

Grand Gulf Fire PRA Quantitative Refinements To Support the Kaowool Wrap Analysis

Rev. 0

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1.0 Scenario Evaluation with Fire PRA

This report describes the fire risk assessment of the five fire zones noted below in support of a *Change Analysis for Grand Gulf Nuclear Station License Amendment Request for Kaowool Resolution*. Each of these zones was examined for the risk significance associated with the indeterminate status of the Kaowool wrap material. The assessment was performed using the existing Grand Gulf Fire PRA [PRA-GG-05-001, GGNS Fire PRAQuant, Rev 0 - Draft]. The fire PRA was used to begin the evaluation of transient fires found in each on the 5 fire zones of concern. The results presented here are conditional core damage probability (CCDP) and conditional large early release probability (CLERP) for those zones where a fire has the potential to damage both safe shutdown divisions. They do not represent the change in risk due to the presence of the Kaowool wrap but instead represent a bounding calculation of the entire risk. The areas evaluated are all in the Auxiliary Building and are:

Fire Zone	Elevation
1A101	93'
1A117	93'
1A211	119'
1A316	139'
1A417	166'

2.0 Approach and Methodology

The fire PRA fails equipment, assumes a plant trip and analyzes the resultant expected core damage frequency (CDF) and large early release frequency (LERF). The original fire PRA failed equipment that is expected to be lost in a fire in the zone with the use of flag files. These files set the failed equipment to True, indicating failure. Initiating events that are not expected to occur are set to False. As a result, this analysis determines the total CDF and LERF as surrogates for the Δ CDF and Δ LERF.

The analysis documented herein further refines the work in the fire PRA by examining specific transient combustible based fires at specific locations within each of the identified fire areas. The risk assessment was structured to integrate with proposed resolution strategies to support deterministic compliance. To support this approach, two quantifications were performed for each postulated transient fire - 1) only Division I equipment is lost or 2) only Division II equipment is lost. For some of the fire zones, the original work assumed that in these locations both divisions are lost due to the fire.

Two of the Auxiliary Building fire analyses zones are part of the northeast most compartment on the specified elevation: 1A211, and 1A316. The eastern most portion of

these zones are designated as the “a” scenario and can be found pictorially in Grand Gulf Fire Modeling Report [GGNS-94-0051 Documentation of Fire Modeling for Fire Probabilistic Risk Assessment] and are quantified in the Grand Gulf Fire PRA. Analysis zone 1A101 is a northern most cross-section of the elevation, while 1A117 meets 1A101 perpendicularly and is on the same elevation. Analysis area 1A401 encompasses the entire elevation, and will be used as a surrogate for fire zone 1A417. Because the quantitative results in the Fire PRA were below the screening criterion, no refinements were made in the original analysis of fire zone 1A101 and and fire area 1A401.

New flag files were created in order to analyze the affect of only losing a single division of equipment. The end of this section contains tables showing the failed basic events for each zone and division. Table 3-1 lists all of the basic events that are failed in each analysis. This set of basic events is failed in each location because the location of their cables is unknown; most of this equipment is balance of plant components.

Tables 3-2 through 3-11 list the basic events failed in each zone in order to simulate the loss of only a single division. The basic events in these tables (set to True) along with 1) the list of components that are always failed (Table 3-1 basic events set to True) and 2) the list of unaffected initiators (set to False) together form the flag file used for the specific analysis.

The results in the next section are shown with and without credit for manual fire suppression. In most cases, the construction of both fault trees is such that the fire initiator is an input to an AND gate with the fire suppression HEP and CDF (or LERF) model. Hence every cutset contains the fire suppression HEP. Calculating the CCDP and CLERP without fire suppression just requires the value to be divided out of the PRAQUANT result or “trued” in the cutset file.

The following files were used in the analysis:

Description	File	Date
<i>CDF Model</i>		
fault tree	FIRE.CAF	3/16/2004
database	GGFire.BE	3/23/2004
	GGFire.GT	3/16/2004
	GGFire.TC	8/14/2003
mutually exclusive file	Mutexct	3/16/2004
recovery file	Firerules.txt	3/23/2004
PRAQUANT file	FIREPRA-ERIN.QNT	7/19/2005
cutset file	KLEINSORG.CUT	7/19/2005
<i>LERF Model</i>		
fault tree	FireLERF.caf	4/5/2005
Database	[same as CDF model]	
mutually exclusive file	[same as CDF model]	
recovery file	[same as CDF model]	
PRAQUANT file	FIRELERF-ERIN.CUT	7/19/2005
master flag file	Fgmasterfirelerf.caf	4/5/2005
cutset file	FIRELERF-ERIN.CUT	7/19/2005
<i>Flag Files</i>		

Description	File	Date
93' No Division 1 Failures	101D1.TXT	6/20/2005
93' No Division 2 Failures	101D2.TXT	6/20/2005
93' No Division 1 Failures	117D1.TXT	6/20/2005
93' No Division 2 Failures	117D2.TXT	6/20/2005
119' No Division 1 Failures	201D1.TXT	6/20/2005
119' No Division 2 Failures	201D2.TXT	6/20/2005
119' No Division 1 Failures	211D1.TXT	6/20/2005
119' No Division 2 Failures	211D2.TXT	6/20/2005
139' No Division 1 Failures	316D1.TXT	6/20/2005
139' No Division 2 Failures	316D2.TXT	6/20/2005
166' No Division 1 Failures	401D1.TXT	6/20/2005
166' No Division 2 Failures	401D2.TXT	6/20/2005

3.0 Results

The results presented in Table 3-12 provide the current Fire PRA results (conditional core damage probability (CCDP)) for each zone of interest. The current Fire PRA did not generally credit the Kaowool (although some sensitivity cases were run) and assumed that all targets exposed to fire conditions in excess of their damage threshold were disabled. Each row in Table 3-12 lists the CCDP and CLERP for the same zone with all divisions failed followed by the results with only either the Division I or Division II equipment lost. This corresponds to locating a fire adjacent to the Division I cable trays and risers or the Division II cable trays and risers. Finally, the columns designated No Credit shows the impact of disallowing the possibility for manual suppression of the fire.

The results of the analysis show CCDP values, with no manual suppression credited, ranging from a low of 2.76E-05 to a high of 1.42E-03 assuming no Division I components are disabled. The results of the companion case that assumes no Division II components are disabled range from a low of 9.59E-05 to a high of 1.93E-03. The highest CCDP values occur in Fire Areas 1A117 (no Division I failures) and 1A211 (no Division II failures) and the lowest values occur in Fire Areas 1A101 (no Division I failures) and 1A117 (no Division II failures).

The results of the analysis show CLERP values, with no manual suppression credited, ranging from a low of 1.99E-06 to a high of 5.78E-05 assuming no Division I components are disabled. The results of the companion case that assumes no Division II components are disabled range from a low of 7.31E-06 to a high of 1.67E-04. The highest CLERP values occur in Fire Areas 1A117 (no Division I failures) and 1A211 (no Division II failures) and the lowest values occur in Fire Areas 1A101 (no Division I failures) and 1A101 (no Division II failures).

