LASALLE COUNTY STATION

PROBABILISTIC RISK ASSESSMENT (PRA)

SUMMARY DOCUMENT

MARCH 1996

PREPARED BY
NES PRA GROUP

ComEd

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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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 1I 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	2.4
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)
LOCA's	(see Note 1)
Large Break LOCA	3.0E-04
Medium Break LOCA	8.0E-04
Small Break LOCA	3.0E-03

NOTES:

1. 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."

2. 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).

3. Flooding scenario initiating event frequencies for the two different Reactor Building locations are documented in the following report:
   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	VQ
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

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:

1. Reactor subcriticality
2. Containment pressure suppression
3. Reactor coolant boundary integrity
4. Core inventory makeup
5. Core heat removal
6. 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:

1. 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 ;

2. Transient tree for sequences in which there is a successful scram, primary system pressure boundary remains intact, condenser available, and off-site power available;

3. Event tree for sequences initiated by (or resulting in) a stuck-open safety relief valve with successful scram and off-site power available;

4. Event tree for single unit loss of off-site power (LOOP) and dual unit loss of off-site power (DLOOP) with successful scram.

5. 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:

6. Event tree for Large LOCA (LLOCA).

7. Event tree for Medium LOCA (MLOCA).

8. 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 <u>any</u> of the inputs to the gate cause the defined failure; and 2) **AND** gates, which are used when <u>all</u> 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:

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

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.

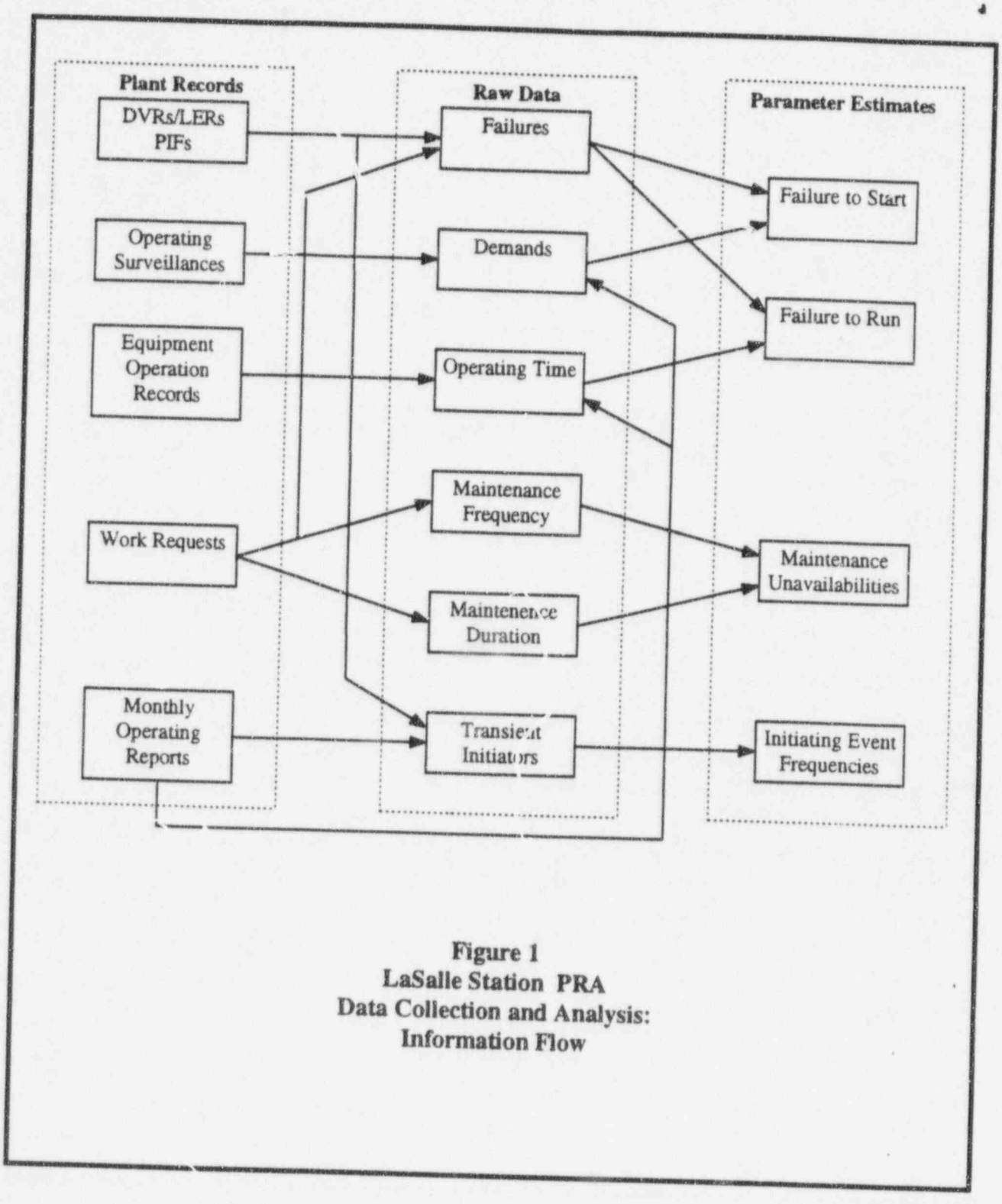


Figure 1
LaSalle Station PRA
Data Collection and Analysis:
Information Flow

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	9.22E-03
High Pressure Low Pressure Core Spray 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
Reactor Building Closed Cooling Water Heat Exchangers	3.63E-03	8.33E-03
Reactor Building Closed Cooling Water Pumps	3.63E-03	2.53E-03
Station Service Water Pumps	1.46E-03	7.68E-03
Turbine Building Closed Cooling Water Heat Exchangers	4.56E-03	4.58E-04
Turbine Building Closed Cooling Water Pumps	9.03E-03	---

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 cutsets. 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 1×10^{-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 1.0×10^{-5} per year. This is below the NRC's published safety goal of 1×10^{-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 5×10^{-6} per year or 2×10^{-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 relative importance 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 diesel generators or crossties, then the plant response is similar to transient events. If both diesel generators or the crossties become unavailable, the unit is considered to be in a station blackout sequence. The core damage contribution 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.
* Failure to recover offsite power to unit 2 or use the unit 1 cross-ties to restore ..... power to unit 2 emergency busses.

- 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 AC 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 maintaining 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.

