712E-05	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	2.458E-05	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
D-MV1100C--U	2.182E-05	3.000E-03	OPS FAILS TO CLOSE MOV-1100C PER PROCEDURE
U-MXB42----V	1.662E-05	.200	OPERATOR FAILS TO OPERATE MANUAL SWITCH B42
U-BYD25--1DI	1.662E-05	2.400E-05	BATTERY D25 LOW OR NO OUTPUT SIGNAL W/I 24 H
D-XV303----X	1.404E-05	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
D-CV305----P	1.404E-05	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
D-XV302----X	1.404E-05	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
U-DG1----1DR	1.188E-05	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	1.188E-05	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:44:52

Basic Event	F-V Importance	Event Probability	Description
UT22-----Z	.875	.930	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-DGDS--1DR	.179	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-MPG8A----U	.102	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MV1100C--V	9.761E-02	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
D-FNE908---V	9.712E-02	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
U-DGDS----V	9.707E-02	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
D-E908B30--V	9.707E-02	3.000E-02	OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 PER PROCEDURE
D-G8ADSD---V	9.707E-02	3.000E-02	OP FAILS TO CONNECT CHR G PUMP G-8A TO DSD DIESEL PER PROC.
U-DGDS----S	8.089E-02	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
D-005051---Z	5.271E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
U-DGCC0001-R	3.365E-02	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
DTTKRWST---K	3.256E-02	9.360E-03	TORNADO INDUCED MISSILE FAILURE OF RWST
U-DGCC0002-S	2.710E-02	7.788E-03	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	2.552E-02	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	2.152E-02	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DGDS----M	2.136E-02	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
UTDSD-----K	1.948E-02	6.020E-03	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
U-DG2-----M	1.941E-02	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	1.562E-02	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	1.449E-02	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE
D-FNE908---M	1.197E-02	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-MV1100C--Y	1.044E-02	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MV1100C--N	1.044E-02	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MPG8A----S	1.014E-02	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-MV1100B--P	9.803E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
D-C33011---N	9.707E-03	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
D-C21A403--N	9.707E-03	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-TC1400---J	9.707E-03	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-FNE908---S	9.707E-03	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
DTPRWST---K	7.759E-03	2.230E-03	TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST
U-IRV30-1DI	6.468E-03	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
UTWPC-----K	5.578E-03	1.720E-03	MISSILE RELATED RACEWAY FAILURE
U-DG2-----S	4.522E-03	1.200E-02	DIESEL GENERATOR 2 FT START ON DEMAND
UTEPC-----K	4.367E-03	1.340E-03	MISSILE RELATED RACEWAY FAILURE
D-MPG8B----U	3.559E-03	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
U-T21-----K	2.667E-03	8.200E-04	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
D-MPG8A--1DR	2.429E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
D-FNE908-1DR	2.330E-03	7.200E-04	FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
U-BY1-----Z	2.269E-03	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
UT39-----K	2.107E-03	6.290E-04	MISSILE RELATED RACEWAY FAILURE
U-C212C15--U	1.741E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C15--N	1.709E-03	3.000E-03	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-C212C01--U	1.699E-03	3.000E-03	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211C01--U	1.699E-03	3.000E-03	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211A02--U	1.699E-03	3.000E-03	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C212C01--N	1.699E-03	3.000E-03	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211C01--N	1.699E-03	3.000E-03	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C211A02--N	1.699E-03	3.000E-03	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND

System-level Basic Event Report for TNDTLF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.874E-01
Flag Set Used: DTLOOP
This file was created on 8-21-1990 at 16:44:52

Basic Event	F-V Importance	Event Probability	Description
U-C211C14--U	1.419E-03	3.000E-03	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	1.387E-03	3.000E-03	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
UT56-----K	1.085E-03	3.120E-04	MISSILE RELATED RACEWAY FAILURE
U-C2CC0002-N	1.075E-03	3.090E-04	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
D-MS1100C--Y	1.044E-03	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MS1100C--J	1.044E-03	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MS1100B--J	9.707E-04	3.000E-04	MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
D-MPG8B----M	4.341E-04	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
UT6306-----K	3.527E-04	1.090E-04	MISSILE RELATED RACEWAY FAILURE
D-C211C07--N	3.519E-04	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8B----S	3.519E-04	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-CV301----P	3.479E-04	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-XV388----P	3.479E-04	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-XV425----X	3.479E-04	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV316----X	3.479E-04	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-CV306----P	3.340E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
D-MXB31----N	3.236E-04	1.000E-04	MANUAL SWITCH B31 FAILS TO CLOSE
D-MPG987-1DR	2.621E-04	8.100E-05	MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
U-T22&T23--K	1.543E-04	1.230E-03	SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
UT22B-----K	1.010E-04	8.360E-04	MISSILE RELATED RACEWAY FAILURE
U-B21C---1DA	8.610E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
D-MV883--1DQ	8.350E-05	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG8B--1DR	8.266E-05	7.200E-04	MTR-DRIVEN PP G8B FT RUN FOR 24 HOURS CHARGING
U-T2X55--1DI	7.765E-05	2.400E-05	4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
U-BDD28--1DA	7.765E-05	2.400E-05	125VDC BUS D28 SHORT CIRCUIT W/I 24 H
U-B31/1B-1DA	7.765E-05	2.400E-05	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-B3830--1DA	7.765E-05	2.400E-05	480V BUS B30 SHORT CIRCUIT W/I 24 H
U-T11----1DI	7.765E-05	2.400E-05	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B2A4---1DA	7.765E-05	2.400E-05	4160V BUS A4 SHORT CIRCUIT W/I 24 H
U-B31----1DA	7.765E-05	2.400E-05	480V BUS 1 SHORT CIRCUIT
D-MV1100D--P	6.012E-05	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
UT22A-----K	5.125E-05	4.910E-04	MISSILE RELATED RACEWAY FAILURE
UT22D-----K	5.121E-05	4.460E-04	MISSILE RELATED RACEWAY FAILURE
D-FNE909---V	4.929E-05	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
U-WRDG2--1DA	4.401E-05	7.896E-05	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
UTPB56AF---K	4.225E-05	3.680E-04	MISSILE RELATED RACEWAY FAILURE
ET-CCWSYS--Z	3.870E-05	4.120E-03	MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM
PT-SWCSYS--Z	3.523E-05	3.750E-03	MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM
UT46-----K	3.467E-05	1.730E-03	MISSILE RELATED RACEWAY FAILURE
UT22C-----K	3.256E-05	3.120E-04	MISSILE RELATED RACEWAY FAILURE
D-MV1100C--U	2.912E-05	3.000E-03	OPS FAILS TO CLOSE MOV-1100C PER PROCEDURE
U-WRDG1--1DA	2.780E-05	7.896E-05	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-BYD25--1DI	1.553E-05	2.400E-05	BATTERY D25 LOW OR NO OUTPUT SIGNAL W/I 24 H
U-MXB42----V	1.553E-05	.200	OPERATOR FAILS TO OPERATE MANUAL SWITCH B42
U-B22C---1DA	1.338E-05	2.400E-05	4160V BUS 2C SHORT CIRCUIT W/I 24 H
U-B21A---1DA	1.244E-05	2.400E-05	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B21B---1DA	1.244E-05	2.400E-05	4160V BUS 1B SHORT CIRCUIT W/I 24 H
D-CV305----P	1.044E-05	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
D-XV302----X	1.044E-05	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT

System-level Basic Event Report for TNDDTLF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.874E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:44:52

Basic Event	F-V Importance	Event Probability	Description
D-XV303----X	1.044E-05	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
U-BD1----1JA	4.853E-06	1.500E-06	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1----1JI	4.853E-06	1.500E-06	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS

Charging System Importance Summary

F1 5 Tornado - PT

System-level Basic Event Report for TNDTTF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.611E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:31:58

Basic Event	F-V Importance	Event Probability	Description
UT22-----Z	.951	.930	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-DGDSD--1DR	.197	5.520E-02	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
D-MPG8A----U	.112	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8A PER PROCEDURE
D-MV1100C--V	.107	3.000E-02	OPS FAILS TO CONNECT MOV-1100C TO ALT PWR SUPPLY PER PROC
D-FNE908---V	.107	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E908 (CHG G8A) PER PROC
D-E908B30--V	.107	3.000E-02	OP FAILS TO CONNECT MCC B30 TO FAN CLR E-908 PER PROCEDURE
D-G8ADSD---V	.107	3.000E-02	OP FAILS TO CONNECT CHR G PUMP G-8A TO DSD DIESEL PER PROC.
U-DGDSD----V	.107	3.000E-02	OPERATOR FAILS TO START DSD DIESEL
U-DGDSD----S	8.906E-02	2.500E-02	DIESEL GENERATOR DSD FT START ON DEMAND
D-005051---Z	5.449E-02	1.00	INADEQUATE FLOW FROM FCV-5051 TRAIN
DTTKRWST---K	3.585E-02	9.360E-03	TORNADO INDUCED MISSILE FAILURE OF RWST
U-DGDSD----M	2.351E-02	6.600E-03	DSD DIESEL DOWN DUE TO MAINTENANCE
UTDSD-----K	2.145E-02	6.020E-03	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
D-FNE908---M	1.318E-02	3.700E-03	FAN COOLER E-908 IN MAINTENANCE
D-MV1100C--N	1.149E-02	3.000E-03	MTR-OPERATED VLV MOV-1100C FT CLOSE ON DEMAND
D-MV1100C--Y	1.149E-02	1.00	OPS FAILS TO RECOVER MOV-1100C
D-MPG8A----S	1.117E-02	3.000E-03	MTR-DRIVEN PP G8A FT START ON DEMAND CHARGING
D-FNE908---S	1.069E-02	3.000E-03	FAN E908 FT START ON DEMAND CHARGING LUBE OIL
D-C21A403--N	1.069E-02	3.000E-03	BKR (CONTROL) 4160V 1A403 FT CLOSE ON DEMAND
D-TC1400---J	1.069E-02	3.000E-03	VLV TCV-1400 FAILS TO DIVERT FLOW TO L.O. COOLER
D-C33011---N	1.069E-02	3.000E-03	BKR (CONTROL) 480V 3011 FT CLOSE ON DEMAND
DTPPRWST---K	8.542E-03	2.230E-03	TORNADO INDUCED FAILURE OF PIPE SUCTION FROM RWST
D-MV1100B--P	7.636E-03	3.000E-03	MTR-OPERATED VLV MOV-1100B FT OPEN ON DEMAND
U-IRYV30-1DI	7.121E-03	1.999E-03	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
U-OOSDG&E--Z	6.169E-03	.500	SDG&E LINE UNAVAILABLE
UTWPC-----K	6.137E-03	1.720E-03	MISSILE RELATED RACEWAY FAILURE
UTEPC-----K	4.802E-03	1.340E-03	MISSILE RELATED RACEWAY FAILURE
D-MPG8B----U	3.918E-03	3.000E-02	OPERATOR FAILS TO START CHARGING PUMP G8B PERPROCEDURE
U-T21-----K	2.936E-03	8.200E-04	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
D-MPG8A--1DR	2.674E-03	7.200E-04	CHARGING PUMP G-8A FAILS TO RUN FOR 24 HOURS (MECH)
D-FNE908-1DR	2.565E-03	7.200E-04	FAN E908 FT RUN FOR 24 HOURS CHARGING LUBE OIL
U-B32SDGE--V	2.463E-03	.200	OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
UT39-----K	2.320E-03	6.290E-04	MISSILE RELATED RACEWAY FAILURE
UT56-----K	1.195E-03	3.120E-04	MISSILE RELATED RACEWAY FAILURE
D-MS1100C--Y	1.149E-03	1.00	OPER. FAILS TO RECOVER MOV-1100C MOTOR STARTER
D-MS1100C--J	1.149E-03	3.000E-04	MTR STARTER MOV-1100C FT ACTUATE ON DEMAND
D-MS1100B--J	7.481E-04	3.000E-04	MTR STARTER MOV-1100B FT ACTUATE ON DEMAND
D-MPG8B----M	4.779E-04	3.700E-03	CHRG PUMP G-8B OUT OF SERVICE FOR MAINT.
D-C211C07--N	3.875E-04	3.000E-03	BKR (CONTROL) 4160V 11C07 FT CLOSE ON DEMAND (G8B)
D-MPG8B----S	3.875E-04	3.000E-03	MTR-DRIVEN PP G8B FT START ON DEMAND CHARGING
D-XV316----X	3.830E-04	1.000E-04	MANUAL VLV CRS-316 LEFT INOP POST-MAINT
D-CV301----P	3.830E-04	1.000E-04	CHECK VALVE CRS-301 FT OPEN ON DEMAND
D-XV425----X	3.830E-04	1.000E-04	MANUAL VLV CRS-425 LEFT INOP POST-MAINT
D-XV388----P	3.830E-04	1.000E-04	MANUAL VLV VCC-388 FT OPEN ON DEMAND
D-CV306----P	3.677E-04	1.000E-04	CHECK VLV 306 FT OPEN ON DEM
D-MXB31----N	3.562E-04	1.000E-04	MANUAL SWITCH B31 FAILS TO CLOSE
D-MPG987-1DR	2.885E-04	8.100E-05	MECH DRIVEN PP G987 FAILS TO RUN 24 HRS
UT6306----K	2.718E-04	1.090E-04	MISSILE RELATED RACEWAY FAILURE