Table 3-1 Equipment Failed in Each Analysis

Gate	Description	Division
B21-FT-LSN682A-I	REACTOR LEVEL TRIP UNIT B21-LS-N682A FAILS TO TRANSFER	Note 2
B21-FT-LSN682B-I	REACTOR LEVEL TRIP UNIT B21-LS-N682B FAILS TO TRANSFER	Note 2
B21-FT-LSN682C-I	REACTOR LEVEL TRIP UNIT B21-LS-N682C FAILS TO TRANSFER	Note 2
B21-FT-LSN682D-I	LIMIT SWITCH N682D FAILS TO TRANSFER	Note 2
B21-FT-PSN667C-I	FAILURE OF DRYWELL PRESSURE TRIP UNIT B21-PIS-N667C	Note 2
B21-FT-PSN667G-I	FAILURE OF DRYWELL PRESSURE TRIP UNIT B21-PIS-N667G	Note 2
B21-FT-PSN667L-I	FAILURE OF DRYWELL PRESSURE TRIP UNIT B21-PIS-N667L	Note 2
B21-FT-PSN667R-I	FAILURE OF DRYWELL PRESSURE TRIP UNIT B21-PSN667R	Note 2
B21-FT-PSN694B-I	DRYWELL PRESSURE TRIP UNIT N694B FAILS TO TRANSFER	Note 2
B21-FT-PSN694F-I	DRYWELL PRESSURE TRIP UNIT N694F FAILS TO TRANSFER	Note 2
B21-FT-TD1051-I	105 SEC DIV.1 TIME DELAY RELAY FAILS TO TRANSFER	Note 2
B21-FT-TD1052-I	105 SEC. DIV. 2 TMER DELAY RELAY FAILS TO TRANSFER	Note 2
B21-FT-TDADSA-I	FAILURE OF ADS DIV.1 9 MINUTE DELAY RELAY A TO TRANSFER	Note 2
B21-FT-TDADSB-I	FAILURE OF DIV.1 9 MINUTE TIMER DELAY RELAY B TO TRANSFER	Note 2
B21-FT-TDADSE-I	FAILURE OF DIV.1 9 MINUTE TIMER DELAY RELAY E TO TRANSFER	Note 2
B21-FT-TDADSF-I	FAILURE OF DIV 2 9 MINUTE TIMER DELAY RELAY F TO TRANSFER	Note 2
B21-HW-LTN081A-I	REACTOR LEVEL SENS/TRANS B21-LT-N081A FAILS TO FUNCTION	Note 2
B21-HW-LTN081B-I	REACTOR LEVEL SENS/TRANS B21-LT-N081B FAILS TO FUNCTION	Note 2
B21-HW-LTN081C-I	REACTOR LEVEL SENS/TRANS B21-LT-N081C FAILS TO FUNCTION	Note 2
B21-HW-LTN081D-I	REACTOR LEVEL SENS/TRANS B21-LT-N081D FAILS TO FUNCTION	Note 2
B21-HW-PTN067C-I	FAILURE OF DRYWELL PRESSURE TRANSMITTER B21-PT-N067C	Note 2
B21-HW-PTN067G-I	FAILURE OF DRYWELL PRESSURE TRANSMITTER B21-PT-N067G	Note 2
B21-HW-PTN067L-I	FAILURE OF DRYWELL PRESSURE TRANSMITTER B21-LT-N067L	Note 2
B21-HW-PTN067R-I	FAILURE OF DRYWELL PRESSURE TRANSMITTER B21-PT-N067R	Note 2
B21-HW-PTN094B-I	DRYWELL PRESSURE SENS/TRANS N094B FAILS TO FUNCTION	Note 2
B21-HW-PTN094F-I	DRYWELL PRESSURE SENS/TRANS N094F FAILS TO FUNCTION	Note 2
C11-CC-AVF002A-G	AIR-OPERATED VALVE C11-FOO2A FAILS TO OPEN COMPLETELY	Note 1
C11-CC-MVF003-G	MOTOR OPERATED PRESS. CNTRL VALVE C11-F003 FAILS TO OPEN COMPLETELY	Note 1
C11-FR-MPC001B-G	CRD PUMP C11-C001B FAILS TO CONTINUE TO RUN	Note 1
C11-FS-MPC001B-G	CRD PUMP C11-C001B FAILS TO START	Note 1
C11-HW-CTR600-I	FAILURE OF AIR-OPERATED VALVE FLOW CONTROLLER (C11-FK-R600)	Note 1
C71-FT-PSN650A-I	DRYWELL PRESSURE TRIP UNIT C71-PT-N650A FAILS TO TRANSFER	Note 2
C71-FT-PSN650B-I	PRESSURE SWITCH N650B FAILS TO TRANSFER	Note 2
C71-FT-PSN650C-I	PRESSURE SWITCH N650C FAILS TO TRANSFER	Note 2
C71-FT-PSN650D-I	DRYWELL PRESSURE TRIP UNIT C71-PIS-N650D FAILS TO TRANSFER	Note 2
C71-HW-PTN050A-I	DRYWELL PRESSURE SENS/TRANS C71-PT-N050A FAILS TO FUNCTION	Note 2
C71-HW-PTN050B-I	DRYWELL PRESSURE SENS/TRANS C71-PT-N050B FAILS TO FUNCTION	Note 2
C71-HW-PTN050C-I	DRYWELL PRESSURE SENS/TRANS C71-PT-N050C FAILS TO FUNCTION	Note 2
C71-HW-PTN050D-I	DRYWELL PRESSURE SENS/TRANS C71-PT-N050A FAILS TO FUNCTION	Note 2
E12-FT-PSN662B-P	CONTAINMENT PRESSURE TRIP UNIT N662B FAILS TO TRANSFER	Note 2
E12-FT-PSN662C-P	CONTAINMENT PRESSURE TRIP UNIT N662C FAILS TO TRANSFER	Note 2
E12-FT-PSN662D-P	CONTAINMENT PRESSURE TRIP UNIT N662D FAILS TO TRANSFER	Note 2
E12-FT-TDK116-P	TIME DELAY RELAY K116 FAILS TO TRANSFER	Note 2
E12-HW-PTN062B-P	CONTAINMENT PRESSURE SENS/TRANS N062B FAILS TO FUNCTION	Note 2

Gate	Description	Division
E12-HW-PTN062C-P	CONTAINMENT PRESSURE SENS/TRANS N062C FAILS TO FUNCTION	Note 2
E12-HW-PTN062D-P	CONTAINMENT PRESSURE SENS/TRANS N062D FAILS TO FUNCTION	Note 2
E30-FT-LSN600A-I	SUPP POOL LEVEL TRIP UNIT E30-LS-N600A FAILS TO TRANSFER	Note 2
E30-FT-LSN600B-I	SUPP POOL LEVEL TRIP UNIT E30-LS-N600B FAILS TO TRANSFER	Note 2
E30-FT-LSN600C-I	SUPP POOL LEVEL TRIP UNIT E30-LS-N600D FAILS TO TRANSFER	Note 2
E30-FT-LSN600D-I	SUPP POOL LEVEL TRIP UNIT E30-LS-N600D FAILS TO TRANSFER	Note 2
E30-FT-TDTMDYA-I	FAILURE OF TIMER/RELAY TO TRANSFER-SPMU TRAIN A	Note 2
E30-FT-TDTMDYB-I	FAILURE OF TIMER/RELAY TO TRANSFER-SPMU TRAIN B	Note 2
E30-HW-LTN003A-I	SUPP POOL LEVEL SENS/TRANS E30-LT-N003A FAILS TO FUNCTION	Note 2
E30-HW-LTN003B-I	SUPP POOL LEVEL SENS/TRANS E30-LT-N003B FAILS TO FUNCTION	Note 2
E30-HW-LTN003C-I	SUPP POOL LEVEL SENS/TRANS E30-LT-N003D FAILS TO FUNCTION	Note 2
E30-HW-LTN003D-I	SUPP POOL LEVEL SENS/TRANS E30-LT-N003D FAILS TO FUNCTION	Note 2
E51-FT-LSN635E-I	NO OUTPUT FROM CST LEVEL TRIP UNIT E51-LIS-N635E	Note 2
E51-HW-LTN035E-I	HARDWARE FAILURE OF CST LEVEL TRANSMITTER E51-LT-N035E	Note 2
L21-CO-CB11D01-X	FEEDER BREAKER 72-11D01 FROM BATTERY 1D3 FAILS OPEN	Note 1
L21-CO-CB11D02-X	CHARGER 1D4 FEEDER BREAKER 72-11D02 FAILS OPEN	Note 1
L21-CO-CB11D03-X	CHARGER 1D5 FEEDER BREAKER 72-11D03 FAILS OPEN	Note 1
L21-CO-CB11E01-X	FEEDER BREAKER 72-11E01 FROM BATTERY 1E3 FAILS OPEN	Note 1
L21-CO-CB11E02-X	CHARGER 1E4 FEEDER BREAKER 72-11E02 FAILS OPEN	Note 1
L21-CO-CB11E03-X	CHARGER 1E5 FEEDER BREAKER 72-11E03 FAILS OPEN	Note 1
L21-LP-DC11DD-X	125V DC BOP BUS 11DD HARDWARE FAILURE	Note 1
L21-LP-DC11DE-X	125V DC BOP BUS 11DE HARDWARE FAILURE	Note 1
L51-LP-BC-1D4-X	CHARGER 1D4 HARDWARE FAILURE	Note 1
L51-LP-BC-1D5-X	BATTERY CHARGER -1D5- FAILURE	Note 1
L51-LP-BC-1E4-X	BATTERY CHARGER -1E4- FAILURE	Note 1
L51-LP-BC-1E5-X	BATTERY CHARGER -1E5- FAILURE	Note 1
M41-CC-AVF034-Q	NORMALLY CLOSED AIR OPERATED VALVE F034- FAILS TO OPEN	Note 2
M41-CC-AVF035-Q	NORMALLY CLOSED AIR OPERATED VALVE F035- FAILS TO OPEN	Note 2
M41-CC-AVF036-Q	NORMALLY CLOSED AIR OPERATED VALVE F036- FAILS TO OPEN	Note 2
M41-CC-AVF037-Q	NORMALLY CLOSED AIR OPERATED VALVE F037- FAILS TO OPEN	Note 2
N21-CC-MVF014B-G	CLOSED MOTOR DRIVEN VALVE N21F014B FAILS TO OPEN	Note 1
N21-CO-AVF030A-G	MIN FLOW VALVE N21-F503A FAILS FULL OPEN	Note 1
N21-CO-AVF030B-G	MIN FLOW VALVE N21-F503B FAILS FULL OPEN	Note 1
N37-CF-HVF001-G	CC FAILURE OF NORMALLY CLOSED HYDRAULIC OPERATED VALVES F001 TO OPEN	Note 1
P41-CC-MVF154-U	NORMALLY CLOSED MOTOR DRIVEN VALVE F154- FAILS TO OPEN	Note 1
P41-CC-MVF155A-U	NORMALLY CLOSED MOTOR DRIVEN VALVE F155A FAILS TO OPEN	Note 1
P41-CC-MVF155B-U	NORMALLY CLOSED MOTOR DRIVEN VALVE F155B FAILS TO OPEN	Note 1
P42-FT-FSN600A-I	FLOW TRIP UNIT P42-FIS-N600A FAILS TO TRANSFER	Note 1
P42-FT-FSN601A-I	FLOW TRIP UNIT P42-FIS-N601A FAILS TO TRANSFER	Note 1
P42-FT-PSLN025-I	PRESSURE TRIP UNIT PIS-N025 FAILS TO TRANSFER	Note 1
P42-HW-FTN041-I	FLOW SENS/TRANS P42-FT-N041 FAILS TO FUNCTION	Note 1
P42-HW-FTN042-I	FLOW SENS/TRANS P42-FT-N042 FAILS TO FUNCTION	Note 1
P42-OO-AVF103-W	CCW AOV F103 AT RWCU HXs INLET FAILS TO CLOSE UPON LOSP	Note 1
P42-OO-MVF105-W	MOTOR OPERATED VALVE F105 FAILS TO CLOSE	Note 1
P42-OO-MVF205-W	MOTOR OPERATED VALVE F205 FAILS TO CLOSE	Note 1
P43-FT-PSLN003-I	PRESSURE TRIP UNIT PSL-N003 FAILS TO TRANSFER SIGNAL TO PUMP C001C	Note 1

