# Appendix A

# BRUNSWICK MAAP CASES TO SUPPORT POWER UPRATE

### Appendix A BRUNSWICK MAAP CASES TO SUPPORT POWER UPRATE

The Modular Accident Analysis Package (MAAP) are used to calculate changes in the thermal hydraulic profile for specific issues (e.g., boildown timing). The boildown time decreases as a result of increasing the current power of 2558 MWth to 2923 MWth.

MAAP is an industry recognized thermal hydraulics code used to evaluate design basis and beyond design basis accidents. MAAP (Version 3.0B) has been used to support the CP&L PSA for performing best estimate calculations. The Brunswick plant description is based on the BNP MAAP parameter file *bmaap10.exe*. This parameter file contains plant specific parameters representing the primary system and containment.

### A.1 PARAMETER FILE CHANGES

A number of changes to the BNP base parameter file were made as part of the input decks of these runs to reflect the as-operated condition of the plant. These changes relate to RPV level setpoints.

The base BNP parameter file primarily uses Tech. Spec. setpoints. The changes to the base parameter file setpoints in support of these MAAP runs are summarized in Table A-1.

### A.2 MAAP RUN RESULTS

A summary of the MAAP runs performed in support of this risk assessment is provided in Table A-2.

In addition, copies of the cover pages of the individual runs are also provided at the end of this appendix. The actual run documentation packages are included in the BNP PSA Deterministic Calculations Notebook. [A-1]

### BRUNSWICK PARAMETER FILE CHANGES - Changes to Parameters Via Input Decks for EPU PSA Runs -

Parameter	Definition	Original Value	Reference for Original Value	Modified Value	Reference for Modified Value	Reason for Change
ZLMSIV	Low water level for MSIV closure	64.29' = 2.5" above reactor 0	Ref 1: Table 7.3.1-3	67.83' = 45" above reactor 0	Ref. 2 LL3	Use actual level
ZLLPCI	Low water level setpoint to initiate LPCI	64.29' = 2.5" above reactor 0	Ref 1: Table 7.3.3-4	67.83' = 45" above reactor 0	Ref. 2 LL3	Use actual level
ZLLPCS	Low water level setpoint to initiate LPCS	64.29' = 2.5" above reactor 0	Ref 1: Table 7.3.3-3	67.83' = 45" above reactor 0	Ref. 2 LL3	Use actual level
ZLADS	Low water level for ADS initiation	64.29' = 2.5" above reactor 0	Ref 1: Table 6.3.3-5	67.83' = 45" above reactor 0	Ref. 2 LL3	Use actual level
ZLHPCI	Low water level setpoint to initiate HPCI	71.75' = 92" above reactor 0	Ref 1: Table 6.3.3-5	72.83' = 105" above reactor 0	Ref. 2 LL2	Use actual level
ZLRCIC	Low water level setpoint to initiate RCIC	71.75 = 92" above reactor 0	Ref 1: Table 7.3.3-1	72.83' = 105" above reactor 0	Ref. 2 LL2	Use actual level
ZLRPT	Low water level for Recirc Pump trip	71.75 = 92" above reactor 0	Ref 1: Table 7.3.1-3	72.83' = 105" above reactor 0	Ref. 2 LL2	Use actual level
ZSCRAM	Level 2 trip for scram	76.58 = 150" above reactor 0	Ref 1: Table 7.2.1-1	77.92' = 166" above reactor 0	Ref. 1 LL1	Use actual level

References:

(1) Brunswick Steam Electric Plant Updated Final Safety Analysis Report June 1986. Docket-50324-46. Levels are "analytical" levels.

(2) Telefax, V. Andersen (ERIN) to B. Schlenger-Faber (ERIN), 3/6/01 based on CP&L Brunswick Nuclear Plant EOP/SAMG Numerical Limits and Values, Rev. 5, 0EOP-01-NL. Levels are "actual" levels.

Case ID	MAAP Run Description	Purpose	Core Uncovered	Max Core <sup>(2)</sup> Temp (°F)	HCTL <sup>(3)</sup> Exceeded	Comments
BNP1a	<ul> <li>LOFW w/SORV, RCIC, No ED, and No LP Injection</li> <li>Stick open 1 SRV at t=0 and do not reclose</li> <li>RCIC auto cycling (trip @ steam press. 50 psi)</li> <li>No Emergency Depressurization (OK to follow HCTL curve, if possible)</li> <li>No other injection</li> <li>SPC w/1 RHR train initiated at pool temp. 95F</li> </ul>	Verify that RCIC operation can delay core damage for 24hrs. during a transient w/1SORV	3.07 hr	12.9 hr	1.38 hr	Core damage
BNP1b	<ul> <li>LOFW w/SORV, HPCI, No ED, and No LP Injection</li> <li>Stick open 1 SRV at t=0 and do not reclose</li> <li>HPCI auto cycling (trip @ steam press. 100 psi)</li> <li>No Emergency Depressurization (OK to follow HCTL curve, if possible)</li> <li>No other injection</li> <li>SPC w/1 RHR train initiated at pool temp. 95F</li> </ul>	Verify that HPCI operation can delay core damage for 24hrs. during a transient w/1SORV	3.58 hr	4.20 hr	1.55 hr	Core damage

Case ID	MAAP Run Description	Purpose	Core Uncovered	Max Core <sup>(2)</sup> Temp (°F)	HCTL <sup>(3)</sup> Exceeded	Comments
BNP2	<ul> <li>Med. Water Break LOCA, HPCI, 1 LPCI pump, and No ED</li> <li>MLOCA .0873 ft<sup>2</sup> (4" ID water break) at t=0</li> <li>HPCI auto cycling</li> <li>No Emergency Depressurization (OK to follow HCTL curve, if possible)</li> <li>Initiate 1 LPCI pump when LP interlock reached</li> </ul>	• Verify viability of LP injection for MLOCA with HPCI and no requirement for RPV ED on HCTL (MLOCA ET success criteria)	Did not uncover	547 F @ 0 hr	3.28, 5.06 hr (depending on what level LPCI is throttled at)	No core damage
BNP3a	<ul> <li>LOFW, no HP Injection, delayed ED (at MSCL), and 1 LPCI pump</li> <li>LOFW and MSIV Closure at t=0</li> <li>Only 3 SRVs available for initial pressure transient</li> <li>No HP injection</li> <li>Emergency Depressurization at minimum steam cooling level (using only 3 SRVs)</li> <li>Initiate 1 LPCI pump at LP interlock</li> <li>SPC w/1 RHR train initiated at pool temp. 95F</li> </ul>	<ul> <li>Verify 3 SRVs sufficient for pressure control to prevent exceeding RPV pressure operability limits (success criteria)</li> <li>Verify 3 SRVs sufficient for RPV Emergency Depressurization (success criteria)</li> <li>Verify time allowable for manual initiation of ADS</li> </ul>	0.64 hr	958 F @ 0.71 hr	N/a	No core damage RPV peak pressure remains well below 1500 psig Have ~1.0 hr to ED to avoid core damage (2200 F)

Case ID	MAAP Run Description	Purpose	Core Uncovered	Max Core <sup>(2)</sup> Temp (°F)	HCTL <sup>(3)</sup> Exceeded	Comments
BNP3b	<ul> <li>LOFW, no HP Injection, delayed ED (at 1/3 core height), and 1 LPCI pump</li> <li>LOFW and MSIV Closure at t=0</li> <li>Only 3 SRVs available for initial pressure transient</li> <li>No HP injection</li> <li>Emergency Depressurization at 1/3 core height (using only 3 SRVs)</li> <li>Initiate 1 LPCI pump at LP interlock</li> <li>SPC w/1 RHR train initiated at pool temp. 95F</li> </ul>	<ul> <li>Verify 3 SRVs sufficient for RPV Emergency Depressurization (success criteria)</li> <li>Verify time allowable for manual initiation of ADS</li> </ul>	0.66 hr	992 F @ 0.77 hr	N/a	No core damage
BNP4	<ul> <li>Med. Water Break LOCA, no HP Injection, delayed ED (at MSCL), and 1 LPCI pump</li> <li>MLOCA .0873 ft<sup>2</sup> (4" ID water break) at t=0</li> <li>Only 3 SRVs available</li> <li>No HP injection</li> <li>Emergency Depressurization at minimum steam cooling level (using only 3 SRVs)</li> <li>Initiate 1 LPCI pump at LP interlock</li> <li>SPC w/1 RHR train initiated at pool temp. 95F</li> </ul>	<ul> <li>Verify time allowable for manual initiation of ADS</li> </ul>	7.6 min.	1103 F @ 10.8 min.	N/A	No core damage

Case ID	MAAP Run Description	Purpose	Core Uncovered	Max Core <sup>(2)</sup> Temp (°F)	HCTL <sup>(3)</sup> Exceeded	Comments
BNP6a	<ul> <li>LOFW ATWS with Level Control (using RCIC), SLC and 1 SORV</li> <li>LOFW ATWS at t=0</li> <li>Stick open 1 SRV at t=0 and do not reclose</li> <li>RPT (both pumps) at t=0</li> <li>CRD injection</li> <li>RCIC injection (trip @ steam press. 50 psi)</li> <li>Level controlled at 6" above TAF at 4 mins.</li> <li>SLC w/2 pumps initiated at 4 mins.</li> <li>Decrease RPV power during boron injection period</li> <li>SPC w/2 RHR trains initiated at pool temp. 95F</li> <li>OK to follow HCTL curve, if possible (no LP systems available)</li> </ul>	Verify RCIC successful during ATWS w/SORV for 24 hour mission time and does not require RPV ED or other injection systems	0.09 hr	2200 F @ 15.2 min	Never reached	CRD injection Level controlled at 6" above TAF instead of exactly TAF Core damage

Case ID	MAAP Run Description	Purpose	Core Uncovered	Max Core <sup>(2)</sup> Temp (°F)	HCTL <sup>(3)</sup> Exceeded	Comments
BNP6b	<ul> <li>LOFW ATWS with Level Control (using HPCI), SLC and 1 SORV</li> <li>LOFW ATWS at t=0</li> <li>Stick open 1 SRV at t=0 and do not reclose</li> <li>RPT (both pumps) at t=0</li> <li>CRD injection</li> <li>HPCI injection (trip @ steam press. 100 psi)</li> <li>Level controlled at 6" TAF at 4 mins.</li> <li>SLC w/2 pumps initiated at 4 mins.</li> <li>Decrease RPV power during boron injection period</li> <li>SPC w/2 RHR trains initiated at pool temp. 95F</li> <li>OK to follow HCTL curve, if possible (no LP systems available)</li> </ul>	Verify HPCI successful during ATWS w/SORV for 24 hour mission time and does not require RPV ED or other injection systems	0.33 hr	554 @ 0.038 hr	0.13 hr	CRD injection Level controlled at 6" above TAF instead of exactly TAF HPCI trips at 0.34 hr No core damage

Case ID	MAAP Run Description	Purpose	Core Uncovered	Max Core <sup>(2)</sup> Temp (°F)	HCTL <sup>(3)</sup> Exceeded	Comments
BNP7	<ul> <li>LOFW ATWS with Level Control (using RCIC) and SLC</li> <li>LOFW ATWS at t=0</li> <li>RPT (both pumps) at t=0</li> <li>All SRVs allowed to operate as challenged</li> <li>CRD injection</li> <li>RCIC injection (trip @ steam press. 50 psi)</li> <li>Level controlled at 6" above TAF at 4 mins.</li> <li>SLC w/2 pumps initiated at 4 mins.</li> <li>Decrease RPV power during boron injection period</li> <li>SPC w/2 RHR trains initiated at pool temp. 95F</li> <li>RPV ED if HCTL exceeded – OK to follow HCTL curve, if possible (no LP systems available)</li> </ul>	Verify RCIC successful during ATWS for 24 hour mission time and does not require RPV ED or other injection systems	0.09 hr	1581 F @ 0.36 hr	Not reached	CRD injection Level controlled at 6" above TAF instead of exactly TAF No core damage

Case ID	MAAP Run Description	Purpose	Core Uncovered	Max Core <sup>(2)</sup> Temp (°F)	HCTL <sup>(3)</sup> Exceeded	Comments
BNP8	<ul> <li>Isolation ATWS, Level Control and SLC</li> <li>MSIV Closure ATWS at t=0</li> <li>RPT (both pumps) at t=0</li> <li>Only 6 SVs available for initial pressure transient</li> <li>CRD injection</li> <li>HPCI injection source (trip @ steam press. 100 psi)</li> <li>Level controlled at 6" above TAF at 4 mins.</li> <li>SLC w/2 pumps initiated at 4 mins.</li> <li>Decrease RPV power during boron injection period</li> <li>SPC w/2 RHR trains initiated at pool temp. 95F</li> <li>OK to follow HCTL curve, if possible (no LP systems available)</li> </ul>	<ul> <li>Verify that RPT (both pumps) and 6 SVs sufficient to limit pressure transient during isolation ATWS</li> <li>Verify time allowable for SLC initiation</li> <li>Verify time allowable for ADS Inhibit for ATWS scenarios with initial HP injection</li> </ul>	N/A	560 @ 04.5 hr	0.090 hr	CRD injection RPV peak pressure remains below 1500 psig Level controlled at 6" above TAF instead of exactly TAF No core damage.
BNP10	<ul> <li>Loss of Containment Heat Removal with injection</li> <li>MSIV Closure w/no SPC or Vent at t=0</li> <li>CRD injection</li> <li>HPCI initially</li> <li>HCTL curve followed</li> <li>1 LPCI pump until SRVs re-close when DW pressure &gt;104.7 psia (go to normal SRV operation)</li> </ul>	Identify time frames (for information purposes) for vent initiation and ultimate containment failure pressure	~32 hrs	>2200 F @33.4 hr	2.42 hr	CRD injection LPCI on @ 4.24 hr HPCI off @ 4.93 hr DW pressure > 104.7 psia @ 20.8 hr Containment failed due to overpressure in the DW at 31.4 hr

Case ID	MAAP Run Description	Purpose	Core Uncovered	Max Core <sup>(2)</sup> Temp (°F)	HCTL <sup>(3)</sup> Exceeded	Comments
BNP2ED	Loss of HP Injection and 2 SRVs Loss of FW MSIV closure No HPCI, RCIC, or CRD RPV ED using 2 SRVs @ MSCL 1 LPCI pump available SPC available	Verify that 2 SRVs satisfy RPV ED	42 mins.	1000F	N/A	No core damage
BNPMSIV	Loss of FW w/RCIC <ul> <li>Loss of FW</li> <li>RCIC only HP injection source</li> </ul>	Determine whether RCIC can prevent MSIV low level isolation during LOFW w/SORV	N/A	N/A	N/A	LL3 reached in 44 seconds. MSIVs close before RCIC turns around the level drop. Case ran for a few minute time frame

#### Notes to Table A-2

- (1) Sensitivity cases were run for some of the MAAP runs. These cases are described on the run cover sheets and in the BNP Deterministic Calculations Notebook. [A-1] These sensitivity case are not summarized in this table.
- (2) The Brunswick PSA Groundrules and Assumptions Document defines the onset of core damage as 2200F of any node in the core (best-estimate thermal-hydraulic calculation using MAAP or similar code). This is the definition used in these runs.
- (3) The suppression pool Heat Capacity Temperature Limit, HCTL, is one of the key parameters (along with low RPV water level) requiring RPV Emergency Depressurization per the EOPs (refer to Figure 3 of Brunswick EOP Users Guide, 0EOP-01-UG).

### SUMMARY OF MAAP3B RESULTS: BRUNSWICK EXTENDED POWER UPRATE CASES BNP1A and BNP1B

#### I. RUN INFORMATION

Date of Runs: <u>3/14-15/01</u>

Title of Runs: \_Stuck Open SRV with RCIC or HPCI

Analyst: \_ B. Schlenger-Faber

Reviewer: J. Gabor

MAAP File Name/Date: <u>bmaap10.exe 5/4/99</u>

Parameter File Version/Date: <u>bsep.par 12/12/00</u>

Input File Names: <u>BNP1A\_R, BNP1B\_R</u>

Computer Used: \_\_\_\_\_\_ Dell Dimension V350 Tag # UY8MA

Server Directory Where Results are Stored: <u>M:\cp&I\brunswick\febmar01\bnp1</u>

#### II. <u>PURPOSE AND DESCRIPTION</u>

Determine if RCIC or HPCI operation can delay core damage for 24 hrs for a transient with 1 SORV. There is no other injection, and no emergency depressurization. The system is depressurized due to the HCTL curve. Suppression pool cooling is operating. The injection flow is throttled to maintain level at 104". Steam extraction is reduced in proportion to the injection flow.

#### III. ADJUSTED PARAMETERS

Injection: 1) RCIC (HPCI along with RCIC for the first 5 min) - Case BNP1A\_R 2) HPCI - Case BNP1B\_R

#### IV. KEY EVENT TIMING AND RESULTS

### 

<u>TIME</u>

Core damage	
Uncovers (level below TOAF)se	e table
Max. temp. > 2200 Fse	e table

Sequence	High Pressure	Time (hr)				
	Injection	Depress. due to	Injection	Core	Hottest Core	
		HCTL curve	Pressure	Uncovered	Node > 2200 F	
BNP1A_R	RCIC	1.38	12.3	3.07	12.9	
BNP1B_R	HPCI	1.55	2.73	3.58	4.20	

### V. <u>DISCUSSION</u>

RCIC and HPCI are not sufficient to provide adequate makeup to the vessel for more than approximately 13 and 4 hours, respectively.

### SUMMARY OF MAAP3B RESULTS: BRUNSWICK EXTENDED POWER UPRATE CASE BNP2

#### I. RUN INFORMATION

Date of Runs: 4/5/01

Title of Runs: \_\_\_\_\_\_ Medium LOCA with HPCI and LPCI, no ED

Analyst: B. Schlenger-Faber

Reviewer: J. Gabor

MAAP File Name/Date: <u>bmaap10.exe 5/4/99</u>

Parameter File Version/Date: <u>bsep.par 4/5/01 (=12/12/00 + output control)</u>

Input File Names: BNP2, BNP2A

Computer Used: \_\_\_\_\_\_ Dell Dimension V350\_\_\_\_\_ Tag # UY8MA

Server Directory Where Results are Stored: <u>M:\cp&l\brunswick\febmar01\case2</u>

#### II. PURPOSE AND DESCRIPTION

Determine if one loop of LP injection is adequate to prevent core damage for a 4" diameter LOCA with HPCI and no requirement for RPV ED. The RPV is depressurized due to the HCTL curve. HPCI injection flow is throttled to maintain level at 104". LP injection flow is throttled at two different levels - see the adjusted parameters. The steam extraction is reduced in proportion to the HPCI injection flow. There is one train of suppression pool cooling. The power is increased to 2923 MWth.

#### III. ADJUSTED PARAMETERS

Level at which LPCI is throttled: 1) 105" - Case BNP2 2) Level 8 = 209.5" - Case BNP2A

#### IV. KEY EVENT TIMING AND RESULTS

#### <u>TIME</u>

Initial conditions	0
4" LOCA at elevation of recirculation suction Loss of all injection except HPCI and 1 loop of LPCI	
MSIV closure	14.1 sec
BNP2 (LPCI controlled at 105")	0.40 hr
HPCI Injection tripped on low pressure	0.42 nr
Depressurization due to HCTL	3.28 hr
BNP2A (LPCI controlled at 209.5")	
Depressurization due to HCTL	2.35 hr
HPCI Injection tripped on low pressure	5.06 hr

The core is not uncovered. The case runs to 24 hours without core damage.

#### V. <u>DISCUSSION</u>

One loop of LP injection is adequate to prevent core damage for a 4" diameter LOCA with HPCI and no requirement for RPV ED.

#### SUMMARY OF MAAP3B RESULTS: <u>BRUNSWICK EXTENDED POWER UPRATE CASES</u> <u>BNP3a AND BNP3b</u>

#### I. RUN INFORMATION

Date of Runs: \_3/19/01

Title of Runs: \_LOFW, no HP injection, delayed ED

Analyst: <u>B. Schlenger-Faber</u>

Reviewer: J. Gabor

MAAP File Name/Date: <u>bmaap10.exe 5/4/99</u>

Parameter File Version/Date: \_bsep.par 12/12/2000

Input File Names: BNP3a and BNP3b

Computer Used: \_\_\_\_\_\_ Dell Dimension V350 Tag # UY8MA

Server Directory Where Results are Stored: <u>M:\cp&l\brunswick\febmar01\bnp3</u>

#### II. PURPOSE AND DESCRIPTION

Determine if 3 SRVs are sufficient to prevent RPV over-pressurization (pressure > 1500 psia) and core damage (temperature > 2200 F) for a LOFW sequence with no HP injection. Emergency depressurization is delayed until the water level reaches the minimum steam cooling level (MSCL = - 37") or until it reaches 1/3 core height. Also, determine how much time is available to ED.

One RHR loop is aligned for LPCI and the other is used for suppression pool cooling. The power is increased to 2923 MWth.

#### III. ADJUSTED PARAMETERS

Water level for ED

1) MSCL - Case BNP3A 2) 1/3 core height - Case BNP3B

#### IV. KEY EVENT TIMING AND RESULTS

TIME

Emergency depressurization	0.62 hr (ED at MSCL)
	0.68 hr (ED at 1/3 core)
Maximum core temperature	
•	992 F @ 0.77 hr (ED at 1/3 core)

#### V. <u>DISCUSSION</u>

The core uncovered briefly and experienced a spike in temperature, but this was not sufficient to lead to core damage. Three SRVs are sufficient to prevent over-pressurization of the vessel and core damage. Sensitivity sequences showed that the operators have up to 1 hr to manually depressurize.

#### SUMMARY OF MAAP3B RESULTS: BRUNSWICK EXTENDED POWER UPRATE CASE BNP4

#### I. **RUN INFORMATION**

Date of Runs: 3/19/01, 4/3/01

Title of Runs: Medium LOCA, no HP, delayed ED

Analyst: B. Schlenger-Faber

Reviewer: J. Gabor

MAAP File Name/Date: \_bmaap10.exe 5/4/99

Parameter File Version/Date: bsep.par 12/12/00, 3/21/01 (=12/12/00 + output control)

Input File Names: BNP4 and BNP4W

Computer Used: Dell Dimension V350 Tag # UY8MA

Server Directory Where Results are Stored: M:\cp&l\brunswick\febmar01\bnp4

#### H. PURPOSE AND DESCRIPTION

Determine if 3 SRVs are sufficient to prevent RPV over-pressurization. Also investigate if core damage can be prevented for a 4" diameter LOCA with no HP injection. Emergency depressurization is delayed until the water level reaches the minimum steam cooling level (MSCL = -37"). The power is increased to 2923 MWth.

#### 111. ADJUSTED PARAMETERS

MSIV closure pressure setpoint:

- 1) Close when PPS < 799.7 psia (plant value in par. file) Case BNP4
- 2) Don't close on low pressure, just low level Case BNP4W

#### IV. KEY EVENT TIMING AND RESULTS

Initial conditions	n
4" LOCA at elevation of recirculation suction	5
Loss of all injection except 1 loop of LPCI	

Only 3 SRVs are available

Suppression pool cooling at pool temperature > 95 F

#### BNP4

MSIV closed	14 sec
Emergency depressurization	6.44 min
Core uncovery	
LPCI flow started	9.91 min
Tmax (= 1103 F)	10.8 min
Case runs to 24 hours without core damage.	

#### TIME

BNP4W	
Tmax (= 547 F)	0.0
LPCI flow started	1.5 min
MSIV closed	25.1 min
No core uncovery.	
No emergency depressurization (level did not drop to MSCL	_).
Case runs to 24 hours without core damage.	

#### V. DISCUSSION

With MSIV closure on low RPV pressure, MSCL was reached at 6.44 min, at which point the vessel was depressurized. Without MSIV closure on low pressure, the core did not uncover so there was no ED (case BNP4W). This is likely due to the extended time with feedwater injection for this case. This provides significant inventory makeup to limit the decrease in water level, preventing core uncovery.

Both cases ran to 24 hours without core damage.

#### SUMMARY OF MAAP3B RESULTS: <u>BRUNSWICK EXTENDED POWER UPRATE CASES</u> <u>BNP6a AND BNP6b</u>

#### I. RUN INFORMATION

Date of Runs: 4/9/01

Title of Runs: LOFW ATWS with HP injection, 1 SORV

Analyst: <u>B. Schlenger-Faber</u>

Reviewer: J. Gabor

MAAP File Name/Date: <u>bmaapslc.exe 9/6/00 (= bmaap10.exe 5/4/99 plus change so that the power decays linearly to decay power over the SLC injection period</u>

Parameter File Version/Date: <u>bsep.par 4/5/01 (=12/12/2000 + output control)</u>

Input File Names: BNP6ASLC and BNP6BSLC

Computer Used: Dell Dimension V350 Tag # UY8MA

Server Directory Where Results are Stored: <u>M:\cp&l\brunswick\febmar01\bnp6a.b</u>

#### II. PURPOSE AND DESCRIPTION

Determine if RCIC or HPCI is sufficient to prevent core damage during a LOFW ATWS with a SORV. CRD is operational, and SLC is initiated at 4 min. There is no ED and no other injection. The level is controlled at 6" above TAF after 4 min. The power is increased to 2923 MWth.

#### III. ADJUSTED PARAMETERS

HP injection: 1) RCIC - Case BNP6ASLC 2) HPCI - Case BNP6BSLC

#### IV. KEY EVENT TIMING AND RESULTS

### 

TIME

Core uncovered	5.3 min
Core temperature > 2200 F	. 15.2 min

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#### V. <u>DISCUSSION</u>

RCIC and CRD are not sufficient to prevent early core damage, while HPCI and CRD are sufficient. HPCI shuts off at 2 hour, but from that point on CRD is sufficient to keep the core covered, and the case runs for 24 hours without core damage.

#### SUMMARY OF MAAP3B RESULTS: BRUNSWICK EXTENDED POWER UPRATE CASE BNP7

#### I. RUN INFORMATION

Date of Runs: 4/9/01

Title of Runs: <u>LOFW ATWS with RCIC</u>

Analyst: B. Schlenger-Faber

Reviewer: J. Gabor

MAAP File Name/Date: <u>bmaapslc.exe 9/6/00 (= bmaap10.exe 5/4/99 plus change so that the power decays linearly to decay power over the SLC injection period</u>

Parameter File Version/Date: <u>bsep.par 4/5/01 (= 12/12/00 + output control)</u>

Input File Names: BNP7SLC

Computer Used: \_\_\_\_\_\_Dell Dimension V350\_Tag # UY8MA

Server Directory Where Results are Stored: <u>M:\cp&\\brunswick\febmar01\bnp7</u>

#### II. PURPOSE AND DESCRIPTION

Determine if RCIC is sufficient to prevent core damage during a LOFW ATWS. CRD is operational, and SLC is initiated at 4 min. There is no ED and no other injection. The level is controlled at 6" above TAF after 4 min. The power is increased to 2923 MWth.

#### III. ADJUSTED PARAMETERS

None

IV.	KEY EVENT TIMING AND RESULTS	
	Initial conditions	0
	Loss of feedwater	
	ATWS	
	Loss of all injection except RCIC and CRD	
	Recirculation pumps are tripped	
	Suppression pool cooling with 2 trains at pool temperature > 95 F	
	SLC Injection	4 min
	Flow controlled on level	4 min
	Core uncovered	5.5 min
	Max. core temperature	1581 F @ 21.8 mir

#### V. <u>DISCUSSION</u>

RCIC and CRD are sufficient to prevent core damage. RCIC never trips on low pressure, and the HCTL curve is not reached.

#### SUMMARY OF MAAP3B RESULTS: BRUNSWICK EXTENDED POWER UPRATE CASE BNP8

#### I. RUN INFORMATION

Date of Runs: 4/9/01

Title of Runs: <u>Isolation ATWS with HPCI</u>

Analyst: B. Schlenger-Faber

Reviewer: J. Gabor

MAAP File Name/Date: <u>bmaapslc.exe 9/6/00 (= bmaap10.exe 5/4/99 plus change so that the</u> power decays linearly to decay power over the SLC injection period

Parameter File Version/Date: <u>bsep.par 4/5/01 (=12/12/00 + output control)</u>

Input File Names: BNP8SLC, BNP8ASLC, BNP8APSL

Computer Used: \_\_\_\_\_\_ Dell Dimension V350 Tag # UY8MA

Server Directory Where Results are Stored: <u>M:\cp&I\brunswick\febmar01\bnp8</u>

#### II. PURPOSE AND DESCRIPTION

Determine if HPCI is sufficient to prevent core damage during an isolation ATWS. CRD is operational, and SLC is initiated at 4 min. There are only 6 SRVs. There is no ED and no other injection. The level is controlled at 6" above TAF after 4 min. The power is increased to 2923 MWth.

#### III. ADJUSTED PARAMETERS FOR SENSITIVITY

Base - Case BNP8SLC

No HPCI or CRD injection - Case BNP8ASLC

No HPCI or CRD injection and initial power level reduced to original value of 2558 MWth - Case BNP8APSL

#### IV. KEY EVENT TIMING AND RESULTS

TIME

Initial conditions......0 MSIV closure ATWS Loss of all injection except HPCI and CRD Recirculation pumps are tripped

Only 6 SRVs are available Suppression pool cooling with 2 trains at pool temperature > 95	F
SLC Injection	4 min
Flow controlled on level	4 min
Depressurization due to HCTL	5.4 min
Max. core temperature	~560 F starting @ 4.5 hr

The core did not uncover, and HPCI did not trip on low pressure

#### V. DISCUSSION

HPCI and CRD are sufficient to prevent core damage. With no HPCI or CRD the core uncovers in 4.9 min and the maximum core temperature reaches 2200 F in approximately 14.5 min. At the lower power level, these events occur at 5.4 min and 17.0 min, respectively.

### SUMMARY OF MAAP3B RESULTS: BRUNSWICK EXTENDED POWER UPRATE CASE BNP10

#### I. RUN INFORMATION

Date of Runs: 4/4/01

Title of Runs: Loss of Containment Heat Removal with Injection

Analyst: <u>B. Schlenger-Faber</u>

Reviewer: J. Gabor

MAAP File Name/Date: <u>bmaap10.exe 5/4/99</u>

Parameter File Version/Date: <u>bsep.par 3/21/00 (=12/12/2000 plus output control)</u>

Input File Name: BNP10 V

Computer Used: \_\_\_\_\_ Dell Dimension V350 Tag # UY8MA

Server Directory Where Results are Stored: <u>M:\cp&I\brunswick\febmar01\bnp10</u>

#### II. PURPOSE AND DESCRIPTION

Identify time frames for vent initiation and ultimate containment failure pressure for sequence initiated by MSIV closure. HPCI and CRD injection are available, along with 1 train of LPCI. The RPV is depressurized due to the HCTL curve until the drywell pressure exceeds104.7 psia, at which time all SRVs are assumed to reclose due to increased drywell pressure.

The injection flow is throttled to maintain level near 105".

The power is increased to 2923 MWth.

#### III. ADJUSTED PARAMETERS

None

IV.

KEY EVENT TIMING AND RESULTS	TIME
Initial conditions	0
MSIV closure	
Loss of all injection except HPCI and CRD	
Depressurization due to HCTL	2.42 hr
LPCI injecting	4.24 hr
HPCI tripped on low pressure	4.93 hr
DW pressure > 104.7 psia	20.8 hr
SHVs reclose	

### Brunswick Extended Power Uprate Risk Implications

Containment failed on overpressure in DW	31.4 hr
Max. core temperature > 2200 F	33.4 hr

### V. <u>DISCUSSION</u>

There was no core damage prior to containment failure, as expected.

#### SUMMARY OF MAAP3B RESULTS: <u>BRUNSWICK EXTENDED POWER UPRATE CASE</u> BNP2ED

#### Error! Bookmark not defined.

#### I. RUN INFORMATION

Date Run: <u>4/4/01</u>

Title of Run: 2ed

Analyst: J. Gabor

Reviewer: <u>B. Schlenger-Faber</u>

MAAP File Name/Date: <u>bmaap10.exe 5/4/99</u>

Parameter File Version/Date: <u>bsep.par 11/27/00</u>

Input File Name: 2ed.inp

Computer Used: \_\_\_\_\_ Dell Inspiron 3800 Tag # F7M6601

Server Directory Where Results are Stored: <u>M:\cp&l\brunswick\2ed</u>

KEY EVENT	<u>TIMING INFO</u>	RMATION
(Enter time c	or else N/A)	

Initial Conditions	0
MSIV Closure	
Loss of FW	
Failure of all injection except 1 LPCI pump	
Core Uncovers	42 min.
Emergency Depressurization w 2 SRVs at Min Steam Cooling (-37")	48 min.
Vessel failure	N/A

#### III. <u>KEY PARAMETERS</u>

#### IV. DISCUSSION

11.

This sequence was run to investigate if 2 SRVs opened when the level reaches the minimum steam cooling water level limit (-37") would result in core damage. This event is initiated with closure of all MSIVs and loss of feedwater. All injection to the RPV is assumed unavailable with the exception of 1 LPCI pump. The indicated water level reaches the top of active fuel (-8.4") at 42 minutes into the event. The minimum steam cooling water level limit (-37") is exceeded at about 48 minutes at which time 2 SRVs are manually opened to depressurize the vessel. At about 55 minutes into the accident the vessel pressure has decreased sufficiently for LPCI to begin to inject. A maximum core temperature of 1000 °F was reached at 56 minutes and then rapidly dropped as a result of successful injection of LPCI.

TIME

#### SUMMARY OF MAAP3B RESULTS: BRUNSWICK EXTENDED POWER UPRATE CASE BNPMSIV

#### Error! Bookmark not defined.

#### I. RUN INFORMATION

Date Run: \_4/18/01

Title of Run: Loss of Feedwater with RCIC - Timing of MSIV closure

Analyst: <u>B. Schlenger-Faber</u>

Reviewer: J. Gabor

MAAP File Name/Date: <u>bmaap10.exe 5/4/99</u>

Parameter File Version/Date: \_bsep.par 4/5/01 (=12/12/00 + output control)

Input File Name: BNPMSIV

Computer Used: <u>Dell Dimension V350 Tag # UY8MA</u> Server Directory Where Results are Stored: <u>M:\cp&l\brunswick\febmar01\msiv</u>

#### II. PURPOSE AND DESCRIPTION

Determine the time for MSIV closure on low level for a loss of feedwater sequence with RCIC as the only operational high pressure injection system. The power is increased to 2923 MWth.

#### III. ADJUSTED PARAMETERS FOR SENSITIVITY

None

#### IV KEY EVENT TIMING AND RESULTS

MSIV Closure
Loss of FW
Failure of all injection except 1 LPCI pump
MSIV closure on low water level
RIC starts
Max. core temperature

#### V. <u>KEY PARAMETERS</u>

#### VI. <u>DISCUSSION</u>

The MSIV will close on low water level at ~44 sec. RCIC starts soon after, and the water level rises well above the top of the core.

### REFERENCES

[A-1] <u>BNP Deterministic Calculations Notebook</u>, Doc. #P1100001-1730, April 2001.

# Appendix B

# IMPACT OF 15% EPU ON SHUTDOWN OPERATOR ACTION RESPONSE TIMES

### Appendix B

### IMPACT OF 15% EPU ON SHUTDOWN OPERATOR ACTION RESPONSE TIMES

This appendix describes the thermal hydraulic analyses performed to support the assessment that the BNP 15% EPU has a negligible impact on human response times during plant shutdown accident scenarios.

### B.1 INTRODUCTION

The risk due to accidents during shutdown is strongly dependent upon the time available from the start of the event to the onset of core damage. As time elapses after shutdown, accidents leading to boiling of coolant within the RPV and consequential inventory losses take more time to evolve. The burden on plant systems decreases as well, introducing the chance of accident mitigation with non-safety, low capacity systems.

The effect of decreasing decay heat on the times to boil and core damage is accounted for in two ways. The first is the calculation of decay heat present at a particular point in the outage. The second takes into consideration the heat capacity of the water and structures in the system available to absorb decay heat before boiling and core damage occur. Both of these aspects are addressed in this appendix to support the assessment of the relationship of decay heat levels and times available in which to perform human actions to prevent core damage during shutdown accident scenarios.

### B.2 ASSUMPTIONS

The following assumptions were used in the following calculation of the times to boil off the fuel coolant and reach core damage. These assumptions allow for some simplifications in the calculation, and also allow for an appropriate degree of conservatism in the results.

- The time to boil and time to core damage calculations are appropriate for conditions of RPV vented and maintained at atmospheric pressure.
- The time to core damage is conservatively estimated by calculating the time to reach 2/3 core height, and then extrapolating the time to gap release based on decay heat level ratios by assuming that gap release occurs 0.5 hours after 2/3 core height is reached one day after shutdown. Gap release is the release of fission products in the fuel pin gap, which occurs immediately after failure of the fuel cladding and is the first radiological indication of core damage.
- There is no heat loss from the system to the surroundings via the water surface or through the vessel walls.
- The calculation of decay heat levels and times to boiling and core damage nominally apply to conditions prior to movement of fuel. After fuel is moved to or from the fuel pool, the decay heat in the core is reduced by the fraction of spent fuel transferred to the fuel pool.
- The decay heat as a function of time after shutdown is derived from a curve fit to the ASB 9-2 Branch Technical Position methodology assuming 100% initial power and 16,000 hours of power operation.
- The effective heatup and boiloff water volumes and the heat capacities of the internal structures for the various configurations are nominal values based on review of other BWR PSSAs.

### B.3 DECAY HEAT LEVEL CALCULATION

There are several methods available to calculate decay heat as a function of time after shutdown. The NRC has provided an acceptable method of calculating the decay heat rate in Branch Technical Position ASB 9-2 [B-1]. This method uses the following equation:

$$P_{s} = P_{o} \left[ (1+K)(1/200) \sum_{n=1}^{11} A_{n} exp(-a_{n}t_{s}) - (1/200) \sum_{n=1}^{11} A_{n} exp[-a_{n}(t_{s} + t_{0})] \right]$$
(B-1)

Where:  $P_s = decay heat level (MBtu/hr)$  $P_o = normal operating power (MBtu/hr)$ 

ts	=	time after shutdown (seconds)
to	=	operating history
К	=	uncertainty factor
	=	0.2 for $t_s < 10^3$ , 0.1 for $10^3 < t_s < 10^7$
A <sub>n</sub> , a <sub>n</sub>	=	fit coefficients as specified in Reference B-1.

Other less complex formulas have been developed and provide reasonable estimates of decay heat rates. Reference B-2 provides the simplest of these, assuming an infinite power history:

$$P_{S}(t) = P_{O}(0.0950) t_{S}^{-0.26}$$
 (B-2)

where  $P_s(t)$ ,  $P_0$  and  $t_s$  are as defined above. A comparison of Equation B-2 to Equation B-1, assuming 16,000 hours of power operation, shows that Equation B-2 underestimates the decay heat in the first day or two by 10-20%, and it overestimates the decay heat thereafter (by 10-75%). At 70 days after shutdown, the decay heat calculated by Equation B-2 is about 75% higher than that calculated using the ASB 9-2 method [B-1].