Figure 2

Initiating Event Frequency - CDF = 1.00E-05 @ Truncation Limit of 1E-11

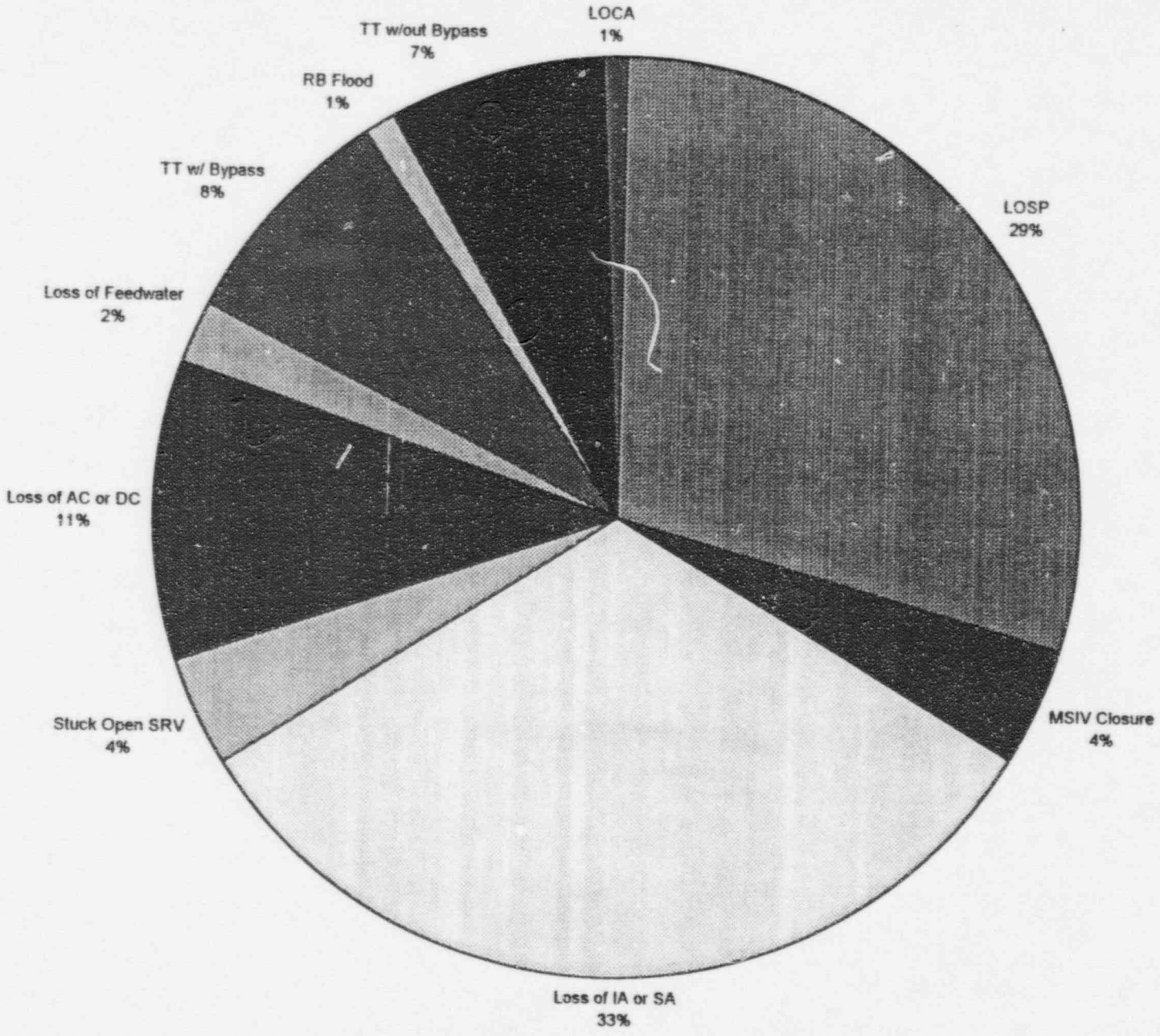


Figure 3

Importance of Plant Systems to Core Damage Risk

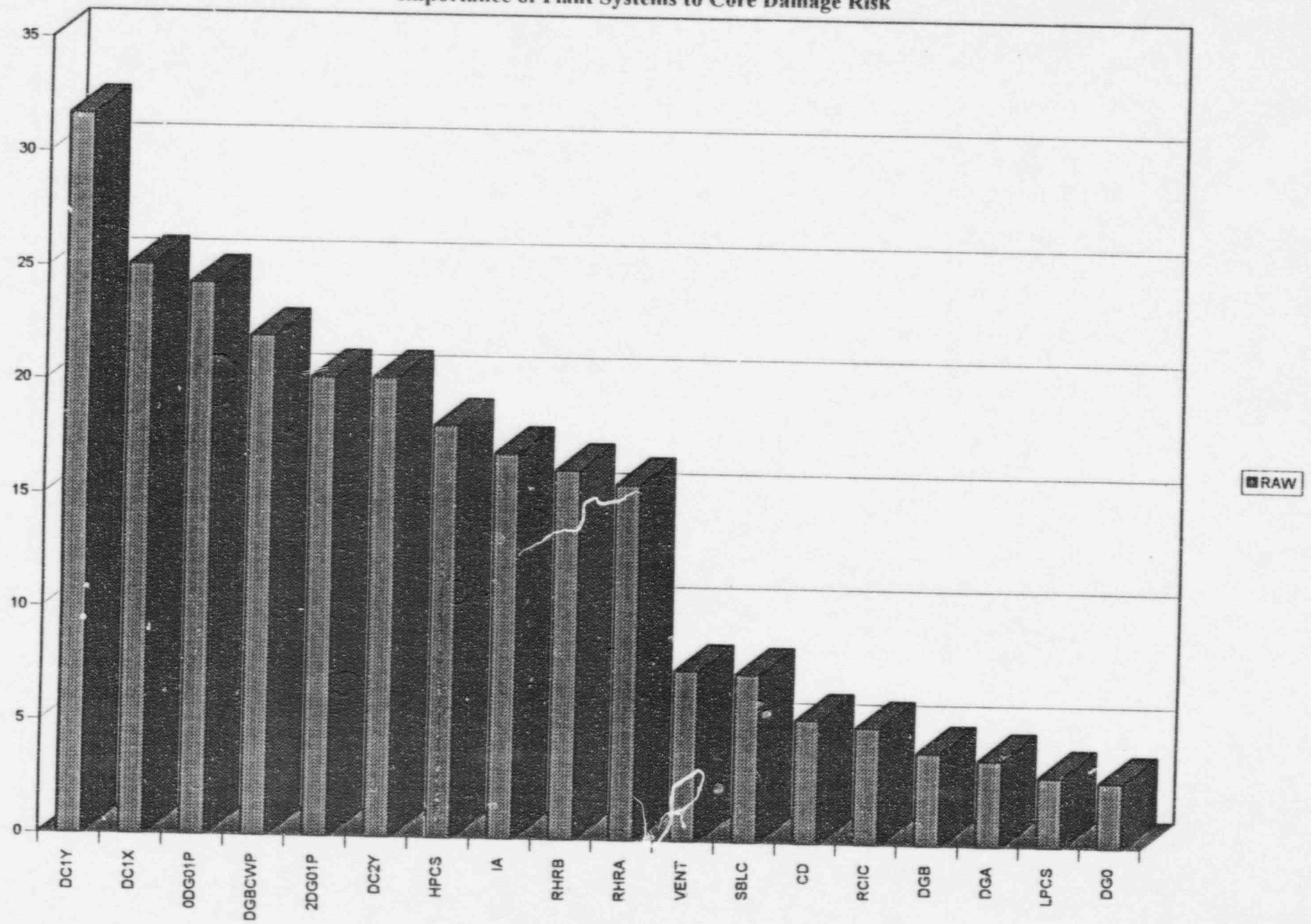


Table 5a
Component Failure Mode Importances to CDF - RAW≥2

Event Name	RAW	Description
RPS-ARI-F	2.93E+03	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
125DC-CM	1.16E+03	125 DC BUS COMMON MODE FAILURE(BUS FAULT * BETA=.1)
CS-COOL-PMP-CM	6.32E+02	COMMON MODE CS COOL. WTR PMPS
LPCI-CM	3.35E+02	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
1EB235A-BCO	2.24E+02	CB 2AP04E-4 FEED FROM 4KV BUS 241Y TO 480 BUSES 235X & 235Y
1E42YB-FAULTS	1.66E+02	4KV 242Y FAULTS
1E41YA-FAULTS	1.62E+02	4KV 241Y FAULTS
DGS-FAIL-CM	8.66E+01	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012))
ADS	7.48E+01	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND
VSP	3.18E+01	VAPOR SUPPRESSION POOL
SRV-DIDNOT--OPEN	2.58E+01	SRV FAILURE TO OPEN (Reset prob to 6.64E-04 aft quant)
C0DG01P-FAULTS	2.57E+01	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
1E35YA-480-LPW	2.33E+01	LOSS OF POWER AT 480 BUS 1E35YA
2E22C002-FAULTS	2.30E+01	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
SWVY02AX-INHTR	2.27E+01	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
1EB35Y2X-BCO	2.11E+01	ELECTRIC POWER CIRCUIT BREAKER 1EB35Y2X CO
C2DG032-XOC-LF	2.09E+01	2DG032: CSCS DIV1 COOLING FLOW ISOLATION MANUAL VALVE
2E22C001-PMS-SS	2.07E+01	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
HP-MOV-FAULTS	2.05E+01	HPCS MOV VALVES FAULTS
HP-CHK-MAN-FLT	1.89E+01	HPCS MANUAL OR CHECK VALVES FAULTS
SEVY03CB-FMS-SS	1.86E+01	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
SEVY03AX-ACX-LFI	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 HTX 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 NWVY01AX
NWVB001X-BCO	1.16E+01	ELECTRIC POWER CIRCUIT BREAKER NWVB001X CO
LPCI-INJ-VLV-CM	1.15E+01	LPCI INJECTION VALVE COMON MODE FAILURE TO OPEN(BETA = .03)
CSCD300A-STR-PLG	1.15E+01	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 STRNR FOR RHR PUMP A (GEN)
1EB2Y22X-BCO	9.80E+00	4KV BRKRS:DIV2 125VDC CNTRL PWR CKT BRKR 1EB2Y22X XFER OPN
NOS-PIP-LAK3BB	9.19E+00	FAULT OCCURS PRIOR TO INPUT OF 3 OF 3 LOGIC UNIT LAK3BB
1EB1Y22X-BCO	7.93E+00	4KV BRKRS: DIV1 125VDC CNTRL PWR CKT BRKR 1EB1Y22 XFER OPN
NEVY04CA-FMS-SS	7.08E+00	MOTOR-DRIVEN FAN NEVY04CA SS FAULTS
NEVY04AX-ACX-LFI	6.83E+00	LOCAL FAULT CAUSING INADEQUATE HEAT REMOVAL IN ACX
FAULT-SLC-C03	6.81E+00	COMPONENT FAULT OCCURS IN STDBY LIQUID CTRL SEGMENT C03
NEVB001X-BCO	6.80E+00	ELECTRIC POWER CIRCUIT BREAKER NEVB001X CO
SLC-XPLOSV-CM	6.72E+00	SLC EXPLOSIVE VALVE FAILURE TO EXPLODE CM (BETA = .03)
NOS-PIP-SAV1B1X	6.72E+00	FAULT OCCURS PRIOR TO INPUT OF 2 OF 2 LOGIC UNIT SAV1B1X
1E36Y1B-480-LPW	6.63E+00	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[illegible]E+00	SRV FAILURE TO CLOSE (Reset quant to 6.64E-04 aft quant)
LAK10BB-ROO-LFO	5.99E+00	FAULT IN RELAY COIL LAK10BB OO IN LCI SIGNAL PATH V2N
LOSP-AT-U1-ONLY	5.67E+00	LOSS OF OFFSITE POWER (UNIT 1) ONLY GIVEN OSP AVAIL AT U2
RCI/LCS-COOL-V	5.64E+00	RCIC/LPCS RM COOLING VALVE FAULTS
PIP-SAP1AAC2	5.53E+00	FAULT OCCURS PRIOR TO INPUT OF 1 OF 2 LOGIC UNIT SAP1AAC2
RHR-CNTRL-FUSES	4.81E+00	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 SGNL FAIL
RHR-RECOVERY	4.31E+00	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
PSW-TBCCW-PATH	4.24E+00	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 CONDENSATEJ1
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 RCIC001 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	MOTOR-OPERATED VALVE RCIF008C OC
RCIC-EXHST-VLVS	3.09E+00	RCIC EXHAUST VALVES MODULE
VALVECL-RCI-011	2.94E+00	VALVE IN SEGMENT FAULTS
RCI-TTT-GVRNR-F	2.90E+00	MOV/HOV THROTTLE/GVRNR VALVES FAULTS
1EB413A-BOO	2.67E+00	ELECTRIC POWER CIRCUIT BREAKER 1EB413A OO
SY-VNF-HVDG2A	2.60E+00	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
RCIC-RPV-CHKVLV	2.54E+00	VALVE IN SEGMENT FAULTS
DG2A-FAULTS	2.53E+00	DG2A PLANT SPECIFIC FAULTS
1EB412A-BCC	2.50E+00	ELECTRIC POWER CB 1EB412A CC
CCB2G1P-BCO	2.49E+00	ELECTRIC POWER CIRUIT BREAKER CCB2G1P OO
NOS-PIP-LAK10BB	2.47E+00	FAULT OCCURS PRIOR TO INPUT OF 1 OF 2 LOGIC UNIT LAK10BB
RCIC-ISOL-VLVS	2.46E+00	EITHER RCIC PUMP L.O. ISOLATION VALVES TRANSFERS CLOSED
1E243C-FAULTS	2.44E+00	4KV BUS 234 FAULTS
1E213C-125-LF	2.44E+00	LOCAL FAULT OF 125 BUS 1E213C
1EB423B-BOO	2.35E+00	ELECTRIC POWER CIRCUIT BREAKER 1EB423B OO
RCIRD001	2.33E+00	RUPTURE DISC RCIRD001 FAILS
FLT-CSCINT-004	2.29E+00	COMPONENT FAULT OCCURS IN INTERFACE CSCS SEGMENT 004
1E35XA-480-LPW	2.28E+00	LOSS OF POWER AT 480 BUS 1E35XA
1EE-GOB-CTP	2.28E+00	LOSS OF CONTROL POWER TO COMPONENTS IN 1EE SIGNAL PATH GOB
2DG01P-CP-BRKR	2.27E+00	2DG01P CONTROL POWER BREAKER/FUSE FAULTS
1EB422B-BCC	2.22E+00	ELECTRIC POWER CB 1EB422B CC
1EB234X-BCC	2.22E+00	ELECTRIC POWER CIRCUIT BREAKER 1EB234B CC
1EB425B-BCC	2.22E+00	ELECTRIC POWER CB 1EB425B CC
RX-LO-PR-SGNL-F	2.19E+00	RCIC RESPONSE TO RX LO PRES SGNL FAIL
1EB2Y14X-BCO	2.14E+00	DG2A LOCAL CONTROL PNL CNTRL CIRCUIT BREAKER 1EB2Y14X CO
DG0-FAULTS	2.13E+00	DG0 PLANT SPECIFIC FAULTS(PSD)
DG0V01YA-FAULTS	2.12E+00	0VD01YA MOD FAULTS
1E36X3B-FAULTS	2.11E+00	1E36X3B CB FAULTS
DG0V01CA-FMS-SS	2.10E+00	OVD01C MOTOR-DRIVEN FAN DG0V01CA SS FAULTS
DG0V02YA-FAULTS	2.09E+00	0VD02YA FAULTS
DG0V03YA-FAULTS	2.09E+00	0VD03YA MOD FAULTS
NEB2522-BCO-LF	2.04E+00	LOCAL FAULT OF CIRCUIT BREAKER NEB2522
DIVI-BRKR-SGNL	2.02E+00	DG0 BREAKER CONTROL SIGNALS FAULT
2FW01PC-FAULTS	2.01E+00	COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3

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

Event Name	Fussell-Vesely	Description
RHR-RECOVERY	2.34E-01	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
DG2A-FAULTS	1.34E-01	DG2A PLANT SPECIFIC FAULTS
DG0-FAULTS	1.33E-01	DG0 PLANT SPECIFIC FAULTS(PSD)
2E22C002-FAULTS	1.32E-01	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
2E22S001-FAULTS	1.21E-01	DG2B PLANT SPECIFIC FAULTS (PSD)
2E22C001-PMS-SS	1.06E-01	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
C0DG01P-FAULTS	1.05E-01	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
ROP3	9.70E-02	failure to recover OSP within 3 HRS(NO LOAD SHED)
HP-MOV-FAULTS	9.01E-02	HPCS MOV VALVES FAULTS
2DG01P-FAULTS	8.28E-02	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
RPS-ARI-F	8.19E-02	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
SWVY02AX-INHTR	7.72E-02	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
2FW005-PATH-FLT	7.54E-02	2FW005 MDRFP REG VALVE PATH FAULTS
2E12C002B-FLT	7.39E-02	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
2E12C002A-FLT	7.11E-02	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
SEVY03CB-FMS-SS	6.67E-02	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
RCIC001X-TDP-SS	5.64E-02	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
NWVY01CA-FMS-SS	5.35E-02	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS
HPCS-TOTAL--UUM	5.25E-02	HPCS total unavailability due to mech and elec maintenance
RHRF48BB-VOO	5.01E-02	MOTOR-OPERATED VALVE RHRF48BB OO
RHRSWB-HTX-ISO-V	5.01E-02	RHRSW B HTX ISOLATION VALVE FAULTS
RHRSWA-HTX-ISO-V	4.82E-02	RHRSW A HTS ISOLATION VALVE FAULTS
RHRF48AA-VOO	4.82E-02	MOTOR-OPERATED VALVE RHRF48AA OO
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
LPCI-CM	4.43E-02	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
RCIF063C-VOC	4.36E-02	MOTOR-OPERATED VALVE RCIF063C OC
2E12B001B-HTX-LF	4.09E-02	2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD)
2E12B001A-HTX-LF	3.94E-02	2E12B001A HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD)
ROP24	3.50E-02	failure to recover OSP within 24 hrs
RCIF013C-FAULTS	2.70E-02	MOV RCIC F013 VALVE FAULTS
DG2B-AUX-SYS	2.67E-02	HPCS DIESEL AUXILIARY SYTEMS FAILURE
RCIF046C-FAULTS	2.52E-02	MOTOR-OPERATED VALVE RCIF046C CC
DGS-FAIL-CM	2.50E-02	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012))
RCIF045C-VCC	2.50E-02	MOTOR-OPERATED VALVE RCIF045C 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))
2FW01PC-FAULTS	2.20E-02	COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3
ADS	1.67E-02	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED MR
SY-VNF-HVDG2A	1.67E-02	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
CST-HOTWELL-LF	1.12E-02	CST TO HOTWELL MAKEUP LOCAL FAULTS
DW-HP-RHR-SGNB-F	1.01E-02	DW HI-PRESS RHR TRAIN B SGNL FAIL (QUANT:NOS-POP-RHR-T24A)
LCSC001A-PMS-SS	9.64E-03	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
1E12D301B-STR-F	9.16E-03	1E12D301B SUPP POOL SUCTION STRNR FOR RHR PUMP B (GEN)
DW-HP-RHR-SGNA-F	8.97E-03	DW HI-PRESS RHR TRAIN A SGNL FAIL (QUANT:NOS-POP-RHR-T24B)
1E12D301A-STR-F	8.82E-03	1E12D301A SUPP POOL SUCTION STRNR FOR RHR PUMP A (GEN)
RX-LO-PR-SGNL-F	8.70E-03	RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A)
0SA01C-PATH-FLT	8.27E-03	0SA01C COMMON UNIT STATION AIR COMRESSOR PATH FAULTS
1SA01C-PATH-FLT	8.27E-03	1SA01C IA UNIT 1 STATION AIR COMPRESSOR PATH FAULTS
1EB235A-BCO	8.06E-03	CB 2AP04E-4 FEED FROM 4KV BUS 241Y TO 480 BUSES 235X & 235Y
LPCS-LOGIC-FLT	7.40E-03	LPCS PUMP LOGIC FAULTS

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

Event Name	Fussell-Vesely	Description
LCSF005A-FLT	7.10E-03	LCSF005A CB OR OTHER LOCAL FAILURES
NEVY04CA-FMS-SS	6.85E-03	MOTOR-DRIVEN FAN NEVY04CA SS FAULTS
DG0V01YA-FAULTS	6.57E-03	0VD01YA MOD FAULTS
RCIC-EXHST-VLVS	6.57E-03	RCIC EXHAUST VALVES MODULE
DG0V03YA-FAULTS	6.52E-03	0VD03YA MOD FAULTS
HP-CHK-MAN-FLT	3.90E-03	HPCS MANUAL OR CHECK VALVES FAULTS
DG0V01CA-FMS-SS	3.81E-03	OVD01C MOTOR-DRIVEN FAN DG0V01CA SS FAULTS
VALVECL-RCI-011	3.22E-03	VALVE IN SEGMENT FAULTS
RHRB01BB-BOO	3.01E-03	ELECTRIC POWER CIRCUIT BREAKER RHRB01BB OO
RCIF008C-VOC	2.91E-03	MOTOR-OPERATED VALVE RCIF008C OC
RHRB01AA-BOO	2.90E-03	ELECTRIC POWER CIRCUIT BREAKER RHRB01AA OO
RHR-CNTRL-FUSES	2.35E-03	RHR CONTROL POWER BRKR AND FUSES FAULTS
SRV-DIDNOT-CLOSE	2.06E-03	SRV FAILURE TO RECLOSE (RMIEP)
1EE-GOB-CTP	1.65E-03	LOSS OF CONTROL POWER TO COMPONENTS IN 1EE SIGNAL PATH GOB
C0DG035-VOC	1.39E-03	MOTOR-OPERATED VALVE C0DG035 OC
DG0V02YA-FAULTS	1.36E-03	0VD02YA FAULTS
FAULT-SLC-C03	1.32E-03	COMPONENT FAULT OCCURS IN STDBY LIQUID CTRL SEGMENT C03
D0VMODCOM-CC-UUM	1.31E-03	UNAVAILABLE FOR PERIOD OF UNSCHD MAINT ONCONTROL SYSTEM
LCSD302X-STR	1.25E-03	SUPPRESSION POOL SUCTION STRAINER LCSD302X FAULTS
2E12C002B-OUT-V	1.12E-03	RHR TRAIN B PUMP DISCHARGE ISOLATION VALVES
2E12C002A-OUT-V	1.08E-03	RHR TRAIN A PUMP DISCHARGE ISOLATION VALVES
FOP-OUT-CDS-J1	8.92E-04	FAULT OCCURS PRIOR TO THE OUTPUT OF CONDENSATEJ1
NOS-PIP-SAV1B1X	7.80E-04	FAULT OCCURS PRIOR TO INPUT OF 2 OF 2 LOGIC UNIT SAV1B1X
1E35YA-480-LPW	6.80E-04	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	LPCI INJECTION VALVE COMON MODE FAILURE TO OPEN(BETA = .03)
1E243-1-480-LPW	5.41E-04	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	3.24E-04	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
1EB1Y22X-BCO	2.89E-04	4KV BRKRS: DIV1 125VDC CNTRL PWR CKT BRKR 1EB1Y22 XFER OPN
1EB432C-BCC	2.87E-04	BUS 243 NORMAL FEEDER BRKR FAILS TO OPEN GIVEN LOSP
1EB2Y22X-BCO	2.77E-04	4KV BRKRS:DIV2 125VDC CNTRL PWR CKT BRKR 1EB2Y22X XFER OPN
LPS-FUSES	2.75E-04	LPS CONTROL FUSES
NWVB001X-BCO	2.70E-04	ELECTRIC POWER CIRCUIT BREAKER NWVB001X CO
2DG01P-CP-BRKR	2.28E-04	2DG01P CONTROL POWER BREAKER/FUSE FAULTS
1EB433C-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
VALVECL-LCS-S1	1.56E-04	VALVE IN SEGMENT FAULTS
FLT-CSCINT-028	1.54E-04	COMPONENT FAULT OCCURS IN INTERFACE CSCS SEGMENT 028
SAT-LOCAL-FAULT	1.44E-04	SAT LOCAL FAULT
LPCS-SGNL-FLT	8.53E-05	LPCS PERMISSIVE SIGNAL FAULTS
DAMPERCL-D0V-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	7.08E-05	125 DC BUS COMMON MODE FAILURE(BUS FAULT * BETA=.1)
1EB1Y13X-BCO	5.36E-05	CONTROL POWER CIRCUIT BREAKER 1EB1Y13X CO
NEVB001X-BCO	5.10E-05	ELECTRIC POWER CIRCUIT BREAKER NEVB001X CO
1E35XA-480-LPW	5.05E-05	LOSS OF POWER AT 480 BUS 1E35XA
SLC-XPLOSV-AB-F	4.78E-05	Both SLC explosive valves fail to explode
LOSP-AT-U1-ONLY	2.64E-05	LOSS OF OFFSITE POWER (UNIT 1) ONLY GIVEN OSP AVAIL AT U2
RHRF03BB-VOC-LF	9.15E-06	LOCAL FAULT OF MOTOR-OPERATED VALVE RHRF03BB
RHRF47AA-VOC-LF	9.15E-06	LOCAL FAULT OF MOTOR-OPERATED VALVE RHRF47AA
RHRF47BB-VOC-LF	9.15E-06	LOCAL FAULT OF MOTOR-OPERATED VALVE RHRF47BB
RHRF03AA-VOC-LF	9.15E-06	LOCAL FAULT OF MOTOR-OPERATED VALVE RHRF03AA
1E211XA-125-LF	6.36E-06	LOCAL FAULT OF 125 BUS 1E211XA
RHRB&C-COOL-FLT	3.19E-06	RHR PMPS B&C ROOM COOLING FAULTS
1E35Y2A-480-LPW	2.20E-06	LOSS OF POWER AT 480 BUS 1E35Y2A

