ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]

Sent: Thursday, July 16, 2009 1:57 PM

To: Tesfaye, Getachew

Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); NOXON

David B (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 227, FSAR Ch 19,

Supplement 1

Attachments: RAI 227 Supplement 1 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided responses to 12 of the 20 questions of RAI No. 227 on July 6, 2009. The attached file, "RAI 227 Supplement 1 Response U.S. EPR DC" provides a technically correct and complete response to one of the remaining 8 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 227 Question 19-285.

The following table indicates the respective pages in the response document, "RAI 227 Supplement 1 Response U.S. EPR DC," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 227 — 19-285	2	3
	A-1	A-90
	B-1	B-130

A complete answer is not provided for 7 of the 20 questions. The schedule for a technically correct and complete response to these questions was provided previously and remains as indicated below.

Question #	Response Date
RAI 227 — 19-284	September 18, 2009
RAI 227 — 19-287	September 18, 2009
RAI 227 — 19-292	September 18, 2009
RAI 227 — 19-293	September 18, 2009
RAI 227 — 19-294	September 18, 2009
RAI 227 — 19-295	September 18, 2009
RAI 227 — 19-298	August 28, 2009

Sincerely,

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

AREVA NP Inc.

An AREVA and Siemens company

3315 Old Forest Road Lynchburg, VA 24506-0935

Phone: 434-832-3694 Cell: 434-841-8788 **From:** WELLS Russell D (AREVA NP INC) **Sent:** Monday, July 06, 2009 6:08 PM

To: 'Getachew Tesfaye'

Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 227, FSAR Ch 19

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 227 Response US EPR DC.pdf" provides technically correct and complete responses to 12 of the 20 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 227 Questions 19-299 and 19-300.

The following table indicates the respective pages in the response document, "RAI 227 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 227 — 19-284	2	3
RAI 227 — 19-285	4	4
RAI 227 — 19-286	5	5
RAI 227 — 19-287	6	6
RAI 227 — 19-288	7	10
RAI 227 — 19-289	11	11
RAI 227 — 19-290	12	12
RAI 227 — 19-291	13	13
RAI 227 — 19-292	14	14
RAI 227 — 19-293	15	15
RAI 227 — 19-294	16	16
RAI 227 — 19-295	17	17
RAI 227 — 19-296	18	19
RAI 227 — 19-297	20	22
RAI 227 — 19-298	23	23
RAI 227 — 19-299	24	26
RAI 227 — 19-300	27	32
RAI 227 — 19-301	33	33
RAI 227 — 19-302	34	35
RAI 227 — 19-303	36	37

A complete answer is not provided for 8 of the 20 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 227 — 19-284	September 18, 2009
RAI 227 — 19-285	July 20, 2009
RAI 227 — 19-287	September 18, 2009
RAI 227 — 19-292	September 18, 2009
RAI 227 — 19-293	September 18, 2009
RAI 227 — 19-294	September 18, 2009

RAI 227 — 19-295	September 18, 2009
RAI 227 — 19-298	August 28, 2009

(Russ Wells on behalf of)

Ronda Pederson

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Licensing Manager, U.S. EPR Design Certification

New Plants Deployment

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Phone: 434-832-3694 Cell: 434-841-8788

From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]

Sent: Friday, June 05, 2009 3:29 PM

To: ZZ-DL-A-USEPR-DL

Cc: Theresa Clark; Hanh Phan; Edward Fuller; Lynn Mrowca; Prosanta Chowdhury; Joseph Colaccino; ArevaEPRDCPEm

Resource

Subject: U.S. EPR Design Certification Application RAI No. 227 (2564, 2598),FSAR Ch. 19

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on May 15, 2009, and discussed with your staff on May 29, 2009. Draft RAI Questions 19-296, 19-300, and 19-302 were modified as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks, Getachew Tesfaye Sr. Project Manager NRO/DNRL/NARP (301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs

Email Number: 667

Mail Envelope Properties (5CEC4184E98FFE49A383961FAD402D310110FAC3)

Subject: Response to U.S. EPR Design Certification Application RAI No. 227, FSAR Ch

19, Supplement 1

Sent Date: 7/16/2009 1:57:08 PM **Received Date:** 7/16/2009 1:57:12 PM

From: Pederson Ronda M (AREVA NP INC)

Created By: Ronda.Pederson@areva.com

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Options

Priority:StandardReturn Notification:NoReply Requested:NoSensitivity:Normal

Expiration Date: Recipients Received:

Response to

Request for Additional Information No. 227 (2564, 2598), Supplement 1 6/05/2009

U. S. EPR Standard Design Certification AREVA NP Inc. Docket No. 52-020

SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation Application Section: 19

QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1 (AP1000/EPR Projects) (SPLA)

Question 19-285:

(Follow-up to Question 19-125) The significant sequences (i.e., those with a sequence frequency greater than 1 percent of internal events or shutdown core damage frequency (CDF) or those that have an aggregate contribution of 95 percent of CDF when ranked by frequency) provided in response to Question 19-125 yield different insights than the cutset groups listed in FSAR Table 19.1-7. For example:

- The response to Question 19-125 states that sequence 14 in the loss-of-offsite-power (LOOP) event tree has a sequence frequency of 8.58E-8 per year (/yr), about 30 percent of the internal events point estimate for CDF. In comparison, the first cutset group in FSAR Table 19.1-7 includes cutsets from this sequence that are included in the top 100 cutsets, and represents only about 19 percent of the internal events CDF.
- The top five cutset groups based on the percent contributions listed in FSAR Table 19.1-7 are 1 (LOOP-14), 9 (SLOCA-17), 17 (ATWS-12), 8 (SLOCA-34), and 18 (GT-15). In contrast, the top five sequences based on the response to Question 19-125 are LOOP-14, GT-15, SLOCA-17, SLOCA-34, and LOOP-45.

The staff uses the significant cutsets and sequences to communicate important scenarios both to other reviewers and to the public in the Safety Evaluation Report (SER). In addition, the staff uses individual cutsets to understand the modeling of systems and operator actions. Therefore, the staff needs to see both cutsets and sequences and understand the reasons for any discrepancies in the rankings.

- a. Revise the FSAR to include a ranking of significant sequences (those provided in response to Question 19-125), with a description of each. The representative cutsets and sequence descriptions currently provided in FSAR Table 19.1-7 are one way of describing the sequences.
- b. Provide (in the RAI response only) the top 10 cutsets for each significant sequence, or the cutsets contributing 95 percent to the sequence frequency, whichever is less.
- c. Provide (in the RAI response only) the top 200 core damage cutsets for internal events, internal fire, internal flooding, shutdown, and the total at-power and shutdown model.

Response to Question 19-285:

Response to Question 19-285a:

The following tables (with table descriptions added to the sections where they are referenced) will be added to the U.S. EPR FSAR:

- Table 19.1-127—U.S. EPR Important Sequences Level 1 Internal Events (Referenced in Section 19.1.4.1.2.3).
- Table 19.1-128—U.S. EPR Important Sequences Level 1 Flooding Events (Referenced in Section 19.1.5.2.2.3).
- Table 19.1-129—U.S. EPR Important Sequences Level 1 Fire Events (Referenced in Section 19.1.5.3.2.3).
- Table 19.1-130—U.S. EPR Important Sequences Level 1 Shutdown (Referenced in Section 19.1.6.2.3).

Response to Question 19-285b:

The top 10 cutsets (or fewer if cutsets contribute to at least 95 percent of sequence frequency) for each significant sequence for internal events, internal fire, internal flooding, and shutdown are provided in Appendix A to this response.

Response to Question 19-285c:

The top 200 core damage cut sets for internal events, internal fire, internal flooding, shutdown, and total at-power are provided in Appendix B to this response.

FSAR Impact:

U.S. EPR FSAR Tier 2, tables 19.1-127, 19.1-128, 19.1-129, and 19.1-130 will be added as described in the response to 19-285a and indicated on the enclosed markup.

U.S. EPR FSAR, Tier 2, Sections 19.1.4.1.2.3, 19.1.5.2.2.3, 19.1.5.3.2.3 and 19.1.6.2.3 will be revised as described in the response and indicated on the enclosed markup.

Response to Request for Additional Information No. 227

Question 19-285 Appendix A Top 10 Cutsets for Significant Sequences

ATWS:0012

Minimal Cutsets

Top Event probability Q = 9.359E-09

No.	Prob.	%	Event	Description
1	3.932E-09	42.01	IE LOMFW	Initiator - Total Loss of Main Feedwater
			STUCK ROD	Stuck Control Rods
2	3.325E-09	35.53	IE LOC	Initiator - Loss of Main Condenser (Includes MSIV Closure etc.)
			STUCK ROD	Stuck Control Rods
3	2.083E-09	22.25	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loop Cooling Water or Aux Cooling Water
			STUCK ROD	Stuck Control Rods

Top Event probability Q = 6.780E-09

No. 1	Prob. 4.112E-10	% 6.07	Event IE GT LOOPCON+REC XKA10 DFR_C -ALL XKA50 DFR XKA80 DFR	Description Initiator - General Transient (Includes Turbine Trip and Reactor Trip) Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram CCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Run ELEC, SBO Diesel Generator XKA80, Fails to Run
2	3.959E-10	5.84	IE GT BTD01_BATST_C -ALL LOOPCON+REC	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) CCF of Safety Related Batteries on Demand Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
3	3.024E-10	4.46	IE GT EFWS PM1 LOOPCON+REC XKA10DFR_C -ALL XKA80DFR	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) EFWS Train 1 Unavailable due to Preventive Maintenance Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram CCCF of EDGs to Run ELEC, SBO Diesel Generator XKA80, Fails to Run
4	3.024E-10	4.46	IE GT EFWS PM4 LOOPCON+REC XKA10DFR_C -ALL XKA50DFR	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) EFWS Train 4 Unavailable due to Preventive Maintenance Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram CCCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Run
5	3.024E-10	4.46	IE GT LOOPCON+REC SBODG5 PM1 XKA10DFR_C -ALL XKA80DFR	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram SBO-DG Train 1 Unavailable due to Preventive Maintenance CCCF of EDGs to Run ELEC, SBO Diesel Generator XKA80, Fails to Run
6	3.024E-10	4.46	IE GT LOOPCON+REC SBODG8 PM4 XKA10DFR_C -ALL XKA50DFR	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram SBO-DG Train 4 Unavailable due to Preventive Maintenance CCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Run

GT:0014

No.	Prob.	%	Event	Description
7	2.186E-10	3.22	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			XKA10DFR_I -ALL	D CCF of EDGs to Run
			XKA50DFR_I -ALL	B CCF of SBO DGs to Run
8	1.352E-10	1.99	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			CL-TXS-OSCCF	SW CCF of TXS operating system or multiple diversity groups
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
9	8.978E-11	1.32	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Run
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			XKA10DFR_I -ALL	D CCF of EDGs to Run
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run
10	8.978E-11	1.32	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to Run
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			XKA10DFR_I -ALL	D CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

Top Event probability Q = 2.018E-08

No. 1	Prob. 2.715E-09	% 13.45	Event IE GT LOOPCON+REC OPF-SAC-2H QKA10GH001_FS_ B-ALL	Description Initiator - General Transient (Includes Turbine Trip and Reactor Trip) Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram Operator Fails to Recover Room Cooling Locally CCF of the Air Cooled SCWS Chiller Units to Start
2	2.555E-09	12.66	IE GT LOOPCON+REC OPF-SAC-2H QKA10GH001_FS SAC04/QKA40 PM4	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram Operator Fails to Recover Room Cooling Locally SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
3	2.555E-09	12.66	IE GT LOOPCON+REC OPF-SAC-2H QKA40GH001_FS SAC01/QKA10 PM1	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram Operator Fails to Recover Room Cooling Locally SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
4	4.126E-10	2.04	IE GT LOOPCON+REC OPF-SAC-2H QKA10GH001_FS QKA40GH001_FS	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram Operator Fails to Recover Room Cooling Locally SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
5	3.908E-10	1.94	IE GT LOOPCON+REC OPF-SAC-2H QKA10GH001_FR_ B-ALL	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram Operator Fails to Recover Room Cooling Locally CCF of the Air Cooled SCWS Chiller Units to Run
6	3.677E-10	1.82	IE GT LOOPCON+REC OPF-SAC-2H QKA40GH001_FR SAC01/QKA10 PM1	Initiator - General Transient (Includes Turbine Trip and Reactor Trip) Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram Operator Fails to Recover Room Cooling Locally SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Run Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance

GT:0015

No.	Prob.	%	Event	Description
7	3.677E-10	1.82	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
8	3.428E-10	1.70	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			31BTD01_BATST	ELEC, 250V 1E 2-hr Battery 31BTD01, Fails on Demand
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
9	3.428E-10	1.70	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			34BTD01_BATST	ELEC, 250V 1E 2-hr Battery 34BTD01, Fails on Demand
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
10	2.029E-10	1.01	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA40AP107EFS	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107, Fails to Start on Demand
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance

Top Event probability Q = 6.389E-09

No.	Prob.	%	Event	Description
1	2.260E-10	3.54	IE LOOP	Initiator - Loss Of Offsite Power
			BTD01_BATST_0 -124	CCF of Safety Related Batteries on Demand
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
2	2.260E-10	3.54	IE LOOP	Initiator - Loss Of Offsite Power
			BTD01_BATST_0 -134	CCF of Safety Related Batteries on Demand
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
3	1.507E-10	2.36	IE LOOP	Initiator - Loss Of Offsite Power
			BTD01_BATST_0 -124	CCF of Safety Related Batteries on Demand
			LHSI PM3	LHSI Train 3 Unavailable due to Preventive Maintenance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
4	1.507E-10	2.36	IE LOOP	Initiator - Loss Of Offsite Power
			BTD01_BATST_0 -134	CCF of Safety Related Batteries on Demand
			LHSI PM2	LHSI Train 2 Unavailable due to Preventive Maintenance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
5	1.130E-10	1.77	IE LOOP	Initiator - Loss Of Offsite Power
			BTD01_BATST_0 -124	CCF of Safety Related Batteries on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC03/QKA30 PM3	Normal SAC03/QKA30 Train Unavailable due to Preventive Maintenance
6	1.130E-10	1.77	IE LOOP	Initiator - Loss Of Offsite Power
				D CCF of Safety Related Batteries on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Preventive Maintenance

No. 7	Prob. 9.236E-11	% 1.45	Event IE LOOP	Description Initiator - Loss Of Offsite Power
1	9.230⊑-11	1.45	EFWS PM1	EFWS Train 1 Unavailable due to Preventive Maintenance
			LHSI PM1	LHSI Train 1 Unavailable due to Preventive Maintenance
				Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			XKA10DFR_[-234	CCF of EDGs to Run
8	9.236E-11	1.45	IE LOOP	Initiator - Loss Of Offsite Power
			EFWS PM4	EFWS Train 4 Unavailable due to Preventive Maintenance
			LHSI PM4	LHSI Train 4 Unavailable due to Preventive Maintenance
			OPF-XTLDSBO-NS C	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			XKA10DFR_[-123	O CCF of EDGs to Run
9	9.236E-11	1.45	IE LOOP	Initiator - Loss Of Offsite Power
			EFWS PM3	EFWS Train 3 Unavailable due to Preventive Maintenance
			LHSI PM3	LHSI Train 3 Unavailable due to Preventive Maintenance
			OPF-XTLDSBO-NS C	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			XKA10DFR_[-124	CCF of EDGs to Run
10	9.236E-11	1.45	IE LOOP	Initiator - Loss Of Offsite Power
			EFWS PM2	EFWS Train 2 Unavailable due to Preventive Maintenance
			LHSI PM2	LHSI Train 2 Unavailable due to Preventive Maintenance
			OPF-XTLDSBO-NS C	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			XKA10DFR_[-134	O CCF of EDGs to Run

Top Event probability Q = 8.578E-08

No. 1	Prob. 1.220E-08	% 14.22	Event IE LOOP OPF-SAC-2H QKA10GH001_FS_ B-ALL REC OSP 2HR	Description Initiator - Loss Of Offsite Power Operator Fails to Recover Room Cooling Locally CCF of the Air Cooled SCWS Chiller Units to Start Failure to Recover Offsite Power Within 2 Hours
2	1.148E-08	13.38	IE LOOP OPF-SAC-2H QKA10GH001_FS REC OSP 2HR SAC04/QKA40 PM4	Initiator - Loss Of Offsite Power Operator Fails to Recover Room Cooling Locally SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand Failure to Recover Offsite Power Within 2 Hours Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
3	1.148E-08	13.38	IE LOOP OPF-SAC-2H QKA40GH001_FS REC OSP 2HR SAC01/QKA10 PM1	Initiator - Loss Of Offsite Power Operator Fails to Recover Room Cooling Locally SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand Failure to Recover Offsite Power Within 2 Hours Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
4	1.854E-09	2.16	IE LOOP OPF-SAC-2H QKA10GH001_FS QKA40GH001_FS REC OSP 2HR	Initiator - Loss Of Offsite Power Operator Fails to Recover Room Cooling Locally SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand Failure to Recover Offsite Power Within 2 Hours
5	1.756E-09	2.05	IE LOOP OPF-SAC-2H QKA10GH001_FR_ B-ALL REC OSP 2HR	Initiator - Loss Of Offsite Power Operator Fails to Recover Room Cooling Locally CCF of the Air Cooled SCWS Chiller Units to Run Failure to Recover Offsite Power Within 2 Hours
6	1.652E-09	1.93	IE LOOP OPF-SAC-2H QKA40GH001_FR REC OSP 2HR SAC01/QKA10 PM1	Initiator - Loss Of Offsite Power Operator Fails to Recover Room Cooling Locally SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Run Failure to Recover Offsite Power Within 2 Hours Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
7	1.652E-09	1.93	IE LOOP OPF-SAC-2H QKA10GH001_FR REC OSP 2HR SAC04/QKA40 PM4	Initiator - Loss Of Offsite Power Operator Fails to Recover Room Cooling Locally SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run Failure to Recover Offsite Power Within 2 Hours Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance

No. 8	Prob. 1.540E-09	% 1.80	Event IE LOOP 34BTD01_BATST OPF-SAC-2H REC OSP 2HR SAC01/QKA10 PM1	Description Initiator - Loss Of Offsite Power ELEC, 250V 1E 2-hr Battery 34BTD01, Fails on Demand Operator Fails to Recover Room Cooling Locally Failure to Recover Offsite Power Within 2 Hours Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
9	1.540E-09	1.80	IE LOOP 31BTD01_BATST OPF-SAC-2H REC OSP 2HR SAC04/QKA40 PM4	Initiator - Loss Of Offsite Power ELEC, 250V 1E 2-hr Battery 31BTD01, Fails on Demand Operator Fails to Recover Room Cooling Locally Failure to Recover Offsite Power Within 2 Hours Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
10	9.116E-10	1.06	IE LOOP OPF-SAC-2H QKA40AP107EFS REC OSP 2HR SAC01/QKA10 PM1	Initiator - Loss Of Offsite Power Operator Fails to Recover Room Cooling Locally SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107, Fails to Start on Demand Failure to Recover Offsite Power Within 2 Hours Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance

Top Event probability Q = 5.382E-09

No.	Prob.	%	Event	Description
1	6.281E-11	1.17	IE LOOP	Initiator - Loss Of Offsite Power
			32BTB01_BATST	ELEC, 250V Non 1E 12-hr Battery 32BTB01, Fails on Demand
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_0 -234	CCF of EDGs to Run
2	6.281E-11	1.17	IE LOOP	Initiator - Loss Of Offsite Power
			31BTB01_BATST	ELEC, 250V Non 1E 12-hr Battery 31BTB01, Fails on Demand
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_0 -123	CCF of EDGs to Run
3	3.782E-11	0.70	IE LOOP	Initiator - Loss Of Offsite Power
			JEB20AA010EFC	RCP, RCP2 Leakoff Isolation MOV JEB20AA010, Fails to Close on Demand
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
4	3.782E-11	0.70	IE LOOP	Initiator - Loss Of Offsite Power
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run

No.	Prob.	%	Event	Description
5	3.782E-11	0.70	IE LOOP	Initiator - Loss Of Offsite Power
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
6	3.782E-11	0.70	IE LOOP	Initiator - Loss Of Offsite Power
			JEB20AA020EFC	RCP Seal, RCP2 Seal Nitrogen Venting Isolation MOV JEB20AA020, Fails to Close on Demand
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
7	3.782E-11	0.70	IE LOOP	Initiator - Loss Of Offsite Power
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
8	3.782E-11	0.70	IE LOOP	Initiator - Loss Of Offsite Power
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run

No.	Prob.	%	Event	Description
9	3.782E-11	0.70	IE LOOP	Initiator - Loss Of Offsite Power
			JEB10AA020EFC	RCP Seal, RCP1 Seal Nitrogen Venting Isolation MOV JEB10AA020, Fails to Close on Demand
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
10	3.782E-11	0.70	IE LOOP	Initiator - Loss Of Offsite Power
			JEB10AA010EFC	RCP, RCP1 Leakoff Isolation MOV JEB10AA010, Fails to Close on Demand
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run

Top Event probability Q = 5.481E-09

No.	Prob.	%	Event	Description
1	4.351E-11	0.79	IE LOOP	Initiator - Loss Of Offsite Power
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_0 -234	CCF of EDGs to Run
2	4.351E-11	0.79	IE LOOP	Initiator - Loss Of Offsite Power
			JEB20AA010EFC	RCP, RCP2 Leakoff Isolation MOV JEB20AA010, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_0 -123	CCF of EDGs to Run
3	4.351E-11	0.79	IE LOOP	Initiator - Loss Of Offsite Power
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D -234	CCF of EDGs to Run
4	4.351E-11	0.79	IE LOOP	Initiator - Loss Of Offsite Power
			JEB20AA020EFC	RCP Seal, RCP2 Seal Nitrogen Venting Isolation MOV JEB20AA020, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D -123	CCF of EDGs to Run