Another abbreviated formula is found in Reference B-3. This formula, called the Wigner-Way formula, also includes a factor for the power history:

$$P_{S}(t) = P_{O}(0.0622) [t_{S}^{-0.2} - (t_{O} + t_{S})^{-2}]$$
 (B-3)

As with Equation B-1, t<sub>o</sub> is the operating history in seconds, also assumed to be 16,000 hours for comparison purposes. Equation B-3 shows a better correlation late in the outage, but the first twenty to thirty days after shutdown are under predicted (by 10-20% compared to the ASB 9-2 formula). A separate curve fit to the ASB 9-2 equation can be developed of the form:

$$P_{S}(t) = P_{O}(0.02561) t_{S(hrs)}^{-0.42371}$$
 (B-4)

where  $t_{S(hrs)}$  is the time since shutdown in hours. This simple equation is considered to have an advantage over Equations B-2 and B-3 because it agrees with the ASB 9-2 data to within about 10% over the full time period of interest. Although the agreement is not quite as good as the Wigner-Way formula after about 40 days, the agreement at the critical earlier times is much better.

Using Equation B-4, the decay heat level as a function of time after shutdown is given as:

BNP 105% OLTP:  $P_s(t) = (2558 \text{ MWt}) (3.4118E6 \text{ Btu/hr} / 1 \text{ MWt}) (0.02561) t_{s(hrs)}^{-0.42371}$ 

$$P_{S}(t) = (2.24E8) t_{S(hrs)}^{-0.42371} Btu/hr$$
 (B-5a)

BNP 120% OLTP:  $P_{S}(t) = (2923 \text{ MWt}) (3.4118E6 \text{ Btu/hr} / 1 \text{ MWt}) (0.02561) t_{S(hrs)}^{-0.42371}$ 

$$P_{s}(t) = (2.55E8) t_{s(hrs)}^{-0.42371} Btu/hr$$
 (B-5b)

### B.4 RPV HEATUP AND BOILOFF CALCULATIONS

Once the core decay heat rate has been calculated using Equation B-5, the times to fuel coolant boiling and core damage can be calculated using simple heat transfer formulas based on the volume of water available. The principal shutdown states are represented by the following water level configurations:

• normal level

- at the flange level
- reactor cavity flooded

Nominal water volumes and associated heat capacities (based on review of a number of
BWR PSSAs<sup>(1)</sup>) for use in this calculation are summarized in Table B-1.

#### Time to Boil

The time required for the vessel water to reach the boiling temperature (given loss of coolant decay heat removal) is represented by the following equation:

$$t_{b} = E_{boil} / P_{s}(t) \quad hrs. \tag{B-6}$$

where:

t <sub>b</sub>	=	time to boil (hours)
E <sub>boil</sub>	=	Ewater + Estruct
E <sub>water</sub>	=	energy absorbed by heated water volume to reach saturation (MBtu)
E <sub>struct</sub>	=	energy absorbed by fuel and clad (MBtu)
P <sub>s</sub> (t)	=	decay heat level (MBtu/hr),
E <sub>water</sub>	=	V/v * (h <sub>Tsat</sub> - h <sub>Tinit</sub> )

۷	=	volume of water that heats up to the saturation temperature ( ${ m ft}^3$ )
v	=	specific volume of water at $T_{init}$ (assumed constant at 0.0167 ft <sup>3</sup> /lb <sub>r</sub>

- specific volume of water at T<sub>init</sub> (assumed constant at 0.0167 ft<sup>3</sup>/lb<sub>m</sub> over the temperature range of interest)
- enthalpy of water at T<sub>sat</sub>, 212°F (Btu/lb<sub>m</sub>), h<sub>Tsat</sub> =
- enthalpy of water at the initial RPV temperature, T<sub>init</sub> (Btu/lb<sub>m</sub>), h<sub>Tinit</sub> =

#### and

and

MCp<sub>struct</sub> (T<sub>sat</sub> - T<sub>init</sub>)  $E_{\text{struct}} =$ 

configuration specific structure heat capacity  $MCp_{struct} =$ 

<sup>(1)</sup> Cooper, DAEC, Dresden, LaSalle, NMP2, Quad Cities, Susquehanna, WNP-2.

Since the specific heat of water is 1.0 Btu/lb<sub>m</sub>°F, the difference in the enthalpies in the  $E_{water}$  expression above ( $h_{Tsat} - h_{Tinit}$ ) is equivalent to the temperature difference in the  $E_{struct}$  expression ( $T_{sat} - T_{init}$ ). This allows the complete expression for  $E_{boil}$  to simplify to:

$$E_{\text{boil}} = [(V/v) + MCp_{\text{STRUCT}}] * [T_{\text{SAT}} - T_{\text{init}}]$$
(B-7)

Substituting in the appropriate constant values, Equation B-7 can be rewritten as:

$$E_{boil} = C * [212 - T_{init}]$$
 (B-8)

where the constant C is calculated for each of the water volumes and structure capacities given in Table B-1. Thus, with the initial temperature,  $T_{init}$  in °F and the decay heat load,  $P_s(t)$  in Btu/hr, the time to reach saturation for the different configurations are given by Equations B-9 through B-13.

t b, 2/3 core height	=	0.55E6	*	(212 - T <sub>init</sub> ) / P <sub>s</sub> (t)	hours	(B-9)
t <sub>b,TAF</sub>	=	0.61E6	*	(212 - T <sub>init</sub> ) / P <sub>s</sub> (t)	hours	(B-10)
t <sub>b,Normal Level</sub>	=	0.98E6	*	(212 - T <sub>init</sub> ) / P <sub>s</sub> (t)	hours	(B-11)
t b,Flange Level	=	1.28E6	*	(212 - T <sub>init</sub> ) / P <sub>s</sub> (t)	hours	(B-12)
t <sub>b,Cavity</sub> Flooded	=	3.25E6	*	(212 - T <sub>init</sub> ) / P <sub>s</sub> (t)	hours	(B-13)

where  $P_s(t)$  is the decay heat level (refer to Equation 5)

## Table B-1

# NOMINAL WATER VOLUMES AND HEAT CAPACITIES FOR THE TIME TO BOIL AND TIME TO CORE DAMAGE CALCULATIONS

		Heat Capacity (Btu/°F)		
Water Level	Water Volume (ft <sup>3</sup> )	Water	Structure	
2/3 Core Height	7000	0.42E6	0.13E6	
Top of Active Fuel	8000	0.48E6	0.13E6	
Normal Level	12000	0.72E6	0.26E6	
Flange Level	17000	1.02E6	0.26E6	
Cavity Flooded	50000	2.99E6	0.26E6	

#### Time to Uncover Fuel (Boil Off) and Core Damage

The time to uncover the core due to boil off (due to loss of coolant decay heat removal) is the sum of the time required to bring the full heated water volume to saturation and the time to boil off an equivalent volume of water that lies above the core. This can be represented by an equation similar in format to the time to boil equation (Equation B-6):

$$t_{cu} = E_{total} / P_{S} (t)$$
 (B-14)

where:

t <sub>cu</sub>	=	time to uncover the core (hours)
E <sub>total</sub>	=	E <sub>boil</sub> + E <sub>boiloff</sub>
E <sub>boil</sub>	=	energy absorbed to reach saturation as defined for Equation B-6 (MBtu)
E <sub>boiloff</sub>	=	energy absorbed by the water that vaporizes during boiloff (MBtu),

and

E <sub>boiloff</sub>	=	V <sub>b</sub> / v <sub>sat</sub> * (h <sub>fg</sub> )
Vb	=	equivalent volume of water that must vaporize for the collapsed level to reach TAF ( $\mathrm{ft}^3$ )
Vsat	=	specific volume of water at saturation ( $T_{sat} = 212^{\circ}F$ ), or 0.0167 ft <sup>3</sup> /lb <sub>m</sub>
h <sub>fg</sub>	=	heat of vaporization at 212°F and 14.7 psia, or 970.32 Btu/lbm.

With constant values again assumed where appropriate, Equations B-15 through B-17 below provide the time to uncover the core for the different shutdown water level configurations:

t <sub>cu,Normal</sub> Level	=	[0.98E6	*	(212 - T <sub>init</sub> )	+	2.32E8] / P <sub>S</sub> (t)		hours	(B-15)
t <sub>cu,Flange</sub> Level	=	[1.28E6	*	(212 - T <sub>init</sub> )	+	5.23E8] / P <sub>S</sub> (t)	I	hours	(B-16)
t <sub>cu,Cavity</sub> Flooded	=	[3.25E6	*	(212 - T <sub>init</sub> )	+	2.44E9] / P <sub>S</sub> (t)		hours	(B-17)
where $P_s(t)$ is the decay heat level (refer to Equation 5)									

Using an initial bulk water temperature of 140°F, the time to uncover the core with the existing power level (105% OLTP) is 10.5 hours (9.3 hrs for the 120% OLTP case) at one day into the outage from the flange level configuration, and the available time exceeds 24 hours from this level at about 8 days into the outage. From normal level, the time to uncover the core with the existing power level (105% OLTP) is 5.2 hours (4.5 hrs. for the 120% OLTP case) at one day, and exceeds 24 hours at about 35 days into the outage. At no time during the outage is the available time before the core becomes uncovered from a boiloff event from a flooded up configuration less than 24 hours for either the 105% or the 120% case.

For the impact on shutdown human error probabilities, it is necessary to know the approximate time of core damage so that this time can be used as the maximum allowable time window rather than conservatively estimating the time to reach an uncovered core. For BWRs with steam cooling available, extensive heatup of the fuel and cladding leading to gap release (i.e., core damage) will generally not begin to occur until the level drops below 2/3 core height. Based on information reported in SECY-93-190 [B-4], calculations for Grand Gulf performed by Sandia show that at 4 days after shutdown more than five hours are available between reaching TAF and before gap release occurs, and almost nine additional hours would be available at 15 days after shutdown. For these calculations, the time to core damage is estimated by incorporating the additional time available from boiloff down to 2/3 core height (nominally 1000 ft<sup>3</sup> of water), and then extrapolating the time to gap release by assuming that gap release occurs 0.5 hours after 2/3 core height is reached one day after shutdown. The resulting equation for core damage, t<sub>cd</sub>, is of the form for boiloff cases:

B-9

$$t_{cd} = t_{cu} + [5.8E7 + 0.5 * P_s(1d)] / P_s(t)$$
 hours (B-18)

where:

5.8E7 represents the amount of decay heat required to boildown from TAF to 2/3 core height

 $P_{s}(1d)$  is the decay heat level 1 day after shutdown (refer to Equation B-5)

 $P_{S}(t)$  is the decay heat level as a function of time after shutdown (refer to Equation B-5)

Comparisons of the time to core damage due to boil off (given loss of coolant decay heat removal) for the normal and RPV flange water level configurations for the 105% OLTP and the 120% OLTP cases are provided in Tables B-2 and B-3. Information is not summarized for the flood-up configuration as the times to core damage are 50 hours and greater (much longer than the time frames considered in PSAs).

As can be seen from Tables B-2 and B-3, the reduction in times to core damage (i.e., 120% OLTP case compared to 105% OLTP case) are on the order of 2-3%. Such small changes in already lengthy allowable operator response times result in negligible changes (<<1%) in calculated human error probabilities.

#### Table B-2

#### TIME TO CORE DAMAGE DUE TO BOIL OFF (Initial Water Level: Normal Level)

	Time to Core Damage (hrs.)		
Days After Shutdown	105% OLTP	120% OLTP	
1	6.7	6.5	
5 <sup>(1)</sup>	13.2	12.9	
10 <sup>(1)</sup>	17.7	17.3	
15 <sup>(1)</sup>	21.1	20.5	
20 <sup>(1)</sup>	23.8	23.2	
25 <sup>(1)</sup>	26.2	25.4	
30	28.3	27.5	

#### NOTE:

(1) This list of days after shutdown is summarized to show the increasing trend of time available. Thirty days is shown here to correspond with the current industry trend toward refueling outages on the order of a month in duration. Note that the days marked with the footnote are not directly applicable to a real outage schedule for this water level configuration (i.e., the first day or two the water level will be low, but then for the majority of the outage the water level will be at the spent fuel pool level, and then will be lowered again at the end of the outage).

#### Table B-3

#### TIME TO CORE DAMAGE DUE TO BOIL OFF (Initial Water Level: RPV Flange Level)

	Time to Core Damage (hrs.)		
Days After Shutdown	105% OLTP	120% OLTP	
1	12.1	11.9	
5 <sup>(1)</sup>	23.8	23.5	
10 <sup>(1)</sup>	32.0	31.5	
15 <sup>(1)</sup>	38.0	37.4	
20 <sup>(1)</sup>	42.9	42.2	
25 <sup>(1)</sup>	47.1	46.4	
30	50.9	50.2	

#### NOTE:

(1) This list of days after shutdown is summarized to show the increasing trend of time available. Thirty days is shown here to correspond with the current industry trend toward refueling outages on the order of a month in duration. Note that the days marked with the footnote are not directly applicable to a real outage schedule for this water level configuration (i.e., the first day or two the water level will be low, but then for the majority of the outage the water level will be at the spent fuel pool level, and then will be lowered again at the end of the outage).

#### REFERENCES

- [B-1] USNRC, Branch Technical Position 9-2, "Residual Decay Heat Energy for Light-Water Reactors for Long-Term Cooling."
- [B-2] M.M. El-Wakil, Nuclear Heat Transport, International Textbook Company, 1971.
- [B-3] K. Way, E. Wigner, "The Rate of Decay of Fission Products," (Phys. Rev., 73, 1948, pp. 1318-1330)
- [B-4] USNRC, "Regulatory Approach to Shutdown and Low Power Operations," SECY-93-190, July 12, 1993, Enclosure: Draft Regulatory Analysis in Accordance with 10CFR50.109 dated February 1993.



# Appendix C BRUNSWICK PSA QUALITY

The quality of the BNP PSA models used in performing the risk assessment for the BNP EPU is manifested by the following:

- Level of detail in PSA
- Maintenance of the PSA
- Comprehensive Critical Reviews

#### C.1 LEVEL OF DETAIL

The BNP PSA modeling is highly detailed, including a wide variety of initiating events, modeled systems, operator actions, and common cause events.

#### C.1.1 Initiating Events

The BNP at-power PSA explicitly models a large number of internal initiating events:

- General transients
- LOCAs
- Support system failures
- Internal Flooding events

The initiating events explicitly modeled in the BNP at-power PSA are summarized in Table C-1. The number of internal initiating events modeled in the BNP at-power PSA is equal to or greater than the majority of U.S. BWR PSAs currently in use.

Initiating Event Description	Modeling Designator
Turbine Trip	%Т(Т)
Total Loss of Feedwater	%T( <b>F</b> )
Loss of Offsite Power (Site)	%TE(S)
Loss of Offsite Power (Unit 1)	%TE(U1)
Loss of Offsite Power (Unit 2)	%TE(U2)
MSIV Closure	%T(M)
Loss of Condenser Vacuum	%T(C)
Stuck Open SRV	%T(S)
Loss of Nuclear Service Water	%TNSW
Loss of Conventional Service Water	%TCSW
Loss of Control Rod Drive	%TCRD
Loss of Instrument Air	%TIAN
Loss of RBCCW	%TRCC
Loss of TBCCW	%TTBC
Loss of DC Bus 1A1/2A1	%T(DC1A1 ), %T(DC2A1)
Loss of DC Bus 1A2/2A2	%T(DC1A2), %T(DC2A2)
Loss of DC Bus 1B1/2B1	%T(DC1B1), %T(DC2B1)
Loss of DC Bus 1B2/2B2	%T(DC1B2), %T(DC2B2)
Loss of 4160V AC Bus 1C/1D	%TE(1C), %TE(1D)
Loss of 4160V AC Bus 2C/2D	%TE(2C), %TE(2D)
Loss of 4160V AC Bus E1/E2/E3/E4	%TE(E1), %TE(E2), %TE(E3), %TE(E4)
Loss of 480V AC Substation E5/E6/E7/E8	%TE(E5), %TE(E6), %TE(E7), %TE(E8)
Large LOCA	%A
Medium LOCA	%S1
Small LOCA	% <b>S</b> 2

# Table C-1

# **BNP PSA Initiating Events**

### Table C-1

# BNP PSA Initiating Events

Initiating Event Description	Modeling Designator
Internal Flood: Fails All CS Pumps	%TF2
Internal Flood: Fails RHR Pump Room A	%TF4
Internal Flood: Fails All RHR Pump Rooms and HPCI	%TF6
Internal Flood: Fails All Pumps at -17ft Level	%TF7
Internal Flood: Fails RHR Pump Room B	%TF9
Internal Flood: Fails HPCI Pump Only	%TF12
Internal Flood: Fails Condensate and Cable Spreading Room	%TF14
Excessive LOCA	%E
ISLOCA in CS A	ISL-CS-LOOPA
ISLOCA in CS B	ISL-CS-LOOPB
ISLOCA in LPCI A	ISL-RHR-LPCI-A
ISLOCA in LPCI B	ISL-RHR-LPCI-B
ISLOCA in SDC	ISL-RHR-SDC

#### C.1.2 System Models

The BNP at-power PSA explicitly models a large number of frontline and support systems that are credited in the accident sequence analyses. The BNP systems explicitly modeled in the BNP at-power PSA are summarized in Table C-2. The number and level of detail of plant systems modeled in the BNP at-power PSA is equal to or greater than the majority of U.S. BWR PSAs currently in use. Where other PSAs may not develop logic for such systems as instrument air, ECCS instrumentation, circulating water, and fire protection, the BNP PSA specifically models these with fault tree logic. In addition, a number of support system initiating events are modeled with fault trees and linked directly into the PSA models.

#### C.1.3 Operator Actions

The BNP at-power PSA explicitly models a large number of operator actions:

- Pre-Initiator actions
- Post-Initiator actions
- Recovery Actions
- Dependent Human Actions

Over two hundred operator actions (about 130 pre-initiators, about 60 post-initiators, about a dozen recovery actions, and about 25 dependent actions) are explicitly modeled. Given the large number of actions modeled in the BNP at-power internal events PSA, a summary table of the individual actions modeled is not provided here.

The human error probabilities for the actions are modeled with accepted industry HRA techniques and include input based on discussion with plant operators, trainers, and other cognizant personnel.

## Table C-2

## SYSTEMS MODELED IN THE BNP PSA

System Name	PSA System Designator
Reactor Core Isolation Cooling	RCI
High Pressure Coolant Injection	HPC
Control Rod Drive	CRD
Safety Relief Valve	SRV
Core Spray System	CSS
Low Pressure Coolant Injection	RHR
Standby Liquid Control	SLC
Recirculation Pump Trip	RRS
AC Power	ACP
DC Power	DCP
Emergency Diesel Generators	EDG
Service Water System	SWS
Reactor Building Component Cooling Water	RCC
Turbine Building Component Cooling Water	TBC
Condensate System	CDS
Instrument Air and Nitrogen	IAN
Turbine Control System	TCS
Instrumentation & Control Circuitry	ICC
Containment Hardened Wetwell Venting	CAC
Circulating Water System	CWS
Screen Wash Water System	SCW
Feedwater System	FWS

## Table C-2

## SYSTEMS MODELED IN THE BNP PSA

System Name	PSA System Designator
Main Steam System	MSS
Fire Protection System	FPS
Reactor Protection System	RPS
Diesel Generator Building HVAC	DGH
Reactor Water Cleanup	RWC
Suppression Pool Cooling	SPC

With regard to dependent actions, the human reliability analysis facet of the BNP PSA explicitly considers the dependent effects of individual modeled actions (considering such issues as relevant timing among actions, similar cues) and develops dependent operator actions that replace various combinations of the independent human actions appearing in the quantification results.

The number of operator actions modeled in the BNP at-power PSA, and the level of detail of the HRA, is equal to or greater than many U.S. BWR PSAs currently in use.

### C.1.4 Common Cause Events

The BNP at-power PSA explicitly models a large number of common cause component failures. The components explicitly modeled in the BNP at-power PSA with common cause component failures are summarized in Table C-3. Many hundreds of common cause terms are explicitly included in the BNP PSA. Given the large number of CCF terms modeled in the BNP at-power internal events PSA, a summary table of them is not provided here. The number and level of detail of common cause component failures modeled in the BNP at-power PSA is equal to or greater than the majority of U.S. BWR PSAs currently in use.

### C.1.5 Level 2 PSA

The Brunswick Level 2 has been updated to incorporate insights from the independent peer review and the NEI Guidelines, NEI 00-02, on PRA Peer Review. The updated analysis is designed to calculate the LERF frequency consistent with NRC Regulatory Guidance (e.g., Reg. Guides 1.174 and 1.177) and the PSA Application Guide.

The following aspects of the Level 2 model reflect the more than adequate level of detail and scope:

- Dependencies from Level 1 accidents are carried forward directly into the Level 2 by transfer of cutsets to ensure that their effects on Level 2 response is accurately treated.
- Virtually all phenomena identified by the NRC and industry for inclusion in BWR Mark I Level 2 analyses are treated explicitly within the model. Some phenomena are screened from consideration based on Brunswick plant design or subsumed by other phenomenological effects.
- The model truncation is sufficiently low to be consistent with the NEI PRA Peer Review Guidelines for Risk-Informed Applications.
- C.2 MAINTENANCE OF PSA

#### C.2.1 History of BNP PSA Models Maintenance

The BNP PSA model and documentation has been maintained living and is routinely updated to reflect the current plant configuration following refueling outages and to reflect the accumulation of additional plant operating history and component failure data. The Level 1 and Level 2 BNP PSA analyses were originally developed and submitted to the NRC in August, 1992 as the Brunswick Individual Plant Examination (IPE) Submittal. The BNP Level 1 PSA models supporting the IPE have been subsequently updated in 1993 and 1996, and the Level 1 PSA models have been fully upgraded during 1998-2000. The Level 2 analysis has been fully upgraded during 2000-2001, and the Level 2 report is currently being finalized.

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#### Table C-3

# COMPONENTS RECEIVING COMMON CAUSE TREATMENT IN BNP PSA<sup>(1)</sup>

RCIC and HPCI	Inverters/Chargers
Core spray pumps	Circuit breakers
Residual heat removal pumps	Powered dampers
Service water pumps	Pneumatic/air/solenoid valves
CRD pumps	ADS/SRVs
Other misc. pumps	Batteries
Diesel generators	Relays (all types)
Check valves	Transmitters (all types)
Motor-operated valves	

<sup>(1)</sup> This is not the exhaustive list of the items modeled with common cause failure in the BNP PSA.

The Brunswick IPE model of 1992 was updated in 1993 and 1996 to reflect the changes made to the plant since the development of the submittal. Most notably, a comprehensive review of the loss of offsite power event tree was performed because the IPE results indicated that station blackout was the dominant contributor to the total core damage frequency (CDF). The IPE model conservatively assumed that after 2 hours, both DC power divisions would be lost and subsequently, offsite power would be unrecoverable. No credit was taken for restoring DC power because procedures for performing the actions did not exist. Since the development of the IPE submittal, new procedures on DC power recovery and station blackout have been implemented (AOP-39, "Loss of DC Power", and AOP-36.2, "Station Blackout"). These new procedures take advantage of the flexibility in the plant-specific design features of the Brunswick AC and DC power distribution systems. They provide an enhanced ability to cope with a LOOP, resulting in a significant decrease in the SBO induced CDF.

Another model change was based on the results of thermal hydraulic timing studies that were performed to assess the effects of the SBO procedure, AOP-36.2. The results indicated that for SBO sequences involving the failure of high pressure injection sources, there is inadequate time to perform the emergency bus cross-tie or to use firewater for low pressure injection. These actions were deleted from the event tree, contributing to a higher core damage frequency for some accident sequences.

The original Level 2 analysis was fully upgraded during 2000-2001 (the Level 2 models and documentation are currently undergoing final comment resolution at this time). See discussion under C.1.5 and C.3.3.

The PSA models are continually implemented and studied by plant PSA personnel in the performance of their duties. Electronic copies of the models are maintained in a controlled read-only server location. Potential model modifications/enhancements are itemized and maintained for further investigation and subsequent implementation, if necessary. The current list of potential modifications/enhancements were reviewed and judged not to impact the results (i.e., no significant change in delta CDF or delta LERF expected) and conclusions of the BNP EPU risk assessment (refer to Section C.2.2).

Each supporting element of the BNP PSA is documented, typically in a stand-alone report. Each analysis element is reviewed by cognizant personnel and comments reconciled before final approval. The analysis element reviews are guided by checklists that cover both technical and document format/content issues.

Formal comprehensive model reviews are discussed in Section C.3.

#### C.2.2 Impact Of Current List Of Potential Model Changes on EPU

This section provides a discussion of potential modifications/enhancements and their impact on the BNP EPU. This list of potential modifications/enhancements was provided by CP&L as part of the PSA Maintenance and Update process.

1. Remove credit for DC battery chargers as alternative power supply source to batteries in response to NCR-20277.

The PSA modification to remove credit for the DC battery chargers as an alternate power supply source to the batteries would have a significant impact on the base CDF and LERF values. Preliminary calculations by CP&L indicate that the Level 1 CDF may increase from 2.5E-5/yr to nearly 5E-5/yr. However, the identified PSA model changes due to EPU (i.e., RPV level control during ATWS) are minor such that the increase in CDF over the revised base case is judged to remain small.

In addition, the proposed PSA modification would have little or no impact on the CDF contribution due to ATWS sequences. ATWS events are dominated by failure of the SCRAM system, failure of SLC pumps for reactivity control, and operator failure of level/power control. These events are not dependent on the DC battery chargers.

The BNP EPU PSA evaluation has identified that the PSA model changes required as a result of the EPU are related to RPV level control during ATWS events. The PSA modification to the DC battery chargers would result in a significantly higher base CDF (Pre-EPU), but the change in CDF due to EPU

would remain small because the PSA modification would not significantly impact the ATWS CDF contribution. Similar judgement would apply that the change in LERF due to EPU would also remain small despite the DC battery charger modification. Therefore, the proposed PSA model change is judged to have no impact on the conclusions of the BNP EPU.

2. Revise the common cause failure data (2/4, 3/4, and 4/4) for the DC batteries in accordance with more recent RSC information.

Revising the DC battery common cause failure data has the potential for changing the base CDF (Pre-EPU). Similar to previous arguments, the identified EPU modifications are minor such that any potential increase in CDF over the revised base case would still be small. In addition, the PSA modification does not significantly impact the ATWS CDF contribution, and thus, does not impact the EPU modifications. The change in CDF and LERF due to EPU is judged to remain small. Therefore, the proposed PSA model change is judged to have no impact on the conclusions of the BNP EPU.

3. Update the equipment database from 18-month to 24-month exposure interval to account for longer operating cycle.

The PSA modification has the potential for increasing the base CDF (Pre-EPU) because system reliability may be reduced. If the exposure interval is increased from 18 months to 24 months, the standby failure rate for particular components (e.g., manual valves) could be increased by as much as 33%. Similar to previous arguments, the identified EPU modifications are minor such that the increase in CDF over the revised base case would still be small. Therefore, the proposed PSA model change is judged to have no impact on the conclusions of the BNP EPU.

4. Correct the power supply logic in HVAC system and circular logic model associated with the DG supply fans to eliminate multiple failures of the diesels.

See similar discussion under Item 2 above. The proposed PSA model change is judged to have no impact on the conclusions of the BNP EPU.

5. Modify the DG supply breaker logic in the circular logic model to mimic proper EOOS response.

See similar discussion under Item 2 above. The proposed PSA model change is judged to have no impact on the conclusions of the BNP EPU.

6. Add the SCW cross-tie SCW-V5 and traveling screens for the opposite unit to provide EOOS status flexibility.

See similar discussion under Item 2 above. The proposed PSA model change is judged to have no impact on the conclusions of the BNP EPU.

7. Alter circular logic model to include failure of DG cooling from loss of SCW traveling screens to clarify EOOS status.

See similar discussion under Item 2 above. The proposed PSA model change is judged to have no impact on the conclusions of the BNP EPU.

8. Change IAN system success criteria and logic to require two out of three JOY air compressors for support of IAN loads based upon plant operating experience.

See similar discussion under Item 2 above. The proposed PSA model change is judged to have no impact on the conclusions of the BNP EPU.

9. Add IAN system logic to model the bypass of the IA and SA dryers to indicate the proper EOOS status of operation with one dryer available..

See similar discussion under Item 2 above. The proposed PSA model change is judged to have no impact on the conclusions of the BNP EPU.

#### C.3 COMPREHENSIVE CRITICAL REVIEWS

The BNP PSA model has benefited from the following comprehensive critical technical reviews:

- Independent Peer Review (Level 1)
- NEI PRA Peer Review Process
- Level 2 Acceptance Review

#### C.3.1 Independent Peer Review

A comprehensive independent peer review of the BNP at-power Level 1 and Level 2 PSA models was contracted and performed in early 2000. [C-1] The scope of the independent peer review included the following key aspects:

- 1. Accident Sequences, especially dominant sequences or sequences important at other BWRs were examined in detail to ensure cutsets, assumptions, and success criteria are appropriate.
- 2. For those "selected" sequences, the top 10 cutsets from each sequence were examined plus 2 lower cutsets at random.
- 3. Sequences that have high contributions to CDF at Brunswick were reviewed by performing cutset review.
- 4. A cutset review was performed to identify:
  - a. Inappropriate high-order cutsets
  - b. More than one initiator in a cutset
  - c. Number of HEPs in a cutset and appropriate dependency
  - d. Dependencies within cutsets not correctly represented
  - e. Reasonable common-cause terms
- 5. A search for those opportunities for recovery, for important cutsets was performed
- 6. A search for "missing cutsets" (those that judgment implies should be there, but are not) was performed
- 7. A review of "merged" cutsets covering a large portion of CDF, plus a few cutsets from the "middle" and "bottom" was performed.
- 8. A comparison of the CDF with other comparable BWRs was performed noting differences caused by differences in the plant features.
- 9. A review of the supporting documentation for the key PRA elements was performed (including, event sequence evaluation, success criteria, initiating events, HRA, data analysis, system notebooks, internal floods, ISLOCA, and groundrules document).
- 10. An assessment of dependency treatment was performed.
- 11. A review of the nine (9) PSA Technical elements specified in the NEI PRA Peer Review Certification Process was also performed.

The comments from the Independent Review were prioritized into four categories A-D based upon importance to the completeness of the model. All comments in Categories A and B (recommended actions and items for consideration) have been resolved in the model upgrade. The comments in Categories C and D (good practices and editorial) are potential enhancements and remain for consideration in future updates of the Level 1 and 2 PSA models.

#### C.3.2 NEI PRA Peer Reviews

The Brunswick internal events PSA has not yet received a formal industry PRA Peer Review based on the NEI guidelines. The Peer Review of the BNP PSA is scheduled for September 2001. However, the detailed documented results of the independent peer review (based on the NEI PRA Peer Review process) are being used to enhance, where applicable, the BNP PSA modeling and documentation. When the NEI PRA Peer Review is performed and the documented results received, these will also be used to modify/enhance the modeling and documentation where appropriate. Because the independent review performed using the NEI Guidelines (NEI 00-02) has been performed already, additional significant comments from the formal implementation are not expected.

#### C.3.3 Level 2 Review

The Level 2 PSA for Brunswick has been completely updated including addressing the PRA Peer Review items from NEI 00-02. The Level 2 PSA has been thoroughly reviewed by the contractor and has received an extensive in-house review by CP&L as part of the QA acceptance process. The extensive Level 2 comments provided significantly improved the presentation of the methodology and results. No significant technical issues arose in the review process.

#### C.4 PSA QUALITY SUMMARY

The quality of modeling and documentation of the BNP PSA models has been demonstrated by the foregoing discussions on the following aspects:

- Level of detail in PSA
- Maintenance of the PSA
- Comprehensive Critical Reviews

Results of previous internal and external reviews have identified several items that could be modified in the models. These items may have a small impact on the absolute value of the CDF or LERF; however, they will not discernibly affect the change in CDF or LERF associated with the EPU change.

It is found that the Brunswick Level 1 and Level 2 PSAs provide the necessary and sufficient scope and level of detail to allow the calculation of CDF and LERF changes due to the Extended Power Uprate (EPU). This has been confirmed by the critical reviews performed on the PSA and their positive results.

## REFERENCES

[C-1] Letter from Dr. E.T. Burns (ERIN Engineering and Research, Inc.) to Dan Labelle (CP&L), "Independent Peer Review of Brunswick PSA", #C1109901-4138/1, May 30, 2000.



# Appendix D CUTSET RESULTS

The top 50 cutsets of each BNP PSA quantification performed in support of this risk assessment are included in this appendix. The quantification runs performed are summarized in Table D-1.

The cutset results are included in the following attachments:

- D.1: Base Level 1 CDF cutsets (pre-EPU)
- D.2: Base EPU CDF cutsets (EPU)
- D.3: Sensitivity #1 CDF cutsets
- D.4: Sensitivity #2 CDF cutsets
- D.5: Sensitivity #3 CDF cutsets
- D.6: Sensitivity #4 CDF cutsets
- D.7: Sensitivity #5 CDF cutsets
- D.8: Sensitivity #6 CDF cutsets
- D.9: Base Level 2 LERF cutsets (pre-EPU)
- D.10: Base EPU LERF cutsets (EPU)
- D.11: Sensitivity #1 LERF cutsets
- D.12: Sensitivity #2 LERF cutsets
- D.13: Sensitivity #3 LERF calculation
- D.14: Sensitivity #4 LERF cutsets
- D.15: Sensitivity #5 LERF cutsets
- D.16: Sensitivity #6 LERF calculation

Case	Description	CDF <sup>(5)</sup>	LERF <sup>(1),(6)</sup>
Base	Base Level 1 Model (pre-EPU)	2.55E-05	4.27E-06
Base EPU	Base Level 1 EPU Model	2.59E-05	4.46E-06
Sensitivity #1	Base EPU with Turbine Trip IE increased by 10%	2.71E-05	4.84E-06
Sensitivity #2	Base EPU with probability for Operator Failure to Maintain FW Post Trip increased by factor of 2 (basic event OPER- FWSCNT)	2.62E-05	4.46E-06
Sensitivity #3	Base EPU with revised SBLC success criteria <sup>(2), (3)</sup>	2.32E-05	3.07E-06
Sensitivity #4	Base EPU wit no credit for alternate RPV Injection (FP/RHRSW) during ATWS	2.59E-05	4.46E-06
Sensitivity #5	Base EPU with Sensitivity #1, #2, and #4	2.73E-05	4.84E-06
Sensitivity #6	Base EPU with Sensitivity #1, #2, #3, and #4 <sup>(2), (4)</sup>	2.43E-05	3.30E-06

# Table D-1

#### DDU MIO

Notes to Table D-1:

- Includes LERF contribution of 3.49E-7/yr from ISLOCA (2.99E-7/yr) and Excessive LOCA (5E-8/yr); although, ISLOCA and Excessive LOCA LERF cutsets are not included in the attached cutset printouts.
- (2) LERF calculated based on the fact that decrease in CDF only applies to Class IVA. Decrease in LERF estimated using Class IVA LERF multiplier of 0.514.
- (3) LERF for Sensitivity #3 estimated based on decrease in CDF compared between Base EPU and Sensitivity #3.
- (4) LERF for Sensitivity #6 estimated based on decrease in CDF compared between Sensitivity #5 and Sensitivity #6.
- (5) The Level 1 (single top model) PSA truncation limit used was 2E-9/yr.
- (6) The truncation limit for the base Level 2 PRAQuant sequence quantification ranged from 1E-10/yr to 1E-11/yr on a sequence-by-sequence basis.