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	INITIATE ADS
OP-VENT-CNTNMNT	3.88E-02	VENT CONTAINMENT
ODPS	3.05E-02	DEPRESSURIZE USING ONLY BYPASS VALVES
OFWLC-A (ATWS)	2.04E-02	FW CNTRL TO LOWER PWR < BYPASS CAPACITY
OADS-A (ATWS)	1.83E-02	ADS AND RESTART PUMPS GIVEN OFWLC-A FAILS
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
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 off-site 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:

1. 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.

2. Loss of the condenser a heat sink so that the Condensate/Feedwater pumps cannot supply core cooling water.

3. 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 ft^2 for liquids and less than 0.1 ft^2 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 ft^2 for liquid
- 0.1 to 0.3 ft^2 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.

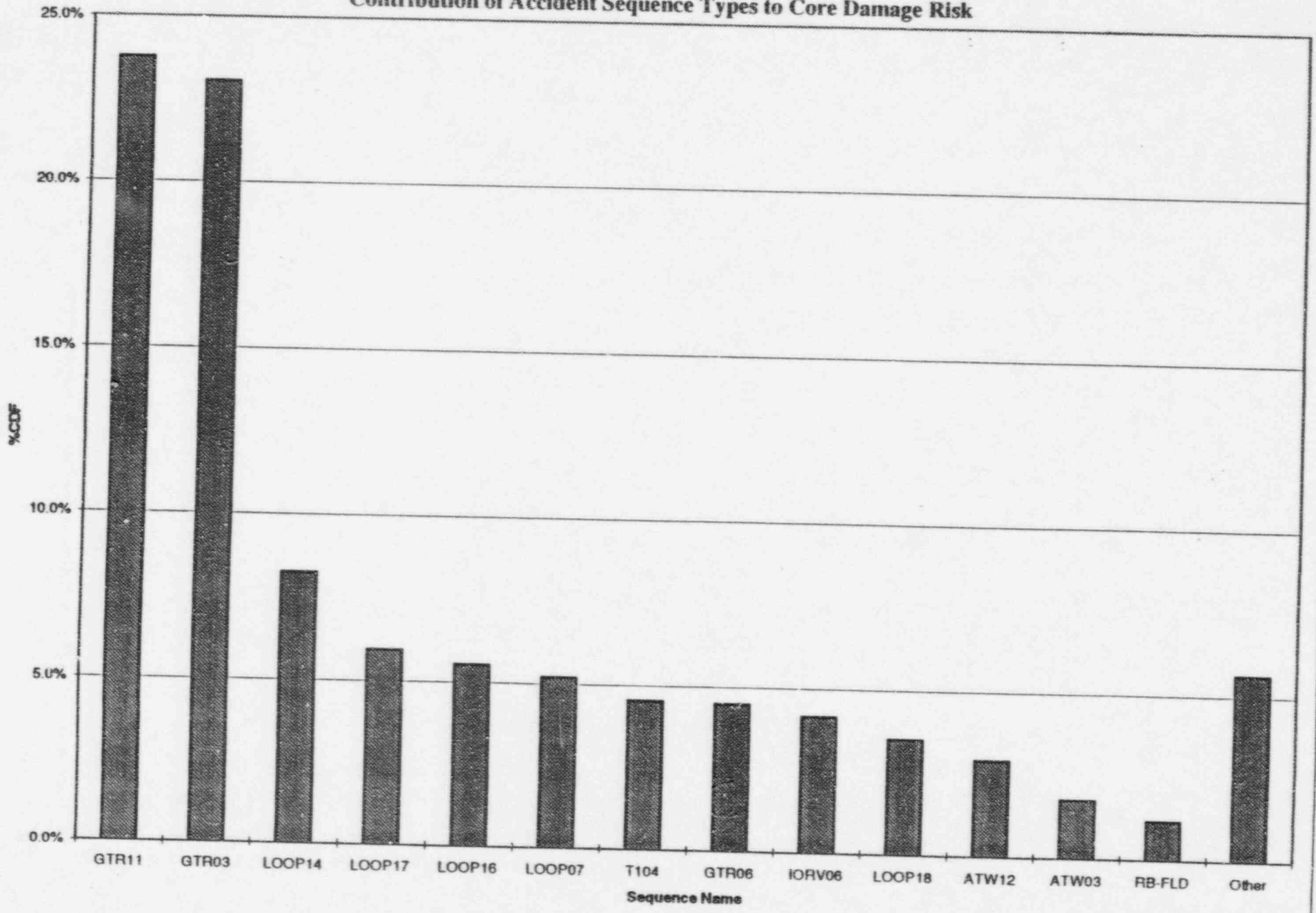
To successfully limit the effects of an ATWS, an equilibrium between coolant injection rates and power level 1s required. The equilibrium power level 1s the one where injection capacity is sufficient to maintain acceptable core temperatures yet not lead to excessive heat-up rates in the suppression pool.

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.

Figure 4

Contribution of Accident Sequence Types to Core Damage Risk



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 shade 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 inter-dependent 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 risk. 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.

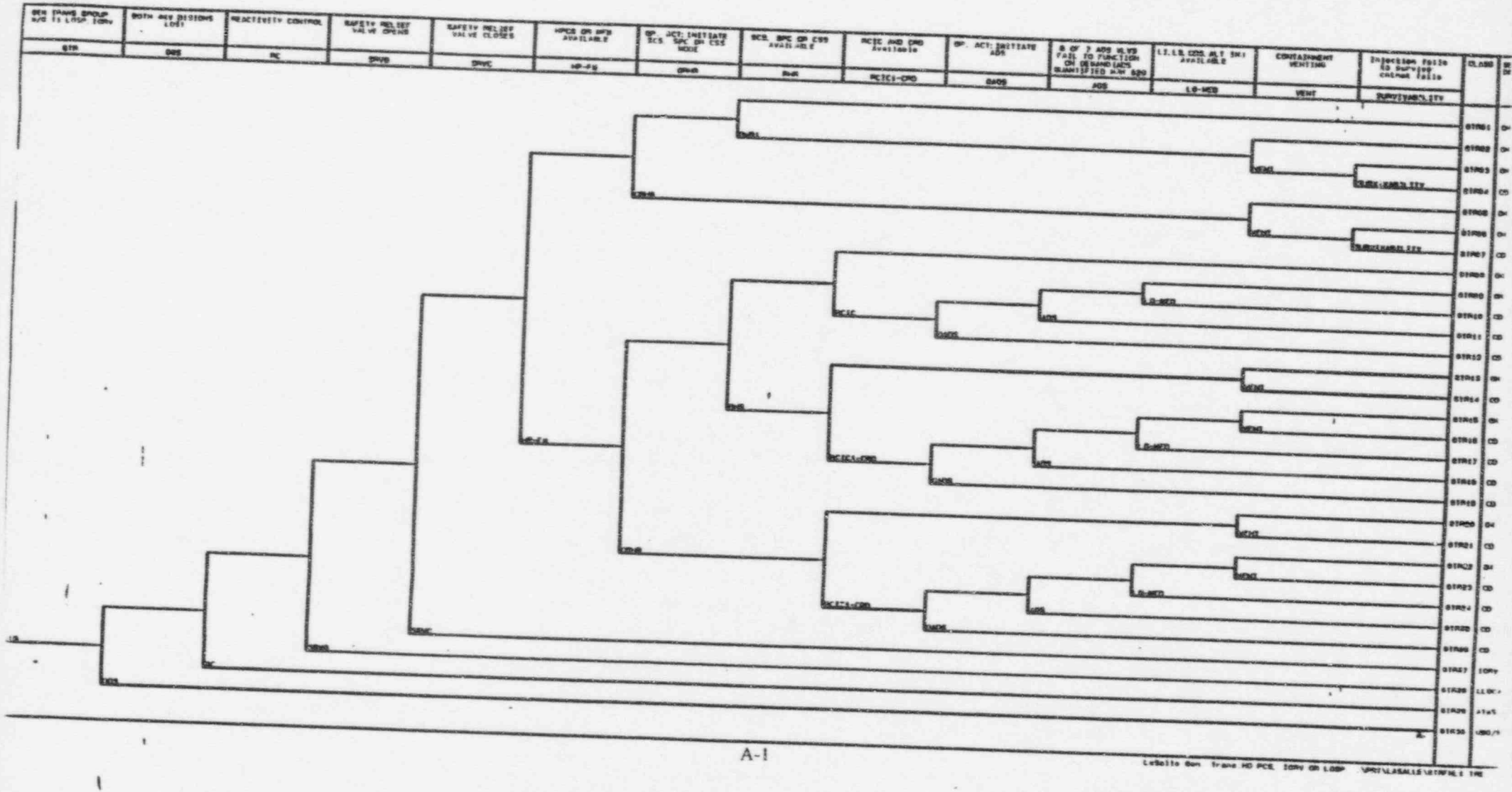
IX. Insights

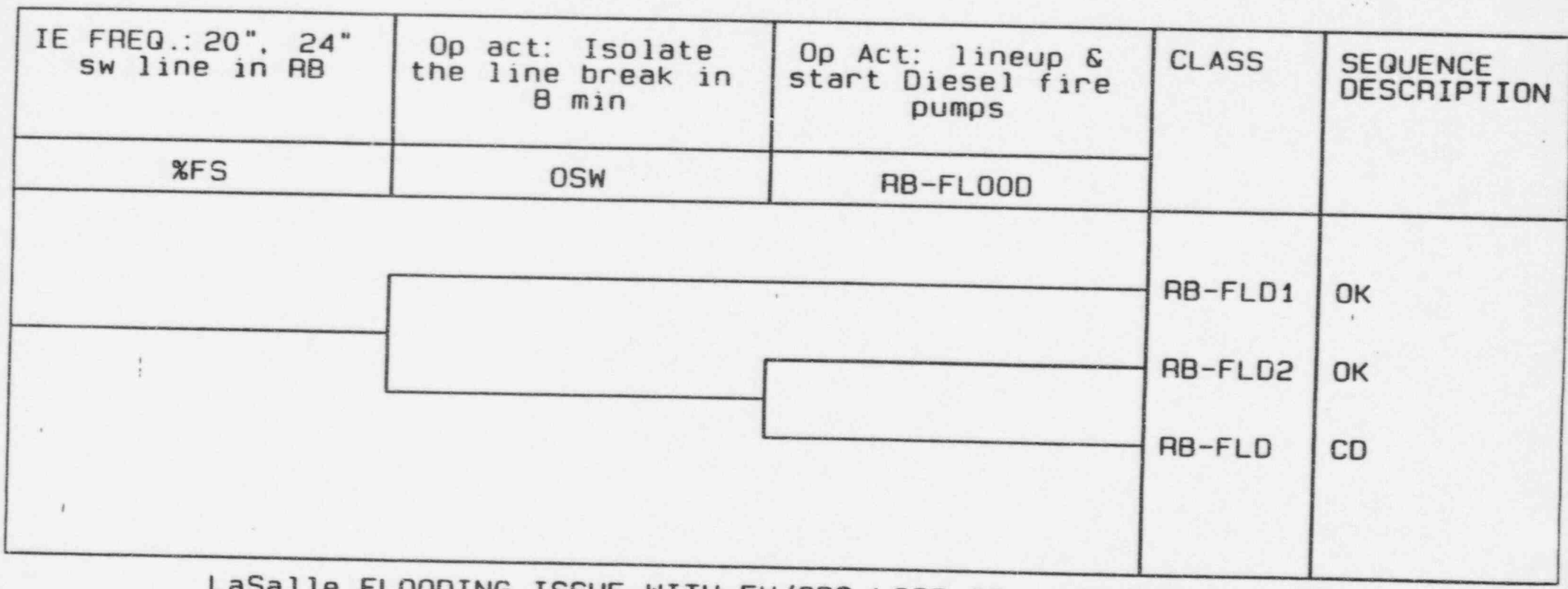
Insights are those observations regarding station configuration or practices suggested by the PRA which may affect the risk profile of the plant. Insights can suggest changes to enhance the capability of the plant and its operators to respond to an initiating event to either prevent core damage or to 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.