System-level Basic Event Report for TNDTTF5 Data File

Top Event: DT-01-01 Top Event Probability: 2.611E-01

Flag Set Used: DTLOOP

This file was created on 8-21-1990 at 16:31:58

Basic Event	F-V Importance	Event Probability	Description
UT22B-----K	1.112E-04	8.360E-04	MISSILE RELATED RACEWAY FAILURE
U-T22&T23--K	1.101E-04	1.230E-03	SERVICE XFMR #2 & #3 FAILURE DUE TO MISSILE IMPACT
D-MV883--1DQ	9.193E-05	2.400E-05	MTR-OPERATED VLV MOV 883 FT REM OPEN 24 H RWST OUTLET
D-MPG88--1DR	9.101E-05	7.200E-04	MTR-DRIVEN PP G88 FT RUN FOR 24 HOURS CHARGING
U-OOCNDLP--Z	9.005E-05	1.000E-03	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-B21C---1DA	8.550E-05	2.400E-05	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-BDD28--1DA	8.550E-05	2.400E-05	125VDC BUS D28 SHORT CIRCUIT W/I 24 H
U-T2X55--1DI	8.550E-05	2.400E-05	4160V-480V XFMR X55 LOW/NO OUTPUT SIGNAL W/I 24 H
U-B2A4---1DA	8.550E-05	2.400E-05	4160V BUS A4 SHORT CIRCUIT W/I 24 H
U-T11----1DI	8.550E-05	2.400E-05	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B31/1B-1DA	8.550E-05	2.400E-05	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-B31----1DA	8.550E-05	2.400E-05	480V BUS 1 SHORT CIRCUIT
U-B3B30--1DA	8.550E-05	2.400E-05	480V BUS B30 SHORT CIRCUIT W/I 24 H
U-BY1-----Z	7.584E-05	6.000E-04	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
D-MV1100D--P	5.930E-05	3.000E-03	MTR-OPERATED VLV MOV-1100D FT OPEN ON DEMAND
UT22A-----K	5.642E-05	4.910E-04	MISSILE RELATED RACEWAY FAILURE
D-FNE909---V	5.426E-05	3.000E-02	OP FT LOCAL MANUALLY START FAN CLR E909 (CHG G8B) PER PROC
UT22D-----K	5.125E-05	4.460E-04	MISSILE RELATED RACEWAY FAILURE
UTPB56AF---K	4.652E-05	3.680E-04	MISSILE RELATED RACEWAY FAILURE
ET-CCWSYS--Z	4.261E-05	4.120E-03	MISSILE RELATED FAILURE OF COMPONENT COOLING WATER SYSTEM
PT-SWCSYS--Z	3.878E-05	3.750E-03	MISSILE RELATED FAILURE OF SALT WATER COOLING SYSTEM
U-DGCC0001-R	3.704E-05	9.671E-03	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
UT22C-----K	3.585E-05	3.120E-04	MISSILE RELATED RACEWAY FAILURE
UT46-----K	3.419E-05	1.730E-03	MISSILE RELATED RACEWAY FAILURE
U-C31202---P	3.206E-05	3.000E-03	BKR (CONTROL) 480V 1202 FT OPEN ON DEMAND
U-C31200---N	3.206E-05	3.000E-03	BKR (CONTROL) 480V 1200 FT CLOSE ON DEMAND
U-DG1-----S	2.287E-05	5.900E-02	DIESEL GENERATOR 1 FT START ON DEMAND
D-MV1100C--U	2.244E-05	3.000E-03	OPS FAILS TO CLOSE MOV-1100C PER PROCEDURE
U-DG2----1DR	2.220E-05	5.520E-02	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	2.012E-05	4.600E-02	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-MXB42----V	1.710E-05	.200	OPERATOR FAILS TO OPERATE MANUAL SWITCH B42
U-BYD25--1DI	1.710E-05	2.400E-05	BATTERY D25 LOW OR NO OUTPUT SIGNAL W/I 24 H
D-XV303----X	1.149E-05	1.000E-04	MANUAL VLV VCC-303 LEFT INOP POST-MAINT
D-CV305----P	1.149E-05	1.000E-04	CHECK VLV VCC-305 FT OPEN ON DEM
D-XV302----X	1.149E-05	1.000E-04	MANUAL VLV VCC-302 LEFT INOP POST-MAINT
U-DG1----1DR	9.726E-06	5.520E-02	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	9.726E-06	4.600E-02	DIESEL GENERATOR NO. 1 IN MAINTENANCE

MSS Importance Summary

Base Case - LOOP

Basic Event	F-V Importance	Event Probability	Description
U-DGCC0001-R	.281	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.226	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.214	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2-----1DR	.178	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.161	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1-----1DR	.132	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.122	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.374E-01	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-C211C01--N	.145E-01	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C01--U	.145E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C212C15--U	.145E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C211C01--U	.145E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211A02--U	.145E-01	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C212C01--N	.145E-01	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.145E-01	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C15--N	.142E-01	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-C211C14--U	.120E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.117E-01	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	.898E-02	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
U-T11-----1DI	.698E-03	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B31/1B--1DA	.698E-03	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-BD1-----1DA	.698E-03	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-B21C---1DA	.698E-03	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
ITAVCV-76--N	.581E-03	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-78--N	.581E-03	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-79--N	.581E-03	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
ITAVCV-77--N	.581E-03	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
U-WRDG2--1DA	.382E-03	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.315E-03	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.116E-03	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.116E-03	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
U-B21A---1DA	.116E-03	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
K-ASDG1&2--U	.594E-04	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1-----1JA	.436E-04	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1-----1JI	.436E-04	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.242E-04	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.200E-04	.500E-02	LOV START SIGNAL FOR DG #1 FAILS
K-ASCC0030-I	.153E-04	.525E-03	COMMON CAUSE FAILURE -AS-I --> LOV01 AND LOV02
U-BCA-----1DI	.140E-04	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
U-BY2-----1JI	.725E-05	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-BD2-----1JA	.725E-05	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BCD-----V	.698E-05	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
U-BCB-----M	.698E-05	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
ITAVCV-77--P	.893E-07	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
ITAVCV-76--P	.893E-07	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
ITAVCV-79--P	.893E-07	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-78--P	.893E-07	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITSV85-----J	.298E-07	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND

System-level Basic Event Report for TNDITLBA Data File

Top Event: IT-01-01 Top Event Probability: 3.440E-02

This file was created on 4-13-1990 at 07:57:41

Basic Event	F-V Importance	Event Probability	Description
ITSV87-----J	.298E-07	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITSV88-----J	.298E-07	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV86-----J	.298E-07	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
U-BCB-----1D1	.167E-07	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H

MSS Importance Summary

Base Case - PT

System-level Basic Event Report for TNDITBA Data File

Top Event: IT-01-01 Top Event Probability: 2.112E-04

This file was created on 4-13-1990 at 07:55:14

Basic Event	F-V Importance	Event Probability	Description
U-OOCNDLP--Z	.164	.100E-02	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-T11----1DI	.114	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B21C---1DA	.114	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-BD1----1DA	.114	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-B31/1B-1DA	.114	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
ITAVCV-78--N	.947E-01	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-77--N	.947E-01	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
ITAVCV-76--N	.947E-01	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-79--N	.947E-01	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
U-DGCC0001-R	.458E-01	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.369E-01	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.351E-01	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.290E-01	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.262E-01	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	.215E-01	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.199E-01	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.610E-02	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-C211C01--N	.242E-02	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C211C01--U	.242E-02	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C212C01--N	.236E-02	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C212C15--U	.236E-02	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C211A02--N	.236E-02	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C01--U	.236E-02	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211A02--U	.236E-02	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C212C15--N	.232E-02	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-BCA----1DI	.228E-02	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
U-C211C14--U	.195E-02	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.191E-02	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	.146E-02	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
U-BCB-----M	.114E-02	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
U-BCD-----V	.114E-02	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
U-T1AUXC-1DI	.126E-03	.240E-04	>4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
U-WRDG2--1DA	.622E-04	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.514E-04	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-B21A---1DA	.193E-04	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.189E-04	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.189E-04	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
ITAVCV-77--P	.145E-04	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
ITAVCV-78--P	.145E-04	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-76--P	.145E-04	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
ITAVCV-79--P	.145E-04	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
U-C1MOD----P	.113E-04	.300E-02	BKR (CONTROL) >4160V MOD FT OPEN ON DEMAND
K-ASDG1&2--U	.967E-05	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1----1JA	.727E-05	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1----1JI	.727E-05	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
ITSV88-----J	.485E-05	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV87-----J	.485E-05	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITSV86-----J	.485E-05	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND

System-level Basic Event Report for TNDITTBA Data File

Top Event: IT-01-01 Top Event Probability: 2.112E-04

This file was created on 4-13-1990 at 07:55:14

Basic Event	F-V Importance	Event Probability	Description
ITSV85-----J	.485E-05	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
K-ASLOV02--I	.393E-05	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.325E-05	.500E-02	LOV START SIGNAL FOR DG #1 FAILS
U-BCB----1DI	.273E-05	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H
K-ASCC0030-I	.249E-05	.525E-03	COMMON CAUSE FAILURE -AS-I --> LOV01 AND LOV02
U-BD2----1JA	.118E-05	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2----1JI	.118E-05	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-T1MAIN-1DI	.565E-07	.240E-04	>4160V XFMR MAIN LOW/NO OUTPUT SIGNAL W/I 24 H