# ATTACHMENT D.1

# BASE LEVEL 1 CDF CUTSETS (PRE-EPU)

(6 pages)

#### **Cutsets with Descriptions Report**

2CDF = 2.54E-05

#	Inputs	Description Rate	Exposure	Event Prob	Probability
1	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	7.02E-07
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
i	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
	IVA1			1.00E+00	
2	&T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	7.02E-07
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
1.	IVAL			1.00E+00	
3	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	6.67E-07
1	ACPOBKR-44-1234	COMMON CAUSE FAILURE OF AT LEAST ONE BREAKER FOR EACH E-BUS	2.04E-04	2.04E-04	
1	X-AC-2H			2.18E-01	
I.	IB			1.00E+00	
4	<b>%</b> Τ(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	6.61E-07
ł	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
1	EDG2DGN-FR-003	DIESEL GENERATOR 3 FAILS TO RUN	7.40E-02	7.40E-02	
1	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
1	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
1	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
1	XOP-COM2-16			7.90E-03	
1	ID			1.00E+00	
5	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.40E-07
l i	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
l i	IA			1.00E+00	
6	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.40E-07
l i	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
i i	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
i i	DCP2REC-34A1B1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2B-1 AND 2B-2	2.37E-07	2.37E-07	
1	IA			1.00E+00	
7	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.75E-07
i -	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07	
i –	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
i i	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
i i	IA			1.00E+00	
8	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.21E-07
l I	CRD2SCRAM	FAILURE OF CONTROL_KOD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
i -	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
I	IVA1			1.00E+00	

		)			)
#	Inputs	Description Rate	Exposure	Event Prob	Probability
9	<del>ነ</del> የጠ	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.21E-07
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
1	IVA1			1.00E+00	
10	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
	EDG1DGN-FR-001	DIESEL GENERATOR 1 FAILS TO RUN	7.40E-02	7.40E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	Х-АС-16Н			1.69E-02	
	IB			1.00E+00	
11	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
	EDG1DGN-FR-002	DIESEL GENERATOR 2 FAILS TO RUN	7.40E-02	7.40E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-16H			1.69E-02	
	IB			1.00E+00	
12	%TF14	INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM	3.50E-07	3.50E-07	3.50E-07
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1,005+00	1.00E+00	3.304 07
	OPER-DC2BALT	OPERATOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER SUPPLY-UNIT 2	1.00E+00	1.00E+00	
	ID		1.002100	1.008+00	
13	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.508-02	1 508-02	2 398-07
	DGH0FAN-44FTSEXH	COMMON CAUSE FAILURE OF EXHAUST FANS E. F. G. AND H TO START	4 588-05	4 588-05	2.300-01
	X-AC-1H		4.301 03	3 468-01	
	IB			1 008+00	
14	TE(S)	LOSS OF OFFSITE POWER (SITE)	1 50E-02	1 508-02	2 288-07
	DGHOFAN-44FTSSUP	COMMON CAUSE FAILURE OF SUPPLY FANS A. B. C. AND D TO START	4.588-05	4 588-05	2.300-07
	X-AC-1H		1.502 05	3 46E-01	
	IB			1.00E+00	
15	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.368-07
	EDG0DGN-44-EDGS	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START	7.22E-05	7.22E-05	2.30L Q/
	X-AC-2H			2.185-01	
	IB			1.008+00	
16	<b>%</b> T (DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.908-03	1 748-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3,90E-01	3.908-01	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.958-02	1.958-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.008+00	
	XOP-COM2-16		51002 01	7 908-03	
	ID			1 00E+00	
17	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1 508-02	1.508-02	1 650.07
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1 958-02	1.335-0/
	IB		1.754 05	1 008+00	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1 008+00	1 005+00	
	X-AC-12H		1.000100	2 958-02	
	XOP-ALTUNITXC			1 905-02	
18	%T(T)	TURBINE TRIP INITIATOR	ኃ 7በፑ⊥ባብ	2 708-02	1 478 07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGED 1 ODE OD	1 008100	4.705+00 1 000,00	1.4/15-U/
	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1 2A-2 AND 2A-2	1.000+00 7 170_07	1.VV&+UU	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PIMP RATIS TO RIN	4.3/8-V/ 2 208-01	2.3/E-U/ 3.30E 01	
	TD		2.305-UI	4.304-UL	
				T.008+00	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
19	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-CAALL	COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL	4750E-05	4.50E-05	
	X-AC-2H			2.18E-01	
	IB			1.00E+00	
20	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DALL	COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
	IB			1.00E+00	
21	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
1	EDG0CKV-44-DCPCV	COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
	IB			1.00E+00	
22	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
1	EDG0CKV-44-DLALL	COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
	IB			1.00E+00	
23	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DWALL	COMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V258	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
	IB			1.00E+00	
24	*TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-VDALL	COMMON CAUSE FAILURE OF ALL DD PUMP DISCHARGE CHECK VALVES	4.50B-05	4.50E~05	
	X-AC-2H			2.18E-01	
1	IB			1.00E+00	
25	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-XCALL	COMMON CAUSE FAILURE OF ALL (8/8) FUEL OIL TRANSFER PUMPS CV TO OPEN	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
	IB			1.00E+00	
26	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	SWSOCKV-44-DGALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
	IB			1.00E+00	
27	*TF7	INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.46E-07
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	9.60E-02	1.00E+00	
	OPER-FWS-INJ	OPERATORS FAIL TO PROPERLY CONTROL CONDENSATE INJECTION FLOW RATE	3.00E-01	1.00E+00	
	XOP-COM2-09			9.40E-03	
	ID (T)			1.00E+00	
28	*T(C)	LOSS OF CONDENSER VACUUM	1.80E-01	1.80E-01	1.38E-07
	HPC2TDP-FR-HPTDP	HPCI TURBINE-DRIVEN POMP FAILS TO RUN	7.40E-02	7.40E-02	
	IAN2CKV-44ALL	COMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN	4.50E-05	4.50E-05	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
				1.00E+00	
29	*T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.30E-07
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2XVN-OC-F001	SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
	IVA1			1.00E+00	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability	
30	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.30E-07	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00		
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00		
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00		
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05		
	XOP-COM2-15			4.80E-03		
	1VA2			1.00E+00		
31	TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.27E-07	
1	EDGOMDC-445X-AC	COMMON CAUSE FAILURE OF UNIT I & 2 DG AIR COMPRESSORS TO START	1.08E-04	1.08E-04		
	X-AC-5H			7.87E-02		
		LODO OF LOEN DO DANEL ADA		1.008+00		
32	ST (DC2B2)	LOSS OF 123V DC FAREL 232	2.90E-03	2.905-03	1.258-07	
	BUSPAULI EDCODON EN DAAS	FRACTION OF 1055 OF 805 TRALARE NON-RECOVERABLE	3.908-01	3.908-01		
	ODED 490Y2	DIESEL GENERATOR S UNAVAILABLE DUE 10 MAINTENANCE (AI POWER)	1.405-02	1.408-02		
ł		OPERATORS FAIL TO MANUALLY CONNECT ON 2 SUBSTRITONS E/ AND ES	1.002+00	1.008+00		
1	OPER-ADIUNITAC	OPERATORS FAIL TO ALLOW DO BUG TO CHANDER FROM OFFOSTIE UNIT	1.002+00	1.000+00		
	YOR-COM2-16	OPERATOR FAILS TO ALIGN DE BUS TO STANDBI DE FORER SUPPLI - UNITZ	3.004-01	7.000+00		
1	ID			1.002.00		
22	ነው ይጥፑ(ፍ)	LOSS OF OFFSITE DOWED (STTE)	1 508-02	1 502-02	1 215-07	
22	EDGIDGN-TM-D001	DIESEL GENERATOR I INAVALLARIE DIE TO MAINTENANCE (AT DOWER)	1 408-02	1 408-02	1.216-07	
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RIN OF DIESEL GENERATORS 3 AND 4	1 958-02	1 958-02		
	X-AC-12H			2 958-02		
	IB			1.00E+00		
34	TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07	
-	EDG1DGN-TM-D002	DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02		
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02		
	X-AC-12H			2.95E-02		
	IB			1.00E+00		
35	%T (DC2A1)	LOSS OF 125V DC PANEL 2A1	2.90E-03	2.90E-03	1.19E-07	
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01		
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00		
1	DCP2REC-LP2B2	CHARGER 2B-2 FAILS 4.40E-06	2.40E+01	1.06E-04		
	IA			1.00E+00		
36	%T (DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.19E-07	
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01		
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00		
	DCP2REC-LP2A1	CHARGER 2A-1 FAILS 4.40E-06	2.40E+01	1.06E-04		
	IA			1.00E+00		
37	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.12E-07	
	EDGODGN-34-D134S	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 1,3 AND 4	3.43E-05	3.43E-05		
1	X-AC-2H			2.18E-01		
	18 9 mm (c)		1 505 05	1.00E+00		
38	TTE(S)	LOSS OF OFFSITE FOWER (SITE)	1.50E-02	1.508-02	1.12E-07	
	EDGODGN-34-D234S	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 2, 3 AND 4	3.43E-05	3.43E-05		
I	A-AU-ZH			4.18E-01		
ł	18			T.00E+00		
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#	Inputs	Description Rate	Exposure	Event Prob	Probability	
39	&T (T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.09E-07	
•	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07		
1	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00		
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01		
	ID			1.00E+00		
40	%TF7	INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.07E-07	
	OPER-DEPRESS	OPERATOR FAILS TO MANUALLY INITIATE AND ALIGN LOW-PRESSURE SYSTEMS	6.90E-03	1.00E+00		
	XOP-DEPRESS			6.90E-03		
	IA			1.00E+00		
41	%TE (U2)	LOSS OF OFFSITE POWER TO UNIT 2	9.80E-03	9.80E-03	1.01E-07	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02		
	IB			1.00E+00		
1	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00		
	X-AC-12H			2.95E-02		
	XOP-ALTUNITXC			1.80E-02		
42	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.00E-07	
1	EDG2MDC-44SU2AC	COMMON CAUSE FAILURE OF UNIT 2 DG AIR COMPRESSORS TO START	1.22E-03	1.22E-03		
	IB			1.00E+00		
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00		
	X-AC-5H			7.87E-02		
	XOP-ALTUNITXC1			7.00E-02		
43	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	9.99E-08	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05		
1	SLC2MDP-FS-PMPA	SLC PUMP C41-C001A FAILS TO START	3.70E-03	3.70E-03		
	IVA1			1.00E+00		
44	&T (T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	9.99E-08	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05		
	SLC2MDP-FS-PMPB	SLC PUMP C41-C001B FAILS TO START	3.70E-03	3.70E-03		
	IVA1			1.00E+00		
45	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	9.64E-08	
	EDG1DGN-24-DG12R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 1 AND 2	1.95E-02	1.95E-02		
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02		
	X-AC-16H			1.69E-02		
	IB			1.00E+00		
46	%T (C)	LOSS OF CONDENSER VACUUM	1.80E-01	1.80E-01	9.36E-08	
1	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00		
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00		
	DCP2REC-24A1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1 AND 2B-2	5.20E-07	5.20E-07		
l	IA			1.00E+00		
47	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	9.22E-08	
	SWSOMOV-44-DGALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY VALVES	2.82E-05	2.82E-05	`	
1	X-AC-2H			2.18E-01		
	IB			1.00E+00		
48	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	8.89E-08	
ł	EDG0DGN-44-EDGR	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO RUN	2.01E-04	2.01E-04		
1	X-AC-12H			2.95E-02		
1	IB			1.00E+00		
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#	Inputs	Description	Rate	Exposure	Event Prob	Probability
49	%T(T) TIA	TURBINE TRIP INITIATOR		2.70E+00	2.70E+00 1.00E+00	8.55E-08
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLO	W (ONE UNIT)	9.60E-02	1.00E+00	
	OPER-WVDHR	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR		1.40E-03	1.00E+00	
1	SWS2XVN-OC-V442	MANUAL VALVE 2 SW V442 FAILS TO REMAIN OPEN	5.50E-08	3.84E+02	2.11E-05	
	XOP-WVDHR				1.50E-03	
50	TE(S)	LOSS OF OFFSITE POWER (SITE)		1.50E-02	1.50E-02	8.36E-08
	EDG0DGN-34-D134R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 1, 3 AND 4		1.89E-04	1.89E-04	
	X-AC-12H				2.95E-02	
	IB				1.00E+00	

Report Summary: .Filename: C:\CAFTA-W\BNP\BNP-WIP\B229AAR.CUT Print date: 4/17/ 1 12:05 PM Not sorted

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# ATTACHMENT D.2

# BASE EPU CDF CUTSETS (EPU)

(5 pages)

### **Cutsets with Descriptions Report**

2CDF = 2.59E-05

#	Inputs	Description Rate	Exposure	Event Prob	Probability
1	&T (T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	7.02E-07
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
2	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	7.02E-07
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
3	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	6.67E-07
	ACP0BKR-44-1234	COMMON CAUSE FAILURE OF AT LEAST ONE BREAKER FOR EACH E-BUS	2.04E-04	2.04E-04	
	X-AC-2H			2.18E-01	
4	%T (DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	6.61E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	EDG2DGN-FR-003	DIESEL GENERATOR 3 FAILS TO RUN	7.40E-02	7.40E-02	
	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	XOP-COM2-16			7.90E-03	
5	&T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.40E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
6	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.40E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-34A1B1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2B-1 AND 2B-2	2.37E-07	2.37E-07	
7	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.75E-07
	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07	
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
8	%T(T)	TURBING TRIP INITIATOR	2.70E+00	2.70E+00	4.21E-07
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
9	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.21E-07
_	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
10	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
	EDG1DGN-FR-001	DIESEL GENERATOR 1 FAILS TO RUN	7.40E~02	7.40E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-16H			1.69E-02	

#     Inputs     Description     Rate     Exposure     Event Prob     Probability       11     4TE(S)     LOSS OF OFFSITE FORER (SITE)     1.508-02     3.658-07     3.658-07       BEGISICN-24-034R     COMMON CAUSES FAILURE TO RUN OF DISESL GENERATORS 3 AND 4     1.958-02     1.688-07     3.668-07       12     ATF14     INTERNAL FLOOD TF14: FAILS COMPENSATE AND DESCRIPTION REAM BOOM 0.1008-00     1.008-00     3.668-07       13     ATF14     INTERNAL 28 DEFLETION FOLLOWING LOSS OF FORER REAM CHARGENI.005-00     1.008-00     3.668-07       13     OPEN-LIGENAL     COMMON CAUSES FAILURE TO RUN OF DISESL GENERATION REAM TO TAUGUADANT ON CONSCIDENT     2.708-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     <		)	)			)
11   +TE(5)   LOSS OF OPESITE POMER (SITE)   1.508-02   1.568-01     EBGIDAN-24-0334R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.958-02   1.658-02     X.AC-10H   INTERNAL PLOOD TP14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM   1.058-02   1.658-02     12   VTF14   INTERNAL PLOOD TP14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM   1.008-00   1.008-00     13   VTF14   INTERNAL PLOOD TP14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM   1.008-00   1.008-00     14   VTF14   INTERNAL PLOOD TP14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM   2.708-00   2.708-00     14   VTF14   INTERNE TEL INITIATOR   2.708-00   2.708-00   2.708-00     15   VTF14   OPERATOR FAILS TO CONTROL LANGE BARTE LAVEL WITH RCIC DURING ANS   3.008-01   1.008+00     16   VTR(5)   LOSS OF OFFSITE FORER (SITE)   1.508-02   1.508-02   1.508-02   2.388-07     17   MCRIMACLA BINDING OF CONTROL RODS   NATEL LAVEL WITH RCIC DURING ANS   1.008-06   1.008-06   1.008-06     10   VTR(6)   LOSS OF OFFSITE FORER (SITE)   1.508-02   1.508-02   1.508-02   2.388-07 <t< th=""><th>#</th><th>Inputs</th><th>Description Rate</th><th>Exposure</th><th>Event Prob</th><th>Probability</th></t<>	#	Inputs	Description Rate	Exposure	Event Prob	Probability
DEGIDDN-FR-022     DIESEL GENERATOR 2 FAILS TO RUN     7.40E-02     7.40E-02     7.40E-02     1.55E-02       MAC-16H     1.55E-02     1.55E-02     1.55E-07     3.50E-07     3.50E-07       DCP2BAT-XCDE2B     RATTER BAIK 25 DELETION FOLGONIRO LOSS OF FORER YEAM CHARGES 10.80E-00     3.50E-07     3.50E-07     3.50E-07       10     DEFATOR FALLS TO SMITCH CHARGES TO ALTERNATE ACTOR YEAM CHARGES TO ALTERNATE ACTORES SUPEL-INIT     1.00E+00     1.00E+00     1.00E+00       11     TITT     TUBERNOF FALLS TO CONTROL LOWRERD WATER LOVEL WITH RCIC DURING AND 3.00E-01     1.00E+00       OPER-LLEVEL     OPERATOR FALLS TO CONTROL LOWRERD WATER LOVEL WITH RCIC DURING ATMS     3.00E-01     1.00E+00       NOP-COM2-15     LOSS OF OFFSITE FORER (SITE)     1.50E-02     1.50	11	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
ENC2DON-24-D534R     COMMON CAUGE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4     1.95E-02     1.95E-02       12     YFF14     INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CAELE SPREADING ROAD     1.00E+00     1.00E+00       0PERF-DC28AIT     COMMON CAUGE FAILURE TO RULLOWING LOW PREASURE FAOM CHARGER, 1.00E+00     1.00E+00     1.00E+00     2.70E+00		EDG1DGN-FR-002	DIESEL GENERATOR 2 FAILS TO RUN	7.40E-02	7.40E-02	
x - AC-158     INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM     1.658-02       12     YF14     INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM     3.508-07     3.508-07       13     WT17     TURENNA TRIP NAMK 23 DEFLETION FOLLOWING LOSS OF FOWER STUPLIN-INT 2     1.008+00     1.008+00       13     WT17     TURENNA TRIP INITIATOR     DERAFOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER STUPLIN-INT 2     1.008+00       14     WT17     TURENNA TRIP INITIATOR     DERAFOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER STUPLIN-INT 2     1.008+00       00FEN-LLEVEL     DERAFOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HORT DURING ATWS     1.008-01     1.008+00       NOP-COMA-15     LOSS OF OFFSITE FOWER (SITE)     1.508-02     1.388-07       DENOFAN-44FFISEKH     COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START     4.58E-05     3.468-01       X-AC-1H     .005 OF OFFSITE FOWER (SITE)     1.508-02     2.38E-07     3.468-01       X-AC-1H     .005 OF OFFSITE FOWER (SITE)     1.508-02     2.38E-07     3.468-01       X-AC-1H     .005 OF OFFSITE FOWER (SITE)     1.508-02     2.38E-07     3.468-01       X-AC-2H		EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
12     YTF14     INTERNAL FLOOD TF14: FALLS CONDENSATE AND FLOODS CABLE SPENDING ROOM     3.508-07     3.508-07     3.508-07       DCPERAT-KCEDP2B     ABTTERY BARK 28 DEPIETING FOLLOWING LOSS OF FORMER FROM CHANGESL 1008400     1.008400     1.008400     1.008400       OPERAT-KCEDP2B     DEFENTION FOLLOWING LOSS OF FORMER FROM CHANGESL 1008400     1.008400     1.008400     1.008400       OPERATOR FALLS TO SWITCH CHANGES TO ALTERNATE AND PUPLY-UNIT 2     1.008400     1.008400     1.008400       OPERATOR FALLS TO SWITCH CHANGES TO ALTERNATE AND PUPLY-UNIT 2     1.008400     1.008400     1.008400       OPERATOR FALLS TO CONTROL LOWERD WATER LAVEL WITH HYL DURING ATMS 3.008-01     1.008400     1.008400     1.008400       OPERATOR FALLS TO CONTROL RODE     DEREMAND RATUE TO CONTROL RODE     1.008400     1.008400     1.008400       NETHEN BALENT CONTROL RODE     LOSS OF OFFFITE FORER (SITE)     1.508-02     1.508-02     2.388-07       ACAC-14     LOSS OF OFFFITE FORER (SITE)     1.508-02     1.508-02     2.388-07       VAC-21     LOSS OF OFFFITE FORER (SITE)     1.508-02     2.368-07     3.465-01       VTE(S)     LOSS OF OFFFITE FORER (SITE)     1.508-02     1.508-02	}	X-AC-16H			1.69E-02	
DCP2BAT-XCDP2B     BATTERY BANK 3D DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER. 1008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     1.008-00     2.70	12	%TF14	INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM	3.50E-07	3.50E-07	3.50E-07
OPER-DC2BALT     OPERATOR FALLS TO SWITCH CHARGE TO ALTERNATE AC FORME SUPPLY-UNIT 2     1.008+00     2.708+00 </td <td>[</td> <td>DCP2BAT-XXDEP2B</td> <td>BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00</td> <td>1.00E+00</td> <td>1.00E+00</td> <td></td>	[	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
13     VT(T)     TUBBING TRIP INITIATOR     2.708+00	[	OPER-DC2BALT	OPERATOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER SUPPLY-UNIT 2	1.00E+00	1.00E+00	
OPER-DILUTEOPERATOR FAILS TO CONTROL LOWERED WAITER LEVEL WITH HPCI DURING ATMS3.088-011.008+00OPERATOR FAILS TO CONTROL LOWERED WAITER LEVEL WITH HPCI DURING ATMS3.008-011.008+00NECHATICAL SINDING OF CONTROL ADDERED WAITER LEVEL WITH HPCI DURING ATMS3.008-011.008+00NCP-COM2-151.008-051.008-051.008-024 TE (5)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-022.368-07DENOFAN-44FTSEXHCOMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START4.588-053.468-01154 TE (5)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-022.368-07DENOFAN-44FTSEXHCOMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START4.588-053.468-01164 TE (5)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-022.368-07174 TE (5)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-022.368-07184 TE (5)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-022.368-01174 TE (5)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-021.508-0218TITICZES/LOSS OF DUST THE ADM REMON-RECOVERABLE2.998-031.74E-0719EDGOLON-44-EDGSCOMMON CAUSE FAILURE OF ALM ALGM FOMER FOOM OFFORTE UNTT1.008+001.008+0010OFFRATOR FAILS TO MANDALLY ALGM FOMER FROM OFFORTE UNTT1.008+001.008+0010OFFRATOR FAILS TO MANDALLY ALGM FOMER FROM OFFORTE UNTT1.008+001.008+0010OFFRATOR FAILS TO MANDALLY ALGM FOMER FROM OF	13	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.70E-07
OPER-LLEVEL1 OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCID DURING ATMS3.00E-011.008+00RESIMUTAL LEVEL NUPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCID DURING ATMS3.00E-011.008+00RESIMUTAL NUPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCID DURING ATMS3.00E-011.008+0014WTE (S)LOSS OF OFFSITE FOWER (SITE)1.50E-021.50B-0215WTE (S)LOSS OF OFFSITE FOWER (SITE)3.46E-0116VTE (S)LOSS OF OFFSITE FOWER (SITE)1.50E-021.50E-0216VTE (S)LOSS OF OFFSITE FOWER (SITE)3.46E-0117VERONA CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START4.56E-0318VTE (S)LOSS OF OFFSITE FOWER (SITE)3.46E-0119COMMON CAUSE FAILURE OF 4 DF 4 DIESEL GENERATORS TO START7.22E-0510X-AC-2H1.50E-021.50E-0210TERCEN24COMMON CAUSE FAILURE OF 4 DF 4 DIESEL GENERATORS TO START7.22E-0510TICC22)LOSS OF DIES THE NUMER DAWN RECOVERABLE3.90E-0110TERCEN24COMMON CAUSE FAILURE OF ON DIESEL GENERATORS TO START1.00E+0010OPER-ALTUNITACOPERATOR FAILS TO ANNUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+0010OPER-ALTUNITACOPERATOR FAILS TO CONTROL LOWER VALURE2.90E-0110OPER-ALTUNITACOPERATOR FAILS TO CONTROL LOWER WAILWES2.70E+001.62E-0710TUREINE TRIP INITIATOR2.70E+001.62E-0710TUREINE TRIP INITIATOR2.70E+001.00E+00<	1	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
OPER-LLEVEL2     OPERATOR FAILS TO CONTROL LOWERE WATER LEVEL WITH RCIC DURING ATMS     3.00E-01     1.00E+00       RESCHARDLE INDING OF CONTROL RODE     1.00E+05     1.00E+05     1.00E+02       VAP-COM2-15     1.00E+02     1.00E+02     1.00E+02       DERIDFAN-44FTSEXH     COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START     4.58E+05     4.58E+05       X-AC-1H     1.50E+02     1.50E+02     1.50E+02     1.50E+02     2.38E+07       YAR-1B     LOSS OF OFFSITE FORMER (SITE)     1.50E+02     1.50E+02     2.38E+07       X-AC-1H     1.50E+02     1.50E+02 <td< td=""><td></td><td>OPER-LLEVEL1</td><td>OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS</td><td>3.00E-01</td><td>1.00E+00</td><td></td></td<>		OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
PF22MBIND     MECHANICAL BINDING OF CONTROL RODS     1.008-05       X0P-COM2-15     1.008-02     1.008-02       14     WTE(3)     LOSS OF OFFSITE FOWER (SITE)     1.508-02     2.38E-07       0GR0FAN-44FTSSUR     COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START     4.58E-05     4.58E-05       X-AC-1H     1.508-02     2.38E-07       X-AC-1H     1.508-02     2.36E-07       DGROGMA-44FTSSUR     COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START     4.58E-05     4.58E-05       X-AC-1H     1.508-02     2.36E-07     3.46E-01     3.46E-01       15     WTE(6)     LOSS OF OFFSITE FOWER (SITE)     1.508-02     2.36E-07       X-AC-2H     LOSS OF FILURE OF 4 0F 4 DIESEL GENERATORS TO START     7.22E-05     7.	1	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
XOP-COM2-15     1.008-02     1.008-02     1.008-02     2.388-07       W TE(S)     LOSS OF OFFSITE FONER (SITE)     1.508-02     2.388-07       DGROFAN-44FYSEXH     COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START     4.588-05     3.468-01       15     WTE(S)     LOSS OF OFFSITE FONER (SITE)     1.508-02     2.388-07       DGROFAN-44FYSEXH     COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START     4.588-05     3.468-01       16     WTE(S)     LOSS OF OFFSITE FONER (SITE)     1.508-02     2.368-07       X-AC-1H     1.508-02     2.368-07     3.468-01       16     WTE(S)     LOSS OF OFFSITE FONER (SITE)     1.508-02     2.368-07       PEDGODGN-44-2DOS     COMMON CAUSE FAILURE OF A OF A DIESEL GENERATORS TO START     7.228-05     7.228-05       Y T(DC282)     LOSS OF DIES THA ARE NON-RECOVERABLE     3.008-01     1.008+00     1.008+00       DEDGEDGN-24-DG34K     COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4     1.958-02     1.958-02       OFER-DUTT     TRENTION FAILS TO ANITALLY ALION POWER FROM OPPOSITE UNIT     1.008+00     1.008+00       OFER-DCALTOC2     OFERATOR FAILS T		RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
14   4 TE (5)   LOSS OF OFFSTE FOMER (SITE)   1.50E-02   2.38E-07     DGROPAN-44FYSEXH		XOP-COM2-15			1.00E-02	
DEMOFRAN-44FTSEXH     COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START     4.58E-05     3.46E-01       15     WTE(S)     LOSS OF OFFSITE FOWER (SITE)     1.50E-02     2.38E-07       15     WTE(S)     LOSS OF OFFSITE FOWER (SITE)     1.50E-02     2.36E-01       16     WTE(S)     LOSS OF OFFSITE FOWER (GITE)     1.50E-02     2.36E-01       16     WTE(S)     LOSS OF OFFSITE FOWER (GITE)     1.50E-02     2.36E-01       17     T(C222)     LOSS OF 125V DC PANEL 2B2     2.90E-03     2.90E-03     2.90E-03       17     T(C222)     LOSS OF 125V DC PANEL 2B2     2.90E-03     1.95E-02     1.95E-02       17     T(C223)     LOSS OF 125V DC PANEL 2B2     2.90E-03     1.96E-01     3.90E-01       18     WT(T)     PRACTION OF LOSS OF BUS TEAT ARE NON-RECOVERABLE     3.90E-01     1.00E+00       18     T(T)     TURKINE TRIP INITIATOR     2.70E+00     1.62E-07       18     T(T)     OPERATOR FAILS TO CONTROL ROD DRIVE SCRAM VALVES     6.00E-06     6.00E-06       0PER-LLEVELI     OPERATOR FAILS TO CONTROL LOWERDE MATER LEVEL WITH HPCI DURING ATWS     3.00E-01	14	%TE(S)	loss of offsite power (site)	1.50E-02	1.50E-02	2.38E-07
X-AC-1H     3.462-01       15     NTE(5)     LOSS OF OFFSITE POWER (SITE)     1.502-02     2.582-02     2.382-01       16     NTE(5)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.502-02     2.382-01       16     NTE(5)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.502-02     2.362-07       17     NTE(5)     LOSS OF 125V DC PANEL 2B2     2.902-03     2.902-03     1.74E-07       17     NT(10C2B2)     LOSS OF DISS THAT ARE NON-RECOVERABLE     3.902-01     1.905E-02     1.958-02       17     NT(10C2B2)     LOSS OF DEUS THAT ARE NON-RECOVERABLE     3.902-01     1.0024-00     1.0024-00       18     WT(7)     OPERATOR FAILS TO ALIGN DC BUS TO STANT     1.0024-00     1.0024-00     1.0024-00       18     WT(7)     TUBEINE TREIP INITIATOR     2.7024-003     1.0024-00     1.0024-00       19     OPER-LIEVELI     OPERATOR FAILS TO PRECLUDE BOKON WASHOT DURING LOW PRESSURE INJECTION     4.302-02     1.0024-00       18     WT(7)     TUBEINE TREIP INITIATOR     2.7024-00     1.0024-00     1.0024-00       OPER-LIEVEL1     <		DGH0FAN-44FTSEXH	COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START	4.58E-05	4.58E-05	
15   TTE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   2.38E-07     X-AC-1H		X-AC-1H			3.46E-01	
DGHOFAN-44FTSSUP     COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START     4.58E-05     3.45E-05       16     4TE(S)     LOSS OF OFFSITE FOWER (SITE)     1.50E-02     1.50E-02     2.36E-07       16     4TE(S)     LOSS OF OFFSITE FOWER (SITE)     1.50E-02     2.36E-07       2.AC-2H     2.90E-03     2.90E-03     2.90E-03     2.90E-03     2.90E-03     2.90E-03     1.74E-07       BUSCALL     FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE     3.90E-01     3.90E-01     3.90E-01     1.00E+00       COPER-ALTUNITXC     OPERATOR FAILS TO NANNALLY ALIGN POWER FROM OPPOSITE UNIT     1.00E+00     1.00E+00     1.00E+00       COPEC-COM2-16     COMMON CAUSE FAILURE OF CONTROL SCOM WASHOUT DURING LOW PRESSURE SUPPLY - UNIT2     3.00E-01     1.00E+00       CDESCRAM     PAILURE OF CONTROL ROD DRIVE SCRAM VALVES     6.00E+06     6.00E+06     6.00E+06       OPER-LLEVEL     OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION     4.30E+02     1.00E+00       VOP-COM2-15     OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS     3.00E+01     1.00E+00       VOP-COM2-15     DEGZDGN-24+D234R     OPERATORS FAIL TO MANUALY ALIGN	15	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
x-Ac-1H   3.46E-01     16   NTE(s)   LOSS OF OFFSITE FOWER (SITE)   1.50E-02   2.36E-07     EDGODEM-44-EDGS   COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START   7.22E-05   7.22E-05     x-AC-2H   2.1085-01   2.90E-03   2.90E-03   2.90E-03     INT (DC2B2)   LOSS OF 125V DC PANEL 2B2   2.90E-03   2.90E-03   3.90E-01     BUSFAULT   FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE   3.90E-01   3.90E-01     COMEDA-C4-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02     OPER-ALTUNITXC   OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC FOWER SUPFLY - UNIT2   3.00E-01   1.00E+00     XOP-COM2-16   TURBINE TRIP INITIATOR   2.70E+00   2.70E+00   2.70E+00     CR02SCRAM   FAILURE OF CONTROL ROD DRIVE SCRAM VALVES   6.00E-06   6.00E-06   1.00E+00     OPER-LLEVEL   OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS   3.00E-01   1.00E+00     OPER-LLEVEL   OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS   3.00E-01   1.00E+00     VET(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.55E-07  <		DGH0FAN-44FTSSUP	COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START	4.58E-05	4.58E-05	
16   TEGODRS-44-EDGS   1.50E-02   1.50E-02   2.36E-07     EDGODRS-44-EDGS   COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START   7.22E-05   7.22E-05   7.22E-05     X-AC-2H   FIG2B2   LOSS OF 125V DC PANEL 2B2   2.90E-03   2.90E-03   3.90E-01     BUSFAULT   FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE   3.90E-01   3.90E-01   3.90E-01     BUSFAULT   FRACTION OF LOSS OF DUS THAT ARE NON-RECOVERABLE   3.90E-01   3.90E-01   1.00E+00     COPER-ALTUNITYC   OPERATORS FAIL TO MANUALLY ALICE POWER FROM OPPOSITE UNIT   1.00E+00   1.00E+00     COPER-DCPALTDC   OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2   3.00E-01   1.00E+00     COPER-DCPALTDC   OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2   3.00E-01   1.00E+00     COPER-DLIFUE   OPERATOR FAILS TO CONTROL LOWER SCAM VALVES   6.00E-06   6.00E-06     OPER-LLEVEL1   OPERATOR FAILS TO CONTROL LOWER DATER LEVEL WITH HCCI DURING ATMS   3.00E-01   1.00E+00     OPER-ALTUNITXC   OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HCCI DURING ATMS   3.00E-01   1.00E+00     VOP-CALIEVEL1   OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATMS		X-AC-1H	· · · · · · · · · · · · · · · · · · ·		3.46E~01	
EDGODGM-44-EDGS X-AC-2HCOMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START7.22E-05 2.18E-0117\$T(DC2B2)LOGS OF 125V DC PANEL 2B22.90E-032.90E-031.74E-07BUSFNULT EDG2DGM-24-DG34RFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-011.05E-02OPER-ALTUNITXC OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC FOWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-16OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC FOWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-16TUBEINE TRIP INITIATOR CRD2SCRAM2.70E+001.62E-070FER-DILITE CRESCRAMOPERATOR FAILS TO PRECLUDE BORN WASHOUT DURING LOW PRESSURE INJECTION4.30E-021.00E+000FER-LLEVEL1 OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HECL DURING ATWS3.00E-011.00E+000FER-LLEVEL2 OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HECL DURING ATWS3.00E-011.00E+000FER-LLEVEL1 OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS3.00E-011.00E+000FER-LLEVEL2 OPERATOR FAILS TO CONTROL CON TROL LOWERED WATER LEVEL WITH RCIC DURING ATWS3.00E-011.00E+0019\$TTE(5)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.55E-0719\$TTE(5)LOSS OF OFFSITE POWER (SITE)1.00E+001.00E+001.00E+0010COPERAT-KXDEP2ACOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.50E-021.50E-0210\$TTTETUBENTE TRIP INITIATOR2.70E+1001.00E+001.00E+001.00E+0	16	%TE(S)	loss of offsite power (site)	1.50E-02	1.50E-02	2.36E-07
X-AC-2H   2.18E-01     17   \$\phi\$ (DC2B2)   LOSS OF 125V DC PANEL 2B2   2.90E-03   2.90E-03   1.74E-07     BUSFAULT   FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE   3.90E-01   3.90E-01   1.00E+00     DEGZDGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02     OPER-DCPAITDC2   OPERATORS FAIL TO MANUALLY ALIGN FOWER FROM OPFOSITE UNIT   1.00E+00   7.90E-03     18   \$\pmathbf{T}(T)   TURBINE TRIP INITIATOR   2.70E+00   2.70E+00   1.62E-07     0PER-LILVEL   OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION   4.30E-02   1.00E+00     0PER-LLEVEL1   OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS   3.00E-01   1.00E+00     0PER-LLEVEL1   OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS   3.00E-01   1.00E+00     0PER-LLEVEL1   OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS   3.00E-01   1.00E+00     0PER-LLEVEL2   OPERATOR FAILS TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.50E-02   1.55E-07     19   \$\pmathbf{T}(T)   TURBINE TRIP DOWER (SITE)   1.00E+00   1.00E+00   2.95E-02		EDG0DGN-44-EDGS	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START	7.22E-05	7.22E-05	
17   #T(DC2B2)   LOSS OF 125V DC PANEL 282   2.90E-03   2.90E-03   2.90E-03   1.74E-07     BUSFAULT   FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE   3.90E-01   3.90E-01   3.90E-01     COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02   1.95E-02     OPER-ALTUNITXC   OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC FOWER SUPFLY - UNIT2   3.00E-01   1.00E+00     XOP-COM2-16   TURBINE TRIP INITIATOR   2.70E+00   2.70E+00   1.62E-07     CRD2SCRAM   FAILURE OF CONTROL ROD DRIVE SCRAM VALVES   6.00E-06   6.00E-06   6.00E-06     OPER-LLEVEL1   OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION   4.30E-02   1.00E+00     OPER-LLEVEL2   OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS   3.00E-01   1.00E+00     NOP-COM2-15   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.55E-02   1.55E-07     19   \$T(5)   LOSS OF OFFSITE FOWER (SITE)   1.50E-02   1.50E-02   1.55E-02     100F-ALTUNITXC   OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT   1.00E+00   1.00E+00   1.00E+00     100F-ALIZUPLA   OPERATOR FAILS TO CONTROL LOWERE SOF POWER FROM C		X-AC-2H			2.18E-01	
BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-01EDG2DCN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-02OPER-DEPAITDC2OPERATOR FAILS TO ALIGN DE BUS TO STANDBY DE POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DEPAITDC2OPERATOR FAILS TO ALIGN DE BUS TO STANDBY DE POWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-16TURBINE TRIP INITIATOR2.70E+001.62E-07CRD2SCRAMFAILURE OF CONTROL ROD DENVE SCRAM VALVES6.00E-066.00E-06OPER-DILUTEOPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION4.30E-021.00E+00OPER-LEVEL2OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HCI DURING ATWS3.00E-011.00E+00OPER-LEVEL2OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HCI DURING ATWS3.00E-011.00E+00XOP-COM2-15ILOSS OF OFFSITE POWER (SITE)1.00E-021.50E-021.55E-07194TE(S)LOSS OF OFFSITE POWER (SITE)1.00E+001.00E+001.00E+00DEG2DEN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.55E-0710DEG2DEN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.55E-0710DEG2DEN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.55E-0710DEG2DEN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.55E-0710DEG2DEN-24-DG34RCOMMON CAUSE FAILURE OF CHANGE	17	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.74E-07
EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-02OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00XOP-COM2-16		BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00XOP-COM2-16OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+0018%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+001.62E-07OPER-DILUTEOPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION4.30E-021.00E+00OPER-LLEVEL1OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS3.00E-011.00E+00OPER-LLEVEL2OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS3.00E-011.00E+00XOP-COM2-15I.50S OF OFFSITE POWER (SITE)1.50E-021.50E-021.50E-0219%TE(S)LOSS OF OFFSITE POWER (SITE)1.00E+001.00E+001.00E+00XOP-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00XOP-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00XOP-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN FOWER FROM OPPOSITE UNIT1.00E+001.00E+00XOP-ALTUNITXCUNGENGE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-071.60E-0220%T(T)TUREINE TRIP INITIATOR2.30E-011.00E+00NCP2BET-XKDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+00NCP2BET-XKDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001SOS OF OFFSITE POWER (SITE)1.50E-021.47E-07NC12DP-FR-RCTDP <td< td=""><td></td><td>EDG2DGN-24-DG34R</td><td>COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4</td><td>1.95E-02</td><td>1.95E-02</td><td></td></td<>		EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
OPER-DCPAITDC2 XOP-COM2-16OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+0018%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+001.62E-07CRD2SCRAMFAILURE OF CONTROL ROD DRIVE SCRAM VALVES6.00E-066.00E-066.00E-06OPER-DLUTEOPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION4.30E-021.00E+00OPER-LLEVEL1OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS3.00E-011.00E+00OPER-LLEVEL2OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS3.00E-011.00E+00IO0E-02ISS OF OFFSITE POWER (SITE)1.50E-021.50E-021.55E-0710EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RNN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-0210VC-ALTUNITXCOPERATOR SFAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+002.95E-0220%T(T)TURBINE TRIP INITIATOR2.70E+001.02E+001.02P2BGT-34A12252COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-0721%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0721*TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-054.50E-051.47E-0721*TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-051.47E-0721*TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0722*TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-054.50E-0523LOSS OF	1	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
XOP-COM2-167.90E-0318%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+001.62E-07CRD2SCRAMFAILURE OF CONTROL ROD DRIVE SCRAM VALVES6.00E-066.00E-061.00E+00OPER-DILUTEOPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION4.30E-021.00E+00OPER-LLEVEL1OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS3.00E-011.00E+00XOP-COM2-15	1	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
18   \$T(T)   TURBINE TRIP INITIATOR   2.70E+00   2.70E+00   1.62E-07     CRD2SCRAM   FAILURE OF CONTROL ROD DRIVE SCRAM VALVES   6.00E-06   6.00E-06   6.00E-06     OPER-DILTE   OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION   4.30E-02   1.00E+00     OPER-LLEVEL1   OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HECI DURING ATWS   3.00E-01   1.00E+00     XOP-COM2-15   1.50E-02   1.50E-02   1.50E-02   1.50E-02     19   \$TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.50E-02     0PER-ALTUNITXC   OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT   1.00E+00   2.95E-02   1.50E-02   1.47E-07     DCP2BAT-XXDEP2A   BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00   1.00E+00   1.00E+00   1.47E-07     DCP2REC-34A1A2E2   COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2   2.37E-07   2.37E-07   2.37E-07     21   \$TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     DCP2REC-34A1A2E2   COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2   2.37E-07   2.37E-07     RCI2TDP-FR-RCTDP   RCIC TURBINE-DRIVEN PUMP FAILS TO R		XOP-COM2-16			7.90E-03	
CRD2SCRAMFAILURE OF CONTROL ROD DRIVE SCRAM VALVES6.00E-066.00E-06OPER-DILUTEOPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION4.30E-021.00E+00OPER-LLEVEL1OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HCI DURING ATWS3.00E-011.00E+00OPER-LLEVEL2OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HCI DURING ATWS3.00E-011.00E+00XOP-COM2-151.50E-021.50E-021.50E-021.50E-0219\$TE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.55E-07EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-021.55E-07VOP-ALTUNITXCOPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+002.95E-021.80E-021.47E-072.70E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-07RC12TDP-FR-RCTDPRC1C TURBINE-DRIVEN PUMP FAILS TO RUN2.30E-012.30E-012.30E-0121\$TE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-07EDG0CKV-44-CAALLCOMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-054.50E-054.50E-052TTE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.47E-071.47E-0722TE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0723EDG0CKV-44-CAALLCOMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK	18	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.62E-07
OPER-DILUTEOPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION4.30E-021.00E+00OPER-LLEVEL1OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS3.00E-011.00E+00NOP-COM2-15	1	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
OPER-LLEVEL1OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS3.00E-011.00E+00OPER-LLEVEL2OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS3.00E-011.00E+00XOP-COM2-151.50E-021.50E-021.50E-021.50E-0219%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.55E-07EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-021.95E-02VOPER-ALTUNITIKCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+002.95E-02XOP-ALTUNITIKCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+002.95E-021.47E-07DCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2E2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.30E-012.30E-01RC12TDP-FR-RCTDPRCIC TURBINE-DRIVEN PUMP FAILS TO RUN2.30E-012.30E-012.30E-0121%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-07EDG0CKV-44-CAALL X-AC-2HCOMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4:50E-054.50E-052.30E-012.30E-011.50E-021.47E-0724YTE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.47E-07EDG0CKV-44-DALL X-AC-2HCOMMON CAUSE FAILURE OF ALL DAY T		OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
OPER-LLEVEL2 XOP-COM2-15OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS3.00E-011.00E+00 1.00E-0219%TE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.55E-07EDG2DGN-24-DG34R OPER-ALTUNITXC X-AC-2HCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-0220%T (T) DCP2BAT-XXDEP2A A DETERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+0021%TE (S) EDG0CKV-44-CAALL X-AC-2HCOMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.30E-012.30E-0121%TE (S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0722%TE (S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0722%TE (S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0723%TE (S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0724%TE (S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0724%TE (S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0721%TE (S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0724%TE (S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0725%TE (S) EDG0CKV-44-DALL X-AC-		OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
XOP-COM2-15   1.008-02     19   %TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.55E-07     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02   1.55E-07     VOPER-ALTUNITXC   OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT   1.00E+00   1.00E+00   2.95E-02     XOP-ALTUNITXC   OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT   1.00E+00   2.95E-02     XOP-ALTUNITXC   OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT   1.00E+00   2.95E-02     XOP-ALTUNITXC   DEPRATORS FAIL TO MANUALLY ALIGN POWER FROM CHARGER1.00E+00   1.00E+00   2.00E+00     20   %T(T)   TURBINE TRIP INITIATOR   2.70E+00   2.70E+00   1.47E-07     DCP2BEC-34AIA2B2   COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2   2.37E-07   2.30E-01   2.30E-01     21   %TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     EDG0CKV-44-CAALL   COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4:50E-05   4.50E-05   2.18E-01     22   %TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07 <t< td=""><td></td><td>OPER-LLEVEL2</td><td>OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS</td><td>3.00E-01</td><td>1.00E+00</td><td></td></t<>		OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
19   4TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     20   4T (T)   TURBINE TRIP INITIATOR   2.30E-01   2.47E-07   EDG0CKV-44-CAALL   COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-05   4.50E-05   4.50E-05   2.18E-01     21   & TE (S) </td <td></td> <td>XOP-COM2-15</td> <td></td> <td></td> <td>1.00E-02</td> <td></td>		XOP-COM2-15			1.00E-02	
EDG2DGN-24-DG34R OPER-ALTUNITXC X-AC-12HCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-02X-AC-12H XOP-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00X-AC-12H XOP-ALTUNITXCTURBINE TRIP INITIATOR DCP2BAT-XXDEP2A2.70E+002.70E+001.47E-0720%T(T) DCP2BAT-XXDEP2ATURBINE TRIP INITIATOR BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2 RC12TDP-FR-RCTDPCOMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-0721%TE(S) EDG0CKV-44-CAALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0722%TE(S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0722%TE(S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0723KTE(S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0723KTE(S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-07	19	%te(s)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.55B-07
OPER-ALTUNITXC X-AC-12H XOP-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+00 2.95E-02 1.80E-0220%T(T)TURBINE TRIP INITIATOR DCP2BAT-XXDEP2A2.70E+002.70E+001.47E-07DCP2BAT-XXDEP2A DCP2EAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2 RC12TDP-FR-RCTDPCOMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-07RC12TDP-FR-RCTDPRCIC TURBINE-DRIVEN PUMP FAILS TO RUN2.30E-012.30E-0121%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-07EDG0CKV-44-CAALL X-AC-2HCOMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-054.50E-051.47E-0722%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0722%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0722%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0721%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0721%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0721%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0722%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-052.18E-0122%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-052.18E-0523LOSS OF OFFSITE POWER (SITE)1		EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
X-AC-12H   2.95E-02     XOP-ALTUNITXC   1.80E-02     20   %T (T)   TURBINE TRIP INITIATOR   2.70E+00   1.47E-07     DCP2BAT-XXDEP2A   BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00   1.00E+00   1.00E+00     DCP2REC-34A1A2B2   COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2   2.37E-07   2.30E-01     RCI2TDP-FR-RCTDP   RCIC TURBINE-DRIVEN PUMP FAILS TO RUN   2.30E-01   2.30E-01     21   %TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     EDG0CKV-44-CAALL   COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-05   4.50E-05     X-AC-2H   2.18E-01   1.50E-02   1.47E-07     22   %TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     22   %TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     24   *TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     24   *TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     25   *TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     24   *TE (S)	ŀ	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
XOP-ALTUNITXC1.80E-0220%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+001.47E-07DCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-07RC12TDP-FR-RCTDPRCIC TURBINE-DRIVEN PUMP FAILS TO RUN2.30E-012.30E-0121%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-07EDG0CKV-44-CAALLCOMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-054.50E-052.18E-0122%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-07EDG0CKV-44-DALLCOMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES4.50E-054.50E-05X-AC-2H2.18E-012.18E-012.18E-01	1	X-AC-12H			2.95E-02	
20%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+001.47E-07DCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-07RCI2TDP-FR-RCTDPRCIC TURBINE-DRIVEN PUMP FAILS TO RUN2.30E-012.30E-0121%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-02EDG0CKV-44-CAALLCOMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-054.50E-05X-AC-2H2.38E-011.50E-021.47E-0722%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-07EDG0CKV-44-DALLCOMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES4.50E-054.50E-051.47E-07X-AC-2H2.38E-012.38E-012.38E-012.38E-01	1	XOP-ALTUNITXC			1.80E-02	
DCP2BAT-XXDEP2A DCP2REC-34A1A2B2BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+00DCP2REC-34A1A2B2 RCI2TDP-FR-RCTDPCOMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-07RCI2TDP-FR-RCTDP RCIC TURBINE-DRIVEN PUMP FAILS TO RUN2.30E-012.30E-012.30E-0121%TE(S) EDG0CKV-44-CAALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0722%TE(S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0722%TE(S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.47E-0724%TE(S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0723%TE(S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-0724%TE(S) EDG0CKV-44-DALL X-AC-2HLOSS OF OFFSITE POWER (SITE)1.50E-021.47E-07	20	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.47E-07
DCP2REC-34A1A2B2   COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2   2.37E-07   2.37E-07     RCI2TDP-FR-RCTDP   RCIC TURBINE-DRIVEN PUMP FAILS TO RUN   2.30E-01   2.30E-01     21   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02     EDG0CKV-44-CAALL   COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-05   4.50E-05     X-AC-2H   2.38E-01   2.38E-01     22   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     EDG0CKV-44-DALL   COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES   4.50E-05   2.18E-01     22   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     EDG0CKV-44-DALL   COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES   4.50E-05   2.18E-01     X-AC-2H   2.18E-01   2.18E-01   2.18E-01		DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
RC12TDP-FR-RCTDP   RCIC TURBINE-DRIVEN PUMP FAILS TO RUN   2.30E-01   2.30E-01     21   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     EDG0CKV-44-CAALL   COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-05   4.50E-05   2.18E-01     22   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     22   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     EDG0CKV-44-DALL   COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES   4.50E-05   4.50E-05     X-AC-2H   2.18E-01   2.18E-01   2.18E-01		DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
21   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     EDG0CKV-44-CAALL   COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-05   4.50E-05   2.18E-01     22   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     22   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     EDG0CKV-44-DALL   COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES   4.50E-05   4.50E-05     X-AC-2H   2.18E-01   2.18E-01	1.	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
EDG0CKV-44-CAALL COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL 4.50E-05 X-AC-2H 22 %TE(S) LOSS OF OFFSITE POWER (SITE) 1.50E-02 1.50E-02 1.47E-07 EDG0CKV-44-DALL COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES 4.50E-05 4.50E-05 X-AC-2H 2.18E-01	21	%te(s)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
X-AC-2H   2.18E-01     22   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     EDGOCKV-44-DALL   COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES   4.50E-05   4.50E-05     X-AC-2H   2.18E-01	1	EDGOCKV-44-CAALL	COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL	4.50E-05	4.50E-05	
22     %TE(S)     LOSS OF OFFSITE POWER (SITE)     1.50E-02     1.50E-02     1.47E-07       EDGOCKV-44-DALL     COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES     4.50E-05     4.50E-05     2.18E-01	1	X-AC-2H			2.18E-01	
EDG0CKV-44-DALL COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES 4.50E-05 4.50E-05 2.18E-01	22	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
X-AC-2H 2.18E-01	1	EDGOCKV-44-DALL	COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES	4.50E~05	4.50E-05	
		X-AC-2H			2.18E-01	