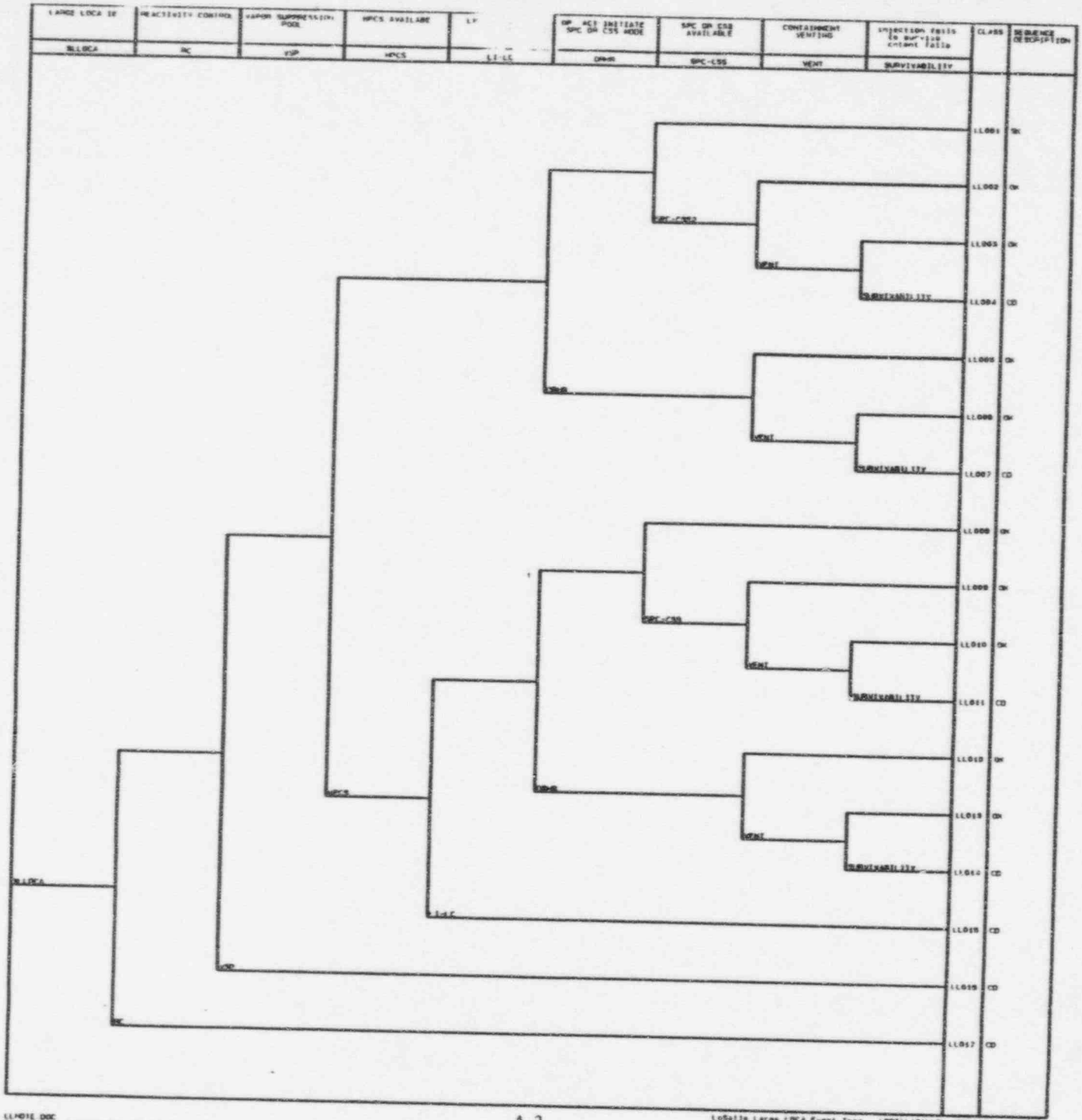
Containment venting is an essential EOP step needed to maintain availability of ADS under emergency conditions. The Instrument (IA)and Service Air (SA) systems are required to ensure availability of the containment venting function. Therefore, the loss of IA/SA initiating event is the top contributor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

Appendix A
Event Trees



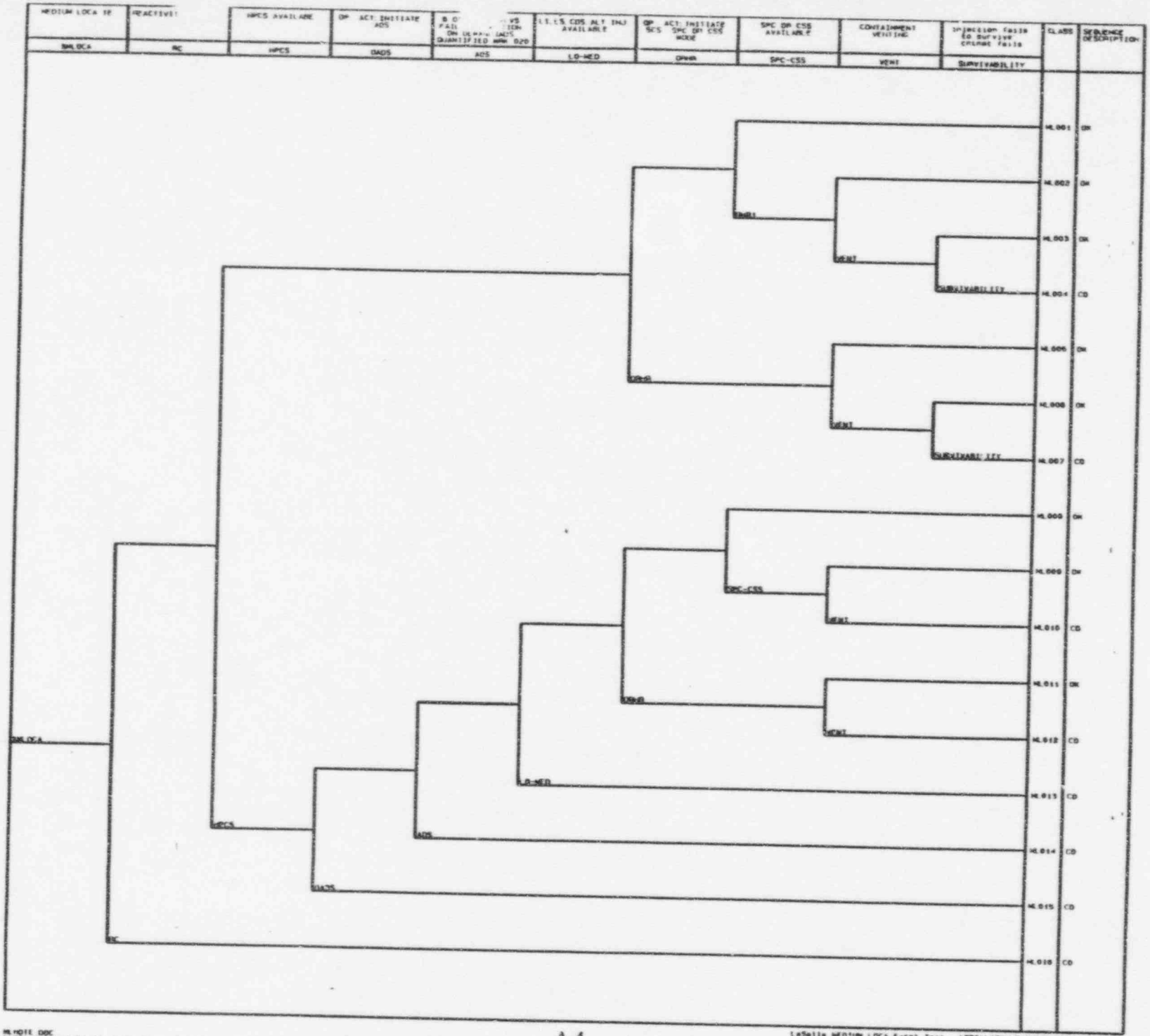


LaSalle FLOODING ISSUE WITH FW/CDS LOST IE .\PRT\ABA-FLD.TRE 1-19-96



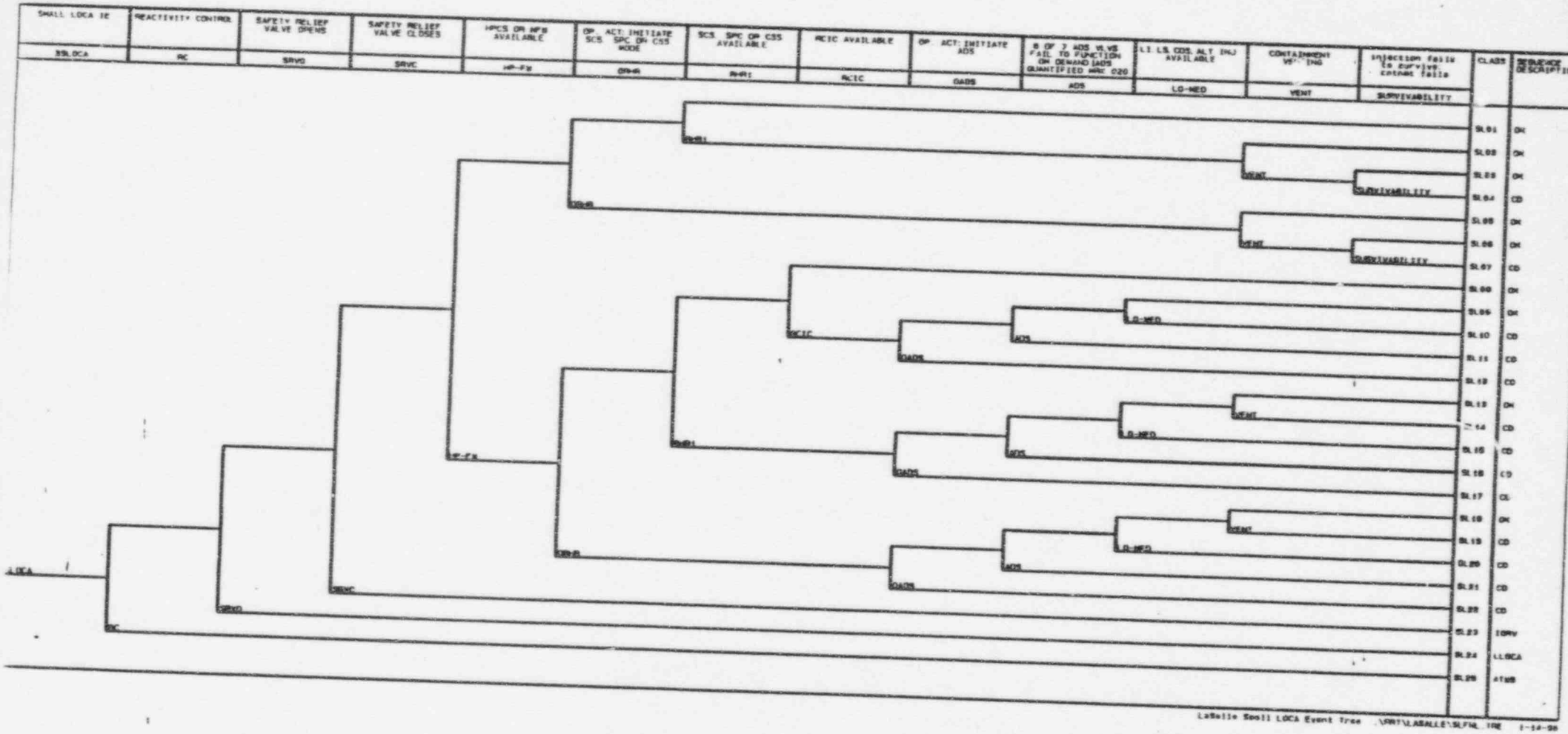
LLMDIE.DOC
IN GENERAL, GIVEN LLOCA, RC IS NOT AN ISSUE. HERE IT IS ASSUMED TO BE A CD SEQ.

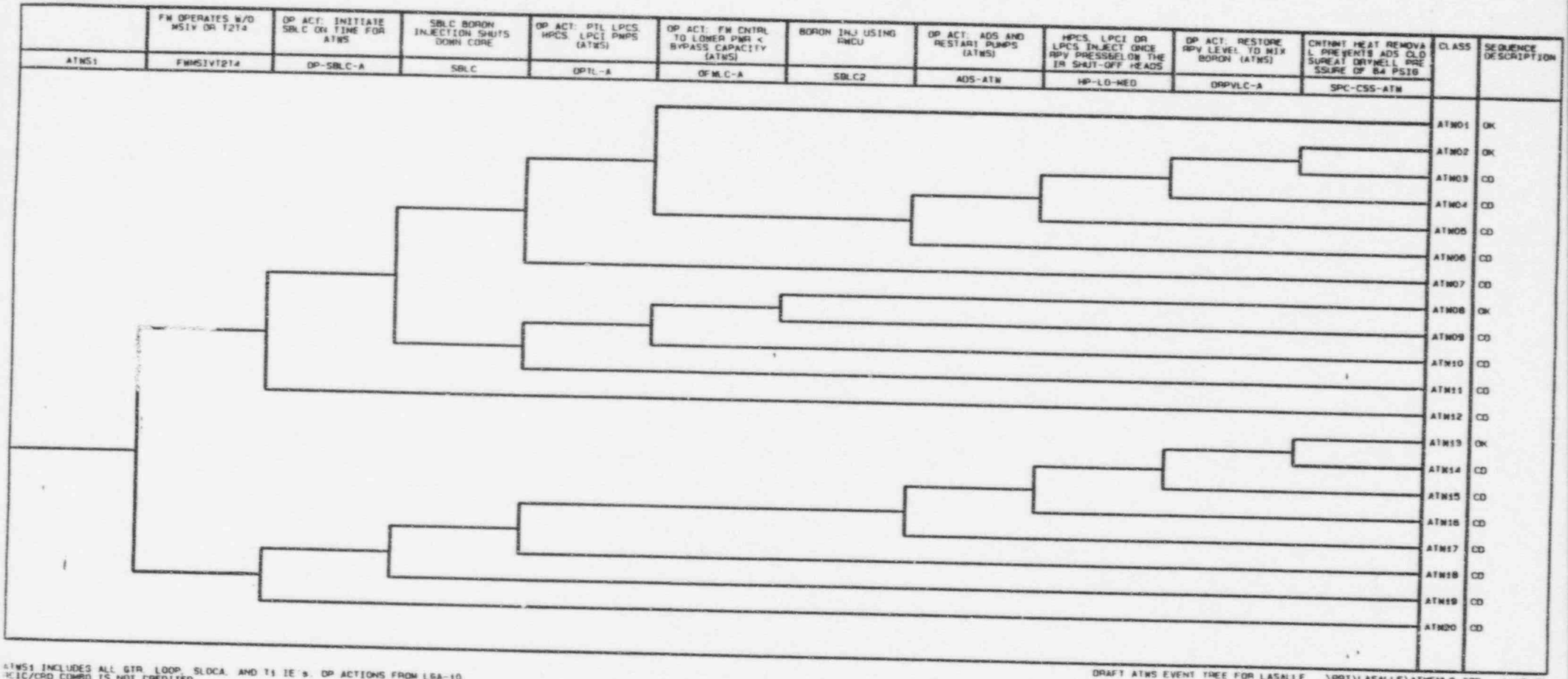
LaSalle Large LOCA Event Tree \PRT\LASALLE\LLFHE.TRE 1-14-96



