LASALLE COUNTY STATION

PROBABILISTIC RISK ASSESSMENT (PRA)

SUMMARY DOCUMENT

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PREPARED BY NES PRA GROUP

ComEd

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LaSalle COUNTY STATION

Probabilistic Risk Assessment

Summary Document

Abstract

The purpose of this document is to provide an overview of the technology of probabilistic risk assessment (PRA), and to summarize the details, results and potential applications of the LaSalle County Station PRA model. The report addresses the level one (core damage end state) portion of the LSCS PRA, which was based on the configuration of Unit 2 as of May 31, 1994. The Individual Plant Examination (IPE) report, which was submitted to the NRC in April, 1994 in response to Generic Letter 88-20 is voluminous, addressing details which are likely to be of interest only to analysts and reviewers. This document provides a concise summary of the important features and conclusion of the LSCS PRA analysis, and gives those who may wish to use the PRA a general understanding of the process and how it may be applied.

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LaSalle County Station

Probabilistic Risk Assessment

Summary Document

I. Background

A probabilistic risk assessment (PRA) is a useful tool for quantitative and qualitative evaluations of the likelihood and consequences of core damage that could conceivably result from events occurring during power plant operation. There are three levels of PRAs (Table 1), each corresponding to a different end state, and each utilizing a different set of plant models. A level 1 PRA analysis is performed to determine the frequency of core damage. The core damage for this PRA is defined as initiation of reactor fuel melting. It consists of models of the systems needed for reactor shutdown and core cooling, as well as necessary support systems. A level 2 PRA analysis has an end state of radioactive release following core damage. It begins with damage states from the level 1 model and combines them with a containment failure model and Radionuclide source term estimates. A level 3 PRA analysis has an end state that quantifies the impact of a radioactive release upon public health and safety, and accounts for site specific topography, meteorology, demographics and emergency planning actions. Typically, each level of a PRA analysis addresses the risk associated with reactor power operation, as contrasted with the risk associated with shutdown operations and outages. An effort is underway to develop a shutdown model to provide quantitative insights into the risk of various outage-related configurations. Sandia National Laboratory, under contract to the NRC, completed a level 1 and 2 PRA for LaSalle Unit 2. A summary of the Sandia PRA was submitted as the LaSalle Station Individual Plant Examination (IPE) to the NRC in April, 1994.

Approximately four person-years of effort were expended over a one and one-half year time frame to update the level 1 analysis of the Sandia LaSalle PRA done for the NRC. A level 2 analysis is in progress and expected to be complete in the second quarter of 1996. There are no plans to complete a level 3 analysis at this time.

The following equations represent the concept of PRA analyses:

Level 1:

Σ (Initiating Event Frequency x Mitigating Systems Failure Probability) = Core Damage Frequency

Level 2:

 Σ (Core Damage Frequency x Containment Failure Probability) = Radioactive Release Frequency and Source Term Magnitude

Level 3:

 Σ (Radioactive Release Frequency x Site Characteristics) = Public Health Impact

In a very simplistic manner, these equations are the basis for the calculations performed for each of the three levels of a PRA. Level 11 is build upon the level 1 analyses by including additional data. The introduced data are related to the progression of core damage. The level 3 analysis addresses the fission

products release and propagation, and their biological impact on the population . This document will address the level 1 equation only.

An initiating event is the starting point of a level 1 PRA analysis. An initiating event is defined as an event which causes a reactor trip (either directly or indirectly) or which requires an immediate plant shutdown due to technical specification or operational limits. A list of the initiating events used in the LSCS PRA is provided in Table 2.

Table 1
PRA Model Levels

PRA LEVEL	END STATE	MODEL
1	CORE DAMAGE	REACTOR SHUTDOWN, CORE COOLING AND SUPPORT SYSTEMS
2	RADIOACTIVE RELEASE	ABOVE + CONTAINMENT
3	PUBLIC HEALTH IMPACT	ABOVE + SITE CHARACTERISTICS

The LSCS level 1 PRA addresses internal events and loss of offsite power. It does not address external events such as fires, earthquakes, hurricanes and external flooding. These events were analyzed in the Sandia PRA for LaSalle and no additional effort in this area is contemplated.

The mitigating systems referred to in the level 1 equation are those which shut down the reactor and provide core cooling to prevent overheating and ultimately melting of the fuel. Any support systems that are necessary for the front-line systems are also included within the level 1 scope. A list of the systems modeled in the level 1 analysis is provided in Table 3.

The level 1 equation uses the initiating event frequencies and, the failure probabilities of the systems required to mitigate these initiating events to estimate the overall core damage frequency per year. The basic concept of a level 1 PRA is simple. However, the large number of initiating events, systems, components, and human interactions associated with a nuclear plant operation and maintenance, make the performance of a PRA analysis complex.

The LSCS PRA model is maintained on personal computers. It will be updated periodically to reflect plant modifications, procedure changes, and the plant-specific failure data for major plant components. The current PRA model represents the core damage frequency for LSCS unit 2. The model reflects the plant configuration for Unit 2, as of May 31, 1994, and its dependencies on unit 1.

Table 2 LSCS Initiating Events and Frequencies

DESCRIPTION	FREQUENCY (per reactor-year
Transients	(see Note 1)
Turbine Trip With Main Condenser Available	12.4
Turbine Trip With Main Condenser Unavailable	8.1E-01
Total Loss of Feedwater	2.8E-01
Single Unit Loss of Offsite Power (LOOP)	5.3E-02
Dual Unit LOOP	1.6E-02
Inadvertently Open Relief Valve	5.3E-02
Total MSIV Closure	4.7E-01
Loss of Instrument Air	5.3E-02
Special Initiators	
Loss of 125 VDC (single bus)	2.63E-04 (see Note 2)
Loss of 125 VDC (double bus)	2.63E-05 (see Note 2)
Loss of 4160 VAC (single bus)	2.63E-04 (see Note 2)
Flooding Scenario - Service Water Piping Rupture, Ground Floor (El. 711') or Main Floor (El. 761') of Reactor Building	2.0E-04 (see Note 3)
OCA's	(see Note 1)
Large Break LOCA	3.0E-04
Medium Break LOCA	8.0E-04
Small Break LOCA	3.0E-03

The Transient and LOCA initiating event frequencies are documented in the following report: ComEd Nuclear Engineering Services, PRA Group, "LaSalle County Station Initiating Event Frequency Analysis," Revision 0, dated June 6, 1995.

The values chosen are based on site-specific and generic data. For consistency, two digits are given for all initiating event frequencies, although the second digit is significant only for the first transient listed. The Dual Unit LOOP frequency has units of "per site-year" rather than "per reactor-year."

- The initiating event frequency for loss of a single AC bus or a single DC bus is based on the quantification of a fault tree representing single bus failure modes. For a double DC bus failure, the value is the single bus frequency multiplied by 0.1 (Beta factor).
- Flooding scenario initiating event frequencies for the two different Reactor Building locations are documented in the following

ComEd Nuclear Engineering Services, PRA Group, "LaSalle County Station Internal Flooding Review," Revision 0, dated August 28, 1995.

The flooding scenario initiating event frequency given in the table above is the sum of the initiating event frequencies for the two locations times a factor of 0.76, the average fraction of time that the LaSalle units were critical during the PRA Baseline period. This factor converts the internal flooding frequency to a "per reactor-year" basis, and is documented in the following memorandum: R.H. Johnson memorandum to M. Kalache, "Additional Data for LaSalle PRA," dated 9/7/95.

Table 3

List of Systems Modeled in LaSalle PRA.

DESCRIPTION	SYSTEM
High Pressure Core Spray	HPCS
Reactor Core Isolation Cooling	RCIC
Main Feedwater (Motor Driven Pump)	MFW
Control Rod Drive	CRD
Automatic Depressurization System	ADS
Low Pressure Core Spray	LPCS
Low Pressure Core Injection Mode of RHR	LPCI (RHR)
Condensate/Condensate Booster/Hotwell Makeup	CDS
Shutdown Cooling Mode of RHR	SDC (RHR)
Suppression Pool Cooling Mode of RHR	SPC (RHR)
Containment Spray System Mode of RHR	CSS (RHR)
Containment Vent	VO
AC Power Distribution/Diesel Generators	AC POWER
125/250Vdc Power Dist./Batteries/Chargers	DC POWER
Diesel Generator Ventilation	DG HVAC
Turbine Building Closed Cooling Water	TBCCW
Reactor Building Closed Cooling Water	RBCCW
Plant Service Water	PSW
Service Air/Instrument Air	SA/IA
Drywell Pneumatic System	DPS
RHR Service Water/DG Cooling Water/Equipment Room Cooling	CSCS
Standby Liquid Control	SBLC
Reactor Protection/Alternate Rod Insertion	RPS/ARI
	KF5/AKI

II. Model Structure

The LSCS PRA level 1 model consists of three basic components: event trees, fault trees and failure data. The actual logical structure of the PRA model is created in the event trees and fault trees.

Event Trees

Event trees are used to create the sequence of events which must occur to result in a core damage event. They are roughly equivalent to the training scenario sequences that are used to train the operators on the plant simulator. The event tree is structured to describe all of the critical safety functions which must be satisfied to protect the core. The safety functions for LSCS are:

- Reactor subcriticality
- Containment pressure suppression
- Reactor coolant boundary integrity
- Core inventory makeup
- Core heat removal
- Containment heat removal

Before each event tree in the PRA model could be used as the basis for processing the probabilistic and frequency information, "success" and "failure" definitions were defined for each event. The definitions of these "success criteria" were determined from the past safety analyses or from the results of specific analyses performed to support the PRA. Timing studies using thermal-hydraulic computer models were performed to determine estimated accident response times and to confirm success criteria. In addition, discussions were held with operations personnel to verify the validity of the proposed events. When event tree construction was complete, the end point for each possible event tree sequence was defined as a core damage, or non-core damage plant state.

The event trees are shown in Appendix A.

The following brief discussion of the Large LOCA event tree is expected to help the reviewers to understand the logical structure of all event trees shown in Appendix A.

First, the initiating event, large LOCA (LLOCA) is defined as any rupture of the primary coolant system boundary large enough to cause the reactor vessel to depressurize to the point that the low pressure injection systems will be able to provide makeup shortly after break initiation and in time to prevent core damage.

LLOCA, and necessary mitigating functions are displayed across the top of the event tree diagram (Appendix A). An upward branch on the event tree means success of the particular function, while a downward branch indicates a failure.

During a LLOCA, core damage can occur when vapor suppression (VSP), reactivity control (RC), or all large volume injection sources fail (HPCS and LPCI-LPCS).

The LSCS event trees are briefly described in the following paragraphs:

Transient Event Trees

The general transient event trees are developed to evaluate the plant response to a given transient initiator group. The LSCS-specific transient event trees are:

 General transient tree for sequences in which there is a successful scram, primary system pressure boundary remains intact, off-site power remains available, but with the condenser unavailable;

- Transient tree for sequences in which there is a successful scram, primary system
 pressure boundary remains intact, condenser available, and off-site power available;
- Event tree for sequences initiated by (or resulting in) a stuck-open safety relief valve with successful scram and off-site power available;
- Event tree for single unit loss of off-site power (LOOP) and dual unit loss of off-site power (DLOOP) with successful scram.
- Three ATWS event trees for transient or small LOCA sequences in which there is a failure of RPS and ARI to complete an automatic scram.

By using sequence transfers between trees, and evaluating each initiator individually, these event tree structures can be used to represent all postulated transient sequences.

LOCA Event Trees

The LOCA event trees are developed to examine the plant response to each LOCA initiating event category:

- Event tree for Large LOCA (LLOCA).
- Event tree for Medium LOCA (MLOCA).
- Event tree for Small LOCA (SLOCA).

Flooding Event Tree

One event tree was also developed for internal flooding events. This event tree was derived from a modified transient event tree to include the effects of flood specific source/location. The flood initiator is derived from some pipe ruptures that have impact on safety systems. Those ruptures are postulated in one of the following areas: The ground and the main floors of the Reactor Building, the Cable Spreading Room in the Auxiliary Building, and the Service Water Intake Structure.

Fault Trees

Fault trees are used to model functions specified in the event trees, and typically represent the logic associated with failure of a system or combinations of systems (such as HPCS and RCIC for loss of high pressure injection). An example of a portion of the fault tree associated with the Low Pressure Core Spray (LPCS) function is provided in Appendix B.

This fault tree represents the combination of events causing a failure of the Low Pressure Core Spray system. Fault trees are made up of gates and basic events. A gate represents the logical combination of component and operator failures that will prevent successful operation of the system. Two types of gates are used for the LSCS PRA model: 1) OR gates, which are used when any of the inputs to the gate cause the defined failure; and 2) AND gates, which are used when all the inputs to the gate are required to cause the defined failure. As shown in Appendix B, gates are linked together to form the logic that defines the failure combinations that will result in occurrence of the "top event". A basic event is represented on the fault tree as a box with a circle beneath it. A basic event can represent a component failure probability, a component test and maintenance unavailability, an initiating event frequency or a human error

probability. The basic events represent the lowest level of detail in the model. Once the fault tree is developed down to the level of a basic event, probability data must be input to the model.

III. Data

There are four basic data types used in the LaSalle Station PRA model:

- · Component failure data,
- · Initiating event data,
- · Component test and maintenance unavailability data, and
- Human reliability data.

These data can be acquired from plant-specific information, or from generic industry data. Generic data can be obtained from various industry publications, such as other PRAs, NUREGs and IEEE-500, or from a combination of the sources. Generic data may be based on expert opinions for rare events, such as large LOCA's. Plant-specific data is preferred over generic data because it will reflect the plant's current design and operating and maintenance history.

Component Failure/Unavailability Data

Component performance is modeled in the fault trees as a total failure probability. This total failure probability is computed using the following equation:

$$\left(\frac{Run\ Failures}{Run\ Time}\ (Mission\ Time) + \frac{Start\ Failures}{Demands}\right) = Total\ Failure\ Probability$$

Figure 1 provides a diagram showing data sources and indicates how the data has been used to give the failure and unavailability data.

- Failure information: The number of failures was determined from a review of equipment failure records (LER/DVR and PIF Records), and work history records (TJM).
- Component Operating Hours: For most components the operating hours were estimated from component breaker hour meter logs kept by System Engineering. For the Diesel Generators the operating hours were obtained from the EDG computerized start log on the IBM Mainframe.
- Component Demands: Estimated using surveillance and preventive maintenance testing requirements.
- Component Unavailability Hours: Estimates of unavailability time were made using TJM records.

The components with plant-specific failure data are listed in Table 4. All other component failure data is based on generic estimates.

The component failure data is also used to determine the probability of common cause failures, that is, failures of multiple similar components due to a single fault. An example might be a common cause failure of all three RHR pumps to start due to a faulty maintenance activity that was performed on each pump. Although such failures are much less likely, they are very important because of their ability to disable redundant trains of mitigating or support systems. To determine the probability of multiple failures due to a common cause, a term called a Beta Factor is calculated and then multiplied by the single component failure probability to arrive at the desired result.

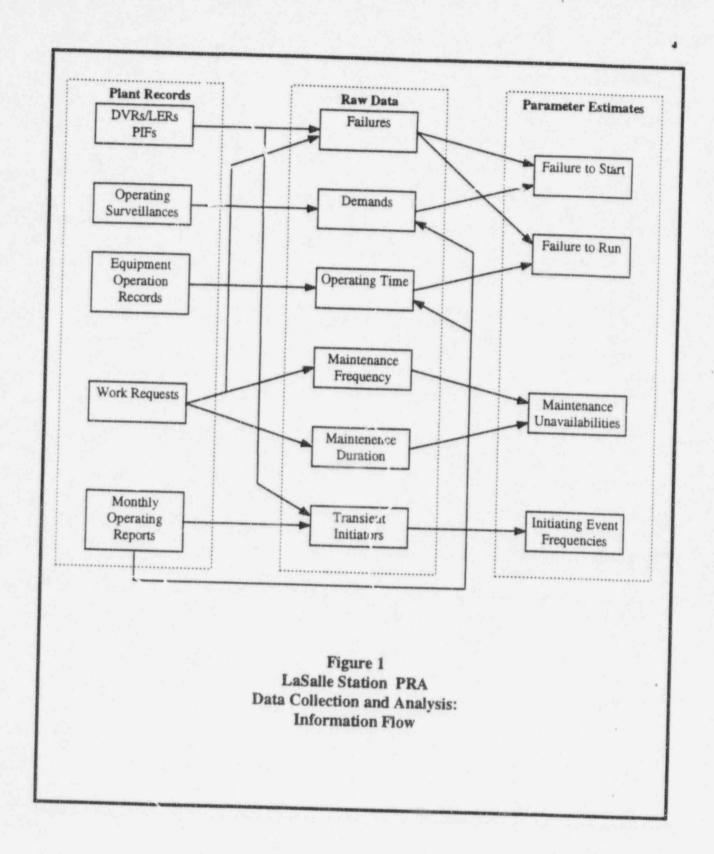


Table 4 Plant-Specific Failure Data				
Component	Failure Probability	Unavailability Probability		
Condensate/Condensate Booster Pumps	2.63E-03	7.93E-03		
Diesel Generators (0, 1A, and 2A)	2.53E-02	5.23E-02		
Diesel Generator Cooling Water Pumps (0,1A, and 2A)	3.97E-03	3.61E-04		
Feed Water Regulating Valves	1.52E-02	7.88E-04		
Motor Driven Reactor Feed Water Pumps	3.40E-03	9.22F -03		
High Pressure Low Pressure Core Spring Pumps	5.89E-02	3.44E-04		
Diesel Generators (1B and 2B)	1.29E-02	1.89E-02		
Diesel Generator Cooling Water Pumps (1B and 2B)	1.13E-02	2.22E-05		
Low Pressure Low Pressure Core Spray Pump	2.67E-02	2.83E-04		
Control Rod Drive Pump	1.67E-03	2.30E-03		
Residual Heat Removal Heat Exchangers	3.13E-03	4.44E-04		
Residual Heat Removal Pumps	2.48E-03	3.14E-03		
Residual Heat Removal Service Water Pumps	2.67E-03	1.64E-03		
Reactor Core Isolation Cooling	2.97E-01	2.32E-03		
Station Air Compressors	5.30E-03	7.44E-03		
Standby Liquid Control Pumps	2.97E-02	3.69E-04		
leactor Building Closed Cooling Water Heat Exchangers	3.63E-03	8.33E-03		
Reactor Building Closed Cooling Water Pumps	3.63E-03	2.53E-03		
tation Service Water Pumps	1.46E-03	7.68E-03		
urbine Building Closed Cooling Water Heat Exchangers	4.56E-03	4.58E-04		
urbine Building Closed Cooling Water Pumps	9.03E-03	4.36E-04		

Initiating Event Data

Initiating event frequency data are either generic or plant-specific. The frequency of initiating events which are relatively common, such as unplanned reactor trips, or losses of main feedwater can be readily calculated for LSCS based on the plant's operating history. For less frequent events, such as loss of offsite power, generic industry data can be used, supplemented with plant-specific information if available. For rare events, such as large LOCA's, expert opinion found in various publications is used. For those initiating events which are dependent upon plant component configurations and failure data, such as loss of service water, fault tree analysis techniques are used to evaluate the likelihood of the event using generic component data and plant-specific data, when available.

Human Reliability Data

Human error probabilities are the least certain of all PRA data. Quantification of human error is accomplished by performing a human reliability analysis (HRA) for each operator action identified in the event trees and fault trees. For each action, the HRA analyst documents the conditions under which the action may have to be performed, including the operator stress at the time of the action, the environment in which the action is performed (for local actions only), the complexity of the action, the procedural guidance available, the cues which inform the operator that the action is required, whether there is conflict experienced in performing the action and the time available to perform the action. This

information is factored into the methodology for calculating a failure probability. Interviews and simulator observations are conducted, when possible, to verify the results of this analysis.

In addition to operator actions, the probabilities of maintenance, calibration, and restoration errors, occurring prior to the event, are similarly estimated.

IV. Model Maintenance

The LSCS PRA model is maintained on a personal computer using an EPRI-developed software package called CAFTA, or Computer Assisted Fault Tree Analysis. The model can be readily manipulated to evaluate risk impact or individual system reliability due to modifications, procedure changes, or equipment status. The model will be periodically updated to reflect the current plant configuration and the accumulation of additional plant operating history and component failure data.

A second software package called RMQS, or Risk Management Query System is used to display and evaluate the results of the LSCS PRA. Various report features of RMQS are used to document the LSCS PRA.

A third software package called EOOSPRA (Equipment Out Of Service Plant Risk Analyzer) is an on-line Risk Monitor used to evaluate changing plant configurations. This tool will be used to evaluate past, day-to-day, and future (planned) plant configuration changes (failures, maintenance, modifications) with respect to their impact on risk (core damage frequency). It is capable of performing instantaneous as well as integrated risk calculations for specific configurations or for trending purposes.

V. Quantification

Quantification is the process of evaluating the event trees and fault trees using the component and human reliability data to determine the various sequences of events which can lead to core damage, and to calculate the frequency at which they are expected to occur. The event trees and fault trees are linked together to represent each accident sequence to be evaluated and, using basic event data, the model is quantified. The CAFTA computer code is used to quantify the several thousand gates and basic events of the LSCS PRA model.

The output of the quantification process consists of the combinations of all sets of basic events relating to the event sequences which will cause a core damage accident. These combinations of the minimum numbers of failures leading to core damage are called <u>cutsets</u>. The numerical value of a cutset consists of the product of an initiating event frequency and the failure probabilities of the basic events which define the sequence. Because of the number of initiating events and the numerous combinations of event tree branches that are represented by fault trees, the total number of cutsets that could cause a core damage event could conceivably be in the millions, given the level of detail to which system failures are modeled. For this reason, a truncation frequency, or cutoff point, of 1 x 10⁻¹¹ per year is chosen, and only cutsets with a frequency of occurrence above this value are calculated as part of the core damage frequency and are loaded into the RMQS and EOOSPRA software.

Any operator action which is considered to be part of the planned response to emergency conditions is incorporated into the model. Credit is only taken if an action is addressed in appropriate abnormal or emergency operating procedures.

VI. General Results

Core Damage Frequency

The total core damage frequency (CDF) at LSCS is calculated to be 1.0 x 10⁻⁵ per year. This is below the NRC's published safety goal of 1 x 10⁻⁴ per year. Typical BWR CDFs are in the range of 10⁻⁶ - 10⁻⁵ per year, with a few outlier plants on either end of this range. The CDF for LSCS is neither exceptionally low nor high. The CDF value must be understood within a specific context. The many assumptions made to facilitate the analysis, the various sources of data, choices made as to what failure modes to model, as well as the subjective nature of HRA and the uncertainties associated with the data for each part of the model, all affect to varying degrees the CDF value. The overall CDF should be viewed as an "order of magnitude" estimate. CDF's from other plants, in reality, cannot be directly compared to LSCS, since different data and analysis techniques may have been applied. Thus a plant with a CDF of 5 x 10⁻⁶ per year or 2 x10⁻⁵ per year cannot be said to be significantly more or less safe, respectively, than LSCS. Further, the level 1 analysis does not evaluate the performance of containment systems in preventing the release of radioactive fission products to the environment after a postulated core damaging event occurs. This is considered in the level 2 evaluation.