#     Inputs     Description     Rate     Exposure     Event Prob     Probability       23     YTE(6)     LOSS OF OFFSITE FOWER (SITE)     I.SOB-02     1.50B-02     1.47E-07       230     YTE(6)     LOSS OF OFFSITE FOWER (SITE)     I.SOB-02     1.50B-02     1.47E-07       24000CW-44-DCPCC     COMMON CAUSE FAILURE OF CHECK VALUE V241, V277, V313, AND V349     4.50B-05     2.16B-02     1.47E-07       24000CW-44-DLAL     COMMON CAUSE FAILURE OF CHECK VALUE V241, V277, V313, AND V349     4.50B-05     1.50B-02     1.47E-07       24000CW-44-URALL     COMMON CAUSE FAILURE OF CHECK VALUE V150, V166, V222, AND V258     4.50B-05     1.47E-07       25000CW-44-URALL     COMMON CAUSE FAILURE OF ALL DD UMP DISCHARGE CHECK VALVES     4.50B-02     1.47E-07       25000CW-44-URALL     LOSS OF OFFFITE POWER (SITE)     1.50B-02     1.47E-07     2.18E-01       25000CW-44-URALL     LOSS OF OFFFITE POWER (SITE)     1.50B-02     1.50B-02     1.47E-07       25000CW-44-URALL     LOSS OF OFFFITE POWER (SITE)     1.50B-05     1.50B-05     1.50B-05     1.50B-05     1.50B-05     1.47E-07       25000CW-44-DALL     LOSS OF OFFFITE POWER (S		)	)			)
23     ENE(6)     LOS OF OFFSTER PORER (STEP)     1.50E-02     1.50E-02 </th <th>#</th> <th>Inputs</th> <th>Description Rate</th> <th>Exposure</th> <th>Event Prob</th> <th>Probability</th>	#	Inputs	Description Rate	Exposure	Event Prob	Probability
EDGOLCKV-44-DECKV     COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN     4.508-05     4.508-05       24     VTR(6)     LOSS OF OFFSTTE FORMER (STTE)     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02       24     VTR(6)     LOSS OF OFFSTTE FORMER (STTE)     1.508-02     1.508-02     1.508-02     1.508-02     1.508-05       24     VTR(6)     LOSS OF OFFSTTE FORMER (STTE)     1.508-02 <td>23</td> <td>%TE (S)</td> <td>LOSS OF OFFSITE POWER (SITE)</td> <td>1.50E-02</td> <td>1.50E-02</td> <td>1.47E-07</td>	23	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
x - AC-2H     2.188-01       4 YET (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.508-02     1.478-07       25 \$\frac{1}{2}\$ YET (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       25 \$\frac{1}{2}\$ YET (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       25 \$\frac{1}{2}\$ YET (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       25 \$\frac{1}{2}\$ YET (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       2 * TE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       2 * TE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       2 * TE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       2 * AC-2H     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       2 * AC-2H     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       2 * AC-2H     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.478-07       2 * SUSCAV-44-DOLL     COMMON CAUSE FAILURE OF ALL (M/A)     1.508-02     1.478-07       2 * SUSCAV-44-DOLL     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.608-02 <td></td> <td>EDG0CKV-44-DCPCV</td> <td>COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN</td> <td>4.50E-05</td> <td>4.50E-05</td> <td></td>		EDG0CKV-44-DCPCV	COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN	4.50E-05	4.50E-05	
24     YTE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.508-02     1.508-02     1.47E-07       EDGOCKV-44-DLALL     COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349     5.508-05     5.508-05     2.188-01       2     YTE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.508-02     1.47E-07       2     YTE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.608-02     1.47E-07       2     YTE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.608-02     1.47E-07       2     YTE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.608-02     1.47E-07       2     YTE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.608-02     1.47E-07       2     YTE (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.608-02     1.47E-07       2     YTE (S)     LOSS OF OFFSITE POWER (SITE)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.608-02     1.47E-07       2     YTE (S)     LOSS OF OFFSITE POWER (SITE)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.608-01     1.47E-07       2	1	X-AC-2H			2.18E-01	
EDGOCKV-44-DIALL     COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349     4.505-05     4.508-05       25     VTT (3)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.502-02     1.478-07       25     VTT (5)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.502-02     1.478-07       26     VTT (5)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.502-02     1.478-07       2188-01     LOSS OF OFFSITE POWER (SITE)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       2188-01     LOSS OF OFFSITE POWER (SITE)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       2188-01     LOSS OF OFFSITE POWER (SITE)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       2188-01     LOSS OF OFFSITE POWER (SITE)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       2188-01     LOSS OF OFFSITE POWER (SITE)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       2188-01     LOSS OF OFFSITE POWER (SITE)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       2188-01     LOSS OF OFFSITE POWER (SITE)     LOSS OF OFFSITE POWER (SITE)     1.502-01     1.5	24	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
x.Ac-2H     2.188-01     2.188-01       Strigs     1.502-02     1.502-02     1.502-02     1.478-07       EDGOCKV-44-URALL     COMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V258     4.502-05     4.502-05       26     VTT(S)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       26     VTT(S)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       27     VTT(S)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       27     VTT(S)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       28     VTT(S)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       28     VTT(C)     LOSS OF OFFSITE POWER (SITE)     1.502-02     1.478-07       29     VTT     INTERNAL FLOOD TF7: FAILS NLL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES     4.502-05     1.588-02       29     VTT     INTERNAL FLOOD TF7: FAILS VALUER OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES     4.502-05     1.468-07       2000000000000000000000000000000000000	1	EDGOCKV-44-DLALL	COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349	4.50E-05	4.50E-05	
25   *TT (3)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     EDGOCKV-44-UPALL X-AC-2R   COMMON CAUSE FAILURE OF CHECK VALVE VISO, VISG, V222, AND V258   4.50E-02   1.50E-02   1.47E-07     21   *TT (5)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     21   *TT (5)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     27   *TT (5)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     27   *TT (5)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     28   *TT (5)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.47E-07     29   *TT (5)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.47E-07     29   *TT7   INTERNAL FLOOD TF7: FAILS ALL PUMES AF -17 LEVEL   1.50E-01   1.50E-01   1.50E-01   1.50E-01   1.46E-07     29   *TT7   INTERNAL FLOOD TF7: FAILS ALL PUMES AF -17 LEVEL   1.50E-01		X-AC-2H			2.18E-01	
EDGOCKV-44-PNALLCOMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V2584.508-052.188-01264TE(S)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-021.478-07274TE(S)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-021.478-07284TE(S)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-021.478-07294TE(S)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-021.478-072000KV-44-CALLCOMMON CAUSE FAILURE OF ALL UNIT 1 6 2 DG COOLING SUPPLY CHECK VALVES2.188-012.188-0128VTE(S)LOSS OF OFFSITE FOWER (SITE)1.508-021.508-021.478-0729VTF7INTERNAL FLOOD TF7: FAILS ALL FUMPS AT -17 LEVEL1.508-021.508-021.478-0720VTC(1)LOSS OF COMDENSE VALUUM1.858-111.558-051.468-0720OFER-FWS-INJOFERATORS FAIL TO PROPERLY CONTROL CONDENSATE INJECTION FLOW NATE3.008-011.008-0020VTC(1)LOSS OF COMDENSER VALUUM1.808-011.808-021.008-0021INTERNAL FLUEND-DRIVEN FUMP FAILS TO RUN1.808-011.808-011.808-011.808-0121COMMON CAUSE FAIL TO PROPERLY CONTROL CONDENSATE INJECTION FLOW NATE3.008-011.808-011.808-0221INTERNAL FULUNT FUENT	25	%te(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
x-AC-2H     2.188-01       4 TT (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.508-02     1.508-02     1.508-02       2 T     TT (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.508-02     1.508-02     1.508-02       2 T     TT (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-02     1.508-05     2.188-01       2 T     TT (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.508-05     2.108-01     2.108-01       2 T     TT (S)     LOSS OF OFFSITE POWER (SITE)     1.508-02     1.008-00     2.108-01       2 T     TT (S)     LOSS OF OFFSITE POWER (SITE)     1.508-05     1.558-05     1.558-05     1.558-05     1.558-05     1.558-05     1.508-02     1.008-01       2 T     TT (T)     INTERNAL PLOOD TF7: FAILS ALL PUMER AT INTECTION FLOW (ORE UNIT)     5.008-03     1.008-01     1.008-01		EDGOCKV-44-DWALL	COMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V258	4.50E-05	4.50E-05	
26   4TE (S)   LOSS OF OFFSTTE POWER (SITE)   1.50E-02   1.50E-02   1.50E-02   1.50E-02     X-AC-2H   LOSS OF OFFSTTE POWER (SITE)   1.50E-02   1.50E-02   1.50E-02   1.50E-02     X-AC-2H   LOSS OF OFFSTTE POWER (SITE)   1.50E-02   1.50E-02   1.50E-02   1.50E-02     X-AC-2H   LOSS OF OFFSTTE POWER (SITE)   1.50E-02   1.50E-02   1.50E-02   1.47E-07     X-AC-2H   LOSS OF OFFSTTE POWER (SITE)   1.50E-05   4.50E-05   4.50E-05   4.50E-05   1.47E-07     SWSGCK-44-PORAL   COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES   1.50E-05   1.46E-07     9   NT7   INTERNAL FLOOD TF7: FAILS ALL FUMPS AT -17 LEVEL   1.55E-05   1.60E-02   1.00E+00     0   OFERATOR FAIL TO POPERLY CONTROL CONDENSATE INJECTION FLOW RATE   3.00E-01   1.00E+00   9.40E-03     0   TACC2D-F-FR-HPTDP   HCI TURBINE-DRIVEN PUMP FAILS TO RUN   1.60E-01   1.30E-07   1.30E-07     1A7C(7)   LOSS OF CONDENSER VACUM   COMMON CAUSE FAILURE PAILER OF ALL SRY AIR CHECK VALVES TO OPEN   4.50E-05   4.50E-05   1.30E-07     1A7C(7)   LOSS OF CONDENSER VACUM   COMMON CAUSE FA		X-AC-2H			2.18E-01	
EDGGCKC-4-4-VDALL     COMMON     CAUSE FAILURE OF ALL DD FUND DISCHARGE CHECK VALVES     4.508-05     2.188-01       27     4TS(S)     LOSS OF OFFSITE FOWER (SITE)     1.508-02     1.508-02     1.508-02     1.478-07       2.4C-2H     COMMON CAUSE FAILURE OF ALL (8/8) FUEL OIL TRANSFER FUNMES CV TO OPEN     4.508-05     4.508-07     0.008-01     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00     1.008+00	26	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
X-AC-2H   1.658-02   1.508-02   1.608-01     X-AC-2H   1.658-02   1.508-02   1.608-05     28   WTE(S)   LOSS OF OFFSITE FOWER (SITE)   1.608-02   1.608-02   1.608-02     28   WTE(S)   LOSS OF OFFSITE FOWER (SITE)   1.608-02   1.608-02   1.608-02   1.47E-07     28   WTE(S)   LOSS OF OFFSITE FOWER (SITE)   1.508-02   1.508-02   1.608-02   1.47E-07     29   WTF7   INTERNAL FLOOD TF7: FAILS ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES   1.508-02   1.608-00   2.168-01     29   WTF7   INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL   1.558-05   1.608-00   2.108-01     20   CPER-FPS1   OPERATOR FAIL TO PROPENLY CONTROL CONDENSATE INJECTION FLOW (ONE UNIT)   9.608-03   3.008-01   1.80		EDGOCKV-44-VDALL	COMMON CAUSE FAILURE OF ALL DD PUMP DISCHARGE CHECK VALVES	4.50E-05	4.50E-05	
27   *TE(S)   LOSS OF OPFSITE FORER (SITE)   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.502-02   1.47E-07     28   *TE(S)   LOSS OF OFFSITE FONER (SITE)   1.502-02   1.502-02   1.47E-07     29   *TF7   INTERNAL FLOOD TF7: FAILS ALL FUMPS AT -17 LEVEL   1.55E-05   1.55E-05   1.55E-05   1.46E-07     0PER-FPS1   OPERATORS FAIL TO PROPERLY CONTROL CONDENSATE INJECTION FLOW (DUIT)   9.602-02   1.002+00   9.40E-03   1.38E-07     1   LOSS OF CONDENSER VACUUM   1.802-01   1.60E-01   1.38E-07   1.60E-01   1.38E-07     1   LOSS OF CONDENSER VACUUM   1.802-04   1.60E-01   1.30E-07   1.002+04   1.30E-07     1   LOSS OF OFFSITE PORVER (SITE)   COMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN   4.502-05   1.002+04   1.30E-07     1   LOSS OF CONDENSER VACUUM   1.802-01   1.60E-01   1.30E-07   1.502+02   1.002+00   1.30E-07		X-AC-2H			2.18E-01	
EDGCCKV-44-XCALL     COMMON CAUSE FAILURE OF ALL (9/8) FORL OIL TRANSPER FUMPS CV TO OPEN     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-05     4.502-02     1.47E-07       28     WTE(3)     COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES     4.502-05     4.502-05     4.502-05     2.108-01       28     WTF7     INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL     1.552-05     1.60E+00     2.108-01     0.00E+00       29     WTF7     INTERNAL FLOOD TF7: FAILS TO ALIGN FIREWATER FOR COOLDENSATE INJECTION FLOW RATE     3.00E+01     1.00E+00     9.60E+02     1.00E+00       30     WT(C)     LOSS OF CONDENSER VACUUM     1.60E-01     1.80E-01     1.80E-01     1.38E-07       1H02CTDP-FR-HETDP     HPCI TURBINE-DRIVEN PUMP FAILS TO RUN     2.30E-01     2.30E-01     2.30E-01     1.30E-07       1H02CTDP-FR-RCTDP     RCIC TURBINE-DRIVEN PUMP FAILS TO RUN     2.30E-01     1.00E+00     2.30E-01     1.30E-07       1H02CTDP-FR-RCTDP     RUCC TURBINE-DRIVEN PUMP FAILS TO RUN	27	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
X-AC-2H     X-AC-2H     Z-150E-02     1.50E-02     1.47E-07       SWSOCKV-44-DGALL     COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES     4.50E-05     2.16E-01       29     ¥TF7     INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL     1.55E-05     1.46E-07       0 PER-FMS1     OPERATORS FAIL TO PROPERLY CONTROL CONDENSATE INJECTION FLOW (ONE UNIT)     9.60E-02     1.00E+00       30     WT(C)     LOSS OF CONDENSEE VACUUM     1.80E-01     1.60E-01     1.38E-07       1HPC2TDP-FR-HPTDP     HPC1 TURBINE-DRIVEN PUMP FAILS TO RUN     7.40E-02     7.40E-02     7.40E-03       30     WT(C)     LOSS OF OFFSTE POWER (SITE)     COMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN     4.50E-05     4.50E-05       1HC2TDP-FR-RCTDP     RCIC TURBINE-DRIVEN PUMP FAILS TO RUN     2.30E-01     2.30E-01     1.30E-07       1KT(1)     TURBINE TRIP INITATOR     Z.70E+00     2.70E+00     2.30E-01     1.30E-07       1KT(2)     LOSS OF OFFSTE POWER (SITE)     DECK MALL SRV AIR CHECK VALVES TO OPEN     4.50E-05     1.00E-05     1.00E-05       1KT(2)     LOSS OF OFFSTE POWER (SITE)     S.50E-08     8.76E+04 <td< td=""><td></td><td>EDGOCKV-44-XCALL</td><td>COMMON CAUSE FAILURE OF ALL (8/8) FUEL OIL TRANSFER PUMPS CV TO OPEN</td><td>4.505-05</td><td>4.505-05</td><td></td></td<>		EDGOCKV-44-XCALL	COMMON CAUSE FAILURE OF ALL (8/8) FUEL OIL TRANSFER PUMPS CV TO OPEN	4.505-05	4.505-05	
28   TE(S)   LOSS OF OFPSITE POWER (SITE)   1.302-02   1.302-01     29   ¥TF7   INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL   0.552-05   1.002+00   1.002+00   9   402-03     30   ¥TE(C)   LOSS OF CONDENSER VACUUM   1.802-01   1.802-01   1.382-07   7.402-02   1.002+00   9   402-03     30   ¥T(C)   LOSS OF CONDENSER VACUUM   1.802-01   1.382-07   7.402-02   7.402-02   1.302-01   1.382-07   1.302-01   1.302-01   1.302-01   1.302-01   1.302-01   1.302-01   1.302-01   1.302-01		X-AC-2H		1	2.186-01	1 485 45
SNSC(XV-44-DGAL)COMMON CAUSE FAILORE OF ALL ONT T & 2 DECOMING SUPPLY CHECK VALUES4.508-0529%TF7INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL1.558-051.558-051.46E-070PER-FPS1OPERATOR FAILS TO ALIGN FREWATER FOR COCLANT INJECTION FLOW (ONE UNIT)9.60E-011.00E+0030%T(C)LOSS OF CONDENSER VACUUM1.80E-011.80E-011.38E-071NC2TDP-FR-IPTDPHPCI TURBINE-DRIVEN VOMP FAILS TO RUN7.40E-027.40E-021.38E-071NC2TDP-FR-RCTDPCOMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN4.50E-054.50E-0511%T(T)TURBINE-DRIVEN VOMP FAILS TO RUN2.30E-012.30E-012.70E/XV-44ALLCOMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN4.50E-051.30E-0711%T(T)TURBINE-DRIVEN PUMP FAILS TO RUN2.30E-012.30E-012.30E-012.70E/XV-45ALLCOMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN4.50E-051.30E-0731%T(T)TURBINE TRIF INITIATOR2.70E+002.70E+001.30E-0712SIC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN5.50E-088.76E+044.81E-032%TE(S)LOSS OF DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN5.50E-088.76E+044.81E-032%TE(S)LOSS OF LISCHARGE VALVE C51 FO1 FAILS TO REMAIN OPEN5.50E-088.76E+044.81E-033%T(DC2B2)LOSS OF DISCHARGE VALVE C51 FO1 FAILS TO REMAIN OPEN5.50E-088.76E+044.81E-033%T(DC2B2)LOSS OF DISCHARGE VALVE	28	<b>%</b> TE(S)	LOSS OF OFFSITE POWER (SITE)	1.505-02	1.50E-02	1.4/8-0/
X-RC-2H     X-RC-2H     X-RC-2H     X-RC-2H       9     ¥TF7     INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL     1.55E-05     1.55E-05     1.55E-05       0FER-FPS1     OPERATOR FAILS TO ALIGN FIREWARER FOR COOLANT INJECTION FLOW (ONE UNIT)     9.60E-02     1.00E+00       XOP-COM2-09     9.40E-03     9.40E-03     9.40E-03     9.40E-03       1NPCCTDP-FR-HPTDP     COMMON CAUSE FAILURE OF ALL STO RUN     7.40E-02     7.40E-02     7.40E-02       1AR2CKV-44ALL     COMMON CAUSE FAILURE OF ALL STO RUN     2.30E-01     2.30E-01     2.30E-01       1AR2CKV-44ALL     COMMON CAUSE FAILURE OF ALL STO RUN     2.70E+00     2.70E+00     1.30E-07       1AR2CKV-44ALL     COMMON CAUSE FAILURE OF ALL STO RUN     2.30E-01     2.30E-01     2.30E-01       31     ¥T(T)     TURBINE TRIP INITIATOR     2.70E+00     1.30E-07     1.00E-05     1.00E-05     1.00E-05     1.00E-05     1.00E-05     1.00E-04     1.30E-07       32     ¥T(E)     LOSS OF OFFSITE POWER (SITE)     1.00E-04     1.00E-04     1.30E-07       332     ¥T(C)     LOSS OF OFFSITE POWER (SITE)     1.00E+00		SWSOCKV-44-DGALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES	4.505-05	4.505-05	
29This Exam Function TermFAILS and Point's An I - Device1.552-03<		X-AC-2H	TUMPENAL BLOOD MET, BALLO ALL DIMOD AM 17 LEURI	1	2.10E-U1 1 EEP AE	1 460 07
OPERATOR FAILS TO FAILS TO FAILS TO FAILS TO FAILS FOR CONDENSTE INJECTION FLOW NATE3.008-011.008-03OPERATORS FAIL TO PROPENJY CONTROL CONDENSTE INJECTION FLOW NATE3.008-011.008-03XCP-COM2-09STOCOMPENSER VACUUM1.808-011.808-011008-001HPC2TDP-FR-HPTDPHPCI TURBINE-DRIVEN PUMP FAILS TO RUN7.408-027.408-021008-01HPC2TDP-FR-HPTDPHPCI TURBINE TRIP INITIATOR7.408-027.408-0211008-05RETURNICAL BINDING OF CONTROL ROL RUN2.308-012.308-01111*T(T)TURBINE TRIP INITIATOR2.708+002.708+00111*T(S)LOSS OF OFFSITE POWER (SITE)1.008-051.008-0511208-07LOSS OF OFFSITE POWER (SITE)1.508-021.278-071131*TE(S)LOSS OF OFFSITE POWER (SITE)1.508-021.278-071132*TE(S)LOSS OF DEFSITE POWER (SITE)1.508-021.278-071131*TE(S)LOSS OF PISSITE POWER (SITE)1.508-021.278-071132*TE(S)LOSS OF PISSITE POWER (SITE)1.508-021.278-071133*TE(S)LOSS OF DESC DE PANEL 2222.908-031.258-071141FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.908-013.908-0111408-02DIEBEL GENERATOR 3 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.408-021.408-021141OPERATORS FAIL TO MANUALLY CONDECT UNT 2 SUBSTATIONS ET AND ES1.008+001.008+0000FER-480X2OPERATORS FAIL TO MANUALLY CONDECT UNT 2 SUBSTATIONS ET AND ES1.008+001	29	TTF/	INTERNAL FLOOD IF/: FAILS ALL POMPS AI -1/ LEVEL	1.356-05	1.002.00	1.406-07
OPERTMONOPERATORS FAIL TO PROFERIT CONTROL CONDENSATE INDECITOR FAILS3.005011.0050030%T(C)LOSS OF CONDENSER VACUUM1.80E-0331%T(C)LOSS OF CONDENSER VACUUM1.80E-0132%T(C)TURBINE-DRIVEN PUMP FAILS TO RUN7.40E-0233RCI2TDP-FR-RCTDPRCIC TURBINE-DRIVEN PUMP FAILS TO RUN2.30E-0134XT(T)TURBINE TRIP INITIATOR2.30E-0131%T(T)TURBINE TRIP INITIATOR2.70E+0032%TE(S)LOSS OF OFFSTTE POWER (SITE)1.00E-0532%TE(S)LOSS OF OFFSTTE POWER (SITE)1.50E-021.50E-0233%T(DC2B2)LOSS OF OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-0134%T(DC2B2)LOSS OF OFENTE POWER (SITE)1.00E+001.00E+0035%T(DC2B2)LOSS OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-0136%T(DC2B2)DESSE FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS ET AND E81.00E+001.00E+0037OPER-ADTORS FAIL TO MANUALLY ALIGN POWER FRAMO OPPOSITE UNIT1.00E+001.00E+0000FER-ALTONITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FRAMO OPPOSITE UNIT1.00E+001.00E+0000FER-ALTONITXCOPERATORS FAIL TO ALIGN DE BUS TO STANDEY DC POWER SUPPLY - UNIT23.00E-011.00E+0000FER-ALTONITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FRAMO OPPOSITE UNIT1.00E+001.00E+0000FER-ALTONITXCOPERATOR FAILS TO ALIGN DE BUS TO STANDEY DC POWER SUPPLY - UNIT23.00E-011.00E+0014FTE(S)<		OPER-FPSI	OPERATOR FAILS TO ALIGN FIREWATER FOR COULANT INDECTION FLOW (ONE UNIT)	3.00E-02	1 000400	
ADF-COMPUSDistribution1AUT(C)LOSS OF CONDENSER VACUUM1.80E-011.80E-011.30E-071HPC2TDP-PR-HPTDPHPCI TURBINE-DRIVEN PUMP FAILS TO RUN7.40E-027.40E-021IAUZXV-44ALCOMMON CAUSE FAILURE OF ALL SEV AIR CHECK VALVES TO OPEN4.50E-054.50E-051RCIZTDP-FR-RCTDPRCIC TURBINE-DRIVEN PUMP FAILS TO RUN2.30E-012.30E-012TURBINE TRIP INITIATOR2.70E+002.70E+001.30E-071RFSZMSINDMSCHANICAL BIDDING OF CONTROL RODS1.00E-051.00E-052SLCZXVN-OC-F001SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN5.50E-086.76E+044.81E-0332#TE (S)LOSS OF OFFSITE POWER (SITE)1.60E-041.08E-041.08E-041.08E-0433#TIC229LOSS OF 125V DC PANEL 2B22.90E-032.90E-031.25E-07BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-01OPER-A10X2OPERATORS FAIL TO MANUALLY CUNNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-A10X10OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTOCOPERATOR FAILS TO ALIGN DC BUS TO STANDEY DC POWER SUPPLY - UNIT23.00E-011.00E+00OPER-A10X10DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02OPER-DCPALTOCOPERATOR FAILS TO ALIGN DC BUS TO STANDEY DC POWER SUPPLY - UNIT23.00E-011.00E+00OPER-A10X2OPERATOR FAILS TO		VOD COMO AO	OPERATORS FAIL TO FROPERATE CONTROL CONDENSATE INDECTION FROM RATE	2.000.01	9 40E-03	
No.Hold Common cause failure or own on cause failure of all srv air check valves to open7.408-027.408-027.408-021AN2CKV-44ALLCOMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN4.508-054.508-054.508-0531#T(T)TURBINE DRIVEN PUMP FAILS TO RUN2.308-012.308-012.308-0131#T(T)TURBINE TRIP INITIATOR2.70E+002.70E+002.70E+001.30E-0731MECHANICAL BINDING OF CONTROL RODS1.008-051.008-051.008-051.008-0532#TE (S)LOSS OF OFFSITE POWER (SITE)1.50E O21.50E-021.27E-0733#T (DC2B2)LOSS OF OFFSITE POWER (SITE)2.90E-032.90E-031.25E-0734#T (DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-031.25E-0735#T (DC2B2)LOSS OF 125V DC PANEL 2B22.90E-033.90E-013.90E-0136OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.008+001.008+000PER-ABOX2OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+000PER-CPALITOC2OPERATOR FAILS TO ALIGN DC EUS TO STANDEY DC POWER SUPPLY - UNIT23.002-011.00E+000PER-CPALTDC2OPERATOR FAILS TO RUN OF DIESEL GENERATOR 3 AND 41.95E-021.21E-071202DON-TW-D001DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.408-021.408-02134#TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-07135#TE(S)LOSS OF OFFSITE POWER (SITE)1.50	20		LOSS OF CONDENSED VACUUM	1.80E-01	1.80E-01	1.38E-07
International and the second state of the second s	30	TTALES	HOST TIDETNE-DETURN DIMP FATLS TO RIN	7.405-02	7.40E-02	1.502 07
RRICT URBINE-DRIVEN PUMP PAILS TO RUN2.30E-012.30E-0131\$T(T)TURBINE TRIP INITIATOR2.70E+001.30E-0731\$T(T)TURBINE TRIP INITIATOR2.70E+001.30E-0731\$T(T)TURBINE TRIP INITIATOR2.70E+001.30E-0732\$TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.27E-0733\$T(DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-032.90E-031.25E-0734\$T(DC2B2)LOSS OF 125V DC PANEL 2B22.90E-033.90E-011.40E-021.40E-020PER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+001.00E+000PER-ALTUNITXCOPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+000PER-ALTUNITXCOPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+0034\$TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-0725#TE(S)LOSS OF OFFSITE POWER (SITE)1.60E-021.20E-0214USS OF OFFSITE POWER (SITE)1.00E+007.90E-0325#TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-0726EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.21E-0735\$TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-0736EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.50E-0		TAN2CKU-44ATJ.	COMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN	4.50E-05	4.50E-05	
31AT (T) RT (T)TURBINE TRIP INITIATOR TURBINE TRIP INITIATOR2.70E+002.70E+001.30E-0731AT (T) RFS2MBIND SLC2XVN-OC-F001MECHANICAL BINDING OF CONTROL RODS SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN5.50E-088.76E+044.81E-0332ATE (S) EDGOMDC-44SX-AC 		RCTOTOR-FR-RCTOR	RCIC TURBINE-DRIVEN PIMP FAILS TO RIN	2.30E-01	2.30E-01	
Res2MBINDMECHANICAL BINDING OF CONTROL RODS1.00E-05SLC2XVN-OC-F001SLC TANK DISCHARGE VALUE C41-FOOI FAILS TO REMAIN OPEN5.50E-088.76E+044.81E-0332*TE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.27E-07BIGOMDC-44SX-ACCOMMON CAUSE FAILURE OF UNIT 1 & 2 D3 AIR COMPRESSORS TO START1.08E-047.87E-0233*T (DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-031.25E-07BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-01COPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ABOX2OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-16LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07BIG1DGN-TM-D001DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02A'TE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07BIG1DGN-TM-D001DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02S'* WE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07S'* WE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07BIG1DGN-TM-D002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02BI	21	жт(т)	TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.30E-07
SLC2XVN-OC-F001SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN5.50E-088.76E+044.81E-0332%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.27E-07EDG0MDC-44SX-ACCOMMON CAUSE FAILURE OF UNIT 1 & 2 DG AIR COMPRESSORS TO START1.08E-041.08E-041.08E-0433%T(DC2B2)LOSS OF 125V DC PANEL 2E22.90E-032.90E-031.25E-07BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-01EDG2DGN-TM-D003DIESEL GENERATOR J UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-CPCPALTDC2OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00OPER-COM2-16LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-0734%TE(S)LOSS OF OFFSITE POWER (SITE)1.40E-021.40E-02EDG1DGN-TM-D001DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-022.95E-02LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-0735%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-0725%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-0726LOSS OF OFFSITE POWER (SITE)LOSS OF OFFSITE POWER (SITE)1.50E-02	171	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
32%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.27E-07EDGOMDC-44SX-AC X-AC-5HCOMMON CAUSE FAILURE OF UNIT 1 & 2 DG AIR COMPRESSORS TO START1.08E-047.87E-0233%T (DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-031.25E-07BUSFAULT EDG2DGN-TM-D003FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-01OPER-480X2 OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ACTATICC OPER-ALTUNITXC OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT EDG1DGN-TM-D0011.00E+001.00E+001.00E+0034%TE(S) EDG1DGN-TM-D001LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-071.21E-0735%TE(S) EDG1DGN-TM-D002 <td></td> <td>SLC2XVN-OC-F001</td> <td>SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08</td> <td>8.76E+04</td> <td>4.81E-03</td> <td></td>		SLC2XVN-OC-F001	SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
EDGOMDC-44SX-AC X-AC-5HCOMMON CAUSE FAILURE OF UNIT 1 & 2 DG AIR COMPRESSORS TO START1.08E-04 7.87E-0233\$T(DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-032.90E-031.25E-07BUSFAULT EDG2DGN-TM-D003FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-01OPER-480X2 	32	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.27E-07
X-AC-5H7.87E-0233\$T(DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-031.25E-07BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-01EDG2DGN-TM-D003DIESEL GENERATOR 3 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02OPER-460X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-16LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-0734\$TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-07EDG1DGN-TM-D001DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02155\$TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.95E-022.95E-0235\$TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-07EDG1DGN-TM-D002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-0235\$TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-07EDG1DGN-TM-D002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.21E-07EDG1DGN-TA-002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02S5\$TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.95E-02 <t< td=""><td></td><td>EDGOMDC-44SX-AC</td><td>COMMON CAUSE FAILURE OF UNIT 1 &amp; 2 DG AIR COMPRESSORS TO START</td><td>1.08E-04</td><td>1.08E-04</td><td></td></t<>		EDGOMDC-44SX-AC	COMMON CAUSE FAILURE OF UNIT 1 & 2 DG AIR COMPRESSORS TO START	1.08E-04	1.08E-04	
33\$T(DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-031.25E-07BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-013.90E-01EDG2DGN-TM-D003DIESEL GENERATOR 3 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-021.40E-02OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-16ILOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07BUG1DGN-TM-D001DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-021.21E-07EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.21E-0735\$TE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07EDG1DGN-TM-D002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-021.21E-07Soft StellowLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07Soft StellowLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07EDG1DGN-TM-D002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-02 <tr<tr>X-AC-12H</tr<tr>		X-AC-5H			7.87E-02	
BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-01EDG2DGN-TM-D003DIESEL GENERATOR 3 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-161.00SS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07BUG1DGN-TM-D001DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-021.40E-02X-AC-12HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-0735%TE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07BUG1DGN-TM-D002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-0235%TE (S)LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-07BUG1DGN-TM-D002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.21E-07BUG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.21E-07EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-02X-AC-12H2.95E-022.95E-022.95E-022.95E-02	33	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.25E-07
EDG2DGN-TM-D003 OPER-480X2DIESEL GENERATOR 3 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02OPER-480X2 OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8 OPER-ALTUNITXC OPER-DCPALTDC2 XCP-COM2-161.00E+001.00E+0034%TE (S) EDG1DGN-TM-D001 EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE) LOSS OF OFFSITE POWER (SITE)1.50E-021.40E-0235%TE (S) EDG1DGN-TM-D002 EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE) LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-0234%TE (S) X-AC-12HLOSS OF OFFSITE POWER (SITE) LOSS OF OFFSITE POWER (SITE)1.50E-021.21E-0735%TE (S) EDG1DGN-TM-D002 ZDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE) LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-0236%TE (S) EDG1DGN-TM-D002 EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE) LOSS OF OFFSITE POWER (SITE)1.40E-021.40E-0237%TE (S) EDG1DGN-TM-D002 ZOGNON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.40E-0236%TE (S) EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE) ZOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.40E-0237%TE (S) EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE) ZOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-0238%TE (S) EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE) ZOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-02		BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
OPER-480X2 OPER-ALTUNITXC OPER-ALTUNITXC OPER-ALTUNITXC OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2 XOP-COM2-16OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+0034%TE(S) EDG1DGN-TM-D001 EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE) DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.50E-021.21E-0735%TE(S) EDG1DGN-TM-D002 EDG2DGN-24-DG34RLOSS OF OFFSITE POWER (SITE) DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.50E-021.21E-0735%TE(S) EDG1DGN-TM-D002 EDG2DGN-24-DG34R COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.50E-021.21E-0735%TE(S) EDG1DGN-TM-D002 EDG2DGN-24-DG34R COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.40E-021.40E-0236%TE(S) EDG1DGN-TM-D002 EDG2DGN-24-DG34R COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.21E-0736%TE(S) EDG1DGN-TM-D002 EDG2DGN-24-DG34R X-AC-12H000000000000000000000000000000000	1	EDG2DGN-TM-D003	DIESEL GENERATOR 3 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
OPER-ALTUNITXC OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2 OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-167.90E-0334%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-02EDG1DGN-TM-D001 EDG2DGN-24-DG34R X-AC-12HDIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-0235%TE(S) EDG1DGN-TM-D002 EDG1DGN-TM-D002 EDG2DGN-24-DG34RLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-0735%TE(S) EDG1DGN-TM-D002 EDG2DGN-24-DG34R EDG2DGN-24-DG34RLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-0735%TE(S) EDG2DGN-24-DG34R Z-AC-12HLOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-0736%TE(S) EDG2DGN-24-DG34R Z-AC-12HLOSS OF OFFSITE POWER (SITE)1.50E-021.21E-0737%TE(S) EDG2DGN-24-DG34R Z-AC-12HLOSS OF OFFSITE POWER (SITE)1.50E-021.21E-0736%TE(S) EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE)1.40E-021.40E-0237%TE(S) EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE)1.40E-021.40E-0238%TE(S) EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE)1.40E-021.40E-0239%TE(S) EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE POWER (SITE)1.95E-021.95E-0239%TE(S) EDG2DGN-24-DG34R X-AC-12HLOSS OF OFFSITE PO	1	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
OPER-DCPALTDC2 XOP-COM2-16OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+0034%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07EDG1DGN-TM-D001DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-021.40E-02EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-022.95E-0235%TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-021.21E-07EDG1DGN-TM-D002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-021.21E-07EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.20E-021.21E-07K-AC-12HCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-021.21E-07K-AC-12HCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-022.95E-02	1	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
XOP-COM2-16   7.90E-03     34   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.21E-07     EDG1DGN-TM-D001   DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)   1.40E-02   1.40E-02   1.40E-02     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02     X-AC-12H   2.95E-02   1.50E-02   1.21E-07     35   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.21E-07     BDG1DGN-TM-D002   DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)   1.40E-02   1.40E-02   1.21E-07     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.21E-07     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.21E-07     K-AC-12H   2.95E-02   1.95E-02   1.95E-02   1.95E-02   1.95E-02		OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
34   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.21E-07     EDG1DGN-TM-D001   DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)   1.40E-02   1.40E-02     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02     35   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.21E-07     35   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.21E-07     BDG1DGN-TM-D002   DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)   1.40E-02   1.40E-02   1.40E-02     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02   1.21E-07     K-AC-12H   2.95E-02   1.40E-02   1.40E-02   1.40E-02   1.40E-02     K-AC-12H   2.95E-02   2.95E-02   2.95E-02   2.95E-02   2.95E-02		XOP-COM2-16			7.90E-03	
EDG1DGN-TM-D001   DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)   1.40E-02   1.40E-02     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02     X-AC-12H   2.95E-02   1.50E-02   1.50E-02   1.21E-07     S5   %TE (S)   LOSS OF OFFSITE POWER (SITE)   1.40E-02   1.40E-02   1.21E-07     EDG1DGN-TM-D002   DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)   1.40E-02   1.40E-02   1.40E-02     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02   2.95E-02     X-AC-12H   2.95E-02   1.95E-02   1.95E-02   1.95E-02   1.95E-02	34	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   2.95E-02     X-AC-12H   2.95E-02   1.50E-02   1.21E-07     35   %TE (S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.21E-07     EDG1DGN-TM-D002   DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)   1.40E-02   1.40E-02     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   2.95E-02     X-AC-12H   2.95E-02   1.95E-02   1.95E-02		EDG1DGN-TM-D001	DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
X-AC-12H   2.95E-02     35   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.21E-07     EDG1DGN-TM-D002   DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)   1.40E-02   1.40E-02     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02     X-AC-12H   2.95E-02   2.95E-02	1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
35   %TE(S)   LOSS OF OFFSITE POWER (SITE)   1.50E-02   1.50E-02   1.21E-07     EDG1DGN-TM-D002   DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)   1.40E-02   1.40E-02   1.40E-02     EDG2DGN-24-DG34R   COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4   1.95E-02   1.95E-02     X-AC-12H   2.95E-02	1	X-AC-12H			2.95E-02	
EDG1DGN-TM-D002DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)1.40E-021.40E-02EDG2DGN-24-DG34RCOMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 41.95E-021.95E-02X-AC-12H2.95E-02	35	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
EDG2DGN-24-DG34R COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4 1.95E-02 1.95E-02 2.95E-02	1	EDG1DGN-TM-D002	DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
X-AC-12H 2.95E-02	1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
		X-AC-12H			2.95E-02	