HLNOTE.DOC
HLOCA AND RC FAILURE WHICH IS AN ATWS SEQ IS TREATED AS HLOCA CD SEQ

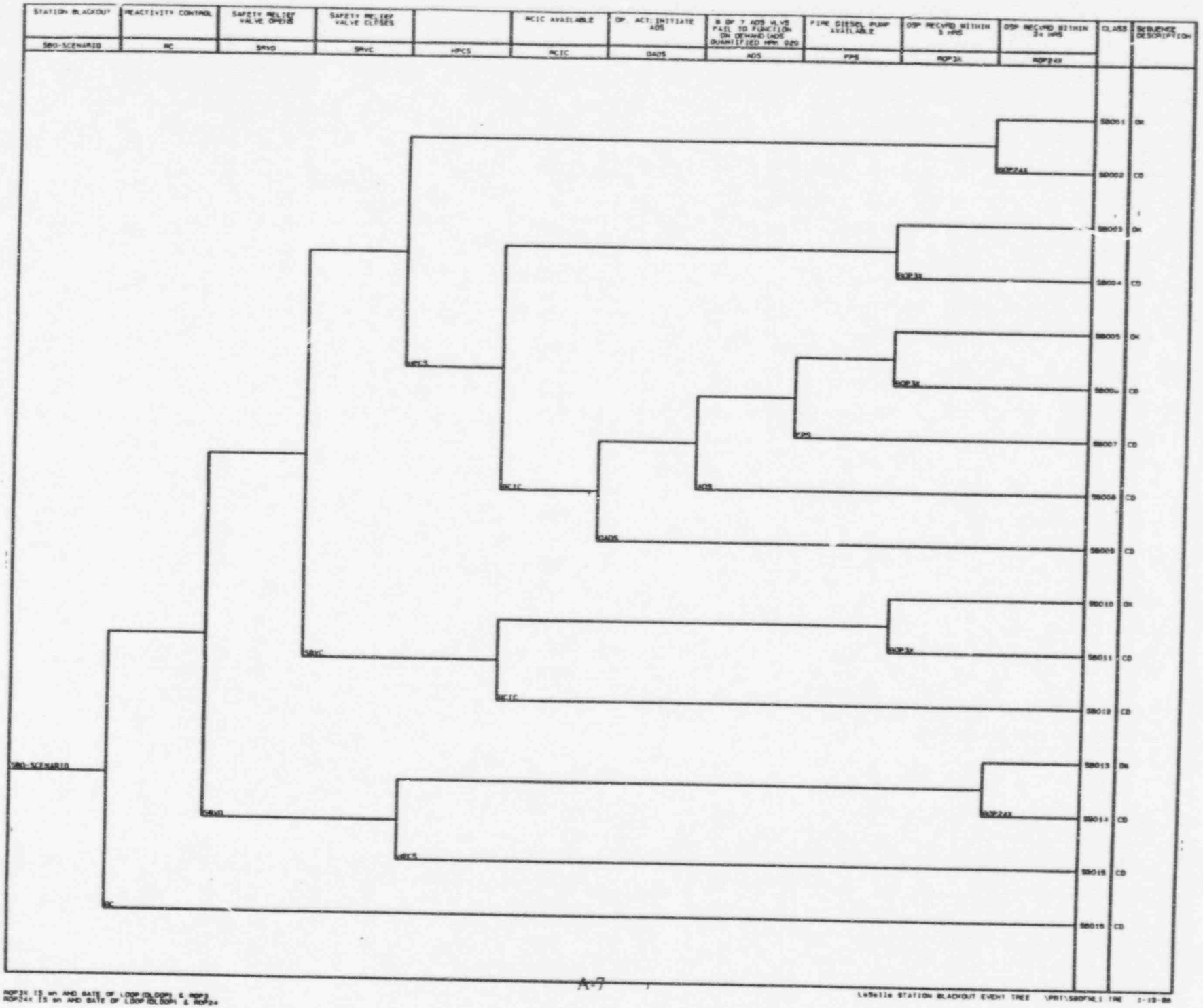
LaSalle MEDIUM LOCA Event Tree \PRA\LASALLE\HLFNL.TRE 1-14-88


SMALL LOCA IE
REACTIVITY CONTROL
SAFETY RELIEF VALVE OPENS
SAFETY RELIEF VALVE CLOSES
HPCS OR HPB AVAILABLE
OP ACT: INITIATE SCS SPC ON CSS MODE
SCS SPC OR CSS AVAILABLE
RCIC AVAILABLE
OP ACT: INITIATE ADS
8 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND (ADS QUANTIFIED MAR 020
LI LS CDS ALT INJ AVAILABLE
CONTAINMENT VENTING
injection fail to survive, cntmt fails
CLASS
SEQUENCE DESCRIPTION
SLOCA
RC
SRVO
SRVC
HP-FW
OP-MR
SHPI
RCIC
DADS
ADS
LO-MED
VENT
SURVIVABILITY
SL01 OK
SL02 OK
SL03 OK
SL04 CD
SL05 OK
SL06 OK
SL07 CD
SL08 OK
SL09 OK
SL10 CD
SL11 CD
SL12 CD
SL13 OK
SL14 CD
SL15 CD
SL16 CD
SL17 CL
SL18 OK
SL19 CD
SL20 CD
SL21 CD
SL22 CD
SL23 IORV
SL24 LLOCA
SL25 ATWS
LOCA
LaSalle Small LOCA Event Tree .\SHT\LASALLE\SLFNL.IRE 1-14-98



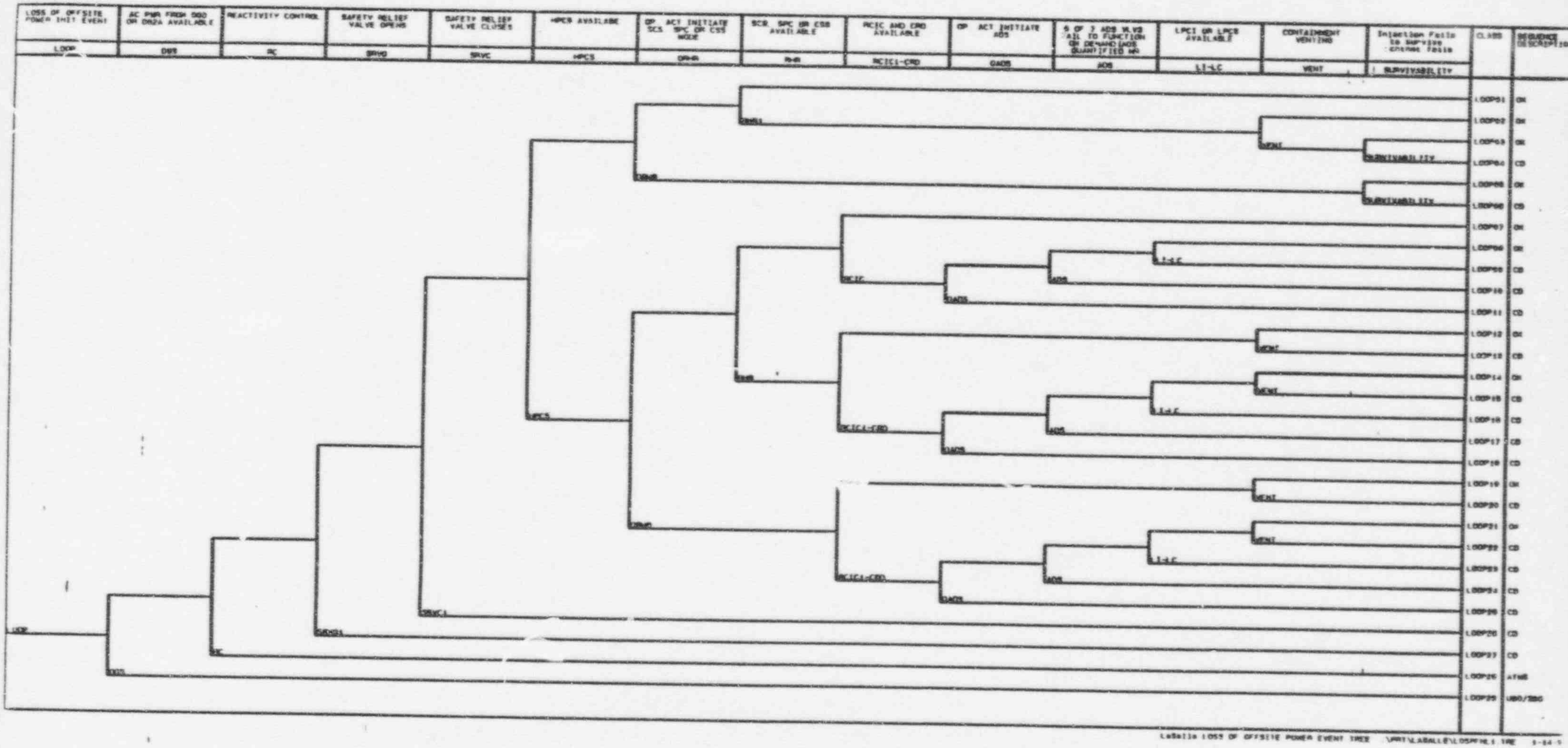
ATWS1 INCLUDES ALL GTR, LOOP, SLOCA, AND T1 IE's. OP ACTIONS FROM LGA-10.
SCIC/CRD COMBO IS NOT CREDITED.
MLOCA, IORV, OR MLOCA, AND RC FAILURE ARE CO SEQ. NO TRANSFER TO THIS TREE
SYSTEM AVAILABILITY GIVEN VARIOUS IE'S IS ADDRESSED AT FAULT TREE LEVEL