Gate	Description	Division
P43-OC-AVF289-W	NORMALLY OPEN AIR OPERATED VALVE F289 FAILS CLOSED	Note 1
P44-CC-MVF042-W	MOV F042 FAILS TO OPEN	Note 2
P44-CC-MVF067-W	MOV F067 FAILS TO OPEN	Note 2
P44-CO-MVF128-W	HARDWARE FAILURE OF FLOW REVERSAL MOV F128	Note 2
P44-CO-MVF130-W	HARDWARE FAILURE OF FLOW REVERSAL VALVE F130	Note 2
P44-OC-AVF011-W	AIR-OPERATED VALVE F011 FAILS TO REMAIN OPEN DUE TO HARDWARE FAILURE	Note 2
P44-OC-AVF116-W	AIR-OPERATED VALVE F116 FAILS TO REMAIN OPEN DUE TO HARDWARE FAILURE	Note 2
P44-OC-AVF117-W	AIR-OPERATED VALVE F117 FAILS TO REMAIN OPEN DUE TO HARDWARE FAILURE	Note 2
P44-OC-MVF127-W	HARDWARE FAILURE OF FLOW REVERSAL MOV F127	Note 2
P44-OC-MVF129-W	HARDWARE FAILURE OF FLOW REVERSAL MOV F129	Note 2
P52-CC-PVPR504-T	NORMALLY CLOSED PRESSURE CONTROL VALVE PR504 FAILS TO OPEN	Note 2
P52-FR-CMP52AN-T	AIR COMPRESSOR P52AN FAILS TO CONTINUE RUNNING	Note 2
P52-FR-CMP52BN-T	AIR COMPRESSOR P52BN FAILS TO CONTINUE RUNNING	Note 2
P52-FS-CMP52BN-T	AIR COMPRESSOR P52BN FAILS TO START	Note 2
P52-OC-PVPR500-T	PRESSURE REGULATOR PR500 FAILS CLOSED	Note 2
P53-FT-PSLN036-T	PRESSURE SWITCH PS036 FAILS TO TRANSFER	Note 2
P64-OC-AVF282A-G	AIR OPERATED VALVE 282A FAILS CLOSED	Note 2
P64-OC-AVF282B-G	AIR OPERATED VALVE F282B FAILS CLOSED	Note 2
P64-OC-AVF283A-G	AIR OPERATED VALVE 283A FAILS CLOSED	Note 2
P64-OC-AVF283B-G	AIR OPERATED VALVE F283B FAILS CLOSED	Note 2
P71-FR-CHB001A-U	FAILURE OF CHILLER B001A-N TO RUN	Note 1
P71-FR-CHB001B-U	FAILURE OF CHILLER B001B-N TO RUN	Note 1
P71-FR-CHB001C-U	FAILURE OF CHILLER B001C-N TO RUN	Note 1
P71-FR-MPC001A-U	PUMP C001A-N FAILS TO RUN DUE TO HARDWARE FAILURE	Note 1
P71-FR-MPC001B-U	PUMP C001B-N FAILS TO RUN	Note 1
P71-FS-CHB001C-U	CHILLER B001C-N FAILS TO START DUE TO HARDWARE FAILURE	Note 1
P71-FS-MPC001B-U	PUMP C001B-N FAILS TO START DUE TO HARDWARE FAILURE	Note 1
R20-CO-CB-1104-X	FEEDER BREAKER 252-1104 FAILS OPEN	Note 1
R20-CO-CB-1105-X	FEEDER BREAKER 252-1105 FAILS OPEN	Note 1
R20-CO-CB-1106-X	FEEDER BREAKER 252-1106 FAILS OPEN	Note 1
R20-CO-CB11101-X	FEEDER BREAKER 52-11101 FAILS OPEN	Note 1
R20-CO-CB11104-X	FEEDER BREAKER 52-11104 FAILS OPEN	Note 1
R20-CO-CB11301-X	FEEDER BREAKER 52-11301 FAILS OPEN	Note 1
R20-CO-CB11501-X	FEEDER BREAKER 52-11501 FAILS OPEN	Note 1
R20-CO-CB-1203-X	FEEDER BREAKER 252-1203 FAILS OPEN	Note 1
R20-CO-CB-1204-X	FEEDER BREAKER 252-1204 FAILS OPEN	Note 1
R20-CO-CB12201-X	FEEDER BREAKER 52-12201 FAILS OPEN	Note 1
R20-CO-CB12501-X	FEEDER BREAKER 52-12501 FAILS OPEN	Note 1
R20-CO-CB12508-X	NORMALLY CLOSED BREAKER 52-12508 FAILS OPEN	Note 1
R20-CO-CB13101-X	FEEDER BREAKER 52-13101 FAILS OPEN	Note 1
R20-CO-CB13103-X	FEEDER BREAKER 52-13103 FAILS OPEN	Note 1
R20-CO-CB13501-X	FEEDER BREAKER 52-13501 FAILS OPEN	Note 1
R20-CO-CB14101-X	FEEDER BREAKER 52-14101 FAILS OPEN	Note 1
R20-CO-CB14103-X	FEEDER BREAKER 52-14103 FAILS OPEN	Note 1