Although much attention is given to the overall CDF, the most valuable information of a PRA is found in the <u>relative importance</u> of systems, components, human interactions and initiating events to the risk of core damage. These relative importance values provide a basis for prioritization of resources applied to the operation, maintenance and design of a nuclear power plant.

Core Damage Sequences:

A list of the 100 top core damage sequence cutsets is provided in Table 1 in the Appendix C. These cutsets are presented in order of descending frequency per year and their percent contribution to the overall core damage frequency. The sequence names reflect the order of those sequences in the appropriate event trees.

Initiating Event Importance:

The pie chart shown in Figure 2 shows the relative contributions of the individual initiating events to LSCS core damage frequency.

Transients with loss of instrument air, (T11), are the largest initiating event category, contributing 32% of the CDF. These transients are significant because venting containment cannot be performed without instrument air. Failure to vent results in the loss of the ADS function (and subsequent loss of the low pressure injection systems) and eventual containment failure, causing potential loss of injection systems in the reactor building due to severe environments.

Loss of offsite power, LOSP, events are the second highest contributor to CDF. Single unit LOSP events contribute 6.5% of CDF and dual unit LOSP events contribute 22.9%. If AC power can be restored to the emergency buses by the diese! generators or crossties, then the plant response is similar to transient events. If both diesel generators or the crossties accome unavailable, the unit is considered to be in a station blackout sequence. The core damage concribution of those SBO sequences (subset of LOSP) is 17.2%.

The SBO sequences involve:

- Successful scram following a loss of offsite power.
- Failure of the emergency diesel generators to function.

Safe shutdown of unit(1) is assumed.

To prevent battery depletion, at least one emergency bus must be recovered within 3 hours (without operator action to shed loads).

Losses (failures) of A. or DC emergency buses contribute 11% of the CDF. These events are significant because of the unavailability of those systems powered by the failed bus(es).

Turbine/generator trips, with or without bypass valves, and MSIV closure events contribute 8%, 7%, and 4% of the CDF, respectively. These events are significant because of their relatively high frequency of occurrence or the loss of the main condenser as a heat sink, which results in a larger reliance on the availability of the RHR system to remove decay heat.

Stuck open (or inadvertently open) safety/relief valve events contribute 4% of the CDF. These events are significant because of the continuous loss of vessel inventory and the accelerated heatup of the suppression pool.

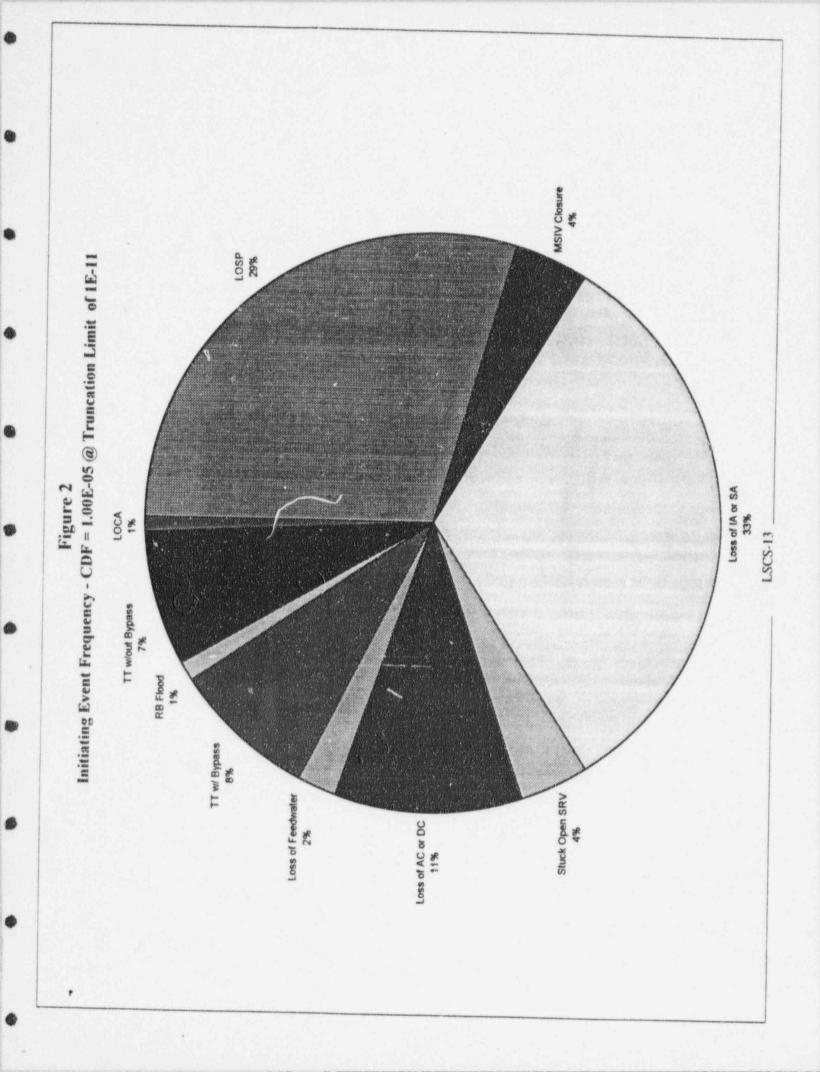
LOCA's and other transients each contribute smaller amounts to the CDF.

System Importance:

The bar chart shown in Figure 3 gives the relative importance of the various systems to core damage risk. This chart can be used in determining where resources can be effectively applied to improve plant safety. The chart shows the relative ranking of the systems modeled in the PRA based on the increase in CDF which occur if the system were unavailable (i.e., it always fails), which is referred to as its Risk Achievement Worth (RAW). The chart demonstrates the importance of the diesel generator cooling water pumps, which maintain the operability of not only the diesels, but also various injection and decay heat removal systems via room cooling. High pressure injection from HPCS or RCIC is important for main training core coverage after plant transients. The PRA results illustrate that support systems such as AC and DC power and instrument air are important to core damage risk because they are required for the successful operation of several mitigating functions. The diesel-driven firewater pumps (FPS) are important because they could be the only low pressure injection source available during a station blackout event. RHR pumps are used for containment cooling, reflecting the importance of decay heat removal.

Component Importance:

Table 5a lists the LSCS components in order of their importance to core damage risk based on their RAW value. On a system level, component importance is used to prioritize design, maintenance, surveillance, and training activities. Table 5b lists the LSCS components in order of their importance to core damage risk based on their Fussell-Vesely importance, that is, the reduction in CDF which would occur if the component never failed.



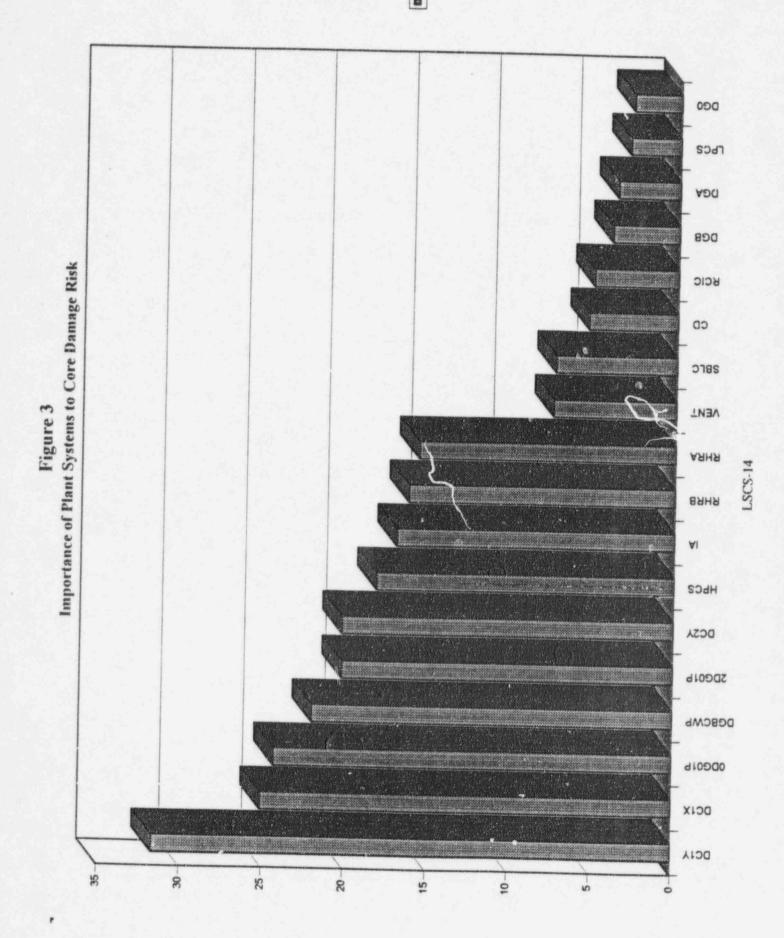


Table 5a Component Failure Mode Importances to CDF - RAW≥2

Event Name	RAW	Description
RPS-ARI-F	2.93E+03	DDC and ADJ CANADA
125DC-CM	1.16E+03	The same of the sa
CS-COOL-PMP-CM	6.32E+02	THE PARTY OF THE PROPERTY OF T
LPCI-CM	3.35E+02	COMMON MODE CS COOL. WTR PMPS
1EB235A-BCO	2.24E+02	THE PLANT OF ALL 3 LPC PLMPS (RETA = 05)
1E42YB-FAULTS	1.66E+02	CB ZAPO4E-4 FEED FROM 4KV BUS 241Y TO 480 BUSES 235Y & 225V
1E41YA-FAULTS	1.62E+02	4KV 2421 FAULIS
DGS-FAIL-CM	8.66E+01	
ADS	7.48E+01	The common mode range (DC) A PAIL *(RP) A = (117)
VSP	3.18E+01	OF ADS VLVS FAIL TO FUNCTION ON DEMAND
SRV-DIDNOTOPEN	2.58E+01	VAPOR SUPPRESSION POOL
CODGOIP-FAULTS	2.57E+01	SRV FAILURE TO OPEN (Reset prob to 6.64E-04 aft quant)
1E35YA-480-LPW	2.33E+01	MOTOR-DRIVEN PUMP CODGOIP SS FAULTS
2E22C002-FAULTS		LOSS OF POWER AT 480 BUS 1E35YA
SWVY02AX-INHTR	2.30E+01 2.27E+01	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
1EB35Y2X-BCO		INADEQUATE HEAT REMOVAL VIA AIR COOLING SWYVOOAV
C2DG032-XOC-LF	2.11E+01	ELECTRIC POWER CIRCUIT BREAKER 1FR35V2V CO
2E22C001-PMS-SS	2.09E+01	2DG032: CSCS DIV1 COOLING FLOW ISOLATION MANUAL VALVE
HP-MOV-FAULTS	2.07E+01	2E22COOT FIPCS PUMP PLANT SPECIFIC FAIR T DATA (GEN)
HP-CHK-MAN-FLT	2.05E+01	HPCS MOV VALVES FAULTS
SEVY03CB-FMS-SS	1.89E+01	HPCS MANUAL OR CHECK VALVES FAULTS
SEVY03AX-ACX-LFI	1.86E+01	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
	1.83E+01	LOCAL FAULT CAUSING INADEQUATE HEAT REMOVAL IN ACX SEVY03AX
SEVB001X-BCO-LF	1.82E+01	LOCAL FAULT OF CIRCUIT BREAKER SEVB001X
1EB236B-BCO	1.81E+01	FDR BRKR 2AP06E-5:4KV BUS 242Y TO 480V BUSES 236X/236Y FAILS
TBCCW-PSW-U1-FLT	1.81E+01	(U1) TBCCW/PSW SYSTEMS FAILURES
1E36YB-480-LPW	1.81E+01	LOSS OF POWER AT 480 BUS 1E36YB
1E211YA-125-LF	1.76E+01	LOCAL FAULT OF 125 BUS 1E211YA
FLT-CSCINT-005	1.71E+01	COMPONENT FAULT OCCURS IN INTERFACE CSCS SEGMENT 005
1E36XB-480-LPW	1.70E+01	LOSS OF POWER AT 480 BUS 1E36XB
2DG01P-FAULTS	1.64E+01	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
1E243-1-480-LPW	1.58E+01	LOSS OF POWER AT 480 BUS 1E243-1
1EB36Y1X-BCO	1.57E+01	ELECTRIC POWER CIRCUIT BREAKER 1EB36Y1X CO
IAS-TROUBLE	1.52E+01	INSTR AIR TROUBLES
2E12C002B-FLT	1.35E+01	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
RHRB01BB-BOO	1.34E+01	ELECTRIC POWER CIRCUIT BREAKER RHRB01BB OO
2E12B001B-HTX-LF	1.33E+01	2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD)
SAT-LOCAL-FAULT	1.32E+01	SAT LOCAL FAULT
RHRSWB-HTX-ISO-V	1.31E+01	RHRSW B HIX ISOLATION VALVE FAULTS
CSCD300B-STR-PLG	1.31E+01	2E12D300B STRAINER RHR SW TRAIN B PLUG
RHRF48BB-VOO	1.31E+01	MOTOR-OPERATED VALVE RHRF48BB OO
RHRF03BB-VOC	1.24E+01	MOTOR-OPERATED VALVE RHRF03BB OC
RHRF47BB-VOC	1.24E+01	MOTOR-OPERATED VALVE RHRF47BB OC
2E12C002B-OUT-V	1.22E+01	RHR TRAIN B PUMP DISCHARGE ISOLATION VALVES
2E12C002A-FLT	1.20E+01	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
1E12D301B-STR-F	1.20E+01	1E12D301B SUPP POOL SUCTION STRNR FOR RHR PUMP B (GEN)
RHRB01AA-BOO	1.19E+01	ELECTRIC POWER CIRCUIT BREAKER RHRB01AA OO
2E12B001A-HTX-LF	1.19E+01	2E12B001A HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD)
NWVY01CA-FMS-SS	1.18E+01	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS
RHRF48AA-VOO	1.18E+01	MOTOR-OPERATED VALVE RHRF48AA OO
RHRSWA-HTX-ISO-V	1.18E+01	RHRSW A HTS ISOLATION VALVE FAULTS

Table 5a Component Failure Mode Importances to CDF - RAW≥2

Event Name	RAW	Description	
NWVY01AX-ACX-LFI	1.16E+01	LOCAL FAULT CAUSING INADEQUATE HEAT REMOVAL IN ACX	
NWVB001X-BCO	1.16E+01	ELECTRIC POWER CIRCUIT BREAKER NWVB001X CO	
LPCI-INJ-VLV-CM	1.15E+01	LPCI INJECTION VALVE COMON MODE FAIL LIBE TO OPEN A	
CSCD300A-STR-PLG	1.15E+01	LPCI INJECTION VALVE COMON MODE FAILURE TO OPEN(BETA = .03) 2E12D300A STRAINER RHR SW TRAIN A PLUG	
RHRF03AA-VOC	1.10E+01	MOTOR-OPERATED VALVE RHRF03AA OC	
RHRF47AA-VOC	1.10E+01	MOTOR-OPERATED VALVE RHRF47AA OC	
1E35Y2A-480-LPW	1.08E+01	LOSS OF POWER AT 480 BUS 1E35Y2A	
2E12C002A-OUT-V	1.08E+01	RHR TRAIN A PUMP DISCHARGE ISOLATION VALVES	
FLT-CSCINT-018	1.07E+01	COMPONENT FAULT OCCURS IN INTERFACE CSCS SEGMENT 018	
1E12D301A-STR-F	1.06E+01	1E12D301A SUPP POOL SUCTION STAND FOR BUT SUCTION STAND	
1EB2Y22X-BCO	9.80E+00	1E12D301A SUPP POOL SUCTION STRNR FOR RHR PUMP A (GEN)	
NOS-PIP-LAK3BB	9.19E+00	4KV BRKRS:DIV2 125VDC CNTRL PWR CKT BRKR 1EB2Y22X XFER OPN	
1EB1Y22X-BCO	7.93E+00	FAULT OCCURS PRIOR TO INPUT OF 3 OF 3 LOGIC UNIT LAK3BB	
NEVY04CA-FMS-SS	7.08E+00	4KV BRKRS: DIV1 125VDC CNTRL PWR CKT BRKR 1EB1Y22 XFER OPN MOTOR-DRIVEN FAN NEVY04CA SS FAULTS	
NEVY04AX-ACX-LFI	6.83E+00	LOCAL FAIR T CAUSING INADEQUATE HE	
FAULT-SLC-C03	6.81E+00	LOCAL FAULT CAUSING INADEQUATE HEAT REMOVAL IN ACX	
NEVB001X-BCO	6.80E+00	COMPONENT FAULT OCCURS IN STDBY LIQUID CTRL SEGMENT C03 ELECTRIC POWER CIRCUIT BREAKER NEVB001X CO	
SLC-XPLOSV-CM	6.72E+00	SLC EXPLOSIVE VALVE FAILURE TO EVEN ORDER OF	
NOS-PIP-SAV1B1X	6.72E+00	SLC EXPLOSIVE VALVE FAILURE TO EXPLODE CM (BETA = .03)	
1E36Y1B-480-LPW	6.63E+00	FAULT OCCURS PRIOR TO INPUT OF 2 OF 2 LOGIC UNIT SAV1B1X LOSS OF POWER AT 480 BUS 1E36Y1B	
SLC-XPLOSV-AB-F	6 54E+00	Both SLC explosive valves fail to explode	
SRV-DIDNOT-CLOSE	6.4 E+00	SRV FAILURE TO CLOSE (Posts and to explode	
LAK10BB-ROO-LFO	5.99E+00	SRV FAILURE TO CLOSE (Reset quant to 6.64E-04 aft quant)	
LOSP-AT-U1-ONLY	5.67E+00	FAULT IN RELAY COIL LAKIOBB OO IN LCI SIGNAL PATH V2N	
RCI/LCS-COOL-V	5.64E+00	LOSS OF OFFSITE POWER (UNIT 1) ONLY GIVEN OSP AVAIL AT U2 RCIC/LPCS RM COOLING VALVE FAULTS	
PIP-SAP1AAC2	5.53E+00	FAILT OCCUPS PRIOR TO INDICT OF A OCCUPANT	
RHR-CNTRL-FUSES	4.81E+00	FAULT OCCURS PRIOR TO INPUT OF 1 OF 2 LOGIC UNIT SAP1AAC2 RHR CONTROL POWER BRKR AND FUSES FAULTS	
DW-HP-RHR-SGNB-F	4.70E+00	DW HI-PRESS RHR TRAIN B SGNL FAIL	
2FW005-PATH-FLT	4.45E+00	2FW005 MDRFP REG VALVE PATH FAULTS	
DW-HP-RHR-SGNA-F	4.32E+00	DW HI-PRESS RHR TRAIN A STANDARD	
RHR-RECOVERY	4.31E+00	FAILLIRE TO RECOVER 1 OF THE PARTY OF THE PA	
PSW-TBCCW-PATH	4.24E+00	FAILURE TO RECOVER 1-OF-2 RED: TRAINS WITHIN 33Hrs (ERIN) PSW TO TBCCW HTX A PATH FAULTS	
CST-HOTWELL-LF	4.22E+00	CST TO HOTWELL MAKEUP LOCAL FAULTS	
CD-POLISHER-OUT	4.16E+00	FAULT OCCURS PRIOR TO THE OUTPUT OF CONDENSATE POLISHER	
DG2B-AUX-SYS	3.96E+00	HPCS DIESEL AUXILIARY SYTEMS FAILURE	
2E22S001-FAULTS	3.95E+00	DG2B PLANT SPECIFIC FAULTS (PSD)	
FOP-OUT-CDS-J1	3.91E+00	FAULT OCCURS PRIOR TO THE OUTPUT OF CONDENSATE I	
1EB433C-BOO	3.91E+00	DG 2B OUTPUT BRKR FAILURE TO CLOSE	
1E212YB-125-LF	3.75E+00	LOCAL FAULT OF 125 BUS 1E212YB	
DG2B-LOGIC-FTS	3.67E+00	dg2b start logic failure(auto)**calculated value.	
1EB432C-BCC	3.64E+00	BUS 243 NORMAL FEEDER BRKR FAILS TO OPEN GIVEN LOSP	
TBCCW-HTXA-FLT	3.64E+00	TBCCW HTX A OR INLET/OUTLET VALVES FAILURE	
FAULT-TCW-TI3	3.49E+00	COMPONENT FAULT OCCURS IN TBCCW SEGMENT TI3	
PSW025DX-VOC	3.42E+00	2WS025 MOV: TBCCW HTXs PLANT SW INLET VALVE	
RCIF063C-VOC	3.25E+00	MOTOR-OPERATED VALVE RCIF063C OC	
RCIC001X-TDP-SS	3.24E+00	TURBINE-DRIVEN PUMP RCICOOI SS FAULTS	
RCIF013C-FAULTS	3.21E+00	MOV RCIC F013 VALVE FAULTS	
RCIF045C-VCC	3.20E+00	MOTOR-OPERATED VALVE RCIF045C CC	
RCIF046C-FAULTS	3.20E+00	MOTOR-OPERATED VALVE RCIF046C CC	
CD-HOTWLL-TNK-LF	3.15E+00	LOCAL FAULT OF CONDENSER HOTWELL TANK	