DRAFT ATWS EVENT TREE FOR LASALLE .\PRT\LASALLE\ATWFNLO.TRE 1-19-96

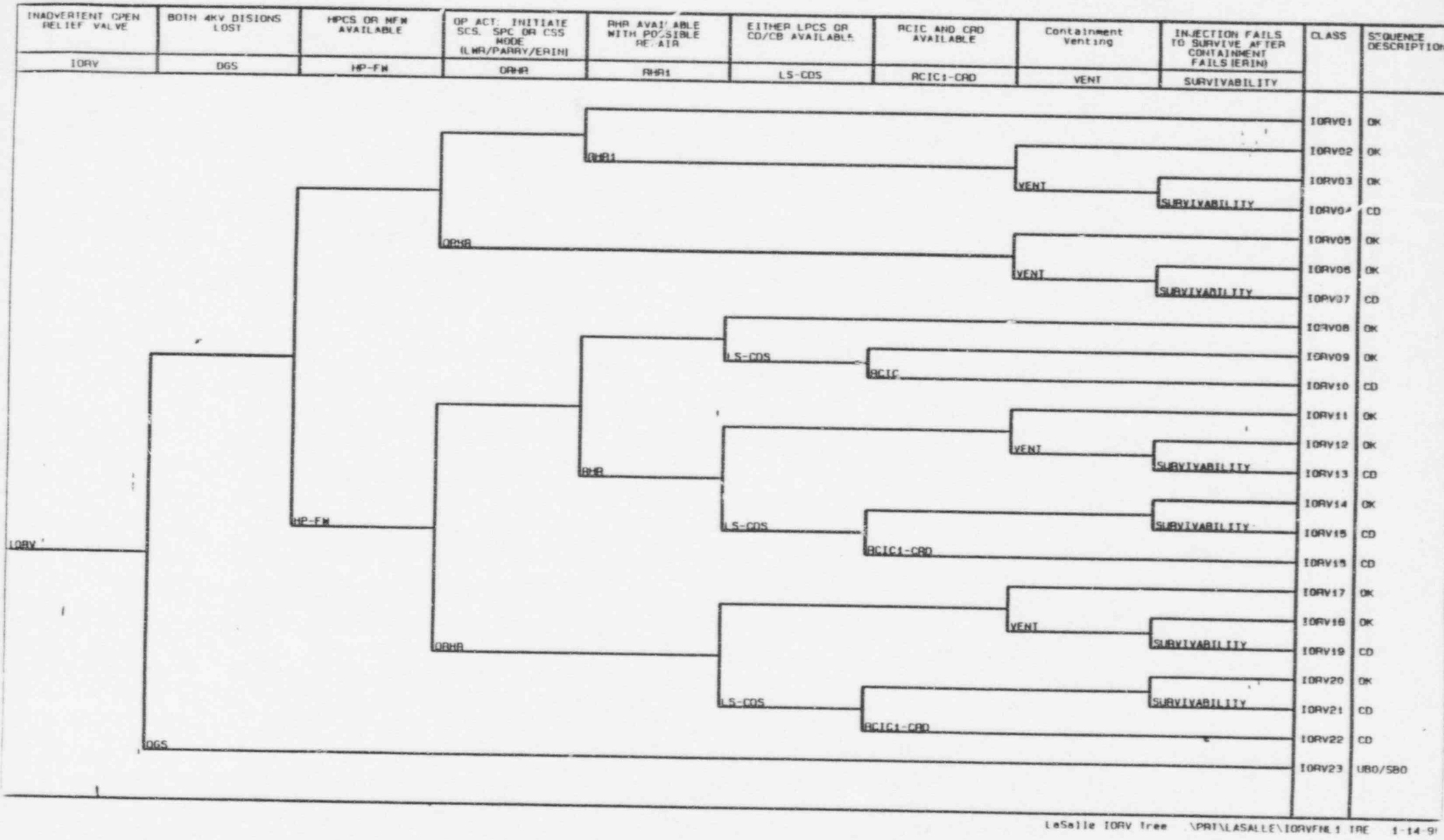


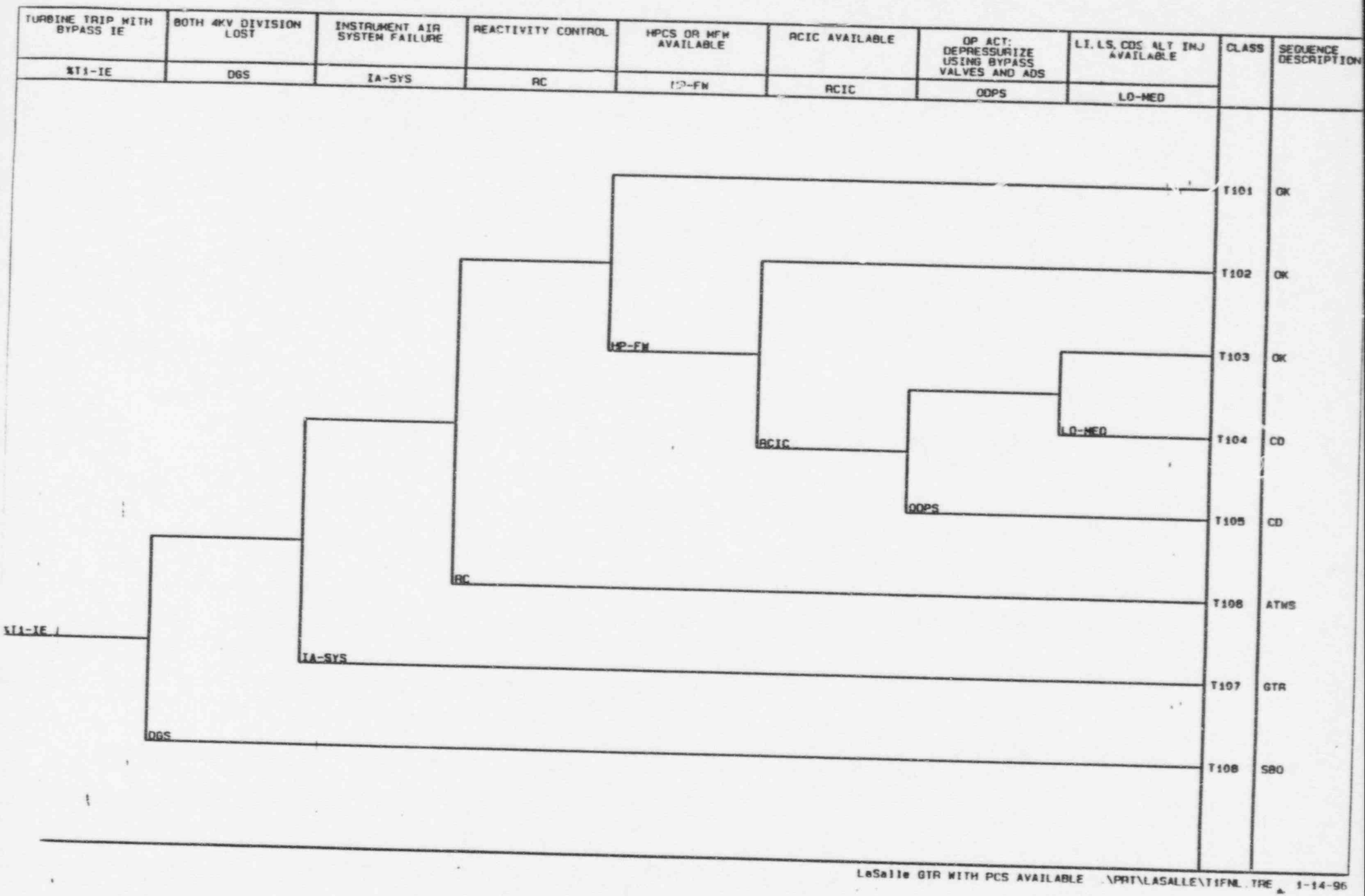
RDP3X IS an AND GATE OF LOOP (SLOOP) & RDP3
RDP24X IS an AND GATE OF LOOP (SLOOP) & RDP24

LaSalle STATION BLACKOUT EVENT TREE \PRT\SBOFNL1 TRE 1-19-88

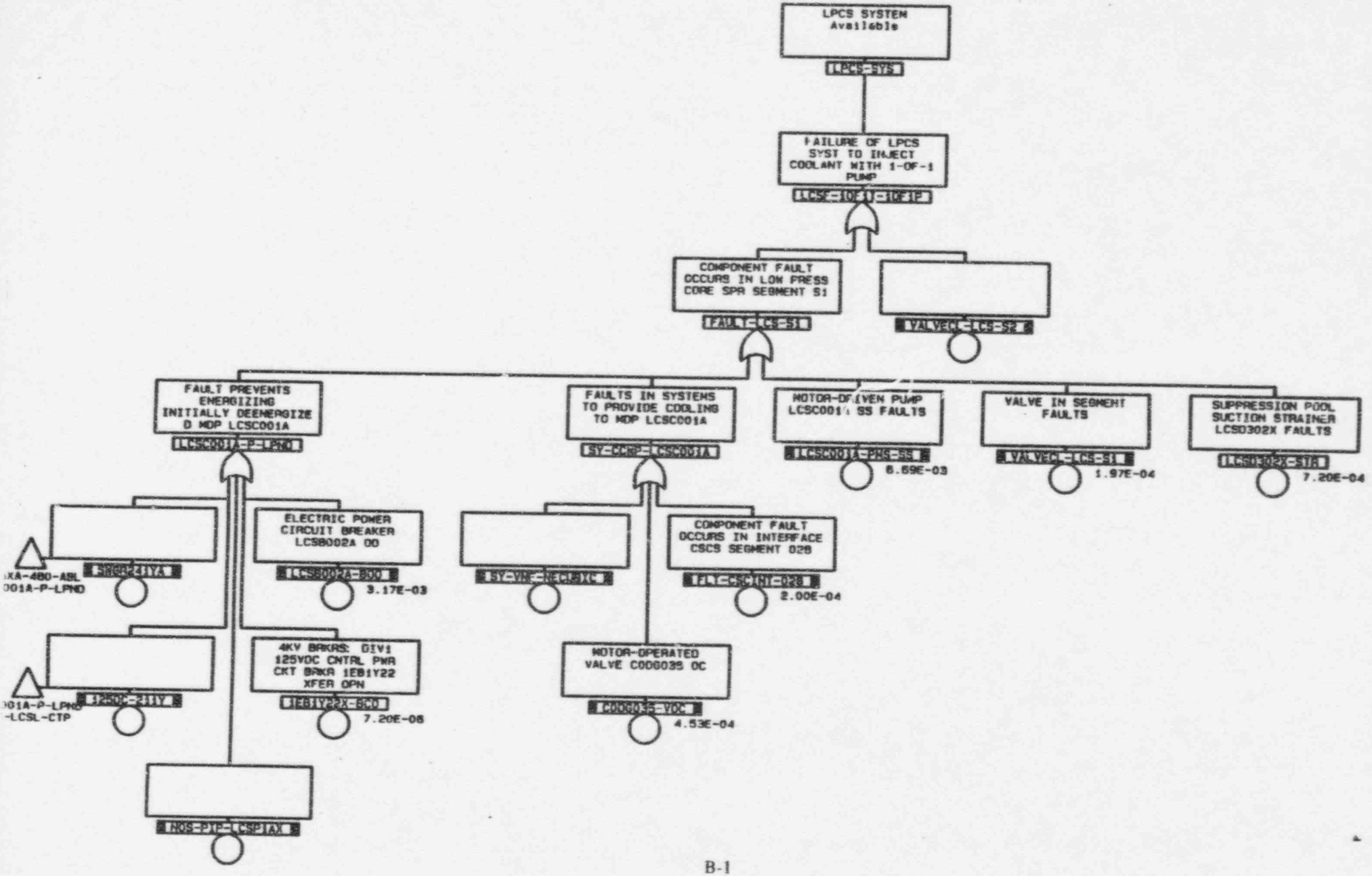


LOSS OF OFFSITE POWER INIT EVENT
LOOP
AC PWR FROM DGO OR DG2A AVAILABLE
DGS
REACTIVITY CONTROL
RC
SAFETY RELIEF VALVE OPENS
SRVO
SAFETY RELIEF VALVE CLOSES
SRVC
HPCS AVAILABLE
HPCS
OP ACT INITIATE SCS SPC OR CSS MODE
ORHR
SCS, SPC OR CSS AVAILABLE
RHR
RCIC AND CRD AVAILABLE
RCIC1-CRD
OP ACT INITIATE ADS
OADS
ADS
LPCI OR LPCS AVAILABLE
LI-LC
CONTAINMENT VENTING
VENT
SURVIVABILITY
CLASS
SEQUENCE DESCRIPTION
LOOP01 OK
LOOP02 OK
LOOP03 OK
LOOP04 CD
LOOP05 OK
LOOP06 CD
LOOP07 OK
LOOP08 OK
LOOP09 CD
LOOP10 CD
LOOP11 CD
LOOP12 OK
LOOP13 CD
LOOP14 OK
LOOP15 CD
LOOP16 CD
LOOP17 CD
LOOP18 CD
LOOP19 OK
LOOP20 CD
LOOP21 OK
LOOP22 CD
LOOP23 CD
LOOP24 CD
LOOP25 CD
LOOP26 CD
LOOP27 CD
LOOP28 ATWS
LOOP29 UBO/SBO
LOOP
DGS
RC
DGXD1
SRVC1
HPCS
ORHR
RHR1
RHR
RCIC
RCIC1-CRD
OADS
ADS
LI-LC
VENT
SURVIVABILITY
LaSalle LOSS OF OFFSITE POWER EVENT TREE \PRT\LASALLE\LOSPFHL1.TRE


INADVERTENT OPEN RELIEF VALVE
IORV
BOTH 4KV DISIONS LOST
DGS
HPCS OR HPM AVAILABLE
HP-FW
OP ACT. INITIATE SCS, SPC OR CSS MODE (LHR/PARRY/ERIN)
ORHR
RHR AVAILABLE WITH POSSIBLE RE-AIR
RHR1
EITHER LPCS OR CD/CB AVAILABLE
LS-CDS
RCIC AND CRD AVAILABLE
RCIC1-CRD
Containment Venting
VENT
INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
SURVIVABILITY
CLASS
SEQUENCE DESCRIPTION
IORV01 OK
IORV02 OK
IORV03 OK
IORV04 CD
IORV05 OK
IORV06 OK
IORV07 CD
IORV08 OK
IORV09 OK
IORV10 CD
IORV11 OK
IORV12 OK
IORV13 CD
IORV14 OK
IORV15 CD
IORV16 CD
IORV17 OK
IORV18 OK
IORV19 CD
IORV20 OK
IORV21 CD
IORV22 CD
IORV23 UBO/SBO
LaSalle IORV tree \PRI\LASALLE\IORVFNL1 IRE 1-14-9


TURBINE TRIP WITH BYPASS IE
BOTH 4KV DIVISION LOST
INSTRUMENT AIR SYSTEM FAILURE
REACTIVITY CONTROL
HPCS OR MFW AVAILABLE
RCIC AVAILABLE
OP ACT: DEPRESSURIZE USING BYPASS VALVES AND ADS
LI, LS, CDS ALT INJ AVAILABLE
CLASS
SEQUENCE DESCRIPTION
%T1-IE
DGS
IA-SYS
RC
HP-FW
RCIC
ODPS
LO-MED
T101 OK
T102 OK
T103 OK
T104 CD
T105 CD
T106 ATWS
T107 GTR
T108 SBO
%T1-IE
DGS
IA-SYS
RC
HP-FW
RCIC
ODPS
LO-MED
LaSalle GTR WITH PCS AVAILABLE \PRT\LASALLE\T1FNL.TRE 1-14-96

Appendix B
Low Pressure Core Spray Fault Tree



Appendix C - Table 1
Top 100 Core Damage Cutsets
Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
1	LOOP18	2.30E-07	2.31%	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)
				2.47E-03	ROP24	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)
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
3	ATW03	1.65E-07	1.65%	2.40E+00	%T1-IE	TURBINE 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)
				4.40E-02	OFWLC-A	OP ACT: FW CNTRL TO LOWER PWR < BYPASS CAPACITY (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
4	GTR03	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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
5	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(DG2A FAIL*(BETA =.012))
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
6	RB-FLD	9.68E-08	0.97%	2.00E-04	%FS	FLOOD IE'S GROUND OR MAIN RB FLOOR (x capacity factor .7
				2.20E-02	ODFP	OP ACT: START AND ALIGN FIRE PROTECTION SYSTEM TO FW LINE
				2.20E-02	OSW	OP ACT: SECURE SW PUMPS FROM THE CNTRL ROOM
7	ATW08	9.36E-08	0.94%	2.40E+00	%T1-IE	TURBINE TRIP WITH BYPASS IE
				1.00E+00	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)
8	ATW12	7.78E-08	0.78%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.20E-03	ORPVLC-A	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
9	LOOP14	6.15E-08	0.62%	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)
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
10	ATW12	5.59E-08	0.56%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				2.30E-03	OADS-B	OP ACT: ADS AND RESTART PUMPS GIVEN FW UNAVAILABLE (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)

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Top 100 Core Damage Cutsets
Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
11	LOOP07	4.90E-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 RCIC001 SS FAULTS
				1.40E-03	OADS	OP ACT: INITIATE ADS
12	GTR11	4.77E-08	0.48%	5.30E-02	%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)
				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	4.64E-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 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
15	ATW12	4.51E-08	0.45%	4.70E-01	%MSIV	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.20E-03	ORPVLC-A	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
16	GTR03	4.41E-08	0.44%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.60E-05	CS-COOL-PMP-CM	COMMON MODE CS COOL. WTR PMPS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
17	ATW07	4.18E-08	0.42%	2.40E+00	%T1-IE	TURBINE TRIP WITH BYPASS IE
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				5.80E-04	OPTL-A	OP ACT: PTL LPCS, HPCS, LPCI PMPS (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
18	IORV06	4.11E-08	0.41%	5.30E-02	%T7-IE	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
				5.39E-03	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	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
20	GTR11	3.97E-08	0.40%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)

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21	GTR03	3.86E-08	0.39%	5.30E-02	%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)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
22	LOOP17	3.85E-08	0.39%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
23	LOOP07	3.80E-08	0.38%	5.30E-02	%LOSP	LOSS OF OFFSITE POWER INIT EVENT
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
				1.40E-03	OADS	OP ACT: INITIATE ADS
24	LOOP14	3.76E-08	0.38%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				1.53E-02	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))
25	GTR03	3.61E-08	0.36%	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)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
26	GTR03	3.61E-08	0.36%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				5.61E-03	2E12C002B-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	AILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
27	GTR03	3.41E-08	0.34%	2.63E-04	%T101-IE	LOSS OF 4160V 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	AILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
28	GTR03	3.41E-08	0.34%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				5.61E-03	2E12C002A-FLT	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	AILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
29	GTR03	3.39E-08	0.34%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	AILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)

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Top 100 Core Damage Cutsets
Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	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	OADS-B	OP ACT: ADS AND RESTART PUMPS GIVEN FW UNAVAILABLE (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
31	GTR03	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 (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
32	GTR03	3.20E-08	0.32%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
33	IORV06	3.16E-08	0.32%	5.30E-02	%T7-IE	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
				4.15E-03	LPCS-LOGIC-FLT	LPCS PUMP LOGIC FAULTS
34	ATW15	3.16E-08	0.32%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				1.00E+00	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)
35	IORV06	3.04E-08	0.30%	5.30E-02	%T7-IE	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
				3.98E-03	LCSF005A-FLT	LCSF005A CB OR OTHER LOCAL FAILURES
36	LOOP14	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
				7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
37	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
				1.54E-04	DGS-FAIL-CM	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012))
38	GTR03	2.91E-08	0.29%	5.30E-02	%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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
39	GTR03	2.91E-08	0.29%	5.30E-02	%T11-IE	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-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
40	LOOP18	2.90E-08	0.29%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE

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Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
				9.62E-03	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
41	LOOP17	2.89E-08	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-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
42	LOOP17	2.81E-08	0.28%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
				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
				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)
				6.85E-03	RCIF046C-FAULTS	MOTOR-OPERATED VALVE RCIF046C CC
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
45	LOOP14	2.75E-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)
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				6.81E-03	RCIF045C-VCC	MOTOR-OPERATED VALVE RCIF045C CC
46	GTR03	2.73E-08	0.27%	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)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
47	GTR03	2.73E-08	0.27%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
48	GTR03	2.63E-08	0.26%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRSWB-HTX-ISO-V	RHRSW B HTX ISOLATION VALVE FAULTS
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
49	GTR03	2.63E-08	0.26%	5.30E-02	%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)