Gate	Description	Division
R20-CO-CB14106-X	FEEDER BREAKER 52-14106 FAILS OPEN	Note 1
R20-CO-CB31116-F	MCC 13B11 TO CHARGER 1C5 FEEDER BREAKER 52-131116 FAILS OPEN	Note 1
R20-CO-CB41106-X	NORMALLY CLOSED BREAKER 52-141106 FAILS OPEN	Note 1
R20-LP-MC11B12-X	MOTOR CONTROL CENTER 11B12 FAILURE	Note 1
R20-LP-MC11BD1-X	LCC 11BD1 HARDWARE FAILURES	Note 1
R20-LP-MC11BD3-X	LCC 11BD3 HARDWARE FAILURE	Note 1
R20-LP-MC12B52-X	MOTOR CONTROL CENTER 12B52 FAILURE	Note 1
R20-LP-MC12BE2-X	LCC 12BE2 HARDWARE FAILURES	Note 1
R20-LP-MC12BE5-X	LCC 12BE5 HARDWARE FAILURES	Note 1
R20-LP-MC13B11-X	MOTOR CONTROL CENTER 13B11 FAILURE	Note 1
R20-LP-MC13BD1-X	LCC 13BD1 HARDWARE FAILURES	Note 1
R20-LP-MC13BD5-X	LCC 13BD5 HARDWARE FAILURES	Note 1
R20-LP-MC14B11-X	MOTOR CONTROL CENTER 14B11 FAILURE	Note 1
R20-LP-MC14B12-X	MOTOR CONTROL CENTER 14B12 FAILURE	Note 1
R20-LP-MC14BE1-X	LCC 14BE1 HARDWARE FAILURES	Note 1
R20-LP-MC14P12-X	120V POWER PANEL 14P12 HARDWARE FAILURES	Note 1
R20-LP-TR11BD1-X	LCC 11BD1 TRANSFORMER FAILURE	Note 1
R20-LP-TR11BD3-X	LCC TRANSFORMER 11BD3 FAILURE	Note 1
R20-LP-TR11BD5-X	LCC TRANSFORMER 11BD5 FAILURE	Note 1
R20-LP-TR12BE2-X	LCC 12BE2 TRANSFORMER FAILURE	Note 1
R20-LP-TR12BE5-X	LCC 12BE5 TRANSFORMER FAILURE	Note 1
R20-LP-TR13BD1-X	LCC 13BD1 TRANSFORMER FAILURES	Note 1
R20-LP-TR13BD5-X	LCC 13BD5 TRANSFORMER FAILURE	Note 1
R20-LP-TR14BE1-X	LCC 14BE1 TRANSFORMER FAILURE	Note 1
R22-CO-CB-1108-X	NORMALLY CLOSED CIRCUIT BREAKER 252-1108 FAILS OPEN	Note 1
R22-CO-CB-1201-X	NORMALLY CLOSED CIRCUIT BREAKER 252-1201 FAILS OPEN	Note 1
R22-CO-CB-1208-X	NORMALLY CLOSED CIRCUIT BREAKER 252-1208 FAILS OPEN	Note 1
R22-LP-AC11HD-X	AC BUS 11HD- FAILURE	Note 1
R22-LP-AC12HE-X	AC BUS 12HE- FAILURE	Note 1
T41-FR-CUC11AN-U	FAILURE OF STEAM TUNNEL COOLER FAN C011A-N TO RUN	Note 1
T41-FR-CUC11BN-U	FAILURE OF STEAM TUNNEL COOLER FAN C011B-N TO RUN	Note 1
T41-FS-CUC11BN-U	FAILURE OF STEAM TUNNEL COOLER C011B-N TO START	Note 1
P81-LP-BC-1C4-F	BATTERY CHARGER -1C4- FAILURE	Note 2
P81-LP-BC-1C5-F	CHARGER 1C5 HARDWARE FAILURE	Note 2
R21-FT-RL-27SX-C	BUS 17AC UNDERVOLTAGE RELAY 27SX FAILURE	Note 2
R21-FT-RL-27SY-C	BUS 17AC UNDERVOLTAGE RELAY 27SY FAILURE	Note 2
Notes		
Note 1 - Balance of plant equipment whose cable locations are unknown.		
Note 2 - Other instrumentation and equipment whose locations are unknown.		

Table 3-2 Zone 101 No Division I Components Failed

Basic Event	Description
%T3A	PCS AVAILABLE TRANSIENT
E12-HW-FTN052B-J	FLOW SENS/TRANS N052B FAILS TO FUNCTION
E12-PG-MVF064B-J	MOTOR-OPERATED VALVE F064B PLUGS
E12-HW-FTN052C-J	FLOW SENS/TRANS N052C FAILS TO FUNCTION

Table 3-3 Zone 101 No Division II Components Failed

Basic Event	Description
%T3A	PCS AVAILABLE TRANSIENT
E12-HW-FTN052A-J	FLOW SENS/TRANS N052A FAILS TO FUNCTION
E12-PG-MVF064A-J	MOTOR-OPERATED VALVE F064A PLUGS
E21-CC-MVF005A-G	REACTOR INJECTION MOTOR-OPERATED VALVE F005-A FAILS TO OPEN
E21-HW-FS-N651-I	FLOW SWITCH -N651 FAILS TO FUNCTION
E51-HW-CTF019A-G	MINIMUM FLOW MOTOR-OPERATED VALVE F019-A CONTROLLER FAILURE
G33-OO-MVF004-S	NORMALLY OPEN MOTOR DRIVEN VALVE F004 FAILS TO CLOSE
P41-CC-MVF018A-U	MOTOR OPERATED VALVE F018A-A FAILS TO OPEN
P75-FR-DG-DG11-A	DG11 FAILS TO RUN
R20-CO-CB15101-A	FEEDER BREAKER 52-15101 FAILS OPEN
R20-CO-CB15102-X	LCC 15BA1 TO CHARGER 1D4 FEEDER BREAKER 52-15102 FAILS OPEN
R20-CO-CB15103-A	FEEDER BREAKER 52-15103 FAILS OPEN
R20-CO-CB15301-A	FEEDER BREAKER 52-15301 FAILS OPEN
R20-CO-CB15303-A	FEEDER BREAKER 52-15303 FAILS OPEN
R20-CO-CB15306-D	LCC 15BA3 TO CHARGER 1A5 FEEDER BREAKER 52-15306 FAILS OPEN
R20-LP-MC15BA1-A	LCC 15BA1 HARDWARE FAILURES
R20-LP-MC15BA3-A	LCC 15BA3 HARDWARE FAILURES
R20-LP-TR15BA1-A	LCC 15BA1 TRANSFORMER FAILURE
R20-LP-TR15BA3-A	LCC 15BA3 TRANSFORMER FAILURE
C11-FR-MPC001A-G	CRD PUMP C11-C001A FAILS TO CONTINUE TO RUN

Table 3-4 Zone 117 No Division I Components Failed

Basic Event	Description
%T3A	PCS AVAILABLE TRANSIENT
E12-CC-MVF094B-G	NORMALLY CLOSED MOTOR DRIVEN VALVE F094B FAILS TO OPEN
E12-CC-MVF096B-G	NORMALLY CLOSED MOTOR DRIVEN VALVE F096B FAILS TO OPEN
E12-FT-FSN652C-I	FLOW TRIP UNIT N652C FAILS TO TRANSFER
E12-HW-FTN052B-I	FLOW SENS/TRANS N052B FAILS TO FUNCTION
E12-HW-FTN052C-I	FLOW SENS/TRANS N052C FAILS TO FUNCTION
E12-PG-MVF064B-J	MOTOR-OPERATED VALVE F064B PLUGS
E22-CC-MVF015-H	MOTOR OPERATED VALVE F015-C FAILS TO OPEN
E22-HW-FTN056-I	FAILURE OF MIN-FLOW TRANSMITTER E22-FT-N056
E22-HW-PTN051-I	FAILURE OF MIN-FLOW PRESSURE TRANSMITTER E22-PT-N051
E22-OO-MVF001-G	MOTOR OPERATED VALVE F001-C FAILS TO CLOSE
E22-OO-MVF011-G	TEST LINE ISOLATION VALVE F011-C FAILS DUE TO HARDWARE FAULT(FAILS TO CLOSE)
P41-CC-MVF014B-L	MOTOR OPERATED VALVE F014B-B FAILS TO OPEN
P41-CC-MVF018B-U	MOTOR OPERATED VALVE F018B-B FAILS TO OPEN
P41-CC-MVF068B-L	MOTOR OPERATED VALVE F068B-B FAILS TO OPEN
P44-CC-MVF054-W	MOV F054 FAILS TO OPEN
P75-FR-DG-DG12-B	DG12 FAILS TO RUN

Table 3-5 Zone 117 No Division II Components Failed

Basic Event	Description
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%T3A	PCS AVAILABLE TRANSIENT
C11-FR-MPC001A-G	CRD PUMP C11-C001A FAILS TO CONTINUE TO RUN
E22-CC-MVF015-H	MOTOR OPERATED VALVE F015-C FAILS TO OPEN
E22-HW-FTN056-I	FAILURE OF MIN-FLOW TRANSMITTER E22-FT-N056
E22-HW-PTN051-I	FAILURE OF MIN-FLOW PRESSURE TRANSMITTER E22-PT-N051
E22-OO-MVF001-G	MOTOR OPERATED VALVE F001-C FAILS TO CLOSE
E22-OO-MVF011-G	TEST LINE ISOLATION VALVE F011-C FAILS DUE TO HARDWARE FAULT(FAILS TO CLOSE)
G33-OO-MVF004-S	NORMALLY OPEN MOTOR DRIVEN VALVE F004 FAILS TO CLOSE