Table 5a Component Failure Mode Importances to CDF - RAW≥2

Event Name	RAW	Description
CST-TNK	3.15E+00	CST TANK FAILURE
RCIF008C-VOC	3.14E+00	
RCIC-EXHST-VLVS	3.09E+00	MOTOR-OPERATED VALVE RCIF008C OC
VALVECL-RCI-011	2.94E+00	RCIC EXHAUST VALVES MODULE
RCI-TTT-GVRNR-F	2.90E+00	VALVE IN SEGMENT FAULTS
1EB413A-BOO	2.67E+00	MOV/HOV THROTTLE/GVRNR VALVES FAULTS
SY-VNF-HVDG2A	2.60E+00	ELECTRIC POWER CIRCUIT BREAKER 1EB413A OO
RCIC-RPV-CHKVLV	2.54E+00	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
DG2A-FAULTS	2.53E+00	VALVE IN SEGMENT FAULTS
1EB412A-BCC	2.50E+00	DG2A PLANT SPECIFIC FAULTS
CCB2G1P-BCO	2.49E+00	ELECTRIC POWER CB 1EB412A CC
NOS-PIP-LAK10BB	2.47E+00	ELECTRIC POWER CIRUIT BREAKER CCB2G1P OO
RCIC-ISOL-VLVS	2.46E+00	FAULT OCCURS PRIOR TO INPUT OF 1 OF 2 LOGIC UNIT LAK10BB
1E243C-FAULTS	2.44E+00	EITHER RCIC PUMP L.O. ISOLATION VALVES TRANSFERS CLOSED
IE213C-125-LF	2.44E+00	4KV BUS 234 FAULTS
IEB423B-BOO	2.35E+00	LOCAL FAULT OF 125 BUS 1E213C
RCIRD001	2.33E+00	ELECTRIC POWER CIRCUIT BREAKER 1EB423B OO
FLT-CSCINT-004	2.29E+00	RUPTURE DISC RCIRD001 FAILS
E35XA-480-LPW	2.28E+00	COMPONENT FAULT OCCURS IN INTERFACE CSCS SEGMENT 004
EE-GOB-CTP	2.28E+00	LOSS OF POWER AT 480 BUS 1E35XA
DG01P-CP-BRKR	2.27E+00	LOSS OF CONTROL POWER TO COMPONENTS IN 1EE SIGNAL PATH GO
EB422B-BCC	2.22E+00	2DG01P CONTROL POWER BREAKER/FUSE FAULTS
EB234X-BCC	2.22E+00	ELECTRIC POWER CB 1EB422B CC
EB425B-BCC	2.22E+00	ELECTRIC POWER CIRCUIT BREAKER 1EB234B CC
X-LO-PR-SGNL-F	2.19E+00	ELECTRIC POWER CB 1EB425B CC
EB2Y14X-BCO	2.14E+00	RCIC RESPONSE TO RX LO PRES SGNL FAIL
G0-FAULTS	2.13E+00	DG2A LOCAL CONTROL PNL CNTRL CIRCUIT BREAKER 1EB2Y14X CO
GOV01YA-FAULTS	2.12E+00	DG0 PLANT SPECIFIC FAULTS(PSD)
E36X3B-FAULTS	2.11E+00	0VD01YA MOD FAULTS
G0V01CA-FMS-SS	2.10E+00	1E36X3B CB FAULTS
G0V02YA-FAULTS	2.09E+00	OVD01C MOTOR-DRIVEN FAN DG0V01CA SS FAULTS 0VD02YA FAULTS
GOV03YA-FAULTS	2.09E+00	
EB2522-BCO-LF	2.04E+00	OVD03YA MOD FAULTS
IVI-BRKR-SGNL	2.04E+00	LOCAL FAULT OF CIRCUIT BREAKER NEB2522
FW01PC-FAULTS	2.01E+00	DG0 BREAKER CONTROL SIGNALS FAULT
The state of the s	2.012700	COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3

Table 5b Component Failure Mode Importances to CDF - Fussell-Vesely

RHR-RECOVERY DG2A-FAULTS 134E-01 DG2A PLANT SPECIFIC FAULTS DG2A-FAULTS 134E-01 DG2A PLANT SPECIFIC FAULTS DG2A-FAULTS 132E-01 DG2B PLANT SPECIFIC FAULT SPECIFIC FAULT SPECIFIC FAULTS DG2B-FAULTS DG2B-F	Event Name	Fussell- Vesely	Description
DG2A FAULTS DG6-FAULTS 133E-01 DG2A PLANT SPECIFIC FAULTS(PSD) 125E2C002-FAULTS 125E2C002-FAULTS 125E2C003-FAULTS 125E2C003-F	RHR-RECOVERY	2 34E 01	EARLINE TO DECOME 1 OF A DIST
DGG FAULTS 133E-01 132E-01 132		1.34E-01	DG2A PLANT SPECIFIC SAFE TRAINS WITHIN 33Hrs (ERIN)
2E222C001-FAULTS 2E22C001-FAULTS 2E22C001-FAULTS 2E22C001-FAULTS 2E22C001-FAULTS 2E22C001-FAULTS 2E22C001-FAULTS 2E22C001-FAULTS 3E2C01-FAULTS 3E2C01-FAULTS 3E2C01-FAULTS 3E2C01-FAULTS 3E2C001-FAULTS 3E2C01-FAULTS 3E2C01-FAULTS 3E2C001-FAULTS 3E2E001-FAULTS 3E2		1.33E-01	DGO DI ANT SPECIFIC FAULTS
121E-01 DG2B PLANT SPECIFIC FAULTS (PSD)		1.32F-01	2F22CM2 DG2P COOL WITH PLANT DIAM DIAM DIAM DIAM DIAM DIAM DIAM DIAM
2E22C001.PMS-SS CODG01P-FAULTS (CODG01P-FAULTS		1.32E-01	DG2B PLANT SPECIFIC PART TO (PSD)
CODGOIP-FAULTS 1.05E-01 MOTOR-DRIVEN PUMP CODGOIP SS FAULTS ROP3 9.70E-02 failure to recover OSP within 3 HRS(NO LOAD SHED) HP-MOV-FAULTS 9.01E-02 HPCS MOV AUVES FAULTS SRS-ARJF 8.28E-02 DG2A COOL WTR PUMP 2DG0IP PLANT SPECIFIC FAULTS (PSD) SWYY02AX-INHTR 7.72E-02 PSWATTH-LT SEVW03CB-FAHL-LT 7.2EE-02 PSWAD AND AND AND AND AND AND AND AND AND A		1.06E-01	2F22CM1 HPCS DIMP DI ANT SPECIFIC FAULTS (PSD)
Property		1.05E-01	MOTOR-DEIVEN BLIMP CODCOLD SS FAME TO
Substitution Subs		9.70E-02	failure to recover OSP within 2 UPS AND LOAD SUPPLY
2001P-FAULTS 8.28E-02 DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)	HP-MOV-FAULTS	9.01E-02	HPCS MOV VALVES FAIR TO
18-02 18-03 18-04 18-04 18-05 18-0		8.28E-02	DG2A COOL WTP PLIMP 2DC01P PLANT SOFOTE COLUMN
1728-02 1728-03 1728	RPS-ARI-F	8.19E-02	RPS and ARI FAIT LIDE (PMIED NIMES WATER A)
2512C0024 F.LT 7.39E-02 2512C0022 R.H. TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD) 2512C002 R.H. TRAIN A MOTOR-DRIVEN PUMP RIVEN PUMP FAULTS (PSD) 2512C002 R.H. TRAIN A MOTOR-DRIVEN PUMP RIVEN PUMP FAULTS (PSD) 2512C002 R.H. TRAIN A MOTOR-DRIVEN PUMP RIVEN PUMP FAULTS (PSD) 2512C002 R.H. TRAIN A MOTOR-DRIVEN PUMP RIVEN PUMP R	SWVY02AX-INHTR	7.72E-02	INADEQUATE HEAT REMOVAL VIA ATR COOLING OVER 1800
2812C0024-FLT	2FW005-PATH-FLT	7.54E-02	2FW005 MDRFP REG VALVE DATH FAIR COOLING SWVY02AX
SEVYOSCB-FMS-SS	2E12C002B-FLT	7.39E-02	2E12C002B RHR TRAIN B MOTOR DRIVEN BUMP FALL TO COOP
MOTOR-DRIVEN FAN SEYY03CB SS FAULTS		7.11E-02	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
No.		6.67E-02	MOTOR-DRIVEN FAN SEVYO3CR SS FAIT TS
NWY10ICA-FMS-SS HPCS-TOTALUUM RHPG-8TDTALUUM RHRF48BB-VOO RHRSWB-HTX-ISO-V RHSWB-HTX-ISO-V RHSWB-HTX-ISO		5.64E-02	TURBINE-DRIVEN PUMP RCICOOL SS FAULTS
RHRF48BB-VOO RHRSWB-HTX-ISO-V RHRSWB-HX-ISO-V RHRSWB-HX-IS-V RHRSWB-HX-ISO-V RHRSWB-HX-IS-V RHRSWB-HX-ISO-V RHRSWB-HX-IS-V RHRSWB-HX-ISO-V RHRSWB-HX-ISO-V RHRSWB-HX-ISO-V RHRSBB-O-V RHRSB-OB-V RHR		5.35E-02	MOTOR-DRIVEN FAN NWYY01CA SS FALL TS
SAURY SAUR		5.25E-02	HPCS total unavailability due to mech and elec maintenance
KRISSWB-HTX-ISO-V RHRSWB HTX ISOLATION VALVE FAULTS RHRSWA-HTX-ISO-V 4.82E-02 RHRF48AA-VOO 4.82E-02 CSCD300B-STR-PLG 4.62E-02 LPCI-CM 4.62E-02 RCIF063C-VOC 4.36E-02 2E12B001B-HTX-LF 2E12B001B-HTX-LF 2E12B001A-HTX-LF 4.09E-02 ROP24 4.09E-02 RCIF013C-FAULTS 3.94E-02 DG2B-AUX-SYS 2.70E-02 RCIF046C-FAULTS 2.50E-02 DG3F-AIL-CM 2.50E-02 RCIF045C-VCC 2.50E-02 CS-COOL-PMP-CM 2.50E-02 RCIF045C-VCC 2.50E-02 CS-COOL-PMP-CM 2.40E-02 CST-HOTWELL-LF 2.00E-02 PW-HP-RHR-SGNB-F 1.67E-02 CCSCO01 A-PMS-SS 1.67E-02 DW-HP-RHR-SGNA-F 1.01E-02 LCSC001 A-PMS-SS 1.01E-02 LCSC001 A-PMS-SS 1.05E-03 LCSC001 A-PMS-SS 1.05E-03 LCSC001 A-PMS-SS 1.05E-03 LCSC001 A-PMS-SS 1.05E-03		5.01E-02	MOTOR-OPERATED VALVE RHRF48BB OO
RHRF48AA-VOO CSCD300B-STR-PLG CSCD300A-STR-PLG CSCD300A-STR-PLG CSCD300A-STR-PLG CSCD300A-STR-PLG CSCD30OA-STR-PLG CSCD30OA-STR-IN-STR-F CSCD30OA-STR-INER RHR SW TRAIN A PLUG COMMON MODE FALLURE OF ALL 3 LPCI PUMPS (BETA = .05) COMMON MODE FALLURE OF ALL 3 LPCI PUMPS (BETA = .05) COMPON-OPERATED VALVE FCIF063C CC CSCD30OA-STR-PLG COMMON MODE CSCOOL WITH PMPS CSCD30A-STR-INER CHR SW TRAIN A PLUG COMMON MODE CSCOOL WITH PMPS CSCOOL-PMP-CM CSCD30A-STR-INER CHR SW TRAIN A PLUG COMMON MODE CSCOOL WITH PMPS CSCOOL-PMP-CM CSCO		5.01E-02	RHRSW B HTX ISOLATION VALVE FAULTS
A.52E-02		4.82E-02	RHRSW A HTS ISOLATION VALVE FAULTS
CSCD300B-STR-PLG 4.62E-02 2E12D300B STRAINER RHR SW TRAIN B PLUG CSCD300A-STR-PLG 4.45E-02 2E12D300A STRAINER RHR SW TRAIN A PLUG CSCD300B-STRAINER 2E12B001B STRAINER RHR SW TRAIN A PLUG CSCD300B-STRAINER 2E12B001B STRAINER RHR SW TRAIN A PLUG CSCD301B-HTX-LF 4.43E-02 2C0MMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) CSCD301B-HTX-LF 4.43E-02 2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) CSCD301B-STRAILTS 3.50E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) CSCD30B-AUX-SYS 2.67E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) CSCD30B-AUX-SYS 2.67E-02 MOV RCIC F013 VALVE FAULTS DGS-FAIL-CM 2.50E-02 MOY RCIC F013 VALVE FAULTS CGF-045C-VCC 2.50E-02 MOTOR-OPERATED VALVE RCIF046C CC CS-COOL-PMP-CM 2.42E-02 COMMON MODE CS COOL. WTR PMPS TBCCW-PSW-U1-FLT 2.40E-02 (U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) CSC-ACOL-PMP-CM 2.42E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 CST-HOTWELL		4.82E-02	MOTOR-OPERATED VALVE RHRF48AA OO
LPCI-CM RCIF063C-VOC 2E12B001B-HTX-LF 2E12B001A-HTX-LF 2E12B001A-HX-TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 2E12B001A-HX-TRAIN A PL		4.62E-02	2E12D300B STRAINER RHR SW TRAIN B PLUG
## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON ADDE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON ADDE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05) ## A36E-02 COMMON ADDE FAILURE OF ALL 3 LPCI PUMPS (PETA = .05) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) ## A36E-02 CE12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD		4.45E-02	2E12D300A STRAINER RHR SW TRAIN A PLUG
2E12B001B-HTX-LF 2E12B001A-HTX-LF 2E12B001A-HTX-LF 2E12B001A-HTX-LF 2E12B001A-HTX-LF 2E12B001A-HTX-LF 3.94E-02 2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) 3.94E-02 2E12B001A HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 3.50E-02 RCIF013C-FAULTS 2.70E-02 RCIF046C-FAULTS 2.70E-02 RCIF046C-FAULTS DGS-FAIL-CM 2.50E-02 DGS-FAIL-CM 2.50E-02 CS-COOL-PMP-CM 2.50E-02 CS-COOL-PMP-CM 2.42E-02 CS-COOL-PMP-CM 2.40E-02 CY-VNF-HVDG2A CST-HOTWELL-LF DW-HP-RHR-SGNB-F LCSC001A-PMS-SS 1E12D301B-STR-F DW-HP-RHR-SGNA-F 1E12D301A-STR-F RX-LO-PR-SGNL-F SSA01C-PATH-FLT 1SA01C-PATH-FLT 1SA01C-PATH-FLT 1EB235A-BCO RCIF013C-FAULTS 1.99E-02 2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) 3.94E-02 2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 4.09E-02 2E12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 4.09C-02 2F12B001B HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD) 4.09C-02 4.00E-02 4.00C-02 4.00E-02 4.00C-02 4.00E-02 4.00C-02 4		4.43E-02	COMMON MODE FAILURE OF ALL 3 LPCI PLIMPS (BETA = 05)
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S.94E-02 2E12B001A HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD)		4.09E-02	2E12B001B HX TRAIN B PLANT SPECIFIC FAIR T DATA (PSD)
RCIF013C-FAULTS 2.70E-02 MOV RCIC F013 VALVE FAULTS DG2B-AUX-SYS 2.67E-02 MOV RCIC F013 VALVE FAULTS DG3F-FAIL-CM 2.50E-02 MOTOR-OPERATED VALVE RCIF046C CC CS-COOL-PMP-CM 2.42E-02 COMMON MODE CS COOL. WTR PMPS TBCCW-PSW-U1-FLT 2.40E-02 CU1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) TBCW-PSW-U1-FLT 2.20E-02 COMMON MODE CS COOL. WTR PMPS TBCW-PSW-U1-FLT 2.20E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ADS 1.67E-02 COMPONENT		3.94E-UZ	ZEIZBOOIA HX TRAIN A PLANT SPECIFIC FAIR T DATA (PSD)
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RCIF046C-FAULTS DGS-FAIL-CM RCIF045C-VCC CS-COOL-PMP-CM TBCCW-PSW-U1-FLT 2FW01PC-FAULTS ADS SY-VNF-HVDG2A CST-HOTWELL-LF DW-HP-RHR-SGNB-F LCSC001A-PMS-SS 1E12D301B-STR-F DW-HP-RHR-SGNA-F 1E12D301A-STR-F RX-LO-PR-SGNL-F RX-LO-PR-SGNL-F RX-LO-PR-SGNL-F RX-LO-PR-SGNL-F RX-LO-PR-SGNL-F SSA01C-PATH-FLT 1E8235A-BCO 2.50E-02 MOTOR-OPERATED VALVE RCIF046C CC CS-COOL. WTR PMPS MOTOR-OPERATED VALVE RCIF045C CC CS-COOL. WTR PMPS (U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.50E-02 MOTOR-OPERATED VALVE RCIF046C CC CS-COOL. WTR PMPS (U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.40E-02 COMMON MODE CS COOL. WTR PMPS (U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.50E-02 COMMON MODE CS COOL. WTR PMPS (U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.50E-02 COMMON MODE CS COOL. WTR PMPS (U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.50E-02 COMMON MODE CS COOL. WTR PMPS (U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.50E-02 COMMON MODE CS COOL. WTR PMPS (U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.40E-02 COMMON MODE CS COOL. WTR PMPS (U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.40E-02 COMMON MODE CS COOL. WTR PMPS 2.40E-02 COMMON UNIS FAULT OFUNCTION STBCCW-OR-PSW-FLT(U2)) 2.50E-02 COMMON WALVE RCIF045C CC CS-COOL. WTR PMPS 2.40E-02 COMMON UNIS TAILURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.40E-02 COMMON WAIN PMPS 2.40E-02 COMMON UNIT STATION AIR COMPRESSOR PATH FAULTS 2.40E-02 COMMON MODE CS COOL. WTR PMPS 2.40E-02 COMMON WAIN PMPS 2.40E-02 COMMON UNIT STATION AIR COMPRESSOR PATH FAULTS 2.40E-02 COMMON UNIT STATION AIR COMPRESSOR PATH FAULTS 2.40E-02 COMMON UNIT STATION AIR COMPRESSOR PATH FAULTS 2.50E-03 CB 24P04E-4 FEED FROM 4KV RUS 241Y TO 480 RUSES 235X 8-235X		2.70E-02	MOV RCIC F013 VALVE FAULTS
DGS-FAIL-CM RCIF045C-VCC CS-COOL-PMP-CM TBCCW-PSW-U1-FLT 2FW01PC-FAULTS ADS SY-VNF-HVDG2A CST-HOTWELL-LF DW-HP-RHR-SGNB-F LCSC001a-PMS-SS 1E12D301B-STR-F DW-HP-RHR-SGNA-F EI2D301A-STR-F RX-LO-PR-SGNL-F RX-LO-PR-SGNL-F SSA01C-PATH-FLT SA01C-PATH-FLT SA01C-PATH-FLT SA01C-PATH-FLT SCSCOOL-PMP-CM 2.50E-02 DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012)) MOTOR-OPERATED VALVE RCIF045C CC CS-COOL-WTR PMPS MOTOR-OPERATED VALVE RCIF045C CC COMMON MODE CS COOL. WTR PMPS (U1) TBCCW/PSW SYSTEMS FAILLURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.20E-02 COMMON MODE CS COOL. WTR PMPS COMMON MODE CS COOL. WTR PMPS SA1LURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.20E-02 COMMON MODE CS COOL. WTR PMPS COMMON MODE CS COOL. WTR PMPS SA1LURES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.20E-02 COMMON MODE CS COOL. WTR PMPS COMMON WAIN FEEDWATER SEGMENT L3 COMMON WAIN FEEDWATER SEGMENT L3 SA01C DAY NAIN FEEDWATER SEGMENT L3 COMMON HVDG2A COOLING OR VENTILATION SYSTEM FAULTS CST TO HOTWELL MAKEUP LOCAL FAULTS DW HI-PRESS RHR TRAIN B SGNL FAIL (QUANT:NOS-POP-RHR-T24A) MOTOR-DRIVEN PUMP LCSC001A SS FAULTS IE12D301B-STR-F SA01C-PATH-FLT S		2.67E-02	HPCS DIESEL AUXILIARY SYTEMS FAILURE
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TBCCW-PSW-U1-FLT 2FW01PC-FAULTS ADS SY-VNF-HVDG2A CST-HOTWELL-LF DW-HP-RHR-SGNB-F LCSC001A-PMS-SS 1E12D301B-STR-F DW-HP-RHR-SGNA-F RX-LO-PR-SGNL-F RX-LO-PR-SGNL-F SA01C-PATH-FLT 1SA01C-PATH-FLT 1SA01C-PATH-FLT 1EB235A-BCO 2.40E-02 (U1) TBCCW/PSW SYSTEMS FAIL.URES(FROM: TBCCW-OR-PSW-FLT(U2)) 2.40E-02 (CMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED MR 1.67E-02 ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS 1.12E-02 CST TO HOTWELL MAKEUP LOCAL FAULTS 1.12E-02 DW HI-PRESS RHR TRAIN B SGNL FAIL (QUANT:NOS-POP-RHR-T24A) MOTOR-DRIVEN PUMP LCSC001A SS FAULTS 1E12D301B SUPP POOL SUCTION STRNR FOR RHR PUMP B (GEN) B.70E-03 DW HI-PRESS RHR TRAIN A SGNL FAIL (QUANT:NOS-POP-RHR-T24B) 1E12D301A SUPP POOL SUCTION STRNR FOR RHR PUMP A (GEN) RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A) 1E3A01C-PATH-FLT 1SA01C-PATH-FLT 1S		2.30E-02	MOTOR-OPERATED VALVE RCIF045C CC
2.20E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 SY-VNF-HVDG2A CST-HOTWELL-LF DW-HP-RHR-SGNB-F LCSC001A-PMS-SS 1E12D301B-STR-F DW-HP-RHR-SGNA-F 1E12D301A-STR-F RX-LO-PR-SGNL-F RX-LO-PR-SGNL-F OSA01C-PATH-FLT 1SA01C-PATH-FLT 1SA01C-PATH-FLT 1EB235A-BCO 2.20E-02 COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 1.67E-02 6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED MR 1.67E-02 ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS 1.12E-02 CST TO HOTWELL MAKEUP LOCAL FAULTS 1.12E-02 CST TO HOTWELL MAKEUP LOCAL FAULTS 1.01E-02 DW HI-PRESS RHR TRAIN B SGNL FAIL (QUANT:NOS-POP-RHR-T24A) 9.64E-03 MOTOR-DRIVEN PUMP LCSC001A SS FAULTS 9.16E-03 IE12D301B SUPP POOL SUCTION STRNR FOR RHR PUMP B (GEN) 8.82E-03 IE12D301A SUPP POOL SUCTION STRNR FOR RHR PUMP A (GEN) 8.70E-03 RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A) 8.27E-03 OSA01C COMMON UNIT STATION AIR COMPRESSOR PATH FAULTS 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS		2.42E-02	COMMON MODE CS COOL. WTR PMPS
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SY-VNF-HVDG2A CST-HOTWELL-LF DW-HP-RHR-SGNB-F LCSC001A-PMS-SS 1E12D301B-STR-F DW-HP-RHR-SGNA-F 1E12D301A-STR-F RX-LO-PR-SGNL-F 0SA01C-PATH-FLT 1SA01C-PATH-FLT 1EB235A-BCO 1.67E-02 ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS 1.12E-02 CST TO HOTWELL MAKEUP LOCAL FAULTS 1.12E-02 DW HI-PRESS RHR TRAIN B SGNL FAIL (QUANT:NOS-POP-RHR-T24A) 9.64E-03 MOTOR-DRIVEN PUMP LCSC001A SS FAULTS 9.16E-03 1E12D301B SUPP POOL SUCTION STRNR FOR RHR PUMP B (GEN) 8.97E-03 DW HI-PRESS RHR TRAIN A SGNL FAIL (QUANT:NOS-POP-RHR-T24B) 8.82E-03 1E12D301A SUPP POOL SUCTION STRNR FOR RHR PUMP A (GEN) 8.70E-03 RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A) 8.27E-03 0SA01C COMMON UNIT STATION AIR COMRESSOR PATH FAULTS 8.26E-03 CB 2AP04E-4 FEED FROM 4KV BUS 241V TO 480 BUSES 235V & 235V		Art de Ula Ula	COMPONENT FAULT OCCURS IN MAIN FEEDWATED CECLEBRATE
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1E12D301B-STR-F DW-HP-RHR-SGNA-F 1E12D301A-STR-F RX-LO-PR-SGNL-F 0SA01C-PATH-FLT 1SA01C-PATH-FLT 1EB235A-BCO 9.16E-03 1E12D301B SUPP POOL SUCTION STRNR FOR RHR PUMP B (GEN) 8.97E-03 DW HI-PRESS RHR TRAIN A SGNL FAIL (QUANT:NOS-POP-RHR-T24B) 8.82E-03 1E12D301A SUPP POOL SUCTION STRNR FOR RHR PUMP A (GEN) 8.70E-03 RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A) 8.27E-03 0SA01C COMMON UNIT STATION AIR COMRESSOR PATH FAULTS 8.27E-03 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 8.06E-03 CB 2AP04E-4 FEED FROM 4KV BUS 241V TO 480 BUSES 235V & 235V		9.64F-02	MOTOR PRIVING TRAIN B SGNL FAIL (QUANT:NOS-POP-RHR-T24A)
DW-HP-RHR-SGNA-F 1E12D301A-STR-F RX-LO-PR-SGNL-F 0SA01C-PATH-FLT 1SA01C-PATH-FLT 1EB235A-BCO 8.97E-03 DW HI-PRESS RHR TRAIN A SGNL FAIL (QUANT:NOS-POP-RHR-T24B) 8.97E-03 DW HI-PRESS RHR TRAIN A SGNL FAIL (QUANT:NOS-POP-RHR-T24B) 8.97E-03 RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A) 9SA01C COMMON UNIT STATION AIR COMRESSOR PATH FAULTS 8.27E-03 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 8.06E-03 CB 2AP04E-4 FEED FROM 4KV BUS 241V TO 480 BUSES 235V & 235V		9.16F-03	TELEDIAL SUPPRIOR SUP
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0SA01C-PATH-FLT 1SA01C-PATH-FLT 1EB235A-BCO 8.27E-03 0SA01C COMMON UNIT STATION AIR COMRESSOR PATH FAULTS 1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS 8.06E-03 CB 2AP04E-4 FEED FROM 4KV BUS 241V TO 480 BUSES 235V & 235V		8.70E-03	RCIC RESPONSE TO BY LO PRES SOAN THE
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1EB235A-BCO 8.06E-03 CB 2AP04E-4 FEED FROM 4KV BUS 241Y TO 480 BUSES 235V & 235V		8.27E-03	ISAOIC LA LINIT I STATION AIR COMRESSOR PATH FAULTS
LPCS-LOGIC-FLT 7.40E-03 LPCS PUMP LOGIC FAULTS		8.06E-03	CB 2 APPAE A FEED FROM ANY PUR SAME TO SAME FAULTS
	LPCS-LOGIC-FLT	7.40E-03 I	PCS PUMP LOGIC FAULTS PCS PUMP LOGIC FAULTS PCS PUMP LOGIC FAULTS