LOOP:	0030			
No.	Prob.	%	Event	Description
5	4.351E-11	0.79	IE LOOP	Initiator - Loss Of Offsite Power
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D -234	CCF of EDGs to Run
6	4.351E-11	0.79	IE LOOP	Initiator - Loss Of Offsite Power
			JEB10AA010EFC	RCP, RCP1 Leakoff Isolation MOV JEB10AA010, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D -123	CCF of EDGs to Run
7	4.351E-11	0.79	IE LOOP	Initiator - Loss Of Offsite Power
			JEB10AA020EFC	RCP Seal, RCP1 Seal Nitrogen Venting Isolation MOV JEB10AA020, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D -123	CCF of EDGs to Run
8	4.351E-11	0.79	IE LOOP	Initiator - Loss Of Offsite Power
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D -234	CCF of EDGs to Run

No.	Prob.	%	Event	Description
9	2.083E-11	0.38	IE LOOP	Initiator - Loss Of Offsite Power
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			JEB20AA010EFC	RCP, RCP2 Leakoff Isolation MOV JEB20AA010, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
10	2.083E-11	0.38	IE LOOP	Initiator - Loss Of Offsite Power
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run

Top Event probability Q = 1.117E-08

No. 1	Prob. 1.359E-09	% 12.16	Event IE LOOP EFWS PM1 REC OSP 2HR XKA10DFR_C -ALL XKA80DFR	Description Initiator - Loss Of Offsite Power EFWS Train 1 Unavailable due to Preventive Maintenance Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run ELEC, SBO Diesel Generator XKA80, Fails to Run
2	1.359E-09	12.16	IE LOOP EFWS PM4 REC OSP 2HR XKA10DFR_C -ALL XKA50DFR	Initiator - Loss Of Offsite Power EFWS Train 4 Unavailable due to Preventive Maintenance Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Run
3	6.074E-10	5.44	IE LOOP CL-TXS-OSCCF REC OSP 2HR	Initiator - Loss Of Offsite Power SW CCF of TXS operating system or multiple diversity groups Failure to Recover Offsite Power Within 2 Hours
4	4.034E-10	3.61	IE LOOP LAS41AP001EFR REC OSP 2HR XKA10DFR_0 -ALL XKA50DFR	Initiator - Loss Of Offsite Power EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to Run Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Run
5	4.034E-10	3.61	IE LOOP LAS11AP001EFR REC OSP 2HR XKA10DFR_C -ALL XKA80DFR	Initiator - Loss Of Offsite Power EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Run Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run ELEC, SBO Diesel Generator XKA80, Fails to Run
6	2.966E-10	2.66	IE LOOP LAS11AP001EFR REC OSP 2HR SBODG8 PM4 XKA10DFR_E-ALL	Initiator - Loss Of Offsite Power EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Run Failure to Recover Offsite Power Within 2 Hours SBO-DG Train 4 Unavailable due to Preventive Maintenance CCF of EDGs to Run
7	2.966E-10	2.66	IE LOOP EFWS PM4 LAS11AP001EFR REC OSP 2HR XKA10DFR_E-ALL	Initiator - Loss Of Offsite Power EFWS Train 4 Unavailable due to Preventive Maintenance EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Run Failure to Recover Offsite Power Within 2 Hours CCCF of EDGs to Run

No. 8	Prob. 2.966E-10	% 2.66	Event IE LOOP EFWS PM1 LAS41AP001EFR REC OSP 2HR XKA10DFR_I -ALL	Description Initiator - Loss Of Offsite Power EFWS Train 1 Unavailable due to Preventive Maintenance EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to Run Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run
9	2.966E-10	2.66	IE LOOP LAS41AP001EFR REC OSP 2HR SBODG5 PM1 XKA10DFR_I -ALL	Initiator - Loss Of Offsite Power EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to Run Failure to Recover Offsite Power Within 2 Hours SBO-DG Train 1 Unavailable due to Preventive Maintenance CCF of EDGs to Run
10	1.107E-10	0.99	IE LOOP EFWS PM4 REC OSP 2HR XKA10DFR_I -ALL XKA50DFS	Initiator - Loss Of Offsite Power EFWS Train 4 Unavailable due to Preventive Maintenance Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Start on Demand

Top Event probability Q = 1.665E-08

No. 1	Prob. 1.848E-09	% 11.10	Event IE LOOP REC OSP 2HR XKA10 DFR C-ALL XKA50 DFR XKA80 DFR	Description Initiator - Loss Of Offsite Power Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Run ELEC, SBO Diesel Generator XKA80, Fails to Run
2	1.779E-09	10.69	IE LOOP BTD01_BATST_C -ALL REC OSP 2HR	Initiator - Loss Of Offsite Power OCCF of Safety Related Batteries on Demand Failure to Recover Offsite Power Within 2 Hours
3	1.359E-09	8.16	IE LOOP REC OSP 2HR SBODG5 PM1 XKA10DFR_C -ALL XKA80DFR	Initiator - Loss Of Offsite Power Failure to Recover Offsite Power Within 2 Hours SBO-DG Train 1 Unavailable due to Preventive Maintenance CCF of EDGs to Run ELEC, SBO Diesel Generator XKA80, Fails to Run
4	1.359E-09	8.16	IE LOOP REC OSP 2HR SBODG8 PM4 XKA10DFR_C -ALL XKA50DFR	Initiator - Loss Of Offsite Power Failure to Recover Offsite Power Within 2 Hours SBO-DG Train 4 Unavailable due to Preventive Maintenance CCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Run
5	9.820E-10	5.90	-ALL	Initiator - Loss Of Offsite Power Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run CCF of SBO DGs to Run
6	3.746E-10	2.25	REC OSP 2HR	Initiator - Loss Of Offsite Power Operator Fails to Connect and Load SBO DGs to Div 1 and 4 Failure to Recover Offsite Power Within 2 Hours OCCF of EDGs to Run
7	2.260E-10	1.36	-134	Initiator - Loss Of Offsite Power CCF of Safety Related Batteries on Demand CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance Failure to Recover Offsite Power Within 2 Hours

No.	Prob.	%	Event	Description
8	2.260E-10	1.36	IE LOOP	Initiator - Loss Of Offsite Power
			BTD01_BATST_C -124	CCF of Safety Related Batteries on Demand
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
9	2.085E-10	1.25	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10AP107EFS_[-ALL	DCCF of SCWS Pumps to Start
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
10	1.507E-10	0.91	IE LOOP	Initiator - Loss Of Offsite Power
			BTD01_BATST_0 -134	CCF of Safety Related Batteries on Demand
			EDG PM2	EDG Train 2 Unavailable due to Preventive Maintenance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours

Top Event probability Q = 5.307E-09

No. 1	Prob. 1.359E-10	% 2.56	REC OSP 1HR	Description Initiator - Loss Of Offsite Power ELEC, 250V Non 1E 12-hr Battery 31BTB01, Fails on Demand Probability of Seal LOCA Occurring Given a Loss of Seal Cooling Failure to Recover Offsite Power Within 1 Hour CCF of EDGs to Run
2	1.359E-10	2.56	REC OSP 1HR	Initiator - Loss Of Offsite Power ELEC, 250V Non 1E 12-hr Battery 32BTB01, Fails on Demand Probability of Seal LOCA Occurring Given a Loss of Seal Cooling Failure to Recover Offsite Power Within 1 Hour CCF of EDGs to Run
3	5.068E-11	0.96	PROB SEAL LOCA REC OSP 1HR	Initiator - Loss Of Offsite Power RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions Probability of Seal LOCA Occurring Given a Loss of Seal Cooling Failure to Recover Offsite Power Within 1 Hour CCF of EDGs to Run
4	5.068E-11	0.96	PROB SEAL LOCA REC OSP 1HR	Initiator - Loss Of Offsite Power RCP, RCP1 Leakoff Isolation MOV JEB10AA010, Fails to Close on Demand Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions Probability of Seal LOCA Occurring Given a Loss of Seal Cooling Failure to Recover Offsite Power Within 1 Hour CCF of EDGs to Run
5	5.068E-11	0.96	PROB SEAL LOCA REC OSP 1HR	Initiator - Loss Of Offsite Power RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions Probability of Seal LOCA Occurring Given a Loss of Seal Cooling Failure to Recover Offsite Power Within 1 Hour CCCF of EDGs to Run

	No.	Prob.	%	Event	Description
(6	5.068E-11	0.96	IE LOOP	Initiator - Loss Of Offsite Power
				JEB20AA020EFC	RCP Seal, RCP2 Seal Nitrogen Venting Isolation MOV JEB20AA020, Fails to Close on Demand
				OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
				PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
				REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
				XKA10DFR_D -ALL	CCF of EDGs to Run
-	7	5.068E-11	0.96	IE LOOP	Initiator - Loss Of Offsite Power
				JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
				OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
				PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
				REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
				XKA10DFR_D -ALL	CCF of EDGs to Run
,	8	5.068E-11	0.96	IE LOOP	Initiator - Loss Of Offsite Power
•	O	0.000L 11	0.30	JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
				OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
				PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
				REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
				XKA10DFR_D -ALL	CCF of EDGs to Run
ę	9	5.068E-11	0.96	IE LOOP	Initiator - Loss Of Offsite Power
				JEB20AA010EFC	RCP, RCP2 Leakoff Isolation MOV JEB20AA010, Fails to Close on Demand
				OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
				PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
				REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
				XKA10DFR_D -ALL	CCF of EDGs to Run
	10	5.068E-11	0.96	IE LOOP	Initiator - Loss Of Offsite Power
				JEB10AA020EFC	RCP Seal, RCP1 Seal Nitrogen Venting Isolation MOV JEB10AA020, Fails to Close on Demand
				OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
				PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
				REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
				XKA10DFR_D -ALL	CCF of EDGs to Run

Top Event probability Q = 7.236E-09

No.	Prob.	%	Event	Description
1	3.620E-10	5.00	IE LOOP	Initiator - Loss Of Offsite Power
•	0.0202 10	0.00	JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run
2	3.620E-10	5.00	IE LOOP	Initiator - Loss Of Offsite Power
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020 Fails to Close on Demand
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_C -ALL	CCF of EDGs to Run
3	3.620E-10	5.00	IE LOOP	Initiator - Loss Of Offsite Power
			JEB20AA020EFC	RCP Seal, RCP2 Seal Nitrogen Venting Isolation MOV JEB20AA020 Fails to Close on Demand
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_C -ALL	OCCF of EDGs to Run
4	3.620E-10	5.00	IE LOOP	Initiator - Loss Of Offsite Power
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_C -ALL	CCF of EDGs to Run
5	3.620E-10	5.00	IE LOOP	Initiator - Loss Of Offsite Power
			JEB10AA010EFC	RCP, RCP1 Leakoff Isolation MOV JEB10AA010, Fails to Close on Demand
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run
	DAL 227 Oues	tion 10 20E Annandiv	A: Top 10 Cuteote for Sig	gnificant Sequences Page A 23 of 00

No.	Prob.	%	Event	Description
6	3.620E-10	5.00	IE LOOP	Initiator - Loss Of Offsite Power
			JEB20AA010EFC	RCP, RCP2 Leakoff Isolation MOV JEB20AA010, Fails to Close on Demand
			OPE-FCD-40MSBC	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_I -ALL	D CCF of EDGs to Run
7	3.620E-10	5.00	IE LOOP	Initiator - Loss Of Offsite Power
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			OPE-FCD-40MSBC	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_I -ALL	D CCF of EDGs to Run
8	3.620E-10	5.00	IE LOOP	Initiator - Loss Of Offsite Power
			JEB10AA020EFC	RCP Seal, RCP1 Seal Nitrogen Venting Isolation MOV JEB10AA020, Fails to Close on Demand
			OPE-FCD-40MSBC	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_I -ALL	D CCF of EDGs to Run
9	1.008E-10	1.39	IE LOOP	Initiator - Loss Of Offsite Power
			JEB40 SSSF	Mechanical Failure of the Stand Still Seal for RCP4
			OPE-FCD-40MSBC	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_[-ALL	D CCF of EDGs to Run
10	1.008E-10	1.39	IE LOOP	Initiator - Loss Of Offsite Power
			JEB10 SSSF	Mechanical Failure of the Stand Still Seal for RCP1
			OPE-FCD-40MSBC	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_[-ALL	D CCF of EDGs to Run

Minimal Cutsets

Top Event probability Q = 5.627E-09

No.	Prob.	%	Event	Description
1	5.594E-09	99.42	IE LOOP	Initiator - Loss Of Offsite Power
			BTD01_BAT_ -ALL	_ST_D CCF of Safety Related Batteries on Demand

SGTR:0018

Minimal Cutsets

Top Event probability Q = 9.717E-09

No. 1	Prob. 3.936E-09	% 40.51	Event IE SGTR	Description Initiator - Steam Generator Tube Rupture
			LBA40AA002PFC	MSS, Train 4 Main Steam Isolation Valve LBA40AA002, Fails to Close on Demand
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
2	3.388E-09	34.86	IE SGTR	Initiator - Steam Generator Tube Rupture
			LBA43AA101EFC	MSS, Train 4 MSRCV LBA43AA101, Fails to Close on Demand
			OPD-RHR4H/SGTR 1H	Dependency (MED) Between Operator Actions for Stabilizing SGTR and Initiating RHR
			OPF-SGTR-1H	Operator Fails to Isolate SGTR and Initiate Cooldown
3	2.832E-10	2.91	IE SGTR	Initiator - Steam Generator Tube Rupture
			LBA40AA002POP	MSS, Train 4 Main Steam Isolation Valve LBA40AA002, Fails to Remain Closed (SO)
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
4	2.574E-10	2.65	IE SGTR	Initiator - Steam Generator Tube Rupture
			LBA42AA191SPO	MSS, Train 4 Main Steam Safety Relief Valve LBA42AA191, Premature Opening
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
5	2.574E-10	2.65	IE SGTR	Initiator - Steam Generator Tube Rupture
			LBA41AA191SPO	MSS, Train 4 Main Steam Safety Relief Valve LBA41AA191, Premature Opening
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
6	1.520E-10	1.56	IE SGTR	Initiator - Steam Generator Tube Rupture
			34BRARFR	ELEC, 480V AC to 24V DC Rectifier for MCC 34BRA Control Power, Fails to Run
			OPD-RHR4H/SGTR 1H	Dependency (MED) Between Operator Actions for Stabilizing SGTR and Initiating RHR
			OPF-SGTR-1H	Operator Fails to Isolate SGTR and Initiate Cooldown
7	8.581E-11	0.88	IE SGTR	Initiator - Steam Generator Tube Rupture
			BRW70BUW71OFL	ELEC, 24V DC I&C Power Rack 34BRW70/34BUW71, Fails During Operation
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
8	6.950E-11	0.72	IE SGTR	Initiator - Steam Generator Tube Rupture
			LBA10AA002PFC_C -24	OCCF to Close Main Steam Isolation Valves
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours

SGTR:0018

No.	Prob.	%	Event	Description
9	6.950E-11	0.72	IE SGTR	Initiator - Steam Generator Tube Rupture
			LBA10AA002PFC_I -14	D CCF to Close Main Steam Isolation Valves
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
10	6.950E-11	0.72	IE SGTR LBA10AA002PFC_I -34	Initiator - Steam Generator Tube Rupture D CCF to Close Main Steam Isolation Valves
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours

Top Event probability Q = 6.777E-09

No. 1	Prob. 5.000E-09	% 73.78	Event IE SLBI CL-PS-B-SWCCF	Description Initiator - Steam Break Inside Containment SW CCF of Protection System diversity group B
2	3.342E-10	4.93	IE SLBI ALU-B CCF NS-ALL	Initiator - Steam Break Inside Containment CCF of ALU-B Protection System Computer Processors (Non-Self-Monitored)
3	3.342E-10	4.93	IE SLBI APU4 CCF NS-ALL	Initiator - Steam Break Inside Containment CCF of APU-4 Protection System Computer Processors (Non-Self-Monitored)
4	1.000E-10	1.48	IE SLBI CL-TXS-OSCCF	Initiator - Steam Break Inside Containment SW CCF of TXS operating system or multiple diversity groups
5	9.036E-11	1.33	IE SLBI ALU-B CCF SM-ALL	Initiator - Steam Break Inside Containment CCF of ALU-B Protection System Computer Processors (Self-Monitored)
6	9.036E-11	1.33	IE SLBI APU4 CCF SM-ALL	Initiator - Steam Break Inside Containment CCF of APU-4 Protection System Computer Processors (Self-Monitored)
7	4.024E-11	0.59	S CLF23EQ002LB01N S	Initiator - Steam Break Inside Containment N Digital output module fails (non-self-monitored) N Digital output module fails (non-self-monitored) N Digital output module fails (non-self-monitored)
8	4.024E-11	0.59	S CLG23EQ002LB01N S	Initiator - Steam Break Inside Containment I Digital output module fails (non-self-monitored) I Digital output module fails (non-self-monitored) I Digital output module fails (non-self-monitored)
9	4.024E-11	0.59	S CLF23EQ002LB01N S	Initiator - Steam Break Inside Containment I Digital output module fails (non-self-monitored) I Digital output module fails (non-self-monitored) I Digital output module fails (non-self-monitored)

SLBI:0017

No.	Prob.	%	Event	Description
10	4.024E-11	0.59	IE SLBI	Initiator - Steam Break Inside Containment
			CLE23EQ002LB01N S	I Digital output module fails (non-self-monitored)
			CLG23EQ002LB01N S	I Digital output module fails (non-self-monitored)
			CLH23EQ002LB01N S	I Digital output module fails (non-self-monitored)

Minimal Cutsets

Top Event probability Q = 6.487E-09

No. 1	Prob. 5.000E-09	% 77.08	Event IE SLBI CL-PS-B-SWCCF	Description Initiator - Steam Break Inside Containment SW CCF of Protection System diversity group B
2	3.342E-10	5.15	IE SLBI ALU-B CCF NS-ALL	Initiator - Steam Break Inside Containment CCF of ALU-B Protection System Computer Processors (Non-Self-Monitored)
3	3.342E-10	5.15	IE SLBI APU4 CCF NS-ALL	Initiator - Steam Break Inside Containment CCF of APU-4 Protection System Computer Processors (Non-Self-Monitored)
4	1.000E-10	1.54	IE SLBI CL-TXS-OSCCF	Initiator - Steam Break Inside Containment SW CCF of TXS operating system or multiple diversity groups
5	9.036E-11	1.39	IE SLBI APU4 CCF SM-ALL	Initiator - Steam Break Inside Containment CCF of APU-4 Protection System Computer Processors (Self-Monitored)
6	9.036E-11	1.39	IE SLBI ALU-B CCF SM-ALL	Initiator - Steam Break Inside Containment CCF of ALU-B Protection System Computer Processors (Self-Monitored)
7	4.024E-11	0.62	S CLG23EQ002LB01N S	Initiator - Steam Break Inside Containment N Digital output module fails (non-self-monitored) N Digital output module fails (non-self-monitored) N Digital output module fails (non-self-monitored)
8	4.024E-11	0.62	S CLG23EQ002LB01N S	Initiator - Steam Break Inside Containment N Digital output module fails (non-self-monitored) N Digital output module fails (non-self-monitored) N Digital output module fails (non-self-monitored)
9	4.024E-11	0.62	S CLF23EQ002LB01N S	Initiator - Steam Break Inside Containment N Digital output module fails (non-self-monitored) N Digital output module fails (non-self-monitored) N Digital output module fails (non-self-monitored)

SLBI:0030

No.	Prob.	%	Event	Description
10	4.024E-11	0.62	IE SLBI	Initiator - Steam Break Inside Containment
			CLE23EQ002LB01I S	N Digital output module fails (non-self-monitored)
			CLF23EQ002LB01I S	N Digital output module fails (non-self-monitored)
			CLH23EQ002LB01	N Digital output module fails (non-self-monitored)

SLBI:0040

Minimal Cutsets

Top Event probability Q = 1.038E-08

No.	Prob.	%	Event	Description
1	5.000E-09	48.16	IE SLBI	Initiator - Steam Break Inside Containment
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B
2	6.723E-10	6.48	IE SLBI	Initiator - Steam Break Inside Containment
			SG4 PRES CCF-ALL	CCF of SG4 pressure sensors
3	4.180E-10	4.03	IE SLBI	Initiator - Steam Break Inside Containment
			SG4 PRES CCF-124	CCF of SG4 pressure sensors
4	4.180E-10	4.03	IE SLBI	Initiator - Steam Break Inside Containment
			SG4 PRES CCF-234	CCF of SG4 pressure sensors
5	4.180E-10	4.03	IE SLBI	Initiator - Steam Break Inside Containment
			SG4 PRES CCF-134	CCF of SG4 pressure sensors
6	4.180E-10	4.03	IE SLBI	Initiator - Steam Break Inside Containment
			SG4 PRES CCF-123	CCF of SG4 pressure sensors
7	3.342E-10	3.22	IE SLBI	Initiator - Steam Break Inside Containment
			APU4 CCF NS-ALL	CCF of APU-4 Protection System Computer Processors (Non-Self-Monitored)
8	3.342E-10	3.22	IE SLBI	Initiator - Steam Break Inside Containment
			ALU-B CCF NS-ALL	CCF of ALU-B Protection System Computer Processors (Non-Self-Monitored)
9	1.000E-10	0.96	IE SLBI	Initiator - Steam Break Inside Containment
			CL-TXS-OSCCF	SW CCF of TXS operating system or multiple diversity groups
10	9.036E-11	0.87	IE SLBI	Initiator - Steam Break Inside Containment
			ALU-B CCF SM-ALL	CCF of ALU-B Protection System Computer Processors (Self-Monitored)