Table 3-6 Zone 211 No Division I Components Failed

Basic Event	Description
%T3A	PCS AVAILABLE TRANSIENT
E12-CC-MVF042C-G	NORMALLY CLOSED MOTOR-OPERATED VALVE F042C FAILS TO OPEN
E12-CC-MVF094B-G	NORMALLY CLOSED MOTOR DRIVEN VALVE F094B FAILS TO OPEN
E12-CC-MVF096B-G	NORMALLY CLOSED MOTOR DRIVEN VALVE F096B FAILS TO OPEN
E12-FR-MPC002C-G	MOTOR-DRIVEN PUMP C002C FAILS TO CONTINUE RUNNING
E12-FS-MPC002C-G	MOTOR-DRIVEN PUMP C002C FAILS TO START
E12-FT-FSN652C-I	FLOW TRIP UNIT N652C FAILS TO TRANSFER
E12-HW-FTN052B-I	FLOW SENS/TRANS N052B FAILS TO FUNCTION
E12-HW-FTN052C-I	FLOW SENS/TRANS N052C FAILS TO FUNCTION
E12-PG-MVF004C-G	MOTOR-OPERATED VALVE F004C PLUGS
E12-PG-MVF064C-G	MOTOR-OPERATED VALVE F064C PLUGS
E22-FT-LSN654C-I	FAILURE OF CST LEVEL TRIP UNIT E22-LIS-N654C
E22-FT-LSN654G-I	FAILURE OF CST LEVEL TRIP UNIT E22-LIS-N654G
E22-HW-LTN054C-I	FAILURE OF CST LEVEL TRANSMITTER E22-LT-N054C
E22-HW-LTN054G-I	FAILURE OF CST LEVEL TRANSMITTER E22-LT-N054G
R20-CO-CB16101-B	FEEDER BREAKER 52-16101 FAILS OPEN
R20-CO-CB16102-X	LCC 16BB1 TO CHARGER 1E4 FEEDER BREAKER 52-16102 FAILS OPEN
R20-CO-CB16103-B	FEEDER BREAKER 52-16103 FAILS OPEN
R20-CO-CB16201-B	FEEDER BREAKER 52-16201 FAILS OPEN
R20-CO-CB16202-X	LCC 16BB2 TO CHARGER 1E5 FEEDER BREAKER 52-16202 FAILS OPEN
R20-CO-CB16203-B	FEEDER BREAKER 52-16203 FAILS OPEN
R20-LP-MC16BB1-B	LCC 16BB1 HARDWARE FAILURES
R20-LP-MC16BB2-B	LCC 16BB2 HARDWARE FAILURES
R20-LP-TR16BB1-B	LCC 16BB1 TRANSFORMER FAILURES
R20-LP-TR16BB2-B	LCC 16BB2 TRANSFORMER FAILURES
P42-FR-MPC001B-W	CCW PUMP B FAILS TO RUN
P42-FS-MPC001B-W	CCW PUMP B FAILS TO START
P43-OC-AVF289-W	NORMALLY OPEN AIR OPERATED VALVE F289 FAILS CLOSED
P44-OC-AVF120-W	NORMALLY OPEN AIR OPERATED VALVE F120 FAILS CLOSED
P53-FR-CMC001B-T	AIR COMPRESSOR C001B FAILS TO RUN (MTTR)
P53-FS-CMC001B-T	AIR COMPRESSOR C001B FAILS TO START 1P52C001
P53-OC-AVF013-T	NORMALLY OPEN AIR OPERATED VALVE F013- FAILS CLOSED

Table 3-7 Zone 211 No Division II Components Failed

Basic Event	Description
%T3A	PCS AVAILABLE TRANSIENT
E12-HW-FTN052A-I	FLOW SENS/TRANS N052A FAILS TO FUNCTION
E21-CC-MVF005A-G	REACTOR INJECTION MOTOR-OPERATED VALVE F005-A FAILS TO OPEN
E22-FT-LSN654C-I	FAILURE OF CST LEVEL TRIP UNIT E22-LIS-N654C
E22-FT-LSN654G-I	FAILURE OF CST LEVEL TRIP UNIT E22-LIS-N654G
E22-HW-LTN054C-I	FAILURE OF CST LEVEL TRANSMITTER E22-LT-N054C
E22-HW-LTN054G-I	FAILURE OF CST LEVEL TRANSMITTER E22-LT-N054G
E51-CC-MVF019A-G	MOTOR-OPERATED VALVE F019-A FAILS TO OPEN
E51-CC-MVF031A-H	MOTOR-OPERATED VALVE F031-A FAILS TO OPEN
E51-CC-MVF046A-G	MOTOR-OPERATED VALVE F046-A FAILS TO OPEN
E51-CC-MVF095A-G	RCIC STEAM SUPPLY BYPASS VALVE F095-A FAILS TO OPEN
E51-HW-CTF019A-G	MINIMUM FLOW MOTOR-OPERATED VALVE F019-A CONTROLLER FAILURE
E51-HW-LTN035A-I	HARDWARE FAILURE OF CST LEVEL TRANSMITTER E51-LT-N035A
G33-OO-MVF004-S	NORMALLY OPEN MOTOR DRIVEN VALVE F004 FAILS TO CLOSE

Table 3-8 Zone 316 No Division I Components Failed

Basic Event	Description
%T3A	PCS AVAILABLE TRANSIENT
B21-FT-LSN693B-I	NO OUTPUT FROM RPV LEVEL 8 TRIP UNIT B21-LS-N693B
B21-FT-LSN695B-I	REACTOR LEVEL SWITCH N695B FAILS TO TRANSFER
B21-FT-PSN697B-I	REACTOR PRESSURE TRIP UNIT N697B FAILS TO TRANSFER
B21-FT-PSN697F-I	REACTOR PRESSURE TRIP UNIT N697F FAILS TO TRANSFER
B21-FT-PSN698B-I	REACTOR PRESSURE TRIP UNIT N698B FAILS TO TRANSFER
B21-FT-PSN698F-I	REACTOR PRESSURE TRIP UNIT N698F FAILS TO TRANSFER
B21-HW-ICDIV2-K	FAILURE OF ADS DIVISION 2 ACTUATION SUBLOGIC
B21-HW-LTN095B-I	HARDWARE FAILURE OF RPV LEVEL TRANSMITTER B21-LT-N095B
B21-HW-PTN068B-I	REACTOR PRESSURE SENS/TRANS N068B FAILS TO FUNCTION
B21-HW-PTN068F-I	REACTOR PRESSURE SENS/TRANS N068F FAILS TO FUNCTION
E12-CC-MVF009B-O	NORMALLY CLOSED MOTOR-OPERATED VALVE F009B FAILS TO OPEN
E12-CC-MVF024B-M	NORMALLY CLOSED MOTOR-OPERATED VALVE F024B FAILS TO OPEN
E12-CC-MVF028B-N	NORMALLY CLOSED MOTOR-OPERATED VALVE F028B FAILS TO OPEN
E12-CC-MVF042B-G	NORMALLY CLOSED MOTOR-OPERATED VALVE F042B FAILS TO OPEN
E12-CC-MVF042C-G	NORMALLY CLOSED MOTOR-OPERATED VALVE F042C FAILS TO OPEN
E12-FR-MPC002B-J	MOTOR-DRIVEN PUMP C002B FAILS TO CONTINUE RUNNING
E12-FS-MPC002B-J	MOTOR-DRIVEN PUMP C002B FAILS TO START
E12-FT-FSN652C-I	FLOW TRIP UNIT N652C FAILS TO TRANSFER
E12-HW-FTN052B-I	FLOW SENS/TRANS N052B FAILS TO FUNCTION
E12-HW-FTN052C-I	FLOW SENS/TRANS N052C FAILS TO FUNCTION
E12-OO-MVF004B-O	NORMALLY OPEN MOTOR-OPERATED VALVE F004B FAILS TO CLOSE
E12-OO-MVF048B-L	NORMALLY OPEN MOTOR-OPERATED VALVE F048B FAILS TO CLOSE
E12-PG-MVF004B-J	MOTOR-OPERATED VALVE F004B PLUGS
E12-PG-MVF004C-G	MOTOR-OPERATED VALVE F004C PLUGS
E12-PG-MVF027B-J	MOTOR-OPERATED VALVE F027B PLUGS
E12-PG-MVF048B-J	MOTOR-OPERATED VALVE F048B PLUGS
E12-PG-MVF064B-J	MOTOR-OPERATED VALVE F064B PLUGS