Table 5b Component Failure Mode Importances to CDF - Fussell-Vesely

Event Name	Fussell- Vesely	Description
LCSF005A-FLT	7 10E 0	
NEVY04CA-FMS-SS	6.85E.03	LCSF005A CB OR OTHER LOCAL FAILURES
DG0V01YA-FAULTS	6.63E-03	MOTOR-DRIVEN FAN NEVY04CA SS FAULTS
RCIC-EXHST-VLVS	6.57E-03	0VD01YA MOD FAULTS
DG0V03YA-FAULTS	6.57E-03	RCIC EXHAUST VALVES MODULE
HP-CHK-MAN-FLT	3.00E.03	0VD03YA MOD FAULTS
DG0V01CA-FMS-SS	3.90E-03	HPCS MANUAL OR CHECK VALVES FAULTS
VALVECL-RCI-011	3.01E-03	OVD01C MOTOR-DRIVEN FAN DG0V01CA SS FAULTS VALVE IN SEGMENT FAULTS
RHRB01BB-BOO	3.01E-03	FI ECTRIC POWER CIRCUITS
RCIF008C-VOC	2.01E-03	MOTOR OPERATED VALVES BREAKER RHRB01BB OO
RHRB01AA-BOO	2.90E-03	MOTOR-OPERATED VALVE RCIF008C OC
RHR-CNTRL-FUSES	2.35E-03	ELECTRIC POWER CIRCUIT BREAKER RHRB01AA OO
SRV-DIDNOT-CLOSE	2.05E-03	RHR CONTROL POWER BRKR AND FUSES FAULTS
IEE-GOB-CTP	1.65E-03	SRV FAILURE TO RECLOSE (RMIEP)
C0DG035-VOC	1.03E-03	LOSS OF CONTROL POWER TO COMPONENTS IN 1EE SIGNAL PATH GOB
DG0V02YA-FAULTS	1.35E-03	MOTOR-OPERATED VALVE CODG035 OC 0VD02YA FAULTS
FAULT-SLC-C03	1.30E-03	COMPONENT FALL TO COURS
D0VMODCOM-CC-UUM	1.32E-03	COMPONENT FAULT OCCURS IN STDBY LIQUID CTRL SEGMENT C03
LCSD302X-STR	1.31E-03	UNAVAILABLE FOR PERIOD OF UNSCHO MAINT ONCONTROL SYSTEM
2E12C002B-OUT-V	1.23E-03	SUPPRESSION POOL SUCTION STRAINER LCSD302X FAULTS
2E12C002A-OUT-V	1.12E-03	RHR TRAIN B PUMP DISCHARGE ISOLATION VALVES
FOP-OUT-CDS-J1	8 92F-04	RHR TRAIN A PUMP DISCHARGE ISOLATION VALVES
NOS-PIP-SAV1B1X	7.80E-04	FAULT OCCURS PRIOR TO THE OUTPUT OF CONDENSATEJ1
1E35YA-480-LPW	6.80E-04	FAULT OCCURS PRIOR TO INPUT OF 2 OF 2 LOGIC UNIT SAV1B1X LOSS OF POWER AT 480 BUS 1E35YA
RCIC-RPV-CHKVLV	6.06E-04	VALVE IN SEGMENT FAULTS
1E36YB-480-LPW	5.76E-04	LOSS OF POWER AT 480 BUS 1E36YB
LPCI-INJ-VLV-CM	5.58E-04	I PCI INIECTION VALVE CONCUMON MODE THE
1E243-1-480-LPW	5.41E-04	LPCI INJECTION VALVE COMON MODE FAILURE TO OPEN(BETA = .03) LOSS OF POWER AT 480 BUS 1E243-1
1E36XB-480-LPW	5.26E-04	LOSS OF POWER AT 480 BUS 1E36XB
SLC-XPLOSV-CM	4.87E-04	SLC EXPLOSIVE VALVE FAILURE TO EXPLODE CM (BETA = .03)
LCSB002A-BOO	4.16E-04	ELECTRIC POWER CIRCUIT BREAKER LCSB002A OO
1E41YA-FAULTS	3.77E-04	4KV 241Y FAULTS
1EB35Y2X-BCO	3.67E-04	ELECTRIC POWER CIRCUIT BREAKER 1EB35Y2X CO
1E42YB-FAULTS	3.56E-04	4KV 242Y FAULTS
1EB236B-BCO		FDR BRKR 2AP06E-5:4KV BUS 242Y TO 480V BUSES 236X/236Y FAILS
1EB36Y1X-BCO	3.04E-04	ELECTRIC POWER CIRCUIT BREAKER 1EB36Y1X CO
SEVB001X-BCO	3.04E-04	ELECTRIC POWER CIRCUIT BREAKER SEVB001X CO
VSP	2.99E-04	VAPOR SUPPRESSION POOL
IEB1Y22X-BCO	2.89E-04	4KV BRKRS: DIV1 125VDC CNTRL PWR CKT BRKR 1EB1Y22 XFER OPN
IEB432C-BCC	2.87E-04	BUS 243 NORMAL FEEDER BRKR FAILS TO OPEN GIVEN LOSP
IEB2Y22X-BCO	2.77E-04	4KV BRKRS:DIV2 125VDC CNTRL PWR CKT BRKR 1EB2Y22X XFER OPN
LPS-FUSES	2.75E-04	LPS CONTROL FUSES
WWVB001X-BCO	2.70E-04	ELECTRIC POWER CIRCUIT BREAKER NWVB001X CO
DG01P-CP-BRKR	2.28E-04	2DG01P CONTROL POWER BREAKER/FUSE FAULTS
IEB433C-BOO	2.20E-04	DG 2B OUTPUT BRKR FAILURE TO CLOSE
TBCCW-HTXA-FLT	1.88E-04	TBCCW HTX A OR INLET/OUTLET VALVES FAILURE
ALVECL-LCS-S1	1.56E-04	VALVE IN SEGMENT FAULTS
LT-CSCINT-028	1.54E-04	COMPONENT FAULT OCCURS IN INTERFACE CSCS SEGMENT 028
SAT-LOCAL-FAULT	1.44E-04	SAT LOCAL FAULT
PCS-SGNL-FLT	8.53E-05	LPCS PERMISSIVE SIGNAL FAULTS
DAMPERCL-DOV-B	7.47E-05	DAMPER IN SEGMENT FAULTS

Table 5b Component Failure Mode Importances to CDF - Fussell-Vesely

Event Name	Fussell- Vesely	Description
125DC-CM 1EB1Y13X-BCO NEVB001X-BCO 1E35XA-480-LPW SLC-XPLOSV-AB-F LOSP-AT-U1-ONLY RHRF03BB-VOC-LF RHRF47AA-VOC-LF RHRF47BB-VOC-LF RHRF03AA-VOC-LF 1E211XA-125-LF RHRB&C-COOL-FLT 1E35Y2A-480-LPW	2.64E-05 9.15E-06 9.15E-06 9.15E-06 6.36E-06	CONTROL POWER CIRCUIT BREAKER 1EB1Y13X CO ELECTRIC POWER CIRCUIT BREAKER NEVB001X CO LOSS OF POWER AT 480 BUS 1E35XA Both SLC explosive valves fail to explode LOSS OF OFFSITE POWER (UNIT 1) ONLY GIVEN OSP AVAIL AT U2 LOCAL FAULT OF MOTOR-OPERATED VALVE RHRF03BB LOCAL FAULT OF MOTOR-OPERATED VALVE RHRF47AA LOCAL FAULT OF MOTOR-OPERATED VALVE RHRF47BB LOCAL FAULT OF MOTOR-OPERATED VALVE RHRF47BB LOCAL FAULT OF MOTOR-OPERATED VALVE RHRF03AA LOCAL FAULT OF 125 BUS 1E211XA RHR PMPS B&C ROOM COOLING FAULTS

Important Operator Actions:

The dominating operator actions are shown in Table 6. The actions are ranked in decreasing order of importance based on the reduction in CDF which would occur if the action never failed, referred to as its Fussell-Vesely (F-V) value. The failure to depressurize after a loss of high pressure injection is the most important because the vessel must be depressurized to allow for low pressure injection, or core damage will occur. If AC power is not restored, the diesel driven firewater pump may be the only injection source. HPCS, RCIC and ADS (manual depressurization) are dependent upon DC power.

The other operator actions are related to coping with the dominant accident sequences. As a rule of thumb, operator action failure probabilities fall in the range of 10^{-2} to 10^{-4} while component failure probabilities tend to fall in the range of 10^{-2} to 10^{-5} . Therefore, operator errors can be dominant contributors to system failures and CDF.

Table 6
Operator Action Importances

Event Name	Fussell- Vesely	Description
OADS	9.92E-02	Thirty Area Area
OP-VENT-CNTNMNT	3.88E-02	INITIATE ADS
ODPS		VENT CONTAINMENT
	3.05E-02	DEPRESSURIZE USING ONLY BYPASS VALVES
OFWLC-A (ATWS)	2.04E-02	FW CNTRL TO LOWER PWR < BYPASS CAPACITY
OADS-A	1.83E-02	ADS AND RESTART PUMPS GIVEN OFWLC-A FAILS
(ATWS)		
ORPVLC-A	1.61E-02	RESTORE RPV LEVEL TO MIX BORON (ATWS)
OP-SBLC-A	1.58E-02	INITIATE SBLC (ATWS)
ODFP LINE	1.37E-02	START AND ALIGN FIRE PROTECTION SYSTEM TO FW
OSW	1.20E-02	SECURE SW PUMPS FROM THE CNTRL ROOM
OADS-B (ATWS)	1.08E-02	ADS AND RESTART PUMPS GIVEN FW UNAVAILABLE
THE RESERVE TO SERVE THE PROPERTY OF THE PERSON NAMED IN COLUMN TO SERVE THE PERSON NAMED IN COLUMN TO		
OPTL-A	7.06E-03	PTL LPCS, HPCS, LPCI PMPS (ATWS)
OP-STRT-MDFP-CE	6.29E-03	TRIP BOTH TDRFPS OR MANUALLY START MDFWP
ORHR	4.96E-03	INITIATE SCS, SPC OR CSS MODE(LWR/PARRY/ERIN)

VII. Accident Sequence Analysis

In Figure 2, the Core Damage Frequency was displayed as a pie chart according to the contributions from the various initiating events. In order to be more useful for plant applications, the results can be presented according to contributions to CDF by accident sequence. The dominant accident sequences for LSCS are represented in Figure 4 below.

The distinction between initiating event and accident sequence depends on how the accident progresses. For example, a LOOP initiating event could result in a station blackout event if the EDGs fail, or, if the EDGs are successful, it could result in a transient event with other postulated failures. Among these failures are failure to scram, which would be categorized as an ATWS event, or successful scram, but failure of an SRV to reclose, which would be categorized as an IORV due to the accident behavior. The following discussion describes the details of the important accident sequences in the LSCS PRA.

Station Blackout (17% of CDF)

Even though the functional requirements for a LOOP are similar to those for other transients, loss of offsite power can lead to unit blackout (UBO, total loss of AC power within an individual unit) or to station blackout (SBO, no AC power available to either unit). A UBO/SBO is a particularly important event because station blackout conditions mean that many normally used safety systems are unavailable.

Loss of off-site power can be caused either by a complete grid loss or switchyard faults which isolate plant buses from the grid. Both of these events are included within the definition of the event, which is

designated as a LOSP or DLOSP in the PRA. A review of industry experience led to the following conclusions:

- A switchyard fault is more likely than grid loss and more often results loss of power to a single unit (LOSP), rather than a station (DLOSP). These events can usually be recovered within one half hour.
- Loss of power to the station (DLOSP) because of a transmission grid failure is less likely
 than a switchyard failure, but, frequently requires more time to restore.

A LOSP can result in an immediate loss of power to all station AC buses, except 120 VAC instrumentation buses which are fed from the batteries through the inverters, and result in MSIV closure, initiation of a reactor scram, cycling of the SRVs as the primary system pressure increases, and coast-down of the recirculation pumps.

The ability of the plant to successfully respond to a LOSP event depends upon how widespread the loss of power actually is. For a station DLOSP, at least one emergency diesel generator must start and the emergency 4KV bus unit cross-tie must be implemented to maintain power to both units' battery chargers to provide DC power to keep the SRVs operable on each unit, to keep an RHR pump operable on each unit, and to keep an RHRSW system pump operable for each unit. The availability of this minimum set of equipment maintains the low-pressure injection and decay heat removal capabilities in both units Transients at High Pressure (77% of CDF)

Transient initiated sequences with core damage at high reactor vessel pressure involve the loss of high pressure injection and failure to depressurize. HPCS, RCIC, and the SRVs depend on DC power to function. Common cause battery failures either due to component faults or due to battery depletion can disable all three DC power divisions and thus disable HPCS, RCIC and the SRVs so that the reactor remains at high pressure without any injection. Other types of failures include independent failures of HPCS and RCIC (e.g. failure to start, tagged out of service for maintenance), coupled with an operator failure to successfully depressurize. With decay heat levels still fairly high, steam is being discharged into the suppression pool, reducing vessel water level and after about one hour, ausing the core to be uncovered and fuel damage will ensue unless recovery actions can be taken.

The following sequences are included in this category: T104; GTR03, 06, 09, 10, and 11; LOOP03, 07, 12, 15, 16, 17, and 18.

Transients with Loss of Decay Heat Removal (62% of CDF)

Transient initiated sequences which result in the loss of decay heat removal involve a transient initiating event, such as closure of the MSIVs, successful scram, successful injection of cooling water to the core; and loss of the following long term decay heat removal options:

- Failure of the Residual Heat Removal (RHR) system (or failure of the operator to initiate RHR) in the shutdown cooling, suppression pool cooling, and containment spray modes.
- Loss of the condenser a heat sink so that the Condensate/Feedwater pumps cannot supply core cooling water.
- Inability to vent the containment to remove decay heat.

The following sequences are included in this category: GTR03 and 11; IORV03 and 10; and LOOP03, 16, 17, and 18.

LOCA's (0.7% of CDF)

The small LOCA (SLOCA) initiating event category represents all breaks inside the drywell which are less than 5.0E-3 ft² for liquids and less than 0.1 ft² for steam. However, it was assumed the break discharge would always be large enough to pressurize the drywell to 2 psig and initiate a reactor scram. A small break would not necessarily result in low reactor water level. Breaks which are too small to pressurize the containment would be detected by the drywell floor drain system, and cause a manual reactor shutdown to be initiated. No specific break location was assumed during the development of the SLOCA event tree.

An SLOCA is expected to increase drywell pressure by 2 psig and initiate a reactor trip. The HPCS system will be actuated by high drywell pressure. Depending upon the rate of decrease in feedwater flow and the speed at which the HPCS system flow increases, the reactor vessel water level may, or may not, drop to Low Level 2. If HPCS does not start successfully, reactor vessel level will decrease to low level 2 and initiate a start of the RCIC system. Both HPCS and RCIC have sufficient capability to maintain adequate coolant make-up to the primary system for this range of break sizes.

Because the small break is relatively small and incapable of removing large amounts of energy from the primary system, the pressure will remain high enough to continue to challenge the SRVS, which will cycle between open and closed. The combined energy from the break and from the SRVS will be transferred to the suppression pool which will then heat-up unless containment cooling is successfully implemented.

The medium LOCA (MLOCA) initiating event category includes breaks inside the drywell in the ranges of:

- 5.0E-3 to 0.3 ft² for liquid
- 0.1 to 0.3 ft² for steam

No specific break locations were assumed during event tree development.

Following the occurrence of a medium LOCA, the following core protection functions are critical:

- reactor must be made subcritical
- reactor coolant inventory must be replenished and maintained.

For MLOCA, operation of both high and low-pressure systems is required. The energy removed through the break will maintain an adequate level of reactor energy removal. This function is passive and will assure core protection so long as adequate vessel inventory is maintained.

All LOCA sequences are included in this category.

Anticipated Transients Without Scram (8% of CDF)

When a transient occurs and the reactor fails to scram, the event is known as an ATWS. To prevent serious core damage from occurring in a relatively short period of time, the operating staff must:

- Initiate negative reactivity insertion with SBLC.
- Reduce core power by lowering the vessel water level.
- Limit the effects of the ATWS event by maintaining primary system injection rates which can remove adequate amounts energy from the core.
- Maintain, or establish, effective overpressure protection for the primary system and containment conditions.

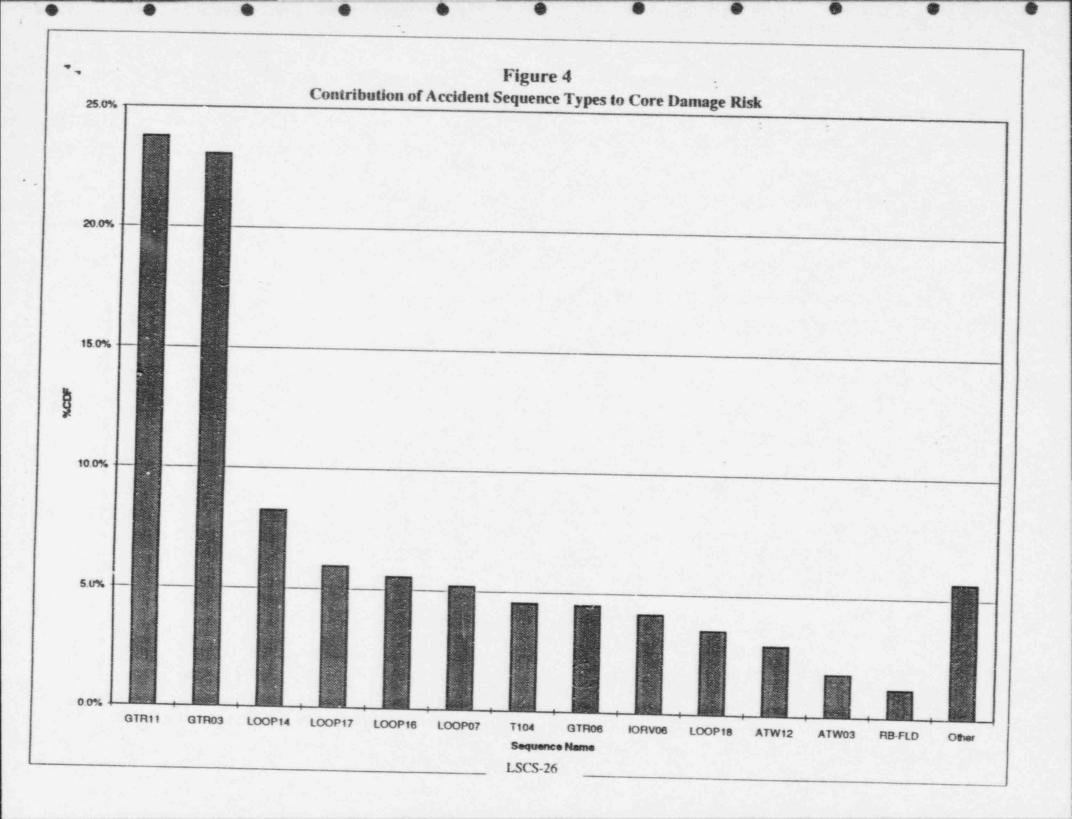
When a transient is followed by RPS/ARI failure, several other systems are normally available to provide the alternate success paths for the subcriticality function. These systems are:

- Manual scram
- Actuation of SLC
- Manual insertion of individual control rods.

To successfully limit the effects of an ATWS, an equilibrium between coolant injection rates and power level 1s required. The equilibrium power level 1s the one where injection capacity is sufficient to maintain acceptable core temperatures yet not lead to excessive heat-up rates in the suppression pool.

For isolation transients, in which the MSIVs close, recirculation pump trip (RPT) is necessary to decrease power to the level which can be matched by non-balance of plant systems. If the MSIVs remain open, the feedwater and turbine bypass systems will remain available as sources of injection and core energy removal. For this reason, the energy discharged to the suppression pool will be lower than that for an isolated ATWS. However, to limit suppression pool heatup so that short term containment protection is not required, successful initiation of RPT and SLC is still required.

All ATWS sequences are included in this category.



VIII. Applications

By applying the knowledge and insights gained from the LSCS PRA to the various activities supporting plant operation, ComEd may be able to realize cost savings by redirecting regulatory attention on marginal safety issues, prioritizing work, and making resource expenditure decisions within a common framework of overall plant safety.