Minimal Cutsets

Top Event probability Q = 1.946E-08

No. 1	Prob. 6.659E-09	% 34.22	Event IE SLOCA LBA13AA001PFO_C	Description Initiator - Small LOCA (0.6 to 3-Inch Diameter) CCF to Open Main Steam Relief Isolation Valves
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
2	2.269E-09	11.66	IE SLOCA MSRIVSCPFO_P-A LL OPE-FB-40M	Initiator - Small LOCA (0.6 to 3-Inch Diameter) CCF to Open Main Steam Relief Isolation Pneumatic Pilot Valves Operator Fails to Initiate Feed & Bleed for SLOCA
3	8.970E-10	4.61	IE SLOCA CL-PS-B-SWCCF OPE-FB-40M	Initiator - Small LOCA (0.6 to 3-Inch Diameter) SW CCF of Protection System diversity group B Operator Fails to Initiate Feed & Bleed for SLOCA
4	7.856E-10	4.04	IE SLOCA CCWS/ESWS PM3 LOOPCONL+REC OPE-FB-40M OPF-XTDIV-NSC XKA20DFR	Initiator - Small LOCA (0.6 to 3-Inch Diameter) CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance Consequential LOOP and Failure of Recovery Within 1 Hour for LOCA IEs Operator Fails to Initiate Feed & Bleed for SLOCA Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions ELEC, Emergency Diesel Generator XKA20, Fails to Run
5	7.856E-10	4.04	IE SLOCA CCWS/ESWS PM2 LOOPCONL+REC OPE-FB-40M OPF-XTDIV-NSC XKA30DFR	Initiator - Small LOCA (0.6 to 3-Inch Diameter) CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance Consequential LOOP and Failure of Recovery Within 1 Hour for LOCA IEs Operator Fails to Initiate Feed & Bleed for SLOCA Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions ELEC, Emergency Diesel Generator XKA30, Fails to Run
6	7.564E-10	3.89	IE SLOCA MSRIVSOOFO_P-A LL OPE-FB-40M	Initiator - Small LOCA (0.6 to 3-Inch Diameter) CCF to Open Main Steam Relief Isolation Solenoid Pilot Valves Operator Fails to Initiate Feed & Bleed for SLOCA
7	5.237E-10	2.69	IE SLOCA EDG PM3 LOOPCONL+REC OPE-FB-40M OPF-XTDIV-NSC XKA20DFR	Initiator - Small LOCA (0.6 to 3-Inch Diameter) EDG Train 3 Unavailable due to Preventive Maintenance Consequential LOOP and Failure of Recovery Within 1 Hour for LOCA IEs Operator Fails to Initiate Feed & Bleed for SLOCA Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions ELEC, Emergency Diesel Generator XKA20, Fails to Run

SLOCA:0017

No.	Prob.	%	Event	Description
8	5.237E-10	2.69	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			EDG PM2	EDG Train 2 Unavailable due to Preventive Maintenance
			LOOPCONL+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for LOCA IEs
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
9	3.606E-10	1.85	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			LOOPCONL+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for LOCA IEs
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
10	1.394E-10	0.72	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			LOOPCONL+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for LOCA IEs
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PEB20AP001EFS	ESWS, Train 2 Motor Driven Pump PEB20AP001, Fails to Start on Demand

SLOCA:0020

Minimal Cutsets

Top Event probability Q = 6.241E-09

No.	Prob.	%	Event	Description
1	6.178E-09	98.98	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves

Minimal Cutsets

Top Event probability Q = 1.734E-08

No. 1	Prob. 6.822E-09	% 39.35	Event IE SLOCA	Description Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JND10AP001EFR_[-ALL	OCCF of MHSI Pumps to Run
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA
2	8.970E-10	5.17	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA
3	8.294E-10	4.78	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JND10AP001EFS_0 -ALL	OCCF of MHSI Pumps to Start
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA
4	8.031E-10	4.63	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA
5	4.321E-10	2.49	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			JND10AP001EFR_[-134	OCCF of MHSI Pumps to Run
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA
6	4.321E-10	2.49	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			JND10AP001EFR_[-124	OCCF of MHSI Pumps to Run
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA
7	2.881E-10	1.66	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JND10AP001EFR_[-124	OCCF of MHSI Pumps to Run
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenance
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA
8	2.881E-10	1.66	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JND10AP001EFR_[-123	OCCF of MHSI Pumps to Run
			MHSI PM4	MHSI Train 4 Unavailable due to Preventive Maintenance
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA

SLOCA:0034

No.	Prob.	%	Event	Description
9	2.881E-10	1.66	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JND10AP001EFR_I -234	D CCF of MHSI Pumps to Run
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA
10	2.881E-10	1.66	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JND10AP001EFR_I -134	D CCF of MHSI Pumps to Run
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA

FLD-ANN ALL:0002

Minimal Cutsets

Top Event probability Q = 3.200E-08

No.	Prob.	%	Event	Description
1	3.200E-08 1	00.00	IE FLD-ANN ALL	Initiator - Flood in the RB Annulus (Contained)
			PROB ANNULUS	Probability that the Annulus connection boxes will withstand a contained Flood

Minimal Cutsets

Top Event probability Q = 8.659E-09

No.	Prob.	%	Event	Description
1	8.933E-11	1.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			KAA12AA005EFO_ -ALL	DCCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
2	8.933E-11	1.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			KAA12AA005EFO_ -ALL	DCCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
3	8.933E-11	1.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			KAA12AA005EFO_ -ALL	DCCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
4	8.933E-11	1.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			KAA12AA005EFO_ -ALL	DCCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
5	7.478E-11	0.86	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			PED10AN002EFS_ -ALL	DCCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
6	7.478E-11	0.86	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			PED10AN002EFS_ -ALL	DCCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

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No.	Prob.	%	Event	Description
7	7.478E-11	0.86	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			PED10AN002EFS_I -ALL	DCCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
8	7.478E-11	0.86	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
		JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand	
			PED10AN002EFS_[-ALL	DCCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
9	4.823E-11	0.56	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			JNG13AA005CFO_ D-123	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
10	4.823E-11	0.56	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JNG13AA005CFO_ D-123	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

Minimal Cutsets

Top Event probability Q = 8.979E-09

No.	Prob.	%	Event	Description
1	1.620E-10	1.80	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			JND10AP001EFR_0 -123	OCCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
2	1.620E-10	1.80	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JND10AP001EFR_0 -123	OCCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
3	1.620E-10	1.80	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			JND10AP001EFR_0 -123	OCCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
4	1.620E-10	1.80	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			JND10AP001EFR_0 -123	OCCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
5	1.535E-10	1.71	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			JND10AP001EFR_[-ALL	OCCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
6	1.535E-10	1.71	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JND10AP001EFR_[-ALL	OCCF of MHSI Pumps to Run
				Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

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No.	Prob.	%	Event	Description
7	1.535E-10	1.71	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			JND10AP001EFR_0 -ALL	OCCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
8	1.535E-10	1.71	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			JND10AP001EFR_0 -ALL	OCCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
9	4.823E-11	0.54	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			JNG13AA005CFO_ D-123	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
10	4.823E-11	0.54	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			JNG13AA005CFO_ D-123	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

IE FIRE-SAB-078:0015

Minimal Cutsets

Top Event probability Q = 1.253E-08

No.	Prob.	%	Event	Description
1	7.800E-09	62.25	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
2	2.808E-09	22.41	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
3	4.535E-10	3.62	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
4	3.744E-10	2.99	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failure of Recovery Within 1 Hour
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
5	1.814E-10	1.45	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run
6	9.062E-11	0.72	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to Run

IE FIRE-SAB-078:0015

No. 7	Prob. 9.062E-11	% 0.72	Event IE FIRE-SAB-MECH OPF-SAC-2H PAS SAC01AN001EFR	Description Initiator - Fire in the Pump Room of Any Safeguard Building Operator Fails to Recover Room Cooling Locally Proccess Automation System (PAS) Fails (Estimate) SAC, Normal Air Supply Fan SAC01AN001, Fails to Run
8	6.529E-11	0.52	IE FIRE-SAB-MECH LOOPFCSD+REC OPF-SAC-2H QKA10GH001_FR	Initiator - Fire in the Pump Room of Any Safeguard Building Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn Operator Fails to Recover Room Cooling Locally SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run
9	6.171E-11	0.49	IE FIRE-SAB-MECH OPF-SAC-2H PAS QKA10AP107EFR	Initiator - Fire in the Pump Room of Any Safeguard Building Operator Fails to Recover Room Cooling Locally Proccess Automation System (PAS) Fails (Estimate) SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107, Fails to Run

Minimal Cutsets

Top Event probability Q = 1.717E-08

No. 1	Prob. 8.854E-10	% 5.16	Event IE FIRE-SAB14-AC	Description Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			KAA12AA005EFO_I -ALL	DCCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
2	7.412E-10	4.32	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PED10AN002EFS_I -ALL	DCCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
3	4.609E-10	2.68	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PED10AN002EFS_I -123	DCCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
4	3.607E-10	2.10	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			KAA12AA005EFO_I -123	DCCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
5	1.579E-10	0.92	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			LHSI PM1	LHSI Train 1 Unavailable due to Preventive Maintenance
			PEB20AP001EFS_E -ALL	3 CCF of ESWS Pumps 2 and 3 to Start (Standby)
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
6	1.536E-10	0.89	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			JNG10AA006MEC3	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA006, Left in Wrong Position
			JNG20AA006MEC3	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA006, Left in Wrong Position
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

No. 7	Prob. 1.184E-10	% 0.69	CVCS VCT PEB20AP001EFS_E -ALL	Description Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) CVCS Switchover to IRWST May Not Be Required CCF of ESWS Pumps 2 and 3 to Start (Standby) Probability of Seal LOCA Occurring Given a Loss of Seal Cooling Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
8	1.076E-10	0.63	CVCS VCT KAA20AP001EFS_E -ALL LHSI PM1	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) CVCS Switchover to IRWST May Not Be Required CCF of CCWS Pumps 2 and 3 to Start (Standby) LHSI Train 1 Unavailable due to Preventive Maintenance Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
9	1.067E-10	0.62	CVCS VCT PED10AN002EFR_ D-ALL	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) CVCS Switchover to IRWST May Not Be Required CCF to Run Standby Cooling Tower Fans Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
10	1.067E-10	0.62	CVCS VCT PED10AN001EFR_ D-ALL	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) CVCS Switchover to IRWST May Not Be Required CCF to Run Normally Running Cooling Tower Fans Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

Minimal Cutsets

Top Event probability Q = 5.785E-08

No.	Prob.	%	Event	Description
1	6.133E-09	10.60	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			32BRARFR	ELEC, 480V AC to 24V DC Rectifier for MCC 32BRA Control Power, Fails to Run
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
2	6.133E-09	10.60	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			31BRARFR	ELEC, 480V AC to 24V DC Rectifier for MCC 31BRA Control Power, Fails to Run
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
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3	4.320E-09	7.47	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
4	2.880E-09	4.98		Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			EDG PM2	EDG Train 2 Unavailable due to Preventive Maintenance
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
5	1.983E-09	3.43	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
6	1.485E-09	2.57	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			LBA13AA001PFO_L -ALL	OCCF to Open Main Steam Relief Isolation Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

No.	Prob.	%	Event	Description
7	9.600E-10	1.66	IE FIRE-SAB14-AC 32BMT02TFL CVCS VCT OPF-XTIE BC PROB SEAL LOCA	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) ELEC, 6.9kV-480V Transformer 32BMT02, Fails During Operation CVCS Switchover to IRWST May Not Be Required Operator Fails to Align Backup Battery Charger to BUC Bus Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
8	9.600E-10	1.66	IE FIRE-SAB14-AC 31BMBOFL CVCS VCT OPF-XTIE BC PROB SEAL LOCA	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) ELEC, 480V Load Center 31BMB, Fails During Operation CVCS Switchover to IRWST May Not Be Required Operator Fails to Align Backup Battery Charger to BUC Bus Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
9	9.600E-10	1.66	IE FIRE-SAB14-AC 32BMBOFL CVCS VCT OPF-XTIE BC PROB SEAL LOCA	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) ELEC, 480V Load Center 32BMB, Fails During Operation CVCS Switchover to IRWST May Not Be Required Operator Fails to Align Backup Battery Charger to BUC Bus Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
10	9.600E-10	1.66	IE FIRE-SAB14-AC 31BRAOFL CVCS VCT PROB SEAL LOCA	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) ELEC, 480V MCC 31BRA, Fails During Operation CVCS Switchover to IRWST May Not Be Required Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

Minimal Cutsets

Top Event probability Q = 7.520E-09

No.	Prob.	%	Event	Description
1	7.973E-10	10.60	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			31BRARFR	ELEC, 480V AC to 24V DC Rectifier for MCC 31BRA Control Power, Fails to Run
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
2	7.973E-10	10.60	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			32BRARFR	ELEC, 480V AC to 24V DC Rectifier for MCC 32BRA Control Power, Fails to Run
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
3	5.616E-10	7.47	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
4	3.744E-10	4.98	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			EDG PM2	EDG Train 2 Unavailable due to Preventive Maintenance
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
5	2.578E-10	3.43	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run

	_ 0/10/2.1			
No.	Prob.	%	Event	Description
6	1.930E-10	2.57	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			LBA13AA001PFO_[-ALL	OCCF to Open Main Steam Relief Isolation Valves
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
7	1.248E-10	1.66	IE FIRE-SAB14-AC 32BMBOFL CVCS VCT OPE-FB-40M OPF-XTIE BC PROB SEAL LOCA	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) ELEC, 480V Load Center 32BMB, Fails During Operation CVCS Switchover to IRWST May Not Be Required Operator Fails to Initiate Feed & Bleed for SLOCA Operator Fails to Align Backup Battery Charger to BUC Bus Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
8	1.248E-10	1.66	IE FIRE-SAB14-AC 31BDAOFL OPE-FB-40M OPF-XTLDSBO-NS C PROB SEAL LOCA	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) ELEC, 6.9kV Switchgear 31BDA, Fails During Operation Operator Fails to Initiate Feed & Bleed for SLOCA Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
9	1.248E-10	1.66	IE FIRE-SAB14-AC 31BDCOFL CVCS VCT OPE-FB-40M PROB SEAL LOCA	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) ELEC, 6.9kV SWGR 31BDC, Fails During Operation CVCS Switchover to IRWST May Not Be Required Operator Fails to Initiate Feed & Bleed for SLOCA Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
10	1.248E-10	1.66	IE FIRE-SAB14-AC 31BDBOFL CVCS VCT OPE-FB-40M OPF-XTIE BC PROB SEAL LOCA	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) ELEC, 6.9kV SWGR 31BDB, Fails During Operation CVCS Switchover to IRWST May Not Be Required Operator Fails to Initiate Feed & Bleed for SLOCA Operator Fails to Align Backup Battery Charger to BUC Bus Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

IE FIRE-SWGR:0013

Minimal Cutsets

Top Event probability Q = 2.156E-08

No. 1	Prob. 8.963E-10	% 4.16	Event IE FIRE-SWGR OPF-SAC-2H QKA10GH001_FR_ B-ALL	Description Initiator - Fire in the Switchgear Building Operator Fails to Recover Room Cooling Locally CCF of the Air Cooled SCWS Chiller Units to Run
2	8.433E-10	3.91	IE FIRE-SWGR OPF-SAC-2H QKA40GH001_FR SAC01/QKA10 PM1	Initiator - Fire in the Switchgear Building Operator Fails to Recover Room Cooling Locally SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Run Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
3	8.433E-10	3.91	IE FIRE-SWGR OPF-SAC-2H QKA10GH001_FR SAC04/QKA40 PM4	Initiator - Fire in the Switchgear Building Operator Fails to Recover Room Cooling Locally SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
4	8.433E-10	3.91	IE FIRE-SWGR OPF-SAC-2H QKA40GH001_FR SAC02/QKA20 PM2	Initiator - Fire in the Switchgear Building Operator Fails to Recover Room Cooling Locally SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Run Normal SAC02/QKA20 Train Unavailable due to Preventive Maintenance
5	8.433E-10	3.91	IE FIRE-SWGR OPF-SAC-2H QKA30GH001_FR SAC01/QKA10 PM1	Initiator - Fire in the Switchgear Building Operator Fails to Recover Room Cooling Locally SCWS, Train 3 Chiller Unit QKA30GH001, Fails to Run Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
6	8.433E-10	3.91	IE FIRE-SWGR OPF-SAC-2H QKA20GH001_FR SAC04/QKA40 PM4	Initiator - Fire in the Switchgear Building Operator Fails to Recover Room Cooling Locally SCWS, Train 2 Chiller Unit QKA20GH001, Fails to Run Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
7	8.433E-10	3.91	IE FIRE-SWGR OPF-SAC-2H QKA10GH001_FR SAC03/QKA30 PM3	Initiator - Fire in the Switchgear Building Operator Fails to Recover Room Cooling Locally SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run Normal SAC03/QKA30 Train Unavailable due to Preventive Maintenance
8	5.736E-10	2.66	IE FIRE-SWGR LOOPCON+REC XKA10DFR_I	Initiator - Fire in the Switchgear Building Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram D CCF of EDGs to Run

IE FIRE-SWGR:0013

No.	Prob.	%	Event	Description
9	4.214E-10	1.95	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to Run
10	4.214E-10	1.95	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
			SAC03AN001EFR	SAC, Normal Air Supply Fan SAC03AN001, Fails to Run

IE FIRE-MS-VR:0024

Minimal Cutsets

Top Event probability Q = 2.733E-08

No.	Prob.	%	Event	Description
1	2.626E-08	96.07	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Opening of 1 MSRIV
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours

Minimal Cutsets

Top Event frequency F = 1.313E-09

No .	Freq. 1.917E-11	% 1.46	Event IE SD LOCA CBD	Description Initiator - LOCA During Shutdown State CBd			
			JND10AP001EFR_D CCF of MHSI Pumps to Run -ALL				
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening			
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand			
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB			
2	1.917E-11	1.46	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd			
			JND10AP001EFR_ -ALL	D CCF of MHSI Pumps to Run			
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve JNG10AA192, Premature Opening			
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand			
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB			
3	1.917E-11	1.46	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd			
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening			
			JND10AP001EFR_ -ALL	D CCF of MHSI Pumps to Run			
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand			
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB			
4	1.917E-11	1.46	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd			
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening			
			JND10AP001EFR_ -ALL	D CCF of MHSI Pumps to Run			
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand			
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB			
5	1.917E-11	1.46	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd			
			JND10AP001EFR_ -ALL	D CCF of MHSI Pumps to Run			
			JNG30AA192SPO	LHSI, LHSI/RHR Train 30 Overpressure Protection Safety Valve JNG30AA192, Premature Opening			
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand			
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB			

SD LOCA C:0029 CBD

SD LC	CA C:0029	עסט		
No.	Freq.	%	Event	Description
6	1.917E-11	1.46	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd
			JNA30AA191SPO	RHR, LHSI Train 3 Safety Valve JNA30AA191, Premature Opening
			JND10AP001EFR_ -ALL	D CCF of MHSI Pumps to Run
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
7	1.917E-11	1.46	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd
			JMQ40AA001EFO	SAHR, Suction Line Containment Isolation MOV JMQ40AA001, Fails to Open on Demand
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening
			JND10AP001EFR_ -ALL	D CCF of MHSI Pumps to Run
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
8	1.917E-11	1.46	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd
			JMQ42AA001EFO	SAHR, Active Cooling Line MOV JMQ42AA001, Fails to Open on Demand
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening
			JND10AP001EFR_ -ALL	D CCF of MHSI Pumps to Run
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
9	1.917E-11	1.46	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd
			JMQ42AA001EFO	SAHR, Active Cooling Line MOV JMQ42AA001, Fails to Open on Demand
			JND10AP001EFR_ -ALL	D CCF of MHSI Pumps to Run
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve JNG10AA192, Premature Opening
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
10	1.917E-11	1.46	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd
			JMQ40AA001EFO	SAHR, Suction Line Containment Isolation MOV JMQ40AA001, Fails to Open on Demand
			JNA30AA191SPO	RHR, LHSI Train 3 Safety Valve JNA30AA191, Premature Opening
			JND10AP001EFR_ -ALL	D CCF of MHSI Pumps to Run
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB

Minimal Cutsets

Top Event frequency F = 6.495E-10

No. 1	Freq. 1.437E-11	% 2.21	Event IE SD LOCA CBU	Description Initiator - LOCA During Shutdown State CBu
			JNA20AA191SPO JND10AP001EFR_I	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening D CCF of MHSI Pumps to Run
			-ALL JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails
			SINICI IAAOO9EI O	to Open on Demand
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
2	1.437E-11	2.21	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening
			JND10AP001EFR_I -ALL	D CCF of MHSI Pumps to Run
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
3	1.437E-11	2.21	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
			JND10AP001EFR_I	D CCF of MHSI Pumps to Run
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
4	1.437E-11	2.21	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
			JND10AP001EFR_I	D CCF of MHSI Pumps to Run
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve JNG10AA192, Premature Opening
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
5	1.437E-11	2.21	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
			JMQ40AA001EFO	SAHR, Suction Line Containment Isolation MOV JMQ40AA001, Fails to Open on Demand
			JND10AP001EFR_I -ALL	D CCF of MHSI Pumps to Run
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve JNG10AA192, Premature Opening
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB

SD LOCA C:0029 CBU

SD LO	SD LOCA C:0029 CBU					
No.	Freq.	%	Event	Description		
6	1.437E-11	2.21	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu		
			JMQ40AA001EFO	SAHR, Suction Line Containment Isolation MOV JMQ40AA001, Fails to Open on Demand		
			JND10AP001EFR_[-ALL	OCCF of MHSI Pumps to Run		
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening		
			OPF-ISORHRFD-CE	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB		
7	1.437E-11	2.21	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu		
			JMQ42AA001EFO	SAHR, Active Cooling Line MOV JMQ42AA001, Fails to Open on Demand		
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening		
			JND10AP001EFR_[-ALL	DCCF of MHSI Pumps to Run		
			OPF-ISORHRFD-CE	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB		
8	1.437E-11	2.21	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu		
			JMQ40AA001EFO	SAHR, Suction Line Containment Isolation MOV JMQ40AA001, Fails to Open on Demand		
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening		
			JND10AP001EFR_[-ALL	OCCF of MHSI Pumps to Run		
			OPF-ISORHRFD-CE	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB		
9	1.437E-11	2.21	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu		
			JMQ42AA001EFO	SAHR, Active Cooling Line MOV JMQ42AA001, Fails to Open on Demand		
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening		
			JND10AP001EFR_[-ALL	OCCF of MHSI Pumps to Run		
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB		
10	1.437E-11	2.21	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu		
			JMQ42AA001EFO	SAHR, Active Cooling Line MOV JMQ42AA001, Fails to Open on Demand		
			JND10AP001EFR_[-ALL	D CCF of MHSI Pumps to Run		
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening		
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB		