MSS Importance Summary

F1 1 Tornado - LOOP

System-level Basic Event Report for TNDITLFI Data File

Top Event: IT-01-01 Top Event Probability: 3.498E-02

This file was created on 4-13-1990 at 07:49:44

Basic Event	F-V Importance	Event Probability	Description
U-DGCC0001-R	.277	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.223	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.211	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2-----1DR	.175	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.158	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1-----1DR	.129	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.120	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.368E-01	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-BY1-----Z	.172E-01	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-C212C15--U	.143E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C211C01--U	.143E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211A02--U	.143E-01	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C211C01--N	.143E-01	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C01--N	.143E-01	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.143E-01	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C01--U	.143E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C212C15--N	.140E-01	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-C211C14--U	.118E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.115E-01	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	.883E-02	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
U-B31/1B-1DA	.686E-03	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-B21C---1DA	.686E-03	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-BD1---1DA	.686E-03	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-T11---1DI	.686E-03	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
ITAVCV-78--N	.572E-03	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-79--N	.572E-03	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
ITAVCV-77--N	.572E-03	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
ITAVCV-76--N	.572E-03	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
U-WRDG2--1DA	.375E-03	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.310E-03	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.114E-03	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
U-B21A---1DA	.114E-03	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.114E-03	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
K-ASDG1&2--U	.584E-04	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1---1JA	.429E-04	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1---1JI	.429E-04	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.238E-04	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.196E-04	.500E-02	LOV START SIGNAL FOR DG #1 FAILS
K-ASCC0030-I	.150E-04	.525E-03	COMMON CAUSE FAILURE -AS-I --> LOV01 AND LOV02
U-BCA---1DI	.137E-04	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
U-BD2---1JA	.713E-05	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2---1JI	.713E-05	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-BCB-----M	.686E-05	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
U-BCD-----V	.686E-05	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
ITAVCV-76--P	.878E-07	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
ITAVCV-77--P	.878E-07	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
ITAVCV-79--P	.878E-07	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-78--P	.878E-07	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND

System-level Basic Event Report for TNDITLF1 Data File

Top Event: IT-01-01 Top Event Probability: 3.498E-02

This file was created on 4-13-1990 at 07:49:44

Basic Event	F-V Importance	Event Probability	Description
ITSV88-----J	.293E-07	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV86-----J	.293E-07	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
ITSV87-----J	.293E-07	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITSV85-----J	.293E-07	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
U-T21-----K	.286E-07	.100E-08	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
UTEPC-----K	.286E-07	.100E-08	MISSILE RELATED RACEWAY FAILURE
U-BC8-----1DI	.165E-07	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H
ITHR-E25A--Z	.858E-09	.100E-08	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITHR-E25C--Z	.858E-09	.100E-08	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
ITHR-E25D--Z	.858E-09	.100E-08	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
ITMV14-----U	.858E-09	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
ITMV15-----U	.858E-09	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
ITMV16-----U	.858E-09	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
ITMV17-----U	.858E-09	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITHR-E25B--Z	.858E-09	.100E-08	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT

MSS Importance Summary

F' 1 Tornado - PT

System-level Basic Event Report for TNDITF1 Data File

Top Event: IT-01-01 Top Event Probability: 2.118E-04

This file was created on 4-13-1990 at 07:47:22

Basic Event	F-V Importance	Event Probability	Description
U-OOCNDLP--Z	.167	.100E-02	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-B21C---1DA	.113	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-BD1----1DA	.113	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-T11----1DI	.113	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B31/1B-1DA	.113	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
ITAVCV-76--N	.944E-01	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-79--N	.944E-01	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
ITAVCV-78--N	.944E-01	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-77--N	.944E-01	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
U-DGCC0001-R	.457E-01	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.368E-01	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.350E-01	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.289E-01	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2----M	.261E-01	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	.214E-01	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1----M	.199E-01	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.608E-02	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-BY1-----Z	.290E-02	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-C211C01--N	.241E-02	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C211C01--U	.241E-02	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C212C01--U	.236E-02	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C212C01--N	.236E-02	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.236E-02	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C15--U	.236E-02	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C211A02--U	.236E-02	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C212C15--N	.231E-02	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-BCA----1DI	.227E-02	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
U-C211C14--U	.195E-02	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.190E-02	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	.146E-02	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
U-BCB-----M	.113E-02	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
U-BCD-----V	.113E-02	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
U-T1AUXC-1DI	.193E-03	.240E-04	>4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
U-WRDG2--1DA	.620E-04	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.512E-04	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-B21A---1DA	.193E-04	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.188E-04	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.188E-04	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
ITAVCV-79--P	.145E-04	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-78--P	.145E-04	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-77--P	.145E-04	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
ITAVCV-76--P	.145E-04	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
U-C1MOO----P	.113E-04	.300E-02	BKR (CONTROL) >4160V MOD FT OPEN ON DEMAND
K-ASDG1&2--U	.964E-05	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BY1----1JI	.725E-05	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
U-BD1----1JA	.725E-05	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
ITSV85-----J	.483E-05	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
ITSV88-----J	.483E-05	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND

System-level Basic Event Report for TNDITTF1 Data File

Top Event: IT-01-01 Top Event Probability: 2.118E-04

This file was created on 4-13-1990 at 07:47:22

Basic Event	F-V Importance	Event Probability	Description
ITSV87-----J	.483E-05	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITSV86-----J	.483E-05	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
UTEPC-----K	.472E-05	.100E-08	MISSILE RELATED RACEWAY FAILURE
U-T21-----K	.472E-05	.100E-08	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
K-ASLOV02--I	.392E-05	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.324E-05	.500E-02	LOV START SIGNAL FOR DG #1 FAILS
U-BCB----1DI	.272E-05	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H
K-ASCC0030-I	.248E-05	.525E-03	COMMON CAUSE FAILURE -AS-I --> LOV01 AND LOV02
U-BD2----1JA	.118E-05	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2----1JI	.118E-05	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
ITHR-E25A--Z	.142E-06	.100E-08	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITMV14-----U	.142E-06	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
ITMV16-----U	.142E-06	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
ITMV17-----U	.142E-06	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITHR-E25B--Z	.142E-06	.100E-08	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT
ITHR-E25C--Z	.142E-06	.100E-08	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
ITHR-E25D--Z	.142E-06	.100E-08	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
ITMV15-----U	.142E-06	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
U-T1MAIN-1DI	.563E-07	.240E-04	>4160V XFMR MAIN LOW/NO OUTPUT SIGNAL W/I 24 H

MSS Importance Summary

F' 2 Tornado - LOOP

System-level Basic Event Report for TNDITLF2 Data File

Top Event: IT-01-01 Top Event Probability: 3.559E-02

This file was created on 4-13-1990 at 07:45:21

Basic Event	F-V Importance	Event Probability	Description
U-DGCC0001-R	.272	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.219	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.207	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2-----1DR	.172	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.155	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1-----1DR	.127	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.118	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.362E-01	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-BY1-----Z	.169E-01	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-C212C15--U	.140E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C01--U	.140E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211C01--U	.140E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211A02--U	.140E-01	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C212C01--N	.140E-01	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211C01--N	.140E-01	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C211A02--N	.140E-01	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C15--N	.138E-01	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-C211C14--U	.116E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.113E-01	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
UTEPC-----K	.967E-02	.344E-03	MISSILE RELATED RACEWAY FAILURE
U-C2CC0002-N	.868E-02	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
U-T21-----K	.593E-02	.211E-03	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
U-B21C---1DA	.674E-03	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-BD1---1DA	.674E-03	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-B31/1B-1DA	.674E-03	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-T11---1DI	.674E-03	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
ITAVCV-77--N	.562E-03	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
ITAVCV-78--N	.562E-03	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-79--N	.562E-03	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
ITAVCV-76--N	.562E-03	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITHR-E25A--Z	.531E-03	.630E-03	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITHR-E25C--Z	.531E-03	.630E-03	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
ITHR-E25D--Z	.531E-03	.630E-03	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
ITMV15-----U	.531E-03	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
ITMV17-----U	.531E-03	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITMV16-----U	.531E-03	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
ITHR-E25B--Z	.531E-03	.630E-03	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT
ITMV14-----U	.531E-03	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
U-WRDG2--1DA	.369E-03	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.305E-03	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-B21A---1DA	.112E-03	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.112E-03	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.112E-03	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
K-ASDG1&2--U	.574E-04	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1---1JA	.422E-04	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1---1JI	.422E-04	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.234E-04	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.193E-04	.500E-02	LOV START SIGNAL FOR DG #1 FAILS

System-level Basic Event Report for TNDITLF2 Data File

Top Event: IT-01-01 Top Event Probability: 3.559E-02

This file was created on 4-13-1990 at 07:45:21

Basic Event	F-V Importance	Event Probability	Description
K-ASCC0030-I	.148E-04	.525E-03	COMMON CAUSE FAILURE -AS-I --> LOV01 AND LOV02
U-BCA----1DI	.135E-04	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
U-BD2----1JA	.701E-05	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2----1JI	.701E-05	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-BCB-----M	.674E-05	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
U-BCD-----V	.674E-05	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
UTWPC-----K	.150E-05	.441E-03	MISSILE RELATED RACEWAY FAILURE
B-SYINAIR--Z	.102E-05	1.00	INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO
ITGBADV-E--K	.910E-06	.572E-04	FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES
ITAVCV-78--P	.763E-06	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-76--P	.763E-06	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
ITSV85-----J	.254E-06	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
ITSV87-----J	.254E-06	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITGBADV-W--K	.208E-06	.610E-04	FAILURE OF N2 SUPPLY FOR ADV CV-77,79 DT TORNADO MISSILES
ITAVCV-79--P	.163E-06	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-77--P	.163E-06	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
ITSV88-----J	.545E-07	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV86-----J	.545E-07	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
U-BCB----1DI	.162E-07	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H

MSS Importance Summary

F' 2 Tornado - PT

Basic Event	F-V Importance	Event Probability	Description
UTEPC-----K	.408	.344E-03	MISSILE RELATED RACEWAY FAILURE
U-T21-----K	.251	.211E-03	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
U-00CNDLP--Z	.419E-01	.100E-02	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-B31/1B-1DA	.285E-01	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-B21C----1DA	.285E-01	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-BD1----1DA	.285E-01	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-T11----1DI	.285E-01	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
ITAVCV-77--N	.237E-01	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
ITAVCV-76--N	.237E-01	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-78--N	.237E-01	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-79--N	.237E-01	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
ITMV16-----U	.224E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
ITMV15-----U	.224E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
ITHR-E25B--Z	.224E-01	.630E-03	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT
ITHR-E25A--Z	.224E-01	.630E-03	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITHR-E25D--Z	.224E-01	.630E-03	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
ITMV14-----U	.224E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
ITMV17-----U	.224E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITHR-E25C--Z	.224E-01	.630E-03	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
U-DGCC0001-R	.115E-01	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.825E-02	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.879E-02	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.728E-02	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.657E-02	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	.539E-02	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.500E-02	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.153E-02	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-BY1-----Z	.729E-03	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-C211C01--U	.606E-03	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211C01--N	.606E-03	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C15--U	.592E-03	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C01--U	.592E-03	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C212C01--N	.592E-03	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.592E-03	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C211A02--U	.592E-03	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C212C15--N	.582E-03	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-BCA----1DI	.571E-03	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
U-C211C14--U	.490E-03	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.479E-03	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	.367E-03	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
U-BCB-----M	.285E-03	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
U-BCD-----V	.285E-03	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
UTWPC-----K	.635E-04	.441E-03	MISSILE RELATED RACEWAY FAILURE
U-T1AUXC-1DI	.486E-04	.240E-04	>4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
B-SYINAIR--Z	.431E-04	1.00	INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO
ITGBADV-E--K	.384E-04	.572E-04	FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES
ITAVCV-78--P	.323E-04	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-76--P	.323E-04	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND

System-level Basic Event Report for TNDITTF2 Data File

Top Event: IT-01-01 Top Event Probability: 8.423E-04

This file was created on 4-13-1990 at 07:43:18

Basic Event	F-V Importance	Event Probability	Description
U-WRDG2--1DA	.156E-04	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.129E-04	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
ITSV87-----J	.108E-04	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITSV85-----J	.108E-04	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
ITGBADV-W--K	.878E-05	.610E-04	FAILURE OF N2 SUPPLY FOR ADV CV-77,79 DT TORNADO MISSILES
ITAVCV-79--P	.691E-05	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-77--P	.691E-05	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
U-B21A----1DA	.485E-05	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B22C----1DA	.474E-05	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
U-B21B----1DA	.474E-05	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
U-C1MOD----P	.285E-05	.300E-02	BKR (CONTROL) >4160V MOD FT OPEN ON DEMAND
K-ASDG1&2--U	.242E-05	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
ITSV88-----J	.230E-05	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV86-----J	.230E-05	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
U-B01----1JA	.182E-05	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1----1JI	.182E-05	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.987E-06	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.814E-06	.500E-02	LOV START SIGNAL FOR DG #1 FAILS
U-BCB----1DI	.684E-06	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H
K-ASCC0030-I	.623E-06	.525E-03	COMMON CAUSE FAILURE -AS-1 --> LOV01 AND LOV02
U-B02----1JA	.296E-06	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2----1JI	.296E-06	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-T1MAIN-1DI	.142E-07	.240E-04	>4160V XFMR MAIN LOW/NO OUTPUT SIGNAL W/I 24 H

MSS Importance Summary

F13 Tornado - LOOP

System-level Basic Event Report for TNDITLF3 Data File

Top Event: IT-01-01 Top Event Probability: 3.652E-02

This file was created on 4-13-1990 at 07:41:11

Basic Event	F-V Importance	Event Probability	Description
U-DGCC0001-R	.265	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.213	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.202	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2-----1DR	.168	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.151	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1-----1DR	.124	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.115	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.352E-01	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
UTEPC-----K	.239E-01	.872E-03	MISSILE RELATED RACEWAY FAILURE
U-BY1-----Z	.164E-01	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-T21-----K	.146E-01	.535E-03	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
U-C212C15--U	.137E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C01--U	.137E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211A02--U	.137E-01	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C211C01--U	.137E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211C01--N	.137E-01	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C01--N	.137E-01	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.137E-01	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C15--N	.134E-01	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-C211C14--U	.113E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.110E-01	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	.846E-02	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
ITHR-E25B--Z	.131E-02	.160E-02	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT
ITMV17-----U	.131E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITMV14-----U	.131E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
ITMV16-----U	.131E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
ITHR-E25C--Z	.131E-02	.160E-02	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
ITHR-E25A--Z	.131E-02	.160E-02	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITMV15-----U	.131E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
ITHR-E25D--Z	.131E-02	.160E-02	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
U-BD1----1DA	.657E-03	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-B21C---1DA	.657E-03	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-T11----1DI	.657E-03	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B31/1B-1DA	.657E-03	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
ITAVCV-78--N	.548E-03	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-76--N	.548E-03	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-79--N	.548E-03	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
ITAVCV-77--N	.548E-03	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
U-WRDG2--1DA	.360E-03	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.297E-03	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-B21A---1DA	.109E-03	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.109E-03	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.109E-03	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
K-ASDG1&2--U	.559E-04	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1----1JA	.411E-04	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1----1JI	.411E-04	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.228E-04	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.188E-04	.500E-02	LOV START SIGNAL FOR DG #1 FAILS

System-level Basic Event Report for TNDITLF3 Data File

Top Event: IT-01-01 Top Event Probability: 3.652E-02

This file was created on 4-13-1990 at 07:41:11

Basic Event	F-V Importance	Event Probability	Description
K-ASCC0030-I	.144E-04	.525E-03	COMMON CAUSE FAILURE -AS-1 --> LOV01 AND LOV02
U-BCA----1DI	.132E-04	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
U-BD2----1JA	.683E-05	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2----1JI	.683E-05	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-BCB-----M	.657E-05	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
U-BCD-----V	.657E-05	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
UTWPC-----K	.641E-05	.112E-02	MISSILE RELATED RACEWAY FAILURE
B-SYINAIR--Z	.505E-05	1.00	INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO
ITGBADV-E--K	.494E-05	.145E-03	FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES
ITAVCV-78--P	.164E-05	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-76--P	.164E-05	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
ITSV85-----J	.545E-06	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
ITSV87-----J	.545E-06	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITGBADV-W--K	.349E-06	.610E-04	FAILURE OF N2 SUPPLY FOR ADV CV-77,79 DT TORNADO MISSILES
ITAVCV-79--P	.275E-06	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-77--P	.275E-06	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
ITSV88-----J	.916E-07	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV86-----J	.916E-07	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
U-BCB----1DI	.158E-07	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H

MSS Importance Summary

F' 3 Tornado - PT

Basic Event	F-V Importance	Event Probability	Description
UTEPC-----K	.482	.872E-03	MISSILE RELATED RACEWAY FAILURE
U-T21-----K	.296	.535E-03	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
ITMV15-----U	.265E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
ITMV17-----U	.265E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITHR-E25A--Z	.265E-01	.160E-02	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITHR-E25B--Z	.265E-01	.160E-02	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT
ITHR-E25C--Z	.265E-01	.160E-02	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
ITHR-E25D--Z	.265E-01	.160E-02	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
ITMV14-----U	.265E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
ITMV16-----U	.265E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
U-OOCNDLP--Z	.195E-01	.100E-02	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-B31/1B-1DA	.133E-01	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-BD1----1DA	.133E-01	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-T11----1DI	.133E-01	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B21C---1DA	.133E-01	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
ITAVCV-78--N	.110E-01	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-76--N	.110E-01	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-77--N	.110E-01	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
ITAVCV-79--N	.110E-01	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
U-DGCC0001-R	.534E-02	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.430E-02	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.409E-02	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.339E-02	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.306E-02	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	.251E-02	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.233E-02	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.711E-03	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-BY1-----Z	.339E-03	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-C211C01--U	.282E-03	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211C01--N	.282E-03	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C15--U	.276E-03	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C01--U	.276E-03	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C212C01--N	.276E-03	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.276E-03	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C211A02--U	.276E-03	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C212C15--N	.271E-03	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-BCA----1DI	.266E-03	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
U-C211C14--U	.228E-03	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.223E-03	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	.171E-03	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
U-BCB-----M	.133E-03	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
U-BCD-----V	.133E-03	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
UTWPC-----K	.129E-03	.112E-02	MISSILE RELATED RACEWAY FAILURE
B-SY1NAIR--Z	.102E-03	1.00	INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO
ITGBADV-E--K	.997E-04	.145E-03	FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES
ITAVCV-78--P	.330E-04	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-76--P	.330E-04	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
U-T1AUXC-1DI	.226E-04	.240E-04	>4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H

System-level Basic Event Report for TNDITTF3 Data File

Top Event: IT-01-01 Top Event Probability: 1.810E-03

This file was created on 4-13-1990 at 07:38:37

Basic Event	F-V Importance	Event Probability	Description
ITSV85-----J	.110E-04	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
ITSV87-----J	.110E-04	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
U-WRDG2--1DA	.725E-05	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
ITGBADV-W--K	.704E-05	.610E-04	FAILURE OF N2 SUPPLY FOR ADV CV-77,79 DT TORNADO MISSILES
U-WRDG1--1DA	.600E-05	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
ITAVCV-79--P	.554E-05	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-77--P	.554E-05	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
U-B21A---1DA	.226E-05	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.220E-05	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.220E-05	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
ITSV88-----J	.185E-05	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV86-----J	.185E-05	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
U-C1MOD----P	.132E-05	.300E-02	BKR (CONTROL) >4160V MOD FT OPEN ON DEMAND
K-ASDG1&2--U	.113E-05	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1----1JA	.849E-06	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1----1JI	.849E-06	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.459E-06	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.379E-06	.500E-02	LOV START SIGNAL FOR DG #1 FAILS
U-BCB----1DI	.318E-06	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H
K-ASCC0030-I	.290E-06	.525E-03	COMMON CAUSE FAILURE -AS-1 --> LOV01 AND LOV02
U-BD2----1JA	.138E-06	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2----1JI	.138E-06	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-T1MAIN-1DI	.659E-08	.240E-04	>4160V XFMR MAIN LOW/NO OUTPUT SIGNAL W/I 24 H

MSS Importance Summary

F' 4 Tornado - LOOP

System-level Basic Event Report for TNDITLF4 Data File

Top Event: IT-01-01 Top Event Probability: 3.692E-02

This file was created on 4-13-1990 at 07:35:03

Basic Event	F-V Importance	Event Probability	Description
U-DGCC0001-R	.262	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.211	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.200	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.166	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.150	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	.123	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.114	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.349E-01	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
UTEPC-----K	.298E-01	.110E-02	MISSILE RELATED RACEWAY FAILURE
U-T21-----K	.182E-01	.673E-03	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
U-BY1-----Z	.163E-01	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-C212C15--U	.135E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C01--U	.135E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211A02--U	.135E-01	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C211C01--U	.135E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211C01--N	.135E-01	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C01--N	.135E-01	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.135E-01	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C15--N	.133E-01	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-C211C14--U	.112E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.109E-01	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	.837E-02	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
ITHR-E25B--Z	.163E-02	.201E-02	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT
ITMV17-----U	.163E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITMV14-----U	.163E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
ITMV16-----U	.163E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
ITHR-E25C--Z	.163E-02	.201E-02	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
ITHR-E25A--Z	.163E-02	.201E-02	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITMV15-----U	.163E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
ITHR-E25D--Z	.163E-02	.201E-02	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
U-BD1----1DA	.650E-03	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-B21C---1DA	.650E-03	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-T11----1DI	.650E-03	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B31/1B-1DA	.650E-03	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
ITAVCV-78--N	.542E-03	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-76--N	.542E-03	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-79--N	.542E-03	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
ITAVCV-77--N	.542E-03	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
U-WRDG2--1DA	.356E-03	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.294E-03	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-B21A---1DA	.108E-03	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.108E-03	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.108E-03	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
K-ASDG1&2--U	.553E-04	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1----1JA	.406E-04	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1----1JI	.406E-04	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.225E-04	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.186E-04	.500E-02	LOV START SIGNAL FOR DG #1 FAILS

System-level Basic Event Report for TNDITLF4 Data File

Top Event: IT-01-01 Top Event Probability: 3.692E-02

This file was created on 4-13-1990 at 07:35:03

Basic Event	F-V Importance	Event Probability	Description
K-ASCC0030-I	.142E-04	.525E-03	COMMON CAUSE FAILURE -AS-I --> LOV01 AND LOV02
U-BCA----1DI	.130E-04	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
UTWPC-----K	.943E-05	.141E-02	MISSILE RELATED RACEWAY FAILURE
B-SYINAIR--Z	.854E-05	1.00	INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO
ITGBADV-E--K	.822E-05	.183E-03	FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES
U-BD2----1JA	.676E-05	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2----1JI	.676E-05	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-BCD-----V	.650E-05	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
U-BCB-----M	.650E-05	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
ITAVCV-78--P	.216E-05	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-76--P	.216E-05	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
ITGBADV-W--K	.123E-05	.184E-03	FAILURE OF N2 SUPPLY FOR ADV CV-77,79 DT TORNADO MISSILES
ITSV85-----J	.719E-06	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
ITSV87-----J	.719E-06	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITAVCV-79--P	.321E-06	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-77--P	.321E-06	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
ITSV88-----J	.107E-06	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV86-----J	.107E-06	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
U-BCB----1DI	.156E-07	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H