A criticism of the use of PRA in decision making is the presence of uncertainties in the model. There are two important points relevant to this criticism. First, while uncertainties may chade the exact meaning of the absolute CDF calculated, the relative risks calculated for different accident sequences, or for different plant systems and components, represent the true worth of the PRA, and these are less impacted by the existing uncertainties. Secondly, the alternative to the use of PRA is to base decisions on each individual's assessment of the situation, which can vary considerably depending upon the person's background and biases. PRA is a tool for prioritization and relative worth comparisons. It provides a logical structural basis for decisions, and provides common ground for discussions relevant to plant safety.

It is important to note that PRA analysis must be used in conjunction with other methods to assure plant safety. If a design basis condition is not being met, the necessary actions must be taken to bring the plant back into the proper design bounds. Even if a PRA analysis concludes that the increase in core damage risk due to a particular design basis problem is negligible, the problem must still be fixed. The PRA analysis can provide an insight on how critical the problem is and what priority it should receive, but a PRA analysis by itself does not provide sufficient justification to allow a design basis problem to remain unfixed.

The most important lesson learned from the creation of the LSCS PRA is what is important to safety and what, in a relative sense, is not. This applies to systems, components, initiating events and operator actions. A nuclear power plant is a complex system composed of many subsystems with many interdependent relationships, including the human interfaces. The PRA model allows us to group these relationships together and quantify their effects on a relative basis.

The LSCS plant staff should be familiar with the PRA results and apply the information to its full advantage. The results of the PRA should be used to prioritize the allocation of resources to maximize the impact on plant safety and system reliability. The identification of the important accident sequences and operator actions should be used as an input to operator training programs.

In the licensing area, the LSCS PRA can be used to evaluate the risk significance of regulatory concerns, and limit or eliminate proposed requirements of plant-initiated activities which provide no appreciable improvement in plant safety. The PRA can be used for plant-specific cost-benefit analyses to evaluate generic requirements which may not provide any real benefit to LSCS.

The tools used to build the PRA models can be useful in other applications, such as evaluating non-safety systems which impact plant performance in order to focus resources on those components which are most likely to cause an upset condition.

As PRA becomes a more integral part of routine plant operations, it will be necessary to better integrate data collection requirements needed to maintain the model up-to-date. Performance trending of major safety-related equipment is required to evaluate the plant-specific failure probability of these items. This data collection should become part of other, ongoing efforts to monitor and trend major equipment, rather than a separate, manpower intensive function of the risk assessment group.

In view of the NRC's emphasis on the Severe Accident Policy Statement programs such as the Individual Plant Examination they might expect to see the use of PRA by licensees in many areas of plant operation. The LSCS PRA is a valuable tool for licensing, engineering, maintenance, training and operations

activities, and should be used to its full extent. It is hoped that this document will help non-PRA personnel to understand and appreciate this value, and better see how PRA can be applied to their areas of responsibilities.

To help illustrate the various uses of the PRA, some past applications are described below.

Outage Risk Assessment

System fault trees similar to those used in the PRA have been incorporated into a software tool named Outage Risk Assessment Management (ORAM). ORAM has been developed at LSCS to assist with outage planning and execution. The fault tree input will allow plant personnel to examine proposed outage schedules to determine if the requirements of station risk management procedures are satisfied down to the component level. The benefit of the PRA and ORAM for outage planning should result in higher confidence levels of outage planning and consequently shorter outages.

Although the PRA models power operations, application of reliability techniques can also be applied to shutdown conditions.

On-line Maintenance

Moving maintenance from outages to power operation is an important initiative to reduce outage length. The PRA is an excellent tool to determine if voluntary on-line maintenance is acceptable from a risk perspective. Out of service times are modeled in the PRA for major plant systems and can be adjusted to check the impact on the CDF. Information about the importance of systems, given a system is taken out of service, is used to manage the overall risk.

Ongoing and Future Applications

Maintenance Rule

The results of the PRA are being used to help establish the basis for including system and components into the Maintenance Rule program, and in developing the required performance criteria and goals against which system and component performance will be monitored.

Severe Accident Management

The Severe Accident Management program will require development and implementation of severe accident (beyond core melt) guidelines. Much of this work will be based on PRA results and insights. It has been proposed that the PRA be used to screen severe accident guidelines based on their plant applicability and importance and to assist with subsequent training prioritization.

Graded QA

The graded QA program will re-examine the plant Q-list and base in part the pedigree of plant components on their relative contribution to the overall core damage rick. EPRI estimates saving based on the Grand Gulf plant to be as much as \$10 million dollars per year for the life of the plant.

Risk Based Regulation

As the NRC and utilities become more familiar and comfortable with PRA, it is likely that the application of PRA techniques will increase in many facets of plant operation. Ongoing initiatives such as reliability-centered maintenance and risk-based regulation strategies will become more common.

In addition to programs which may arise as regulatory requirements, ComEd could use the PRA as a means to reduce operating costs. Some examples which may prove viable include prioritization of preventive maintenance and testing activities (such as the MOV testing program), and surveillance test interval and allowed out of service time (LCO) relaxation. Other initiatives which may help improve plant safety include using the PRA to prioritize operator training programs, emergency drill scenarios, and developing analyses to evaluate shutdown risk and apply the results to outage planning.

IX. Insights

Insights are those observations regarding station configuration or practices suggested by the PRA which may affect the risk profile of the plant. Insights can suggest changes to enhance the capability of the plant and its operators to respond to an initiating event to either prevent core damage or to mitigate the consequences of core damage. All insights that are developed during the PRA development will be evaluated for significance. The beneficial insights will be submitted to the plant for disposition.

The generic procedure enhancements that were identified during the Dresden and Quad Cities IPE analyses are also applicable to the LaSalle County Station and have been forwarded to the BWR Owners Group (BWROG) and to LaSalle County Station for their consideration.

Containment venting is an essential EOP step needed to maintain availability of ADS under emergency conditions. The Instrument (IA) and Service Air (SA) systems are required to ensure availability of the containment venting function. Therefore, the loss of IA/SA initiating event is the top contributor to core damage. This important insight should be addressed.

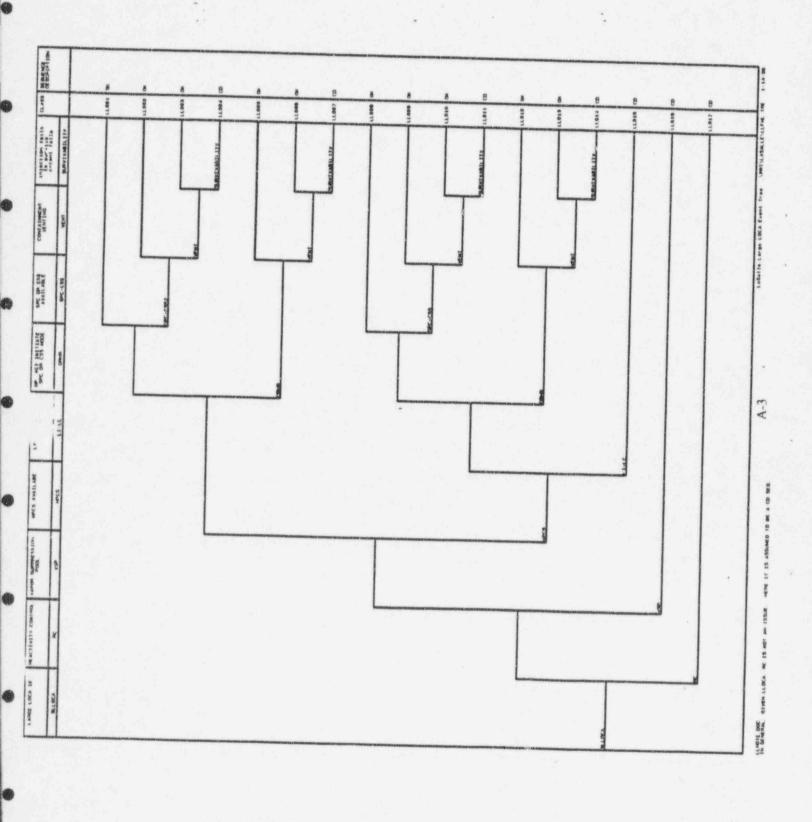
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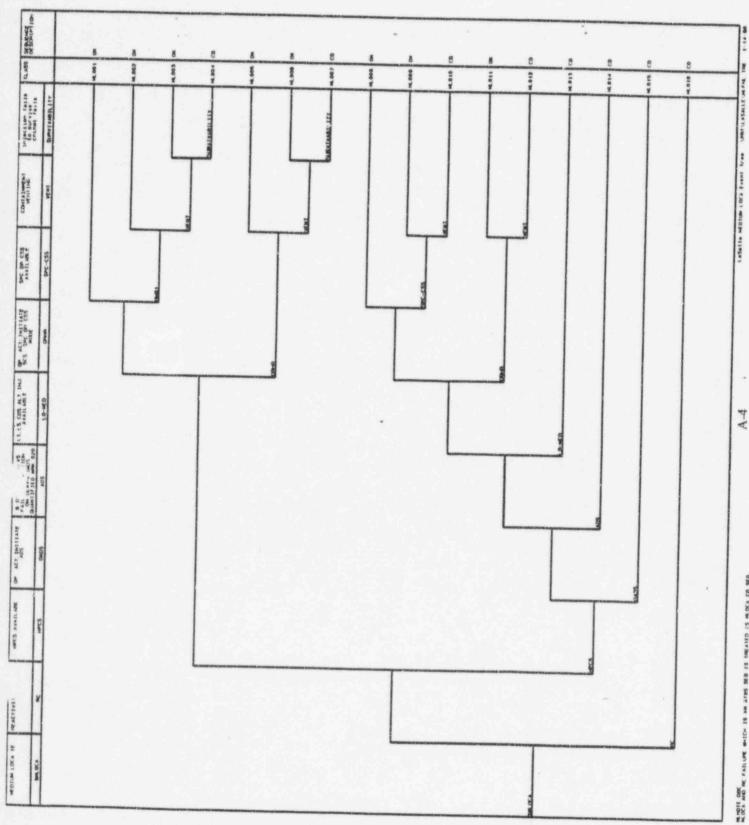
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Appendix A Event Trees

IE FREQ.: 20", 24" sw line in AB	Op act: Isolate the line break in 8 min	Op Act: lineup & start Diesel fire pumps	CLASS	SEQUENCE DESCRIPTION
%FS	OSW	RB-FLOOD	1	
			RB-FLD1	OK
			RB-FLD2	ОК
			RB-FLD	CD

LaSalle FLOODING ISSUE WITH FW/CDS LOST IE .\PRT\RBA-FLD.TRE 1-19-96





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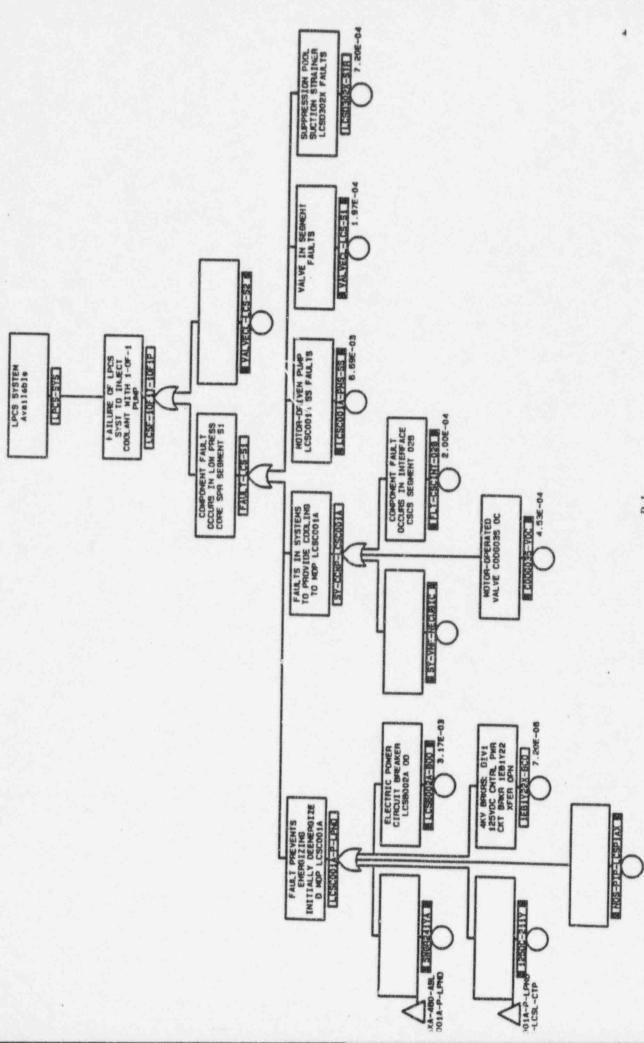
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Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Pro	Total CDF Freque	
1	LOOP18	2.30E-07	2.31%		a rotti riditio	Accident-Sequence Event Description
	2001 10	2.302-07	2.3176	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
2	LOOP17	1.72E-07	4 700/	2.47E-03	ROP24	failure to recover OSP within 24 hrs
-	2001 17	1.12L-01	1.73%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
3	ATW03	1.65E-07	4.050	4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
-	A11103	1.03E-07	1.65%	2.40E+00	%T1-IE	TUHBINE TRIP WITH BYPASS IE
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				5.20E-02	OADS-A	OP ACT: ADS AND RESTART PUMPS GIVEN OFWLC-A FAILS (ATWS)
					OFWLC-A	OP ACT: FW CNTRL TO LOWER PWR < BYPASS CAPACITY (ATWS)
4	GTR03	1.52E-07	4 500		RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
-	011103	1.52E-07	1.52%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
5	LOOP17	1 055 07		3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
3	LOOP 17	1.05E-07	1.05%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				1.54E-04	DGS-FAIL-CM	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012))
6	RB-FLD	0.005.00		4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
0	ND-FLD	9.68E-08	0.97%	2.00E-04	%FS	FLOOD IE'S GROUND OR MAIN RB FLOOR (x capacity factor .7
					ODFP	OP ACT: START AND ALIGN FIRE PROTECTION SYSTEM TO FW LINE
7	ATW08	0.005.00			OSW	OP ACT: SECURE SW PUMPS FROM THE CNTRL ROOM
,	ATTIOO	9.36E-08	0.94%		%T1-IE	TURBINE TRIP WITH BYPASS IE
					ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					OP-SBLC-A	OP ACT: INITIATE SBLC (ATWS)
8	ATW12	7 705 00			RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
0	MINNIZ	7.78E-08	0.78%		%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
					ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					ORPVLC-A	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
9	LOOP14	0.455.00			RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
9	LOOP 14	6.15E-08	0.62%		%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				4.33E-02	2E22S001-FAULTS	DG28 PLANT SPECIFIC FAULTS (PSD)
					DG0-FAULTS	DGC PLANT SPECIFIC FAULTS(PSD)
					RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
10	ATMA	F F0F			DG2A-FAULTS	DGCA PLANT SPECIFIC FAULTS
10	ATW12	5.59E-08	0.56%		%T2T4-IE	TURBINE TRIP WITH CONDENSED LINAVAL ADJ. 5 OD 4 555
				1.00E+00	ATWS	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM ATWS FLAG TO IDENTIFY ATWS CUTSETS
					OADS-B	OP ACT: ADS AND RESTART PLIADS COUTE TO A CO
					RPS-ARI-F	OP ACT: ADS AND RESTART PUMPS GIVEN FW UNAVAILABLE (ATWS) RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prol	D. Event Name	
11	LOOP07	4.90E-08	0.49%			Accident-Sequence Event Description
	200107	4.50E-08	0.49%	5.30E-02	%LOSP	LOSS OF OFFSITE POWER INIT EVENT
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
12	GTR11	4 775 00		1.40E-03		OP ACT: INITIATE ADS
12	GINII	4.77E-08	0.48%		%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
10	10004			1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
13	LOOP14	4.76E-08	0.48%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
14	GTR11	4.04F-08	0.47%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				7.06E-03	2E22C001-PMS-SS	2E22C001 HDCC DUMP DI ANT ODECISIO SAVE
				1.24E-04	LPCI-CM	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
15	ATW12	4.51E-08	0.45%	4.70E-01	%MSIV	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = 05)
					ATWS	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
					ORPVLC-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					RPS-ARI-F	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
16	GTR03	4.41E-08	0.44%		%T11-IE	HPS and AHI FAILURE (RMIEP, NMPC, WNP-2)
			0.4470			LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				7.00E-03	CS-COOL-PMP-CM	COMMON MODE CS COOL. WTR PMPS
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
17	ATW07	4.18E-08	0.42%		SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL SCEDING
	,,,,,,	4.102-00	0.42%		%T1-IE	TURBINE THIP WITH BYPASS IE
					ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					OPTL-A	OP ACT: PTL LPCS, HPCS, LPCI PMPS (ATWS)
18	IORV06	4 115 00			RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
	IONVOO	4.11E-08	0.41%		%T7-IE	IORV IE
					2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
40	IODVos				LCSC001A-PMS-SS	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
19	IORV06	4.01E-08	0.40%	5.30E-02	%T7-IE	IORV IE
				7.26E-03	2E22C002 FAULTS	
				1.98E-02	2FW005-PATH-FLT	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD) 2FW005 MDRFP REG VALVE PATH FAULTS
					CODGO1P-FAULTS	MOTOR DRIVEN BUMP CODOM POR SAULTS
20	GTR11	3.97E-08	0.40%		%T11-IE	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
					HP-MOV-FAULTS	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				1.24E-04		HPCS MOV VALVES FAULTS
						COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)

Seq.	Sequence		Percent of		Total CDF Freque	ncy: 1.0E-05/yr
No.	Name	CDF	Total CDF	Eveni Pro	b. Event Name	Accident Seguence Francis Devices
21	GTR03	3.86E-08	0.39%	5.30E-02	%T11-IE	Accident-Sequence Event Description
				5.61E-03	2E12C002B-FLT	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.61E-03	2E12C002A-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
				3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR THAINS WITHIN 33Hrs (ERIN)
22	LOOP17	3.85E-08	0.39%	1.60E-02	%DLOSP	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				9.69E-03	DG2B-AUX-SYS	DUAL LOSS OF OFFSITE POWER IE
				7.63E-02	DG2A-FAULTS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				7.63E-02	DG0-FAULTS	DG2A PLANT SPECIFIC FAULTS
				4.27E-02	ROP3	DG0 PLANT SPECIFIC FAULTS(PSD)
23	LOOP07	3.80E-08	0.38%	5.30E-02	%LOSP	failure to recover OSP within 3 HRS(NO LOAD SHED)
				4.33E-02	2E22S001-FAULTS	LOSS OF OFFSITE POWER INIT EVENT
				1.18E-02	RCIF063C-VOC	DG2B PLANT SPECIFIC FAULTS (PSD)
				1.40E-03	OADS	MOTOR-OPERATED VALVE RCIF063C OC OP ACT: INITIATE ADS
24	LOOP14	3.76E-08	0.38%	1.60E-02	%DLOSP	
				1.53E-02	RCIC001X-TDP-SS	DUAL LOSS OF OFFSITE POWER IE
				1.54E-04	DGS-FAIL-CM	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
25	GTR03	3.61E-08	0.36%	5.30E-02	%T11-iE	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012))
				5.26E-03	2DG01P-FAULTS	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.61E-03	2E12C002A-FLT	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
792.427				3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
26	GTR03	3.61E-08	0.36%	5.30E-02	%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				5.26E-03	CODGO1P-FAULTS	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1 MOTOR-DRIVEN PUMP CODG01P SS FAULTS
				5.61E-03	2E12C002B-FLT	2F12C002R PHP TRAIN PARCTOR PRINTED BY
				7.00E-02	RHR-RECOVERY	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
				3.30E-01	SURVIVABILITY	AILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
27	GTR03	3.41E-08	0.34%	2.63E-04	%T101-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				5.61E-03	2E12C002B-FLT	2F12C002R BHR TRAIN P MOTOR DRIVEN SUBSECTION
				7.00E-02	RHR-RECOVERY	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
				3.30E-01	SURVIVABILITY	AILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
28	GTR03	3.41E-08	0.34%	2.63E-04	%T102-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
					2E12C002A-FLT	2F12C002A BHD TRAIN A MOTOR DRIVEN SWGH242YA)
					RHR-RECOVERY	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
					SURVIVABILITY	AILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
29	GTR03	3.39E-08	0.34%		%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
					CODG01P-FAULTS	MOTOR-DRIVEN PLINE CODOCAD CO SALVET
					2DG01P-FAULTS	MOTOR-DRIVEN PUMP CODGOTP SS FAULTS
					RHR-RECOVERY	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				3.30E-01	SURVIVABILITY	AILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
						INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)

Seq.	Sequence		Percent of		Total CDF Freque	ncy: 1.0E-05/yr
No.	Name	CDF	Total CDF	Event Pro		Accident-Sequence Event Description
30	ATW12	3.24E-08	0.32%	4.70E-01	%MSIV	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				2.30E-03	The state of the s	OP ACT: ADS AND RESTART PUMPS GIVEN FW UNAVAILABLE (ATWS)
31	GTR03	3 305 00	0.000	3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
	311103	3.20E-08	0.32%	2.63E-04	%T101-IE	LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSU)
				7.00E-02		FAILURE TO RECOVER 1-0F-2 PHR TRAINS WITHIN 33Hrs (ERIN)
32	GTR03	2 205 00		3.30E-01	SURVIVABILITY	INJECTION FAILS TO SUBVIVE AFTER CONTAINING (ERIN)
-	011103	3.20E-08	0.32%	2.63E-04	7 T. T. S. Mar. 1 San	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				5.26E-03	STORE INCLID	MOTOR-DRIVEN PUMP CODG01P SS FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1 OF 2 PUR TRAINS WITHIN
33	IORV06	0.405.00		3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
33	IONVUO	3.16E-08	0.32%	5.30E-02	%T7-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				7.26E-03		
				1.98E-02	2FW005-PATH-FLT	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD) 2FW005 MDRFP REG VALVE PATH FAULTS
34	ATW15	0.405.00		4.15E-03	LPCS-LOGIC-FLT	LPCS PUMP LOGIC FAULTS
54	W1 88 12	3.16E-08	0.32%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH COMPENSED LINAVA II A DI T
				1.00E+00	ATWS	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM ATWS FLAG TO IDENTIFY ATWS CUTSETS
				1.30E-03	OP-SBLC-A	OP ACT: INITIATE SBLC (ATWS)
35	IORV06	2245 22		3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
55	1011400	3.04E-08	0.30%	5.30E-02	%T7-IE	IORV IE
				7.26E-03	2E22C002-FAULTS	
				1.98E-02	2FW005-PATH-FLT	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD) 2FW005 MDRFP REG VALVE PATH FAULTS
36	LOOP14	2.005.00		3.98E-03	LCSF005A-FLT	LCSF005A CB OR OTHER LOCAL FAILURES
50	LOOF 14	2.96E-08	0.30%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
37	LOOP14	2015 00		7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
	2001 14	2.91E-08	0.29%		%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
38	GTR03	2015 00		1.54E-04	DGS-FAIL-CM	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA = .012))
-	G11103	2.91E-08	0.29%		%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.61E-03	2E12C002B-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
				4.23E-03	NWVY01CA-FMS-SS	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
39	GTR03	2015 00		3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINING (ERIN)
	GINUS	2.91E-08	0.29%		%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS (ERIN) LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
				5.61E-03	2E12C002A-FLT	2E12C002A RHR TRAIN A MOTOR DOWNER SHARE
				7.00E-02	RHR-RECOVERY	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
40	LOOP18	2.005.00		3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
40	2001 18	2.90E-08	0.29%		%DLOSP	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) DUAL LOSS OF OFFSITE POWER IE
					CA	STONE FOWER IE