SD LOCA C:0030 CBD

Minimal Cutsets

Top Event frequency F = 6.068E-09

No. 1	Freq. 6.446E-10	% 10.62	D-ALL	Description Initiator - LOCA During Shutdown State CBd RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves) B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
2	6.446E-10	10.62	D-ALL	Initiator - LOCA During Shutdown State CBd RHR, LHSI Train 3 Safety Valve JNA30AA191, Premature Opening CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves) B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
3	6.446E-10	10.62	D-ALL	Initiator - LOCA During Shutdown State CBd RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves) B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
4	6.446E-10	10.62	D-ALL	Initiator - LOCA During Shutdown State CBd LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve JNG10AA192, Premature Opening CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves) B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
5	6.446E-10	10.62	D-ALL JNG20AA192SPO	Initiator - LOCA During Shutdown State CBd CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves) LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
6	6.446E-10	10.62	IE SD LOCA CBD JNG13AA005CFO_ D-ALL JNG30AA192SPO OPF-ISORHRFD-CI	Initiator - LOCA During Shutdown State CBd CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves) LHSI, LHSI/RHR Train 30 Overpressure Protection Safety Valve JNG30AA192, Premature Opening B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB

SD LOCA C:0030 CBD

No.	Freq.	%	Event	Description
7	1.074E-10	1.77	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd
			JND30AA003CIR	MHSI, MHSI Pump 30 Discharge Manual CHECK Valve JND30AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
8	1.074E-10	1.77	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd
			JND10AA003CIR	MHSI, MHSI Pump 10 Discharge Manual CHECK Valve JND10AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
9	1.074E-10	1.77	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd
			JND20AA003CIR	MHSI, MHSI Pump 20 Discharge Manual CHECK Valve JND20AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
10	8.137E-11	1.34	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd
			JNA30AA191SPO	RHR, LHSI Train 3 Safety Valve JNA30AA191, Premature Opening
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB

SD LOCA C:0030 CBU

Minimal Cutsets

Top Event frequency F = 3.039E-09

No .	Freq. 4.835E-10	% 15.01	Event IE SD LOCA CBU	Description Initiator LOCA During Shutdown State CRU
ı	4.035⊑-10	15.91	JNG10AA192SPO	Initiator - LOCA During Shutdown State CBu LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve JNG10AA192, Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
2	4.835E-10	15.91	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
3	4.835E-10	15.91	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
4	4.835E-10	15.91	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
5	8.058E-11	2.65	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
			JND20AA003CIR	MHSI, MHSI Pump 20 Discharge Manual CHECK Valve JND20AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
6	8.058E-11	2.65	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
			JND10AA003CIR	MHSI, MHSI Pump 10 Discharge Manual CHECK Valve JND10AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB

SD LOCA C:0030 CBU

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	No.	Freq.	%	Event	Description
	7	6.103E-11	2.01	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
				JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening
				_	P CCF of IRWST Sump Strainers - Plugged
				-ALL	
				OPF-ISORHRFD-CI	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
	8	6.103E-11	2.01	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
				JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening
				JNK10AT001SPG I	P CCF of IRWST Sump Strainers - Plugged
				-ALL	, 55
				OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
	9	6.103E-11	2.01	IE SD LOCA CBU	Initiator LOCA During Chutdown State CDu
	9	6.103E-11	2.01		Initiator - LOCA During Shutdown State CBu
				JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening
				JNK10AT001SPG_F	CCF of IRWST Sump Strainers - Plugged
				-ALL	
				OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
	10	6.103E-11	2.01	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu
	. •			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve
				011010701102010	JNG10AA192, Premature Opening
				JNK10AT001SPG_F	CCF of IRWST Sump Strainers - Plugged
				-ALL	
				OPF-ISORHRFD-CI	3 Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB

SD LOCA D E:0003 DD

Minimal Cutsets

Top Event frequency F = 1.351E-09

No.	Freq.	%	Event	Description
1	1.612E-10	11.93	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
2	1.612E-10	11.93	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			JNG30AA192SPO	LHSI, LHSI/RHR Train 30 Overpressure Protection Safety Valve JNG30AA192, Premature Opening
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
3	1.612E-10	11.93	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
4	1.612E-10	11.93	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
5	1.612E-10	11.93	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve JNG10AA192, Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
6	2.686E-11	1.99	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JND30AA003CIR	MHSI, MHSI Pump 30 Discharge Manual CHECK Valve JND30AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
7	2.686E-11	1.99	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JND10AA003CIR	MHSI, MHSI Pump 10 Discharge Manual CHECK Valve JND10AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D

SD LOCA D E:0003 DD

No.	Freg.	%	Event	Description
NO.	rieq.	/0	Event	Description
8	2.686E-11	1.99	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JND20AA003CIR	MHSI, MHSI Pump 20 Discharge Manual CHECK Valve JND20AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
9	2.034E-11	1.51	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
10	2.034E-11	1.51	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged
			OPE-ISORHRED-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D

SD LOCA D E:0003 DU

Minimal Cutsets

Top Event frequency F = 3.079E-09

No.	Freq.	%	Event	Description
1	4.835E-10	15.70	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
2	4.835E-10	15.70	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve JNG10AA192, Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
3	4.835E-10	15.70	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
4	4.835E-10	15.70	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
5	8.058E-11	2.62	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JND20AA003CIR	MHSI, MHSI Pump 20 Discharge Manual CHECK Valve JND20AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
6	8.058E-11	2.62	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JND10AA003CIR	MHSI, MHSI Pump 10 Discharge Manual CHECK Valve JND10AA003, Internal Rupture
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
7	6.103E-11	1.98	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection Safety Valve JNG10AA192, Premature Opening
			JNK10AT001SPG_I -ALL	P CCF of IRWST Sump Strainers - Plugged
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D

SD LOCA D E:0003 DU

No.	Freq.	%	Event	Description
8	6.103E-11	1.98	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Premature Opening
			JNK10AT001SPG_I -ALL	P CCF of IRWST Sump Strainers - Plugged
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
9	6.103E-11	1.98	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Premature Opening
			JNK10AT001SPG_I -ALL	P CCF of IRWST Sump Strainers - Plugged
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
10	6.103E-11	1.98	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection Safety Valve JNG20AA192, Premature Opening
			JNK10AT001SPG_I -ALL	P CCF of IRWST Sump Strainers - Plugged
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D

Top Event frequency F = 6.844E-10

No.	Freq.	%	Event	Description
1	7.599E-11	11.10	IE SD RHR CAD	Initiator - RHR in Power State CAd
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
				CCF of EDGs to Run
			-234	
2	2.086E-11	3.05	IE SD RHR CAD	Initiator - RHR in Power State CAd
			KAA10AP001EFS	CCWS, Train 1 Motor Driven Pump KAA10AP001, Fails to Start on Demand
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_C -234	CCF of EDGs to Run
3	1.670E-11	2.44	IE SD RHR CAD	Initiator - RHR in Power State CAd
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run
4	1.520E-11	2.22	IE SD RHR CAD	Initiator - RHR in Power State CAd
			OPF-XTLDSBO-NS C	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_0 -123	CCF of EDGs to Run
5	1.094E-11	1.60	IE SD RHR CAD	Initiator - RHR in Power State CAd
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -234	CCF of EDGs to Run

SD RHR C:0012 CAD

No.	Freq.	%	Event	Description
6	1.030E-11	1.51	IE SD RHR CAD	Initiator - RHR in Power State CAd
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PEB10AP001EFS_I -234	D CCF of the ESWS Pumps to Start
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
7	8.665E-12	1.27	IE SD RHR CAD	Initiator - RHR in Power State CAd
			JMQ42AA001EFO	SAHR, Active Cooling Line MOV JMQ42AA001, Fails to Open on Demand
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
8	8.665E-12	1.27	IE SD RHR CAD	Initiator - RHR in Power State CAd
			JMQ40AA001EFO	SAHR, Suction Line Containment Isolation MOV JMQ40AA001, Fails to Open on Demand
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
9	8.665E-12	1.27	IE SD RHR CAD	Initiator - RHR in Power State CAd
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
10	8.267E-12	1.21	IE SD RHR CAD	Initiator - RHR in Power State CAd
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-123	O CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

Top Event frequency F = 9.226E-10

No.	Freq.	%	Event	Description
1	1.013E-10	10.98	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
				CCF of EDGs to Run
			-234	
2	2.781E-11	3.01	IE SD RHR CBD	Initiator - RHR in Power State CBd
			KAA10AP001EFS	CCWS, Train 1 Motor Driven Pump KAA10AP001, Fails to Start on Demand
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_C -234	CCF of EDGs to Run
3	2.227E-11	2.41	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run
4	2.026E-11	2.20	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-XTLDSBO-NS C	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_0 -123	CCF of EDGs to Run
5	1.458E-11	1.58	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -234	CCF of EDGs to Run

SD RHR C:0012 CBD

No.	Freq.	%	Event	Description
6	1.374E-11	1.49	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PEB10AP001EFS_I -234	OCCF of the ESWS Pumps to Start
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
7	1.155E-11	1.25	IE SD RHR CBD	Initiator - RHR in Power State CBd
			JMQ42AA001EFO	SAHR, Active Cooling Line MOV JMQ42AA001, Fails to Open on Demand
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
8	1.155E-11	1.25	IE SD RHR CBD	Initiator - RHR in Power State CBd
			JMQ40AA001EFO	SAHR, Suction Line Containment Isolation MOV JMQ40AA001, Fails to Open on Demand
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
9	1.155E-11	1.25	IE SD RHR CBD	Initiator - RHR in Power State CBd
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
10	1.102E-11	1.19	IE SD RHR CBD	Initiator - RHR in Power State CBd
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-123	O CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

Top Event frequency F = 6.848E-10

No.	Freq.	%	Event	Description
1	7.599E-11	11.10	IE SD RHR CBU	Initiator - RHR in Power State CBu
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -234	CCF of EDGs to Run
2	2.086E-11	3.05	IE SD RHR CBU	Initiator - RHR in Power State CBu
۷	2.000L-11	3.03	KAA10AP001EFS	CCWS, Train 1 Motor Driven Pump KAA10AP001, Fails to Start on
				Demand
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -234	CCF of EDGs to Run
3	1.670E-11	2.44	IE SD RHR CBU	Initiator - RHR in Power State CBu
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run
4	1.520E-11	2.22	IE SD RHR CBU	Initiator - RHR in Power State CBu
			OPF-XTLDSBO-NS C	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -123	CCF of EDGs to Run
5	1.094E-11	1.60	IE SD RHR CBU	Initiator - RHR in Power State CBu
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -234	OCCF of EDGs to Run

SD RHR C:0012 CBU

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No.	Freq.	%	Event	Description
6	1.030E-11	1.50	IE SD RHR CBU	Initiator - RHR in Power State CBu
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PEB10AP001EFS_I -234	D CCF of the ESWS Pumps to Start
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
7	8.665E-12	1.27	IE SD RHR CBU	Initiator - RHR in Power State CBu
			JMQ40AA001EFO	SAHR, Suction Line Containment Isolation MOV JMQ40AA001, Fails to Open on Demand
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
8	8.665E-12	1.27	IE SD RHR CBU	Initiator - RHR in Power State CBu
			JNK11AA009EFO	IRWST, SAHR Sump Containment Isolation MOV JNK11AA009, Fails to Open on Demand
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
9	8.665E-12	1.27	IE SD RHR CBU	Initiator - RHR in Power State CBu
			JMQ42AA001EFO	SAHR, Active Cooling Line MOV JMQ42AA001, Fails to Open on Demand
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
10	8.267E-12	1.21	IE SD RHR CBU	Initiator - RHR in Power State CBu
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-123	O CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

Top Event frequency F = 4.513E-09

No.	Freq.	%	Event	Description
1	1.845E-09	40.89	IE SD RHR CAD	Initiator - RHR in Power State CAd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_C -ALL	CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
2	2.464E-10	5.46	IE SD RHR CAD	Initiator - RHR in Power State CAd
			PEB10AP001EFS_[-ALL	OCCF of the ESWS Pumps to Start
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
3	1.968E-10	4.36	IE SD RHR CAD	Initiator - RHR in Power State CAd
			OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
			SA-ESWS UHS4 SBO	Failure of SA-ESWS/UHS4 in SBO Conditions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-ALL	CCF of EDGs to Run
4	1.504E-10	3.33	IE SD RHR CAD	Initiator - RHR in Power State CAd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_C -ALL	CCF of EDGs to Run
			XKA50DFS	ELEC, SBO Diesel Generator XKA50, Fails to Start on Demand
5	1.252E-10	2.77	IE SD RHR CAD	Initiator - RHR in Power State CAd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFS_C -ALL	CCF of EDGs to Start
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
6	1.070E-10	2.37	IE SD RHR CAD	Initiator - RHR in Power State CAd
			OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_C -ALL	CCF of EDGs to Run
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run

SD RHR C:0015 CAD

No.	Freq.	%	Event	Description
7	9.665E-11	2.14	IE SD RHR CAD	Initiator - RHR in Power State CAd
			BTD01_BATST_I -ALL	D CCF of Safety Related Batteries on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
8	5.336E-11	1.18	IE SD RHR CAD	Initiator - RHR in Power State CAd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_I -ALL	D CCF of EDGs to Run
			XKA50DFR_E -ALL	3 CCF of SBO DGs to Run
9	4.699E-11	1.04	IE SD RHR CAD	Initiator - RHR in Power State CAd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to Run
			XKA10DFR_[-234	D CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
10	4.699E-11	1.04	IE SD RHR CAD	Initiator - RHR in Power State CAd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-134	D CCF of EDGs to Run
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

Top Event frequency F = 2.987E-09

No.	Freq.	%	Event	Description
1	1.230E-09	41.18	IE SD RHR CAU	Initiator - RHR in Power State CAu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
2	1.642E-10	5.50	IE SD RHR CAU	Initiator - RHR in Power State CAu
			PEB10AP001EFS_C -ALL	OCCF of the ESWS Pumps to Start
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
3	1.312E-10	4.39	IE SD RHR CAU	Initiator - RHR in Power State CAu
			OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
			SA-ESWS UHS4 SBO	Failure of SA-ESWS/UHS4 in SBO Conditions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run
4	1.003E-10	3.36	IE SD RHR CAU	Initiator - RHR in Power State CAu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run
			XKA50DFS	ELEC, SBO Diesel Generator XKA50, Fails to Start on Demand
5	8.346E-11	2.79	IE SD RHR CAU	Initiator - RHR in Power State CAu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFS_D -ALL	CCF of EDGs to Start
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
6	7.136E-11	2.39	IE SD RHR CAU	Initiator - RHR in Power State CAu
			OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run

SD RHR C:0015 CAU

No.	Freq.	%	Event	Description
7	6.444E-11	2.16	IE SD RHR CAU	Initiator - RHR in Power State CAu
			BTD01_BATST_I -ALL	D CCF of Safety Related Batteries on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
8	3.557E-11	1.19	IE SD RHR CAU	Initiator - RHR in Power State CAu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_I -ALL	D CCF of EDGs to Run
			XKA50DFR_I -ALL	B CCF of SBO DGs to Run
9	3.133E-11	1.05	IE SD RHR CAU	Initiator - RHR in Power State CAu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_I -124	D CCF of EDGs to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
10	3.133E-11	1.05	IE SD RHR CAU	Initiator - RHR in Power State CAu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_I -134	D CCF of EDGs to Run
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

Top Event frequency F = 6.041E-09

No .	Freq. 2.461E-09	%	Event IE SD RHR CBD	Description Initiator - RHR in Power State CBd
1	2.401E-09	40.73	SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-ALL	CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
2	3.285E-10	5.44	IE SD RHR CBD	Initiator - RHR in Power State CBd
			PEB10AP001EFS_[-ALL	OCCF of the ESWS Pumps to Start
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
3	2.623E-10	4.34	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
			SA-ESWS UHS4 SBO	Failure of SA-ESWS/UHS4 in SBO Conditions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_C -ALL	O CCF of EDGs to Run
4	2.005E-10	3.32	IE SD RHR CBD	Initiator - RHR in Power State CBd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-ALL	CCF of EDGs to Run
			XKA50DFS	ELEC, SBO Diesel Generator XKA50, Fails to Start on Demand
5	1.669E-10	2.76	IE SD RHR CBD	Initiator - RHR in Power State CBd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFS_C -ALL	CCF of EDGs to Start
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
6	1.427E-10	2.36	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_C -ALL	CCF of EDGs to Run
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run

SD RHR C:0015 CBD

NI.		0/	Frant	Description
No.	Freq.	%	Event	Description
7	1.289E-10	2.13	IE SD RHR CBD	Initiator - RHR in Power State CBd
			BTD01_BATST_I -ALL	D CCF of Safety Related Batteries on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
8	7.114E-11	1.18	IE SD RHR CBD	Initiator - RHR in Power State CBd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-ALL	D CCF of EDGs to Run
			XKA50DFR_E -ALL	B CCF of SBO DGs to Run
9	6.265E-11	1.04	IE SD RHR CBD	Initiator - RHR in Power State CBd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-123	D CCF of EDGs to Run
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
10	6.265E-11	1.04	IE SD RHR CBD	Initiator - RHR in Power State CBd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-124	D CCF of EDGs to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
			XKA50 DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

Top Event frequency F = 4.513E-09

No.	Freq.	%	Event	Description During Research CR
1	1.845E-09	40.89	IE SD RHR CBU SD LOOP24+REC	Initiator - RHR in Power State CBu Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-ALL	CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
2	2.464E-10	5.46	IE SD RHR CBU	Initiator - RHR in Power State CBu
			PEB10AP001EFS_[-ALL	OCCF of the ESWS Pumps to Start
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
3	1.968E-10	4.36	IE SD RHR CBU	Initiator - RHR in Power State CBu
			OPF-XTDIVSBO-2H	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
			SA-ESWS UHS4 SBO	Failure of SA-ESWS/UHS4 in SBO Conditions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-ALL	CCF of EDGs to Run
4	1.504E-10	3.33	IE SD RHR CBU	Initiator - RHR in Power State CBu
7	1.5046-10	0.00	SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-ALL	CCF of EDGs to Run
			XKA50DFS	ELEC, SBO Diesel Generator XKA50, Fails to Start on Demand
5	1.252E-10	2.77	IE SD RHR CBU	Initiator - RHR in Power State CBu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFS_C -ALL	CCF of EDGs to Start
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
6	1.070E-10	2.37	IE SD RHR CBU	Initiator - RHR in Power State CBu
			OPF-XTDIVSBO-2F	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During SBO Considitions
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-ALL	O CCF of EDGs to Run
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run

SD RHR C:0015 CBU

No.	Freq.	%	Event	Description
7	9.665E-11	2.14	IE SD RHR CBU	Initiator - RHR in Power State CBu
			BTD01_BATST_I -ALL	D CCF of Safety Related Batteries on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
8	5.336E-11	1.18	IE SD RHR CBU	Initiator - RHR in Power State CBu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_I -ALL	D CCF of EDGs to Run
			XKA50DFR_I -ALL	B CCF of SBO DGs to Run
9	4.699E-11	1.04	IE SD RHR CBU	Initiator - RHR in Power State CBu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_I -124	D CCF of EDGs to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
10	4.699E-11	1.04	IE SD RHR CBU	Initiator - RHR in Power State CBu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to Run
			XKA10DFR_I -234	D CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

Top Event frequency F = 6.401E-10

No.	Freq.	%	Event	Description
1	8.004E-11	12.50	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			SAC31AN001EFR_ D-ALL	CCF to Run Normal Air Exhaust Fans
2	8.004E-11	12.50	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			SAC01AN001EFR_ D-ALL	CCF to Run Normal Air Supply Fans
3	4.977E-11	7.77	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			SAC31AN001EFR_ D-123	CCF to Run Normal Air Exhaust Fans
4	4.977E-11	7.77	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			SAC01AN001EFR_ D-123	CCF to Run Normal Air Supply Fans
5	3.846E-11	6.01	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			QKA10AP107EFR_ D-ALL	CCF of SCWS Pumps to Run
6	3.484E-11	5.44	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			QKA10AP107EFR_ D-123	CCF of SCWS Pumps to Run

SD RHR C:0016 CBD

OD IXII		50		
No.	Freq.	%	Event	Description
7	2.953E-11	4.61	IE SD RHR CBD	Initiator - RHR in Power State CBd
			31BTB01_BATST	ELEC, 250V Non 1E 12-hr Battery 31BTB01, Fails on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_[-ALL	CCF of EDGs to Run
8	1.510E-11	2.36	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10AP107EFS_ -ALL	DCCF of SCWS Pumps to Start
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
9	1.100E-11	1.72	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10AP107EFS_ -124	DCCF of SCWS Pumps to Start
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
10	7.630E-12	1.19	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC31AN001EFR_ D-ALL	CCF to Run Normal Air Exhaust Fans
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour

Top Event frequency F = 1.191E-09

No. 1	Freq. 1.004E-10	% 8.43	Event IE SD RHR DU SD LOOP24+REC	Description Initiator - RHR in Power State Du Loss Of Offsite Power During Shutdown and Failure of Recovery
			XKA10DFR_0	Within 1 Hour CCF of EDGs to Run
			-ALL XKA50DFR XKA80DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run ELEC, SBO Diesel Generator XKA80, Fails to Run
2	9.665E-11	8.11	IE SD RHR DU	Initiator - RHR in Power State Du
			BTD01_BATST_0 -ALL	OCCF of Safety Related Batteries on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
3	6.003E-11	5.04	IE SD RHR DU	Initiator - RHR in Power State Du
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			SAC01AN001EFR_ D-ALL	CCF to Run Normal Air Supply Fans
4	6.003E-11	5.04	IE SD RHR DU	Initiator - RHR in Power State Du
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			SAC31AN001EFR_ D-ALL	CCF to Run Normal Air Exhaust Fans
5	5.336E-11	4.48	IE SD RHR DU	Initiator - RHR in Power State Du
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_C -ALL	CCF of EDGs to Run
			XKA50DFR_E -ALL	3 CCF of SBO DGs to Run
6	4.068E-11	3.41	IE SD RHR DU	Initiator - RHR in Power State Du
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run