Basic Event	Description
E12-PG-MVF064C-G	MOTOR-OPERATED VALVE F064C PLUGS
E30-CC-MVF001B-V	NORMALLY CLOSED MOTOR DRIVEN VALVE E30-F001B FAILS TO OPEN
E30-CC-MVF002B-V	NORMALLY CLOSED MOTOR DRIVEN VALVE E30-F002B FAILS TO OPEN
P41-CC-MVF014B-L	MOTOR OPERATED VALVE F014B-B FAILS TO OPEN
P41-CC-MVF018B-U	MOTOR OPERATED VALVE F018B-B FAILS TO OPEN
P41-CC-MVF068B-L	MOTOR OPERATED VALVE F068B-B FAILS TO OPEN
P41-FS-FNC003B-R	SSW COOLING TOWER FAN C003B-A FAILS TO START
P44-CC-MVF054-W	MOV F054 FAILS TO OPEN
P53-OC-PVF026B-T	PV-F026B FAILS CLOSED
P75-FR-DG-DG12-B	DG12 FAILS TO RUN
P75-FS-DG-DG12-B	DG12 FAILS TO START
R20-CO-CB16101-B	FEEDER BREAKER 52-16101 FAILS OPEN
R20-CO-CB16102-X	LCC 16BB1 TO CHARGER 1E4 FEEDER BREAKER 52-16102 FAILS OPEN
R20-CO-CB16103-B	FEEDER BREAKER 52-16103 FAILS OPEN
R20-CO-CB16201-B	FEEDER BREAKER 52-16201 FAILS OPEN
R20-CO-CB16202-X	LCC 16BB2 TO CHARGER 1E5 FEEDER BREAKER 52-16202 FAILS OPEN
R20-CO-CB16203-B	FEEDER BREAKER 52-16203 FAILS OPEN
R20-CO-CB16301-B	FEEDER BREAKER 52-16301 FAILS OPEN
R20-CO-CB16303-B	FEEDER BREAKER 52-16303 FAILS OPEN
R20-CO-CB16306-E	LCC 16BB3 TO CHARGER 1B5 FEEDER BREAKER 52-16306 FAILS OPEN
R20-CO-CB16401-B	FEEDER BREAKER 52-16401 FAILS OPEN
R20-CO-CB16403-B	FEEDER BREAKER 52-16403 FAILS OPEN
R20-LP-MC16B21-B	MCC 16B21 HARDWARE FAILURES
R20-LP-MC16B41-B	MCC 16B41 HARDWARE FAILURES
R20-LP-MC16BB1-B	LCC 16BB1 HARDWARE FAILURES
R20-LP-MC16BB2-B	LCC 16BB2 HARDWARE FAILURES
R20-LP-MC16BB3-B	LCC 16BB3 HARDWARE FAILURES
R20-LP-MC16BB4-B	LCC 16BB4 HARDWARE FAILURES
R20-LP-TR16BB1-B	LCC 16BB1 TRANSFORMER FAILURES
R20-LP-TR16BB2-B	LCC 16BB2 TRANSFORMER FAILURES
R20-LP-TR16BB3-B	LCC 16BB3 TRANSFORMER FAILURES
R20-LP-TR16BB4-B	LCC 16BB4 TRANSFORMER FAILURES
R21-CO-CB-1608-B	DG12 TO 16AB FEEDER BREAKER FAILS OPEN
X77-CC-MDF001B-U	MOTOR OPERATED DAMPER X77F001B-B FAILS TO OPEN ON DEMAND
X77-FR-FNC001B-U	FAN X77C001B-B FAILS TO RUN
X77-FS-FNC001B-U	FAN X77C001B-B FAILS TO START
Y47-FR-FNC01AA-U	OUTSIDE AIR FAN 1Y47C001A-A FAILS TO RUN
Y47-FS-FNC01AA-U	OUTSIDE AIR FAN 1Y47C001A-A FAILS TO START
Z77-FS-FNB001B-U	SUPPLY FAN 1Z77B001B-B FAILS TO START IN HIGH SPEED
Z77-OC-SDF003B-U	SOLENOID OPERATED DAMPER 1Z77F003B TRANSFERS CLOSED
Z77-OC-SDF035B-U	SOLENOID OPERATED DAMPER 1Z77F035B TRANSFERS CLOSED

Table 3-9 Zone 316 No Division II Components Failed

Basic Event	Description
%T3A	PCS AVAILABLE TRANSIENT
B21-FT-LSN691A-I	REACTOR LEVEL TRIP UNIT N691A FAILS TO TRANSFER
B21-FT-LSN691E-I	REACTOR LEVEL TRIP UNIT N691E FAILS TO TRANSFER
B21-FT-LSN692A-I	NO OUTPUT FROM RPV LEVEL 2 TRIP UNIT B21-LS-N692A
B21-FT-LSN692E-I	NO OUTPUT FROM RPV LEVEL 2 TRIP UNIT B21-LS-N692E
B21-FT-LSN693A-I	NO OUTPUT FROM RPV LEVEL 8 TRIP UNIT B21-LS-N693A
B21-FT-LSN695A-I	REACTOR LEVEL SWITCH N695A FAILS TO TRANSFER
B21-FT-PSN694A-I	DRYWELL PRESSURE TRIP UNIT N694A FAILS TO TRANSFER
B21-FT-PSN694E-I	DRYWELL PRESSURE TRIP UNIT N694E FAILS TO TRANSFER
B21-FT-PSN697A-I	REACTOR PRESSURE TRIP UNIT N697A FAILS TO TRANSFER
B21-FT-PSN697E-I	REACTOR PRESSURE TRIP UNIT N697E FAILS TO TRANSFER
B21-FT-PSN698A-I	REACTOR PRESSURE TRIP UNIT N698A FAILS TO TRANSFER
B21-FT-PSN698E-I	REACTOR PRESSURE TRIP UNIT N698E FAILS TO TRANSFER
B21-HW-ICDIV1-K	FAILURE OF ADS DIVISION 1 ACTUATION SUBLOGIC
B21-HW-LTN091A-I	REACTOR LEVEL SENS/TRANS N091A FAILS TO FUNCTION
B21-HW-PTN068A-I	REACTOR PRESSURE SENS/TRANS N068A FAILS TO FUNCTION
B21-HW-PTN068E-I	REACTOR PRESSURE SENS/TRANS N068E FAILS TO FUNCTION
B21-HW-PTN094A-I	DRYWELL PRESSURE SENS/TRANS N094A FAILS TO FUNCTION
B21-HW-PTN094E-I	DRYWELL PRESSURE SENS/TRANS N094E FAILS TO FUNCTION
E12-CC-MVF006A-O	NORMALLY CLOSED MOTOR-OPERATED VALVE F006A FAILS TO OPEN
E12-CC-MVF008A-O	NORMALLY CLOSED MOTOR-OPERATED VALVE F008A FAILS TO OPEN
E12-CC-MVF024A-M	NORMALLY CLOSED MOTOR-OPERATED VALVE F024A FAILS TO OPEN
E12-CC-MVF028A-N	NORMALLY CLOSED MOTOR-OPERATED VALVE F028A FAILS TO OPEN
E12-CC-MVF042A-G	NORMALLY CLOSED MOTOR-OPERATED VALVE F042A FAILS TO OPEN
E12-CC-MVF053A-O	NORMALLY CLOSED MOTOR-OPERATED VALVE F053A FAILS TO OPEN
E12-FT-PSN662A-P	CONTAINMENT PRESSURE TRIP UNIT N662A FAILS TO TRANSFER
E12-HW-FTN052A-I	FLOW SENS/TRANS N052A FAILS TO FUNCTION
E12-HW-PTN062A-P	CONTAINMENT PRESSURE SENS/TRANS N062A FAILS TO FUNCTION
E12-OO-MVF004A-O	NORMALLY OPEN MOTOR-OPERATED VALVE F004A FAILS TO CLOSE
E12-OO-MVF048A-L	NORMALLY OPEN MOTOR-OPERATED VALVE F048A FAILS TO CLOSE
E12-PG-MVF003A-L	MOTOR-OPERATED VALVE F003A PLUGS
E12-PG-MVF004A-J	MOTOR-OPERATED VALVE F004A PLUGS
E12-PG-MVF027A-J	MOTOR-OPERATED VALVE F027A PLUGS
E12-PG-MVF047A-L	MOTOR-OPERATED VALVE F047A PLUGS
E12-PG-MVF048A-J	MOTOR-OPERATED VALVE F048A PLUGS
E12-PG-MVF064A-J	MOTOR-OPERATED VALVE F064A PLUGS
E21-CC-MVF005A-G	REACTOR INJECTION MOTOR-OPERATED VALVE F005-A FAILS TO OPEN
E51-CC-MVF019A-G	MOTOR-OPERATED VALVE F019-A FAILS TO OPEN
E51-CC-MVF031A-H	MOTOR-OPERATED VALVE F031-A FAILS TO OPEN
E51-CC-MVF046A-G	MOTOR-OPERATED VALVE F046-A FAILS TO OPEN
E51-CC-MVF095A-G	RCIC STEAM SUPPLY BYPASS VALVE F095-A FAILS TO OPEN
E51-HW-CTF019A-G	MINIMUM FLOW MOTOR-OPERATED VALVE F019-A CONTROLLER FAILURE
E51-HW-LTN035A-I	HARDWARE FAILURE OF CST LEVEL TRANSMITTER E51-LT-N035A
G33-OO-MVF004-S	NORMALLY OPEN MOTOR DRIVEN VALVE F004 FAILS TO CLOSE