Seq.	Sequence		Percent of		Total CDF Frequei	ncy: 1.0E-05/yr
No.	Name	CDF	Total CDF	Event Prof		Accident-Sequence Event Description
				9.62F-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FALLETS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
41	LOOP17	2.89E-08	0.000/	2.47E-03	ROP24	failure to recover OSP within 24 hrs
-	200.17	2.032-00	0.29%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				7.63E-02		DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
42	LOOP17	2.81E-08	0.000	4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
72	LOOF 17	2.81E-08	0.28%	1.60E-02		DUAL LOSS OF OFFSITE POWER IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
					DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
43	OTDIA			4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
43	GTR11	2.80E-08	0.28%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
	1000			1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
44	LOOP14	2.77E-08	0.28%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
					RCIF046C-FAULTS	MOTOR-OPERATED VALVE FICIF046C CC
					DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
45	LOOP14	2.75E-08	0.28%		%DLOSP	DUAL LOSS OF OFFICE POWER IS
					2E22S001-FAULTS	DUAL LOSS OF OFFSITE POWER IE
					DG0-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
					DG2A-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
					RCIF045C-VCC	DG2A PLANT SPECIFIC FAULTS
46	GTR03	2.73E-08	0.27%		%T11-IE	MOTOR-OPERATED VALVE RCIF045C CC
					2DG01P-FAULTS	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
					NWVY01CA-FMS-SS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
					RHR-RECOVERY	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS
					SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
47	GTR03	2.73E-08	0.27%			INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL CIEDIAL
			0.2776		%T11-IE	LUSS OF INSTRUMENT AIR IE OR LOSP AT LINIT 1
				4.23E-03	CODGO1P-FAULTS	MOTOR-DRIVEN PUMP CODGOTP SS FAULTS
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FALILTS
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hre (EDIN)
48	GTR03	2.63E-08	0.26%		SURVIVABILITY	1143 COTTON FAILS TO SURVIVE AFTER CONTAINMENT FAILS (EDIAL)
	G11100	2.03L-00	0.20%		%T11-IE	LUSS OF INSTRUMENT AIR IE OR LOSP AT LINIT 1
				3.82E-03	RHRSWB-HTX-ISO-V	HHRSW B HTX ISOLATION VALVE FAULTS
					2E12C002A-FLT	2E12C002A RHR TRAIN A MOTOR-DRIVEN PLIMP FALLETS (PCD)
					RHR-RECOVERY	FAILURE TO HECOVER 1-OF-2 RHR TRAINS WITHIN 32Hre (EDIAL)
49	GTR03	2.63E-08	0.000	3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL CEDIAL
10	211103	2.03E-08	0.26%		%T11-IE	LUSS OF INSTHUMENT AIR IE OR LOSP AT LINIT 1
				5.61E-03	2E12C002B-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Pro	b Event Name	
				3.82E-03		Accident-Sequence Event Description
					RHRSWA-HTX-ISO-V	RHRSW A HTS ISOLATION VALVE FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hre (EDIN)
50	GTR03	2.63E-08	0.26%	3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT EAR CIEDIAL
	G11100	2.032-00	0.20%	5.30E-02	%T11-IE	LUSS OF INSTRUMENT AIR IE OR LOSP ATTINIT 1
				3.82E-03	RHRF48BB-VOO	MOTOH-OPERATED VALVE RHRF48BB OO
				5.61E-03	2E12C002A-FLT	2E12C002A RHR TRAIN A MOTOR-DRIVEN PLIMP FALL TO (DCD)
				7.00E-02	RHR-RECOVERY	FAILURE TO HECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (EDIA)
51	GTR03	2.63E-08	0.000	3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS (EDIA)
	011105	2.032-08	0.26%	5.30E-02	%T11-IE	LUSS OF INSTHUMENT AIR IE OR LOSP AT LINIT 1
				3.82E-03	RHRF48AA-VOO	MOTOR-OPERATED VALVE RHRF48AA OO
				5.61E-03	2E12C002B-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PLIMP EALL TO (DED)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 22U- /EDIAN
52	GTR03	2.57E-08	0.000/	3.30E-01	SURVIVABILITY	INSECTION FAILS TO SURVIVE AFTER CONTAINMENT EAT CLEDING
02	011103	2.37E-08	0.26%	2.63E-04	%T101-IE	LOSS OF 4100V AC BUS 241Y IEIQUANT SWGR241VAL
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (EDIN)
53	GTR03	2.57E-08	0.000	3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL C/EDIAN
00	011103	2.37E-08	0.26%	2.63E-04	%T102-IE	LOSS OF 4180V AC BUS 242Y IEIQUANT SWGD242VAL
				4.23E-03	NWVY01CA-FMS-SS	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
54	GTR03	2.46E-08	0.050	3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
-	GINOS	2.400-08	0.25%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				3.82E-03	RHRSWA-HTX-ISO-V	RHRSW A HTS ISOLATION VALVE FAULTS
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 22H-2 (EDIN)
55	GTR03	2.46E-08	0.050		SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
00	G11103	2.400-08	0.25%		%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	CODG01P-FAULTS	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
				3.82E-03	RHRSWB-HTX-ISO-V	RHRSW B HTX ISOLATION VALVE FAULTS
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF 2 RHR TRAINS WITHIN 33Hrs (ERIN)
56	GTR03	2.46E-08	0.050/		SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL STEDIAL
	GIIIOG	2.40E-08	0.25%		%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP CODGOTP SS FAULTS
				3.82E-03	RHRF48BB-VOO	MOTOR-OPERATED VALVE RHRF48BB OO
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
57	GTR03	2.46E-08	0.050		SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
0.	G11103	2.40E-08	0.25%		%T11-IE	LOSS OF INSTRUMENT AIR IF OR LOSP AT UNIT 1
				3.82E-03	RHRF48AA-VOO	MOTOR-OPERATED VALVE RHRE46A OO
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2)G01P PLANT SPECIFIC FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
58	GTR03	2 425 00	0.040		SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
50	GTH03	2.42E-08	0.24%		%T11-IE	LOSS OF INSTRUMENT AIF IE OR LOSP AT UNIT 1
				5.61E-03	2E12C002B-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
					Cé	PSD)

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Pro	b. Event Name	네 이게 뭐야? 그 뭐라고 없는 요요? 아니는 것이 뭐요? 요요네
THE REAL PROPERTY.			7010,001			Accident-Sequence Event Description
				3.53E-03 7.00E-02	CSCD300A-STR-PLG	2E12D300A STRAINER RHR SW TRAIN & PLUG
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 22Hrs (EDIN)
59	GTR03	2.42E-08	0.24%	3.30E-01	SURVIVABILITY	HOLOTON FAILS TO SURVIVE AFTER CONTAINMENT EAR CEDIAN
		Z.42L-00	0.24%	5.30E-02	%T11-IE	LOSS OF INSTHUMENT AIR IE OR LOSP AT LINIT 1
				3.53E-03	CSCD300B-STR-PLG	2E12D300B STRAINER RHR SW TRAIN B PLUG
				5.61E-03	2E12C002A-FLT	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
60	IORV06	2 415 00		3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
00	1011400	2.41E-08	0.24%	5.30E-02	%T7-IE	IORV IE
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
61	100047	0 105 00		5.39E-03	LCSC001A-PMS-SS	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
01	LOOP17	2.40E-08	0.24%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
00	141 000			4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
62	32 ML009	2.40E-08	0.24%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	BPS and ADI FAILURE DAVIS AND
63	LOOP07	2.36E-08	0.24%	5.30E-02	%LOSP	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
				4.33E-02	2E22S001-FAULTS	LOSS OF OFFSITE POWER INIT EVENT
				7.34E-03	RCIF013C-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				1.40E-03	OADS	MOV RCIC F013 VALVE FAULTS OP ACT: INITIATE ADS
64	IORV06	2.35E-08	0.24%	5.30E-02	%T7-IF	IORV IE
					2FW005-PATH-FLT	
					CODGO1P-FAULTS	2FW005 MDRFF REG VALVE PATH FAULTS
				4.26F-03	SWVY02AX-INHTR	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
65	GTR11	2.33E-08	0.23%	5.30E-02	%T11-IF	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
				3.55F-03	HPCS-TOTALUUM	LUSS OF INSTHUMENT AIR IE OR LOSP AT LINIT 1
					LPCI-CM	HPCS total unavailability due to mech and elec maintenance
66	GTR03	2.32E-08	0.23%		%T102-IE	COMMON MODE FAILURE OF ALL 31 PCI PLIMPS (PETA - AC)
					RHRSWA-HTX-ISO-V	LOSS OF 4160V AC BUS 242Y IF(QUANT SWGR242VA)
				7.00E-02	RHR-RECOVERY	HHHS Y A HIS ISOLATION VALVE FALLETS
					SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
57	GTR03	2.32E-08	0.23%		%T101-IE	INDUCTION FAILS TO SURVIVE AFTER CONTAINMENT EAST CIEDIAN
			0.2070			2003 OF 4160V AC BUS 241Y IEIQUANT SWGR241VAL
				The second secon	RHRSWB-HTX-ISO-V	HUNDAN BHIX ISOLATION VALVE FALLETS
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 224- (FDIA)
68	GTR03	2.32E-08	0.23%		SURVIVABILITY	HADEOTION FAILS TO SURVIVE AFTER CONTAINMENT EAT CLEON
		TIOLE OF	0.23/6		%T101-IE	LOSS OF 4100V AC BUS 241Y IEIQUANT SWGR241VAL
				3.825-03	RHRF48BB-VOO	MOTOR-OPERATED VALVE RHRF48RR OO
				7.00E-02 1	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 22Hrs (EDIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
					C.7	TAILS(EHIN)

Seq. No.	Sequence Mame	CDF	Percent of Total CDF	Event Pro	b. Event Name			
69	GTR03	2.32E-08	0.23%	2.63E-04	%T102-IE	Accident-Sequence Event Description		
				3.82E-03	RHRF48AA-VOO	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)		
				7.00E-02	RHR-RECOVERY	MOTOR-OPERATED VALVE RHRF48AA OO		
				3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)		
70	RB-FLD	2.29E-08	0.23%	2.00E-04	%FS	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)		
				5.42E-02	INTR-JOCKY-P-LF	FLOOD IE'S GROUND OR MAIN RB FLOOR (x capacity factor .7		
				3.10E-01	DFPA	INTERMEDIATE JOCKY PMP FAILURE		
				3.10E-01	DFPB	DIESEL FIRE PUMP TRAIN A		
				2.20E-02	OSW	DIESEL FIRE PUMP TRAIN B		
71	GTR03	2.27E-08	0.23%	5.30E-02	%T11-IE	OP ACT: SECURE SW PUMPS FROM THE CNTRL ROOM		
				5.26E-03	CODGO1P-FAULTS	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1		
				3.53E-03	CSCD300B-STR-PLG	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS		
					RHR-RECOVERY	2E12D300B STRAINER RHR SW TRAIN B PLUG		
				3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)		
72 GTR03	GTR03	2.27E-08	0.23%	5.30E-02	%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL CLEDING		
				5.26E-03	2DG01P-FAULTS	LUSS OF INSTHUMENT AIR IE OR LOSP AT LINIT 1		
				3.53E-03	CSCD300A-STR-PLG	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)		
						RHR-RECOVERY	2C 12D3UGA STRAINER HHR SW TRAIN A PILIG	
				3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)		
73	LOOP07	2.20E-08	0.22%	5.30E-02	%LOSP	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT EAST CLEDIAN		
				***************************************	4.33E-02	2E22S001-FAULTS	LUSS OF OFFSITE POWER INIT EVENT	
			1.40E-03		OADS	MOTOR-OPERATED VALVE RCIF046C CC		
74	ATW14	2.20E-08	0.22%		%T2T4-IE	OP ACT: INITIATE ADS		
					2C41C001B-PMP-F	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM		
					2C41C001A-PMP-F	2041CUU1B SLC PUMP B LOCAL FAULTS		
					ATWS	2C41C001A SLC PUMP A LOCAL FAULTS (PSD)		
					RPS-ARI-F	ATWS FLAG TO IDENTIFY ATWS CUTSETS		
75	GTR03			%T101-IE	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)			
					DW-HP-RHR-SGNB-F	LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)		
				7.00E-02	RHR-RECOVERY	DW HI-PRESS RHR TRAIN B SGNL FAIL (QUANT:NOS-POP-RHR-T24A)		
					SURVIVABILITY	TAILONE TO RECOVER 1-UF-2 HHH TRAINS WITHIN 32Hre (EDIN)		
76	GTR03	2.20E-08	0.22%		%T102-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS (EDIA)		
					DW-HP-RHR-SGNA-F	LUSS OF 4160V AC BUS 242Y IE(QUANT SWGR242VA)		
					RHR-RECOVERY	DW HI-PRESS RHR TRAIN A SGNL FAIL (QUANT:NOS-POP-RHR-T24B)		
					SURVIVABILITY	ALLONE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hre (EDIN)		
77	GTR03	2.20E-08	0.22%	and the same and the same	%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL CLEDIAL		
					SEVY03CB-FMS-SS	LUSS OF INSTRUMENT AIR IE OR LOSP AT LINIT 1		
				4.23E-03	NWVY01CA-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS		
				7.00E-02	RHR-RECOVERY	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS		
					SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)		
78	LOOP07	2.19E-08	0.22%		%LOSP	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL CLEDING		
			-		2E22S001-FAULTS	LOSS OF OFFSITE POWER INIT EVENT DG2B PLANT SPECIFIC FAULTS (PSD)		

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prot	Event Name	
				6.81E-03	RCIF045C-VCC	Accident-Sequence Event Description
				1.40E-03	OADS	MOTOR-OPERATED VALVE RCIF045C CC OP ACT: INITIATE ADS
79	LOOP17	2.17E-08	0.22%	1.60E-02	%DLOSP	
				4.33E-02	2E22S001-FAULTS	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	SY-VNF-HVDG2A	DG2B PLANT SPECIFIC FAULTS (PSD)
				7.63E-02	DG0-FAULTS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				4.27E-02	ROP3	DG0 PLANT SPECIFIC FAULTS(PSD)
80	GTR03	2.15E-08	0.22%	5.30E-02	%T11-IE	failure to recover OSP within 3 HRS(NO LOAD SHED)
				5.61E-03	2E12C002A-FLT	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.13E-03	2E12C002A-FLT	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	2E12B001B-HTX-LF	ZETZBUUTB HX THAIN B PLANT SPECIFIC FALLET DATA (PSD)
				3.30E-01	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hre (EDIN)
81 GTR03	2.15E-08	0.22%		SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL STEDING	
		2.101.00	0.2276	5.30E-02	%T11-IE	LUSS OF INSTRUMENT AIR IE OR LOSP AT LINIT 1
				2E12C002B-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PLIMP FALLETS (PSD)	
				3.13E-03	2E12B001A-HTX-LF	ZETZBUUTA HX THAIN A PLANT SPECIFIC FAULT DATA (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 32Hre (EDIM)
82	GTR03	2 145 00	0.040	3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL C/EDIAN
02	02 G1703	2.14E-08	0.21%		%T101-IE	LUSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				3.53E-03	CSCD300B-STR-PLG	2E12D300B STRAINER RHR SW TRAIN B PLUG
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
83	OTDOO	0.445.00			SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
03	GTR03	2.14E-08	0.21%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
			3.53E-	3.53E-03	CSCD300A-STR-PLG	2E12D300A STRAINER RHR SW TRAIN A PLUG
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
	OTDAA	and the second section of		3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS (ERIN)
84	GTR03	2.09E-08	0.21%		%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
					OP-VENT-CNTNMNT	OP ACT: VENT CONTAINMENT
					RHR-RECOVERY	FAILURE TO RECOVER 1 OF 2 PUR TRAING WITHIN AND
				3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
85	GTR03	2.02E-08	0.20%	5.30E-02	%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
					CODGO1P-FAULTS	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
					2E12B001B-HTX-LF	2F12R001R HY TRAIN P. DI ANT COPCUEIO SAU STATE
					RHR-RECOVERY	2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD)
					SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHM TRAINS WITHIN 33Hrs (ERIN)
86	GTR03	2.02E-08	0.20%		%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				The second secon	2DG01P-FAULTS	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
					2E12B001A-HTX-LF	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
					RHR-RECOVERY	2E12B001A HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD)
					SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
87	GTR03	1.98E-08	0.20%		%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS (FRIM)
			V.16.0.10		RHRSWB-HTX-ISO-V	LUSS OF INSTHUMENT AIR IE OR LOSP AT UNIT 1
					NWVY01CA-FMS-SS	RHRSW B HTX ISOLATION VALVE FAULTS
				V.EUL-03	CO	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS

Seq.	Sequence Name	CDF	Percent of		Total CDF Frequer	ncy: 1.0E-05/yr
	realine	CDF	Total CDF	Event Pro		Accident-Sequence Event Description
				7.00E-02 3.30E-01	RHR-RECOVERY SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 PHR TRAINS MUTUAL COLL (FEB.)
88	GTR03	1.98E-08	0.20%	5.30E-02	%T11-IE	THE CONTRACTOR ALLS TO SURVIVE AFTER CONTAINING FAIR OF THE
				4.23E-03		
				3.82E-03	RHRSWA-HTX-ISO-V	MOTOH-DHIVEN FAN SEVY03CR SS FALLETS
				7.00E-02	RHR-RECOVERY	HHHSW A HIS ISOLATION VALVE FALLITE
00	OTDOO			3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
89	GTR03	1.98E-08	0.20%	5.30E-02	%T11-IE	THE TOTAL OF THE CONTAINING AT FAIR OF THE
				3.82E-03	RHRF48BB-VOO	TO THE PROPERTY AND IN COUNTY AND INCIDENT A
				4.23E-03	NWVY01CA-FMS-SS	MOTOR-OPERATED VALVE RHRF48BB OO
				7.00E-02	RHR-RECOVERY	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS
90	GTR03	1 005 00		3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
00	011103	1.98E-08	0.20%	5.30E-02	%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRF48AA-VOO	MOTOR-OPERATED VALVE RHRF48AA OO
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
91	GTR03	1.90E-08	0.19%	3.30E-01	SURVIVABILITY	THE STATE OF THE S
			0.19%	2.63E-04	%T101-IE	
				3.13E-03	2E12B001B-HTX-LF	TELEBOOTE TA THAIN B PLANT SPECIFIC FALLET DATA (DOD)
				7.00E-02 3.30E-01	RHR-RECOVERY	THE TO THE OVER 1-UF-2 HAR TRAINE MITLING AND THE TENTS
92	GTR03	1.90E-08	0.19%	2.63E-04	SURVIVABILITY	THE STATE OF THE S
			0.1070	3.13E-03	%T102-IE	TOUR ACTION ACTION AND THE STAND CHARGE CHAR
				7.00E-02	2E12B001A-HTX-LF RHR-RECOVERY	TOTAL THAIN A PLANT SPECIFIC FALLET DATA (DOD)
				3.30E-01	SURVIVABILITY	THE TO RECOVER 1-11F-2 RHD TDAING WITHIN AGE
93	IORV06	1.86E-08	0.19%	5.30E-02	%T7-IE	THE TOTAL OF THE CONTAINING THE CONTAINING THE COLOR
				1.98E-02	2FW005-PATH-FLT	
				4.26E-03	SWVY02AX-INHTR	2FW005 MDRFP REG VALVE PATH FAULTS
94	ATMAG			4.15E-03	LPCS-LOGIC-FLT	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
94	ATW15	1.83E-08	0.18%	4.70E-01	%MSIV	EF OS FOME LOGIC FAULTS
				1.00E+00	ATWS	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
				1.30E-03	OP-SBLC-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS OP ACT: INITIATE SBLC (ATWS)
95	GTR03	1 005 00			RPS-ARI-F	RPS and ARI FAILURE DAILED ANADO MANDO
00	GINUS	1.83E-08	0.18%		%T11-IE	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2) LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.53E-03	CSCD300B-STR-PLG	2E12D300B STRAINER RHR SW TRAIN B PLUG
				4.23E-03	NWVY01CA-FMS-SS	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
96	GTR03	1.83E-08	0.400/		SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS (ERIN)
		1.03E-06	0.18%		%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVYD3CR SS FALL TO
				3.53E-03	CSCD300A-STR-PLG	ZE12U300A STRAINER RHR SW TRAIN A PLUG
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 BHR TRAINC WITHIN COLL
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
					C 10	THE CONTRIVING IN PAILS (EHIN)

No.	Sequence Name	CDF	Percent of Total CDF			Academ Communication
97	LOOP14	1.81E-08	0.18%	1.60E-02 7.34E-03	%DLOSP RCIF013C-FAULTS	Accident-Sequence Event Description DUAL LOSS OF OFFSITE POWER IE MOV RCIC F013 VALVE FAULTS
98	GTR03	1.79E-08	0.18%	3.82E-03 3.82E-03	DGS-FAIL-CM %T11-IE RHRSWB-HTX-ISO-V RHRSWA-HTX-ISO-V RHR-RECOVERY	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012)) LOSS OF INSTRUMENT AIF IE OR LOSP AT UNIT 1 RHRSW B HTX ISOLATION VALVE FAULTS RHRSW A HTS ISOLATION VALVE FAULTS
99	GTR03	1.79E-08	0.18%	3.30E-01 5.30E-02 3.82E-03 3.82E-03	SURVIVABILITY %T11-IE RHRF48AA-VOO HHRSWB-HTX-ISO-V RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN) INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1 MOTOR-OPERATED VALVE RHRF48AA OO RHRSW B HTX ISOLATION VALVE FAULTS
100	GTR03	1.79E-08	0.18%	3.30E-01 5.30E-02 3.82E-03 3.82E-03 7.00E-02	SURVIVABILITY '6T11-IE 'HRF48BB-VOO RHRSWA-HTX-ISO-V RHR-RECOVERY SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN) INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1 MCTOR-OPERATED VALVE RHRF48BB OO RHRSW A HTS ISOLATION VALVE FAULTS FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN) INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
	Totals:	3.68E-06	36.91%	Of Total CDF F	requency: 1.0E-05	

Appendix C - Table 2 Top Cutsets for LOSP Sequences Total CDF Frequency: 1.0E-05/yr