	)	)			)
#	Inputs	Description Rate	Exposure	Event Prob	Probability
36	%T (DC2A1)	LOSS OF 125V DC PANEL 2A1	2.90E-03	2.90E-03	1.19E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-LP2B2	CHARGER 2B-2 FAILS 4.40E-06	2.40E+01	1.06E-04	
37	%T (DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.19E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-LP2A1	CHARGER 2A-1 FAILS 4.40E-05	2.40E+01	1.06E-04	
38	%te(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.12E-07
	EDG0DGN-34-D134S	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 1,3 AND 4	3.43E-05	3.43E-05	
	X-AC-2H			2.18E-01	
39	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.12E-07
	EDG0DGN-34-D234S	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 2, 3 AND 4	3.43E-05	3.43E-05	
1	X-AC-2H			2.18E-01	
40	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.09E-07
1	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07	
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
41	<b>%TF7</b>	INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.07E-07
	OPER-DEPRESS	OPERATOR FAILS TO MANUALLY INITIATE AND ALIGN LOW-PRESSURE SYSTEMS	6.90E-03	1.00E+00	
	XOP-DEPRESS			6.90E-03	
42	<b>%</b> TE (U2)	LOSS OF OFFSITE POWER TO UNIT 2	9.80E-03	9.80E-03	1.01E-07
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	X-AC-12H			2.95E-02	
	XOP-ALTUNITXC			1.80E-02	
43	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.00E-07
1	EDG2MDC-44SU2AC	COMMON CAUSE FAILURE OF UNIT 2 DG AIR COMPRESSORS TO START	1.22E-03	1.22E-03	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	X-AC-5H			7.87E-02	
1	XOP-ALTUNITXC1			7.00E-02	
44	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	9.99E-08
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FS-PMPA	SLC PUMP C41-C001A FAILS TO START	3.70E-03	3.70E-03	
45	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	9.99E-08
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	SLC2MDP-FS-PMPB	SLC PUMP C41-C001B FAILS TO START	3.70E-03	3.70E-03	
46	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	9.94E-08
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	XOP-COM2-14			1.60E-02	
47	%te(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	9.64E-08
1	EDG1DGN-24-DG12R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 1 AND 2	1.95E-02	1.95E-02	
ſ	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-16H			1.69E-02	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability	
48 49	<pre>%T(C) DCP2BAT-XXDEP2A DCP2BAT-XXDEP2B DCP2REC-24A1B2 %TE(S) SWSOMOV-44-DGALL X-AC-2H</pre>	LOSS OF CONDENSER VACUUM BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 COMMON CAUSE FAILURE OF CHARGER 2A-1 AND 2B-2 LOSS OF OFFSITE POWER (SITE) COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY VALVES	1.80E-01 1.00E+00 1.00E+00 5.20E-07 1.50E-02 2.82E-05	1.80E-01 1.00E+00 1.00E+00 5.20E-07 1.50E-02 2.82E-05 2.18E-01	9.36E-08 9.22E-08	
50	TE(S) EDGODGN-44-EDGR X-AC-12H	LOSS OF OFFSITE POWER (SITE) COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO RUN	1.50E-02 2.01E-04	1.50E-02 2.01E-04 2.95E-02	8.89E-08	

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Report Summary: Filename: C:\CAFTA-W\BNP\EPU-L1\EPU-L1.CUT Print date: 4/17/ 1 6:34 PM Not sorted

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### **Cutsets with Descriptions Report**

2CDF = 2.71E-05

#	Inputs	Description Rate	Exposure	Event Prob	Probability
1	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.80E-07
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
2	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.80E-07
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	I
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	I
3	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.11E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	I
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	I
	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
4	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.11E-07
1	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	· · · · ·
1	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	I
1	DCP2REC-34A1B1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2B-1 AND 2B-2	2.37E-07	2.37E-07	· ·
5	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	6.67E-07
-	ACP0BKR-44-1234	COMMON CAUSE FAILURE OF AT LEAST ONE BREAKER FOR EACH E-BUS	2.04E-04	2.04E-04	V.V.2 V.
	X-AC-2H		<b>D</b>	2.18E-01	
6	%T (DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	6.61E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3,908-01	3.90E-01	
	EDG2DGN-FR-003	DIESEL GENERATOR 3 FAILS TO RUN	7.40E-02	7.40E-02	
	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.008+00	1 00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1 008+00	
	XOP-COM2-16		3.004 04	7.908-03	
7	*T(T)	TIRRINE TRIDING TO TATATOR	2.708+00	3 00E±00	5 28E-07
ľ	DCPOREC-44ALL	COMMON CAUSE FATLINE OF BOTH INTT 1 AND INTT 2 CHARGERS	1 768-07	1 768-07	3.202-01
1	DCFURDE TIME	CONTRA CHORE TAILORS OF DOWN ONLY I AND ONLY & CHARGENE THAD THE CARL	1 000+00	1 002.00	
l I	DCF2DAT-AADDE 2A	BATTERT DAME 20 DELIGITION FOLLOWING LOSS OF FOWER FROM CURRENT. CONTOUR	1.000400	1 002.00	1
	em (m)	MIDENT MARK 25 DELIGITOR FOLLOWING LOSS OF FORER FROM CHERGERI. CONTOUR	1.005+00	1.005+00	1 641 02
8	TT(1)	LUKBING DE CONTROL DAD DELLE COEM UNIVER	2.705+00	3.008+00	4.688-07
	CRD2SCRAM	FAILURE OF CONTROL ROL DRIVE SCRAPT VALVES	6.00E-06	5.005-06	
	SLCZMDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO KUN FOR 1 HK	2.605-02	2.60E-02	
9	*T(T)	TORBINE TRIP INITIATOR	2.706+00	3.00E+00	4.68E-07
i	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-05	6.00E-06	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
10	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
1	EDG1DGN-FR-001	DIESEL GENERATOR 1 FAILS TO RUN	7.40E-02	7.40E-02	l
l .	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	l
	X-AC-16H			1.69E-02	1

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
11	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
	EDG1DGN-FR-002	DIESEL GENERATOR 2 FAILS TO RUN	7.40E-02	7.40E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-16H			1.69E-02	
12	*1F14	INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM	3.50E-07	3.50E-07	3.50E-07
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	OPER-DC2BALT	OPERATOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER SUPPLY-UNIT 2	1.00E+00	1.00E+00	
13	*T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	3.00E-07
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	XOP-COM2-15			1.00E-02	
14	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.388-07
	DGH0FAN-44FTSEXH	COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START	4.58E-05	4.58E-05	2.004 07
	X-AC-1H			3.46E-01	
15	TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
	DGHOFAN-44FTSSUP	COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START	4.58E-05	4.58E-05	
	X-AC-1H			3.46E-01	
10	TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.36E-07
	EDGODGN~44-EDGS	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START	7.22E-05	7.22E-05	
				2.18E-01	
11/	ST(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	1.80E-07
	OPER DILIME	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	OPER-DIDUIE	OPERATOR FAILS TO PRECLODE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-DLEVELI	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	VOD-COM2 15	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
10	AUF-COM2~15 9m (DC292)	LOSS OF 195Y DO DANK ADD		1.00E-02	
10		LOSS OF 125V DC FAREL 282	2.90E-03	2.90E-03	1.74E-07
	FDC2DCN-24-DC24B	COMON CAUGE BALLINE BOS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	OPER-ALTINITYC	OPERATORS E FAILURE TO KNOW OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	OPER-DCPALTDC2	OPERATOR FAIL TO ALIGN DO DUE TO TANDAL AD THE TROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	XOP-COM2-16	OFERATOR FAILS TO ALIGN DC BOS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
19	<b>%</b> Ψ(T)	ΤΊΓΙ ΒΑΤΝΕ ΤΟΙ ΤΙ ΙΤΙΤΑΤΛΟ		7.90E-03	
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEDIRTION ROLLOWING LOSS OF DOWED DOW CONCERNS AND A	2.70E+00	3.00E+00	1.64E-07
	DCP2REC-34A1A2B2	COMMON CAUSE RALLIDE OF CHARGEP 2A-1 2A-2 AND 2 A	1.00E+00	1.00E+00	
	RCI2TOP-FR-RCTOP	CONTACT CROSS FRIDARS OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
20	*TE(S)	LOSS OF OFFICITE DOWED (STRE)	2.30E-01	2.30E-01	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO PIN OF DIFERE CENERATORS 2 AND 4	1.50E-02	1.50E-02	1.55E-07
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN DOWER FROM OPDOSTTE INTE	1.955-02	1.95E-02	
	X-AC-12H		1.005+00	1.00E+00	
	XOP-ALTUNITXC			2.95E-02	
21	%TE(S)	LOSS OF OFFSITE POWER (SITE)		1.80E-02	
	EDGOCKV-44-CAALL	COMMON CAUSE FAILURE OF INIT 1 AND INIT 2 RECEIVED CHECK VALUES - CONTROL	1.508-02	1.50E-02	1.47E-07
	X-AC-2H		4.50E-05	4.50E~05	
22	%TE(S)	LOSS OF OFFSITE POWER (STTE)	1	2.18E-01	
	EDGOCKV-44-DALL	COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES	1.508-02	1.50E-02	1.47E-07
	X-AC-2H	THE CHECK VALVED	4.505-05	4.50E-05	
				2.188-01	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
23	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DCPCV	COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
24	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DLALL	COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
25	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
1	EDGOCKV-44-DWALL	COMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V258	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
26	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-VDALL	COMMON CAUSE FAILURE OF ALL DD PUMP DISCHARGE CHECK VALVES	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
27	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.508-02	1.478-07
	EDGOCKV-44-XCALL	COMMON CAUSE FAILURE OF ALL (8/8) FUEL OIL TRANSFER PUMPS CV TO OPEN	4.508-05	4.508-05	
	X-AC-2H		1 508 00	2.186-01	1 498 09
28	<b>%</b> TE(S)	LOSS OF OFFSITE POWER (SITE)	1.508-02	1.505-02	1.4/8-0/
	SWSOCKV-44-DGALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES	4.506-05	4.508-05	
	X-AC-2H	THE ADDRESS TO ADDRES	1 558-05	2.105-U1 1 558-05	1 468-07
29	STF7	INTERNAL FLOOD IF/: FAILS ALL POMPS AI -1/ DEVEL	1.335-03	1.556-05	1.405-07
	OPER-FPS1	OPERATOR FAILS TO ADIGN FIREWATER FOR COLLANT INDECTION FLOW (ONE ONT)	3.00E-02	1.000+00	
	OPER-FWS-INJ	OPERATORS FAIL TO PROPERTY CONTROL CONDENSATE INDECTION FROM RATE	3.006-01	9 408-03	
20	AUP-COM2-09		2 708+00	3 008+00	1 448-07
30		NUCHING INTE INTITUCA MECHINICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2XIN-OC-F003	SLC TANK DISCHARGE VALVE (41-F001 FALLS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
21	SUCZAVN-UC-FUUI	LOSS OF CONDENSED VACUM	1.80E-01	1.80E-01	1.38E-07
31	HDCOTTOR-FR-HPTOR	HOCI TIRBINE-DRIVEN PIMP FAILS TO RUN	7.40E-02	7.40E-02	
	TAN2CKV-44ALL	COMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN	4.50E-05	4.50E-05	
	RCT2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
32	TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.27E-07
1.	EDGOMDC-44SX-AC	COMMON CAUSE FAILURE OF UNIT 1 & 2 DG AIR COMPRESSORS TO START	1.08E-04	1.08E-04	
	X-AC-5H			7.87E-02	
22	*T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.25E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	EDG2DGN-TM-D003	DIESEL GENERATOR 3 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	XOP-COM2-16			7.90E-03	
34	&T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	1.21E-07
[···	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07	
1	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
35	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
1	EDG1DGN-TM-D001	DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-12H			2.95E-02	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
36	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
ļ	EDG1DGN-TM-D002	DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
ł	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
ł	X-AC-12H			2.95E-02	
37	%T (DC2A1)	LOSS OF 125V DC PANEL 2A1	2.90E-03	2.90E-03	1.19E-07
Į	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-LP2B2	CHARGER 2B-2 FAILS 4.40E-06	2.40E+01	1.06E-04	
38	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.19E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	1997 - B. C. 1997 - S. C. 1997
[	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.008+00	
	DCP2REC-LP2A1	CHARGER 2A-1 FAILS 4.40E-06	2.40E+01	1 068-04	
39	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1 50E-02	1 50E-02	1 178-07
	EDGODGN-34-D134S	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 1.3 AND 4	2 432-05	1.308-02 2 428-05	1.120-V/
l	X-AC-2H	ANDIAN ATARA STREAMENT IN ALLES AS REFERE ANTIMITATION ALA FRIM .	J. 130-03	3.436-03	
40	<u>ቶፐደ (S)</u>	LASS OF OFFSITTE DOWRD (SITE)	1 500-00	7.100-AT	1 1 1 1 1 1 1 1
	EDGODGN-34-D2345	COMMON CALLER FAILLIRE TO START OF DIESEL GENERATORS 2 3 AND 4	1,505-02	1.505-02	1.125-07
l	Y-AC-2H	COMMON CAUGE FAILLORE TO START OF DIEDED GENERATORS 2, J AND 3	3.435-00	3.435-05	
41	ይሞ/ጥ)	סראד הזאד הואדיה אורייקאיים	0 70B 00	2.185-01	
1	DCOMRTND	NECUNITOR ENTITIES OF CONTENT. DODE	2.705+00	3.005+00	1.11E-07
l I	CT.COMDD_FQ_DMDA	PIC DIME CALLCOALS DISTIC TO CONTROL SUDG	1.005-05	1.005-05	
42	ይጥ ( ጥ )	SHC PUMP CHI-CUUIA PAING IV SIARI	3.705-03	3.70E-03	
74	ער בעניםמם האריםמיםמם	IURBING IKIF INIIIAIUK	2.705+00	3.006400	1.11E-07
1	CLOOMDD-FC-DMDR	MECHANICAL BINDING OF CONTROL ROLD	1.00E-05	1.00E-05	
1.2	211/21/11/2 - 210 - 21/2 0 2m /m	SLC PUMP C41-COULD FALLS TO START	3.70E-03	3.70E-03	
4.5	01(1) 51(1)	TURBING TRIP INITIATOR	2.70E+00	3.00E+00	1.10E-07
1	OPER-DILUIE	OPERATOR FAILS TO PRECIDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
1	OLEK-TDEAPTT	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPUI DURING ATWS	3.00E-01	1.00E+00	
1	KUIZIDE-EK-KUIDE	KCIC TURBINE-DRIVEN PUMP FAILS TO KUN	2.30E-01	2.30E-01	
1	KPSZMBINU	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	XOP-COM2-14			1.60E-02	
44	TF7	INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.07E-07
1	OPER-DEPRESS	OPERATOR FAILS TO MANUALLY INITIATE AND ALIGN LOW-PRESSURE SYSTEMS	6.90E-03	1.00E+00	
<b>I</b>	XOP-DEPRESS	· · ·		6.90E-03	
45	%TE(U2)	LOSS OF OFFSITE POWER TO UNIT 2	9.80E-03	9.80E-03	1.01E-07
i i	EDG2DGN-24-DG34k	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
i i	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
l	X-AC-12H			2.95E-02	
1	XOP-ALTUNITXC			1.80E-02	
46	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.00E-07
ł	EDG2MDC-44SU2AC	COMMON CAUSE FAILURE OF UNIT 2 DG AIR COMPRESSORS TO START	1.22E-03	1.22E-03	
i i	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
i	X-AC-5H			7.87E-02	
i .	XOP-ALTUNITXC1			7.00E-02	
47	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	9 64E-08
1	EDG1DGN-24-DG12R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 1 AND 2	1 955-02	1 958-02	9.04L VV
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1 958-02	1 958-02	
1	X-AC-16H		1.700 vu	1 295-02	
i				1.025-02	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability	
48	%T(T) OPER-FPS1 OPER-WVDHR SWS2XVN-OC-V442 XOP-WVDHR	TURBINE TRIP INITIATOROPERATOR FAILS TO ALIGN FIREWATER FORCOOLANT INJECTION FLOW (ONE UNIT)OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHRMANUAL VALVE 2 SW V442 FAILS TO REMAIN OPEN5.50E-08	2.70E+00 9.60E-02 1.40E-03 3.84E+02	3.00E+00 1.00E+00 1.00E+00 2.11E-05 1.50E-03	9.50E-08	
49	\$T{C} DCP2BAT-XXDEP2A DCP2BAT-XXDEP2B DCP2REC-24A1B2	LOSS OF CONDENSER VACUUM BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 COMMON CAUSE FAILURE OF CHARGER 2A-1 AND 2B-2	1.80E-01 1.00E+00 1.00E+00 5.20E-07	1.80E-01 1.00E+00 1.00E+00 5.20E-07	9.36E-08	
50	%TE(S) SWSOMOV-44-DGALL X-AC-2H	LOSS OF OFFSITE POWER (SITE) COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY VALVES	1.50E-02 2.82E-05	1.50E-02 2.82E-05 2.18E-01	9.22E-08	

Report Summary: Filename: C:\CAFTA-W\BNP\EPU-L1\EPU-L1S1.CUT Print date: 4/17/ 1 6:35 PM Not sorted

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# **ATTACHMENT D.4 SENSITIVITY 2 CDF CUTSETS** (5 pages)

# Cutsets with Descriptions Report

2CDF = 2.62E-05

#	Inputs	Description Rate	Exposure	Event Prob	Probability
1	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	7.02E-07
•	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
2	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	7.02E-07
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
3	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	6.67E-07
	ACP0BKR-44-1234	COMMON CAUSE FAILURE OF AT LEAST ONE BREAKER FOR EACH E-BUS	2.04E-04	2.04E-04	• • • • • •
	X-AC-2H			2.18E-01	
4	%T (DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	6.61E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	EDG2DGN-FR-003	DIESEL GENERATOR 3 FAILS TO RUN	7.40E-02	7.40E-02	
1	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
1	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	XOP-COM2-16			7.90E-03	
5	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.40E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
6	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.40E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.008+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-34A1B1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2B-1 AND 2B-2	2.37E-07	2.37E-07	
7	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.758-07
	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07	
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1,00E+00	
8	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.708+00	4.21E-07
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6-00E-06	TINTE VI
	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
9	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.218-07
-	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	5.00E-06	7.210 07
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2 608-02	
10	<b>%</b> TE(S)	LOSS OF OFFSITE POWER (SITE)	1.508-02	1 508-02	3 668-07
	EDG1DGN-FR-001	DIESEL GENERATOR 1 FAILS TO RIN	7 408-02	7 108-02	3.000-01
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RIN OF DIESEL GENERATORS 3 AND 4	1 958-02	1 055 03	I
	X-AC-16H		T.200-02	1.708-04	
ļ				1.695-02	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
11	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
	EDG1DGN-FR-002	DIESEL GENERATOR 2 FAILS TO RUN	7.40E-02	7.40E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-16H			1.69E-02	
12	%TF14	INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM	3.50E-07	3.50E-07	3.50E-07
1	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	OPER-DC2BALT	OPERATOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER SUPPLY-UNIT 2	1.00E+00	1.00E+00	
13	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.70E-07
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
1	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
f i	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	XOP-COM2-15			1.00E-02	
14	ŧte(s)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
	DGH0FAN-44FTSEXH	COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START	4.58E-05	4.58E-05	
1	X-AC-1H			3.46E-01	
15	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
	DGH0FAN-44FTSSUP	COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START	4.58E-05	4.58E-05	
	X-AC-1H			3.46E-01	
16	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.36E-07
	EDG0DGN-44-EDGS	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START	7.22E-05	7.22E-05	
	X-AC-2H			2.18E-01	
17	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.74E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	XOP-COM2-16			7.90E-03	
18	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.62E-07
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
	XOP-COM2-15			1.00E-02	
19	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.508-02	1.50E-02	1.55E-07
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.958-02	1.95E-02	
1	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.008+00	1.00E+00	
ł	X-AC-12H			2.95E-02	
	XOP-ALTUNITXC			1.80E-02	
20	%T(T)	TURBINE TRIP INITIATOR	2.70B+00	2.70E+00	1.47E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
l	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E+01	2.30E-01	
21	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E~02	1.47E-07
1	EDGOCKV-44-CAALL	COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL	4.50E-05	4.50E-05	
ł	X-AC-2H			2.18E~01	
22	<pre>%TE(S)</pre>	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DALL	COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
23	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DCPCV	COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
24	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DLALL	COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
25	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DWALL	COMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V258	4.50E-05	4.50E-05	
1	X-AC-2H			2.18E-01	
26	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-VDALL	COMMON CAUSE FAILURE OF ALL DD PUMP DISCHARGE CHECK VALVES	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
27	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-XCALL	COMMON CAUSE FAILURE OF ALL (8/8) FUEL OIL TRANSFER PUMPS CV TO OPEN	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
28	TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	SWSOCKV-44-DGALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
29	\$TF7	INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.46E-07
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	9.60E-02	1,00E+00	
	OPER-FWS-INJ	OPERATORS FAIL TO PROPERLY CONTROL CONDENSATE INJECTION FLOW RATE	3.00E-01	1.00E+00	
1	XOP-COM2-09			9.40E-03	
30	%T(C)	LOSS OF CONDENSER VACUUM	1.80E-01	1.80E-01	1.38E-07
1	HPC2TDP-FR-HPTDP	HPCI TURBINE-DRIVEN PUMP FAILS TO RUN	7.40E-02	7.40E-02	
	IAN2CKV-44ALL	COMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN	4.50E-05	4.50E-05	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
31	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.30E-07
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2XVN-OC-F001	SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
32	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.27E-07
	EDGOMDC-44SX-AC	COMMON CAUSE FAILURE OF UNIT 1 & 2 DG AIR COMPRESSORS TO START	1.08E-04	1.08E-04	
	X-AC-5H			7.87E-02	
33	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.25E-07
<b>111</b>	BUSFAILT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
1	EDG2DGN-TM-D003	DIESEL GENERATOR 3 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	· • •
	OPER - AUTINITYC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
1	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
1	XOP-COM2-16			7.90E-03	
24	ACT COME IC	ανταστηγιατικά το	2.70E+00	2 708+00	1 24E-07
34	HDCOTOR-FR-HOTOR	HOLT TIRBINE-DRIVEN PIMP FAILS TO RIN	7.40E-02	7.40E-02	1.0.0 0/
1	TAN2CKV_AAAI.I.	COMMON CAUSE FAILURE OF ALL SRV AIR CHECK VALVES TO OPEN	4.508-05	4.508-05	
	ODED - EWSCINT	OPERATOR FAILS TO CONTROL FEEDWATER FLOW AND FEEDWATER LOST AFTER TRIP	3.00E-02	6.00E-02	
1	DOI OFDR-FROMI	DETERMENT OF THE DESTRICT OF DIN	2 308-01	2 202-01	
25	STD (C)		1 508-02	1 508-03	1 218-07
133	916 (87 RDC1 DCN_ MM_D001	DIDECT CONDITION (CATE)	1 408-02	1 400-02	1.210-0/
1	EDGIDGN-24-DG24P	COMMON CANCER DATING TO DIN OF DIVECT (ENDERANCE (AI FOREA)	1 958-02	1 052-02	
1	2192191-24-1934R	COPIENT CAUSE FRIENDE TO KON OF STEDEL GENERATORS 5 RAP 4	1.758-02	1.236-V2 2 650-72	
1	A-MC-12M			2.930-02	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
36	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
	EDG1DGN-TM-D002	DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-12H			2.95E-02	
37	%T (DC2A1)	LOSS OF 125V DC PANEL 2A1	2.90E-03	2.90E-03	1.19E-07
<u> </u>	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-LP2B2	CHARGER 2B-2 FAILS 4.40E-06	2.40E+01	1.06E-04	
38	<b>%T(DC2B2)</b>	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.19E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-LP2A1	CHARGER 2A-1 FAILS 4.40E-06	2.40E+01	1.06E-04	
39	* %TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.12E-07
1	EDG0DGN-34-D134S	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 1,3 AND 4	3.43E-05	3.43E-05	
	X-AC-2H			2.18E-01	
40	*TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.12E-07
1.	EDG0DGN-34-D2345	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 2, 3 AND 4	3.43E-05	3.43E-05	
	X-AC-2H			2.18E-01	-
41	<u>ዲ 110 211</u> ትር (ጥ)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.09E-07
1.1	DCPOREC-44ALJ	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07	
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	BCT 2TOP-FR-BCTOP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
42	ACTZIDI IN MOLDI ATE7	INTERNAL FLOOD TET: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.07E-07
72	ODED-DEDBESS	OPERATOR FAILS TO MANUALLY INITIATE AND ALIGN LOW-PRESSURE SYSTEMS	6.90E-03	1.00E+00	
	YOR-DEPRESS			6.90E-03	
43	*TE (112)	LOSS OF OFFSITE POWER TO UNIT 2	9.80E-03	9.80E-03	1.01E-07
13	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	Y-AC-12H			2.95E-02	
1	YOR-ALTINITYYC			1.80E-02	
44	AUL MELONITING	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.00E-07
111	EDG2MDC-44SU2AC	COMMON CAUSE FAILURE OF UNIT 2 DG AIR COMPRESSORS TO START	1.22E-03	1.22E-03	
	OPER-ALTINITYC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	Y-AC-5H			7.87E-02	
1				7.00E-02	
45	ST(T)	TURBING TRIP INITIATOR	2.70E+00	2.70E+00	9.99E-08
4.5	DECOMPTNE	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	RESIDEND FG DMDA	SLC DIMD C41-C001A FAILS TO START	3.70E-03	3.70E-03	
1.0	SUCZMDE - FS - FMFA		2.70E+00	2.70E+00	9.99E-08
40		MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	RESIDEND FOR DMDD	CLC DIMP CA1-COOLB FAILS TO START	3.70E-03	3.70E-03	
4.7			2.70E+00	2.70E+00	9.94E-08
4 /	SI(I)	ODERATOR FAILS TO DECLIDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER*DIDUIE	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCT DURING ATWS	3.00E-01	1.00E+00	
1	OFER-LLEVELL	DOTO THERE DELINE DIME FAILS TO RIN	2.30E-01	2.30E-01	
1	RUIZIDE*EK*RUIDE	MECHANICAL RINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	XOP-COM2-14	MECHANICAL BINDING OF CONINCH NODE		1.60E-02	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
48	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	9.64E-08
	EDG1DGN-24-DG12R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 1 AND 2	1.95E-02	1.95E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E~02	1.95E-02	
	X-AC-16H			1.69E-02	
49	%T(C)	LOSS OF CONDENSER VACUUM	1.80E-01	1.80E-01	9.36E-08
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-24A1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1 AND 2B-2	5.20E-07	5.20E-07	
50	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	9.22E-08
	SWSOMOV-44-DGALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY VALVES	2.82E-05	2.82E-05	
1	X-AC-2H			2.18E-01	

Report Summary: Filename: C:\CAFTA-W\BNP\EPU-L1\EPU-L1S2.CUT Print date: 4/17/ 1 6:36 PM Not sorted

C:\CAFTA-W\BNP\EPU-L1\EPU-L1S2.CUT

# ATTACHMENT D.5

# SENSITIVITY 3 CDF CUTSETS

(5 pages)