SD RHR D:0003 DU

No.	Freq.	%	Event	Description
7	3.809E-11	3.20	IE SD RHR DU	Initiator - RHR in Power State Du
			KAA10AP001EFRS D-ALL	CCF of the CCWS Pumps to Run
			OPF-LHSIRHR-DU	Operator Fails to Start LHSI Pump in DU, given a loss of RHR
8	3.192E-11	2.68	IE SD RHR DU	Initiator - RHR in Power State Du
			JND10AP001EFR_[-ALL	OCCF of MHSI Pumps to Run
			JNG10AP001EFR_I -ALL	DCCF of LHSI Pumps to Run
9	2.885E-11	2.42	IE SD RHR DU	Initiator - RHR in Power State Du
			OPD-SAC2H/SAC1	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			QKA10AP107EFR_ D-ALL	CCF of SCWS Pumps to Run
10	2.563E-11	2.15	IE SD RHR DU	Initiator - RHR in Power State Du
			OPF-LHSIRHR-DU	Operator Fails to Start LHSI Pump in DU, given a loss of RHR
			PEB10AP001EFR_I -ALL	DCCF of the ESWS Pumps to Run

SD RHR ISLOCA E:0002

Minimal Cutsets

Top Event frequency F = 7.919E-10

No.	Freq.	%	Event	Description
1	3.432E-10	43.34	IE SD RHR ISLOCA E	RHR ISLOCA During Shutdown State E
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			RHR TR2 PIPE BRK	Pipe Break in RHR Train 2
2	3.432E-10	43.34	IE SD RHR ISLOCA E	RHR ISLOCA During Shutdown State E
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			RHR TR1 PIPE BRK	Pipe Break in RHR Train 1
3	3.777E-11	4.77	IE SD RHR ISLOCA E	RHR ISLOCA During Shutdown State E
			JNA20AA001EFC	RHR, LHSI Pump 20 Hot Leg Isolation MOV JNA20AA001, Fails to Close on Demand
			JNA20AA002EFC	RHR, LHSI Pump 20 Hot Leg Isolation MOV JNA20AA002, Fails to Close on Demand
			RHR TR2 PIPE BRK	Pipe Break in RHR Train 2
4	3.777E-11	4.77	IE SD RHR ISLOCA E	RHR ISLOCA During Shutdown State E
			JNA10AA001EFC	RHR, LHSI Pump 10 Hot Leg Isolation MOV JNA10AA001, Fails to Close on Demand
			JNA10AA002EFC	RHR, LHSI Pump 10 Hot Leg Isolation MOV JNA10AA002, Fails to Close on Demand
			RHR TR1 PIPE BRK	Pipe Break in RHR Train 1

SD ULD CB:0003 CBD D

Minimal Cutsets

Top Event frequency F = 7.182E-09

No.	Freq.	%	Event	Description
1	3.388E-09	47.18	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			KBA14AA004EFC_E -ALL	3 CCF to Close CVCS Low Pressure Reducing Station MOVs
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
2	1.891E-09	26.33	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
3	6.502E-10	9.05	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
4	5.500E-10	7.66	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
			PAS	Proccess Automation System (PAS) Fails (Estimate)
5	1.891E-10	2.63	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			PAS	Proccess Automation System (PAS) Fails (Estimate)
6	1.844E-10	2.57	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			KBA14AA004PANS	CVCS, LP Reducing Iso MOV KBA14AA004, PAC A Priority Module (Type AV42) Fails (Non-Self-Monitored)
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop

SD ULD CB:0039 CBD D

Minimal Cutsets

Top Event frequency F = 6.721E-10

No.	Freq.	%	Event	Description
1	2.758E-10	41.03	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA004EFC_I -ALL	3 CCF to Close CVCS Low Pressure Reducing Station MOVs
2	1.539E-10	22.90	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
3	5.292E-11	7.87	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand
4	4.477E-11	6.66	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
			PAS	Proccess Automation System (PAS) Fails (Estimate)
5	3.481E-11	5.18	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged
			KBA14AA004EFC_I -ALL	3 CCF to Close CVCS Low Pressure Reducing Station MOVs
6	1.943E-11	2.89	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
7	1.539E-11	2.29	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand
			PAS	Proccess Automation System (PAS) Fails (Estimate)

SD ULD CB:0039 CBD D

No.	Freq.	%	Event	Description
8	1.501E-11	2.23	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA004PANS	CVCS, LP Reducing Iso MOV KBA14AA004, PAC A Priority Module (Type AV42) Fails (Non-Self-Monitored)
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
9	6.681E-12	0.99	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand
10	5.651E-12	0.84	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
			PAS	Proccess Automation System (PAS) Fails (Estimate)

SD ULD D:0003 DU D

Minimal Cutsets

Top Event frequency F = 7.182E-09

No.	Freq.	%	Event	Description
1	3.388E-09	47.18	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			KBA14AA004EFC_E -ALL	3 CCF to Close CVCS Low Pressure Reducing Station MOVs
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
2	1.891E-09	26.33	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
3	6.502E-10	9.05	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
4	5.500E-10	7.66	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
			PAS	Proccess Automation System (PAS) Fails (Estimate)
5	1.891E-10	2.63	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			PAS	Proccess Automation System (PAS) Fails (Estimate)
6	1.844E-10	2.57	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			KBA14AA004PANS	CVCS, LP Reducing Iso MOV KBA14AA004, PAC A Priority Module (Type AV42) Fails (Non-Self-Monitored)
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop

SD ULD D:0006 DU D

Minimal Cutsets

Top Event frequency F = 6.740E-10

No.	Freq.	%	Event	Description
1	2.758E-10	40.91	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA004EFC_E -ALL	3 CCF to Close CVCS Low Pressure Reducing Station MOVs
2	1.539E-10	22.84	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
3	5.292E-11	7.85	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand
4	4.477E-11	6.64	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
			PAS	Proccess Automation System (PAS) Fails (Estimate)
5	3.481E-11	5.16	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged
			KBA14AA004EFC_E -ALL	3 CCF to Close CVCS Low Pressure Reducing Station MOVs
6	1.943E-11	2.88	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
7	1.539E-11	2.28	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand
			PAS	Proccess Automation System (PAS) Fails (Estimate)

SD ULD D:0006 DU D

No.	Freq.	%	Event	Description
8	1.501E-11	2.23	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)
			KBA14AA004PANS	CVCS, LP Reducing Iso MOV KBA14AA004, PAC A Priority Module (Type AV42) Fails (Non-Self-Monitored)
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
9	6.681E-12	0.99	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNK10AT001SPG_P -ALL	CCF of IRWST Sump Strainers - Plugged
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KBA14AA106, Fails to Close on Demand $$
10	5.651E-12	0.84	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			JNK10AT001SPG_P -ALL	CCF of IRWST Sump Strainers - Plugged
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
			PAS	Proccess Automation System (PAS) Fails (Estimate)

Response to Request for Additional Information No. 227

Question 19-285 Appendix B Top 200 Core Damage Cutsets

Top Event probability Q = 2.886E-07

No.	Prob.	%	Event	Description
1	1.220E-08	4.23	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Start
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
2	1.148E-08	3.98	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
3	1.148E-08	3.98	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
4	6.822E-09	2.36	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA
5	6.659E-09	2.31	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			LBA13AA001PFO_D-ALL	CCF to Open Main Steam Relief Isolation Valves
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
6	6.178E-09	2.14	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JNG13AA005CFO_D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves
7	5.594E-09	1.94	IE LOOP	Initiator - Loss Of Offsite Power
			BTD01_BATST_D-ALL	CCF of Safety Related Batteries on Demand
8	5.000E-09	1.73	IE SLBI	Initiator - Steam Break Inside Containment
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B
9	3.936E-09	1.36	IE SGTR	Initiator - Steam Generator Tube Rupture
			LBA40AA002PFC	MSS, Train 4 Main Steam Isolation Valve LBA40AA002, Fails to Close on Demand
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
10	3.932E-09	1.36	IE LOMFW	Initiator - Total Loss of Main Feedwater
			STUCK ROD	Stuck Control Rods
11	3.388E-09	1.17	IE SGTR	Initiator - Steam Generator Tube Rupture
			LBA43AA101EFC	MSS, Train 4 MSRCV LBA43AA101, Fails to Close on Demand
			OPD-RHR4H/SGTR1H	Dependency (MED) Between Operator Actions for Stabilizing SGTR and Initiating RHR
			OPF-SGTR-1H	Operator Fails to Isolate SGTR and Initiate Cooldown

MCS Results			EPR	RDC050	INTERNAL
No.	Prob.	%	Event	Description	
12	3.325E-09	1.15	IE LOC	Initiator - Loss of Main Condenser (Includes M	SIV Closure etc.)
			STUCK ROD	Stuck Control Rods	
13	2.715E-09	0.94	IE GT	Initiator - General Transient (Includes Turbine	Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Leading to Auto Scram	Within 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Loca	lly
			QKA10GH001_FS_B-ALL	CCF of the Air Cooled SCWS Chiller Units to S	Start
14	2.555E-09	0.89	IE GT	Initiator - General Transient (Includes Turbine	Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Leading to Auto Scram	Within 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Loca	lly
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fai	ls to Start on Demand
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due	to Preventive Maintenance
15	2.555E-09	0.89	IE GT	Initiator - General Transient (Includes Turbine	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Leading to Auto Scram	Within 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Loca	lly
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fai	ls to Start on Demand
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due	to Preventive Maintenance
16	2.269E-09	0.79	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			MSRIVSCPFO_P-ALL	CCF to Open Main Steam Relief Isolation Pne	umatic Pilot Valves
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLC	OCA
17	2.083E-09	0.72	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loc Cooling Water	op Cooling Water or Aux
			STUCK ROD	Stuck Control Rods	
18	1.854E-09	0.64	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Loca	lly
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fai	ls to Start on Demand
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fai	ls to Start on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hou	rs
19	1.848E-09	0.64	IE LOOP	Initiator - Loss Of Offsite Power	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hou	rs
			XKA10DFR_D-ALL	CCF of EDGs to Run	_
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to	
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to	Kun
20	1.756E-09	0.61	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Loca	•
			QKA10GH001_FR_B-ALL	CCF of the Air Cooled SCWS Chiller Units to F	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hou	rs
21	1.652E-09	0.57	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Loca	
			QKA40GH001_FR	SCWS, Train 4 Chiller Unit QKA40GH001, Fai	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hou	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due	to Preventive Maintenance

MC2	Results		EPR	KDC030	INTERNAL
No.	Prob.	%	Event	Description	
22	1.652E-09	0.57	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Ru	ın
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Prev	entive Maintenance
23	1.540E-09	0.53	IE LOOP	Initiator - Loss Of Offsite Power	
			31BTD01_BATST	ELEC, 250V 1E 2-hr Battery 31BTD01, Fails on Dema	and
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Prev	entive Maintenance
24	1.540E-09	0.53	IE LOOP	Initiator - Loss Of Offsite Power	
			34BTD01_BATST	ELEC, 250V 1E 2-hr Battery 34BTD01, Fails on Dema	and
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Prev	entive Maintenance
25	1.359E-09	0.47	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM1	EFWS Train 1 Unavailable due to Preventive Mainten	ance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run	
26	1.359E-09	0.47	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM4	EFWS Train 4 Unavailable due to Preventive Mainten	ance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
27	1.359E-09	0.47	IE LOOP	Initiator - Loss Of Offsite Power	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SBODG8 PM4	SBO-DG Train 4 Unavailable due to Preventive Maint	enance
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
28	1.359E-09	0.47	IE LOOP	Initiator - Loss Of Offsite Power	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SBODG5 PM1	SBO-DG Train 1 Unavailable due to Preventive Maint	enance
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run	
29	1.222E-09	0.42	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV	
			SAHR PM4	SAHR Train Unavailable due to Preventive Maintenar	nce
30	1.212E-09	0.42	IE IND SGTR	Initiator - Induced Steam Generator Tube Rupture	
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours	

MCS Results			EPR	2DC050	INTERNAL
No.	Prob.	%	Event	Description	
31	1.023E-09	0.35	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			PED10AN002EFS D-ALL	CCF to Start Standby Cooling Tower Fans	
			SAHR PM4	SAHR Train Unavailable due to Preventive Maintenance	
32	9.820E-10	0.34	IE LOOP	Initiator - Loss Of Offsite Power	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA50DFR_B-ALL	CCF of SBO DGs to Run	
33	9.116E-10	0.32	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFS	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AF Start on Demand	107, Fails to
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive	Maintenance
34	9.116E-10	0.32	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40AP107EFS	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AF Start on Demand	107, Fails to
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive	Maintenance
35	8.970E-10	0.31	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B	
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA	
36	8.970E-10	0.31	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
37	8.810E-10	0.31	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loop Cooling W Cooling Water	ater or Aux
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01AN001EFR_D-ALL	CCF to Run Normal Air Supply Fans	
38	8.810E-10	0.31	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loop Cooling W Cooling Water	ater or Aux
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC31AN001EFR_D-ALL	CCF to Run Normal Air Exhaust Fans	
39	8.294E-10	0.29	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			JND10AP001EFS_D-ALL	CCF of MHSI Pumps to Start	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
40	8.256E-10	0.29	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive	Maintenance
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to Run	

No.	Prob.	%	Event	Description
41	8.256E-10	0.29	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
			SAC04AN001EFR	SAC, Normal Air Supply Fan SAC04AN001, Fails to Run
42	8.256E-10	0.29	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
			SAC34AN001EFR	SAC, Normal Air Exhaust Fan SAC34AN001, Fails to Run
43	8.256E-10	0.29	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC01AN001EFR	SAC, Normal Air Supply Fan SAC01AN001, Fails to Run
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
44	7.943E-10	0.28	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA40GH001PANS	SCWS, Train 4 Chiller Unit QKA40GH001, PAC A Priority Module (Type AV42) Fails (Non-Self-Monitored)
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
45	7.943E-10	0.28	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001PANS	SCWS, Train 1 Chiller Unit QKA10GH001, PAC A Priority Module (Type AV42) Fails (Non-Self-Monitored)
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
46	7.856E-10	0.27	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			LOOPCONL+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for LOCA IEs
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
47	7.856E-10	0.27	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			LOOPCONL+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for LOCA IEs
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
48	7.798E-10	0.27	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			JNK10AT001SPG_P-ALL	CCF of IRWST Sump Strainers - Plugged

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No.	Prob.	%	Event	Description	
49	7.747E-10	0.27	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to F	Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive	Maintenance
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run	
50	7.747E-10	0.27	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to F	Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive	Maintenance
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run	
51	7.564E-10	0.26	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			MSRIVSOOFO_P-ALL	CCF to Open Main Steam Relief Isolation Solenoid Pilot Va	lves
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA	
52	7.519E-10	0.26	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			LOOPCONL+REC	Consequential LOOP and Failure of Recovery Within 1 Hou	ır for LOCA IEs
			XKA10DFR_D-ALL	CCF of EDGs to Run	
53	6.774E-10	0.23	IE GT	Initiator - General Transient (Includes Turbine Trip and Rea	ctor Trip)
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
			STUCK ROD	Stuck Control Rods	
54	6.723E-10	0.23	IE SLBI	Initiator - Steam Break Inside Containment	
			SG4 PRES CCF-ALL	CCF of SG4 pressure sensors	
55	6.074E-10	0.21	IE LOOP	Initiator - Loss Of Offsite Power	
			CL-TXS-OSCCF	SW CCF of TXS operating system or multiple diversity grou	ips
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
56	5.622E-10	0.19	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40AP107EFR	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40Af Run	P107, Fails to
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive	Maintenance
57	5.622E-10	0.19	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFR	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AF Run	P107, Fails to
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive	Maintenance
58	5.358E-10	0.19	IE SLBO	Initiator - Steam Break Downstream of MSIV	
			LBA10AA002PFC_D-ALL	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	

MC2	Results		EPR	KDC050	INTERNAL
No.	Prob.	%	Event	Description	
59	5.237E-10	0.18	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			EDG PM3	EDG Train 3 Unavailable due to Preventive Maintenance	е
			LOOPCONL+REC	Consequential LOOP and Failure of Recovery Within 1 H	Hour for LOCA IEs
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division During Non-SBO Conditions	4 to Divison 3
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Ru	n
60	5.237E-10	0.18	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			EDG PM2	EDG Train 2 Unavailable due to Preventive Maintenance	
			LOOPCONL+REC	Consequential LOOP and Failure of Recovery Within 1 h	Hour for LOCA IEs
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division During Non-SBO Conditions	
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Ru	n
61	5.016E-10	0.17	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preven	
			SAC34AN001EFS	SAC, Normal Air Exhaust Fan SAC34AN001, Fails to St	art on Demand
62	5.016E-10	0.17	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preven	tive Maintenance
			SAC31AN001EFS	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to St	art on Demand
63	5.016E-10	0.17	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preven	tive Maintenance
			SAC04AN001EFS	SAC, Normal Air Supply Fan SAC04AN001, Fails to Sta	rt on Demand
64	5.016E-10	0.17	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01AN001EFS	SAC, Normal Air Supply Fan SAC01AN001, Fails to Sta	rt on Demand
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preven	tive Maintenance
65	4.979E-10	0.17	IE SLBO	Initiator - Steam Break Downstream of MSIV	
			LBA10AA002PFC_D-234	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
66	4.979E-10	0.17	IE SLBO	Initiator - Steam Break Downstream of MSIV	
			LBA10AA002PFC_D-124	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
67	4.979E-10	0.17	IE SLBO	Initiator - Steam Break Downstream of MSIV	
			LBA10AA002PFC_D-123	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	

MCS Results			EPR	RDC050	INTERNAL
No.	Prob.	%	Event	Description	
68	4.979E-10	0.17	IE SLBO	Initiator - Steam Break Downstream of MSIV	
			LBA10AA002PFC D-134	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
			OT 1 -LBO-30IVI	Operator Fails to Manually Actuate EBO (OEB & ATWO)	
69	4.321E-10	0.15	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive N	laintenance
			JND10AP001EFR_D-124	CCF of MHSI Pumps to Run	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
70	4.321E-10	0.15	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive M	laintenance
			JND10AP001EFR_D-134	CCF of MHSI Pumps to Run	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
71	4.234E-10	0.15	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loop Cooling Wat Cooling Water	ter or Aux
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFR_D-ALL	CCF of SCWS Pumps to Run	
72	4.215E-10	0.15	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM4	EFWS Train 4 Unavailable due to Preventive Maintenance	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on D	emand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	omana
			XKA30 DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run	
			XIVAUUBITK	ELEO, Emergency Dieser Ocherator Arvivos, Falls to Run	
73	4.215E-10	0.15	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM1	EFWS Train 1 Unavailable due to Preventive Maintenance	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on D	emand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run	
74	4.180E-10	0.14	IE SLBI	Initiator - Steam Break Inside Containment	
			SG4 PRES CCF-124	CCF of SG4 pressure sensors	
				•	
75	4.180E-10	0.14	IE SLBI	Initiator - Steam Break Inside Containment	
			SG4 PRES CCF-234	CCF of SG4 pressure sensors	
76	4.180E-10	0.14	IE SLBI	Initiator - Steam Break Inside Containment	
			SG4 PRES CCF-134	CCF of SG4 pressure sensors	
77	4.400=.40	0.44	IE CLDI	Initiator Characa Darah Ingida Cantainarant	
77	4.180E-10	0.14	IE SLBI	Initiator - Steam Break Inside Containment	
			SG4 PRES CCF-123	CCF of SG4 pressure sensors	
78	4.126E-10	0.14	IE GT	Initiator - General Transient (Includes Turbine Trip and React	or Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour Leading to Auto Scram	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on D	emand
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on D	emand

MCS	Results		EPR	(DC050	INTERNAL
No.	Prob.	%	Event	Description	
79	4.112E-10	0.14	IE GT	Initiator - General Transient (Includes Turbine Trip a	nd Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Withir Leading to Auto Scram	1 Hour for IEs
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run	
80	4.034E-10	0.14	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fa	ails to Run
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
81	4.034E-10	0.14	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fa	ails to Run
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run	
82	3.959E-10	0.14	IE GT	Initiator - General Transient (Includes Turbine Trip at	nd Reactor Trip)
			BTD01_BATST_D-ALL	CCF of Safety Related Batteries on Demand	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Withir Leading to Auto Scram	1 Hour for IEs
83	3.908E-10	0.14	IE GT	Initiator - General Transient (Includes Turbine Trip a	nd Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Withir Leading to Auto Scram	1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FR_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Run	
84	3.746E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-XTLDSBO-2H	Operator Fails to Connect and Load SBO DGs to Div	/ 1 and 4
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
85	3.677E-10	0.13	IE GT	Initiator - General Transient (Includes Turbine Trip a	nd Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Withir Leading to Auto Scram	1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to R	lun
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Pre	ventive Maintenance
86	3.677E-10	0.13	IE GT	Initiator - General Transient (Includes Turbine Trip a	nd Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Withir Leading to Auto Scram	1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FR	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to R	lun
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Pre	ventive Maintenance
87	3.632E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power	
			34BNB01RFR	ELEC, 480V AC to 24V DC Rectifier for MCC 34BNE Fails to Run	301 Control Power,
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Pre	ventive Maintenance

MCS	Results		EPF	RDC050	INTERNAL
No.	Prob.	%	Event	Description	
88	3.632E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power	
			31BNB01RFR	ELEC, 480V AC to 24V DC Rectifier for MCC 31BNB01 Fails to Run	Control Power,
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preven	itive Maintenance
89	3.620E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails Demand	to Close on
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During	SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Sea	al Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
90	3.620E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails Demand	to Close on
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During	SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Sea	al Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
91	3.620E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB20AA020EFC	RCP Seal, RCP2 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB20AA020,
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During	SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Sea	al Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
92	3.620E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB10AA020EFC	RCP Seal, RCP1 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB10AA020,
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During	SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Sea	al Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour	-
			XKA10DFR_D-ALL	CCF of EDGs to Run	
93	3.620E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB30AA020,
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During	SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Sea	al Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
94	3.620E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB20AA010EFC	RCP, RCP2 Leakoff Isolation MOV JEB20AA010, Fails Demand	to Close on
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During	SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Sea	al Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour	
			XKA10DFR_D-ALL	CCF of EDGs to Run	