Seq.	Sequence Name	CDF	Percent of		Total CDF Freque	ney: 1.0E-05/yr
1	LOOP18		Total CDF	Event Prol	b. Event Name	Accident-Sequence Event Description
	LOUPIE	2.30E-07	2.31%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.63E-02	DG2A-FAULTS	DG24 PLANT SPECIFIC FAULTS
				7.63E-02		DG0 PLANT SPECIFIC FAULTS(PSD)
2	100017	4 705 47		2.47E-03		failure to recover OSP within 24 hrs
2	LOOP17	1.72E-07	1.73%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
_	100017			4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
3	LOOP17	1.05E-07	1.05%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				1.54E-04	DGS-FAIL-CM	DGs DIV 1.2 common mode failure/DCCA FAIL +/DETA
				4.27E-02	ROP3	DGs DIV 1, 2 common mode failure(DG2A FAIL*(PETA =.012))
4	LOOP14	6.15E-08	0.62%	1.60E-02	%DLOSP	failure to recover OSP within 3 HRS(NO LOAD SHED) DUAL LOSS OF OFFSITE POWER IE
				4.33E-02	2E22S001-FAULTS	DG28 PLANT SPECIFIC FAULTS (PSD)
				7.63E-02	DG0-FAULTS	DGO PLANT SPECIFIC FAULTS (PSD)
				1.53E-02	RCIC001X-TDP-SS	DG0 PLANT SPECIFIC FAULTS(PSD)
					DG2A-FAULTS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
5	LOOP07	4.90E-08	0.49%	the second second	%LOSP	DG2A PLANT SPECIFIC FAULTS
					2E22S001-FAULTS	LOSS OF OFFSITE POWER INIT EVENT
					RCIC001X-TDP-SS	DG2B PLANT SPECIFIC FAULTS (PSD)
					OADS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
6	LOOP14	4.76E-08	0.48%		%DLOSP	OP ACT: INITIATE ADS
					2E22S001-FAULTS	DUAL LOSS OF OFFSITE POWER IE
					DG0-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
					DG2A-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
					RCIF063C-VOC	DG2A PLANT SPECIFIC FAULTS
7	LOOP17	3.85E-08	0.39%		%DLOSP	MOTOR-OPERATED VALVE RCIF063C OC
					DG2B-AUX-SYS	DUAL LOSS OF OFFSITE POWER IE
					DG2A-FAULTS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
					DG0-FAULTS	DG2A PLANT SPECIFIC FAULTS
					ROP3	DG0 PLANT SPECIFIC FAULTS(PSD)
8	LOOP07	3.80E-08	0.38%		%LOSP	failure to recover OSP within 3 HRS(NO LOAD SHED)
			0.0070			LOSS OF OFFSITE POWER INIT EVENT
				The second secon	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
					RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
9	LOOP14	3.76E-08	0.38%		OADS	OP ACT: INITIATE ADS
		J. 1 OL 00	0.30 %		%DLOSP	DUAL LOSS OF OFFSITE POWER IE
					RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				1.54E-04	DGS-FAIL-CM	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012))

Appendix C - Table 2 Top Cutsets for LOSP Sequences

Total	CDF	Frequency:	1.0E-05/vr
a Ottal	CDL	riequency:	I.UE-US/VE

Seq.	Sequence Name	CDF	Percent of Total CDF	Event Prot	Total CDF Freque			
10		2.96E-08				Accident-Sequence Event Description		
	1001 14	2.900-08	0.30%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE		
				4.33E-02		DG2B PLANT SPECIFIC FAULTS (PSD)		
				7.63E-02		DG0 PLANT SPECIFIC FAULTS(PSD)		
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS		
44	10004	444		7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS		
11	LOOP14	2.91E-08	0.29%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE		
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC		
	12 100010			1.54E-04	DGS-FAIL-CM	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA = .012))		
12	12 LOOP18	2.90E-08	0.29%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE		
					SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS		
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)		
				2.47E-03	ROP24	failure to recover OSP within 24 hrs		
13	LOOP17	2.89E-08	0.29%		%DLOSP	DUAL LOSS OF OFFSITE POWER IE		
						2E22C002-FAULTS	DOAL LOSS OF OFFSITE POWER IE	
					DG2A-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)		
					DG0-FAULTS	DG2A PLANT SPECIFIC FAULTS		
					ROP3	DG0 PLANT SPECIFIC FAULTS(PSD)		
14	14 LOOP17	2.81E-08	0.28%		%DLOSP	failure to recover OSP within 3 HRS(NO LOAD SHED)		
					2E22C001-PMS-SS	DUAL LOSS OF OFFSITE POWER IE		
				7.63E-02	DG2A-FAULTS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)		
							DG0-FAULTS	DG2A PLANT SPECIFIC FAULTS
				The second secon	ROP3	DG0 PLANT SPECIFIC FAULTS(PSD)		
15	LOOP14	2.77E-08	0.28%		%DLOSP	failure to recover OSP within 3 HRS(NO LOAD SHED)		
			0.2070		2E22S001-FAULTS	DUAL LOSS OF OFFSITE POWER IE		
				7.63E-02	DG0-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)		
				6.85E-02	RCIF046C-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)		
					DG2A-FAULTS	MOTOR-OPERATED VALVE RCIF046C CC		
16	LOOP14	2.75E-08	0.28%	1.60E-02	% DI OCD	DG2A PLANT SPECIFIC FAULTS		
			0.2076			DUAL LOSS OF OFFSITE POWER IE		
					2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)		
					DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)		
					DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS		
17	LOOP17	2.40E-08	0.24%		RCIF045C-VCC	MOTOR-OPERATED VALVE RCIF045C CC		
- 10.00		2.402-00	0.24/6		%DLOSP	DUAL LOSS OF OFFSITE POWER IE		
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS		
					HP-MOV-FAULTS	HPCS MOV VALVES FAULTS		
					DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)		
18	LOOP07	2.36E-08	0.040		ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)		
10	200101	2.30E-08	0.24%		%LOSP	LOSS OF OFFSITE POWER INIT EVENT		
					2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)		
				7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS		
				1.40E-03 (DADS	OP ACT: INITIATE ADS		

Appendix C - Table 2 Top Cutsets for LOSP Sequences Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob. Event Name	Accident-Sequence Event Description
19	LOOP07	2.20E-08	0.22%	5.30E-02 %LOSP 4.33E-02 2E22S001-FAULTS 6.85E-03 RCIF046C-FAULTS 1.40E-03 OADS	LOSS OF OFFSITE POWER INIT EVENT DG2B PLANT SPECIFIC FAULTS (PSD) MOTOR-OPERATED VALVE RCIF046C CC OP ACT: INITIATE ADS
20	LOOP07	2.19E-08	0.22%	5.30E-02 %LOSP 4.33E-02 2E22S001-FAULTS 6.81E-03 RCIF045C-VCC 1.40E-03 OADS	LOSS OF OFFSITE POWER INIT EVENT DG2B PLANT SPECIFIC FAULTS (PSD) MOTOR-OPERATED VALVE RCIF045C CC OP ACT: INITIATE ADS
	Totals:	1.07E-06	10.74%	Of Total CDF Frequency: 1.0E-05	

Appendix C - Table 3 Top Cutsets for Transient Sequences Total CDF Frequency: 1.0F.05/yr

Seq.	Sequence		Percent of	Total CDF Frequency: 1.0E-05/yr				
No.	Name	CDF	Total CDF	Event Pro	b. Event Name	Accident-Sequence Event Description		
1	GTR03	1.52E-07	1.52%	5.30E-02	N. T. 1. 1.			
			1.5£ /6	1.24E-04	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1		
				7.00E-02	LPCI-CM	COMMON MODE FAILURE OF ALL 21 DOLD HADO IDETA		
				3.30E-01	RHR-RECOVERY	THE TO RECOVER 1-1 IF-2 HAD TO AIME MITTING AND		
2	GTR11	4.77E-08	0.48%	5.30E-02	SURVIVABILITY %T11-IE	THE TOTAL TO SURVIVE AFTER CONTAINING FAIR COMMIT		
				1.24E-04	2E22C002-FAULTS LPCI-CM	EEZZCUUZ DGZB COOL WTR PI IMP PI ANT EDECITIO EL TRATA		
3	GTR11	4.64E-08	0.47%	5.30E-02	%T11-IE			
				7.06E-03		LUUS OF INSTRUMENT AIR IF OR LOCK AT LIAUT 4		
				1.24E-04	2E22C001-PMS-SS LPCI-CM	ELECTION HALS PUMP PLANT SPECIFIC FALL T DATA LOCAL		
4	GTR03	4.41E-08	0.44%	5.30E-02	%T11-IE	COMMON MODE FAILUME OF ALL 31 DOLD IMADE (DETA		
				3.60E-05	CS-COOL-PMP-CM	LOGO OF INSTRUMENT AIR IF OR LOGO ATTIMIT 4		
				7.00E-02	RHR-RECOVERY	COMMON MODE CS COOL WTR PMPS		
-				3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)		
5	5 GTR11	3.97E-08	0.40%	5.30E-02	%T11-IE	THE STATE OF THE PROPERTY OF T		
					HP-MOV-FAULTS	THE PROPERTY AND LEGISLATION OF THE PROPERTY O		
	OTDAA			1.24E-04	LPCI-CM	TIFUS MOV VALVES FALLETS		
6	GTR03	3.86E-08	0.39%	5.30E-02	%T11-IE	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)		
				5.61E-03	2E12C002B-FLT	LOUGH INDINUMENT AIM IN THE THE TOTAL TENTE		
					5.61E-03	2E12C002A-FLT	ELIZOUZD HITH THAIN B MOTOR-DRIVEN DUMB CALL TO 1999	
				7.00E-02	RHR-RECOVERY	THE PARTY A MILLIAM PROPERTY OF THE PROPERTY O		
7	CTDoo			3.30E-01	SURVIVABILITY	THE TO THE COVER 14 IP 2 PHD TDAING MITTING AND THE		
	GTR03	3.61E-08	0.36%	5.30E-02	%T11-IE	TOTAL MILO TO SURVIVE AFTER CONTAINING FAIR CARRIES		
				5.26E-03	2DG01P-FAULTS			
				5.61E-03	2E12C002A-FLT	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)		
				7.00E-02	RHR-RECOVERY			
8	GTR03	2015 00	1	3.30E-01	SURVIVABILITY	THE TO THE OUT I THE THE THE THE PARTE WITH AND THE		
	GTH03	3.61E-08	0.36%	5.30E-02	%T11-IE	THE TOTAL OF THE CONTAINED BY THE PARTY OF T		
				5.26E-03	CODG01P-FAULTS	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1 MOTOR-DRIVEN PUMP CODGO1P SS FAULTS		
				5.61E-03	2E12C002B-FLT	2E12C002B BHR TRAIN B MOTOR DRIVEN BUILD		
				7.00E-02	RHR-RECOVERY	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)		
9	GTR03	3.41E-08	0.040	3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)		
	0.1105	3.41E-U8	0.34%		%T101-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS (ERIN) LOSS OF 4150V AC BUS 241Y IE (QUANT SWGR241YA)		
				5.61E-03	2E12C002B-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)		
				7.00E-02	RHR-RECOVERY	THE TO IT COVER IN THE TURNING MUTILIAN AGE.		
10	GTR03	3.41E-08	0.040/	3.30E-01	SURVIVABILITY			
1 15 1		J.41L-08	0.34%		%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)		
				5.61E-03	2E12C002A-FLT	LOUGH HIM I MAIN A MUTCH-DRIVEN DI MAD EATH TO TOOK		
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33hirs (ERIN)		
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS (ERIN)		
						FAILS (ERIN)		

Appendix C - Table 3 Top Cutsets for Transient Sequences

Seq.	Sequence	Total CDF Frequency: 1.0E-05/yr				
No.	Name	CDF	Percent of Total CDF	Event Prol	b. Event Name	Accident-Sequence Event Description
11	GTR03	3.39E-08	0.34%	E 20E 00	N T44 15	
		0.552 00	0.34/6	5.30E-02 5.26E-03	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	CODGO1P-FAULTS	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
				7.00E-02	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				3.30E-01	RHR-RECOVERY SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 23Hre (EDIN)
12	GTR03	3.20E-08	0.32%	2.63E-04	%T101-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL STEDIAL
			0.0270	5.26E-03	2DG01P-FAULTS	LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				7.00E-02	RHR-RECOVERY	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 2011- (EDIN)
13	GTR03	3.20E-08	0.32%	2.63E-04	%T102-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL STEDIAN
				5.26E-03	CODGO1P-FAULTS	LOSS OF 4160V AC BUS 242Y IEIQUANT SWGR242YAT
				7.00E-02	RHR-RECOVERY	MOTOR-DRIVEN PUMP CODG01P SS FAULTS
				3.30E-01	SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
14	14 GTR03 2.91E-08	2.91E-08	0.29%	5.30E-02	%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				5.61E-03	2E12C002B-FLT	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				4.23E-03	NWVY01CA-FMS-SS	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	MOTOR-DRIVEN FAN NWYY01CA SS FAULTS
				SURVIVABILITY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)	
15	GTR03	2.91E-08	0.29%	5.30E-02	%T11-IE	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN) LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
				5.61E-03	2E12C002A-FLT	2E12C002A F.HR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
16	GTR11	0.005	1	3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
10	GIHII	2.80E-08	0.28%		%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
17	GTR03	0.705.00	Links		LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
17	GINUS	2.73E-08	0.27%		%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				4.23E-03	NWVY01CA-FMS-SS	MOTOR-DRIVEN FAN NWVYOTCA SS FALLETS
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
18	GTR03	2.73E-08	0.070/		SURVIVABILITY	INSECTION FAILS TO SURVIVE AFTER CONTAINMENT EAR C/EDIAN
	G11105	2.13E-08	0.2		%T11-IE	LOSS OF INSTHUMENT AIR IE OR LOSP AT LINIT 1
				5.26E-03	CODG01P-FAULTS	MOTOR-DRIVEN PUMP CODGOTP SS FAULTS
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
					RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (EDIN)
19	GTR03	2.63E-08	0.26%		SURVIVABILITY	INSECTION FAILS TO SURVIVE AFTER CONTAINMENT FAIL STEDIAL
	-	2.002.00	0.2076		%T11-IE	LUGG OF ING I HUMEN I AIR IF OR LOSP AT LINIT 1
					RHRSWB-HTX-ISO-V	HHRSW B HTX ISOLATION VALVE FAULTS
					2E12C002A-FLT	2E12C002A RHR TRAIN A MOTOR-DRIVEN PLIMP FALL TS (PSD)
				The state of the s	RHR-RECOVERY SURVIVABILITY	PAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hre (EDIN)
				2.002 01	SOLIVIADICITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)

Appendix C - Table 3

Top Cutsets for Transient Sequences Total CDF Frequency: 1.0F-05/yr

Seq.	Sequence		Percent of	f			
No.	Name	CDF	Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description	
20	GTR03	2.63E-08	0.26%	5.61E-03 3.82E-03 7.00E-02	%T11-IE 2E12C002B-FLT RHRSWA-HTX-ISO-V RHR-RECOVERY SURVIVABILITY	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1 2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD) RHRSW A HTS ISOLATION VALVE FAULTS FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN) INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)	
	Totals	: 8.00E-07	8.03%	Of Total CDF F	requency: 1.0E-05		

Appendix C - Table 4 Top Cutsets for IORV Sequences Total CDF Frequency: 10F 05/m

Seq.	Sequence		Percent of		Total CDF Frequer	ncy: 1.0E-05/yr
No.	Name	CDF	Total CDF	Event Pro	b. Event Name	Accident Sequence Front Devel of
1	IORV06	4.11E-08	0.41%	5.30E-02	%T7-IE	Accident-Sequence Event Description
				7.26E-03	2E22C002-FAULTS	
				1.98E-02	2FW005-PATH-FLT	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				5.39E-03	LCSC001A-PMS-SS	2FW005 MDRFP REG VALVE PATH FAULTS
2	IORV06	4.01E-08	0.40%	5.30E-02	%T7-IE	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
				7.26E-03	2E22C002-FAULTS	IORV IE
				1.98E-02	2FW005-PATH-FLT	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				5.26E-03	CODGO1P-FAULTS	27 WUUS MURPH REG VALVE PATH FALLITS
3	IORV06	3.16E-08	0.32%	5.30E-02	%T7-IE	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
			0.0270	7.26E-03	2E22C002-FAULTS	IORV IE
				1.98E-02	2FW005-PATH-FLT	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				4.15E-03	LPCS-LOGIC-FLT	LI WOOD MIDHER HEG VALVE PATH FALLITS
4	IORV06	3.04E-08	0.30%	5.30E-02	The state of the s	LPCS PUMP LOGIC FAULTS
			0.5076	7.26E-03	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	IORV IE
				1.98E-02		2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
					2FW005-PATH-FLT	27 WUUS MUHFP HEG VALVE PATH FAILITS
5 IORV06	2.41E-08	0.24%	3.98E-03	LCSF005A-FLT	LCSF005A CB OR OTHER LOCAL FAILURES	
	0 1011100	2.412.00	0.24/6	5.30E-02 1.98E-02		IORV IE
					2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWAYDOAY
6	IOFV06	2.35E-08	0.040/	5.39E-03	LCSC001A-PMS-SS	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
-	1011100	2.33E-06	0.24%	5.30E-02		IORV IE
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
7	IORV06	1.86E-08	0.100/	4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWAYORAY
	.0.1100	1.00E-08	0.19%		%T7-IE	IOHV IE
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWAYCOAY
8	IORV06	1.78E-08	0.400	4.15E-03	LPCS-LOGIC-FLT	LPCS PUMP LOGIC FAULTS
-	.511400	1.702-08	0.18%	5.30E-02	%17-IE	IORV IE
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
					SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
9	IORV06	1 715 00	0.170	3.98E-03	LCSF005A-FLT	LCSF005A CB OR OTHER LOCAL FAILURES
3	10/1/00	1.71E-08	0.17%	5.30E-02		IORV IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
0	IORV06	1 005 00		2.24E-03	NEVY04CA-FMS-SS	MOTOR-DRIVEN FAN NEVY04CA SS FAULTS
U	IONAGE	1.00E-08	0.10%		%T7-IE	IORV IE
					2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
					NEVY04CA-FMS-SS	MOTOR-DRIVEN FAN NEVY04CA SS FAULTS

Appendix C - Table 4 Top Cutsets for IORV Sequences Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prol	D. Event Name	
11	IORV06	6.25E-09	0.06%	5.30E-02		Accident-Sequence Event Description
			0.0070	7.26E-03		IORV IE
				3.01E-03	CST-HOTWELL-LF	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
					LCSC001A-PMS-SS	CST TO HOTWELL MAKEUP LOCAL FAULTS
12	IORV06	6.12E-09	0.06%	5.30E-02	%T7-IF	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
					2E22C002-FAULTS	
				1.98E-02	2FW005-PATH-FLT	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD) 2FW005 MDRFP REG VALVE PATH FAULTS
100	The second second			8.02E-04	C0DG035-VOC	MOTOR-OPERATED VALVE CODG035 OC
13	IORV06	6.10E-09	0.06%	5.30E-02	%T7-IE	IORV IE
				7.26E-03	2E22C002-FAULTS	
				3.01E-03	CST-HOTWELL-LF	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD) CST TO HOTWELL MAKEUP LOCAL FAULTS
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP CODG01P SS FAULTS
14	IORV06	5.49E-09	0.06%	5.30E-02	%T7-IE	IORV IE
				7.26E-03		2E22C002 DG28 COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
45	10DV00			7.20E-04	LCSD302X-STR	SUPPRESSION POOL SUCTION STRAINER LCSD302X FAULTS
15	15 IORV06 4.81E-0	4.81E-09	0.05%	5.30E-02		IORV IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				3.01E-03	CST-HOTWELL-LF	CST TO HOTWELL MAKEUP LOCAL FAULTS
16	IORV06	4 605 00		4.15E-03	LPCS-LOGIC-FLT	LPCS PUMP LOGIC FAULTS
10	IONVUO	4.62E-09	0.05%	5.30E-02		IORV IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				3.01E-03	CST-HOTWELL-LF	CST TO HOTWELL MAKEUP LOCAL FAULTS
17	IORV06	4.23E-09	0.040	3.98E-03	LCSF005A-FLT	LCSF005A CB OR OTHER LOCAL FAILURES
	1011400	4.23E-09	0.04%	5.30E-02		IORV IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				5.39E-03	LCSC001A-PMS-SS	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
18	IORV06	4.13E-09	0.04%	2.04E-03	TBCCW-PSW-U1-FLT	(U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)
	1011100	4.132-09	0.04%	5.30E-02	%17-IE	IONA IE
				5.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
					CODGO1P-FAULTS	MOTOH-DHIVEN PUMP CODGOTP SS FALITTS
19	IORV06	3.67E-09	0.04%	5.30E-02	TBCCW-PSW-U1-FLT	(U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)
		0.072 00	0.0476		CST-HOTWELL-LF	IONVIE
				4 26E 03	SWVY02AX-INHTR	CST TO HOTWELL MAKEUP LOCAL FAULTS
				5.20E-03	LCSC001A-PMS-SS	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
20	IORV06	3.59E-09	0.04%	5.30E-02	%T7-IE	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
					2FW005-PATH-FLT	IORV IE
				4.26E-03	SWVY02AX-INHTR	2FW005 MDRFP REG VALVE PATH FAULTS
				8.02E-04	C0DG035-VOC	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX MOTOR-OPERATED VALVE CODG035 OC
	Totals:	3.03E-07	3.04% C	f Total CDF F	requency: 1.0E-05	

Appendix C - Table 5 Top Cutsets for ATWS Sequences Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Pro	b. Event Name	
1	ATW03	1.65E-07	1.65%	2.40E+00	%T1-IE	Accident-Sequence Event Description
				1.00E+00	ATWS	TURBINE TRIP WITH BYPASS IE
				5.20E-02	OADS-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				4.40E-02	OFWLC-A	OP ACT: ADS AND RESTART PUMPS GIVEN OFWLC-A FAILS (ATWS)
				3.00E-05	RPS-ARI-F	OP ACT: FW CNTRL TO LOWER PWR < BYPASS CAPACITY (ATWS)
2	ATW08	9.36E-08	0.94%	2.40E+00		HPS and AHI FAILUHE (HMIEP, NMPC, WNP-2)
				1.00E+00	ATWS	TURBINE TRIP WITH BYPASS IE
				1.30E-03	OP-SBLC-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	OP ACT: INITIATE SBLC (ATWS)
3	ATW12	7.78E-08	0.78%		%T2T4-IE	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
			*******	the state of the s	ATWS	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				3.20E-03		ATMS FLAG TO IDENTIFY ATMS CUTSETS
				3.00E-05	RPS-ARI-F	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
4	ATW12	5.59E-08	0.56%		%T2T4-IE	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
			0.0070	1.00E+00		TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				The second second second	OADS-B	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					RPS-ARI-F	OP ACT: ADS AND RESTART PUMPS GIVEN FW UNAVAILABLE (ATWS)
5	ATW12	4.51E-08	0.45%	4.70E-01	%MSIV	HTS and AHI FAILURE (RMIEP, NMPC, WNP-2)
			0.1070	1.00E+00	ATWS	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
					ORPVLC-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					RPS-ARI-F	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
6	ATW07	4.18E-08	0.42%	2.40E+00	%T1 IE	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
			0.12.0		ATWS	TURBINE TRIP WITH BYPASS IE
					OPTL-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					RPS-ARI-F	OP ACT: PTL LPCS, HPCS, LPCI PMPS (ATWS)
7	ATW12	3.24E-08	0.32%		%MSIV	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
			0.0270		ATWS	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
					OADS-B	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					RPS-ARI-F	OP ACT: ADS AND RESTART PUMPS GIVEN FW UNAVAILABLE (ATWS)
8	ATW15	3.16E-08	0.32%		%T2T4-IE	AFS and ARI FAILURE(RMIEP, NMPC, WNP-2)
			0.02 /0	The Control States of the Control	ATWS	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
					OP-SBLC-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					RPS-ARI-F	OP ACT: INITIATE SBLC (ATWS)
9	ATW14	2.20E-08	0.22%		%T2T4-IE	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
			U.EE /6			TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
					2C41C001B-PMP-F	2041COUTB SEC PUMP B LOCAL FAULTS
				and the second second second second	2C41C001A-PMP-F	2C41C001A SLC PUMP A LOCAL FAULTS (PSD)
					ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
10	ATW15	1.83E-08	0.18%		RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
		1.002 00	0.1076		%MSIV	MSIV CLOSURE IE(including loss of 100 psi pneumatic IF)
					ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				1.30E-03	OP-SBLC-A	OP ACT: INITIATE SBLC (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)