Basic Event	Description
P41-CC-MVF001A-R	NORMALLY CLOSED MOTOR OPERATED VALVE F001A FAILS TO OPEN
P41-CC-MVF005A-R	NORMALLY CLOSED MOTOR DRIVEN VALVE F005A FAILS TO OPEN
P41-CC-MVF018A-U	MOTOR OPERATED VALVE F018A-A FAILS TO OPEN
P41-FR-MPC001A-R	MOTOR DRIVEN PUMP C001A FAILS TO CONTINUE RUNNING
P41-FS-FNC003A-R	SSW COOLING TOWER FAN C003A-A FAILS TO START
P41-FS-MPC001A-R	MOTOR DRIVEN PUMP C001A FAILS TO START
P53-OC-PVF026B-T	PV-F026B FAILS CLOSED
P75-FR-DG-DG11-A	DG11 FAILS TO RUN
P75-FS-DG-DG11-A	DG11 FAILS START
R20-CO-CB15101-A	FEEDER BREAKER 52-15101 FAILS OPEN
R20-CO-CB15102-X	LCC 15BA1 TO CHARGER 1D4 FEEDER BREAKER 52-15102 FAILS OPEN
R20-CO-CB15103-A	FEEDER BREAKER 52-15103 FAILS OPEN
R20-CO-CB15201-A	FEEDER BREAKER 52-15201 FAILS OPEN
R20-CO-CB15202-X	LCC 15BA2 TO CHARGER 1D5 FEEDER BREAKER 52-15202 FAILS OPEN
R20-CO-CB15203-A	FEEDER BREAKER 52-15203 FAILS OPEN
R20-CO-CB15301-A	FEEDER BREAKER 52-15301 FAILS OPEN
R20-CO-CB15303-A	FEEDER BREAKER 52-15303 FAILS OPEN
R20-CO-CB15306-D	LCC 15BA3 TO CHARGER 1A5 FEEDER BREAKER 52-15306 FAILS OPEN
R20-CO-CB15401-A	FEEDER BREAKER 52-15401 FAILS OPEN
R20-CO-CB15403-A	FEEDER BREAKER 52-15403 FAILS OPEN
R20-CO-CB15501-A	FEEDER BREAKER 52-15501 FAILS OPEN
R20-CO-CB15503-A	FEEDER BREAKER 52-15503 FAILS OPEN
R20-CO-CB15601-A	FEEDER BREAKER 52-15601 FAILS OPEN
R20-CO-CB15602-D	LCC 15BA6 TO CHARGER 1A4 FEEDER BREAKER 52-15602 FAILS OPEN
R20-LP-MC15BA1-A	LCC 15BA1 HARDWARE FAILURES
R20-LP-MC15BA2-A	LCC 15BA2 HARDWARE FAILURES
R20-LP-MC15BA3-A	LCC 15BA3 HARDWARE FAILURES
R20-LP-MC15BA4-A	LCC 15BA4 HARDWARE FAILURES
R20-LP-MC15BA5-A	LCC 15BA5 HARDWARE FAILURES
R20-LP-MC15BA6-A	LCC 15BA6 HARDWARE FAILURES
R20-LP-TR15BA1-A	LCC 15BA1 TRANSFORMER FAILURE
R20-LP-TR15BA2-A	LCC 15BA2 TRANSFORMER FAILURES
R20-LP-TR15BA3-A	LCC 15BA3 TRANSFORMER FAILURE
R20-LP-TR15BA4-A	LCC 15BA4 TRANSFORMER FAILURES
R20-LP-TR15BA5-A	LCC 15BA5 TRANSFORMER FAILURE
R20-LP-TR15BA6-A	LCC 15BA6 TRANSFORMER FAILURE
R21-CC-CB-15AA-A	INCOMING FEEDER BREAKER 152-1501,1511 OR 1514 FAILS TO OPEN
R21-CO-CB-1501-A	NORMALLY CLOSED CIRCUIT BREAKER 152-1501 FAILS OPEN
R21-CO-CB-1508-A	DG11 TO 15AA FEEDER BREAKER 152-1508 FAILS OPEN
R21-CO-CB-1511-A	BREAKER 152-1511 FAILS OPEN
R21-CO-CB-1514-A	NORMALLY CLOSED CIRCUIT BREAKER 152-1514 FAILS OPEN
T51-FR-CUB002A-U	FAN COOLER T51B002-A FAILS TO RUN
T51-FS-CUB002A-U	FAN COOLER T51B002-A FAILS TO START
X77-FR-FNC001A-U	FAN X77C001A-A FAILS TO RUN
X77-FS-FNC001A-U	FAN X77C001A-A FAILS TO START
Y47-FR-FNC01AA-U	OUTSIDE AIR FAN 1Y47C001A-A FAILS TO RUN

Basic Event	Description
Y47-FS-FNC01AA-U	OUTSIDE AIR FAN 1Y47C001A-A FAILS TO START
Z77-FS-FNB001A-U	SUPPLY FAN 1Z77B001A-A FAILS TO START IN HIGH SPEED
Z77-FS-FNC001A-U	EXHAUST FAN 1Z77C001A-A FAILS TO START IN HIGH SPEED
Z77-OC-SDF001A-U	SOLENOID OPERATED DAMPER 1Z77F001A TRANSFERS CLOSED
Z77-OC-SDF002A-U	SOLENOID OPERATED DAMPER 1Z77F002A TRANSFERS CLOSED
Z77-OC-SDF003A-U	SOLENOID OPERATED DAMPER 1Z77F003A TRANSFERS CLOSED
Z77-OC-SDF035A-U	SOLENOID OPERATED DAMPER 1Z77F035A TRANSFERS CLOSED

Table 3-10 Zone 401 No Division I Components Failed

Basic Event	Description
%T3C	INADVERTANT OPEN RELIEF VALVE
E30-CC-MVF001B-V	NORMALLY CLOSED MOTOR DRIVEN VALVE E30-F001B FAILS TO OPEN
E30-CC-MVF002B-V	NORMALLY CLOSED MOTOR DRIVEN VALVE E30-F002B FAILS TO OPEN
P41-FR-FNC003B-R	SSW COOLING TOWER FAN C003B-A FAILS TO CONTINUE RUNNING
P41-FS-FNC003B-R	SSW COOLING TOWER FAN C003B-A FAILS TO START
P44-CC-MVF054-W	MOV F054 FAILS TO OPEN
P53-OC-PVF026B-T	PV-F026B FAILS CLOSED
P64-FR-MPC002-G	MOTOR DRIVEN FIRE PUMP C002-N FAILS TO RUN
P64-FS-MPC002-G	MOTOR DRIVEN FIRE PUMP C002-N FAILS TO START
Z77-FR-FNB001B-U	DIVISION II SUPPLY FAN 1Z77B001B-B FAILS TO RUN
Z77-FS-FNB001B-U	DIVISION II SUPPLY FAN 1Z77B001B-B FAILS TO START IN HIGH SPEED
Z77-OC-SDF003B-U	SOLENOID OPERATED DAMPER 1Z77F003B TRANSFERS CLOSED
Z77-OC-SDF035B-U	SOLENOID OPERATED DAMPER 1Z77F035B TRANSFERS CLOSED

Table 3-11 Zone 401 No Division II Components Failed

Basic Event	Description
%T3C	INADVERTANT OPEN RELIEF VALVE
B21-FT-LSN693A-I	NO OUTPUT FROM RPV LEVEL 8 TRIP UNIT B21-LS-N693A
B21-FT-LSN695A-I	REACTOR LEVEL SWITCH N695A FAILS TO TRANSFER
B21-FT-PSN679A-I	REACTOR PRESSURE TRIP UNIT N679A FAILS TO TRANSFER
B21-FT-PSN679D-I	REACTOR PRESSURE TRIP UNIT N679D FAILS TO TRANSFER
B21-FT-PSN694A-I	DRYWELL PRESSURE TRIP UNIT N694A FAILS TO TRANSFER
B21-FT-PSN694E-I	DRYWELL PRESSURE TRIP UNIT N694E FAILS TO TRANSFER
B21-FT-PSN697A-I	REACTOR PRESSURE TRIP UNIT N697A FAILS TO TRANSFER
B21-FT-PSN697E-I	REACTOR PRESSURE TRIP UNIT N697E FAILS TO TRANSFER
B21-FT-PSN698A-I	REACTOR PRESSURE TRIP UNIT N698A FAILS TO TRANSFER
B21-FT-PSN698E-I	REACTOR PRESSURE TRIP UNIT N698E FAILS TO TRANSFER
B21-HW-ICDIVI-K	FAILURE OF ADS DIVISION I ACTUATION SUBLOGIC
B21-HW-PTN068A-I	REACTOR PRESSURE SENS/TRANS N068A FAILS TO FUNCTION
B21-HW-PTN068E-I	REACTOR PRESSURE SENS/TRANS N068E FAILS TO FUNCTION
B21-HW-PTN078A-I	REACTOR PRESSURE SENS/TRANS N078A FAILS TO FUNCTION
B21-HW-PTN078D-I	REACTOR PRESSURE SENS/TRANS N078D FAILS TO FUNCTION
B21-HW-PTN094A-I	DRYWELL PRESSURE SENS/TRANS N094A FAILS TO FUNCTION
B21-HW-PTN094E-I	DRYWELL PRESSURE SENS/TRANS N094E FAILS TO FUNCTION
E12-CC-MVF006A-O	NORMALLY CLOSED MOTOR-OPERATED VALVE F006A FAILS TO OPEN
E12-CC-MVF008A-O	NORMALLY CLOSED MOTOR-OPERATED VALVE F008A FAILS TO OPEN