Appendix C - Table 1
Top 100 Core Damage Cutsets
Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
				3.82E-03	RHRSWA-HTX-ISO-V	RHRSW A HTS ISOLATION VALVE FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
50	GTR03	2.63E-08	0.26%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRF48BB-VOO	MOTOR-OPERATED VALVE RHRF48BB OO
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
51	GTR03	2.63E-08	0.26%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRF48AA-VOO	MOTOR-OPERATED VALVE RHRF48AA OO
				5.61E-03	2E12C002B-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
52	GTR03	2.57E-08	0.26%	2.63E-04	%T101-IE	LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
53	GTR03	2.57E-08	0.26%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
54	GTR03	2.46E-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
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
55	GTR03	2.46E-08	0.25%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				3.82E-03	RHRSWB-HTX-ISO-V	RHRSW B HTX ISOLATION VALVE FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
56	GTR03	2.46E-08	0.25%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				3.82E-03	RHRF48BB-VOO	MOTOR-OPERATED VALVE RHRF48BB OO
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
57	GTR03	2.46E-08	0.25%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRF48AA-VOO	MOTOR-OPERATED VALVE RHRF48AA OO
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
58	GTR03	2.42E-08	0.24%	5.30E-02	%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)

Appendix C - Table 1
Top 100 Core Damage Cutsets
Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
59	GTR03	2.42E-08	0.24%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
60	IORV06	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
				5.39E-03	LCSC001A-PMS-SS	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
61	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)
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
62	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	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
63	LOOP07	2.36E-08	0.24%	5.30E-02	%LOSP	LOSS OF OFFSITE POWER INIT EVENT
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
				1.40E-03	OADS	OP ACT: INITIATE ADS
64	IORV06	2.35E-08	0.24%	5.30E-02	%T7-IE	IORV IE
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
65	GTR11	2.33E-08	0.23%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.55E-03	HPCS-TOTAL--UUM	HPCS total unavailability due to mech and elec maintenance
				1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
66	GTR03	2.32E-08	0.23%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				3.82E-03	RHRSWA-HTX-ISO-V	RHRSW A HTS ISOLATION VALVE FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
67	GTR03	2.32E-08	0.23%	2.63E-04	%T101-IE	LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				3.82E-03	RHRSWB-HTX-ISO-V	RHRSW B HTX ISOLATION VALVE FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
68	GTR03	2.32E-08	0.23%	2.63E-04	%T101-IE	LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				3.82E-03	RHRF48BB-VOO	MOTOR-OPERATED VALVE RHRF48BB OO
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)

Appendix C - Table 1
Top 100 Core Damage Cutsets
Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
69	GTR03	2.32E-08	0.23%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				3.82E-03	RHRF48AA-VOO	MOTOR-OPERATED VALVE RHRF48AA OO
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
70	RB-FLD	2.29E-08	0.23%	2.00E-04	%FS	FLOOD IE'S GROUND OR MAIN RB FLOOR (x capacity factor .7
				5.42E-02	INTR-JOCKY-P-LF	INTERMEDIATE JOCKY PMP FAILURE
				3.10E-01	DFPA	DIESEL FIRE PUMP TRAIN A
				3.10E-01	DFPB	DIESEL FIRE PUMP TRAIN B
				2.20E-02	OSW	OP ACT: SECURE SW PUMPS FROM THE CNTRL ROOM
71	GTR03	2.27E-08	0.23%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				3.53E-03	CSCD300B-STR-PLG	2E12D300B STRAINER RHR SW TRAIN B PLUG
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
72	GTR03	2.27E-08	0.23%	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)
				3.53E-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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
73	LOOP07	2.20E-08	0.22%	5.30E-02	%LOSP	LOSS OF OFFSITE POWER INIT EVENT
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				6.85E-03	RCIF046C-FAULTS	MOTOR-OPERATED VALVE RCIF046C CC
				1.40E-03	OADS	OP ACT: INITIATE ADS
74	ATW14	2.20E-08	0.22%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				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)
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
75	GTR03	2.20E-08	0.22%	2.63E-04	%T101-IE	LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				3.62E-03	DW-HP-RHR-SGNB-F	DW HI-PRESS RHR TRAIN B SGNL FAIL (QUANT:NOS-POP-RHR-T24A)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
76	GTR03	2.20E-08	0.22%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				3.62E-03	DW-HP-RHR-SGNA-F	DW HI-PRESS RHR TRAIN A SGNL FAIL (QUANT:NOS-POP-RHR-T24B)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
77	GTR03	2.20E-08	0.22%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
78	LOOP07	2.19E-08	0.22%	5.30E-02	%LOSP	LOSS OF OFFSITE POWER INIT EVENT
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)

Appendix C - Table 1
Top 100 Core Damage Cutsets
Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
				6.81E-03	RCIF045C-VCC	MOTOR-OPERATED VALVE RCIF045C CC
				1.40E-03	OADS	OP ACT: INITIATE ADS
79	LOOP17	2.17E-08	0.22%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				9.62E-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
80	GTR03	2.15E-08	0.22%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.61E-03	2E12C002A-FLT	2E12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
				3.13E-03	2E12B001B-HTX-LF	2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
81	GTR03	2.15E-08	0.22%	5.30E-02	%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)
				3.13E-03	2E12B001A-HTX-LF	2E12B001A HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
82	GTR03	2.14E-08	0.21%	2.63E-04	%T101-IE	LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				3.53E-03	CSCD300B-STR-PLG	2E12D300B STRAINER RHR SW TRAIN B PLUG
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
83	GTR03	2.14E-08	0.21%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
84	GTR03	2.09E-08	0.21%	8.10E-01	%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)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
85	GTR03	2.02E-08	0.20%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				3.13E-03	2E12B001B-HTX-LF	2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
86	GTR03	2.02E-08	0.20%	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)
				3.13E-03	2E12B001A-HTX-LF	2E12B001A HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
87	GTR03	1.98E-08	0.20%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRSWB-HTX-ISO-V	RHRSW B HTX ISOLATION VALVE FAULTS
				4.23E-03	NWVY01CA-FMS-SS	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS

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Top 100 Core Damage Cutsets
Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
88	GTR03	1.98E-08	0.20%	7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
				3.82E-03	RHRSWA-HTX-ISO-V	RHRSW A HTS ISOLATION VALVE FAULTS
89	GTR03	1.98E-08	0.20%	7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRF48BB-VOO	MOTOR-OPERATED VALVE RHRF48BB OO
				4.23E-03	NWVY01CA-FMS-SS	MOTOR-DRIVEN FAN NWVY01CA SS FAULTS
90	GTR03	1.98E-08	0.20%	7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				5.30E-02	%T11-IE	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
91	GTR03	1.90E-08	0.19%	7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				2.63E-04	%T101-IE	LOSS OF 4160V AC BUS 241Y IE(QUANT SWGR241YA)
				3.13E-03	2E12B001B-HTX-LF	2E12B001B HX TRAIN B PLANT SPECIFIC FAULT DATA (PSD)
92	GTR03	1.90E-08	0.19%	7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				3.13E-03	2E12B001A-HTX-LF	2E12B001A HX TRAIN A PLANT SPECIFIC FAULT DATA (PSD)
93	IORV06	1.86E-08	0.19%	7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				5.30E-02	%T7-IE	IORV IE
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
94	ATW15	1.83E-08	0.18%	4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
				4.15E-03	LPCS-LOGIC-FLT	LPCS PUMP LOGIC FAULTS
				4.70E-01	%MSIV	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				1.30E-03	OP-SBLC-A	OP ACT: INITIATE SBLC (ATWS)
95	GTR03	1.83E-08	0.18%	3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
				5.30E-02	%T11-IE	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
96	GTR03	1.83E-08	0.18%	7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
				5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)

Appendix C - Table 1
Top 100 Core Damage Cutsets
Total CDF Frequency: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
97	LOOP14	1.81E-08	0.18%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
				1.54E-04	DGS-FAIL-CM	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012))
98	GTR03	1.79E-08	0.18%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRSWB-HTX-ISO-V	RHRSW B HTX ISOLATION VALVE FAULTS
				3.82E-03	RHRSWA-HTX-ISO-V	RHRSW A HTS ISOLATION VALVE FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
99	GTR03	1.79E-08	0.18%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRF48AA-VOO	MOTOR-OPERATED VALVE RHRF48AA OO
				3.82E-03	RHRSWB-HTX-ISO-V	RHRSW B HTX ISOLATION VALVE FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
100	GTR03	1.79E-08	0.18%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRF48BB-VOO	MOTOR-OPERATED VALVE RHRF48BB OO
				3.82E-03	RHRSWA-HTX-ISO-V	RHRSW A HTS ISOLATION VALVE FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
	Totals:	3.68E-06	36.91%	Of Total CDF Frequency:		**1.0E-05**

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
1	LOOP18	2.30E-07	2.31%	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)
				2.47E-03	ROP24	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)
				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(DG2A FAIL*(BETA =.012))
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
4	LOOP14	6.15E-08	0.62%	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)
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
5	LOOP07	4.90E-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 RCIC001 SS FAULTS
				1.40E-03	OADS	OP ACT: INITIATE ADS
6	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
7	LOOP17	3.85E-08	0.39%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
8	LOOP07	3.80E-08	0.38%	5.30E-02	%LOSP	LOSS OF OFFSITE POWER INIT EVENT
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
				1.40E-03	OADS	OP ACT: INITIATE ADS
9	LOOP14	3.76E-08	0.38%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				1.53E-02	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/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
10	LOOP14	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
				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
				1.54E-04	DGS-FAIL-CM	DGs DIV 1, 2 common mode failure(DG2A FAIL*(BETA =.012))
12	LOOP18	2.90E-08	0.29%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				9.62E-03	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%	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-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
14	LOOP17	2.81E-08	0.28%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				7.63E-02	DG0-FAULTS	DG0 PLANT SPECIFIC FAULTS(PSD)
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
15	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)
				6.85E-03	RCIF046C-FAULTS	MOTOR-OPERATED VALVE RCIF046C CC
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
16	LOOP14	2.75E-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)
				7.63E-02	DG2A-FAULTS	DG2A PLANT SPECIFIC FAULTS
				6.81E-03	RCIF045C-VCC	MOTOR-OPERATED VALVE RCIF045C CC
17	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)
				4.27E-02	ROP3	failure to recover OSP within 3 HRS(NO LOAD SHED)
18	LOOP07	2.36E-08	0.24%	5.30E-02	%LOSP	LOSS OF OFFSITE POWER INIT EVENT
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
				1.40E-03	OADS	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	LOSS OF OFFSITE POWER INIT EVENT
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				6.85E-03	RCIF046C-FAULTS	MOTOR-OPERATED VALVE RCIF046C CC
				1.40E-03	OADS	OP ACT: INITIATE ADS
20	LOOP07	2.19E-08	0.22%	5.30E-02	%LOSP	LOSS OF OFFSITE POWER INIT EVENT
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				6.81E-03	RCIF045C-VCC	MOTOR-OPERATED VALVE RCIF045C CC
				1.40E-03	OADS	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: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
1	GTR03	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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
2	GTR11	4.77E-08	0.48%	5.30E-02	%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)
				1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
3	GTR11	4.64E-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 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
4	GTR03	4.41E-08	0.44%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.60E-05	CS-COOL-PMP-CM	COMMON MODE CS COOL. WTR PMPS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
5	GTR11	3.97E-08	0.40%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
6	GTR03	3.86E-08	0.39%	5.30E-02	%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)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
7	GTR03	3.61E-08	0.36%	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)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
8	GTR03	3.61E-08	0.36%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				5.61E-03	2E12C002B-FLT	2E12C002B RHR TRAIN B MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
9	GTR03	3.41E-08	0.34%	2.63E-04	%T101-IE	LOSS OF 4160V 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	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
10	GTR03	3.41E-08	0.34%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				5.61E-03	2E12C002A-FLT	12C002A RHR TRAIN A MOTOR-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)

Appendix C - Table 3
Top Cutsets for Transient 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
11	GTR03	3.39E-08	0.34%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
12	GTR03	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 (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
13	GTR03	3.20E-08	0.32%	2.63E-04	%T102-IE	LOSS OF 4160V AC BUS 242Y IE(QUANT SWGR242YA)
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
14	GTR03	2.91E-08	0.29%	5.30E-02	%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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
15	GTR03	2.91E-08	0.29%	5.30E-02	%T11-IE	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-DRIVEN PUMP FAULTS (PSD)
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
16	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
				1.24E-04	LPCI-CM	COMMON MODE FAILURE OF ALL 3 LPCI PUMPS (BETA = .05)
17	GTR03	2.73E-08	0.27%	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)
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
18	GTR03	2.73E-08	0.27%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
19	GTR03	2.63E-08	0.26%	5.30E-02	%T11-IE	LOSS OF INSTRUMENT AIR IE OR LOSP AT UNIT 1
				3.82E-03	RHRSWB-HTX-ISO-V	RHRSW B HTX ISOLATION VALVE FAULTS
				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)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)

Appendix C - Table 3
Top Cutsets for Transient 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
20	GTR03	2.63E-08	0.26%	5.30E-02	%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)
				3.82E-03	RHRSWA-HTX-ISO-V	RHRSW A HTS ISOLATION VALVE FAULTS
				7.00E-02	RHR-RECOVERY	FAILURE TO RECOVER 1-OF-2 RHR TRAINS WITHIN 33Hrs (ERIN)
				3.30E-01	SURVIVABILITY	INJECTION FAILS TO SURVIVE AFTER CONTAINMENT FAILS(ERIN)
	Totals:	8.00E-07	8.03%	Of Total CDF Frequency: **1.0E-05**		