Appendix C - Table 5 Top Cutsets for ATWS Sequences Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Pro	b. Event Name	
11	ATW13	1.41E-08	0.14%	8.10E-01	%T2T4-IE	Accident-Sequence Event Description
				1.00E+00	ATWS	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				5.80E-04	OPTL-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					RPS-ARI-F	OP ACT: PTL LPCS, HPCS, LPCI PMPS (ATWS)
12	ATW14	1.28E-08	0.13%	4.70E-01	%MSIV	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
				3.01E-02	2C41C001B-PMP-F	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
					2C41C001B-PMP-F	2C41C001B SLC PUMP B LOCAL FAULTS
				1.00E+00	ATMS	2C41C001A SLC PUMP A LOCAL FAULTS (PSD)
				3.00E-05	RPS-ARI-F	ATWS FLAG TO IDENTIFY ATWS CUTSETS
13	ATW03	1.01E-08	0.10%	2.40E+00	%T1-IE	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
			0.1076	And the same of th		TURBINE TRIP WITH BYPASS IE
					ATWS OFWLC-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				4.40E-02		OP ACT: FW CNTRL TO LOWER PWR < RYPASS CAPACITY (ATME)
				3.20E-03	ORPVLC-A	OF ACT, RESTORE HPV LEVEL TO MIX ROBON (ATME)
14	ATW13	8.18E-09	0.08%		RPS-ARI-F	HPS and AHI FAILURE (RMIEP, NMPC, WNP-2)
		U. 10L-03	0.08%	4.70E-01	%MSIV	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					OPTL-A	OP ACT: PTL LPCS, HPCS, LPCI PMPS (ATWS)
15	ATW05	6.53E-09	0.070		RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
	A11103	0.53E-09	0.07%		%T1-IE	TURBINE TRIP WITH BYPASS IE
				3.01E-02	2C41C001B-PMP-F	2C41C001B SLC PUMP B LOCAL FAULTS
				3.01E-02	2C41C001A-PMP-F	2C41C001A SLC PUMP A LOCAL FAULTS (PSD)
					ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
16	ATW12	0.045.00			SBLC2	BORON INJECTION USING RWCU GIVEN SBLC FAILURE
10	MINAIS	6.34E-09	0.06%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSED LINAVAILABLE OF ALLUHE
				2.61E-04	ADS	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				1.00E+00	ATWS	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE (DAVIED ANADO MAIS
17	ATW14	5.90E-09	0.06%		%T2T4-IE	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
					FAULT-SLC-C03	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
					ATWS	COMPONENT FAULT OCCURS IN STDBY LIQUID CTRL SEGMENT C03
					RPS-ARI-F	ATWS FLAG TO IDENTIFY ATWS CUTSETS
18	ATW17	5.09E-09	0.05%		%LOSP	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
					ORPVLC-A	LOSS OF OFFSITE POWER INIT EVENT
				The second secon	RPS-ARI-F	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
19	ATW12	4.56E-09	0.05%	AND THE RESERVE OF THE PARTY OF	%T1-IE	HPS and AHI FAILURE(RMIEP, NMPC, WNP-2)
					2FW005-PATH-FLT	TURBINE TRIP WITH BYPASS IE
					ATWS	2FW005 MDRFP REG VALVE PATH FAULTS
					ORPVLC-A	ATWS FLAG TO IDENTIFY ATWS CUTSETS
					The state of the s	OP ACT: RESTORE RPV LEVEL TO MIX ROBON (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)

Appendix C - Table 5 Top Cutsets for ATWS Sequences Total CDF Frequency: 1.0E-05/yr

Seq.	Sequence		Percent of	Total CDF Frequency: 1.0E-05/yr		
No.	Name	CDF	Total CDF	Event Prob. Event Name	Accident-Sequence Event Description	
20	ATW12	4.40E-09	0.04%	2.40E+00 %T1-IE 1.91E-02 2FW01PC-FAULTS 1.00E+00 ATWS 3.20E-03 ORPVLC-A 3.00E-05 RPS-ARI-F	TURBINE TRIP WITH BYPASS IE COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3 ATWS FLAG TO IDENTIFY ATWS CUTSETS OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS) RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)	
	Totals:	6.62E-07	6.63%	Of Total CDF Frequency: 1.0E-05		

Appendix C - Table 6 Top Cutsets for LOCA Sequences Total CDF Frequency: 1 05 05/27

Seq.	Sequence		Percent of		Total CDF Freque	ncy: 1.0E-05/yr
No.	Name	CDF	Total CDF	Event Pro	b. Event Name	Accident-Sequence Event Description
	ML009	2.40E-08	0.24%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY A THE
_	11005			3.00E-05	RPS-ARI-F	ATWS FLAG TO IDENTIFY ATWS CUTSETS
2	LL005	9.00E-09	0.09%	3.00E-04	%LLOCA	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
				1.00E+00	ATWS	LARGE LOCA IE
				3.00E-05	RPS-ARI-F	ATWS FLAG TO IDENTIFY ATWS CUTSETS
3	ML005	8.13E-09	0.08%	8.00E-04	%MLOCA	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
				7.26E-03	2E22C002 FAULTS	MEDIUM LOCA IE
				1.40E-03	OADS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
4	ML005	7.91E-09	0.08%	8.00E-04	%MLOCA	O. MOT. HITTIATE ADS
				7.06E-03	2E22C001-PMS-SS	MEDIUM LOCA IE
				1.40E-03	OADS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
5	ML005	6.76E-09	0.07%	8.00E-04		OF ACT. HATTALE AUS
			0.0776		%MLOCA	MEDIUM LOCA IE
				1.405.00	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
6	ML005	4.77E-09	0.05%	1.40E-03	OADS	OP ACT: INITIATE ADS
			0.05%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
7	ML005	3.98E-09	0.040/	1.40E-03	OADS	OP ACT: INITIATE ADS
		3.30L-03	0.04%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				3.55E-03	HPCS-TOTALUUM	HPCS total unavailability due to mech and elec maintenance
8	LL004	3.00E-09			OADS	OP ACT: INITIATE ADS
_	LLUU4	3.000-09	0.03%	3.00E-04	%LLOCA	LARGE LOCA IE
9	ML005	+ 505 00			VSP	VAPOR SUPPRESSION POOL
9	MILOUS	1.52E-09	0.02%		%MLOCA	MEDIUM LOCA IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WITH DUMAN SI AND SI
10	ML005	4 175		2.61E-04	ADS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
10	MILUUS	1.47E-09	0.01%	8.00E-04	%MLOCA	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M MEDIUM LOCA IE
					2E22C001-PMS-SS	
	14.000				ADS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
11	ML005	1.26E-09	0.01%	8.00E-04	%MLOCA	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M MEDIUM LOCA IE
					HP-MOV-FAULTS	MEDION LOCA IE
				The second secon	ADS	HPCS MOV VALVES FAULTS
12	ML905	8.90E-10	0.01%		%MLOCA	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M
					SWVY02AX-INHTR	TOOM LOOK IL
					ADS	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
13	ML005	7.41E-10	0.01%		%MLOCA	OF AND VEVS FAIL TO FUNCTION ON DESIGNIDADO OLIANIZACIONE
						TOOK IL
					HPCS-TOTAL-UUM	HPCS total unavailability due to mech and elec maintenance
14	ML005	3.23E-10	0.00%		ADS	OF AUS VLVS FAIL TO FUNCTION ON DEMANDIAGE OF THE PERSON
			0.00/6		MLOCA	THE TOTAL LOOK IL
					HP-CHK-MAN-FLT	HPCS MANUAL OR CHECK VALVES FAULTS
				1.40E-03 (DADS	OP ACT: INITIATE ADS

Appendix C - Table 6 Top Cutsets for LOCA Sequences Total CDF Frequency: 1 0F-05/yr

Seq.	Sequence		Percent of		Total CDF Frequen	icy: 1.0E-05/yr
No.	Name	CDF	Total CDF	Event Prol	. Event Name	Accident-Sequence Event Description
15	LL003	7.84E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
40	01.000			3.60E-05	CS-COOL-PMP-CM	COMMON MODE CS COOL. WTR PMPS
16	SL903	7.73E-11	0.00%	3.00E-03	%SLOCA	SMALL LOCA IE
					LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
				9.00E-03	OP-VENT-CNTNMNT	OP ACT: VENT CONTAINMENT
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
47	11000			3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
17	LL003	7.63E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
40	11000			3.60E-05	CS-COOL-PMP-CM	COMMON MODE CS COOL. WIR PMPS
18	LL003	6.52E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IS
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
10	1000			3.60F 05	CS-COOL-PMP-CM	COMMON MODE CS COOL. WTR PMPS
19	ML005	6.02E-11	0.00%	S.00E-04	%MLOCA	MEDIUM LOCA IE
				2.89E-04	HP-CHK-MAN-FLT	HPCS MANUAL OR CHECK VALVES FAULTS
20	11000			2.61E-04	ADS	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M
20	LL003	6.02E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IE
					2E22CC92-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
04	11000			5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
21	LL003	5.86E-11	0.00%		%LLOCA	LARGE LOCA IE
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
22	11000			7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
22	LL003	5.01E-11	0.00%		%LLOCA	LARGE LOCA IE
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
22	11000			6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
23	LL003	4.85E-11	0.00%		%LLOCA	LARGE LOCA IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				5.26E-03	CODG01P-FAULTS	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
24	11000			4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
24	LL003	4.72E-11	0.00%		%LLOCA	LARGE LOCA IE
				5.26E-03	CODG01P-FAULTS	MOTOR-DRIVEN PUMP CODGO1P SS FAULTS
					SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
or.					E22C001-PMS-SS	2F22C001 HPCS DUMP DI ANT SECURIO SALUTA
25	LL003	4.60E-11	0.00%	3.00E-04 9	%LLOCA	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN) LARGE LOCA IE
					SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AID COOL HIS CHILD
					CS-COOL-PMP-CM	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX COMMON MODE CS COOL. WTR PMPS

Appendix C - Table 6 Top Cutsets for LOCA Sequences Total CDF Frequency: 1.0F-05/vr

Seq.	Sequence		Percent of	of Frequency: 1.0E-05/yr		
No.	Name	CDF	Total CDF	Event Prob.	Event Name	
26	ML005	4.38E-11	0.00%	3.91E-05	%MLOCA 1E243-1-480-LPW	Accident-Sequence Event Description MEDIUM LOCA IE LOSS OF POWER AT 480 BUS 1E243-1
27	LL003	4.03E-11	0.00%	3.00E-04 5.26E-03 4.23E-03	OADS %LLOCA CODG01P-FAULTS SEVY03CB-FMS-SS HP-MOV-FAULTS	OP ACT: INITIATE ADS LARGE LOCA IE MOTOR-DRIVEN PUMP CODGO1P SS FAULTS MOTOR-DRIVEN FAN SEVY03CB SS FAULTS HPCS MOV VALVES FAULTS
	Totals	: 7.45E-08	0.75%	of Total CDF F	requency: 1.0E-05	

Appendix C - Table 7 Top Cutsets for SBO Sequences Total CDF Frequency: 1.0E-05//r

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Pro	b. Event Name	
1	SBO14	9.18E-11	0.00%	1.60E-02	%DLOSP	Accident-Sequence Event Description
					SY-VNF-HVDG2A	DUAL LOSS OF OFFSITE POWER IE
				3.82E-03	DG0V01YA-FAULTS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
					2E22S001-FAULTS	OVDUTTA MOD FAULTS
				3.60F-03	RX-LO-PR-SGNL-F	DG2B PLANT SPECIFIC FAULTS (PSD)
2	SBO14	9.12E-11	0.00%	1.60E-02	%DLOSP	RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A)
					SY-VNF-HVDG2A	DUAL LUSS OF OFFSITE POWER IF
				4.33E-02	2E22S001-FAULTS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				3.80E-03	DG0V03YA-FAULTS	DOZE FLANT SPECIFIC FAULTS (PSD)
				3.60E-03	RX-LO-PR-SGNL-F	OVDO3YA MOD FAULTS
3	SBO14	8.69E-11	0.00%	1.60E-02	%Dingr	RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A)
				9.62E-03	SY-VNF-HVDG2A	DONE LOSS OF OFFSITE POWER IF
				3.82E-03	DG0V01YA-FAULTS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS 0VD01YA MOD FAULTS
				1.53E-02	RCIC001X-TDP-SS	TUPPINE DRIVEN DUMP DEIGNA
	and the same of			9.69E-03	DG2B-AUX-SYS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
4	SBO14	8.64E-11	0.00%	1.60E-02	%DLOSP	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				9.62E-03	SY-VNF-HVDG2A	DUAL LOSS OF OFFSITE POWER IE
				1.53E-02	RCIC001X-TDP-SS	ROOM HYDG2A COOLING OR VENTILATION SYSTEM FAULTS
				9.69E-03	DG2B-AUX-SYS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
					DG0V03YA-FAULTS	HPCS DIESEL AUXILIARY SYTEMS FAILURE 0VD03YA MOD FAULTS
5	SBC14	8.21E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
					DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
					FICIC-EXHST-VLVS	RCIC EXHAUST VALVES MODULE
					DG0V01YA-FAULTS	0VD01YA MOD FAULTS
	00011				DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
6	SBO14	8.15E-11	0.00%		%DLGSP	DUAL LOSS OF OFFSITE POWER IE
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				1.82E-03	RCIC-EXHST-VLVS	RCIC EXHAUST VALVES MODULE
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
7	cno			3.80E-03	DG0V03YA-FAULTS	OVDOSYA MOD FAULTS
7	SBO14	6.73E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	SY-VNF-HVDG2A	BOOM HVDG2A COOLING OR VENTUATION OVER THE
				3.82E-03	DG0V01YA-FAULTS	ROOM ! IVDG2A COOLING OR VENTILATION SYSTEM FAULTS 0VD01YA MOD FAULTS
					DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
	00011				RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
8	SBO14	6.69E-11	0.00%		%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	SY-VNF-HVDG2A	ROOM HYDGOA COOLING OR VENTUATION OVOTERA EA
				9.69E-03	DG2B-AUX-SYS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS HPCS DIESEL AUXILIARY SYTEMS FAILURE
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
					DG0V03YA-FAULTS	OVDO3YA MOD FAULTS

Appendix C - Table 7 Top Cutsets for SBO Sequences Total CDF Frequency: 1.0E-05/vr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prol	b. Event Name	
9	SBO14	6.51E-11	0.00%	1.60E-02	%DLOSP	Accident-Sequence Event Description
			0.0070	9.62E-03	SY-VNF-HVDG2A	DUAL LOSS OF OFFSITE POWER IE
				3.82E-03	DG0V01YA-FAULTS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				1.53E-02	RCIC001X-TDP-SS	OVDOTYA MOD FAULTS
				7.26E-03	2E22C002-FAULTS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
10	SBO14	6.47E-11	0.00%	1.60E-02	%DLOSP	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				9.62E-03	SY-VNF-HVDG2A	DUAL LOSS OF OFFSITE POWER IF
				1.53E-02	RCIC001X-TDP-SS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				7.26E-03	2E22C002-FAULTS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
				3.80E-03	DG0V03YA-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SFECIFIC FLT DATA (PSD)
11	SBO14	6.34E-11	0.00%	1.60E-02	%DLOSP	OVDUSTA MOD FAULIS
				7.06E-03	2E22C001-PMS-SS	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	SY-VNF-HVDG2A	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				3.82E-03	DG0V01YA-FAULTS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				1.53E-02	RCIC001X-TDP-SS	OVDOTYA MOD FAULTS
12	SBO14	6.30E-11	0.00%	1.60E-02	%D! OSP	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
				7.06E-03	2E22C001-PMS-SS	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	SY-VNF-HVDG2A	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
					RCIC001X-TDP-SS	ROCM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				3.80E-03	DG0V03YA-FAULTS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS 0VD03YA MOD FAULTS
13	SBO14	5.76E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	SY-VNF-HVDG2A	ROOM HYDIGA COOLING OF VENTUATION SYSTEM
						ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS MOTOR-DRIVEN PUMP CODG01P SS FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
	00011	and the later of		7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
14	SBO14	5.42E-11	0.00%	1.60E-02		DUAL LOSS OF OFFSITE POWER IE
					SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				3.82E-03	DG0V01YA-FAULTS	OVDOTYA MOD FAULTS
					RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
15	SPO14	F 00F 44		6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
10	30314	5.38E-11	0.00%		%DLOSP	DUAL LOSS OF OFFSITE POWER IE
					SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
					RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
					HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
16	SBO14	E 20E 44	0.000		DG0V03YA-FAULTS	0VD03YA MOD FAULTS
1.0	35014	5.38E-11	0.00%		%DLOSP	DUAL LOSS OF OFFSITE POWER IF
					SY-VNF-HVDG2A	ROOM HVDG2/ COOLING OR VENTIL ATION SYSTEM FALL TS
					CODG01P-FAULTS	MUTUH-DHIVE PUMP CODGOTP SS FALITYS
					RCIF046C-FAULTS	MOTOR-OPERATED VALVE RCIF046C CC
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE

Appendix C - Table 7 Top Cutsets for SBO Sequences

Total CDF Frequency: 1.0E-	-05/vr
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Seq.	Sequence Name	CDF	Percent of Total CDF	Event Prot	Total CDF Frequer	
17	SBO14	5.34E-11	0.00%		THE PARTY OF THE P	Accident-Sequence Event Description
	000.4	5.54L-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	SY-VNF-HVDG2A	ROOM I: VDG2A COOLING OR VENTILATION SYSTEM FAULTS
				5.26E-03	CODGO1P-FAULTS	MOTOH-DRIVEN PUMP CODGOTP SS FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
18	SBO14	5.10E-11	2 000	6.81E-03	RCIF045C-VCC	MOTOR-OPERATED VALVE RCIF045C CC
	00014	J. 10E-11	0.00%	1.60E-02		DUAL LOSS OF OFFSITE POWER IE
				2.24E-03	DG0V01CA-FMS-SS	OVD01C MOTOR-DRIVEN FAN DG0V01CA SS FALL TS
				9.62E-03	SY-VNF-HVDG2A	HOOM HVDG2A COOLING OR VENTILATION SYSTEM FAILUTS
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
19	SB014	5.05E-11	0.000/	9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
	00014	3.03E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
					SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
					DG0V01YA-FAULTS	OVDOTYA MOD FAULTS
					2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
20	SBO14	E 01E 11	5 0001		RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
2.0	30014	5.01E-11	0.00%			DUAL LOSS OF OFFSITE POWER IE
					SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
					2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
					RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
21	SBO14	4015 44		3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
21	30014	4.91E-11	0.00%		%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
					SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
					DG0V01YA-FAULTS	OVDOTYA MOD FAULTS
22	SBO14	4 005 44			RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
22	30014	4.88E-11	0.00%		%DLOSP	DUAL LOSS OF OFFSITE POWER IE
					2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
					SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
22	00014			3.80E-03	DG0V03YA-FAULTS	OVDOSYA MOD FAULTS
23	SB014	4./5E 11	0.00%		%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				3.82E-03	DG0V01YA-FAULTS	OVDOTYA MOD FAULTS
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
					DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
24	00011				2DG01P-FAULTS	DG2A COOL WTB PLIMP 2DC01P PLANT OPEGIFIC FALL
24	SBO14	4.72E-11	0.00%		%DLOSP	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD) DUAL LOSS OF OFFSITE POWER IE
					RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCICO01 SS FAULTS
				9.69E-03 [DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
					DG01P-FAULTS	DG2A COOL WTR PLIMP 2DG01P PLANT CRECUES SALE
				3.80E-03 [OGOVO3YA-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD) 0VD03YA MOD FAULTS

Appendix C - Table 7

Top Cutsets for SBO Sequences Total CDF Frequency: 1.0E-05/vr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob	. Event Name	
25	SBO14	4.63E-11	0.00%	1.60E-02	- Cront Hunte	Accident-Sequence Event Description
		4.002 11	0.0076		%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				1.82E-03	RCIC-EXHST-VLVS	RCIC EXHAUST VALVES MODULE
				9.62E-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				3.82E-03	DG0V01YA-FAULTS	OVDOTYA MOD FAULTS
26	SBO14	4.60E-11	0.000/	4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
	30014	4.00E-11	0.00%	1.60E-02		DUAL LOSS OF OFFSITE POWER IE
				1.82E-03	RCIC-EXHST-VLVS	RCIC EXHAUST VALVES MODULE
				9.62E-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
27	CDOLL			3.80E-03	DG0V03YA-FAULTS	0V%DLCSP
21	SBO14	4.20E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				3.82E-03	DG0V01YA-FAULTS	OVDOTYA MOD FAULTS
					HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				the second second second	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF060C OC
28	SBO14	4.18E-11	0.00%	A Company of the Comp	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	SY-VNF-HVDG2A	BOOM HY DOGA COOLING OF VENT
					DG0V01YA-FAULTS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS OVD01YA MOD FAULTS
	У				DG2B-AUX-SYS	HDCC DIECEL ALVILLARY OVER THE
					RCIF013C-FAULTS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
29	SBO14	4.17E-11	0.00%		%DLOSP	MOV RCIC F013 VALVE FAULTS
					SY-VNF-HVDG2A	DUAL LOSS OF OFFSITE POWER IE
					HP-MOV-FAULTS	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
					RCIF063C-VOC	HPCS MOV VALVES FAULTS
					DG0V03YA-FAULTS	MOTOR-OPERATED VALVE RCIF063C OC
30	SB014	4.16E-11	0.00%		%DLOSP	0VD03YA MOD FAULTS
			0.0070			DUAL LOSS OF OFFSITE POWER IE
					SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
					DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
					RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
	Totals:	1.79E-09	0.02% O	f Total CDF F	requency: 1.0E-05	