NO.	Prob.	70	Event	Description
95	3.620E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D-ALL	CCF of EDGs to Run
96	3.620E-10	0.13	IE LOOP	Initiator - Loss Of Offsite Power
			JEB10AA010EFC	RCP, RCP1 Leakoff Isolation MOV JEB10AA010, Fails to Close on Demand
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for RCP During SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 Hour
			XKA10DFR_D-ALL	CCF of EDGs to Run
97	3.606E-10	0.12	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)
			LOOPCONL+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for LOCA IEs
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run
98	3.467E-10	0.12	IE LOMFW	Initiator - Total Loss of Main Feedwater
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Start
99	3.428E-10	0.12	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			31BTD01_BATST	ELEC, 250V 1E 2-hr Battery 31BTD01, Fails on Demand
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
100	3.428E-10	0.12	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			34BTD01_BATST	ELEC, 250V 1E 2-hr Battery 34BTD01, Fails on Demand
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
101	3.342E-10	0.12	IE SLBI	Initiator - Steam Break Inside Containment
			ALU-B CCF NS-ALL	CCF of ALU-B Protection System Computer Processors (Non-Self-Monitored)
102	3.342E-10	0.12	IE SLBI	Initiator - Steam Break Inside Containment
			APU4 CCF NS-ALL	CCF of APU-4 Protection System Computer Processors (Non-Self-Monitored)

MC2	Results		EPR	(DC050	INTERNAL
No.	Prob.	%	Event	Description	
103	3.341E-10	0.12	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fa	ils to Run
			LAS21AP001EFR	EFWS, Train 2 Motor Driven Pump LAS21AP001, Fa	ils to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Prev	ventive Maintenance
104	3.341E-10	0.12	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS31AP001EFR	EFWS, Train 3 Motor Driven Pump LAS31AP001, Fa	ils to Run
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fa	ils to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Prev	ventive Maintenance
105	3.326E-10	0.12	IE LOMFW	Initiator - Total Loss of Main Feedwater	
			CF LOMFW/SSS	Common Factor LOMFW/SSS	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC31AN001EFR_D-ALL	CCF to Run Normal Air Exhaust Fans	
106	3.326E-10	0.12	IE LOMFW	Initiator - Total Loss of Main Feedwater	
			CF LOMFW/SSS	Common Factor LOMFW/SSS	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01AN001EFR_D-ALL	CCF to Run Normal Air Supply Fans	
107	3.262E-10	0.11	IE LOMFW	Initiator - Total Loss of Main Feedwater	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within Leading to Auto Scram	1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to St	tart on Demand
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Prev	ventive Maintenance
108	3.262E-10	0.11	IE LOMFW	Initiator - Total Loss of Main Feedwater	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within Leading to Auto Scram	1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Si	tart on Demand
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Prev	ventive Maintenance
109	3.024E-10	0.10	IE GT	Initiator - General Transient (Includes Turbine Trip ar	nd Reactor Trip)
			EFWS PM4	EFWS Train 4 Unavailable due to Preventive Mainter	nance
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within Leading to Auto Scram	1 Hour for IEs
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
110	3.024E-10	0.10	IE GT	Initiator - General Transient (Includes Turbine Trip ar	nd Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within Leading to Auto Scram	1 Hour for IEs
			SBODG5 PM1	SBO-DG Train 1 Unavailable due to Preventive Main	tenance
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run	

MCS	Results		EPR	RDC050 IN	NIER
No.	Prob.	%	Event	Description	
111	3.024E-10	0.10	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor	Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Leading to Auto Scram	IEs
			SBODG8 PM4	SBO-DG Train 4 Unavailable due to Preventive Maintenance	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
112	3.024E-10	0.10	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor	Trip)
			EFWS PM1	EFWS Train 1 Unavailable due to Preventive Maintenance	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Leading to Auto Scram	IEs
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run	
113	2.966E-10	0.10	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM1	EFWS Train 1 Unavailable due to Preventive Maintenance	
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to Run	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
114	2.966E-10	0.10	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM4	EFWS Train 4 Unavailable due to Preventive Maintenance	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Run	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
115	2.966E-10	0.10	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to Run	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SBODG5 PM1	SBO-DG Train 1 Unavailable due to Preventive Maintenance	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
116	2.966E-10	0.10	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Run	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SBODG8 PM4	SBO-DG Train 4 Unavailable due to Preventive Maintenance	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
117	2.932E-10	0.10	IE LOC	Initiator - Loss of Main Condenser (Includes MSIV Closure etc.)	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Leading to Auto Scram	· IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FS_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Start	
118	2.881E-10	0.10	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			JND10AP001EFR_D-124	CCF of MHSI Pumps to Run	
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenance	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
119	2.881E-10	0.10	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			JND10AP001EFR_D-123	CCF of MHSI Pumps to Run	
			MHSI PM4	MHSI Train 4 Unavailable due to Preventive Maintenance	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	

MCS Results			EPR	RDC050	INTERNAI
No.	Prob.	%	Event	Description	
120	2.881E-10	0.10	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			JND10AP001EFR_D-234	CCF of MHSI Pumps to Run	
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
				·	
121	2.881E-10	0.10	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			JND10AP001EFR_D-134	CCF of MHSI Pumps to Run	
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
122	2.876E-10	0.10	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loop Cooling W Cooling Water	/ater or Aux
			LAS11AP001EFS_D-ALL	CCF of EFWS Pumps to Start	
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient	
			C. E. 1 B CO.W.	operator range to initiate reed a bleed for transient	
123	2.832E-10	0.10	IE SGTR	Initiator - Steam Generator Tube Rupture	
			LBA40AA002POP	MSS, Train 4 Main Steam Isolation Valve LBA40AA002, Fa Closed (SO)	ils to Remain
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours	
124	2.759E-10	0.10	IE LOC	Initiator - Loss of Main Condenser (Includes MSIV Closure	etc.)
	2.7002 10	0.10	LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hou	,
				Leading to Auto Scram	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on	Demand
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive	Maintenance
125	2.759E-10	0.10	IE LOC	Initiator - Loss of Main Condenser (Includes MSIV Closure	etc.)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hou	,
				Leading to Auto Scram	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive	Maintenance
126	2.726E-10	0.09	IE LOOP	Initiator - Loss Of Offsite Power	
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive	Maintenance
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to F	Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on	Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
127	2.726E-10	0.09	IE LOOP	Initiator - Loss Of Offsite Power	
121	2.720L-10	0.03	CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive	Maintenance
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to F	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001 FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on	Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
100	2 6605 40	0.00	IE I COD	Initiator Loss Of Offsite Davis	
128	2.669E-10	0.09	IE LOOP	Initiator - Loss Of Offsite Power Operator Fails to Recover Room Cooling Locally	
			OPF-SAC-2H QKA10GH001 FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on	Demand
			QKA10GH001_FS QKA40GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Run	Pemanu
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
				I to the control of the con	

MC2 I	Results		EPR	KDC050	INTERNA
No.	Prob.	%	Event	Description	
129	2.669E-10	0.09	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Ru	un
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to St	art on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
130	2.576E-10	0.09	IE SLBI	Initiator - Steam Break Inside Containment	
			LBA10AA002PFC_D-ALL	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATW	!S)
131	2.576E-10	0.09	IE MSSV	Initiator - Spurious Opening of Steam Safety Valve	
			LBA10AA002PFC_D-ALL	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATW	' S)
132	2.574E-10	0.09	IE SGTR	Initiator - Steam Generator Tube Rupture	
			LBA41AA191SPO	MSS, Train 4 Main Steam Safety Relief Valve LBA41 Opening	AA191, Premature
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours	
133	2.574E-10	0.09	IE SGTR	Initiator - Steam Generator Tube Rupture	
			LBA42AA191SPO	MSS, Train 4 Main Steam Safety Relief Valve LBA42 Opening	AA191, Premature
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours	
134	2.488E-10	0.09	IE LOOP	Initiator - Loss Of Offsite Power	
			31BTD01_BATST	ELEC, 250V 1E 2-hr Battery 31BTD01, Fails on Dem	and
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to St	art on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
135	2.488E-10	0.09	IE LOOP	Initiator - Loss Of Offsite Power	
			34BTD01_BATST	ELEC, 250V 1E 2-hr Battery 34BTD01, Fails on Dem	and
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to St	art on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
136	2.446E-10	0.08	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loop Coo Cooling Water	ling Water or Aux
			LAS11AP001EFR_D-ALL	CCF of EFWS Pumps to Run	
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient	
137	2.394E-10	0.08	IE MSSV	Initiator - Spurious Opening of Steam Safety Valve	
			LBA10AA002PFC_D-124	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATW	' S)
138	2.394E-10	0.08	IE SLBI	Initiator - Steam Break Inside Containment	
			LBA10AA002PFC_D-234	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATW	' S)
139	2.394E-10	0.08	IE MSSV	Initiator - Spurious Opening of Steam Safety Valve	
			LBA10AA002PFC_D-134	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATW	/S)

MCS Results			EPR	DC050	INTERNAL	
No.	Prob.	%	Event	Description		
140	2.394E-10	0.08	IE MSSV	Initiator - Spurious Opening of Steam Safety Valve		
			LBA10AA002PFC_D-234	CCF to Close Main Steam Isolation Valves		
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)		
141	2.394E-10	0.08	IE SLBI	Initiator - Steam Break Inside Containment		
			LBA10AA002PFC_D-124	CCF to Close Main Steam Isolation Valves		
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)		
142	2.394E-10	0.08	IE SLBI	Initiator - Steam Break Inside Containment		
			LBA10AA002PFC_D-134	CCF to Close Main Steam Isolation Valves		
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)		
143	2.360E-10	0.08	IE LOOP	Initiator - Loss Of Offsite Power		
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally		
			QKA10AP107EFS_D-14	CCF of SCWS Pumps to Start		
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours		
144	2.288E-10	0.08	IE SLBO	Initiator - Steam Break Downstream of MSIV		
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B		
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)		
145	2.260E-10	0.08	IE LOOP	Initiator - Loss Of Offsite Power		
			BTD01_BATST_D-124	CCF of Safety Related Batteries on Demand		
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive	Maintenance	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours		
146	2.260E-10	0.08	IE LOOP	Initiator - Loss Of Offsite Power		
			BTD01_BATST_D-134	CCF of Safety Related Batteries on Demand		
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive	Maintenance	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours		
147	2.189E-10	0.08	IE LOCCW-ALL	Initiator - Loss of CCWS/ESWS - Total Loss of 4 Divisions		
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to C Demand	lose on	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Co	ooling	
148	2.189E-10	0.08	IE LOCCW-ALL	Initiator - Loss of CCWS/ESWS - Total Loss of 4 Divisions		
			JEB10AA020EFC	RCP Seal, RCP1 Seal Nitrogen Venting Isolation MOV JEB Fails to Close on Demand	10AA020,	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Co	ooling	
149	2.189E-10	0.08	IE LOCCW-ALL	Initiator - Loss of CCWS/ESWS - Total Loss of 4 Divisions		
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB Fails to Close on Demand	30AA020,	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Co	ooling	
150	2.189E-10	0.08	IE LOCCW-ALL	Initiator - Loss of CCWS/ESWS - Total Loss of 4 Divisions		
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB Fails to Close on Demand	40AA020,	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Co	ooling	
				,	J	

IVICS I	Results		EFR	ADC030 INTER	NAL
No.	Prob.	%	Event	Description	
151	2.189E-10	0.08	IE LOCCW-ALL	Initiator - Loss of CCWS/ESWS - Total Loss of 4 Divisions	
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
152	2.189E-10	0.08	IE LOCCW-ALL	Initiator - Loss of CCWS/ESWS - Total Loss of 4 Divisions	
			JEB10AA010EFC	RCP, RCP1 Leakoff Isolation MOV JEB10AA010, Fails to Close on Demand	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
153	2.189E-10	0.08	IE LOCCW-ALL	Initiator - Loss of CCWS/ESWS - Total Loss of 4 Divisions	
			JEB20AA020EFC	RCP Seal, RCP2 Seal Nitrogen Venting Isolation MOV JEB20AA020, Fails to Close on Demand	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
154	2.189E-10	0.08	IE LOCCW-ALL	Initiator - Loss of CCWS/ESWS - Total Loss of 4 Divisions	
			JEB20AA010EFC	RCP, RCP2 Leakoff Isolation MOV JEB20AA010, Fails to Close on Demand	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
155	2.186E-10	0.08	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA50DFR_B-ALL	CCF of SBO DGs to Run	
156	2.085E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFS_D-ALL	CCF of SCWS Pumps to Start	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
157	2.029E-10	0.07	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFS	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107, Fails Start on Demand	to
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenan	се
158	2.029E-10	0.07	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40AP107EFS	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107, Fails Start on Demand	to
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenan	се
159	1.997E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC31AN001EFR_D-14	CCF to Run Normal Air Exhaust Fans	

MCS F	Results		EPR	RDC050 INTERNAL
No.	Prob.	%	Event	Description
160	1.997E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC01AN001EFR_D-14	CCF to Run Normal Air Supply Fans
161	1.837E-10	0.06	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to Run
162	1.837E-10	0.06	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
			SAC34AN001EFR	SAC, Normal Air Exhaust Fan SAC34AN001, Fails to Run
163	1.837E-10	0.06	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
			SAC04AN001EFR	SAC, Normal Air Supply Fan SAC04AN001, Fails to Run
164	1.837E-10	0.06	IE GT	Initiator - General Transient (Includes Turbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01AN001EFR	SAC, Normal Air Supply Fan SAC01AN001, Fails to Run
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
165	1.837E-10	0.06	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loop Cooling Water or Aux Cooling Water
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Start
166	1.817E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power
			EFWS PM3	EFWS Train 3 Unavailable due to Preventive Maintenance
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
167	1.817E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power
			EFWS PM4	EFWS Train 4 Unavailable due to Preventive Maintenance

LAS31AP001EFR

QKA10GH001_FS

REC OSP 2HR

OPF-SAC-2H

EFWS, Train 3 Motor Driven Pump LAS31AP001, Fails to Run

SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand

Operator Fails to Recover Room Cooling Locally

Failure to Recover Offsite Power Within 2 Hours

IVICS I	Results		Er	KDC030	INIEKNAL
No.	Prob.	%	Event	Description	
168	1.817E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			EDG PM2	EDG Train 2 Unavailable due to Preventive Maintenance	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Ru	ın
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001 FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on D	emand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
169	1.817E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM1	EFWS Train 1 Unavailable due to Preventive Maintenance	
			LAS21AP001EFR	EFWS, Train 2 Motor Driven Pump LAS21AP001, Fails to Ru	ın
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001 FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on D	emand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
170	1.817E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM2	EFWS Train 2 Unavailable due to Preventive Maintenance	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Ru	ın
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001 FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on D	emand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
171	1.817E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			EDG PM3	EDG Train 3 Unavailable due to Preventive Maintenance	
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to Ru	ın
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001 FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on D	emand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
172	1.797E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			OPF-XTLDSBO-NSC	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 D Non-SBO Conditions)uring
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive N	/laintenance
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to Run	
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run	
173	1.797E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			OPF-XTLDSBO-NSC	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 D Non-SBO Conditions	Ouring (
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive N	/laintenance
			XKA30 DFR	ELEC, Emergency Diesel Generator XKA30, Fails to Run	
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run	
174	1.768E-10	0.06	IE GT	Initiator - General Transient (Includes Turbine Trip and React	or Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour Leading to Auto Scram	for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001PANS	SCWS, Train 1 Chiller Unit QKA10GH001, PAC A Priority Mc AV42) Fails (Non-Self-Monitored)	dule (Type
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive N	/laintenance

MCS	Results		EPR	RDC050	INTERNAL
No.	Prob.	%	Event	Description	
175	1.768E-10	0.06	IE GT	Initiator - General Transient (Includes Turbine Tr	ip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery W Leading to Auto Scram	ithin 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	,
			QKA40GH001PANS	SCWS, Train 4 Chiller Unit QKA40GH001, PAC AV42) Fails (Non-Self-Monitored)	A Priority Module (Type
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to	Preventive Maintenance
176	1.728E-10	0.06	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loop Cooling Water	Cooling Water or Aux
			LOOPCON+REC	Consequential LOOP and Failure of Recovery W Leading to Auto Scram	/ithin 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	,
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails	to Start on Demand
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to	Preventive Maintenance
177	1.728E-10	0.06	IE LBOP	Initiator - Loss of Balance of Plant - Closed Loop Cooling Water	Cooling Water or Aux
			LOOPCON+REC	Consequential LOOP and Failure of Recovery W Leading to Auto Scram	/ithin 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	1
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails	to Start on Demand
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to	Preventive Maintenance
178	1.724E-10	0.06	IE GT	Initiator - General Transient (Includes Turbine Tr	ip and Reactor Trip)
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP00	·
			LOOPCON+REC	Consequential LOOP and Failure of Recovery W Leading to Auto Scram	/ithin 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	'
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to	Preventive Maintenance
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fai	Is to Run
179	1.724E-10	0.06	IE GT	Initiator - General Transient (Includes Turbine Tr	ip and Reactor Trip)
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP00	1, Fails to Run
			LOOPCON+REC	Consequential LOOP and Failure of Recovery W Leading to Auto Scram	ithin 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	,
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to	Preventive Maintenance
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fai	Is to Run
180	1.721E-10	0.06	IE MLOCA	Initiator - Medium Break LOCA (3 to 6-Inch Diam	neter)
			JNG13AA005CFO_D-123	CCF to Open LHSI/MHSI Common Injection Che	eck Valves
181	1.705E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40AP107EEL	SCWS, Train 4 Motor Driven Safety Chiller Pump Leakage	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to	Preventive Maintenance
182	1.705E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	,
			QKA10AP107EEL	SCWS, Train 1 Motor Driven Safety Chiller Pump Leakage	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to	Preventive Maintenance

MCS	Results		EPR	RDC050	INTERNAL
No.	Prob.	%	Event	Description	
183	1.698E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Prev	entive Maintenance
			LBA11AA191SFO_H-ALL	CCF to Open Main Steam Safety Relief Valves	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Divis During Non-SBO Conditions	ion 4 to Divison 3
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to	Run
184	1.698E-10	0.06	IE LOOP	Initiator - Loss Of Offsite Power	
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Prev	rentive Maintenance
			LBA11AA191SFO_H-ALL	CCF to Open Main Steam Safety Relief Valves	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Divis During Non-SBO Conditions	
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to	Run
185	1.667E-10	0.06	IE LOCCW-CH1L	Initiator - Loss of CCWS/ESWS - Leak in Common H	leader 1
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fa	ils to Run
			LOOPCSD+REC	Consequential LOOP and Failure of Recovery Within Leading to a Controlled Shutdown	1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Prev	ventive Maintenance
186	1.598E-10	0.06	IE LOMFW	Initiator - Total Loss of Main Feedwater	
			CF LOMFW/SSS	Common Factor LOMFW/SSS	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFR_D-ALL	CCF of SCWS Pumps to Run	
187	1.520E-10	0.05	IE SGTR	Initiator - Steam Generator Tube Rupture	
			34BRARFR	ELEC, 480V AC to 24V DC Rectifier for MCC 34BRA to Run	Control Power, Fails
			OPD-RHR4H/SGTR1H	Dependency (MED) Between Operator Actions for St Initiating RHR	abilizing SGTR and
			OPF-SGTR-1H	Operator Fails to Isolate SGTR and Initiate Cooldown	ı
188	1.518E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFS_D-134	CCF of SCWS Pumps to Start	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
189	1.518E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFS_D-124	CCF of SCWS Pumps to Start	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
190	1.507E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			BTD01_BATST_D-134	CCF of Safety Related Batteries on Demand	
			EDG PM2	EDG Train 2 Unavailable due to Preventive Maintena	ance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
191	1.507E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			BTD01_BATST_D-134	CCF of Safety Related Batteries on Demand	
			LHSI PM2	LHSI Train 2 Unavailable due to Preventive Maintena	ance
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	

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No.	Prob.	%	Event	Description	
192	1.507E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			BTD01_BATST_D-134	CCF of Safety Related Batteries on Demand	
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
400	4 5075 40	0.05	151.005		
193	1.507E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			BTD01_BATST_D-124	CCF of Safety Related Batteries on Demand	
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenance	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
194	1.507E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			BTD01_BATST_D-124	CCF of Safety Related Batteries on Demand	
			LHSI PM3	LHSI Train 3 Unavailable due to Preventive Maintenance	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
195	1.507E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
193	1.507 L-10	0.03	BTD01 BAT ST D-124	CCF of Safety Related Batteries on Demand	
			EDG PM3	EDG Train 3 Unavailable due to Preventive Maintenance	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			REC OSF ZIIK	railure to Necover Offsite Fower Within 2 Hours	
196	1.506E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
			XKA50DFS	ELEC, SBO Diesel Generator XKA50, Fails to Start on Demand	
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run	
197	1.506E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
		0.00	REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			XKA10 DFR D-ALL	CCF of EDGs to Run	
			XKA50 DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
			XKA80 DFS	ELEC, SBO Diesel Generator XKA80, Fails to Start on Demand	
			7.44.63 <u></u> 5.7 G	,	
198	1.475E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS11AP001EFR_D-12	CCF of EFWS Pumps to Run	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mai	ntenance
199	1.475E-10	0.05	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS11AP001EFR_D-34	CCF of EFWS Pumps to Run	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mai	ntenance
200	1 4725 10	0.05	IE SI OCA	Initiator Small LOCA (0.6 to 3 Inch Diameter)	
200	1.472E-10	0.05	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diameter)	
			PED10AN001EFR_D-ALL	CCF to Run Normally Running Cooling Tower Fans	
			SAHR PM4	SAHR Train Unavailable due to Preventive Maintenance	

Minimal Cutsets

Top Event probability Q = 1.763E-07

No.	Prob.	%	Event	Description
1	2.626E-08	14.90	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Opening of 1 MSRIV
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
2	2.520E-08	14.30	IE FIRE-MCR	Initiator - Fire in the Main Control Room
			OPE-MCR-RSS-90M	Operator Fails to Transfer to the RSS in 90 Mins Given A MCR Fire
3	7.800E-09	4.43	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
4	6.133E-09	3.48	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			31BRARFR	ELEC, 480V AC to 24V DC Rectifier for MCC 31BRA Control Power, Fails to Run
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
5	6.133E-09	3.48	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			32BRARFR	ELEC, 480V AC to 24V DC Rectifier for MCC 32BRA Control Power, Fails to Run
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
6	4.320E-09	2.45	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
7	2.880E-09	1.63	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			EDG PM2	EDG Train 2 Unavailable due to Preventive Maintenance
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
8	2.808E-09	1.59	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance

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No.	Prob.	%	Event	Description	
9	1.983E-09	1.12	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run	
10	1.485E-09	0.84	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			LBA13AA001PFO_D-ALL	CCF to Open Main Steam Relief Isolation Valves	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
11	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			31BDBOFL	ELEC, 6.9kV SWGR 31BDB, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
12	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			31BMB OFL	ELEC, 480V Load Center 31BMB, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
13	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			32BMBOFL	ELEC, 480V Load Center 32BMB, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
14	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			31BDCOFL	ELEC, 6.9kV SWGR 31BDC, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
15	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			31BMT02TFL	ELEC, 6.9kV-480V Transformer 31BMT02, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
16	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			32BRAOFL	ELEC, 480V MCC 32BRA, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
17	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			31BRAOFL	ELEC, 480V MCC 31BRA, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	

MCS I	Results		EPR	DC050	FIRE
No.	Prob.	%	Event	Description	
18	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			32BMT02TFL	ELEC, 6.9kV-480V Transformer 32BMT02, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
19	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			31BDAOFL	ELEC, 6.9kV Switchgear 31BDA, Fails During Operation	
			OPF-XTLDSBO-NSC	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
20	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			32BDB OFL	ELEC, 6.9kV SWGR 32BDB, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			TROB OLAL LOOA	1 Tobability of Occar 200A Occurring Given a 2003 of Occar Occaring	
21	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			BRW32BUW33OFL	ELEC, 24V DC I&C Power Rack 32BRW32/32BUW33, Fails During Operation	J
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
00	0.000= 40	0.54	IE EIDE 04044 40		
22	9.600E-10	0.54	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			BRW10BUW110FL	ELEC, 24V DC I&C Power Rack 31BRW10/31BUW11, Fails During Operation	1
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			THOS SEAL ESSA	1 Tobasinity of Coal 20 St Coccarning Citeria 2 2000 of Coal Coccining	
23	8.963E-10	0.51	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FR_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Run	
24	8.854E-10	0.50	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
25	8.433E-10	0.48	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mainter	nance
26	8.433E-10	0.48	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run	
			SAC03/QKA30 PM3	Normal SAC03/QKA30 Train Unavailable due to Preventive Mainter	nance
27	Q 422E 40	0.49	IE EIDE SWOD	Initiator Fire in the Suitehager Building	
27	8.433E-10	0.48	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA20GH001_FR	SCWS, Train 2 Chiller Unit QKA20GH001, Fails to Run	nones
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mainter	iance

MCS	Results		EPR	RDC050	FIRE
No.	Prob.	%	Event	Description	
28	8.433E-10	0.48	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FR	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Ru	ın
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Prevente	entive Maintenance
29	8.433E-10	0.48	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA30GH001_FR	SCWS, Train 3 Chiller Unit QKA30GH001, Fails to Ru	ın
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Prevente	entive Maintenance
30	8.433E-10	0.48	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FR	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Ru	ın
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Previous	entive Maintenance
31	7.412E-10	0.42	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Build	ing 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PED10AN002EFS_D-ALL	CCF to Start Standby Cooling Tower Fans	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of S	Seal Cooling
32	7.052E-10	0.40	IE FIRE-PZR	Initiator - Fire in the Pressurizer Compartment With Sp PSRV	purious Opening of 1
			LBA13AA001PFO_D-ALL	CCF to Open Main Steam Relief Isolation Valves	
33	6.948E-10	0.39	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Build	ing 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			LBA13AA001PFO_D-124	CCF to Open Main Steam Relief Isolation Valves	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of S	Seal Cooling
34	6.297E-10	0.36	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms Will of 1 MSRIV	th Spurious Opening
			LBA10AA002PFC	MSS, Train 1 Main Steam Isolation Valve LBA10AA00 Demand)2, Fails to Close on
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve R	.oom
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve R	.oom
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATW	S)
35	6.297E-10	0.36	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms Will of 1 MSRIV	th Spurious Opening
			LBA20AA002PFC	MSS, Train 2 Main Steam Isolation Valve LBA20AA00 Demand	02, Fails to Close on
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve R	.oom
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve R	.oom
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATW	S)
36	5.760E-10	0.33	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Build	ing 1 (or 4)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preve	entive Maintenance
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failur 1 Hour	re of Recovery Within
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Divisi During Non-SBO Conditions	on 4 to Divison 3
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of S	seal Cooling

MCS F	Results		EPR	DC050	FIRE
No.	Prob.	%	Event	Description	
37	5.760E-10	0.33	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			EDG PM1	EDG Train 1 Unavailable due to Preventive Maintenance	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire Leading to a Controlled Shutdn	e IEs
			OPF-XTLDSBO-NSC	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
38	5.755E-10	0.33	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Op of 1 MSRIV	pening
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV	
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room	
39	5.736E-10	0.33	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram	
			XKA10DFR_D-ALL	CCF of EDGs to Run	
40	5.059E-10	0.29	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			MSRIVSCPFO_P-ALL	CCF to Open Main Steam Relief Isolation Pneumatic Pilot Valves	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
41	4.818E-10	0.27	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Op of 1 MSRIV	pening
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room	
			PED10AN002EFS_D-ALL	CCF to Start Standby Cooling Tower Fans	
42	4.800E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			32BDAOFL	ELEC, 6.9kV SWGR 32BDA, Fails During Operation	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divisor During Non-SBO Conditions	13
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
43	4.780E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			JNG13AA005CFO_D-123	CCF to Open LHSI/MHSI Common Injection Check Valves	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
44	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CLF24EQ001LB03NS	Digital output module fails (non-self-monitored)	
			CLF24EQ002LB01NS	Digital output module fails (non-self-monitored)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
45	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CLE24EQ001LB01NS	Digital output module fails (non-self-monitored)	
			CLE24EQ002LB03NS	Digital output module fails (non-self-monitored)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	

MC2 I	Results		EP	KDC030
No.	Prob.	%	Event	Description
46	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CLF24EQ001LB01NS	Digital output module fails (non-self-monitored)
			CLF24EQ002LB03NS	Digital output module fails (non-self-monitored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
				, ,
47	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CLE24EQ001LB03NS	Digital output module fails (non-self-monitored)
			CLE24EQ002LB01NS	Digital output module fails (non-self-monitored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
48	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CLE24EQ001LB03NS	Digital output module fails (non-self-monitored)
			CLE24EQ002LB02NS	Digital output module fails (non-self-monitored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
				,
49	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CLF24EQ001LB01NS	Digital output module fails (non-self-monitored)
			CLF24EQ002LB01NS	Digital output module fails (non-self-monitored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
50	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CLF24EQ001LB02NS	Digital output module fails (non-self-monitored)
			CLF24EQ002LB02NS	Digital output module fails (non-self-monitored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
51	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CLE24EQ001LB02NS	Digital output module fails (non-self-monitored)
			CLE24EQ002LB01NS	Digital output module fails (non-self-monitored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
52	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CLF24EQ001LB02NS	Digital output module fails (non-self-monitored)
			CLF24EQ002LB03NS	Digital output module fails (non-self-monitored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
F0	4.0075.40	0.07	IE EIDE CARAA AO	In Winter City in Onlitch and Decree (Onforced B. 1975 4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.
53	4.697E-10	0.27	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CLE24EQ001LB01NS	Digital output module fails (non-self-monitored)
			CLE24EQ002LB02NS	Digital output module fails (non-self-monitored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

CLF24EQ002LB01NS

PROB SEAL LOCA

CVCS VCT

Digital output module fails (non-self-monitored)

CVCS Switchover to IRWST May Not Be Required

Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

FIRE

MCS F	Results		EPR	DC050	FIRE
No.	Prob.	%	Event	Description	
62	4.609E-10	0.26	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PED10AN002EFS_D-123	CCF to Start Standby Cooling Tower Fans	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
63	4.535E-10	0.26	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire Leading to a Controlled Shutdn	IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand	
64	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainter	ance
			SAC33AN001EFR	SAC, Normal Air Exhaust Fan SAC33AN001, Fails to Run	
65	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mainter	ance
			SAC32AN001EFR	SAC, Normal Air Exhaust Fan SAC32AN001, Fails to Run	
66	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainter	ance
			SAC04AN001EFR	SAC, Normal Air Supply Fan SAC04AN001, Fails to Run	
67	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainter	ance
			SAC34AN001EFR	SAC, Normal Air Exhaust Fan SAC34AN001, Fails to Run	
68	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainter	ance
			SAC03AN001EFR	SAC, Normal Air Supply Fan SAC03AN001, Fails to Run	
69	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Preventive Mainter	ance
			SAC34AN001EFR	SAC, Normal Air Exhaust Fan SAC34AN001, Fails to Run	
70	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC03/QKA30 PM3	Normal SAC03/QKA30 Train Unavailable due to Preventive Mainter	ance
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to Run	
71	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Preventive Mainter	ance
			SAC04AN001EFR	SAC, Normal Air Supply Fan SAC04AN001, Fails to Run	

MCS	Results		EPR	RDC050	FIRE
No.	Prob.	%	Event	Description	
72	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mainter	iance
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to Run	
73	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01AN001EFR	SAC, Normal Air Supply Fan SAC01AN001, Fails to Run	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mainter	ance
74	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01AN001EFR	SAC, Normal Air Supply Fan SAC01AN001, Fails to Run	
			SAC03/QKA30 PM3	Normal SAC03/QKA30 Train Unavailable due to Preventive Mainter	ance
75	4.214E-10	0.24	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC02AN001EFR	SAC, Normal Air Supply Fan SAC02AN001, Fails to Run	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mainter	ance
76	3.966E-10	0.22	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire Leading to a Controlled Shutdn	: IEs
			OPF-XTLDSBO-NSC	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to Run	
77	3.840E-10	0.22	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			EDG PM2	EDG Train 2 Unavailable due to Preventive Maintenance	
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failure of Recovery 1 Hour	Within
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divisor During Non-SBO Conditions	າ 3
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
78	3.744E-10	0.21	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building	
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failure of Recovery 1 Hour	Within
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainter	ance
79	3.607E-10	0.20	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			KAA12AA005EFO_D-123	CCF to Open CCWS to LHSI HTX Cooling MOV	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
80	3.518E-10	0.20	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire Leading to a Controlled Shutdn	: IEs
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divisor During Non-SBO Conditions	າ 3
			PEB20AP001EFS	ESWS, Train 2 Motor Driven Pump PEB20AP001, Fails to Start on Demand	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	

MCS Results			EPR	RDC050 FIRE
No.	Prob.	%	Event	Description
81	3.182E-10	0.18	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			XKA20DFS	ELEC, Emergency Diesel Generator XKA20, Fails to Start on Demand
82	3.133E-10	0.18	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			EDG PM1	EDG Train 1 Unavailable due to Preventive Maintenance
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire IEs Leading to a Controlled Shutdn
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
83	2.948E-10	0.17	IE FIRE-CSR	Initiator - Fire in the Cable Spreading Room (Room Under Main Control Room)
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
84	2.920E-10	0.17	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Opening of 1 MSRIV
			JNA10AA003EFO_D-ALL	CCF to Open LHSI Pump Suction from RCS MOVs
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room
85	2.920E-10	0.17	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Opening of 1 MSRIV
			JNA10AA002EFO_D-ALL	CCF to Open LHSI Pump Suction from RCS Angled MOVs
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room
86	2.920E-10	0.17	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Opening of 1 MSRIV
			JNA10AA001EFO_D-ALL	CCF to Open LHSI Pump Suction from RCS MOVs
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room
87	2.891E-10	0.16	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Opening of 1 MSRIV
			LBA30AA002PFC	MSS, Train 3 Main Steam Isolation Valve LBA30AA002, Fails to Close on Demand
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
88	2.891E-10	0.16	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Opening of 1 MSRIV
			L D A 20 A A 002DEC	MCC Train 2 Main Otama Indiation Value I BA20AA202 Fails to Class on

Demand

LBA20AA002PFC

OPE-RHR-4H

MSIV TR4 ISO-FIRE

MSS, Train 2 Main Steam Isolation Valve LBA20AA002, Fails to Close on

MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room

Operator Fails to Initiate RHR Within 4 Hours

IVICS	Nesuits		EF	ADC030 FIRE
No.	Prob.	%	Q Event	Description
89	2.891E-10	0.16	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Opening of 1 MSRIV
			LBA10AA002PFC	MSS, Train 1 Main Steam Isolation Valve LBA10AA002, Fails to Close on Demand
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
90	2.880E-10	0.16	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			1BDC_1BDB1BOP	ELEC, 6.9kV SWGR 31BDC to 6.9kV SWGR 31BDB Circuit Breaker, Fails to Remain Closed (SO)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
91	2.880E-10	0.16	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			1BRU011BRABOP	ELEC, Inverter 31BRU01 to 480V MCC 31BRA Circuit Breaker, Fails to Remain Closed (SO)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
92	2.880E-10	0.16	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
02	2.0002 .0	00	1BMT021BMBBOP	ELEC, Transformer 31BMT02 to 480V Load Center 31BMB Circuit Breaker, Fails to Remain Closed (SO)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
93	2.880E-10	0.16	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			1BDB1BMT02BOP	ELEC, 6.9kV SWGR 31BDB to Transformer 31BMT02 Circuit Breaker, Fails to Remain Closed (SO)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
94	2.880E-10	0.16	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			1BDC_1BDB2BOP	ELEC, 6.9kV SWGR 31BDC to 6.9kV SWGR 31BDB Circuit Breaker, Fails to Remain Closed (SO)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
95	2.880E-10	0.16	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			2BRU012BRABOP	ELEC, Inverter 32BRU01 to 480V MCC 32BRA Circuit Breaker, Fails to Remain Closed (SO)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
96	2.880E-10	0.16	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			2BDB2BMT02BOP	ELEC, 6.9kV SWGR 32BDB to Transformer 32BMT02 Circuit Breaker, Fails to Remain Closed (SO)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

MCS F	Results		EPR	RDC050	FIRE
No.	Prob.	%	Event	Description	
97	2.880E-10	0.16	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			2BMT022BMBBOP	ELEC, Transformer 32BMT02 to 480V Load Center 32BMB Circuit Breaker, Fails to Remain Closed (SO)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
98	2.870E-10	0.16	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA30AP107EFR	SCWS, Train 3 Motor Driven Safety Chiller Pump QKA30AP107, Fa Run	ils to
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainten	ance
99	2.870E-10	0.16	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40AP107EFR	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107, Fa Run	ils to
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Preventive Mainten	ance
100	2.870E-10	0.16	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA20AP107EFR	SCWS, Train 2 Motor Driven Safety Chiller Pump QKA20AP107, Fa	ils to
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mainten	ance
101	2.870E-10	0.16	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFR	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107, Fa Run	ils to
			SAC03/QKA30 PM3	Normal SAC03/QKA30 Train Unavailable due to Preventive Mainten	ance
102	2.870E-10	0.16	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40AP107EFR	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107, Fa Run	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainten	ance
103	2.870E-10	0.16	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EFR	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107, Fa Run	ils to
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mainten	ance
104	2.808E-10	0.16	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire Leading to a Controlled Shutdn	IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainten	ance
105	2.783E-10	0.16	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Op of 1 MSRIV	ening
			JNG10AA004EFC_D-ALL	CCF to Close LHSI to Tangential Miniflow MOTOR Operated Check Valves	
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room	

MSIV TR4 ISO-FIRE

MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room

MCS F	Results		EPR	RDC050	FIRE
No.	Prob.	%	Event	Description	
106	2.644E-10	0.15	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failure of Recovery 1 Hour	Within
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divisor During Non-SBO Conditions	13
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to Run	
107	2.520E-10	0.14	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire Leading to a Controlled Shutdn	: IEs
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divisor During Non-SBO Conditions	
			PEB20AA005EFO	ESWS, Train 2 Pump Discharge Isolation MOV PEB20AA005, Fails Open on Demand	to
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
108	2.403E-10	0.14	IE FIRE-PZR	Initiator - Fire in the Pressurizer Compartment With Spurious Openin PSRV	ng of 1
			MSRIVSCPFO_P-ALL	CCF to Open Main Steam Relief Isolation Pneumatic Pilot Valves	
109	2.157E-10	0.12	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire Leading to a Controlled Shutdn	: IEs
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
110	2.087E-10	0.12	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			JND10AP001EFR_D-123	CCF of MHSI Pumps to Run	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
111	2.000E-10	0.11	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CL-TXS-OSCCF	SW CCF of TXS operating system or multiple diversity groups	
112	2.000E-10	0.11	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
113	1.978E-10	0.11	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
114	1.814E-10	0.10	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PAS	Proccess Automation System (PAS) Fails (Estimate)	
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run	

MCS Results			EPR	RDC050	FIRE
No.	Prob.	%	Event	Description	
115	1.791E-10	0.10	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			JNG13AA005CFO_D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
				,	
116	1.705E-10	0.10	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			LAS31AP001EFR	EFWS, Train 3 Motor Driven Pump LAS31AP001, Fails to Run	
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001, Fails to Run	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainten	ance
117	1.705E-10	0.10	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Run	
			LAS21AP001EFR	EFWS, Train 2 Motor Driven Pump LAS21AP001, Fails to Run	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Mainten	ance
118	1.686E-10	0.10	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
	1.0002 10	0.10	CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			MSRIVSOOFO P-ALL	CCF to Open Main Steam Relief Isolation Solenoid Pilot Valves	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			11105 02/12 200/1	Trobability of Coal Ecopy Cookining Civer a Ecop of Coal Cooking	
119	1.586E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire Leading to a Controlled Shutdn	EIEs
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			SBODG5 PM1	SBO-DG Train 1 Unavailable due to Preventive Maintenance	
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to Run	
120	1.579E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
120	1.579L-10	0.09	CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			LHSI PM1	LHSI Train 1 Unavailable due to Preventive Maintenance	
			PEB20AP001EFS B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			FROB SLAL LOCA	Probability of Sear LOCA Occurring Given a Loss of Sear Cooling	
121	1.544E-10	0.09	IE FIRE-BATT	Initiator - Fire in One of the Four Battery Rooms	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fire Leading to a Controlled Shutdn	EIEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainten	ance
122	1.536E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
122	1.550L-10	0.09	CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Mainten	ance
			CVCS VCT	·	ance
			JNG10AA006MEC3	CVCS Switchover to IRWST May Not Be Required LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA006, Le	ft in
			JING TOPMOUDIVIEGS	Wrong Position	11.111
			JNG20AA006MEC3	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA006, Le Wrong Position	ft in
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	

MCS F	Results		EPR	RDC050	FIRE
No.	Prob.	%	Event	Description	
123	1.451E-10	0.08	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run	
			SAC05 PM1	Maintenance SAC Safety System Train 5 Unavailable due to Preven Maintenance	tive
124	1.440E-10	0.08	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			2BDA_2BDB2BOP	ELEC, 6.9kV SWGR 32BDA to 6.9kV SWGR 32BDB Circuit Breaker to Remain Closed (SO)	, Fails
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison During Non-SBO Conditions	13
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
125	1.440E-10	0.08	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
.20			2BDA_2BDB1BOP	ELEC, 6.9kV SWGR 32BDA to 6.9kV SWGR 32BDB Circuit Breaker to Remain Closed (SO)	, Fails
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison During Non-SBO Conditions	3
			OPF-XTIE BC	Operator Fails to Align Backup Battery Charger to BUC Bus	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
126	1.339E-10	0.08	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Op of 1 MSRIV	ening
			LBA10AA002PFC_D-ALL	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
127	1.245E-10	0.07	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Op of 1 MSRIV	ening
			LBA10AA002PFC_D-124	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
128	1.245E-10	0.07	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Op of 1 MSRIV	ening
			LBA10AA002PFC_D-234	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
129	1.245E-10	0.07	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Op of 1 MSRIV	ening
			LBA10AA002PFC_D-134	CCF to Close Main Steam Isolation Valves	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
130	1.184E-10	0.07	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainten	ance

MCS Results			EPR	RDC050	FIRE
No.	Prob.	%	Event	Description	
131	1.164E-10	0.07	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With S of 1 MSRIV	purious Opening
			JNG13AA005CFO_D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valve	S
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room	ı
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room	1
132	1.112E-10	0.06	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With S of 1 MSRIV	purious Opening
			LBA10AA002PFC_D-12	CCF to Close Main Steam Isolation Valves	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room	ı
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
133	1.112E-10	0.06	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With S of 1 MSRIV	purious Opening
			LBA10AA002PFC_D-13	CCF to Close Main Steam Isolation Valves	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room	1
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
134	1.112E-10	0.06	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With S of 1 MSRIV	purious Opening
			LBA10AA002PFC_D-23	CCF to Close Main Steam Isolation Valves	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room	ı
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
135	1.088E-10	0.06	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building	1 (or 4)
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal	Cooling
			QKA20GH001_FR	SCWS, Train 2 Chiller Unit QKA20GH001, Fails to Run	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Prevention	ve Maintenance
136	1.088E-10	0.06	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building	1 (or 4)
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal	Cooling
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run	
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Prevention	ve Maintenance
137	1.076E-10	0.06	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building	1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			KAA20AP001EFS_B-ALL	CCF of CCWS Pumps 2 and 3 to Start (Standby)	
			LHSI PM1	LHSI Train 1 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal	Cooling
138	1.067E-10	0.06	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building	1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PED10AN001EFR_D-ALL	CCF to Run Normally Running Cooling Tower Fans	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal	Cooling
139	1.067E-10	0.06	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building	1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PED10AN002EFR_D-ALL	CCF to Run Standby Cooling Tower Fans	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal	Cooling