### **Cutsets with Descriptions Report**

2CDF = 2.32E-05

1\$TE(S)LOSS OF OFFSITE POWER (SITE)1.50E-021.50E-026.67E-07ACPOBKR-44-1234COMMON CAUSE FAILURE OF AT LEAST ONE BREAKER FOR EACH E-BUS2.04E-042.04E-042.18E-012\$T(DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-032.90E-036.61E-07BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-01EDG2DGN-FR-003DIESEL GENERATOR 3 FAILS TO RUN7.40E-027.40E-027.40E-02OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-DCPALTDC2OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-CM2-163\$T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07JCC2BAT-XXDEP2BBATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2BAT-XXDEP2BBATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-072.37E-074\$T(T)TURBINE TRIP INITIATOR2.70E+002.70E+002.70E+006.40E-07
ACPOBKR-44-1234 X-AC-2HCOMMON CAUSE FAILURE OF AT LEAST ONE BREAKER FOR EACH E-BUS2.04E-042.04E-042%T(DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-036.61E-07BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-01EDC2DGN-FR-003DIESEL GENERATOR 3 FAILS TO RUN7.40E-027.40E-027.40E-02OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-16TURBINE TRIP INITIATOR2.70E+006.40E-07DCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR2.70E+006.40E-07
X-AC-2H2.18E-012%T(DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-032.90E-036.61E-07BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-013.90E-01EDG2DGN-FR-003DIESEL GENERATOR 3 FAILS TO RUN7.40E-027.40E-027.40E-02OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00XOP-CCM2-16TURBINE TRIF INITIATOR7.90E-037.90E-033%T(T)TURBINE TRIF INITIATOR2.70E+002.70E+00DCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIF INITIATOR2.70E+002.70E+006.40E-07
2\$T(DC2B2)LOSS OF 125V DC PANEL 2B22.90E-032.90E-036.61E-07BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-013.90E-01EDG2DGN-FR-003DIESEL GENERATOR 3 FAILS TO RUN7.40E-027.40E-027.40E-02OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-16TURBINE TRIF INITIATOR2.70E+002.70E+006.40E-073\$T(T)TURBINE TRIF INITIATOR2.70E+001.00E+001.00E+00DCP2BAT-XXDEP2BBATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074\$T(T)TURBINE TRIF INITIATOR2.70E+002.70E+006.40E-07
BUSFAULTFRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE3.90E-013.90E-01EDG2DGN-FR-003DIESEL GENERATOR 3 FAILS TO RUN7.40E-027.40E-02OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00XOP-COM2-16TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07JCCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07
EDG2DGN-FR-003 OPER-480X2DIESEL GENERATOR 3 FAILS TO RUN7.40E-027.40E-02OPER-480X2OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXCOPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2 XOP-COM2-16OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+003%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07DCP2BAT-XXDEP2A DCP2EAT-XXDEP2BBATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07
OPER-480X2 OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E81.00E+001.00E+00OPER-ALTUNITXC OPER-DCPALTDC2 XOP-COM2-16OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+003%T(T) DCP2BAT-XXDEP2A DCP2BAT-XXDEP2BTURBINE TRIP INITIATOR2.70E+002.70E+006.40E-074%T(T)TURBINE TRIP INITIATORCOMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR0.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07
OPER-ALTUNITXC OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT1.00E+001.00E+00OPER-DCPALTDC2 XOP-COM2-16OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+003%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07DCP2BAT-XXDEP2A DCP2RAT-XXDEP2BBATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07
OPER-DCPALTDC2 XOP-COM2-16OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT23.00E-011.00E+00 7.90E-033%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07DCP2BAT-XXDEP2A DCP2BAT-XXDEP2BBATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+00
XOP-COM2-167.90E-033%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07DCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+001.00E+00DCP2BAT-XXDEP2BBATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+002.70E+006.40E-07
3\$T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07DCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+001.00E+00DCP2BAT-XXDEP2BBATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-072.37E-074\$T(T)TURBINE TRIP INITIATOR2.70E+002.70E+002.70E+006.40E-07
DCP2BAT-XXDEP2ABATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2BAT-XXDEP2BBATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07
DCP2BAT-XXDEP2BBATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+001.00E+001.00E+00DCP2REC-34A1A2B2COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-22.37E-072.37E-074%T(T)TURBINE TRIP INITIATOR2.70E+002.70E+006.40E-07
DCP2REC-34A1A2B2     COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2     2.37E-07     2.37E-07       4     %T(T)     TURBINE TRIP INITIATOR     2.70E+00     2.70E+00     6.40E-07
4 %T(T) TURBINE TRIP INITIATOR 2.70E+00 2.70E+00 6.40E-07
DCP2BAT-XXDEP2A BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 1.00E+00 1.00E+00
DCP2BAT-XXDEP2B BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 1.00E+00 1.00E+00
DCP2REC-34A1B1B2 COMMON CAUSE FAILURE OF CHARGER 2A-1, 2B-1 AND 2B-2 2.37E-07 2.37E-07
5 %T(T) TURBINE TRIP INITIATOR 2.70E+00 2.70E+00 4.75E-07
DCPOREC-44ALL COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS 1.76E-07 1.76E-07
DCP2BAT-XXDEP2A BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 1.00E+00 1.00E+00
DCP2BAT-XXDEP2B BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 1.00E+00 1.00E+00
6 %T(T) TURBINE TRIP INITIATOR 2.70E+00 2.70E+00 3.78E-07
RPS2MBIND MECHANICAL BINDING OF CONTROL RODS 1.00E-05
SLC2EPV-CC-F04AB COMMON CAUSE FAILURE OF EXPLOSIVE VALVES C41-F004A/B TO OPEN 1.40E-02 1.40E-02
7 %TE(S) LOSS OF OFFSITE POWER (SITE) 1.50E-02 1.50E-02 3.66E-07
EDG1DGN-FR-001 DIESEL GENERATOR 1 FAILS TO RUN 7.40E-02 7.40E-02
EDG2DGN-24-DG34R COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4
X-AC-16H
8 &TE(S) LOSS OF OFFSITE POWER (SITE)
EDG1DGN-FR-002 DIESEL GENERATOR 2 FAILS TO RUN 7 40E-02 7 40E-02 7
EDG2DGN-24-DG34R COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4 1 95E-02 1 95E-02
X-AC-16H
9 \$TF14 INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING DOOM 3 FOR 07 3 FOR 07 3 FOR 07
DCP2BAT-XXDEP2B BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHAPGEP1 00E+00 1.00E+00 1.00E+00
OPER-DC2BALT OPERATOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER SUPPLY-INIT 2 1 005+00 1 005+00

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
10	&T (T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.70E-07
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	XOP-COM2-15			1.00E-02	
11	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
	DGH0FAN-44FTSEXH	COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START	4.58E-05	4.58E-05	
	X-AC-1H			3.46E-01	
12	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
	DGH0FAN-44FTSSUP	COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START	4.58E-05	4.58E-05	
	X-AC-1H			3.46E-01	
13	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.36E-07
13	EDGODGN-44-EDGS	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START	7.22E-05	7.22E-05	
	X-AC-2H			2.18E-01	
14	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.27E-07
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2EPV-CC-F04AB	COMMON CAUSE FAILURE OF EXPLOSIVE VALVES C41-F004A/B TO OPEN	1.40E-02	1.40E-02	
15	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.74E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	XOP-COM2-16			7.90E-03	
16	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.62E-07
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
1	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
	XOP-COM2-15			1.00E-02	
17	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.55E-07
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	X-AC-12H			2.95E-02	
1	XOP-ALTUNITXC			1.80E-02	
18	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.47E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
19	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
[ · · ·	EDGOCKV-44-CAALL	COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
20	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DALL	COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES	4.50E-05	4.50E-05	
1	X-AC-2H			2.18E-01	
21	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DCPCV	COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN	4.50E-05	4.50E-05	
1	X-AC-2H			2.18E-01	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
22	\$TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DLALL	COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349	4.50E-05	4.50E-05	
1	X-AC-2H			2.18E-01	
22	*TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
<b>111</b>	EDGOCKV-44-DWALL	COMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V258	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
24	*TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
24	EDGOCKV-44-VDALL	COMMON CAUSE FAILURE OF ALL DD PUMP DISCHARGE CHECK VALVES	4.50E-05	4.50E-05	
ł	Y-AC-2H			2.18E-01	
25	2-70-211 2777 (9)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
25	FDCOCKU-AA-YCALL	COMMON CAUSE FAILURE OF ALL (8/8) FUEL OIL TRANSFER PUMPS CV TO OPEN	4.50E-05	4.50E-05	
	Y-NC-2H			2.18E-01	
26	2-AC-20 2-TE (2)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
20	CHEACKU-AA -DCALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES	4.50E-05	4.50E-05	
	SWSUCKV-44-DOADD			2.18E-01	
27	A-AC-20 8mp7	INTERNAL FLOOD TET: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.46E-07
2 '		OPPATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	9.60E-02	1.00E+00	
	OPER-FPSI	OPERATORS FAIL TO PROPERLY CONTROL CONDENSATE INJECTION FLOW RATE	3.00E-01	1.00E+00	
	VOD COM2 A9	OPENATIONE TATE TO THOTELET CONTROL CONDUCTOR ELECTRON		9.40E-03	
20		LOSS OF CONDENSER VACIUM	1.80E-01	1.80E-01	1.38E-07
20		HOSE OF CONDINENDING FAILS TO RIN	7.40E-02	7.40E-02	
I	TANOCKU-AAALI.	COMMON CAUSE FATLURE OF ALL, SRV AIR CHECK VALVES TO OPEN	4.50E-05	4.50E-05	
		PCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
20	RCIZIDF-FR-RCIDF	THE THE THE INITIATOR	2.70E+00	2.70E+00	1.30E-07
29	51(1) 51(1)	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2YUN-OC-F001	SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
20	SUCZAVA OC IVVI	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.27E-07
130	EDGOMDC-44SX-AC	COMMON CAUSE FAILURE OF UNIT 1 & 2 DG AIR COMPRESSORS TO START	1.08E-04	1.08E-04	
1	X-AC-5H			7.87E-02	
21	\$T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.25E-07
131	BUSEAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	FDCODCN_TM_D003	DIESEL GENERATOR 3 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
	ODED-480Y2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
	OPER-AUTINITYC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	YOR-COM2-16			7.90E-03	
22	2012-10 2012 (Q)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
22	*15(5) FDG1DGN_TM_D001	DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
	EDGIDGN-IM DUUL	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	V-AC-128			2.95E-02	
1	8mp (C)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
33	*12 (3) FDG1 DGN-TM-D002	DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
	EDGIDGN-IM-DOUZ	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
1	Y-NC-12H			2.95E-02	
1.	A-AU-124 9m/n/231)	LOSS OF 125V DC PANEL 2A1	2.90E-03	2.90E-03	1.19E-07
34	TICENII.T	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
1	DUDIDAM VVDDDDD	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	DCF2DAI -AADGF2B	CHARGED 2B-2 FAILS 4.40E-06	2.40E+01	1.06E-04	
1	DCF2REC-HF2D2				

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
35	%T (DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.19E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
1	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	DCP2REC-LP2A1	CHARGER 2A-1 FAILS 4.40E-06	2.40E+01	1.06E-04	
36	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.12E-07
	EDG0DGN-34-D134S X-AC-2H	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 1,3 AND 4	3.43E-05	3.43E-05 2.18E-01	
37	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.12E-07
	EDG0DGN-34-D234S X-AC-2H	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 2, 3 AND 4	3.43E-05	3.43E-05 2.18E-01	
38	 እጥ(ጥ)	TURBINE TRIP INITIATOR	2 708+00	2 708+00	1 098-07
38	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1 76E-07	1 768-07	1.092-07
1	DCP2BAT-XXDEP2A	BATTERY BANK 22 DEPLETION FOLLOWING LOSS OF POWER FROM CHARGERI OUR-OD	1 00E+00 '	1 008+00	
	RCI2TDP-FR-RCTDP	RCIC TIRBINE-DRIVEN PIMP FAILS TO RUN	2.308-01	2 308-01	
39	\$TF7	INTERNAL FLOOD TET: FAILS ALL PIMPS AT -17 LEVEL	1.558-05	1 558-05	1 078-07
	OPER-DEPRESS	OPERATOR FAILS TO MANUALLY INITIATE AND ALIGN LOW-PRESSURE SYSTEMS	6.908-03	1 008+00	110/11-0/
1	XOP-DEPRESS		0.002 05	6.90E-03	
40	8TE(U2)	LOSS OF OFFSITE POWER TO UNIT 2	9.808-03	9.802-03	1.018-07
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.958-02	<b>T</b> * <b>O T D</b> = <b>O</b> /
[	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
[	X-AC-12H			2.95E-02	
[	XOP-ALTUNITXC			1.80E-02	
41	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.00E-07
	EDG2MDC-44SU2AC	COMMON CAUSE FAILURE OF UNIT 2 DG AIR COMPRESSORS TO START	1.22E-03	1.22E-03	
1	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	X-AC-5H			7.87E-02	
	XOP-ALTUNITXC1			7.00E-02	
42	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	9.94E-08
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
1	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	XOP-COM2-14			1.60E-02	
43	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	9.64E-08
	EDG1DGN-24-DG12R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 1 AND 2	1.95E-02	1.95E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-16H			1.69E-02	
44	%T (C)	LOSS OF CONDENSER VACUUM	1.80E-01	1.80E-01	9.36E-08
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-24A1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1 AND 2B-2	5.20E-07	5.20E-07	
45	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	9.22E-08
	SWS0MOV-44-DGALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY VALVES	2.82E-05	2.82E-05	
l	X-AC-2H			2.18E-01	
46	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	8.89E-08
	EDG0DGN-44-EDGR	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO RUN	2.01E-04	2.01E-04	
	X-AC-12H			2.95E-02	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
47	%T(T) OPER-FPS1 OPER-WVDHR	TURBINE TRIP INITIATOR OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT) OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR	2.70E+00 9.60E-02 1.40E-03	2.70E+00 1.00E+00 1.00E+00	8.55E-08
48	SWS2XVN-OC-V442 XOP-WVDHR %TE(S) EDG0DGN-34-D134R X-AC-12H	MANUAL VALVE 2 SW V442 FAILS TO REMAIN OPEN 5.505-08 LOSS OF OFFSITE POWER (SITE) COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 1, 3 AND 4	1.50E-02 1.89E-04	2.118-05 1.50E-03 1.50E-02 1.89E-04 2.95E-02	8.36E-08
49	%TE(S) EDG0DGN-34-D234R X-AC-12H	LOSS OF OFFSITE POWER (SITE) COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 2, 3 AND 4	1.50E-02 1.89E-04	1.50E-02 1.89E-04 2.95E-02	8.36E-08
50	\$TE (E3) BUSFAULT DCP2BAT-XXDEP2A DCP2BAT-XXDEP2B DCP2REC-LP2B2	LOSS OF 4160V AC BUS E3 FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 CHARGER 2B-2 FAILS 4.40E-06	2.00E-03 3.90E-01 1.00E+00 1.00E+00 2.40E+01	2.00E-03 3.90E-01 1.00E+00 1.00E+00 1.06E-04	8.24E-08

Report Summary: Filename: C:\CAFTA-W\BNP\EPU-L1\EPU-L1S3.CUT Print date: 4/17/ 1 6:36 PM Not sorted

# ATTACHMENT D.6

# SENSITIVITY 4 CDF CUTSETS

(5 pages)

### Cutsets with Descriptions Report

2CDF = 2.59E-05

#	Inputs	Description Rate	Exposure	Event Prob	Probability
1	<u> </u>	TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	7.02E-07
<b>1</b> *		MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLCOMDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
2	<u>ቆ</u> ጥ(ጥ)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	7.02E-07
<b> </b> ^	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
3	&TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	6.67E-07
17	ACPOBKR-44-1234	COMMON CAUSE FAILURE OF AT LEAST ONE BREAKER FOR EACH E-BUS	2.04E-04	2.04E-04	
	X-AC-2H			2.18E-01	
	&T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	6.61E-07
1	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	EDG2DGN-FR-003	DIESEL GENERATOR 3 FAILS TO RUN	7.40E-02	7.40E-02	
	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
	OPER-ALTINITYC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
1	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	XOP-COM2-16			7.90E-03	
5	xσ(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.40E-07
1	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
ł	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
6	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.40E-07
ľ	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	DCP2DEC-34A1B1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2B-1 AND 2B-2	2.37E-07	2.37E-07	
7	ይር፣ 2KLC 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.75E-07
ľ	DCDOPFC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07	
1	DCPORDC-44ADD	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
		TIDEINE TELE INITIATOR	2.70E+00	2.70E+00	4.21E-07
8	51(1) (DD26(DDM)	FATLINE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	CRD2SCRAM	SLC DIMP CA1-COOLA FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
	SUCZMDP-FR-PMPA		2.70E+00	2.70E+00	4.21E-07
9		EXTING OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
1	CRD2SCRAM	ALC DIMP CAL-COOLB FAILS TO RIN FOR 1 HOUR	2.60E-02	2.60E-02	
	SLCZMDP-FR-FMPB	LOS OF OFFITE DOWER (SITE)	1.50E-02	1.50E-02	3.66E-07
110	ALE (S)	DUSS OF OFFITE FORER (OFFITE)	7.40E-02	7.40E-02	
	EDGIDGN-FK-001	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	EDG2DGN-24-DG34R X-AC-16H	COPTON CRUSH FAILURE TO ROL OF BILDER SERVICES - THE C		1.69E-02	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
11	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
	EDG1DGN-FR-002	DIESEL GENERATOR 2 FAILS TO RUN	7.40E-02	7.40E-02	
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
1	X-AC-16H			1.69E-02	
12	%TF14	INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM	3.50E-07	3.50E-07	3.50E-07
1 ·	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	OPER-DC2BALT	OPERATOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER SUPPLY-UNIT 2	1.00E+00	1.00E+00	
13	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.70E-07
1	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
ł	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
ł	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
Į	XOP-COM2-15			1.00E-02	
14	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
1	DGH0FAN-44FTSEXH	COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START	4.58E-05	4.58E-05	
	X-AC-1H			3.46E-01	
15	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
1	DGH0FAN-44FTSSUP	COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START	4.58E-05	4.58E-05	
	X-AC-1H			3.46E-01	
16	\$TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.36E-07
	EDG0DGN-44-EDGS	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START	7.22E-05	7.22E-05	
	X-AC-2H			2.18E-01	
17	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.74E-07
1	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
1	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	XOP-COM2-16			7.90E-03	
18	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.62E-07
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
	XOP-COM2-15			1.00E-02	
19	<b>%TE(S)</b>	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.55E-07
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
1	X-AC-12H			2.95E-02	
1	XOP-ALTUNITXC			1.80E-02	
20	<b>%</b> Τ(Τ)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.47E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
21	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
1	EDGOCKV-44-CAALL	COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
22	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
1	EDGOCKV-44-DALL	COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES	4.50E-05	4.50E-05	
1	X-AC-2H			2.18E-01	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
23	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DCPCV	COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
24	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DLALL	COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
25	%TE(S)	loss of offsite power (site)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-DWALL	COMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V258	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
26	%TE(S)	loss of offsite power (site)	1.50E-02	1.50E-02	1.47E-07
	EDG0CKV-44-VDALL	COMMON CAUSE FAILURE OF ALL DD PUMP DISCHARGE CHECK VALVES	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
27	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	EDGOCKV-44-XCALL	COMMON CAUSE FAILURE OF ALL (8/8) FUEL OIL TRANSFER PUMPS CV TO OPEN	4.50E-05	4.50E-05	
	X-AC-2H			2.18E-01	
28	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
	SWSOCKV-44-DGALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES	4.50E-05	4.50E-05	
1	X-AC-2H			2.18E-01	
29	%TF7	INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.556-05	1.46E-07
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	9.60E-02	1,006+00	
	OPER-FWS-INJ	OPERATORS FAIL TO PROPERLY CONTROL CONDENSATE INJECTION FLOW RATE	3.008-01	1.00E+00	
1	XOP-COM2-09		1 000 01	J.40E-03	1 200 07
30	%T(C)	LOSS OF CONDENSER VACUUM	7 408-01	7 408-07	1.305-07
	HPC2TDP-FR-HPTDP	HPCI TORBINE-DRIVEN POMP FAILS TO KON	A 500-05	1 50P-05	
1	IAN2CKV-44ALL	COMMON CAUSE FAILURE OF ALL SKY AIR CHECK VALVES TO OPEN	4.30E-03	2 308-01	
	RCI2TOP-FR-RCTDP	RCIC TORBINE-DRIVEN POMP FAILS TO RON	2.30E-01	2.302-01	1 308-07
31	*T(T)	TURBINE TRIP INITIATOR	1 00E-05	1 008-05	1.104-07
1	RPS2MBIND	MECHANICAL BIDDING OF CONTROL ROLL ROLL FALLS TO DEMAIN OPEN 5 50E-08	9 76E+04	4 818-03	
	SLC2XVN-OC-FUUI	SIC TANK DISCHARGE VALVE CEPTON FAILS TO REPAIN OF A STATE STATE	1.50E-02	1.50E-02	1.27E-07
32	TE(S)	LOSS OF OFFSILE FOWER (SILE)	1.08E-04	1.08E-04	
	EDGUMDC-445X-AC	COMPANY CAUSE FRIDARE OF DATE I & 2 DO AIR COMPANY TO DIAL	21002 01	7.87E-02	
1	X-AC-5H	LOSS OF 125W DC DANEL 282	2.90E-03	2.90E-03	1.25E-07
33		EDSTON OF LOSS OF RIGHT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	BUSPAULI BUSPAULI	DIRECT GENERATOR 3 INAVALLARIE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
	EDG2DGN-IM-DUUS	OPERATORS FAIL TO MANUALLY CONNECT INIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
	OPER-400AZ	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE INIT	1.00E+00	1.00E+00	
	OPER-ADIONITAC	OPERATOR FAILS TO ALIGN DC BUS TO STANDRY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
1	VOD COM2-16			7.90E-03	
1.		LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
34		DIESEL GENERATOR 1 INAVALLABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
1	EDGIDGN-IM-DOUL	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
1	Y_AC_12H			2.95E-02	
25	A-AU-1211 STE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
133	EDG1DGN_TM_D002	DIESEL GENERATOR 2 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
1	EDG2DGN-24-DG24P	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-12H			2.95E-02	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
ļ		LODO OF 135U DC DANEL 201	2.90E-03	2.902-03	1.19E-07
36	T (DC2AL)	LOSS OF 123V DO FRIDE INT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
1	BUSFAULT	FRACTION OF DESIGNATION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BALLERI DANK ZE DEFENTION FOLLOWING THE 4.40E-06	2.40E+01	1.06E-04	
1	DCP2REC-LP2B2	CHARGER $2D^{-2}$ FALLS	2.90E-03	2.90E-03	1.19E-07
37	T (DC2B2)	EDS OF 125V DC FRIDE LOS	3.90E-01	3.90E-01	
1	BUSFAULT	FRACTION OF IOSS OF BOST TION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2A	BATTERI DANK 24 DEFETTOR FOLLOWING LOLD OF FULL 4.40E-06	2.40E+01	1.06E-04	
1	DCP2REC-LP2A1	CHARGER ZA-1 FAIDS	1.50E-02	1.50E-02	1.12E-07
38	<b>%</b> TE(S)	LOSS OF OFFSILE FORER (SILE)	3.43E-05	3.43E-05	
1	EDG0DGN-34-D1345	COMMON CAUSE FAILURE TO START OF BILDED CHILDRED CAUSE		2.18E-01	
	X-AC-2H	A CAR OF OFFICE POURD (CIMP)	1.50E-02	1.50E-02	1.12E-07
39	%TE(S)	LOSS OF OFFSITE FOWER (SITE)	3.43E-05	3.43E-05	
	EDG0DGN-34-D234S	COMMON CAUSE FAILORE TO START OF BIRDER CENTERIOUE T, T THE		2.18E-01	
	X-AC-2H		2.70E+00	2.70E+00	1.09E-07
40	%T(T)	TURBINE TRIP INITIATOR	1.76E-07	1.76E-07	
	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH ON THE LOSS OF DOWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2A	BATTERY BANK ZA DEPLETION FOLLOWING HOSS OF FOUR FROM CHEMICAL	2.30E-01	2.30E-01	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN POMP FAILS TO ADD	1.55E-05	1.55E-05	1.07E-07
41	<b>%TF7</b>	INTERNAL FLOOD TF7: FAILS ALL FOMPS AT -17 HUVEL	6.90E-03	1.00E+00	
1	OPER-DEPRESS	OPERATOR FAILS TO MANUALLY INITIALE AND ALIGN LOW TRUSSERS COULTER	••••	6.90E-03	
1	XOP-DEPRESS		9.80E-03	9.80E-03	1.01E-07
42	<b>%TE (U2)</b>	LOSS OF OFFSITE POWER TO UNIT 2	1.95E-02	1.95E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO KUN OF DIESEL GENERATORD SAND	1.00E+00	1.00E+00	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OFFOSTILE ONTI		2.95E-02	
	X-AC-12H			1.80E-02	
1	XOP-ALTUNITXC		1.50E-02	1.50E-02	1.00E-07
43	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.22E-03	1.22E-03	
	EDG2MDC-44SU2AC	COMMON CAUSE FAILURE OF UNIT 2 DG AIR COMPRESSION TO BROSTIE INIT	1.00E+00	1.00E+00	
1	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OFFOSTIB ONT		7.87E-02	
	X-AC-5H			7.00E-02	
	XOP-ALTUNITXC1		2.70E+00	2.70E+00	9.99E-08
44	&T (T)	TURBINE TRIP INITIATOR	1.00E-05	1.00E-05	
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	3.70E-03	3.70E-03	
	SLC2MDP-FS-PMPA	SLC PUMP C41-COOLA FAILS TO START	2.70E+00	2.70E+00	9.99E~08
45	\$T(T)	TURBINE TRIP INITIATOR	1.00E-05	1.00E-05	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	3 708-03	3.70E-03	
	SLC2MDP-FS-PMPB	SLC PUMP C41-C001B FAILS TO START	2 708+00	2.70E+00	9.94E-08
46	&T(T)	TURBINE TRIP INITIATOR	4 308-02	1 00E+00	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INDECTION	2.305-02	1 008+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING AIWS	2 208-01	2 308-01	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	1 008-05	1 008-05	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.005-05	1 608-02	
	XOP-COM2-14		1 508-02	1.502-02	9 64E-08
47	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.305-02	1 958-02	2104H-00
1.	EDG1DGN-24-DG12R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 1 AND 2	1.955-04	1.558-02	
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.955-02	1 600-02	
	X-AC-16H			1.096-02	
	EDG2DGN-24-DG34R X-AC-16H	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.7 <b>52</b> V2	1.69E-02	1

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
48 49	%T(C) DCP2BAT-XXDEP2A DCP2BAT-XXDEP2B DCP2REC-24A1B2 %TE(S) SWS0MOV-44-DGALL	LOSS OF CONDENSER VACUUM BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 COMMON CAUSE FAILURE OF CHARGER 2A-1 AND 2B-2 LOSS OF OFFSITE POWER (SITE) COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY VALVES	1.80E-01 1.00E+00 1.00E+00 5.20E-07 1.50E-02 2.82E-05	1.80E-01 1.00E+00 1.00E+00 5.20E-07 1.50E-02 2.82E-05 2.18E-01	9.36E-08 9.22E-08
50	X-AC-2H %TE(S) EDG0DGN-44-EDGR X-AC-12H	LOSS OF OFFSITE POWER (SITE) COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO RUN	1.50E-02 2.01E-04	1.50E-02 2.01E-04 2.95E-02	8-89E-08

Report Summary: Filename: C:\CAFTA-W\BNP\EPU-L1\EPU-L1S4.CUT Print date: 4/17/ 1 6:37 PM Not sorted



# **Cutsets with Descriptions Report**

2CDF = 2.73E-05

#	Inputs	Description Rate	Exposure	Event Prob	Probability
1	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.80E-07
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
2	<b>%</b> Τ(Τ)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.80E-07
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
3	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.11E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
4	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.11E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-34A1B1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2B-1 AND 2B-2	2.37E-07	2.37E-07	
5	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	6.67E-07
	ACP0BKR-44-1234	COMMON CAUSE FAILURE OF AT LEAST ONE BREAKER FOR EACH E-BUS	2.04E-04	2.04E-04	
	X-AC-2H			2.18E-01	
6	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	6.61E-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	EDG2DGN-FR-003	DIESEL GENERATOR 3 FAILS TO RUN	7.40E-02	7.40E-02	
	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	XOP-COM2-16			7.90E-03	
7	<b>%</b> T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	5.28E-07
	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07	
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
8	<u>ዲር የ</u>	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	4.68E-07
ľ	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
1	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
9	\$π(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	4.68E-07
ľ	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
]	SLC2MDP-FR-PMPB	SLC PIMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
10	ATE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
10	$\overline{\mathbf{FD}}$	DIESEL GENERATOR 1 FAILS TO RIN	7.40E-02	7.40E-02	
	EDGIDGN-24-DC24P	COMMON CAUSE FAILURE TO PIN OF DIESEL GENERATORS 3 AND 4	1.958-02	1.95E-02	
	X-AC-16H	COLTON CUTOR INTERNA IA MAN AL REPORT ARMININA A MAR 3		1.69E-02	

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#	<u>)</u> Inputs	Description Rate	Exposure	Event Prob	Probability	
		LOGG OF OFFETTE DOWED (SITE)	1.50E-02	1.50E-02	3.66E-07	
1:	1 %TE(S)	LOSS OF OFFSILE FORMER (SILE)	7.40E-02	7.40E-02	·	
	EDG1DGN-FR-002	COMMON CAUSE FAILURE TO RIN OF DIESEL GENERATORS 3 AND 4	1.95E-0 <b>2</b>	1.95E-02		
	EDG2DGN-24-DG34R	COMMON CROSE FRIDONE TO THE ELECTRON		1.69E-02		
-		INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM	3.50E-07	3.50E-07	3.50E-07	
1	Z SIFIA	PATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00		
	ODED DC2BALT	OPERATOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER SUPPLY-UNIT 2	1.00E+00	1.00E+00		
		TIDENTE TRIP INITIATOR	2.70E+00	3.00E+00	3.00E-07	
1		OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00		
	OPER-DIDUIE	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00		
	OPER-LIEVEL?	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00		
		MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05		
	Krszmeine Von COM2-15			1.00E-02		
١.		LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07	
1-	4 SIE (S) DCHOENN-44ETSEXH	COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START	4.58E-05	4.58E-05		
	DORUFAN-44FISBAR			3.46E-01		
١.		LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07	
Ľ		COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START	4.58E-05	4.58E-05		
	V NO 14			3.46E-01		
	A = AC = IR	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.36E-07	
11	6 TE(S)	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START	7.22E-05	7.22E-05		
1	EDGUDGN-44-EDGS			2.18E-01		
L		πιαστη ματάστη ΙΝΙΠΙΑΤΟR	2.70E+00	3.00E+00	1.80E-07	
1	.7 *T(T)	PATIME OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06		
l	CRD25CRAM	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00		
	OPER-DIDUIS	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00		
	OPER-DEVEDI	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00		
ł	VOB COM2-15			1.00E-02		
L		LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.74E-07	
ľ		FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01		
L	FORTADIA	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02		
	ODED AL FUNITYC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00		
	OPER-ALIONITAC	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00		
1	VOD COM2 16			7.90E-03		
	XOP = COM2 = 16	TIDETNE TRIP INITIATOR	2.70E+00	3.00E+00	1.64E-07	
P		BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00		
	DCP2BAT-AADEP2A	COMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.375-07		
	DCP2REC-34AIA2B2	DATE TIDRINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01		
L	RCI2TDP-FR-RCIDE	LOS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.55E-07	
F	$20  \text{TE}(S) \\ = 20000 \text{ P}(S) + 200000 \text{ P}(S) + 2000000 \text{ P}(S) + 2000000 \text{ P}(S) + 20000000 \text{ P}(S) + 200000000000000000000000000000000000$	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02		
	EDGZDGN-24-DG34K	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00		
ł	OPER-ALIUNTIAC	OFBRATORD THE TO		2.95E-02		
L				1.80E-02		
	XUP-ALTUNITAC	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07	
ľ		COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL	4.50E-05	4.50E-05		
	EDGUCKV-44-CAADD			2.18E-01		
		LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07	
ł	22 %TE(S)	COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES	4.50E-05	4.50E-05		
	EDGUCKV-44-DALL			2.18E-01		
	A-AC-20				•	

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Ţ,	#	Inputs	Description Rate	Exposure	Event Prob	Probability
		ትጥም ( ሮ )	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
ľ	23		COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN	4.50E-05	4.50E-05	•
L		EDGUCKV-44-DCFCV			2.18E-01	
Ι.	<b>.</b>	x-AC-2A STE(C)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
ľ	24		COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349	4.50E-05	4.50E-05	
		EDGUCKV-44-DIADI			2.18E-01	
L	<b>.</b> .	A-AC-20 2007 (0)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.47E-07
Ŀ	25	TE(S)	COMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V258	4.50E-05	4.50E-05	
		EDGUCKV-44-DWALL	COMPON CRODE FAIlord of children views view, see, see,		2.18E-01	
	~ ~	X-AC-ZH	LOSS OF OFFSITE DOWER (SITE)	1.50E-02	1.50E-02	1.47E-07
ŀ	26	TE(S)	COMMON CALLER FAILURE OF ALL DD PUMP DISCHARGE CHECK VALVES	4.50E-05	4.50E-05	
		EDGOCKV-44-VDADD	CONTION CROSS FAILORE OF ALL 22 FOR 22002000		2.18E-01	
		X-AC-2H	LOCO OR OFFICIER DOWER (SITE)	1.50E-02	1,50E-02	1.47E-07
F	27	TE(S)	CONTROL CONTRACT THE CALL (8/8) FIEL OLL TRANSFER PIMPS CV TO OPEN	4.50E-05	4.50E-05	
1		EDGOCKV-44-ACALL	COMMON CAUSE FAILURE OF ALL (570) Fold off Individue Fond C.		2.18E-01	
I.		X-AC-2H	TAGE OF OFFICE DOWED (SITE)	1.50E-02	1.50E-02	1.47E-07
F	28	TE(S)	CONVOL CALVER OF ALL INIT 1 & 2 DG COOLING SUPPLY CHECK VALVES	4.50E-05	4.50E-05	
1		SWSOCKV-44-DGALL	COMMON CAUSE FAILURE OF ALL ONTE THE DO COULING DUTIE CHECK COMMON		2.18E-01	,
		X-AC-2H	THE PROPERTY FAILS ALL PIMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.46E-07
F	29	STF7	ODERTOP RALE FLOW ALLE AND FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	9.60E-02	1.00E+00	
1		OPER-FPS1	OPERATOR FAILS TO BROKPLY CONTROL CONDENSATE INJECTION FLOW RATE	3.00E-01	1.00E+00	
L		OPER-FWS-INJ	OPERATORS FAIL TO FROFERENCE CONTROL CONDUCTION INCLUSION		9.40E-03	
L		XOP-COM2-09		2.70E+00	3.00E+00	1.44E-07
ŀ	30	Transfer (T)	TORNIAL TRIPTATION OF CONTROL RODS	1.00E-05	1.00E-05	
I		RPS2MBIND	THE TANK DESCHARGE VALUE (41-FOOL FAILS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
I.		SLC2XVN-OC-FUOI	SIL TANK DISCHARGE VALVE CHI FOOT THESE TO MELLIN OF THE STORE	1.80E-01	1.80E-01	1.38E-07
ŀ	31	T(C)	LUSS OF CONDENSER VACUUM PATLS TO RIN	7.40E-02	7.40E-02	
		HPC2TDP-FR-HPTDP	COMON CAUSE FAILURE OF ALL SPU ALE CHECK VALVES TO OPEN	4.50E-05	4.50E-05	
I		IAN2CKV-44ALL	COMMON CAUSE FRIDENE OF MIL STO BIN	2.30E-01	2.30E-01	
1		RCI2TDP-FR-RCIDP	KULL IURDING-DRIVEN FUMF FAILS IO KUN	2.70E+00	3.00E+00	1.38E-07
ł	32	ST(T)	UNDING TRIFTER DIVEN DIMO FATIS TO RIN	7.40E-02	7.40E-02	
1		HPC2TDP-FR-HPTDP	COMON CAUSE PATIENDE OF ALL SEV ATE CHECK VALVES TO OPEN	4.50E-05	4.50E-05	
ł		IAN2CKV-44ALL	ODERATOR CRUSE FRIDE TO CONTROL REEDWATER FLOW AND FEEDWATER LOST AFTER TRIP	3.00E-02	6.00E-02	
		DER-FWSCNT	Determine protein plant to plant the protein and the plant to be the plant to be plant to	2.30E-01	2.30E-01	
1		RC12TDP-FR-RCTDP	KCIC TORDING-DRIVEN FOM FOR STREN	1.50E-02	1.50E-02	1.27E-07
ł	33	TE(S)	COMMON CHISE FAILURE OF INIT 1 & 2 DG ALR COMPRESSORS TO START	1.08E-04	1.08E-04	
		EDGUMDC-445X-AC			7.87E-02	
		X-AC-5H	LOSS OF 125V DC DANEL 282	2.90E-03	2.90E-03	1.25E-07
	34	T (DC2B2)	EDGS OF 123V DC FAILE THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	1	BUSFAULT	FRACTION OF DOUS OF DOU THAT HALF NOW MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
I		EDG2DGN-TM-DUUS	OPERATORS FAIL TO MANUALLY CONNECT INIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
		OPER-480A2	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
		OPER-ALTUNITAC	OPERATORS FALLS TO ALLOW DO BUS TO STANDRY DO POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
		OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DE BOS TO STANDET DE TOULR DETTEL	•••••	7.90E-03	
		XOP-COM2-16		2.70E+00	3.00E+00	1.21E-07
	35	*T(T)	TURBING IRLF INITIATOR OF BOTH INIT 1 AND INIT 2 CHARGERS	1.76E-07	1.76E-07	
	1	DCPOREC-44ALL	COMPLEN CAUSE FAILURE OF BOIR ONLY I AND ONLY & CHERCENE	1.00E+00	1.00E+00	
	I	DCP2BAT-XXDEP2A	BALLERI DANK ZA DEFUELTION FOLLOWING LOSS OF FOREN TROP, CLARGERTFORFO	2.30E-01	2.30E-01	
		RCI2TDP-FR-RCTDP	KULU IUKDINE-DRIVEM FORF FRIED IO KOM			
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#	Inputs	Description Rate	Exposure	Event Prob	Probability
		LOGG OF OFFEITE BOWER (SITE)	1.50E-02	1.50E-02	1.21E-07
36	TE(S)	LUSS OF OFFSILE FORER (DILLA DILL DILL TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
	EDG1DGN-TM-DU01	DIESEL GENERATOR I UNAVAILABLE DOB 10 FAITHEALING (DE CONTINUED DE CONTINUED DE DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 5 Map 4		2.95E-02	
	X-AC-12H		1.50E-02	1.50E-02	1.21E-07
37	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.408-02	1.40E-02	
	EDG1DGN-TM-D002	DIESEL GENERATOR Z UNAVAILABLE DUE 100 PAINTENANCE (AI FOUNA)	1 95E-02	1.95E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1,752 04	2.95E-02	
	X-AC-12H		2 908-03	2.90E-03	1.198-07
38	%T(DC2A1)	LOSS OF 125V DC PANEL 2AL	3 908-01	3.908-01	
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	1 008+00	1 00E+00	
1	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGERING	2 408+00	1.065-04	
	DCP2REC-LP2B2	CHARGER 2B-2 FAILS 4.40E-06	2.405401	2 908-03	1.198-07
39	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.908-03	2.905-03	1.170 07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	1 008+00	
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGERI 1000	1.005+00	1.005700	
1	DCP2REC-LP2A1	CHARGER 2A-1 FAILS 4.40E-06	2.405+01 1 FOR 00	1.002-04	1 128-07
40	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.508-02	1.508-02	1.126-07
ł	EDGODGN-34-D134S	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 1,3 AND 4	3.438-05	3.435-05	
ł	X-AC-2H		1 505 00	2.188-01	1 128-07
41	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.506-02	1.508-02	1.126-07
	EDGODGN-34-D234S	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 2, 3 AND 4	3.43E-05	3.435-05	
	X-AC-2H			2.186-01	1 110 07
42	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.005+00	1.116-07
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FS-PMPA	SLC PUMP C41-C001A FAILS TO START	3.70E-03	3.706-03	1 110 03
43	<b>%</b> T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.005+00	1.116-07
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	SLC2MDP-FS-PMPB	SLC PUMP C41-C001B FAILS TO START	3.70E-03	3.70E-03	
44	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	1.108-07
1	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
1	BCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
	RESOMBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	XOP-COM2-14			1.60E-02	· · · · · ·
15	201 COM2 45	INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.07E-07
123	OPER_DEPRESS	OPERATOR FAILS TO MANUALLY INITIATE AND ALIGN LOW-PRESSURE SYSTEMS	6.90E-03	1.00E+00	
ł	VOD_DEDDESS			6.90E-03	
1.0	AUF - DEF RESS	LOSS OF OFFSITE POWER TO UNIT 2	9.80E-03	9.80E-03	1.01E-07
40	516 (UZ) EDCODCN-24-DG34P	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
1	ODED ALTINITYC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	V AC 124			2.95E-02	
	X-AC-12A			1.80E-02	
1	AUP-ALIUNIIAC	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.00E-07
47	TTE (5)	COMMON CAUSE FAILURE OF UNIT 2 DG AIR COMPRESSORS TO START	1.22E-03	1.22E-03	
1	BUGZMUC-445UZAC	ODERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
1	OPER-ALTUNITAC	VEDRALOND FALL TO PERIONDAL INCOMENTATION CONTRACTOR CONTACT		7.87E-02	
1	X-AC-5H XOP-ALTUNITXC1			7.00E-02	