MSS Importance Summary

F' 4 Tornado - PT

System-level Basic Event Report for TNDITTF4 Data File

Top Event: IT-01-01 Top Event Probability: 2.225E-03

This file was created on 4-13-1990 at 07:32:34

Basic Event	F-V Importance	Event Probability	Description
UTEPC-----K	.494	.110E-02	MISSILE RELATED RACEWAY FAILURE
U-T21-----K	.302	.673E-03	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
ITMV15-----U	.271E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
ITMV17-----U	.271E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITHR-E25A--Z	.271E-01	.201E-02	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITHR-E25B--Z	.271E-01	.201E-02	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT
ITHR-E25C--Z	.271E-01	.201E-02	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
ITHR-E25D--Z	.271E-01	.201E-02	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
ITMV14-----U	.271E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
ITMV16-----U	.271E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
U-OOCNDLP--Z	.159E-01	.100E-02	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-B31/1B-1DA	.108E-01	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-BD1-----1DA	.108E-01	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-T11-----1DI	.108E-01	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B21C---1DA	.108E-01	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
ITAVCV-78--N	.899E-02	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-76--N	.899E-02	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-77--N	.899E-02	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
ITAVCV-79--N	.899E-02	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
U-DGCC0001-R	.435E-02	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.350E-02	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.333E-02	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.276E-02	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.249E-02	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	.204E-02	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.189E-02	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.579E-03	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-BY1-----Z	.276E-03	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-C211C01--U	.230E-03	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211C01--N	.230E-03	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C15--U	.224E-03	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C01--U	.224E-03	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C212C01--N	.224E-03	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.224E-03	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C211A02--U	.224E-03	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C212C15--N	.220E-03	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-BCA----1DI	.216E-03	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
U-C211C14--U	.185E-03	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.181E-03	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
UTWPC-----K	.157E-03	.141E-02	MISSILE RELATED RACEWAY FAILURE
B-SYINAIR--Z	.142E-03	1.00	INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO
U-C2CC0002-N	.139E-03	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
ITGBADV-E--K	.136E-03	.183E-03	FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES
U-BCB-----M	.108E-03	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
U-BCD-----V	.108E-03	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
ITAVCV-78--P	.358E-04	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-76--P	.358E-04	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
ITGBADV-W--K	.204E-04	.184E-03	FAILURE OF N2 SUPPLY FOR ADV CV-77,79 DT TORNADO MISSILES

System-level Basic Event Report for TNDITTF4 Data File

Top Event: IT-01-01 Top Event Probability: 2.225E-03

This file was created on 4-13-1990 at 07:32:34

Basic Event	F-V Importance	Event Probability	Description
U-T1AUXC-1DI	.184E-04	.240E-04	>4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
ITSV85-----J	.119E-04	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
ITSV87-----J	.119E-04	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
U-WRDG2--1DA	.590E-05	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
ITAVCV-79--P	.533E-05	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-77--P	.533E-05	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
U-WRDG1--1DA	.488E-05	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-B21A---1DA	.184E-05	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.179E-05	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.179E-05	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
ITSV88-----J	.178E-05	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV86-----J	.178E-05	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
U-C1MOD-----P	.108E-05	.300E-02	BKR (CONTROL) >4160V MOD FT OPEN ON DEMAND
K-ASDG1&2--U	.918E-06	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1-----1JA	.690E-06	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1-----1JI	.690E-06	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.374E-06	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.308E-06	.500E-02	LOV START SIGNAL FOR DG #1 FAILS
U-BCB----1DI	.259E-06	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H
K-ASCC0030-I	.236E-06	.525E-03	COMMON CAUSE FAILURE -AS-I --> LOV01 AND LOV02
U-BD2-----1JA	.112E-06	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2-----1JI	.112E-06	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-T1MAIN-1DI	.536E-08	.240E-04	>4160V XFMR MAIN LOW/NO OUTPUT SIGNAL W/I 24 H

MSS Importance Summary

F' 5 Tornado - LOOP

Basic Event	F-V Importance	Event Probability	Description
U-DGCC0001-R	.259	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.209	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.198	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.164	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.148	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	.121	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.112	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
UTEPC-----K	.359E-01	.134E-02	MISSILE RELATED RACEWAY FAILURE
U-DG2-----S	.345E-01	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-T21-----K	.220E-01	.820E-03	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
U-BY1-----Z	.161E-01	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-C212C15--U	.134E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C01--U	.134E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C211A02--U	.134E-01	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
U-C211C01--U	.134E-01	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211C01--N	.134E-01	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C01--N	.134E-01	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.134E-01	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C212C15--N	.131E-01	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-C211C14--U	.110E-01	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.108E-01	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2C0002-N	.827E-02	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
ITHR-E25B--Z	.197E-02	.245E-02	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT
ITMV17-----U	.197E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITMV14-----U	.197E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
ITMV16-----U	.197E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
ITHR-E25C--Z	.197E-02	.245E-02	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
ITHR-E25A--Z	.197E-02	.245E-02	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITMV15-----U	.197E-02	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
ITHR-E25D--Z	.197E-02	.245E-02	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
U-BD1----1DA	.643E-03	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-B21C----1DA	.643E-03	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
U-T11----1DI	.643E-03	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B31/1B-1DA	.643E-03	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
ITAVCV-78--N	.536E-03	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-76--N	.536E-03	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-79--N	.536E-03	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
ITAVCV-77--N	.536E-03	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
U-WRDG2--1DA	.352E-03	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.290E-03	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
U-B21A---1DA	.107E-03	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.107E-03	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.107E-03	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
K-ASDG1&2--U	.547E-04	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1----1JA	.402E-04	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1----1JI	.402E-04	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.223E-04	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.184E-04	.500E-02	LOV START SIGNAL FOR DG #1 FAILS

System-level Basic Event Report for TNDITLF5 Data File

Top Event: IT-01-01 Top Event Probability: 3.734E-02

This file was created on 4-13-1990 at 07:30:27

Basic Event	F-V Importance	Event Probability	Description
K-ASCC0030-I	.141E-04	.525E-03	COMMON CAUSE FAILURE -AS-I --> LOV01 AND LOV02
UTWPC-----K	.131E-04	.172E-02	MISSILE RELATED RACEWAY FAILURE
U-BCA----1DI	.129E-04	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
B-SYINAIR--Z	.124E-04	1.00	INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO
ITGBADV-E--K	.120E-04	.221E-03	FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES
U-BD2----1JA	.668E-05	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2----1JI	.668E-05	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-BCD-----V	.643E-05	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
U-BCB-----M	.643E-05	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
ITAVCV-78--P	.260E-05	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-76--P	.260E-05	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
ITGBADV-W--K	.183E-05	.240E-03	FAILURE OF N2 SUPPLY FOR ADV CV-77,79 DT TORNADO MISSILES
ITSV85-----J	.867E-06	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
ITSV87-----J	.867E-06	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITAVCV-79--P	.366E-06	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-77--P	.366E-06	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
ITSV88-----J	.122E-06	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
ITSV86-----J	.122E-06	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
U-BCB----1DI	.154E-07	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H

MSS Importance Summary

F15 Tornado - PT

System-level Basic Event Report for TNDITTF5 Data File

Top Event: IT-01-01 Top Event Probability: 2.664E-03

This file was created on 4-13-1990 at 07:26:52

Basic Event	F-V Importance	Event Probability	Description
UTEPC-----K	.503	.134E-02	MISSILE RELATED RACEWAY FAILURE
U-T21-----K	.308	.820E-03	SERVICE XFMR #1 FAILURE DUE TO MISSILE IMPACT
ITMV15-----U	.276E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25B
ITMV17-----U	.276E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25D
ITHR-E25A--Z	.276E-01	.245E-02	LOSS OF REHEATER E-25A DUE TO TORNADO MISSILE IMPACT
ITHR-E25B--Z	.276E-01	.245E-02	LOSS OF REHEATER E-25B DUE TO TORNADO MISSILE IMPACT
ITHR-E25C--Z	.276E-01	.245E-02	LOSS OF REHEATER E-25C DUE TO TORNADO MISSILE IMPACT
ITHR-E25D--Z	.276E-01	.245E-02	LOSS OF REHEATER E-25D DUE TO TORNADO MISSILE IMPACT
ITMV14-----U	.276E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25A
ITMV16-----U	.276E-01	.300E-01	OPERATOR FAILS TO ISOLATE REHEATER E-25C
U-OOCNDLP--Z	.133E-01	.100E-02	CONDITIONAL LOSS OF OFFSITE POWER GIVEN TURBINE TRIP
U-831/1B-1DA	.901E-02	.240E-04	480V BUS 1/1B SHORT CIRCUIT W/I 24 H
U-BD1----1DA	.901E-02	.240E-04	120V BUS 1 SHORT CIRCUIT W/I 24 H
U-T11----1DI	.901E-02	.240E-04	>4160V STATION SERVICE XFMR #1 LOW/ NO OUTPUT W/I 24 H
U-B21C---1DA	.901E-02	.240E-04	4160V BUS 1C SHORT CIRCUIT W/I 24 H
ITAVCV-78--N	.751E-02	.200E-04	AIR-OPERATED VLV CV 78 FT CLOSE ON DEMAND
ITAVCV-76--N	.751E-02	.200E-04	AIR-OPERATED VLV CV 76 FT CLOSE ON DEMAND
ITAVCV-77--N	.751E-02	.200E-04	AIR-OPERATED VLV CV 77 FT CLOSE ON DEMAND
ITAVCV-79--N	.751E-02	.200E-04	AIR-OPERATED VLV CV 79 FT CLOSE ON DEMAND
U-DGCC0001-R	.363E-02	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGCC0002-S	.292E-02	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG1-----S	.278E-02	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DG2----1DR	.230E-02	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.208E-02	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DG1----1DR	.171E-02	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.158E-02	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
U-DG2-----S	.483E-03	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
U-BY1-----Z	.231E-03	.600E-03	BATTERY 1 FAILURE DUE TO MISSILE IMPACT
U-C211C01--U	.192E-03	.300E-02	OPS FAILS TO CLOSE BREAKER 11C01 PER PROCEDURE
U-C211C01--N	.192E-03	.300E-02	BKR (CONTROL) 4160V 11C01 FT CLOSE ON DEMAND
U-C212C15--U	.187E-03	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 12C15 PER PROCEDURE
U-C212C01--U	.187E-03	.300E-02	OPS FAILS TO CLOSE BREAKER 12C01 PER PROCEDURE
U-C212C01--N	.187E-03	.300E-02	BKR (CONTROL) 4160V 12C01 FT CLOSE ON DEMAND
U-C211A02--N	.187E-03	.300E-02	BKR (CONTROL) 4160V 11A02 FT CLOSE ON DEMAND
U-C211A02--U	.187E-03	.300E-02	OPERATOR FAILS TO CLOSE CKT BKR 11A02
UTWPC-----K	.184E-03	.172E-02	MISSILE RELATED RACEWAY FAILURE
U-C212C15--N	.184E-03	.300E-02	BKR (CONTROL) 4160V 12C15 FT CLOSE ON DEMAND
U-BCA----1DI	.180E-03	.240E-04	BATTERY CHARGER A LOW OR NO OUTPUT W/I 24 H
B-SYINAIR--Z	.174E-03	1.00	INSTRUMENT AIR SYSTEM FAILS DUE TO TORNADO
ITGBADV-E--K	.168E-03	.221E-03	FAILURE OF N2 SUPPLY TO ADV CV-76,78 DT TORNADO MISSILES
U-C211C14--U	.155E-03	.300E-02	OPERATOR FAILS TO CLOSE BREAKER 11C14 PER PROCEDURE
U-C211C14--N	.151E-03	.300E-02	BKR (CONTROL) 4160V 11C14 FT CLOSE ON DEMAND
U-C2CC0002-N	.116E-03	.309E-03	COMMON CAUSE FAILURE -C2-N --> 11C14 AND 12C15
U-BCB-----M	.901E-04	.100E-01	BATTERY CHARGER B IN TEST OR MAINTENANCE
U-BCD-----V	.901E-04	.100E-01	OPER. FAILS TO SW. 125 VDC BUS 1 TO BATTERY CHARGER B
ITAVCV-78--P	.365E-04	.600E-02	AIR-OPERATED VLV CV 78 FT OPEN ON DEMAND
ITAVCV-76--P	.365E-04	.600E-02	AIR-OPERATED VLV CV 76 FT OPEN ON DEMAND
ITGBADV-W--K	.257E-04	.240E-03	FAILURE OF N2 SUPPLY FOR ADV CV-77,79 DT TORNADO MISSILES