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 Prob.	Event Name	Accident-Sequence Event Description
1	IORV06	4.11E-08	0.41%	5.30E-02	%T7-IE	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
				5.39E-03	LCSC001A-PMS-SS	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
2	IORV06	4.01E-08	0.40%	5.30E-02	%T7-IE	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
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
3	IORV06	3.16E-08	0.32%	5.30E-02	%T7-IE	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
				4.15E-03	LPCS-LOGIC-FLT	LPCS PUMP LOGIC FAULTS
4	IORV06	3.04E-08	0.30%	5.30E-02	%T7-IE	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
				3.98E-03	LCSF005A-FLT	LCSF005A CB OR OTHER LOCAL FAILURES
5	IORV06	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
				5.39E-03	LCSC001A-PMS-SS	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
6	IORV06	2.35E-08	0.24%	5.30E-02	%T7-IE	IORV IE
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
7	IORV06	1.86E-08	0.19%	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
				4.15E-03	LPCS-LOGIC-FLT	LPCS PUMP LOGIC FAULTS
8	IORV06	1.78E-08	0.18%	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
				3.98E-03	LCSF005A-FLT	LCSF005A CB OR OTHER LOCAL FAILURES
9	IORV06	1.71E-08	0.17%	5.30E-02	%T7-IE	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
				2.24E-03	NEVY04CA-FMS-SS	MOTOR-DRIVEN FAN NEVY04CA SS FAULTS
10	IORV06	1.00E-08	0.10%	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
				2.24E-03	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 Prob.	Event Name	Accident-Sequence Event Description
11	IORV06	6.25E-09	0.06%	5.30E-02	%T7-IE	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
				5.39E-03	LCSC001A-PMS-SS	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
12	IORV06	6.12E-09	0.06%	5.30E-02	%T7-IE	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
				8.02E-04	C0DG035-VOC	MOTOR-OPERATED VALVE C0DG035 OC
13	IORV06	6.10E-09	0.06%	5.30E-02	%T7-IE	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
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
14	IORV06	5.49E-09	0.06%	5.30E-02	%T7-IE	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
				7.20E-04	LCSD302X-STR	SUPPRESSION POOL SUCTION STRAINER LCSD302X FAULTS
15	IORV06	4.81E-09	0.05%	5.30E-02	%T7-IE	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
				4.15E-03	LPCS-LOGIC-FLT	LPCS PUMP LOGIC FAULTS
16	IORV06	4.62E-09	0.05%	5.30E-02	%T7-IE	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
				3.98E-03	LCSF005A-FLT	LCSF005A CB OR OTHER LOCAL FAILURES
17	IORV06	4.23E-09	0.04%	5.30E-02	%T7-IE	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
				2.04E-03	TBCCW-PSW-U1-FLT	(U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)
18	IORV06	4.13E-09	0.04%	5.30E-02	%T7-IE	IORV IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				2.04E-03	TBCCW-PSW-U1-FLT	(U1) TBCCW/PSW SYSTEMS FAILURES(FROM: TBCCW-OR-PSW-FLT(U2)
19	IORV06	3.67E-09	0.04%	5.30E-02	%T7-IE	IORV IE
				3.01E-03	CST-HOTWELL-LF	CST TO HOTWELL MAKEUP LOCAL FAULTS
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
				5.39E-03	LCSC001A-PMS-SS	MOTOR-DRIVEN PUMP LCSC001A SS FAULTS
20	IORV06	3.59E-09	0.04%	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
				8.02E-04	C0DG035-VOC	MOTOR-OPERATED VALVE C0DG035 OC
	Totals:	3.03E-07	3.04%	Of Total CDF Frequency: **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 Prob.	Event Name	Accident-Sequence Event Description
1	ATW03	1.65E-07	1.65%	2.40E+00	%T1-IE	TURBINE 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)
				4.40E-02	OFWLC-A	OP ACT: FW CNTRL TO LOWER PWR < BYPASS CAPACITY (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
2	ATW08	9.36E-08	0.94%	2.40E+00	%T1-IE	TURBINE TRIP WITH BYPASS IE
				1.00E+00	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)
3	ATW12	7.78E-08	0.78%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.20E-03	ORPVLC-A	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
4	ATW12	5.59E-08	0.56%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				2.30E-03	OADS-B	OP ACT: ADS AND RESTART PUMPS GIVEN FW UNAVAILABLE (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
5	ATW12	4.51E-08	0.45%	4.70E-01	%MSIV	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.20E-03	ORPVLC-A	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
6	ATW07	4.18E-08	0.42%	2.40E+00	%T1-IE	TURBINE TRIP WITH BYPASS IE
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				5.80E-04	OPTL-A	OP ACT: PTL LPCS, HPCS, LPCI PMPS (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
7	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	OADS-B	OP ACT: ADS AND RESTART PUMPS GIVEN FW UNAVAILABLE (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
8	ATW15	3.16E-08	0.32%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				1.00E+00	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)
9	ATW14	2.20E-08	0.22%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				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)
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
10	ATW15	1.83E-08	0.18%	4.70E-01	%MSIV	MSIV CLOSURE IE(including loss of 100 psi pneumatic IE)
				1.00E+00	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 Prob.	Event Name	Accident-Sequence Event Description
11	ATW13	1.41E-08	0.14%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				5.80E-04	OPTL-A	OP ACT: PTL LPCS, HPCS, LPCI PMPS (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
12	ATW14	1.28E-08	0.13%	4.70E-01	%MSIV	MSIV CLOSURE IE(including loss of 100 psi pneumatic 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)
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
13	ATW03	1.01E-08	0.10%	2.40E+00	%T1-IE	TURBINE TRIP WITH BYPASS IE
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				4.40E-02	OFWLC-A	OP ACT: FW CNTRL TO LOWER PWR < BYPASS CAPACITY (ATWS)
				3.20E-03	ORPVLC-A	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
14	ATW13	8.18E-09	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
				5.80E-04	OPTL-A	OP ACT: PTL LPCS, HPCS, LPCI PMPS (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
15	ATW05	6.53E-09	0.07%	2.40E+00	%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)
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
				1.00E-01	SBLC2	BORON INJECTION USING RWCU GIVEN SBLC FAILURE
16	ATW12	6.34E-09	0.06%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				2.61E-04	ADS	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
17	ATW14	5.90E-09	0.06%	8.10E-01	%T2T4-IE	TURBINE TRIP WITH CONDENSER UNAVAILABLE OR LOSS OF VACUUM
				2.43E-04	FAULT-SLC-C03	COMPONENT FAULT OCCURS IN STDBY LIQUID CTRL SEGMENT C03
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
18	ATW17	5.09E-09	0.05%	5.30E-02	%LOSP	LOSS OF OFFSITE POWER INIT EVENT
				3.20E-03	ORPVLC-A	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
19	ATW12	4.56E-09	0.05%	2.40E+00	%T1-IE	TURBINE TRIP WITH BYPASS IE
				1.98E-02	2FW005-PATH-FLT	2FW005 MDRFP REG VALVE PATH FAULTS
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.20E-03	ORPVLC-A	OP ACT: RESTORE RPV LEVEL TO MIX BORON (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 Prob.	Event Name	Accident-Sequence Event Description
20	ATW12	4.40E-09	0.04%	2.40E+00	%T1-IE	TURBINE TRIP WITH BYPASS IE
				1.91E-02	2FW01PC-FAULTS	COMPONENT FAULT OCCURS IN MAIN FEEDWATER SEGMENT L3
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.20E-03	ORPVLC-A	OP ACT: RESTORE RPV LEVEL TO MIX BORON (ATWS)
				3.00E-05	RPS-ARI-F	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: 1.0E-05/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
1	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	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
2	LL005	9.00E-09	0.09%	3.00E-04	%LLOCA	LARGE LOCA IE
				1.00E+00	ATWS	ATWS FLAG TO IDENTIFY ATWS CUTSETS
				3.00E-05	RPS-ARI-F	RPS and ARI FAILURE(RMIEP, NMPC, WNP-2)
3	ML005	8.13E-09	0.08%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				1.40E-03	OADS	OP ACT: INITIATE ADS
4	ML005	7.91E-09	0.08%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				1.40E-03	OADS	OP ACT: INITIATE ADS
5	ML005	6.76E-09	0.07%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				1.40E-03	OADS	OP ACT: INITIATE ADS
6	ML005	4.77E-09	0.05%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
				1.40E-03	OADS	OP ACT: INITIATE ADS
7	ML005	3.98E-09	0.04%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				3.55E-03	HPCS-TOTAL--UUM	HPCS total unavailability due to mech and elec maintenance
				1.40E-03	OADS	OP ACT: INITIATE ADS
8	LL004	3.00E-09	0.03%	3.00E-04	%LLOCA	LARGE LOCA IE
				1.00E-05	VSP	VAPOR SUPPRESSION POOL
9	ML005	1.52E-09	0.02%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				2.61E-04	ADS	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M
10	ML005	1.47E-09	0.01%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				2.61E-04	ADS	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M
11	ML005	1.26E-09	0.01%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				2.61E-04	ADS	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M
12	ML005	8.90E-10	0.01%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
				2.61E-04	ADS	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M
13	ML005	7.41E-10	0.01%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				3.55E-03	HPCS-TOTAL--UUM	HPCS total unavailability due to mech and elec maintenance
				2.61E-04	ADS	6 OF 7 ADS VLVS FAIL TO FUNCTION ON DEMAND(ADS QUANTIFIED M
14	ML005	3.23E-10	0.00%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				2.89E-04	HP-CHK-MAN-FLT	HPCS MANUAL OR CHECK VALVES FAULTS
				1.40E-03	OADS	OP ACT: INITIATE ADS

Appendix C - Table 6
Top Cutsets for LOCA 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
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)
				3.60E-05	CS-COOL-PMP-CM	COMMON MODE CS COOL. WTR PMPS
16	SL003	7.73E-11	0.00%	3.00E-03	%SLOCA	SMALL LOCA IE
				1.24E-04	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)
				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)
				3.60E-05	CS-COOL-PMP-CM	COMMON MODE CS COOL. WTR PMPS
18	LL003	6.52E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IE
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				3.60E-05	CS-COOL-PMP-CM	COMMON MODE CS COOL. WTR PMPS
19	ML005	6.02E-11	0.00%	3.00E-04	%MLOCA	MEDIUM LOCA IE
				2.89E-04	HP-CHK-MAN-FLT	HPCS MANUAL OR CHECK VALVES FAULTS
				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
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
21	LL003	5.86E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IE
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
22	LL003	5.01E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IE
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
23	LL003	4.85E-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)
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
24	LL003	4.72E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IE
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
25	LL003	4.60E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IE
				4.26E-03	SWVY02AX-INHTR	INADEQUATE HEAT REMOVAL VIA AIR COOLING SWVY02AX
				3.60E-05	CS-COOL-PMP-CM	COMMON MODE CS COOL. WTR PMPS

Appendix C - Table 6
Top Cutsets for LOCA 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
26	ML005	4.38E-11	0.00%	8.00E-04	%MLOCA	MEDIUM LOCA IE
				3.91E-05	1E243-1-480-LPW	LOSS OF POWER AT 480 BUS 1E243-1
				1.40E-03	OADS	OP ACT: INITIATE ADS
27	LL003	4.03E-11	0.00%	3.00E-04	%LLOCA	LARGE LOCA IE
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				4.23E-03	SEVY03CB-FMS-SS	MOTOR-DRIVEN FAN SEVY03CB SS FAULTS
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
	Totals:	7.45E-08	0.75%	Of Total CDF Frequency: **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 Prob.	Event Name	Accident-Sequence Event Description
1	SBO14	9.18E-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	0VD01YA MOD FAULTS
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				3.60E-03	RX-LO-PR-SGNL-F	RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A)
2	SBO14	9.12E-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
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
				3.60E-03	RX-LO-PR-SGNL-F	RCIC RESPONSE TO RX LO PRES SGNL FAIL (FROM:RCIACT-XSBRA-A)
3	SBO14	8.69E-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	0VD01YA MOD FAULTS
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
4	SBO14	8.64E-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
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
5	SBO14	8.21E-11	0.00%	1.60E-02	%DLOSP	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
				3.82E-03	DG0V01YA-FAULTS	0VD01YA MOD FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
6	SBO14	8.15E-11	0.00%	1.60E-02	%DLOSP	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
				3.80E-03	DG0V03YA-FAULTS	0VD03YA 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	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				3.82E-03	DG0V01YA-FAULTS	0VD01YA MOD FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
8	SBO14	6.69E-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
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS

Appendix C - Table 7
Top Cutsets for SBO 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
9	SBO14	6.51E-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	0VD01YA MOD FAULTS
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
10	SBO14	6.47E-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
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
11	SBO14	6.34E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				9.62E-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				3.82E-03	DG0V01YA-FAULTS	0VD01YA MOD FAULTS
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
12	SBO14	6.30E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				9.62E-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				3.80E-03	DG0V03YA-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 HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
14	SBO14	5.42E-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	0VD01YA MOD FAULTS
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
15	SBO14	5.38E-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
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
16	SBO14	5.38E-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
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				6.85E-03	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/yr

Seq. No.	Sequence Name	CDF	Percent of Total CDF	Event Prob.	Event Name	Accident-Sequence Event Description
17	SBO14	5.34E-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
				5.26E-03	C0DG01P-FAULTS	MOTOR-DRIVEN PUMP C0DG01P SS FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				6.81E-03	RCIF045C-VCC	MOTOR-OPERATED VALVE RCIF045C CC
18	SBO14	5.10E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				2.24E-03	DG0V01CA-FMS-SS	OVD01C MOTOR-DRIVEN FAN DG0V01CA SS FAULTS
				9.62E-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
19	SBO14	5.05E-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	0VD01YA MOD FAULTS
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
20	SBO14	5.01E-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
				7.26E-03	2E22C002-FAULTS	2E22C002 DG2B COOL WTR PUMP PLANT SPECIFIC FLT DATA (PSD)
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
21	SBO14	4.91E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				9.62E-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				3.82E-03	DG0V01YA-FAULTS	0VD01YA MOD FAULTS
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
22	SBO14	4.88E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				7.06E-03	2E22C001-PMS-SS	2E22C001 HPCS PUMP PLANT SPECIFIC FAULT DATA (GEN)
				9.62E-03	SY-VNF-HVDG2A	ROOM HVDG2A COOLING OR VENTILATION SYSTEM FAULTS
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
23	SBO14	4.75E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				3.82E-03	DG0V01YA-FAULTS	0VD01YA MOD FAULTS
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
24	SBO14	4.72E-11	0.00%	1.60E-02	%DLOSP	DUAL LOSS OF OFFSITE POWER IE
				1.53E-02	RCIC001X-TDP-SS	TURBINE-DRIVEN PUMP RCIC001 SS FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				5.26E-03	2DG01P-FAULTS	DG2A COOL WTR PUMP 2DG01P PLANT SPECIFIC FAULTS (PSD)
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS

Appendix C - Table 7
Top Cutsets for SBO 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
25	SBO14	4.63E-11	0.00%	1.60E-02	%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	0VD01YA MOD FAULTS
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
26	SBO14	4.60E-11	0.00%	1.60E-02	%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
				4.33E-02	2E22S001-FAULTS	DG2B PLANT SPECIFIC FAULTS (PSD)
				3.80E-03	DG0V03YA-FAULTS	0V%DLOSP
27	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	0VD01YA MOD FAULTS
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
28	SBO14	4.18E-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	0VD01YA MOD FAULTS
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
29	SBO14	4.17E-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
				6.04E-03	HP-MOV-FAULTS	HPCS MOV VALVES FAULTS
				1.18E-02	RCIF063C-VOC	MOTOR-OPERATED VALVE RCIF063C OC
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
30	SBO14	4.16E-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
				9.69E-03	DG2B-AUX-SYS	HPCS DIESEL AUXILIARY SYTEMS FAILURE
				7.34E-03	RCIF013C-FAULTS	MOV RCIC F013 VALVE FAULTS
				3.80E-03	DG0V03YA-FAULTS	0VD03YA MOD FAULTS
	Totals:	1.79E-09	0.02%	Of Total CDF Frequency:	**1.0E-05**	