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#### **Cutsets with Descriptions Report**

2CDF = 2.43E-05

#	Inputs	Description Rate	Exposure	Event Prob	Probability
1	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.11E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
l I	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.37E-07	2.37E-07	
2	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	7.11E-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2REC-34A1B1B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2B-1 AND 2B-2	2.37E-07	2.37E-07	
3	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	6.67E-07
	ACPOBKR-44-1234	COMMON CAUSE FAILURE OF AT LEAST ONE BREAKER FOR EACH E-BUS	2.04E-04	2.04E-04	
	X-AC-2H			2.18E-01	
4	%T(DC2B2)	LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	6.61E-07
Ľ	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	EDG2DGN~FR-003	DIESEL GENERATOR 3 FAILS TO RUN	7.40E-02	7.40E-02	
	OPER-480X2	OPERATORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00	
	XOP-COM2-16			7.90E-03	
5	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	5.28E-07
ľ	DCPOREC-44ALL	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07	
1	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
6	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	4.20E-07
l -	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2EPV-CC-F04AB	COMMON CAUSE FAILURE OF EXPLOSIVE VALVES C41-F004A/B TO OPEN	1.40E-02	1.40E-02	
7	TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
	EDG1DGN-FR-001	DIESEL GENERATOR 1 FAILS TO RUN	7.40E-02	7.40E-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-16H			1.69E-02	
8	*TE(S)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	3.66E-07
ľ	EDGIDGN-FR-002	DIESEL GENERATOR 2 FAILS TO RUN	7.40E-02	7.40E-02	
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	X-AC-16H			1.69E-02	
9	8TF14	INTERNAL FLOOD TF14: FAILS CONDENSATE AND FLOODS CABLE SPREADING ROOM	3.50E-07	3.50E-07	3.50E-07
ľ	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
1	OPER-DC2BALT	OPERATOR FAILS TO SWITCH CHARGER TO ALTERNATE AC POWER SUPPLY-UNIT 2	1.00E+00	1.00E+00	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
<u> </u>	0-m (m)		2.70E+00	3.00E+00	3.00E-07
10	ST(T)	OPERATOR BALLS TO PRECLIDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-DILUIE	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
	OPER-DEEVEDZ	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	XOD COM2-15			1.00E-02	
1.1		TURBING TRIP INITIATOR	2.70E+00	3.00E+00	2.52E-07
11		FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
1	CRD25CRAM	COMMON CAUSE FAILURE OF EXPLOSIVE VALVES C41-F004A/B TO OPEN	1.40E-02	1.40E-02	
1	SUCZERV-CC-PUTAD	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
12	TCHOTAN-AAFTSEXH	COMMON CAUSE FAILURE OF EXHAUST FANS E, F, G, AND H TO START	4.58E-05	4.58E-05	
	Y_NC_1W			3.46E-01	
1.2	а-ас-іп \$75 (с)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.38E-07
1.3	DOUDEDN-AAFTSSIIP	COMMON CAUSE FAILURE OF SUPPLY FANS A, B, C, AND D TO START	4.58E-05	4.58E-05	
	Y-NC-14			3.46E-01	
1.4	2-AC-1A 9777 (C)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	2.36E-07
14	TECODON-44-EDGS	COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO START	7.22E-05	7.22E-05	
	X-AC-2H			2.18E-01	
16	<u>አ-RC-20</u> ይም(ጥ)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	1.80E-07
122	CRACRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	OPER-DILITE	OFERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
1	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	3.00E-01	1.00E+00	
	XOP-COM2-15			1.008-02	1 748-07
16	%T (DC2B2)	LOSS OF 125V DC PANEL 2B2	2.905-03	2.905-03	1.748-07
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.908-01	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.955-02	1.956-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.005+00	1.008+00	
	OPER-DCPALTDC2	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.005-01	7 908-03	
	XOP-COM2-16		2 708.00	7.905-03	1 64E-07
17	%T(T)	TURBINE TRIP INITIATOR	2.708+00	3.005+00	1.048-07
	DCP2BAT-XXDEP2A	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGERI. 00E+00	2.275-07	2 278-07	
	DCP2REC-34A1A2B2	COMMON CAUSE FAILURE OF CHARGER 2A-1, 2A-2 AND 2B-2	2.3/6-0/	2.378-01	
	RCI2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	1 508-01	1 508-02	1 55E-07
18	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.506-02	1 958-02	1.331 07
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1,956-02	1 008+00	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.005+00	2 958-02	
1	X-AC-12H			1 908-02	
1	XOP-ALTUNITXC		1 508-02	1 508-02	1 478-07
19	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.508-02	4 508-02	1.1/2 0/
1	EDGOCKV-44-CAALL	COMMON CAUSE FAILURE OF UNIT 1 AND UNIT 2 RECEIVER CHECK VALVES - CONTROL	4.505-05	2 18E-01	
	X-AC-2H		1 608-02	1 508-02	1 478-07
20	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.502-02	4 508-05	
	EDGOCKV-44-DALL	COMMON CAUSE FAILURE OF ALL DAY TANK CHECK VALVES	3.505-05	2.305-03	
1	X-AC-2H		1 600-00	1 505-01	1 478-07
21	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.508-02	1.508-02	1.4.10-01
	EDGOCKV-44-DCPCV	COMMON CAUSE FAILURE OF CHECK VALVES V46, V76, V106, AND V136 TO OPEN	*.5VE-05	2 1812-01	
	X-AC-2H			2.105-01	

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#		Description Rate	Exposure	Event Prob	Probability	
Ľ			1.50E-02	1.50E-02	1.47E-07	
22	%TE(S) EDG0CKV-44-DLALL	COMMON CAUSE FAILURE OF CHECK VALVE V241, V277, V313, AND V349	4.50E-05	4.50E-05 2.18E-01		
1	X-AC-2H		1.50E-02	1.50E-02	1.47E-07	
23	TE(S)	LOSS OF OFFSITE POWER (SITE) COMMON CAUSE FAILURE OF CHECK VALVE V150, V186, V222, AND V258	4.50E-05	4.50E-05		
	EDGUCKV-44-DWADD			2.185-01	1 478-07	
1.	<u>አ-ጽር-20</u> ይጥሮ (ሮ)	LOSS OF OFFSITE POWER (SITE)	1.508-02	1.508-02	1.4/6-0/	
24	EDGOCKV-44-VDALL	COMMON CAUSE FAILURE OF ALL DD PUMP DISCHARGE CHECK VALVES	4.508-05	4.504-05		
	X-AC-2H		1 508.03	1 508-01	1 478-07	
25	%TE(S)	LOSS OF OFFSITE POWER (SITE)	1.506-02	4 50E-05	1.1.1	
1.2	EDGOCKV-44-XCALL	COMMON CAUSE FAILURE OF ALL (8/8) FUEL OIL TRANSFER PUMPS CV TO OPEN	4.305-03	2 18E-01		
1	X-AC-2H		1 508-02	1.508-02	1.47E-07	
26	<b>%TE(S)</b>	LOSS OF OFFSITE POWER (SITE)	4 508-05	4.50E-05		
	SWSOCKV-44-DGALL	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY CHECK VALVES	4.508.05	2.18E-01		
	X-AC-2H		1.55E-05	1.55E-05	1.46E-07	
27	%TF7	INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -1/ LEVEL	9.60E-02	1.00E+00		
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COULANT INJECTION FLOW PATE	3.00E-01	1.00E+00		
	OPER-FWS-INJ	OPERATORS FAIL TO PROPERLY CONTROL CONDENSATE INDECITOR FLOW MILES		9.40E-03		
	XOP-COM2-09		2.70E+00	3.00E+00	1.44E-07	
28	\$T(T)	TURBINE TRIP INITIATOR	1.00E-05	1.00E-05		
	RPS2MBIND	MECHANICAL BINDING OF CONTROL ROOS	8.76E+04	4.81E-03		
	SLC2XVN-OC-F001	SLC TANK DISCHARGE VALVE CALFFORT FAILS TO ALLER OF COMPANY	1.80E-01	1.80E-01	1.38E-07	
29	%T(C)	LOSS OF CONDENSER VACUUM	7.40E-02	7.40E-02		
	HPC2TDP-FR-HPTDP	HPCI TURBINE DRIVEN FOR FAILS STATE CHECK VALVES TO OPEN	4.50E-05	4.50E-05		
	IAN2CKV-44ALL	COMMON CAUSE FAILURE OF ALL OF	2.30E-01	2.30E-01		
1	RCI2TDP-FR-RCTDP	RCIC TORBINE-DRIVEN FORF FAILS TO ROL	2.70E+00	3.00E+00	1.38E-07	
30	%T(T)	TURBING TRIP INTITATOR DING FAILS TO RIN	7.40E-02	7.40E-02		
	HPC2TDP-FR-HPTDP	HPCI TORBING DATUME FOR ALL SEV AR CHECK VALVES TO OPEN	4.50E-05	4.50E-05		
	IAN2CKV-44ALL	COMMON CAUSE FAILURE OF HELDWATER FLOW AND FEEDWATER LOST AFTER TRIP	3.00E-02	6.00E-02		
	OPER-FWSCNT	OPERATOR FAILS TO CONTROL FILM FAILS TO RIN	2.30E-01	2.30E-01		
	RCI2TDP-FR-RCTDP	RCIC TURDING-DRIVEN FOR FOR STEED	1.50E-02	1.50E-02	1.27E-07	
31	%TE(S)	CONTON OF FET LURE OF INIT 1 & 2 DG AIR COMPRESSORS TO START	1.08E-04	1.08E-04		
	EDGOMDC-44SX-AC	COMMON CROSS FRICKE OF CALL I I I I I I I I I I I I I I I I I I		7.87E-02		
	X-AC-5H	TODE OF 125W DC DANEL 282	2.90E-03	2.90E-03	1.25E-07	
32	&T (DC2B2)	LOSS OF 123V DC FAILE THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01		
1	BUSFAULT	PRACTION OF DOSD OF DOSD THAT AT LARLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02		
1	EDG2DGN-TM-D003	ODESTORS FAIL TO MANUALLY CONNECT UNIT 2 SUBSTATIONS E7 AND E8	1.00E+00	1.00E+00		
	OPER-480X2	OPERATORS FALL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.00E+00	1.00E+00		
	OPER-ALTUNITXC	OPERATOR FAILS TO ALIGN DC BUS TO STANDBY DC POWER SUPPLY - UNIT2	3.00E-01	1.00E+00		
	OPER-DCPALITUCZ	OFFICE OFFICE OF THE CONTRACT OF THE CONTRACT.		7.90E-03	1 017 07	
	XOP-COM2-16	TTIDEINE TRIP INITIATOR	2.70E+00	3.00E+00	1.21E-07	
33	ST(T)	COMMON CAUSE FAILURE OF BOTH UNIT 1 AND UNIT 2 CHARGERS	1.76E-07	1.76E-07		
1	DCPOREC-44ADD	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00		
	DCP2BAT-AADEP2A	POLC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01		
1.	KCIZIDP-FR-RCIDP	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.218-07	
34	TE(S)	DIESEL GENERATOR 1 UNAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02		
1	EDGIDGN-IM-DOUI	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02		
	EDG2DGN-24-DG34K			2.95E-02		
1	V-40-15H				•	
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#	Inputs	Description Rate	Exposure	Event Prob	Probability
25	4mm (0)	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.21E-07
35	51E(S) #DC1DCN_TM_D002	DISSEL GENERATOR 2 INAVAILABLE DUE TO MAINTENANCE (AT POWER)	1.40E-02	1.40E-02	
	EDGIDGN-IM-DC02	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.95E-02	1.95E-02	
	EDG2DGN-24-DG34K			2.95E-02	
20	A-AC-12A \$m(DC321)	LOSS OF 125V DC PANEL 2A1	2.90E-03	2.90E-03	1.19E-07
36	SI (DCZAI)	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	DODODAT.VVDEDOD	PATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DCP2BAI -AADBE2B	CHAPGER 2R-2 FAILS 4.40E-06	2.40E+01	1.06E-04	
1.7		LOSS OF 125V DC PANEL 2B2	2.90E-03	2.90E-03	1.19E-07
37		FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	BUSFAULI BUSFAULI	BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
		CHARGER 2A-1 FAILS 4.40E-06	2.40E+01	1.06E-04	
2.0		LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.12E-07
38	51E(5) EDGODGN_34-D1348	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 1,3 AND 4	3.43E-05	3.43E-05	
	N-VC-2H			2.18E-01	
20	አ-ጽር-20 ይጥፍ ( ሮ )	LOSS OF OFFSITE POWER (SITE)	1.50E-02	1.50E-02	1.12E-07
139	EDCODON-34-D234S	COMMON CAUSE FAILURE TO START OF DIESEL GENERATORS 2, 3 AND 4	3.43E-05	3.43E-05	
	X-DC-2H			2.18E-01	
4.0	ል- ጸር- 211 ይም (ጥ)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	1.10E-07
40	OPER-DILITTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	4.30E-02	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	3.00E-01	1.00E+00	
	PCI 2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	XOP-COM2-14			1.60E-02	
41	\$TF7	INTERNAL FLOOD TF7: FAILS ALL PUMPS AT -17 LEVEL	1.55E-05	1.55E-05	1.076-07
	OPER-DEPRESS	OPERATOR FAILS TO MANUALLY INITIATE AND ALIGN LOW-PRESSURE SYSTEMS	6.90E-03	1.008+00	
1	XOP-DEPRESS			6.90E-03	1 018 07
42	%TE(U2)	LOSS OF OFFSITE POWER TO UNIT 2	9.806-03	9.80E-03	1.016-07
1	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.956-02	1.955-02	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.002400	1.005+00	
	X-AC-12H			2.955-02	
	XOP-ALTUNITXC		1 508 00	1 505-02	1 008-07
43	%TE (S)	LOSS OF OFFSITE POWER (SITE)	1.306-02	1.302-02	1.005-07
	EDG2MDC-44SU2AC	COMMON CAUSE FAILURE OF UNIT 2 DG AIR COMPRESSORS TO START	1.226-03	1.228-03	
	OPER-ALTUNITXC	OPERATORS FAIL TO MANUALLY ALIGN POWER FROM OPPOSITE UNIT	1.006+00	7 978-02	
	X-AC-5H			7.078-02	
	XOP-ALTUNITXC1		1 505 00	1 508-02	9 648-08
44	%te (S)	LOSS OF OFFSITE POWER (SITE)	1.506-02	1 958-02	3.048 00
	EDG1DGN-24-DG12R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 1 AND 2	1.956-02	1 958-02	
	EDG2DGN-24-DG34R	COMMON CAUSE FAILURE TO RUN OF DIESEL GENERATORS 3 AND 4	1.956-02	1 692-02	
	X-AC-16H		2 208-00	3 008+00	9.508-08
45	%T(T)	TURBINE TRIP INITIATOR	2./UETUU 0 608-02	1 002400	5.500 00
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	3.00E-02	1 002+00	
1	OPER-WVDHR	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DAR	3 845-03	2.118-05	
	SWS2XVN-OC-V442 XOP-WVDHR	MANUAL VALVE 2 SW V442 FAILS TO REMAIN OPEN 5.50E-06	J.010+02	1.50E-03	

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#	Inouts	Description Rate	Exposure	Event Prob	Probability
46	*T (C) DCP2BAT-XXDEP2A DCP2BAT-XXDEP2B DCP2REC-24A1B2 *T (T) DCP2BAT-XXDEP2A DCP2BAT-XXDEP2B DCP2REC-24A1B2 OPER-FWSCNT *TE (S)	LOSS OF CONDENSER VACUUM BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 COMMON CAUSE FAILURE OF CHARGER 2A-1 AND 2B-2 TURBINE TRIP INITIATOR BATTERY BANK 2A DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00 COMMON CAUSE FAILURE OF CHARGER 2A-1 AND 2B-2 OPERATOR FAILS TO CONTROL FEEDWATER FLOW AND FEEDWATER LOST AFTER TRIP LOSS OF OFFSITE POWER (SITE)	1.80E-01 1.00E+00 1.00E+00 5.20E-07 2.70E+00 1.00E+00 1.00E+00 5.20E-07 3.00E-02 1.50E-02	1.80E-01 1.00E+00 5.20E-07 3.00E+00 1.00E+00 1.00E+00 5.20E-07 6.00E-02 1.50E-02	9.36E-08 9.36E-08 9.22E-08
48 49	VTE(S) SWSOMOV-44-DGALL X-AC-2H VTE(S) EDG0DGN-44-EDGR	COMMON CAUSE FAILURE OF ALL UNIT 1 & 2 DG COOLING SUPPLY VALVES LOSS OF OFFSITE POWER (SITE) COMMON CAUSE FAILURE OF 4 OF 4 DIESEL GENERATORS TO RUN	2.82E-05 1.50E-02 2.01E-04	2.82E-05 2.18E-01 1.50E-02 2.01E-04 2.95E-02	8.89E-08
50	X-AC-12H %T(T) CRD2SCRAM SLC2XVN-OC-F001	TURBINE TRIP INITIATOR FAILURE OF CONTROL ROD DRIVE SCRAM VALVES SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	2.70E+00 6.00E-06 8.76E+04	3.00E+00 6.00E-06 4.81E-03	8.652-08

Report Summary: Filename: C:\CAFTA-W\BNP\EPU-L1\EPU-L1S6.CUT Print date: 4/17/ 1 6:38 PM Not sorted

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# ATTACHMENT D.9

# BASE LEVEL 2 LERF CUTSETS (PRE-EPU)

(5 pages)

### **Cutsets with Descriptions Report**

LERF = 3.92E-08

#	Inputs	Description Rate	Exposure	Event Prob	Probability
1	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.51E-07
-	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
2	%T (T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.51E-07
-	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E~02	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
3	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.11E-07
-	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
4	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.11E-07
-	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
5	8T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.49E-08
-	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2XVN-OC-F001	SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
6	<b>%</b> Τ(Τ)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	6.48E-08
-	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	1.00E+00	1.00E+00	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	XOP-COM2-15		4.80E-03	4.80E-03	
7	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	5.52E-08
	DWT2EST-NM-INTA	DRYWELL INTACT (CLASS II)	6.45E-01	6.45E-01	
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	1.00E+00	1.00E+00	
	OPER-WVDHR	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR	1.00E+00	1.00E+00	
	SWS2XVN-OC-V442	MANUAL VALVE 2 SW V442 FAILS TO REMAIN OPEN 5.50E-08	3.84E+02	2.11E-05	
	XOP-WVDHR		1.50E-03	1.50E-03	
8	<u> </u>	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.99E-08
ľ	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FS-PMPA	SLC PUMP C41-C001A FAILS TO START	3.70E-03	3.70E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
9	ът (Т)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.99E-08
ľ	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FS-PMPB	SLC PUMP C41-C001B FAILS TO START	3.70E-03	3.70E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
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#	Inputs	Description Rate	Exposure	Event Prob	Probability
10	<u>ዲ</u> ሞ (ሞ)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.89E-08
10	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2XVN-OC-F001	SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	8.765+04	4.81E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
11	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.89E-08
<b> </b>	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	1.00E+00	1.00E+00	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	XOP-COM2-15		4.80E-03	4.80E-03	
12	+T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.24E-08
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	SLC2EPV-CC-F004A	EXPLOSIVE VALVE C41-F004A FAILS TO OPEN 2.40E-03	1.00E+00	2.40E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
13	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.24E-08
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2EPV-CC-F004B	EXPLOSIVE VALVE C41-F004B FAILS TO OPEN 2.40E-03	1.00E+00	2.40E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
14	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.00E-08
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2MDP-FS-PMPA	SLC PUMP C41-C001A FAILS TO START	3.70E-03	3.70E-03	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
15	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.00E-08
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2MDP-FS-PMPB	SLC PUMP C41-C001B FAILS TO START	3.70E-03	3.70E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
16	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.838-08
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2TTT-HI-N006	SLC STORAGE TANK TEMPERATURE ELEMENT C41-N006 FAIL 1.90E-06	1.10E+03	2.10E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.008-01	5.00E-01	0 (17 00
17	%TE (E4 )	LOSS OF 4160V AC BUS E4	2.00E-03	2.00E-03	2.616-08
	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.008+00	
1	DWT2EST-NM-INTA	DRYWELL INTACT (CLASS II)	6.45E-01	6.45E-01	
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	1.00E+00	1.00E+00	
	SWS2CKV-00-V22	CHECK VALVE SW V-22 FAILS TO CLOSE 5.40E-04	1.00E+00	5.408-04	
1	XOP-FPS1		9.60E-02	9.60E-02	0 435 00
18	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.436-08
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.006+00	
	OPER-INHIBITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS	1.00E+00	1.00E+00	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1	XOP-COM2-13		1.80E-03	1.80E-03	
19	&T (C)	LOSS OF CONDENSER VACUUM	1.80E-01	1.80E-01	2.34E-08
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
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#	Inputs	Description Rate	Exposure	Event Prob	Probability
20	<b>%</b> Τ(C)	LOSS OF CONDENSER VACUUM	1.80E-01	1.80E-01	2.34E-08
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
21	%T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.30E-08
	ICC2SIGN01	FAILURE OF RPS TRIP SIGNAL	1.00E-05	1.00E-05	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-INHIBITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS	1.00E+00	1.00E+00	
	OPER-SCRAM	OPERATOR FAILS TO INITIATE MANUAL SCRAM	1.00E+00	1.00E+00	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	XOP-SCRAM		1.70E-03	1.70E-03	
22	&T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.30E-08
	ICC2SIGN01	FAILURE OF RPS TRIP SIGNAL	1.00E-05	1.00E-05	
1	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.005+00	
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	1.00E+00	1.008+00	
	OPER-SCRAM	OPERATOR FAILS TO INITIATE MANUAL SCRAM	1.00E+00	1.008+00	
ł	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.008-01	
	XOP-SCRAM		1.70E-03	1.705-03	2 1772 00
23	%T(T)	TURBINE TRIP INITIATOR	2.705+00	2.708+00	2.1/6-00
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.002+00	1.002+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH APCI DURING ATWS	2 208-01	2 208-01	
	RCI2TDP-FR-RCTDP	RCIC TORBINE-DRIVEN POMP FAILS TO ROM	2.308-01	1 00E-05	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	5.005-01	5.00E-01	
	WWBZEST-NM-BIPB	WEIWELL AIRSPACE AND FOOL NOT BIFASSED (CLASS IV)	7.00E-03	7.00E-03	
24	xOP~COM2-14 em (m)		2.70E+00	2.70E+00	2.16E-08
24	ST(T) DDCOMPIND	INFERING OF CONTROL RODS	1.00E-05	1.002-05	
1	RESIDEND COMDD-TM-DMDA	SLC DIMO CAL-COLLA UNAVAILABLE DUE TO MAINTENANCE	1.60E-03	1.60E-03	
	SUCZMDF-IM-FMFR WWRDFST-NM-BVPB	WETWELL ATREPACE AND POOL NOT BYPASSED (CLASS IV)	5.00B-01	5.00E-01	
25	AMB22331-M-D1125 ST(T)	TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.16E-08
[ <sup>2</sup> ]	RPS2MBTND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-TM-PMPB	SLC PUMP C41-C001B UNAVAILABLE DUE TO MAINTENANCE	1.60E-03	1.60E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
26	<b>%</b> Υ(Υ)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.03E-08
<b>1</b>	TCC2STGN01	FAILURE OF RPS TRIP SIGNAL	1.00E-05	1.00E-05	
	OPER-SCRAM	OPERATOR FAILS TO INITIATE MANUAL SCRAM	1.00E+00	1.00E+00	
	OPER-SLCS	OPERATORS FAIL TO INITIATE SLCS	1.00E+00	1.00E+00	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	XOP-SLCS		1.50E-03	1.50E-03	
27	8T (T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.03E-08
	OPER-INHIBITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS	1.00E+00	1.00E+00	
	OPER-SPCATWS	OPERATORS FAIL TO INITIATE SUPPRESSION POOL COOLING DURING AN ATWS	1.00E+00	1.00E+00	
1	OPER-WVDHR	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR	1.00E+00	1.00E+00	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	XOP-WVDHR		1.50E-03	1.50E-03	

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#	Inputs	Description	Rate	Exposure	Event Prob	Probability
28	<u> </u>	TURBINE TRIP INITIATOR		2.70E+00	2.70E+00	2.03E-08
<b>-</b> •	OPER-SLCS	OPERATORS FAIL TO INITIATE SLCS		1.00E+00	1.00E+00	
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS		1.00E-05	1.00E-05	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	XOP-SLCS			1.50E-03	1.50E-03	
29	\$T(T)	TURBINE TRIP INITIATOR		2.70E+00	2.70E+00	1.94E-08
1	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES		6.00E-06	6.00E-06	
ł	SLC2EPV-CC-F004A	EXPLOSIVE VALVE C41-F004A FAILS TO OPEN	2.40E-03	1.00E+00	2.40E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
30	第111日本	TURBINE TRIP INITIATOR		2.70E+00	2.70E+00	1.94E-08
1	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES		6.00E-06	6.00E-06	
1	SLC2EPV-CC-F004B	EXPLOSIVE VALVE C41-F004B FAILS TO OPEN	2.40E-03	1.00E+00	2.40E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
31	*T(T)	TURBINE TRIP INITIATOR		2.70E+00	2.70E+00	1.70E-08
1	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES		6.00E-06	6.00E-06	
	SLC2TTT-HI-N006	SLC STORAGE TANK TEMPERATURE ELEMENT C41-N006 FAIL	1.90E-06	1.10E+03	2.10E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
32	ት ት የ ( የ )	TURBINE TRIP INITIATOR		2.70E+00	2.70E+00	1.62E-08
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS		1.00E-05	1.00E-05	
	RRS2BKR-CC-RRS-A	CIRCUIT BREAKER FOR RECIRCULATION PUMP A FAILS TO OPEN	1.20E-03	1.00E+00	1.20E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
33	%T(T)	TURBINE TRIP INITIATOR		2.70E+00	2.70E+00	1.62E-08
1.2	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS		1.00E-05	1.00E-05	
	RRS2BKR-CC-RRS-B	CIRCUIT BREAKER FOR RECIRCULATION PUMP B FAILS TO OPEN	1.20E-03	1.00E+00	1.20E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
34	&T (T)	TURBINE TRIP INITIATOR		2.70E+00	2.70E+00	1.54E-08
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW	(ONE UNIT)	1.00E+00	1.00E+00	
	OPER-WVDHR	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR		1.00E+00	1.00E+00	
	SWS2XVN-OC-V442	MANUAL VALVE 2 SW V442 FAILS TO REMAIN OPEN	5.50E-08	3.84E+02	2.11E-05	
	WWB2EST-NM-BYPA	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS II)		1.805-01	1.806-01	
	XOP-WVDHR			1.508-03	1.505-03	1 475 00
35	<b>%TCSW</b>	LOSS OF CONVENTIONAL SERVICE WATER		1.005+00	1.008+00	1.4/6-00
1	ACPOTFM-LP-E8	TRANSFORMER 4160/480 E4 TO E8 FAILURE NO POWER	1.30E-06	2.405+01	3.126-05	
ł	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGE	R1.00E+00	1.005+00	1.00E+00	
1	DWT2EST-NM-INTA	DRYWELL INTACT (CLASS II)	(A)	6.458-01	0.45E-UI	
1	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW	(ONE UNIT)	1.002+00	1.00E+00	
	SWS2MDP-33_CSW2	COMMON CAUSE FAILURE OF ALL UNIT 2 CSW PUMPS TO RUN		7.598-03	7.596-03	
1	XOP-FPS1			9.60E-02	9.60E-02	1 4 6 7 4 0
36	%T(T)	TURBINE TRIP INITIATOR		2.708+00	2.70E+00	1.468-08
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES		6.00E-06	6.00E-06	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE	INJECTION	1.006400	1.002+00	
	OPER-INHIBITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS		1.005+00	1.00E+00	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
1	XOP-COM2-13			1.808-03	T.80E-03	1 403 00
37	%T(C)	LOSS OF CONDENSER VACUUM		1.805-01	1.808-01	1.405-08
1	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES		6.00E-06	6.00E-06	
1	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR		2.50E-02	Z.00E-0Z	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	2.00E-01	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability		
	ዓመ (	LOSS OF CONDENSER VACIUM	1.80E-01	1.80E-01	1.40E-08		
38	T(C)	PATTING OF CONTROL FOD DRIVE SCRAM VALVES	6.00E-06	6.00E-06			
	CRD2SCRAM	FALLOW OF CONTROL FALLS TO RIN FOR 1 HOUR	2.60E-02	2.60E-02			
	SLC2MDP-FR-PMPB	WETWELL ATRODUCE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01			
	WWBZESI-NM-BIFB		2.70E+00	2.70E+00	1.35E-08		
39	ST(T)	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05			
1	RESIDIND	SLC SYSTEM INAVALLARIE DUE TO MAINTENANCE (CLOSURE OF C41-F001 DURING PT)	1.00E-03	1.00E-03			
	SUC2SIS-IM-FMFAD	METHELL, ALPSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01			
	WWBZEST-NM-BIPB	WEINEL ATTO INTELATOR	2.70E+00	2.70E+00	1.30E-08		
40	ST(T)	TATINE OF CONTROL FOR DETVE SCRAM VALVES	6.00E-06	6.00E-06			
	CRD2SCRAM	CORPATOR FALLS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00			
1	OPER-DILUIE	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00			
	OPER-DEEVEDI	POLO TERRING DELIVER DIMP FALLS TO BUN	2.30E-01	2.30E-01			
	RC121DP-FR-RC1DF	METHIC IN AT DESTACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01			
1	WWBZEST-NM-BIPB		7.00E-03	7.00E-03			
	XUP-COM2-14		2.70E+00	2.70E+00	1.30E-08		
41	T(T)	TATINE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06			
1	CRD25CRAM	SLC DIMD CA1-COOLA INAVAILABLE DUE TO MAINTENANCE	1.60E-03	1.60E-03			
	SLC2MDP-TM-PMPA	SHE FOMP CELEGOLA ON FOOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01			
	WWB2EST-NM-BIPB		2.70E+00	2.70E+00	1.30E-08		
42	ST(T)	FALLIDE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06			
	CRD2SCRAM	SLC DIMP C41-C001B INAVAILABLE DUE TO MAINTENANCE	1.60E-03	1.60E-03			
	SLUZMUP-IM-PMPB	METHODAL ATTROPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01			
1	WWBZESI-NM-DIFD	TIDE TARE TARE INITIATOR	2.70E+00	2.70E+00	1.22E-08		
43	51(1) (DD-20(DAM	PALLIPE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06			
	ODER_TNUIRITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS	1.00E+00	1.00E+00			
1	OPER-INALDI TADO	OPERATORS FAIL TO INITIATE SUPPRESSION POOL COOLING DURING AN ATWS	1.00E+00	1.00E+00			
	OPER-SPCAINS	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR	1.00E+00	1.00E+00			
1	WIND DECT-NM- BYDB	WETWELL ATRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01			
1	WW92531-WW-BIED		1.50E-03	1.50E-03			
1		TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.22E-08		
44	TILII	PATIJIRE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06			
	ODED SILCS	OPERATORS FAIL TO INITIATE SLCS	1.00E+00	1.00E+00			
	UTER-SLCS	WETWELL ALRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01			
	WWBZESI-WM-BIES		1.50E-03	1.50E-03			
L	AUP-SICS	LOSS OF CONTROL ROD DRIVE	1.00E+00	1.00E+00	1.07E-08		
45	STURD	CPD DEIVE WATER FILTER C11/C12-D003A PLUGS 9.80E-06	8.76E+03	8.23E-02			
	CRD2FL1=PG_DUUSA	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05			
	RPSZMBIND	CLC DIMP CAL-COLA FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02			
	SLC2MDP-FR-PMPR	WETWELL ALESDACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01			
1.0	WWBZEDI-NM-DIPB	LOSS OF CONTROL ROD DRIVE	1.00E+00	1.00E+00	1.07E-08		
46	TICKU	CPD DEIVE WATER FILTER C11/C12-D003A PLUGS 9.80E-06	8.76E+03	8.23E-02			
	CRD2FDT-PG_D003A	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05			
1	KREZMEIND	SLC DIMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02			
	SEC2MDP-FR-PMPB WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01			

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#	Inputs	Description	Rate	Exposure	Event Prob	Probability
47	&TCRD CRD2FLT-PG_S001A RPS2MBIND SLC2MDP-FR-PMPA WWB2EST-NM-BYPB	LOSS OF CONTROL ROD DRIVE FILTER S001A PLUGGED MECHANICAL BINDING OF CONTROL RODS SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	9.80E-06	1.00E+00 8.76E+03 1.00E-05 2.60E-02 5.00E-01	1.00E+00 8.23E-02 1.00E-05 2.60E-02 5.00E-01	1.07E-08
48	*TCRD CRD2FLT-PG_S001A RPS2MBIND SLC2MDP-FR-PMPB WWB2EST-NM-BYPB	LOSS OF CONTROL ROD DRIVE FILTER S001A PLUGGED MECHANICAL BINDING OF CONTROL RODS SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	9.80E-06	1.00E+00 8.76E+03 1.00E-05 2.60E-02 5.00E-01 2.70E+00	1.00E+00 8.23E-02 1.00E-05 2.60E-02 5.00E-01 2.70E+00	1.07E-08 9.88E-09
49	<pre>#T(T) HPC2TDP-FR-HPTDP OPER-DILUTE RCI2TDP-FR-RCTDP RPS2MBIND WWB2EST-NM-BYPB XOP-DILUTE </pre>	HPCI TURBINE TRIFT INITIATOR HPCI TURBINE-DRIVEN PUMP FAILS TO RUN OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE RCIC TURBINE-DRIVEN PUMP FAILS TO RUN MECHANICAL BINDING OF CONTROL RODS WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	INJECTION	7.40E-02 1.00E+00 2.30E-01 1.00E-05 5.00E-01 4.30E-02 2.70E+00	7.40E-02 1.00E+00 2.30E-01 1.00E-05 5.00E-01 4.30E-02 2.70E+00	9.725-09
50	*T(T) CRD2SCRAM RRS2BKR-CC-RRS-A WWB2EST-NM-BYPB	TORBINE TRIFTINITIATOR FAILURE OF CONTROL ROD DRIVE SCRAM VALVES CIRCUIT BREAKER FOR RECIRCULATION PUMP A FAILS TO OPEN WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	1.20E-03	6.00E-06 1.00E+00 5.00E-01	6.00E-06 1.20E-03 5.00E-01	

Report Summary: Filename: C:\CAFTA-W\BNP\EPU-L2\B2-LERF.CUT Print date: 4/17/ 1 12:44 PM Not sorted

## ATTACHMENT D.10

# BASE EPU LERF CUTSETS (EPU)

(5 pages)

#### **Cutsets with Descriptions Report**

LERF = 4.11E-06

#	Inputs	Description Rate	Exposure	Event Prob	Probability
	<u> </u>	TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.51E-07
1 <sup>-</sup>		MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	RESZUELLE GLCOMDD-FR-PMPA	SLC PIMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
•	WWR2EST-NM-RVPR	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
2	9T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.512-07
ľ	PDS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
•	SLC2MDP-FR-PMPR	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
1	WWDOFST-NM-BYDB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
5	9462251-46-5125 27 (T)	TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.11E-07
] 3		FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	CRD2SCRAM	SLC DIMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
	SUCZNUP-PR-PMPR	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	WWBZESI-NM-DIFB		2.70E+00	2.70E+00	2.11E-07
4	41(1)	FATURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	CRUZSCRAM	CLC DIMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
	SLCZMDP-FR-PMPB	WETHERLE AT BOACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
-	WWBZEST-NM-BIPB	WEINE TO ID INITIATOR	2.70E+00	2.70E+00	1.35E-07
5	ST(1)	OPERATOR FAILS TO PRECLIDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER DILOIE	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
	OPER-DEEVELI	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	1.00E+00	1.00E+00	
	OPER-DIEVED2	MECHANICAL RINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	KPSZMBIND	MECHANICAL DISPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1	WWBZEST-NM-BIPB	WEINELL ARGING THE FOOL OF COUNTRY (Series of	4.80E-03	1.00E-02	
	X0P-COM2-15		2.70E+00	2.70E+00	8.10E-08
6		TORSING ON TRAIL FOR DELVE SCRAM VALVES	6.00E-06	6.00E-06	
	CRD2SCRAM	ODERATOR FAILS TO PRECIDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
1	OPER-DILUTE	OPERATOR FALLS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
1	OPER-LLEVELI	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	1.00E+00	1.00E+00	
	OPER~LLEVEL2	UPERATOR FAILS TO CONTROL DOUL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	WWB2EST-NM-BIPB	WEIWEDD ARSFREE AD FOOD NOT DITIEDED (CELES	4.80E-03	1.00E-02	
	XOP-COM2-15		2.70E+00	2.70E+00	6.49E-08
7	*T(T)	TURBING INTE INTERIOR OF CONTROL RODS	1.00E-05	1.00E-05	
I I	RPS2MBIND	MECHANICAL BINDING OF CONTROL RALE TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
	SLC2XVN-OC-FUDI	SEC TANK DISCHARGE VALVE CHIPTON TAMENTO CHIPTON COLLEGE COLLEGE AND DOLL NOT BYDRING (CLASS IV)	5.00E-01	5.00E-01	
	WWB2EST-NM-BYPB	WEIWELL AIRSPACE AND FOLL NOT DIFFASIBLE (CLARED 10)	2.70E+00	2.70E+00	5.52E-08
8	\$T(T)	TURBING INIPACT (CLASS II)	6.45E-01	6.45E-01	
1	DWT2EST-NM-INTA	DRYWELL INTACT (CLASS II)	1.002+00	1.00E+00	
	OPER-FPS1	OPERATOR FALLS TO ADDEN FIREHALSA FOR COUNTING FOR THE CONTENT TO ADDITION (CAL CALL)	1.00E+00	1.00E+00	
1	OPER-WVDHR	OPERATORS FALL TO INTITUDE WEITERD VENTION FOR DATA	3.84E+02	2.11E-05	
	SWS2XVN-OC-V442	MANUAL VALVE Z SW V44Z FAILS IN REPAIR OFEN SINGLASS	1.50E-03	1.50E-03	
	XOP-WVDHR				