Basic Event	Description
E12-CC-MVF024A-M	NORMALLY CLOSED MOTOR-OPERATED VALVE F024A FAILS TO OPEN
E12-CC-MVF028A-N	NORMALLY CLOSED MOTOR-OPERATED VALVE F028A FAILS TO OPEN
E12-CC-MVF042A-G	NORMALLY CLOSED MOTOR-OPERATED VALVE F042A FAILS TO OPEN
E12-CC-MVF053A-O	NORMALLY CLOSED MOTOR-OPERATED VALVE F053A FAILS TO OPEN
E12-FR-MPC002A-J	MOTOR-DRIVEN PUMP C002A FAILS TO CONTINUE RUNNING
E12-FS-MPC002A-J	MOTOR-DRIVEN PUMP C002A FAILS TO START
E12-FT-PSN662A-P	CONTAINMENT PRESSURE TRIP UNIT N662A FAILS TO TRANSFER
E12-HW-FTN052A-I	FLOW SENS/TRANS N052A FAILS TO FUNCTION
E12-HW-PTN062A-P	CONTAINMENT PRESSURE SENS/TRANS N062A FAILS TO FUNCTION
E12-OO-MVF004A-O	NORMALLY OPEN MOTOR-OPERATED VALVE F004A FAILS TO CLOSE
E12-OO-MVF048A-L	NORMALLY OPEN MOTOR-OPERATED VALVE F048A FAILS TO CLOSE
E12-PG-MVF003A-L	MOTOR-OPERATED VALVE F003A PLUGS
E12-PG-MVF004A-J	MOTOR-OPERATED VALVE F004A PLUGS
E12-PG-MVF027A-J	MOTOR-OPERATED VALVE F027A PLUGS
E12-PG-MVF047A-L	MOTOR-OPERATED VALVE F047A PLUGS
E12-PG-MVF048A-J	MOTOR-OPERATED VALVE F048A PLUGS
E12-PG-MVF064A-J	MOTOR-OPERATED VALVE F064A PLUGS
E21-CC-MVF005A-G	REACTOR INJECTION MOTOR-OPERATED VALVE F005-A FAILS TO OPEN
E21-HW-FS-N651-I	FLOW SWITCH -N651 FAILS TO FUNCTION
E30-CC-MVF001A-V	NORMALLY CLOSED MOTOR DRIVEN VALVE E30-F001A FAILS TO OPEN
E30-CC-MVF002A-V	NORMALLY CLOSED MOTOR DRIVEN VALVE E30-F002A FAILS TO OPEN
E51-CC-MVF019A-G	MOTOR-OPERATED VALVE F019-A FAILS TO OPEN
E51-CC-MVF031A-H	MOTOR-OPERATED VALVE F031-A FAILS TO OPEN
E51-CC-MVF045A-G	RCIC TURBINE STEAM SUPPLY VALVE F045-A FAILS TO OPEN
E51-CC-MVF046A-G	MOTOR-OPERATED VALVE F046-A FAILS TO OPEN
E51-CC-MVF095A-G	RCIC STEAM SUPPLY BYPASS VALVE F095-A FAILS TO OPEN
E51-HW-CTF019A-G	MINIMUM FLOW MOTOR-OPERATED VALVE F019-A CONTROLLER FAILURE
E51-HW-LTN035A-I	HARDWARE FAILURE OF CST LEVEL TRANSMITTER E51-LT-N035A
P41-CC-MVF001A-R	NORMALLY CLOSED MOTOR OPERATED VALVE F001A FAILS TO OPEN
P41-CC-MVF005A-R	NORMALLY CLOSED MOTOR DRIVEN VALVE F005A FAILS TO OPEN
P41-CC-MVF014A-L	MOTOR OPERATED VALVE F014A-A FAILS TO OPEN
P41-CC-MVF018A-U	MOTOR OPERATED VALVE F018A-A FAILS TO OPEN
P41-CC-MVF068A-L	MOTOR OPERATED VALVE F068A-A FAILS TO OPEN
P41-FR-FNC003A-R	SSW COOLING TOWER FAN C003A-A FAILS TO CONTINUE RUNNING
P41-FR-MPC001A-R	MOTOR DRIVEN PUMP C001A FAILS TO CONTINUE RUNNING
P41-FS-FNC003A-R	SSW COOLING TOWER FAN C003A-A FAILS TO START
P41-FS-MPC001A-R	MOTOR DRIVEN PUMP C001A FAILS TO START
P53-OC-PVF026A-T	PV-F026A FAILS CLOSED
P64-FR-MPC002-G	MOTOR DRIVEN FIRE PUMP C002-N FAILS TO RUN
P64-FS-MPC002-G	MOTOR DRIVEN FIRE PUMP C002-N FAILS TO START
P75-FR-DG-DG11-A	DG11 FAILS TO RUN
P75-FS-DG-DG11-A	DG11 FAILS START
Z77-FR-FNB001A-U	DIV I SUPPLY FAN Z77-B001A-A FAILS TO RUN IN HIGH SPEED
Z77-FS-FNB001A-U	SUPPLY FAN Z77-B001A-A FAILS TO START IN HIGH SPEED
P41-FR-FNC003B-R	SSW COOLING TOWER FAN C003B-A FAILS TO CONTINUE RUNNING
P41-FS-FNC003B-R	SSW COOLING TOWER FAN C003B-A FAILS START

Basic Event	Description
P41-FR-FNC003A-R	SSW COOLING TOWER FAN C003A-A FAILS TO CONTINUE RUNNING
P41-FS-FNC003A-R	SSW COOLING TOWER FAN C003A-A FAILS START
Z77-OC-SDF035A-U	SOLENOID OPERATED DAMPER 1Z77F035A TRANSFERS CLOSED
Z77-OC-SDF003A-U	SOLENOID OPERATED DAMPER 1Z77F003A TRANSFERS CLOSED
Z77-OC-SDF002A-U	SOLENOID OPERATED DAMPER 1Z77F002A TRANSFERS CLOSED
Z77-OC-SDF001A-U	SOLENOID OPERATED DAMPER 1Z77F001A TRANSFERS CLOSED
Z77-FS-FNC001A-U	EXHAUST FAN 1Z77C001A-A FAILS TO START IN HIGH SPEED
Z77-FR-FNC001A-U	EXHAUST FAN 1Z77C001A-A FAILS TO RUN IN HIGH SPEED

Table 3-12 Refined Results of Fire PRA

					Man Supp. Credit	No Credit	Man Supp. Credit	No Credit
Initiator	Zone	Description	Flag	Run Description	CCDP	CCDP	CLERP	CLERP
\$CA101-1	1A101	Northeastern 93' level	FGCA101.caf	All Divisions Failed	1.54E-04	5.15E-04	2.22E-06	7.38E-06
\$CA101-1	1A101	Northeastern 93' level	101D1.TXT	No Division I Failed	8.29E-06	2.76E-05	5.96E-07	1.99E-06
\$CA101-1	1A101	Northeastern 93' level	101D2.TXT	No Division II Failed	2.88E-05	9.59E-05	2.19E-06	7.31E-06
\$CA101-3	1A117a	Northern area 93' level	FGCA101BS2.caf	All Divisions Failed	4.31E-04	1.44E-03	1.74E-05	5.80E-05
\$CA101-3	1A117a	Northern area 93' level	117D1.TXT	No Division I Failed	4.25E-04	1.42E-03	1.73E-05	5.78E-05
\$CA101-3	1A117a	Northern area 93' level	117D2.TXT	No Division II Failed	1.89E-04	6.30E-04	1.66E-05	5.52E-05
\$CA201-2A	1A211a	Refinement "a" of 119' level	FGCA201AS2.caf	All Divisions Failed	6.25E-02	2.08E-01	1.28E-03	4.28E-03
\$CA201-2A	1A211a	Refinement "a" of 119' level	211D1.TXT	No Division I Failed	2.15E-04	7.18E-04	1.70E-05	5.66E-05
\$CA201-2A	1A211a	Refinement "a" of 119' level	211D2.TXT	No Division II Failed	5.80E-04	1.93E-03	5.02E-05	1.67E-04
\$CA301-5	1A316a	Refinement "a" of 139' level	FGCA301DS4.caf	All Divisions Failed	1.44E-02	4.81E-02	1.47E-03	4.89E-03
\$CA301-5	1A316a	Refinement "a" of 139' level	316D1.TXT	No Division I Failed	7.51E-05	2.50E-04	1.47E-06	4.90E-06
\$CA301-5	1A316a	Refinement "a" of 139' level	316D2.TXT	No Division II Failed	4.87E-05	1.62E-04	4.04E-06	1.35E-05
\$CA401	1A401	Entire 166' level	FGCA401.caf	All Divisions Failed	8.66E-05	2.89E-04	1.67E-05	5.58E-05
\$CA401	1A401	Entire 166' level	401D1.TXT	No Division I Failed	1.07E-05	3.56E-05	9.32E-07	3.11E-06
\$CA401	1A401	Entire 166' level	401D2.TXT	No Division II Failed	5.46E-05	1.82E-04	5.90E-06	1.97E-05
Note:								
1	All CDF runs performed with 1.0E-12 cutoff while LERF runs used 1.0E-13 cutoff.							