System-level Basic Event Report for TNDITTF5 Data File

Top Event: IT-01-01 Top Event Probability: 2.664E-03

This file was created on 4-13-1990 at 07:26:52

Basic Event	F-V Importance	Event Probability	Description
U-T1AUXC-1DI	.154E-04	.240E-04	>4160V XFMR AUX C LOW/NO OUTPUT SIGNAL W/I 24 H
ITSV85-----J	.122E-04	.200E-02	SOLENOID VALVE 85 FT ACTUATE ON DEMAND
ITSV87-----J	.122E-04	.200E-02	SOLENOID VALVE 87 FT ACTUATE ON DEMAND
ITAVCV-79--P	.513E-05	.600E-02	AIR-OPERATED VLV CV 79 FT OPEN ON DEMAND
ITAVCV-77--P	.513E-05	.600E-02	AIR-OPERATED VLV CV 77 FT OPEN ON DEMAND
U-WRDG2--1DA	.493E-05	.790E-04	CABLE WIRE FROM DG2 SHORT CIRCUIT W/I 24 H
U-WRDG1--1DA	.408E-05	.790E-04	CABLE WIRE FROM DG1 SHORT CIRCUIT W/I 24 H
ITSV86-----J	.171E-05	.200E-02	SOLENOID VALVE 86 FT ACTUATE ON DEMAND
ITSV88-----J	.171E-05	.200E-02	SOLENOID VALVE 88 FT ACTUATE ON DEMAND
U-B21A---1DA	.153E-05	.240E-04	4160V BUS 1A SHORT CIRCUIT W/I 24 H
U-B21B---1DA	.150E-05	.240E-04	4160V BUS 1B SHORT CIRCUIT W/I 24 H
U-B22C---1DA	.150E-05	.240E-04	4160V BUS 2C SHORT CIRCUIT W/I 24 H
U-C1MOD----P	.900E-06	.300E-02	BKR (CONTROL) >4160V MOD FT OPEN ON DEMAND
K-ASDG1&2--U	.766E-06	.100E-02	OPERATOR FT MANUALLY START DIESELS PER PROCEDURE
U-BD1----1JA	.577E-06	.150E-05	120V BUS 1 SHORT CIRCUIT W/I 24 HOURS
U-BY1----1JI	.577E-06	.150E-05	BATTERY 1 LOW/NO OUTPUT W/I 24 HOURS
K-ASLOV02--I	.312E-06	.500E-02	LOV START SIGNAL FOR DG #2 FAILS
K-ASLOV01--I	.257E-06	.500E-02	LOV START SIGNAL FOR DG #1 FAILS
U-BC8----1DI	.216E-06	.240E-04	BATTERY CHARGER B LOW OR NO OUTPUT W/I 24 H
K-ASCC0030-I	.197E-06	.525E-03	COMMON CAUSE FAILURE -AS-I --> LOV01 AND LOV02
U-BD2----1JA	.936E-07	.150E-05	120V BUS 2 SHORT CIRCUIT W/I 24 HOURS
U-BY2----1JI	.936E-07	.150E-05	BATTERY 2 LOW OR NO OUTPUT SIGNAL W/I 24 HOURS
U-T1MAIN-1DI	.448E-08	.240E-04	>4160V XFMR MAIN LOW/NO OUTPUT SIGNAL W/I 24 H

AFWS Importance Summary

Base Case - LOOP

Basic Event	F-V Importance	Event Probability	Description
L-XV353----V	.790	.500	OPERATOR FAILS TO OPEN MANUAL VALVE AFW-V353 W/ PROC.
U-DGSD--1DR	.427	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
U-DGCC001-R	.277	.967E-02	COMMON CAUSE FAILURE -DG-R --> 1 AND 2
U-DGSD----V	.223	.300E-01	OPERATOR FAILS TO START DSD DIESEL
U-DG1-----S	.177	.590E-01	DIESEL GENERATOR 1 FT START ON DEMAND
U-DGCC002-S	.173	.779E-02	COMMON CAUSE FAILURE -DG-S --> 1 AND 2
U-DG2----1DR	.172	.552E-01	DIESEL GENERATOR 2 FT RUN FOR 24 HOURS
U-DG2-----M	.151	.460E-01	DIESEL GENERATOR NO. 2 IN MAINTENANCE
U-DGSD----S	.135	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
L-TPG10----M	.129	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
U-DG1----1DR	.824E-01	.552E-01	DIESEL GENERATOR 1 FT RUN FOR 24 HOURS
U-DG1-----M	.808E-01	.460E-01	DIESEL GENERATOR NO. 1 IN MAINTENANCE
L-MPG10W---S	.612E-01	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
L-AV3110---P	.612E-01	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-TPG10----Y	.364E-01	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
L-TPG10----S	.364E-01	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
L-AVFCVS---W	.260E-01	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
L-MPG10W---M	.254E-01	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
U-DG2-----S	.175E-01	.120E-01	DIESEL GENERATOR 2 FT START ON DEMAND
L-SV3110---J	.167E-01	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
L-MPG10W-1DR	.120E-01	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
K-ASAFWAS--U	.781E-02	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
K-ASAFAS2--I	.781E-02	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
L-AV113----P	.578E-02	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.578E-02	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
U-DGSD----M	.560E-02	.660E-02	DSD DIESEL DOWN DUE TO MAINTENANCE

AFWS Importance Summary

Base Case - PT

System-level Basic Event Report for TNDLTTBA Data File

Top Event: LT-01-01 Top Event Probability: 4.040E-04

This file was created on 4-12-1990 at 19:03:21

Basic Event	F-V Importance	Event Probability	Description
L-TPG10----M	.611	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
L-AV3110---P	.291	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.291	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
L-TPG10----Y	.173	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
L-TPG10----S	.173	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
L-AVFCVS---W	.124	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
L-MPG10W---M	.121	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
L-SV3110---J	.792E-01	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
L-MPG10W-1DR	.570E-01	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
K-ASAFAS2--I	.371E-01	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U	.371E-01	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
L-AV2620---P	.275E-01	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
L-AV113----P	.275E-01	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW

AFWS Importance Summary

F' 1 Tornado - LOOP

System-level Basic Event Report for TNDLTLF1 Data File

Top Event: LT-01-01 Top Event Probability: 5.040E-04

This file was created on 4-12-1990 at 16:56:30

Basic Event	F-V Importance	Event Probability	Description
L-TPG10---M	.490	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
L-AV3110---P	.233	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.233	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
UTVENTBLD77Z	.198	.100E-03	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
L-TPG10---Y	.139	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
L-TPG10---S	.139	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
L-AVFCVS---W	.992E-01	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVS
L-MPG10W---M	.969E-01	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
L-SV3110---J	.635E-01	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
L-MPG10W-1DR	.457E-01	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
K-ASAFAS2--I	.298E-01	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U	.298E-01	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
L-AV113---P	.220E-01	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.220E-01	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW

AFWS Importance Summary

F1 1 Tornado - PT

System-level Basic Event Report for TNDLTF1 Data File

Top Event: LT-01-01 Top Event Probability: 5.040E-04

This file was created on 4-12-1990 at 16:53:44

Basic Event	F-V Importance	Event Probability	Description
L-TPG10----M	.490	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
L-AV3110---P	.233	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.233	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
UTVENTBLD77Z	.198	.100E-03	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
L-TPG10----Y	.139	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
L-TPG10----S	.139	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
L-AVFCVS---W	.992E-01	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVS
L-MPG10W---M	.969E-01	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
L-SV3110---J	.635E-01	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
L-MPG10W-1DR	.457E-01	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
K-ASAFAS2---I	.298E-01	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U	.298E-01	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
L-AV113----P	.220E-01	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.220E-01	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW

AFWS Importance Summary

F' 2 Tornado - LOOP

System-level Basic Event Report for TNDLTLF2 Data File

Top Event: LT-01-01 Top Event Probability: 1.569E-02

This file was created on 4-12-1990 at 17:02:42

Basic Event	F-V Importance	Event Probability	Description
UTVENTBLD77Z	.765	.120E-01	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
UTCR-ROOF63K	.547E-01	.859E-03	MISSILE RELATED RACEWAY FAILURE
UTSEB1-----K	.301E-01	.472E-03	MISSILE RELATED RACEWAY FAILURE
LTPPAFWSUPLK	.292E-01	.458E-03	AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
L-TPG10-----M	.288E-01	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
UTWPC-----K	.281E-01	.441E-03	MISSILE RELATED RACEWAY FAILURE
UTVENTBLD77K	.273E-01	.429E-03	MISSILE RELATED RACEWAY FAILURE
UTEPC-----K	.219E-01	.344E-03	MISSILE RELATED RACEWAY FAILURE
UT22-----Z	.153E-01	.550E-01	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-DGSD--1DR	.758E-02	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
L-AV3110---P	.749E-02	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.749E-02	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
L-TPG10-----S	.660E-02	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
L-TPG10-----Y	.660E-02	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
LTPPAFWFEEDK	.605E-02	.950E-04	FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
U-DGSD----V	.412E-02	.300E-01	OPERATOR FAILS TO START DSD DIESEL
L-AVFCVS---W	.319E-02	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
L-MPG10W---M	.311E-02	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
U-DGSD----S	.280E-02	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
L-SV3110---J	.204E-02	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
L-MPG10W-1DR	.147E-02	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
K-ASAFAS2--I	.956E-03	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U	.956E-03	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
U-DGSD----M	.740E-03	.660E-02	DSD DIESEL DOWN DUE TO MAINTENANCE
L-AV113----P	.707E-03	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.707E-03	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW

AFWS Importance Summary

F' 2 Tornado - PT

System-level Basic Event Report for TNDLTF2 Data File

Top Event: LT-01-01 Top Event Probability: 1.559E-02

This file was created on 4-12-1990 at 16:59:55

Basic Event	F-V Importance	Event Probability	Description
UTVENTBLD77Z	.770	.120E-01	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
UTCR-ROOF63K	.551E-01	.859E-03	MISSILE RELATED RACEWAY FAILURE
UTSEB1-----K	.303E-01	.472E-03	MISSILE RELATED RACEWAY FAILURE
LTPPAFWSUPLK	.294E-01	.458E-03	AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
UTWPC-----K	.283E-01	.441E-03	MISSILE RELATED RACEWAY FAILURE
UTVENTBLD77K	.275E-01	.429E-03	MISSILE RELATED RACEWAY FAILURE
L-TPG10-----M	.240E-01	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
UTEPC-----K	.221E-01	.344E-03	MISSILE RELATED RACEWAY FAILURE
UT22-----Z	.884E-02	.550E-01	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
L-AV3110---P	.754E-02	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.754E-02	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
U-OOSDG&E--Z	.692E-02	.500	SDG&E LINE UNAVAILABLE
LTPPAFWFEEDK	.609E-02	.950E-04	FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
L-TPG10-----Y	.518E-02	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
L-TPG10-----S	.518E-02	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
U-DGSD--1DR	.506E-02	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
L-AVFCVS---W	.321E-02	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
L-MPG10W---M	.313E-02	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
U-DGSD----V	.237E-02	.300E-01	OPERATOR FAILS TO START DSD DIESEL
L-SV3110---J	.205E-02	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
U-B32SDGE--V	.192E-02	.200	OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
L-MPG10W-1DR	.148E-02	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
U-DGSD----S	.141E-02	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
K-ASAFAS2--I	.962E-03	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U	.962E-03	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
L-AV113----P	.712E-03	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.712E-03	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW

System-level Basic Event Report for TNDLTF2 Data File

Top Event: LT-01-01 Top Event Probability: 1.559E-02

This file was created on 4-12-1990 at 16:59:55

Basic Event	F-V Importance	Event Probability	Description
UTVENTBLD77Z	.770	.120E-01	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
UTCR-ROOF63K	.551E-01	.859E-03	MISSILE RELATED RACEWAY FAILURE
UTSEB1-----K	.303E-01	.472E-03	MISSILE RELATED RACEWAY FAILURE
LTPPAFWUPLK	.294E-01	.458E-03	AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
UTWPC-----K	.283E-01	.441E-03	MISSILE RELATED RACEWAY FAILURE
UTVENTBLD77K	.275E-01	.429E-03	MISSILE RELATED RACEWAY FAILURE
L-TPG10----M	.240E-01	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
UTEPC-----K	.221E-01	.344E-03	MISSILE RELATED RACEWAY FAILURE
UT22-----Z	.884E-02	.550E-01	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
L-AV3110---P	.754E-02	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.754E-02	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
U-OOSDG&E--Z	.692E-02	.500	SDG&E LINE UNAVAILABLE
LTPPAFWFEEDK	.609E-02	.950E-04	FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
L-TPG10----Y	.518E-02	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
L-TPG10----S	.518E-02	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
U-DGSD--1DR	.506E-02	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
L-AVFCVS---W	.321E-02	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVS
L-MPG10W---M	.313E-02	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
U-DGSD----V	.237E-02	.300E-01	OPERATOR FAILS TO START DSD DIESEL
L-SV3110---J	.205E-02	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
U-832SDGE--V	.192E-02	.200	OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
L-MPG10W-1DR	.148E-02	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
U-DGSD----S	.141E-02	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
K-ASAFAS2--I	.962E-03	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U	.962E-03	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
L-AV113----P	.712E-03	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.712E-03	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW

AFWS Importance Summary

F' 3 Tornado - LOOP

System-level Basic Event Report for TNDLTLF3 Data File

Top Event: LT-01-01 Top Event Probability: 1.491E-01

This file was created on 4-16-1990 at 20:18:44

Basic Event	F-V Importance	Event Probability	Description
UTVENTBLD77Z	.939	.140	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
UT22-----Z	.154E-01	.350	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UTCR-ROOF63K	.146E-01	.218E-02	MISSILE RELATED RACEWAY FAILURE
L-TPG10----M	.115E-01	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
UTSEB1-----K	.805E-02	.120E-02	MISSILE RELATED RACEWAY FAILURE
LTPPAFWUPLK	.778E-02	.116E-02	AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
UTWPC-----K	.751E-02	.112E-02	MISSILE RELATED RACEWAY FAILURE
UTVENTBLD77K	.731E-02	.109E-02	MISSILE RELATED RACEWAY FAILURE
U-DGSD--1DR	.703E-02	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UTEPC-----K	.585E-02	.872E-03	MISSILE RELATED RACEWAY FAILURE
U-DGSD--V	.378E-02	.300E-01	OPERATOR FAILS TO START DSD DIESEL
U-DGSD--S	.309E-02	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
L-TPG10----S	.244E-02	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
L-TPG10----Y	.244E-02	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
LTPPAFWFEEDK	.162E-02	.241E-03	FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
L-AV2620---P	.851E-03	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
L-AV113----P	.851E-03	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
UTSEB3-----K	.825E-03	.291E-02	MISSILE RELATED RACEWAY FAILURE
L-MPG10W---S	.789E-03	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
L-AV3110---P	.789E-03	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
U-DGSD--M	.607E-03	.660E-02	DSD DIESEL DOWN DUE TO MAINTENANCE
UTDSD1-----K	.525E-03	.203E-02	MISSILE RELATED RACEWAY FAILURE
L-MPG10W---M	.400E-03	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
L-PC8-----J	.336E-03	.130E-02	PRESSURE CONTROLLER PC-8 FAILS
L-AVFCVS---W	.335E-03	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVS
LTPPAFWPUMPK	.313E-03	.121E-02	FAILURE OF AFW PUMP G10/G10S PIPING DUE TO TORNADO MISSILES
UTDSD-----K	.295E-03	.392E-02	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
L-MXA4S2---V	.225E-03	.300E-02	OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC.
L-C21A404--N	.225E-03	.300E-02	BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND
L-SV3110---J	.215E-03	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
L-SV2620---P	.200E-03	.100E-02	SV-2620 FAILS TO OPEN RANDOMLY
L-MPG10W-1DR	.155E-03	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
U-IRYV30-1DI	.150E-03	.200E-02	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
LTPPSUCG10WK	.140E-03	.654E-03	FAILURE OF AFW PUMP G-10W SUCTION DUE TO TORNADO MISSILES
K-ASAFAS2--I	.101E-03	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U	.101E-03	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
UTSEB2-----K	.753E-04	.581E-03	MISSILE RELATED RACEWAY FAILURE

AFWS Importance Summary

F' 3 Tornado - PT

System-level Basic Event Report for TNDLTF3 Data File

Top Event: LT-01-01 Top Event Probability: 1.483E-01

This file was created on 4-12-1990 at 16:31:31

Basic Event	F-V Importance	Event Probability	Description
UTVENTBLD77Z	.944	.140	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
UTCR-ROOF63K	.147E-01	.218E-02	MISSILE RELATED RACEWAY FAILURE
UT22-----Z	.969E-02	.350	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
L-TPG10----M	.842E-02	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
UTSEB1-----K	.809E-02	.120E-02	MISSILE RELATED RACEWAY FAILURE
LTPPAFWSUPK	.782E-02	.116E-02	AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
UTWPC-----K	.755E-02	.112E-02	MISSILE RELATED RACEWAY FAILURE
UTVENTBLD77K	.735E-02	.109E-02	MISSILE RELATED RACEWAY FAILURE
U-OOSDG&E--Z	.732E-02	.500	SDG&E LINE UNAVAILABLE
UTEPC-----K	.588E-02	.872E-03	MISSILE RELATED RACEWAY FAILURE
U-DGSD--1DR	.468E-02	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
U-B32SDGE--V	.237E-02	.200	OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
U-DGSD-----V	.233E-02	.300E-01	OPERATOR FAILS TO START DSD DIESEL
U-DGSD-----S	.188E-02	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
L-TPG10----Y	.178E-02	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
L-TPG10----S	.178E-02	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
LTPPAFWFEEDK	.162E-02	.241E-03	FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
L-MPG10W---S	.793E-03	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
L-AV3110---P	.793E-03	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-AV113----P	.543E-03	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.543E-03	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
UTSEB3-----K	.527E-03	.291E-02	MISSILE RELATED RACEWAY FAILURE
L-MPG10W---M	.402E-03	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
U-DGSD-----M	.349E-03	.660E-02	DSD DIESEL DOWN DUE TO MAINTENANCE
L-AVFCVS---W	.337E-03	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
L-SV3110---J	.216E-03	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
UTDSD1-----K	.204E-03	.203E-02	MISSILE RELATED RACEWAY FAILURE
L-MPG10W-1DR	.155E-03	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
UTDSD-----K	.148E-03	.392E-02	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
LTPPSUCG10WK	.141E-03	.654E-03	FAILURE OF AFW PUMP G-10W SUCTION DUE TO TORNADO MISSILES
L-C21A404--N	.113E-03	.300E-02	BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND
L-MXA4S2---V	.113E-03	.300E-02	OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC.
K-ASAFAS2--I	.101E-03	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U	.101E-03	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
L-PC8-----J	.847E-04	.130E-02	PRESSURE CONTROLLER PC-8 FAILS
LTPPAFWPUMPK	.788E-04	.121E-02	FAILURE OF AFW PUMP G10/G10S PIPING DUE TO TORNADO MISSILES
U-IRYV30-1DI	.755E-04	.200E-02	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H

AFWS Importance Summary

F' 4 Tornado - LOOP

System-level Basic Event Report for TNDLTLF4 Data File

Top Event: LT-01-01 Top Event Probability: 5.076E-01

This file was created on 4-12-1990 at 17:10:23

Basic Event	F-V Importance	Event Probability	Description
UTVENTBLD77Z	.985	.500	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
UT22-----Z	.966E-02	.740	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
L-TPG10----M	.671E-02	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
UTCR-ROOF63K	.540E-02	.274E-02	MISSILE RELATED RACEWAY FAILURE
U-DGSD--1DR	.424E-02	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UTSEB1-----K	.297E-02	.151E-02	MISSILE RELATED RACEWAY FAILURE
LTPPAFWSUPLK	.288E-02	.146E-02	AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
UTWPC-----K	.278E-02	.141E-02	MISSILE RELATED RACEWAY FAILURE
UTVENTBLD77K	.270E-02	.137E-02	MISSILE RELATED RACEWAY FAILURE
U-DGSD-----V	.229E-02	.300E-01	OPERATOR FAILS TO START DSD DIESEL
UTEPC-----K	.217E-02	.110E-02	MISSILE RELATED RACEWAY FAILURE
U-DGSD-----S	.191E-02	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
L-TPG10----Y	.153E-02	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
L-TPG10----S	.153E-02	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
LTPPAFWFEEDK	.599E-03	.304E-03	FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
L-AV113----P	.554E-03	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.554E-03	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
U-DGSD-----M	.460E-03	.660E-02	DSD DIESEL DOWN DUE TO MAINTENANCE
UTDSD1-----K	.436E-03	.256E-02	MISSILE RELATED RACEWAY FAILURE
UTDSD-----K	.326E-03	.494E-02	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
LTPPAFWPUMPK	.246E-03	.153E-02	FAILURE OF AFW PUMP G10/G10S PIPING DUE TO TORNADO MISSILES
L-AV3110---P	.232E-03	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.232E-03	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
L-PC8-----J	.209E-03	.130E-02	PRESSURE CONTROLLER PC-8 FAILS
L-MXA4S2---V	.171E-03	.300E-02	OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC.
L-C21A404--N	.171E-03	.300E-02	BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND
L-SV2620---P	.161E-03	.100E-02	SV-2620 FAILS TO OPEN RANDOMLY
LTPPAFWG10WK	.158E-03	.205E-02	FAILURE OF AFW PUMP G-10W PIPING DUE TO TORNADO MISSILES
UTSEB2-----K	.117E-03	.731E-03	MISSILE RELATED RACEWAY FAILURE
U-IRYV30-1DI	.114E-03	.200E-02	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
L-AVFCVS---W	.985E-04	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
L-MPG10W---M	.962E-04	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
L-SV3110---J	.630E-04	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
LTPPSUCG10WK	.519E-04	.823E-03	FAILURE OF AFW PUMP G-10W SUCTION DUE TO TORNADO MISSILES
L-MPG10W-1DR	.454E-04	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
K-ASAFAS2--I	.296E-04	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
K-ASAFWAS--U	.296E-04	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
UTSEB3-----K	.295E-04	.367E-03	MISSILE RELATED RACEWAY FAILURE