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#	inputs	Description Rate	Exposure	Event Prob	Probability
9	<u>ዱጥ(ጥ)</u>	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.99E-08
ľ	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FS-PMPA	SLC PUMP C41-C001A FAILS TO START	3.70E-03	3.70E-03	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
10	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.99E-08
1	RPS2MBTND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2MDP-FS-PMPB	SLC PUMP C41-C001B FAILS TO START	3.70E-03	3.70E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
111	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	4.97E-08
**	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-LIEVEL	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
	PCT2TDP-FR-RCTDP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
	PPS2MRTND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	WWB2FST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	YOR_COM2-14		7.00E-03	1.60E-02	
1.2	977 (T)	TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.89E-08
12	TT (I)	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	ST CONTRACT FOOT	SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
	WWB2FGT_NM_BVDB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
13	ST(T)	TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.24E-08
	DDCOMBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SICOEDV-CC-F004A	EXPLOSIVE VALVE C41-F004A FAILS TO OPEN 2.40E-03	1.00E+00	2.40E-03	
	MMB2EGT-NM-BVDB	WETWEIL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
114	8T(T)	TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.24E-08
14	PROMETIN	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2EPV-CC-F004B	EXPLOSIVE VALVE C41-F004B FAILS TO OPEN 2.40E-03	1.00E+00	2.40E-03	
1	WWB2EST-NM-BVPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
16	8T(T)	TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.00E-08
12	CEDSCEDIM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SI COMDR-ES-PMPA	SIC PIMP C41-C001A FAILS TO START	3.70E-03	3.70E-03	
1	MUDDEET-MM-BVDB	WETWEIL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1.6		TIRBINE TRIP INITIATOR	2.70E+00	2.70E+00	3.00E-08
10		FATLINE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
1	CRU2SCRAM	SIC DIMP C41-C001B FAILS TO START	3.70E-03	3.70E-03	
		WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1		TIDELNE TELE INITIATOR	2.70E+00	2.70E+00	2.98E-08
11		FALLURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
[		OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-DILOIL	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
	OPER-DDEVEDI	PART TIDE TO DEVEN DIMP FAILS TO RIN	2.30E-01	2.30E-01	
	KC12TDP-FR-RCIDP	WETWELL ADSDACE AND DOOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1	WWB2EDI-NM-DIPD		7.00E-03	1.60E-02	
		מינה אוב יים דבר אוני אירא אירא איר איר איר איר איר איר איר	2.70E+00	2.70E+00	2.83E-08
18	T(T)	TURDING IRIF INITIATOR MEGUNNICAL BINDING OF CONTROL PODS	1.00E-05	1.00E-05	
1	RPSZMBIND	OF COMPANY TEMERATION FOR CALLNOR FAIL 1 908-06	1.10E+03	2.10E-03	
	SPCSLL-HI-NOOP	NEWLETT ATCEDACE AND DOOL NOT BYPASSED (CLASS TV)	5.00E-01	5.00E-01	
1	WWBZEST-NM-BYPB	NETHERN VIVELVE VAR LAAR VAT PITURER (ARVA II)			

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
10	877F (FA)	LOSS OF 4160V AC BUS E4	2.00E-03	2.00E-03	2.61E-08
1,2		FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	DODINOLI DODINOLI DODINOLI	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DUPZDAI - AADAFZD DUTZERT-NM-INTA	DRYWELL INTACT (CLASS II)	6.45E-01	6.45E-01	
	DWIZESI-NM-INIA	OPERATOR RATIS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	1.00E+00	1.00E+00	
	OPER FFSI	CUECK VALUE SW V-22 FAILS TO CLOSE 5.40E-04	1.00E+00	5.40E-04	
	SWSZCRV-00-VZZ		9.60E-02	9.60E-02	
			2.70E+00	2.70E+00	2.43E-08
20		OPERATOR FAILS TO PRECLIDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-DILUIE	OPERATOR FAILS TO INHIBIT ADS DIRING ATWS	1.00E+00	1.00E+00	
	OPER-INHIBITADS	MECHANICAL DINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	KYSZMBIND	MECHANICAL BINDING OF CONTROL NOT BYDASSED (CLASS IV)	5.00E-01	5.00E-01	
	WWBZEST-NM-BIPB	WEIWELL AIRSTROL ALL FOUL KOT DITIONED (CELLO LI)	1.80E-03	1.80E-03	
	XOP-COM2-13	LOGE OF CONDENSED VACUUM	1.80E-01	1.80E-01	2.34E-08
21		LOSS OF CONDEMSER VACCOM	1.00E-05	1.00E-05	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL ADDS	2.60E-02	2.60E-02	
	SLC2MDP-FR-PMPA	SEC PUMP (41-COURT PRIES TO NOT FOR TON TON TON TON TON	5.00E-01	5.00E-01	
	WWBZEST-NM-BIPB	WEINELLI AINFRUED VACUM	1.80E-01	1.80E-01	2.34E-08
22	*T(C)	1055 OF CONDENSER VACUUM	1.00E-05	1.00E-05	
	RPSZMBIND	MECHANICAL SINGLAS OF CONTROL NOR 1 HOUR	2.60E-02	2.60E-02	
	SLC2MDP-FR-PMPB	She pump (41-COULD FRIDS TO NOT FOR TON TON TO A TON TO A TO A TO A TO A TO	5.00E-01	5.00E-01	
	WWB2251-NM-BIPB		2.70E+00	2.70E+00	2.30E-08
23	Transa	TORDING TALF INTERIOR	1.00E-05	1.00E-05	
1	ICC2SIGNUI	OPERATOR FAILS TO DECLIDE BORON WASHOLT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
1	OPER-DILUIE	OPERATOR FALLS TO INHIBIT ADS DURING ATWS	1.00E+00	1.00E+00	
1	OPER-INTIBITADS	OPERATOR FALLS TO INITIATE MANUAL SCRAM	1.00E+00	1.00E+00	
	WINDOF CT. MM- RYDR	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
ł	WWBZESI-WM-BIFB		1.70E-03	1.70E-03	
1.	AUP-SCRAM	TINITATOR	2.70E+00	2.70E+00	2.30E-08
24	TOCOSTONAL	FALLING OF DES TELE SIGNAL.	1.00E-05	1.00E-05	
		OPERATOR FAILS TO PRECLIDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-DIDOIS	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
	OPER-LLEVEL?	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	1.00E+00	1.00E+00	
	OPER-LILEVELZ	OPPATOR FALLS TO INITIATE MANIAL SCRAM	1.00E+00	1.00E+00	
	WER-SCRAM	WETWICK FALLS TO HALL AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1	WWBZESI-NM-BIFD		1.70E-03	1.70E-03	
	AUP-SCRAM	αταστα ατος το τητατός	2.70E+00	2.70E+00	2.16E-08
25	SI(I)	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	CT COMOD. TM- DMDA	SLC DIME CAL-COOLA INAVALLABLE DIE TO MAINTENANCE	1.60E-03	1.60E-03	
1	SUCSUDE-IN-END MUDDECT-IN-END	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
20	ет(т) Нидерот-Ми-отго	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	2.16E-08
<b>4</b> °		MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1		SLC PIMP C41-C001B UNAVAILABLE DUE TO MAINTENANCE	1.60E-03	1.60E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	

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#	Inputs	Description	Rate	Exposure	Event Prob	Probability
27	%T(T)	TURBINE TRIP INITIATOR	<u> </u>	2.70E+00	2.70E+00	2.03E-08
1	ICC2SIGN01	FAILURE OF RPS TRIP SIGNAL		1.00E-05	1.00E-05	
	OPER-SCRAM	OPERATOR FAILS TO INITIATE MANUAL SCRAM		1.00E+00	1.00E+00	
	OPER-SLCS	OPERATORS FAIL TO INITIATE SLCS		1.00E+00	1.00E+00	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
1	XOP-SLCS			1.50E-03	1.50E-03	
28	%T(T)	TURBINE TRIP INITIATOR		2.70E+00	2.70E+00	2.03E-08
	OPER-INHIBITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS		1.00E+00	1.00E+00	
	OPER-SPCATWS	OPERATORS FAIL TO INITIATE SUPPRESSION POOL COOLING DURING AN	ATWS	1.00E+00	1.00E+00	
	OPER-WVDHR	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR		1.00E+00	1.00E+00	
	PPS2MBIND	MECHANICAL BINDING OF CONTROL RODS		1.00E-05	1.00E-05	
	WWR2EST-NM-BYPR	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	YOR-WUDHR			1.50E-03	1.50E-03	
20	አርድ- <b>ጠቀይጠ</b> ይሞ/ጥነ	TIDRINE TRIP INITIATOR		2.70E+00	2.70E+00	2.03E-08
23	ADED-ST.CS	OPERATORS FAIL TO INITIATE SLCS		1.00E+00	1.00E+00	
	DECOMPTIO	MECHANICAL BINDING OF CONTROL RODS		1.00E-05	1.00E-05	
	KFS2MS1ND MMD2FCT_NM_BVDB	WETWELL ATRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	NOD CLCC			1.50E-03	1.50E-03	
20	AUF-31C3 4m/m)	TTERTME TOTO INTTATOR		2.70E+00	2.70E+00	1.94E-08
30	41 (1)	EXTLUSE OF CONTROL ROD DRIVE SCRAM VALVES		6.00E-06	6.00E-06	
1	CRDZSCKAM	EVELOSIVE VALVE CAL-FOOAA FAILS TO OPEN	2.40E-03	1.00E+00	2.40E-03	
	MMD 2DGW-NM-DVDD	WETWELL ATRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
1.1				2.70E+00	2.70E+00	1.94E-08
31	51(1) (PD26CP3M	FATLIDE OF CONTROL ROD DRIVE SCRAM VALVES		6.00E-06	6.00E-06	
	CRD2SCRAM	FYDLOSIVE VALVE CAL-FOOAB FAILS TO OPEN	2.40E-03	1.00E+00	2.40E-03	
I.	SUCZEPV-CC-FUU4B	WETWEELL ATBODACE AND DOOL NOT BYDASSED (CLASS IV)		5.00E-01	5.00E-01	
1	WWB2ESI-NM-BIPB	TIDETNE TOTE INITIATOR		2.70E+00	2.70E+00	1.70E-08
32	51(1) (DD20(DDM	PATILIDE OF CONTROL FOR DELVE SCRAM VALVES		6.00E-06	6.00E~06	
	CRD2SCRAM	CLC STOPAGE TANK TEMPERATURE RLEMENT C41-N006 FAIL	1.90E-06	1.10E+03	2.10E-03	
	SUCZITI-RI-NUUS	WERNING THE AND DOOL NOT BYDASSED (CLASS IV)		5.00E-01	5.00E-01	
	WWBZESI~NM-BIFD	WEINELD AIRSPACE AND FOOD NOT BEENEDED (CEEDE IV)		2.70E+00	2.70E+00	1.62E-08
33	T (1)	MECUANICAL BINDING OF CONTROL RODS		1.00E-05	1.00E-05	
	RPSZMBIND	CIPCUIT BREAKED FOR DECIDINATION DIMP & FAILS TO OPEN	1.20E-03	1.00E+00	1.20E-03	
	KRSZBAR-CC-RRS-A	WETWELL ATPEDACE AND DOOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	WWB2851-NM-BIPB	MEINED AIRSPRES AND FOOD NOT DIINSED (CARDS 17)		2.70E+00	2.70E+00	1.62E-08
34	ST(T)	TORBING THE INTING OF CONTROL PODS		1.00E-05	1.00E-05	
	RPS2MBIND	ATRANICAD BINDING OF CONTROL RODD	1.208-03	1.00E+00	1.20E-03	
	RRS2BKR-CC-RRS-B	WERNELL ALBORAGE AND DOOL NOT BYDASSED (CLASS IV)	2.202 00	5.00E-01	5.00E-01	
1	WWBZEST-NM-BIPB	WEINELL AIRSPACE AND FOOD NOT BIFADDED (CEADD IV)		2.70E+00	2.70E+00	1.54E-08
35	*T(T)	TURBING IRIF INITIATOR	(ONE UNIT)	1 00E+00	1 00E+00	1.012 00
	OPER-FPS1	OPERATOR FALLS TO ADION FIREWATER FOR COOLANT INDECTION FLOW	(OND ONLI)	1 008+00	1.00E+00	
1	OPER-WVDHR	VERATURD FALL IN INITIALE NEINELLI VENITING FOR DAR	5 502-08	3 848+02	2 118-05	
	SWS2XVN-OC-V442	MANUALI VALVE 2 5W V442 FALLS IO REMAIN OFEN Normuti atrodage and dogi nor dydaged /giage II)	2.201-00	1 802-01	1.808-01	
1	WWB2EST-NM-BYPA	WETWELL AIRSPACE AND FOOL NOT BIFASSED (CLASS II)		1 508-01	1 508-03	
1	XOP-WVDHR			T-00E-00	1.308-03	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
36	&TCSW	LOSS OF CONVENTIONAL SERVICE WATER	1.00E+00	1.00E+00	1.47E-08
1	ACPOTEM-LP-E8	TRANSFORMER 4160/480 E4 TO E8 FAILURE NO POWER 1.30E-06	2.40E+01	3.12E-05	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DWT2EST-NM-INTA	DRYWELL INTACT (CLASS II)	6.45E-01	6.45E-01	
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	1.00E+00	1.00E+00	
1	SWS2MDP-33 CSW2	COMMON CAUSE FAILURE OF ALL UNIT 2 CSW PUMPS TO RUN	7.59E-03	7.59E-03	
	XOP-FPS1		9.60E-02	9.60E-02	
37	<u>ዲር (ም)</u>	TURBINE TRIP INITIATOR	2.70E+00	2.70E+00	1.46E-08
31	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	OPEP-DILITE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
1	OPER-DIHOIN	OPERATOR FAILS TO INHIBIT ADS DURING ATWS	1.00E+00	1.00E+00	
	WWBOFET-NM-BVDB	WETWELL ALESPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	VOD_COM2_13		1.80E-03	1.80E-03	
2.0	x0F-COM2-13	LOSS OF CONDENSER VACUUM	1.80E-01	1.80E-01	1.40E-08
130		FALLIDE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
		SLC DIMP C41-C001A FAILS TO RIN FOR 1 HR	2.60E-02	2.60E-02	
1	MUDORCT-MARYDR	WETWELL AT DESDACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	WWBZESI-MM-BIFD		1.80E-01	1.80E-01	1.40E-08
39	TT(C)	DATING OF CONTROL FOR DEVE SCRAM VALVES	6.00E-06	6.00E-06	
	CRDZSCRAM	ALCONING CAL-COOLS FAILS TO BIN FOR 1 HOUR	2.60E-02	2.60E-02	
	SLCZMDP-FR-PMPB	SUC FORF CTICOUT AND BOOL NOT BURISSED (CLASS IV)	5.00E-01	5,00E-01	
	WWBZEST-NM-BIPB	MEDINE ALLOFALE AND FOOL NOT DIFFEEDE (SEED LT)	2.70E+00	2.70E+00	1.35E-08
40	*T(T)	IURBING IRIF INITIATOR	1.00E-05	1.00E-05	
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL MODE	1.00E-03	1.00E-03	
	SLC2SYS-TM-PMPAB	SUC SISTEM UNAVAILABLE DOI TO FAINTENAUCH (CLOSENT OF CIT TOT CONTROL T)	5.00E-01	5.00E-01	
	WWBZEST-NM-BIPB	WEINELL AIRSPACE AND FOLD ANT DIFFICULE (CLASS 14)	2.70E+00	2.70E+00	1.30E-08
41	*T (T)	TURBINE INIF INITIATOR	6.00E-06	6.00E-06	
	CRD2SCRAM	FAILURE OF CONTROL ROD DELVE SCREW VALVES	1.60E-03	1.60E-03	
	SLC2MDP-TM-PMPA	SIC FUMP C41-COULD UNAVAILABLE DOE DOE (CLASS TV)	5.00E-01	5.00E-01	
	WWB2EST-NM-BIPB	WEIWEIN AIRSPACE AND FOOD NOT BIFROSED (CHENS IV)	2.70E+00	2.70E+00	1.30E-08
42	<b>%</b> T(T)	TURBINE TRIP INITIATOR	6.00E-06	6.00E-06	
1	CRD2SCRAM	FAILURE OF CONTROL ROD DELVE SCRAF VAINES	1.60E-03	1.60E-03	
ł	SLC2MDP-TM-PMPB	SLC FURY C41-COULD UNAVAILABLE DOB TO MAINTENANCE	5 00E-01	5.00E-01	
	WWB2EST-NM-BYPB	WEIWEIL AIRSPACE AND FOUL NOI BIPASSED (CLASS IV)	2 708+00	2 705+00	1 228-08
43	&T (T)	TURBING TRIP INITIATOR	£ 00E-06	5 00E-06	1.222 00
	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	1.00E-00	1 00E+00	
1	OPER-INHIBITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS	1.000000	1 008+00	
1	OPER-SPCATWS	OPERATORS FAIL TO INITIATE SUPPRESSION FOOL COLLING DURING AN AIWS	1.006400	1.002.00	
	OPER-WVDHR	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR	1.008400	I.00E+00	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	XOP-WVDHR		1.508-03	1.505-03	1 2272 0.0
44	%T(T)	TURBINE TRIP INITIATOR	Z. /UE+UU	2.70E+00	T.228-08
1	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	0.00E-06	
1	OPER-SLCS	OPERATORS FAIL TO INITIATE SLCS	1.008+00	1.00E+00	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1	XOP-SLCS		1.50E-03	1.50E-03	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
45	&TCRD	LOSS OF CONTROL ROD DRIVE	1.00E+00	1.00E+00	1.07E-08
13	CDD2FLT-DG D003A	CRD DRIVE WATER FILTER C11/C12-D003A PLUGS 9.80E-06	8.76E+03	8.23E-02	
1	PRO2MATIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SI.COMDD-FR-DMPA	SLC PIMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
	WWDORCH_NM_BVDB	WETWELL ALESPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
46	ANDZESI-NM-BIED	LOSS OF CONTROL ROD DRIVE	1.00E+00	1.00E+00	1.07E-08
40		CPD DEIVE WATER FILTER C11/C12-D003A PLUGS 9.80E-06	8.76E+03	8.23E-02	
		MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	ALCONOD ED DUDB	STORE TIME CALCOLDE FAILS TO BIN FOR 1 HOUR	2.60E-02	2.60E-02	
	SLUZMDP-FR-PMPB	MEMORY ADDRESS AND DOOL NOT BYDASSED (CLASS IV)	5.00E-01	5.00E-01	
	WWBZEST~NM-BIPB	WEINELD AINSTRUE AND FOUR NOT DITIEDED (SEEDE TV)	1.00E+00	1.00E+00	1.07E-08
47	TCRD		8.76E+03	8.23E-02	
	CRD2FLT-PG_SUUIA	FILLER SOUTH FLOGGED CONTROL DODS	1.00E-05	1.00E-05	
	RPS2MBIND	MECHANICAL BUDING OF CONTROL NODD	2.60E-02	2.60E-02	
	SLC2MDP-FR-PMPA	SEC PUMP CI-CUULE FAILS IN NOT PUBLECED (CLASS IV)	5.00E-01	5.00E-01	
1	WWB2EST-NM-BYPB	WEIWEIL AIRSPACE AND FOUL NOT BIFASSED (CLASS IV)	1.00E+00	1.00E+00	1.07E-08
48	*TCRD	LOSS OF CONTROL ROD DRIVE	8.76E+03	8.23E-02	
1	CRD2FLT-PG_S001A	FILTER SUDIA PLOGGED STOLE	1.00E-05	1.00E-05	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL ROLD	2.60E-02	2.60E-02	
	SLC2MDP-FR-PMPB	SIC PUMP C41-CUULB FAILS TO KUN FOR 1 MODE	5.00E-01	5.00E-01	
	WWB2EST-NM-BYPB	WEIWELL AIRSPACE AND FOUL NOT BIFASSED (CLASS IV)	2.70E+00	2.70E+00	9.99E-09
49	*T(T)	IURBINE IRIF INITIATOR DINE BALLS TO DIN	7.408-02	7.40E-02	
	HPC2TDP-FR-HPTDP	APCI TURBINE-DRIVEN FOMP FAILS TO ADEN WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-DILUTE	OPERATOR FAILS TO CONTROL INVERTED WATER LEVEL WITH POLC DIRENG ATWS	1.00E+00	1.00E+00	
	OPER-LLEVEL2	UPERATOR FAILIS TO CONTROL HOWERED WATER LEVEL WITH ACTO DOUBLE THE	1.00E-05	1.00E-05	
	RPS2MBIND	MECHANICAL BINDING OF CONTROL ADDS	5.00E-01	5.00E-01	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND FOOL NOT BIFASSED (CLASS IV)	4.80E-03	1.00E-02	
	XOP-COM2-15		2.70E+00	2.70E+00	9.88E-09
50	· %T(T)	TURBING TRIP INITIATOR BALLS TO DIN	7.408-02	7.40E-02	
	HPC2TDP-FR-HPTDP	HPCI TURBINE-DRIVEN POMP FAILS TO ROOM DIDING IOW DESSIBE INTECTION	1.008+00	1.00E+00	
	OPER-DILUTE	OPERATOR FAILS TO PRECIDE BORON WASHOUT DORING HOW FREEDOME INDECTION	2 308-01	2.305-01	
1	RC12TDP-FR-RCTDP	KCIC TUKRINE-DRIVEN FUMP FAIDS TO KUM	1.00E-05	1.00E-05	
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL ROLD	5 00E-01	5.00E-01	
ł	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND FOOL NOT BIFASSED (CLASS IV)	4 308-02	4 30E-02	
1	XOP-DILUTE		4.300-02	4.300-02	

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Report Summary: Filename: C:\CAFTA-W\BNP\EPU-L2\EPU-L2.CUT Print date: 4/17/ 1 6:40 PM Not sorted

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### ATTACHMENT D.11

### SENSITIVITY 1 LERF CUTSETS

(5 pages)

### Cutsets with Descriptions Report

LERF = 4.49E-06

#	Inputs	Description Rate	Exposure	Event Prob	Probability
1	&ጥ (ጥ)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	3.90E-07
1-	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	CLOOMDD-FR-PMPA	SLC PIMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
12	\$T(T)	TIRBINE TRIP INITIATOR	2.70E+00	3.00E+00	3.90E-07
ľ	DECOMBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	ST.COMDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
12	\$T(T)	TIRBINE TRIP INITIATOR	2.70E+00	3.00E+00	2.34E-07
13		FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	CLOZDCICHT CLCZMDD-FR-PMPA	SLC PIMP C41-C001A FAILS TO RUN FOR 1 HR	2.60E-02	2.60E-02	
	WWB2FST-NM-RVDR	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
		TIRBINE TRIP INITIATOR	2.70E+00	3.00E+00	2.34E-07
1*	▼▲ \ ▲ / // D D D D C // D B M	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	CKD2SCKAM	SLC PIMP C41-C001B FAILS TO RUN FOR 1 HOUR	2.60E-02	2.60E-02	
	WWB2FST-NM-BYDB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
r.	\$m(m)	TIRBINE TRIP INITIATOR	2.70E+00	3.00E+00	1.50E-07
5	ODER-DILITE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER DILOT	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
	OPER-LLEVEL?	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	1.00E+00	1.00E+00	
	PDS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	WWROFST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	YOR-COM2-15		4.80E-03	1.00E-02	
c	LUF - COM2 - 10 5m / m )	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	9.00E-08
°		FATLURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	ODED-DILITE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-DILUIE	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
	OPER-DISVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	1.00E+00	1.00E+00	
	WHD 2 FOT MM BY DB	WETWELL ATRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	WWBZESI-NM-BIFB		4.80E-03	1.00E-02	
		TIDETNE TELE INITIATOR	2.70E+00	3.00E+00	7.21E-08
17	TI(I)	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	RESTRATING C-FOOL	SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
	WWDDDDCW-WW-DVDB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	WWBZESI-WM-BIFB		2.70E+00	3.00E+00	6.13E-08
в	T (T)	DEVELI INTACT (CLASS II)	6.45E-01	6.45E-01	
	DWIZESI-NM-INIA	OPPRATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	1.00E+00	1.00E+00	
1	OPER-FPS1	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR	1,00E+00	1.00E+00	
	OFER-WVDRR	MANUAL VALVE 2 SW V442 FAILS TO REMAIN OPEN 5.50E-08	3.84E+02	2.11E-05	
	XOP-WVDHR		1.50E-03	1.50E-03	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
	<u> </u>	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	5.55E-08
ľ	50 ± ( ± ) 50 ¢ 3 MB T NID	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
1	CLCOMDD-FS-PMPA	SLC PIMP C41-C001A FAILS TO START	3.70E-03	3.70E-03	
1	WWB2FST-NM-RVPR	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
110	9m (m)	TIRBINE TRIP INITIATOR	2.70E+00	3.00E+00	5.55E-08
1.0		MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	GLCOMDE-FS-PMPB	SLC PUMP C41-C001B FAILS TO START	3.70E-03	3.70E-03	
	WWDDFST-NM-BYDB	WETWELL AIRSPACE AND FOOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
11	9m (m)	TIRBINE TRIP INITIATOR	2.70E+00	3.00E+00	5.52E-08
111	OPER DILITE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
1	OPER-DIDUIE	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
		PCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
1	DECOMBTIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	WWD2EST-NM-RYPR	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1	YOD_COM2_14		7.00E-03	1.60E-02	
12	20F-COM2-14	TIRBINE TRIP INITIATOR	2.70E+00	3.00E+00	4.33E-08
12	31(1) (1)26(9)3M	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	STC2XVN-0C-F001	SLC TANK DISCHARGE VALVE C41-F001 FAILS TO REMAIN OPEN 5.50E-08	8.76E+04	4.81E-03	
	WWR2FST_NM_BYPB	WETWEIL AIRSPACE AND FOOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
12	9m(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	3.60E-08
13		MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2EPV-CC-F004A	EXPLOSIVE VALVE C41-F004A FAILS TO OPEN 2.40E-03	1.00E+00	2.40E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
14	<u>ዲ</u> ሞ(ሞ)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	3.60E-08
111	PPS2MBTND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	SLC2EPV-CC-F004B	EXPLOSIVE VALVE C41-F004B FAILS TO OPEN 2.40E-03	1.00E+00	2.40E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
15	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	3.33E-08
1	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	SLC2MDP-FS-PMPA	SLC PUMP C41-C001A FAILS TO START	3.70E-03	3.70E-03	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
16	<u>%ጠይቷቸው፤</u> የመር 2022 %ጠ(ጠ)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	3.33E-08
1-0	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
1	SLC2MDP-FS-PMPB	SLC PUMP C41-C001B FAILS TO START	3.70E-03	3.70E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1 .7	\$T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	3.31E-08
1-1	CRD2SCRAM	FAILURE OF CONTROL ROD DRIVE SCRAM VALVES	6.00E-06	6.00E-06	
	OPER-DILITE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-DILOTE	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.00E+00	
	PCT 2TOP-FR-RCTOP	RCIC TURBINE-DRIVEN PUMP FAILS TO RUN	2.30E-01	2.30E-01	
	WWDOFST-NM-RYPR	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	YOD COM2-14		7.00E-03	1.60E-02	
1.0	ትው ( ጥ ) ትው ( ጥ )	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	3.14E-08
120	™±\±/ 10003M91ND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
	Kroznolnu Rroznoruut_NAAC	SLC STORAGE TANK TEMPERATURE ELEMENT C41-N006 FAIL 1.90E-06	1.10E+03	2.10E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	

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#	Inputs	Description Rate	Exposure	Event Prob	Probability
19	<u>ዱ</u> ም(ም)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	2.70E-08
1	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-INHIBITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS	1.00E+00	1.00E+00	
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.00E-05	1.00E-05	
Į	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
	XOP-COM2-13		1.80E-03	1.80E-03	
20	%TE(E4)	LOSS OF 4160V AC BUS E4	2.00E-03	2.00E-03	2.615-08
<b>_</b>	BUSFAULT	FRACTION OF LOSS OF BUS THAT ARE NON-RECOVERABLE	3.90E-01	3.90E-01	
	DCP2BAT-XXDEP2B	BATTERY BANK 2B DEPLETION FOLLOWING LOSS OF POWER FROM CHARGER1.00E+00	1.00E+00	1.00E+00	
	DWT2EST-NM-INTA	DRYWELL INTACT (CLASS II)	6.45E-01	6.45E-01	
	OPER-FPS1	OPERATOR FAILS TO ALIGN FIREWATER FOR COOLANT INJECTION FLOW (ONE UNIT)	1.00E+00	1.00E+00	
	SWS2CKV-00-V22	CHECK VALVE SW V-22 FAILS TO CLOSE 5.40E-04	1.00E+00	5.40E-04	
	XOP-FPS1		9.60E-02	9.60E-02	
21	<b>%</b> T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	2.55E-08
	ICC2SIGN01	FAILURE OF RPS TRIP SIGNAL	1.00E-05	1.00E-05	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-INHIBITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS	1.00E+00	1.00E+00	
	OPER-SCRAM	OPERATOR FAILS TO INITIATE MANUAL SCRAM	1.00E+00	1.00E+00	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.00E-01	5.00E-01	
1	XOP-SCRAM		1.70E-03	1.70E-03	0 557 44
22	8T(T)	TURBINE TRIP INITIATOR	2.70E+00	3.00E+00	2.555-08
	ICC2SIGN01	FAILURE OF RPS TRIP SIGNAL	1.00E-05	1.00E-05	
	OPER-DILUTE	OPERATOR FAILS TO PRECLUDE BORON WASHOUT DURING LOW PRESSURE INJECTION	1.00E+00	1.00E+00	
	OPER-LLEVEL1	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH HPCI DURING ATWS	1.00E+00	1.006+00	
	OPER-LLEVEL2	OPERATOR FAILS TO CONTROL LOWERED WATER LEVEL WITH RCIC DURING ATWS	1.00E+00	1.000+00	
	OPER-SCRAM	OPERATOR FAILS TO INITIATE MANUAL SCRAM	1.00E+00	1.00E+00	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	5.008-01	5.008-01	
1	XOP-SCRAM		1.705-03	1.708-03	2 405 09
23	\$T(T)	TURBINE TRIP INITIATOR	2.705+00	3.002+00	2.405-00
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.005-05	1.002-05	
	SLC2MDP-TM-PMPA	SLC PUMP C41-C001A UNAVAILABLE DUE TO MAINTENANCE	1.60E-03	I.80E-03	
ļ	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	2.006-01	3.008-01	2 408-08
24	%T(T)	TURBINE TRIP INITIATOR	1 002-05	1 000-05	2.406-00
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	1.008-03	1.002-03	
	SLC2MDP-TM-PMPB	SLC PUMP C41-C001B UNAVAILABLE DUE TO MAINTENANCE	I.008-03	1.00E-03	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	3.00E-01	1 805-01	2 348-08
25	%T(C)	LOSS OF CONDENSER VACUUM	1.005-01	1.008-01	2.340-00
	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	2 608-03	2 60E-02	
	SLC2MDP-FR-PMPA	SLC PUMP C41-C001A FAILS TO RUN FOR 1 HR	5 00E-02	5 00E-01	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	1 80E-01	1 808-01	2.34E-08
26	\$T(C)	LOSS OF CONDENSER VACUUM	1 008-01	1 008-01	4.12-00
1	RPS2MBIND	MECHANICAL BINDING OF CONTROL RODS	2 202-03	2 60E-03	
1	SLC2MDP-FR-PMPB	SLC PUMP C41-C001B FAILS TO RUN FOR I HOUR	5 000-02	5 00E-02	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)	2.002-01	2.000-01	

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#	Inputs	Description	Rate	Exposure	Event Prob	Probability
27	<u> </u>	TURBINE TRIP INITIATOR	<u>,</u>	2.70E+00	3.00E+00	2.25E-08
	ICC2SIGN01	FAILURE OF RPS TRIP SIGNAL		1.00E-05	1.00E-05	
	OPER-SCRAM	OPERATOR FAILS TO INITIATE MANUAL SCRAM		1.00E+00	1.00E+00	
ļ	OPER-SLCS	OPERATORS FAIL TO INITIATE SLCS		1.00E+00	1.00E+00	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	XOP-SLCS			1.50E-03	1.50E-03	
28	8T(T)	TURBINE TRIP INITIATOR		2.70E+00	3.00E+00	2.25E-08
20	OPER-INHIBITADS	OPERATOR FAILS TO INHIBIT ADS DURING ATWS		1.00E+00	1.00E+00	
	OPER-SPCATWS	OPERATORS FAIL TO INITIATE SUPPRESSION POOL COOLING DURING AN AT	TWS	1.00E+00	1.00E+00	
i i	OPER -WYDHR	OPERATORS FAIL TO INITIATE WETWELL VENTING FOR DHR		1.00E+00	1.00E+00	
1	DECOMPTND	MECHANICAL BINDING OF CONTROL RODS		1.00E-05	1.00E-05	
	WWB2FST-NM-BVDB	WETWELL AIRSPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	NUD2EST-UN-BILD			1.50E-03	1.50E-03	
20	AUP-HYDIA Am (m)	TTORING TRIP INTTATOR		2.70E+00	3.00E+00	2.25E-08
29		ODEPATORS FAIL TO INITIATE SLCS		1.00E+00	1.00E+00	
	OPER-SECS	MECHANICAL RINDING OF CONTROL RODS		1.00E-05	1.00E-05	
	RPSZMBIND	WETTIG A TREBACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	WWBZEST-NM-BIPB	AFTAFUL AIRDIACE AND FOOD NOT STILLED (TELE II)		1.50E-03	1.50E-03	
	XOP-SLCS			2.70E+00	3.00E+00	2.16E-08
30		DEFINE AR CONTROL DOD DETVE SCRAM VALVES		6.00E-06	6.00E-06	
1	CRD2SCRAM	EVELOPTIC VALUE CAL-FORAL FAILS TO OPEN 2.	.40E-03	1.00E+00	2.40E-03	
ŧ	SLC2EPV-CC-FUU4A	WERE AT POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	WWBZEST-NM-BIPB	WEINEINE TOTO INITIATOR		2.70E+00	3.00E+00	2.16E-08
31	TT(T)	TATLINE OF CONTROL ROD DRIVE SCRAM VALVES		6.00E-06	6.00E-06	
ł	CRD25CRAM	EVELOSIVE VALVE CA1-FOO4B FAILS TO OPEN 2.	.40E-03	1.00E+00	2.40E-03	
ł	SLCZEPV-CC-FUU4B	WETWELL ATREPACE AND POOL NOT BYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	WWBZESI-NM-BIPD	WEINEED AINDING THE FOOD NOT DEFINITE (DEFINITION OF THE STORE		2.70E+00	3.00E+00	1.89E-08
32	TT(T)	ENTLINE OF CONTROL ROD DRIVE SCRAM VALVES		6.00E-06	6.00B-06	
	CRD2SCRAM	CLC CTOPAGE TANK TEMPERATURE ELEMENT C41-N006 FAIL	.90E-06	1.10E+03	2.10E-03	
	SLC2TTT-HI-NUU6	WERE AND POOL NOT RYPASSED (CLASS IV)		5.00E-01	5.00E-01	
	WWBZEST-NM-BIPB	MEINER TELE INITIATOR		2.70E+00	3.00E+00	1.80E-08
33	*T(T)	TURBINE IRTE INITIATOR		1.00E-05	1.00B-05	
	RPS2MBIND	CTROUTE DEBATED FOR DECIDINATION DIMP & FAILS TO OPEN 1	.20E-03	1.00E+00	1.20E-03	
1	RRS2BKR-CC-RRS-A	UTRUIT BREAKER FOR RECIRCOMPTION FORM & FILLD TO OTHER -		5.00E-01	5.00B-01	
	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND FOOD NOT DIFABOLD (CLASS 277		2.70E+00	3.00E+00	1.80E-08
34	%T(T)	TURBINE TRIP INITIATOR		1.00E-05	1.00E-05	
	RPS2MBIND	ATTACHT DEPART FOR PECTOCILATION DIMP B FAILS TO OPEN 1	20E-03	1.00E+00	1.20E-03	
	RRS2BKR-CC-RRS-B	CIRCUIT BREAKER FOR RECIRCULATION FORF B FAILD TO OTHER		5.00E-01	5.00E-01	
1	WWB2EST-NM-BYPB	WETWELL AIRSPACE AND POOL NOI BIFASSED (CLASS IV)		2.70E+00	3.00E+00	1.71E-08
35	%T(T)	TURBING TRIP INITIAIOR	ONE UNTT)	1.00E+00	1.00E+00	
	OPER-FPS1	OPERATOR FALLS TO ADIGN FIREWALER FOR COODENT INDECTION FROM (	0112 01121/	1.00E+00	1.00E+00	
1	OPER-WVDHR	OPERATORS FAIL TO INITIATE WEIWELL VENIING FOR DAR	50E-08	3.84E+02	2.11E-05	
	SWS2XVN-OC-V442	MANUAL VALVE Z SW V442 FAILS TO KEMAIN OPEN (J)	1201-00	1 80E-01	1.80E-01	
1	WWB2EST-NM-BYPA	WETWELL AIRSPACE AND FOUL NOT BYPASSED (CLASS II)		1 508-03	1 508-02	
1	XOP-WVDHR			T. 200-03	1.000.00	

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