AFWS Importance Summary

F' 4 Tornado - PT

System-level Basic Event Report for TNDLTT4 Data File

Top Event: LT-01-01 Top Event Probability: 5.068E-01

This file was created on 4-12-1990 at 17:06:17

Basic Event	F-V Importance	Event Probability	Description
UTVENTBLD77Z	.987	.500	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
UT22-----Z	.640E-02	.740	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
UTCR-ROOF63K	.541E-02	.274E-02	MISSILE RELATED RACEWAY FAILURE
L-TPG10----M	.489E-02	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
U-OOSDGE--Z	.467E-02	.500	SDG&E LINE UNAVAILABLE
UTSEB1-----K	.298E-02	.151E-02	MISSILE RELATED RACEWAY FAILURE
U-DGSD--1DR	.292E-02	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
LTPPAFWSUPLK	.288E-02	.146E-02	AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
UTWPC-----K	.278E-02	.141E-02	MISSILE RELATED RACEWAY FAILURE
UTVENTBLD77K	.270E-02	.137E-02	MISSILE RELATED RACEWAY FAILURE
UTEPC-----K	.217E-02	.110E-02	MISSILE RELATED RACEWAY FAILURE
U-B32SDGE--V	.173E-02	.200	OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
U-DGSD----V	.155E-02	.300E-01	OPERATOR FAILS TO START DSD DIESEL
U-DGSD----S	.125E-02	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
L-TPG10----Y	.104E-02	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
L-TPG10----S	.104E-02	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
LTPPAFWFEEDK	.600E-03	.304E-03	FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
L-AV113----P	.360E-03	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.360E-03	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
UTDSD1-----K	.270E-03	.256E-02	MISSILE RELATED RACEWAY FAILURE
U-DGSD----M	.251E-03	.660E-02	DSD DIESEL DOWN DUE TO MAINTENANCE
L-AV3110---P	.232E-03	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.232E-03	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
UTDSD-----K	.188E-03	.494E-02	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
LTPPAFWG10WK	.159E-03	.205E-02	FAILURE OF AFW PUMP G-10W PIPING DUE TO TORNADO MISSILES
LTPPAFWPUMPK	.148E-03	.153E-02	FAILURE OF AFW PUMP G10/G10S PIPING DUE TO TORNADO MISSILES
L-PC8-----J	.126E-03	.130E-02	PRESSURE CONTROLLER PC-8 FAILS
L-AVFCVS---W	.987E-04	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVS
L-MXA4S2---V	.981E-04	.300E-02	OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC.
L-C21A404--N	.981E-04	.300E-02	BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND
L-MPG10W---M	.964E-04	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
L-SV3110---J	.631E-04	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
L-SV2620---P	.622E-04	.100E-02	SV-2620 FAILS TO OPEN RANDOMLY
LTPPSUCG10WK	.520E-04	.823E-03	FAILURE OF AFW PUMP G-10W SUCTION DUE TO TORNADO MISSILES
U-IRYV30-1D1	.467E-04	.200E-02	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
L-MPG10W-1DR	.455E-04	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
K-ASAFWAS--U	.296E-04	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
K-ASAFAS2--I	.296E-04	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
UTSEB2-----K	.295E-04	.731E-03	MISSILE RELATED RACEWAY FAILURE

AFWS Importance Summary

F-5 Tornado - LOOP

System-level Basic Event Report for TNDLTLF5 Data File

Top Event: LT-01-01 Top Event Probability: 7.941E-01

This file was created on 4-12-1990 at 17:19:08

Basic Event	F-V Importance	Event Probability	Description
UTVENTBLD77Z	.995	.790	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
UT22-----Z	.867E-02	.930	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
L-TPG10-----M	.536E-02	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
UTCR-ROOF63K	.421E-02	.334E-02	MISSILE RELATED RACEWAY FAILURE
U-DGSD--1DR	.376E-02	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UTSEB1-----K	.232E-02	.184E-02	MISSILE RELATED RACEWAY FAILURE
LTPPAFWSUPLK	.223E-02	.177E-02	AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
UTWPC-----K	.217E-02	.172E-02	MISSILE RELATED RACEWAY FAILURE
UTVENTBLD77K	.210E-02	.167E-02	MISSILE RELATED RACEWAY FAILURE
U-DGSD----V	.203E-02	.300E-01	OPERATOR FAILS TO START DSD DIESEL
U-DGSD----S	.169E-02	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
UTEPC-----K	.169E-02	.134E-02	MISSILE RELATED RACEWAY FAILURE
L-TPG10----S	.121E-02	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
L-TPG10----Y	.121E-02	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
UTSEB3-----K	.741E-03	.446E-02	MISSILE RELATED RACEWAY FAILURE
UTDSD1-----K	.463E-03	.312E-02	MISSILE RELATED RACEWAY FAILURE
LTPPAFWFEEDK	.462E-03	.367E-03	FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
L-AV2620----P	.445E-03	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
L-AV113----P	.445E-03	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
U-DGSD----M	.422E-03	.660E-02	DSD DIESEL DOWN DUE TO MAINTENANCE
UTDSD-----K	.385E-03	.602E-02	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
LTPPAFWPUMPK	.266E-03	.185E-02	FAILURE OF AFW PUMP G10/G10S PIPING DUE TO TORNADO MISSILES
L-PC8-----J	.168E-03	.130E-02	PRESSURE CONTROLLER PC-8 FAILS
L-AV3110----P	.165E-03	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.165E-03	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
L-C21A404--N	.153E-03	.300E-02	BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND
L-MXA4S2---V	.153E-03	.300E-02	OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC.
LTPPAFWG10WK	.136E-03	.248E-02	FAILURE OF AFW PUMP G-10W PIPING DUE TO TORNADO MISSILES
L-SV2620---P	.129E-03	.100E-02	SV-2620 FAILS TO OPEN RANDOMLY
UTSEB2-----K	.115E-03	.892E-03	MISSILE RELATED RACEWAY FAILURE
L-MPG10W---M	.968E-04	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
U-IRYV30-1DI	.918E-04	.200E-02	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
L-AVFCVS---W	.630E-04	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVs
L-SV3110---J	.403E-04	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
LTPPSUCG10WK	.401E-04	.996E-03	FAILURE OF AFW PUMP G-10W SUCTION DUE TO TORNADO MISSILES
L-MPG10W-1DR	.290E-04	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
K-ASAFWAS--U	.189E-04	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
K-ASAFAS2--I	.189E-04	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
L-TPG10--1DR	.155E-04	.240E-03	TURBINE DRIVEN PP AFW-G-10 FT RUN 24 HOURS-AFW
LTPPDISG10WK	.143E-04	.354E-03	DISCHARGE AND RECIRC PIPING FROM G-10W FAILS DT TORNADOS
L-RV2603---N	.129E-04	.200E-01	SPRING LOADED VLV PSV-2603 FAILS TO RECLOSE
L-PC8/113--J	.129E-04	.100E-01	PSV2603 OPENS DUE TO FAILURE OF PC8/CV113 GIVEN NSSS TRANSIE

AFWS Importance Summary

F' 5 Tornado - PT

System-level Basic Event Report for TNDLTF5 Data File

Top Event: LT-01-01 Top Event Probability: 7.936E-01

This file was created on 4-12-1990 at 17:15:32

Basic Event	F-V Importance	Event Probability	Description
UTVENTBLD77Z	.995	.790	WIND RELATED WALL FAILURE - VENT BLDG IMPACTS RACEWAYS
UT22-----Z	.580E-02	.930	WIND RELATED WALL FAILURE - 480V ROOM IMPACTS RACEWAYS
U-OOSDG&E--Z	.423E-02	.500	SDG&E LINE UNAVAILABLE
UTCR-ROOF63K	.421E-02	.334E-02	MISSILE RELATED RACEWAY FAILURE
L-TPG10----M	.389E-02	.320E-01	TURBINE DRIVEN PUMP AFW-G-10 DOWN DUE TO MAINTENANCE
U-DGSD--1DR	.260E-02	.552E-01	DIESEL GENERATOR DSD FT RUN FOR 24 HOURS
UTSEB1-----K	.232E-02	.184E-02	MISSILE RELATED RACEWAY FAILURE
LTPPAFWSUPLK	.223E-02	.177E-02	AFW SUPPLY PIPING FAILS FOR ALL AFW PUMPS DT TORNADOS
UTWPC-----K	.217E-02	.172E-02	MISSILE RELATED RACEWAY FAILURE
UTVENTBLD77K	.210E-02	.167E-02	MISSILE RELATED RACEWAY FAILURE
UTPC-----K	.169E-02	.134E-02	MISSILE RELATED RACEWAY FAILURE
U-B32SDGE--V	.158E-02	.200	OPERATOR FAILS TO ALIGN SWGR NO. 2 TO SDG&E LINE W/O PROC.
U-DGSD--V	.140E-02	.300E-01	OPERATOR FAILS TO START DSD DIESEL
U-DGSD--S	.116E-02	.250E-01	DIESEL GENERATOR DSD FT START ON DEMAND
L-TPG10----S	.840E-03	.300E-01	TURBINE DRIVEN PP AFW-G-10 FT START ON DEMAND-AFW
L-TPG10----Y	.840E-03	.240	OPERATOR FAILS TO RECOVER AFW PUMP AFW-G-10
UTSEB1-----K	.505E-03	.446E-02	MISSILE RELATED RACEWAY FAILURE
LTPPAFWFEEDK	.462E-03	.367E-03	FAILURE OF DISCHARGE PIPING TO ALL THREE SG'S DT TORNADOS
UTSD1-----K	.297E-03	.312E-02	MISSILE RELATED RACEWAY FAILURE
L-AV113----P	.285E-03	.300E-02	AIR-OPERATED VLV CV-113 FT OPEN ON DEMAND AFW
L-AV2620---P	.285E-03	.300E-02	AIR-OPERATED VLV CV-2620 FT OPEN ON DEMAND-AFW
U-DGSD--M	.218E-03	.660E-02	DSD DIESEL DOWN DUE TO MAINTENANCE
UTSD-----K	.199E-03	.602E-02	DSD DIESEL FAILURE DUE TO MISSILE IMPACT
L-AV3110---P	.165E-03	.300E-02	AIR-OPERATED VLV CV-3110 FT OPEN ON DEMAND-AFW
L-MPG10W---S	.165E-03	.300E-02	MTR-DRIVEN PUMP AFW-G-10W FT START ON DEMAND AFW
LTPPAFWPUMPK	.156E-03	.185E-02	FAILURE OF AFW PUMP G10/G10S PIPING DUE TO TORNADO MISSILES
LTPPAFWG10WK	.136E-03	.248E-02	FAILURE OF AFW PUMP G-10W PIPING DUE TO TORNADO MISSILES
L-PC8-----J	.101E-03	.130E-02	PRESSURE CONTROLLER PC-8 FAILS
L-MPG10W---M	.969E-04	.370E-02	PUMP AFW-G-10W DOWN DUE TO MAINTENANCE
L-C21A404--N	.914E-04	.300E-02	BKR (CONTROL) 4160V 1A404 FT CLOSE ON DEMAND
L-MXA4S2---P	.914E-04	.300E-02	OPER. FAILS TO OPERATE MAN. SWITCH A4S2 W/O PROC.
L-SV2620---P	.775E-04	.100E-02	SV-2620 FAILS TO OPEN RANDOMLY
L-AVFCVS---W	.630E-04	.500E-04	OPER INADVERTENTLY CLOSES AFW FLOW CONTROL VALVES-FCVS
UTSEB2-----K	.576E-04	.892E-03	MISSILE RELATED RACEWAY FAILURE
U-IRYV30-1DI	.525E-04	.200E-02	INVERTER YV30 LOW OR NO OUTPUT SIGNAL W/I 24 H
L-SV3110---J	.403E-04	.100E-02	SOLENOID VALVE SV-3110 FAILS TO DE-ACTUATE
LTPPSUCG10WK	.402E-04	.996E-03	FAILURE OF AFW PUMP G-10W SUCTION DUE TO TORNADO MISSILES
L-MPG10W-1DR	.290E-04	.720E-03	MTR-DRIVEN PP AFW-G-10W FT RUN FOR 24 HOURS AFW
K-ASAFWAS--U	.189E-04	.300E-02	OPERATOR FAILS TO MANUALLY ACTUATE AFWAS PER PROCEDURE
K-ASAFAS2--I	.189E-04	.500E-02	AFWAS 2 FAILS TO PROVIDE ACTUATION SIGNAL
LTPPDISG10WK	.143E-04	.354E-03	DISCHARGE AND RECIRC PIPING FROM G-10W FAILS DT TORNADOS