MCS	MCS Results		EPF	RDC050	FIR
No.	Prob.	%	Event	Description	
140	1.024E-10	0.06	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			JNG10AA006MEC3	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA006, I Wrong Position	₋eft in
			JNG20AA006MEC3	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA006, I Wrong Position	₋eft in
			LHSI PM3	LHSI Train 3 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
141	1.019E-10	0.06	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01AN001EFR_D-24	CCF to Run Normal Air Supply Fans	
142	1.019E-10	0.06	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC31AN001EFR_D-24	CCF to Run Normal Air Exhaust Fans	
143	1.019E-10	0.06	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC31AN001EFR_D-14	CCF to Run Normal Air Exhaust Fans	
144	1.019E-10	0.06	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01AN001EFR_D-13	CCF to Run Normal Air Supply Fans	
145	1.019E-10	0.06	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01AN001EFR_D-14	CCF to Run Normal Air Supply Fans	
146	1.019E-10	0.06	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC31AN001EFR_D-13	CCF to Run Normal Air Exhaust Fans	
147	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CLE24EQ001LB01NS	Digital output module fails (non-self-monitored)	
			CLE24EQ002LF20NS	Digital input module fails (non-self monitored)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
148	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CLE24EQ001LB03NS	Digital output module fails (non-self-monitored)	
			CLE24EQ002LF20NS	Digital input module fails (non-self monitored)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
149	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CLF24EQ001LB03NS	Digital output module fails (non-self-monitored)	
			CLF24EQ002LF20NS	Digital input module fails (non-self monitored)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	

FIRE

MCS Results			ED	RDC050		
No.	Prob.	%	Event			
150	9.531E-11	0.05	IE FIRE-SAB14-AC	Description Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)		
130	9.551L-11	0.05	CLF24EQ001LF20NS	Digital input module fails (non-self monitored)		
			CLF24EQ007LF20NS	Digital output module fails (non-self-monitored)		
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling		
454	0.5045.44	0.05	JE EIDE 0404440			
151	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)		
			CLE24EQ001LF20NS	Digital input module fails (non-self monitored)		
			CLE24EQ002LB01NS	Digital output module fails (non-self-monitored)		
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling		
152	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)		
			CLF24EQ001LB01NS	Digital output module fails (non-self-monitored)		
			CLF24EQ002LF20NS	Digital input module fails (non-self monitored)		
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling		
153	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)		
			CLE24EQ001LB02NS	Digital output module fails (non-self-monitored)		
			CLE24EQ002LF20NS	Digital input module fails (non-self monitored)		
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling		
154	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)		
			CLF24EQ001LF20NS	Digital input module fails (non-self monitored)		
			CLF24EQ002LB01NS	Digital output module fails (non-self-monitored)		
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling		
155	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)		
			CLF24EQ001LF20NS	Digital input module fails (non-self monitored)		
			CLF24EQ002LB02NS	Digital output module fails (non-self-monitored)		
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling		
156	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)		
			CLE24EQ001LF20NS	Digital input module fails (non-self monitored)		
			CLE24EQ002LB02NS	Digital output module fails (non-self-monitored)		
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling		
157	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)		
101	0.001E-11	0.00	CLE24EQ001LF20NS	Digital input module fails (non-self monitored)		
			CLE24EQ007EF20NS	Digital output module fails (non-self-monitored)		
			32221240022500140	2.g.ta. suspent modulo fallo (non oon montorou)		

CVCS VCT

PROB SEAL LOCA

CVCS Switchover to IRWST May Not Be Required

Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

FIRE

MCS F	Results		EPR	RDC050	FIRE
No.	Prob.	%	Event	Description	
158	9.531E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CLF24EQ001LB02NS	Digital output module fails (non-self-monitored)	
			CLF24EQ002LF20NS	Digital input module fails (non-self monitored)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
159	9.500E-11	0.05	IE FIRE-PZR	Initiator - Fire in the Pressurizer Compartment With Spurious Open PSRV	ing of 1
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B	
160	9.393E-11	0.05	IE FIRE-PZR	Initiator - Fire in the Pressurizer Compartment With Spurious Open PSRV	ing of 1
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for SLOCA	
161	9.382E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Mainter	nance
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			JNG10AA006MEC3	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA006, L Wrong Position	eft in
			PEB20AP001EFS	ESWS, Train 2 Motor Driven Pump PEB20AP001, Fails to Start on Demand	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
162	9.364E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			31BTD01_BATST	ELEC, 250V 1E 2-hr Battery 31BTD01, Fails on Demand	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fir Leading to a Controlled Shutdn	e IEs
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
163	9.296E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Mainter	nance
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			JNG10AA006MEC3	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA006, L Wrong Position	eft in
			PED20AN002EFS	UHS, Cooling Tower Train 2 Cooling Fan PED20AN002, Fails to St Demand	tart on
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
164	9.296E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Mainter	nance
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			JNG20AA006MEC3	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA006, L Wrong Position	eft in
			PED10AN002EFS	UHS, Cooling Tower Train 1 Cooling Fan PED10AN002, Fails to St Demand	tart on
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	

MCS	Results		EP	RDC050 FIRE
No.	Prob.	%	Event	Description
165	9.296E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			JNG30AA006MEC3	LHSI, LHSI CL3 Discharge Manual CHECK Valve JNG30AA006, Left in Wrong Position
			PED10AN002EFS	UHS, Cooling Tower Train 1 Cooling Fan PED10AN002, Fails to Start on Demand
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
166	9.252E-11	0.05	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Preventive Maintenance
167	9.062E-11	0.05	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			SAC01AN001EFR	SAC, Normal Air Supply Fan SAC01AN001, Fails to Run
			5, 100 h ii 100 l <u>2</u> . 1 t	one, norman in cappy i an enternount into it, i and it i i an
168	9.062E-11	0.05	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
100	0.00ZL 11	0.00	OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Process Automation System (PAS) Fails (Estimate)
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to Run
			SACSTANOUTER	SAC, NOTHIALAIL EXHAUST FAIT SACS TAINOUT, FAITS TO RUIT
169	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA40AP107EEL	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107, External Leakage
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
170	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building
			KAB30AA191SPO	CCWS, CCWS CH1 RCP1/2 TB Return Safety Valve KAB30AA191, Premature Opening
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
171	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA30AP107EEL	SCWS, Train 3 Motor Driven Safety Chiller Pump QKA30AP107, External Leakage
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
172	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10AP107EEL	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107, External Leakage
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
173	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building
-			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
				- · ·

QKA20AP107EEL

SAC04/QKA40 PM4

SCWS, Train 2 Motor Driven Safety Chiller Pump QKA20AP107, External

Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance

MCS F	Results		EF	PRDC050 FII	RE
No.	Prob.	%	Event	Description	
174	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			KAB10AA192SPO	CCWS, CCWS CH1 Return Safety Valve KAB10AA192, Premature Opening	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance	;
175	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			KAB20AA192SPO	CCWS, CCWS CH2 Return Safety Valve KAB20AA192, Premature Opening	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance	•
176	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			KAB70AA191SPO	CCWS, CVCS HP Cooler 2 Return Safety Valve KAB60AA191, Prematur Opening	re
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance)
177	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			KAB20AA193SPO	CCWS, FPCS Train 2 Cooling Header Safety Valve KAB20AA193, Premature Opening	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance)
178	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40AP107EEL	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107, Externa Leakage	al
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Preventive Maintenance)
179	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			KAB10AA193SPO	CCWS, FPCS Train 1 Cooling Header Safety Valve KAB10AA193, Premature Opening	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance)
180	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			KAB30AA192SPO	CCWS, CCWS CH2 RCP3/4 TB Return Safety Valve KAB30AA192, Premature Opening	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance	;
181	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10AP107EEL	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107, Externa Leakage	al
			SAC03/QKA30 PM3	Normal SAC03/QKA30 Train Unavailable due to Preventive Maintenance	;
182	8.704E-11	0.05	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			KAB60AA191SPO	CCWS, CVCS HP Cooler 1 Return Safety Valve KAB60AA191, Premature Opening	re
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance)

MCS Results			EPR	RDC050 FIRE
No.	Prob.	%	Event	Description
183	8.506E-11	0.05	IE FIRE-PZR	Initiator - Fire in the Pressurizer Compartment With Spurious Opening of 1 PSRV
			JNG13AA005CFO_D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves
184	8.432E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PED10AN002EFS_D-12	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
185	8.432E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			PED10AN002EFS_D-13	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
186	8.073E-11	0.05	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			KAA20AP001EFS_B-ALL	CCF of CCWS Pumps 2 and 3 to Start (Standby)
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
187	8.011E-11	0.05	IE FIRE-PZR	Initiator - Fire in the Pressurizer Compartment With Spurious Opening of 1 PSRV
			MSRIVSOOFO_P-ALL	CCF to Open Main Steam Relief Isolation Solenoid Pilot Valves
188	7.680E-11	0.04	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required
			JNG10AA006MEC3	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA006, Left in Wrong Position
			JNG20AA006MEC3	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA006, Left in Wrong Position
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
			SAC03/QKA30 PM3	Normal SAC03/QKA30 Train Unavailable due to Preventive Maintenance
189	7.680E-11	0.04	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)
			EDG PM1	EDG Train 1 Unavailable due to Preventive Maintenance
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failure of Recovery Within 1 Hour
			OPF-XTLDSBO-NSC	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
190	7.526E-11	0.04	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building
			LAS11AP001EFR_D-34	CCF of EFWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
191	7.526E-11	0.04	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building
			LAS11AP001EFR_D-12	CCF of EFWS Pumps to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance

MCS Results			EPR	DC050	FIRE
No.	Prob.	%	Event	Description	
192	7.378E-11	0.04	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			CVCS VCT	CVCS Switchover to IRWST May Not Be Required	
			JNG10AP001EFS_D-ALL	CCF of LHSI Pumps to Start	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
193	7.249E-11	0.04	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			SAC01AN001EFR	SAC, Normal Air Supply Fan SAC01AN001, Fails to Run	
			SAC05 PM1	Maintenance SAC Safety System Train 5 Unavailable due to Preve Maintenance	entive
194	7.249E-11	0.04	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
			SAC05 PM1	Maintenance SAC Safety System Train 5 Unavailable due to Preve Maintenance	entive
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to Run	
195	7.160E-11	0.04	IE FIRE-SAB14-DC	Initiator - Fire in the DC Cabinets Room of Safeguard Building 1 (o I&C Rooms Included	or 4) -
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fi Leading to a Controlled Shutdn	re IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Mainte	enance
196	7.110E-11	0.04	IE FIRE-TB	Initiator - Fire in the Turbine Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC01AN001EFR_D-ALL	CCF to Run Normal Air Supply Fans	
197	7.110E-11	0.04	IE FIRE-TB	Initiator - Fire in the Turbine Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC31AN001EFR_D-ALL	CCF to Run Normal Air Exhaust Fans	
198	7.036E-11	0.04	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4)	
			LOOPFCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Fi Leading to a Controlled Shutdn	re IEs
			OPF-XTLDSBO-NSC	Operator Fails to Connect and Load SBO DGs to Div 1 or 4 During Non-SBO Conditions	J
			PEB10AP001EFS	ESWS, Train 1 Motor Driven Pump PEB10AP001, Fails to Start or Demand	1
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
199	6.936E-11	0.04	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious O of 1 MSRIV	Opening
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room	
			PED10AN002EFR_D-ALL	CCF to Run Standby Cooling Tower Fans	
200	6.936E-11	0.04	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious O of 1 MSRIV	Opening
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room	
			PED10AN001EFR_D-ALL	CCF to Run Normally Running Cooling Tower Fans	

Minimal Cutsets

Top Event probability Q = 6.135E-08

No.	Prob.	%	Event	Description
1	3.200E-08	52.16	IE FLD-ANN ALL	Initiator - Flood in the RB Annulus (Contained)
			PROB ANNULUS	Probability that the Annulus connection boxes will withstand a contained Flood
2	2.262E-09	3.69	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
3	5.723E-10	0.93	IE FLD-TB	Initiator - Flood in the Turbine Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC31AN001EFR_D-ALL	CCF to Run Normal Air Exhaust Fans
4	5.723E-10	0.93	IE FLD-TB	Initiator - Flood in the Turbine Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01AN001EFR_D-ALL	CCF to Run Normal Air Supply Fans
5	5.460E-10	0.89	IE FLD-EFW	Initiator - EFW Pipe Break
Ü	0002 .0	0.00	OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Process Automation System (PAS) Fails (Estimate)
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
6	4.072E-10	0.66	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			LOOPCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to a Controlled Shutdown
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
7	2.750E-10	0.45	IE FLD-TB	Initiator - Flood in the Turbine Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10AP107EFR_D-ALL	CCF of SCWS Pumps to Run
8	1.868E-10	0.30	IE FLD-TB	Initiator - Flood in the Turbine Building
			LAS11AP001EFS D-ALL	CCF of EFWS Pumps to Start
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient
9	1.620E-10	0.26	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JND10AP001EFR_D-123	CCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

IVICS I	Results		EFF	KDC030	FLOOL
No.	Prob.	%	Event	Description	
10	1.620E-10	0.26	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30/Fails to Close on Demand	AA020,
			JND10AP001EFR_D-123	CCF of MHSI Pumps to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ing
11	1.620E-10	0.26	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Clos Demand	se on
			JND10AP001EFR_D-123	CCF of MHSI Pumps to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ing
12	1.620E-10	0.26	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Clos Demand	se on
			JND10AP001EFR_D-123	CCF of MHSI Pumps to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ing
13	1.589E-10	0.26	IE FLD-TB	Initiator - Flood in the Turbine Building	
			LAS11AP001EFR D-ALL	CCF of EFWS Pumps to Run	
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient	
14	1.535E-10	0.25	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Clos Demand	se on
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ing
15	1.535E-10	0.25	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30/ Fails to Close on Demand	AA020,
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ing
16	1.535E-10	0.25	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40/ Fails to Close on Demand	AA020,
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ing
17	1.535E-10	0.25	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Clos Demand	se on
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ing
18	1.260E-10	0.21	IE FLD-EFW	Initiator - EFW Pipe Break	
			LOOPCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for Leading to a Controlled Shutdown	or IEs
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient	

MCS Results			EPR	RDC050 FLOOD
No.	Prob.	%	Event	Description
19	1.193E-10	0.19	IE FLD-TB	Initiator - Flood in the Turbine Building
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Start
20	1.123E-10	0.18	IE FLD-TB	Initiator - Flood in the Turbine Building
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
21	1.123E-10	0.18	IE FLD-TB	Initiator - Flood in the Turbine Building
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to Auto Scram
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
22	1.086E-10	0.18	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failure of Recovery Within 1 Hour
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
23	9.828E-11	0.16	IE FLD-EFW	Initiator - EFW Pipe Break
			LOOPCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to a Controlled Shutdown
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
24	9.828E-11	0.16	IE FLD-EFW	Initiator - EFW Pipe Break
			LOOPCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to a Controlled Shutdown
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
25	8.933E-11	0.15	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
26	8.933E-11	0.15	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building

JEB30AA020EFC

PROB SEAL LOCA

KAA12AA005EFO_D-ALL

RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020,

Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

CCF to Open CCWS to LHSI HTX Cooling MOV

Fails to Close on Demand

34

35	5.259E-11	0.09	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Proccess Automation System (PAS) Fails (Estimate)
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run
36	4.823E-11	0.08	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			JNG13AA005CFO_D-123	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
37	4.823E-11	0.08	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			JNG13AA005CFO_D-123	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
38	4.823E-11	0.08	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			JNG13AA005CFO_D-123	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
39	4.823E-11	0.08	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JNG13AA005CFO_D-123	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
40	4.650E-11	0.08	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			PED10AN002EFS_D-123	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
41	4.650E-11	0.08	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			PED10AN002EFS_D-123	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
42	4.650E-11	0.08	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			PED10AN002EFS_D-123	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

Demand

CCF of MHSI Pumps to Run

JEB30AA010EFC

PROB SEAL LOCA

JND10AP001EFR_D-123

RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on

Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

52	3.704E-11	0.06	IE FLD-EFW	Initiator - EFW Pipe Break
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
53	3.704E-11	0.06	IE FLD-EFW	Initiator - EFW Pipe Break
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
54	3.704E-11	0.06	IE FLD-EFW	Initiator - EFW Pipe Break
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
55	3.704E-11	0.06	IE FLD-EFW	Initiator - EFW Pipe Break
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
56	3.639E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			KAA12AA005EFO_D-123	CCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
57	3.639E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			KAA12AA005EFO_D-123	CCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
58	3.639E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			KAA12AA005EFO_D-123	CCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
59	3.639E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			KAA12AA005EFO_D-123	CCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

MC2	Results		EI	PRDC050	FLOOL
No.	Prob.	%	Event	Description	
60	3.406E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	uding Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Ma	aintenance
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40/Fails to Close on Demand	AA020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	o Run
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to	o Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	ing
61	3.406E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Ma	aintenance
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Clos Demand	se on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	o Run
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to	o Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing
62	3.406E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Ma	aintenance
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30/Fails to Close on Demand	AA020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	o Run
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to	o Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing
63	3.406E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	uding Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Ma	aintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Clos Demand	se on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	o Run
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to	o Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing
64	3.406E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Ma	aintenance
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30/Fails to Close on Demand	AA020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	o Run
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to	o Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing
65	3.406E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	luding Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Ma	aintenance
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Clos Demand	e on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	o Run
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to	o Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing

MC2	Results		EP	/RDC050	FLOOD
No.	Prob.	%	Event	Description	
66	3.406E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump R Building	oom) Including Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Prev	entive Maintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fa Demand	ils to Close on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP00)1, Fails to Run
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP00)1, Fails to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of S	Seal Cooling
67	3.406E-11	0.06	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump R Building	coom) Including Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Prev	entive Maintenance
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MO Fails to Close on Demand	V JEB40AA020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP00)1, Fails to Run
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP00)1, Fails to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of S	Seal Cooling
68	3.360E-11	0.05	IE FLD-EFW	Initiator - EFW Pipe Break	
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failu 1 Hour	re of Recovery Within
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient	
69	2.800E-11	0.05	IE FLD-EFW	Initiator - EFW Pipe Break	
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient	
			OPF-EFW-1H	Operator Fails to Isolate Leaking EFW Tank and Initia	ate DWS Make-up
			PAS	Proccess Automation System (PAS) Fails (Estimate)	
70	2.683E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump R Building	oom) Including Fuel
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP00)1, Fails to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PAS	Proccess Automation System (PAS) Fails (Estimate)	
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Prev	entive Maintenance
71	2.628E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump R Building	loom) Including Fuel
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PAS	Proccess Automation System (PAS) Fails (Estimate)	
			SAC01AN001EFR	SAC, Normal Air Supply Fan SAC01AN001, Fails to I	Run
72	2.628E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump R Building	oom) Including Fuel
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PAS	Proccess Automation System (PAS) Fails (Estimate)	
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001, Fails to	Run
73	2.621E-11	0.04	IE FLD-EFW	Initiator - EFW Pipe Break	
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failu 1 Hour	re of Recovery Within
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Prev	entive Maintenance

IVICS	Resuits		EFF	(DC030 FLOOL
No.	Prob.	%	Event	Description
74	2.621E-11	0.04	IE FLD-EFW	Initiator - EFW Pipe Break
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failure of Recovery Within 1 Hour
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
75	2.591E-11	0.04	IE FLD-EFW	Initiator - EFW Pipe Break
			LOOPCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to a Controlled Shutdown
			XKA10DFR_D-ALL	CCF of EDGs to Run
76	2.486E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30 SSSF	Mechanical Failure of the Stand Still Seal for RCP3
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
77	2.486E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40 SSSF	Mechanical Failure of the Stand Still Seal for RCP4
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
78	2.395E-11	0.04	IE FLD-EFW	Initiator - EFW Pipe Break
			LOOPCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Hour for IEs Leading to a Controlled Shutdown
			XKA10DFR_D-123	CCF of EDGs to Run
79	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND20AA003, Left in Wrong Position
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
80	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10AA003, Left in Wrong Position
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
81	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND30AA003, Left in Wrong Position
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

IVICS I	Results		⊑r	KDC030 FLOOI
No.	Prob.	%	Event	Description
82	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND20AA003, Left in Wrong Position
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
83	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10AA003, Left in Wrong Position
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
84	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020,
				Fails to Close on Demand
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10AA003, Left in Wrong Position
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
85	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10AA003, Left in Wrong Position
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
86	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Maintenance
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND20AA003, Left in Wrong Position
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
87	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10AA003, Left in Wrong Position
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

MCS	Results		EI	PRDC050	FLOOL
No.	Prob.	%	Event	Description	
88	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	uding Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Ma	aintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Clos Demand	e on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	o Run
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND2 Left in Wrong Position	!0AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing
89	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	uding Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Ma	aintenance
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30/Fails to Close on Demand	AA020,
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND1 Left in Wrong Position	0AA003,
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to	o Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing
90	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	uding Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Ma	aintenance
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40/Fails to Close on Demand	4A020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	o Run
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND3 Left in Wrong Position	50AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing
91	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	uding Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Ma	aintenance
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Clos Demand	e on
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND1 Left in Wrong Position	0AA003,
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to	ວ Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing
92	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	uding Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Ma	aintenance
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Clos Demand	e on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	o Run
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND3 Left in Wrong Position	30AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing
93	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Incl Building	uding Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Ma	aintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Clos Demand	e on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to	ວ Run
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND3 Left in Wrong Position	30AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooli	ing

MC2	Results		EI	PRDC050 FLO	טטי
No.	Prob.	%	Event	Description	
94	2.297E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fu Building	el
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Maintenance	е
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand	
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10AA003, Left in Wrong Position	,
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
95	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fu	ıel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand	
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run	
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to Run	
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
96	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fu	el
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand	
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to Run	
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to Run	
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
97	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fu Building	el
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand	
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run	
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to Run	
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
98	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fu Building	el
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand	
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to Run	
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to Run	
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
99	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fu	el
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand	
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run	
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to Run	
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	

MC2	Results		E	PRDC050	FLOOD
No.	Prob.	%	Event	Description	
100	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Robuilding	om) Including Fuel
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB40AA020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001	, Fails to Run
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001	, Fails to Run
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenar	ıce
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
101	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Ro- Building	om) Including Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails Demand	to Close on
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001	, Fails to Run
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001	, Fails to Run
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenar	nce
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
102	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rob Building	om) Including Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails Demand	to Close on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001	, Fails to Run
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001	, Fails to Run
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenar	ıce
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
103	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Ro- Building	om) Including Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB30AA020,
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001	, Fails to Run
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001	, Fails to Run
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenar	ice
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
104	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rob Building	om) Including Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails Demand	to Close on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001	, Fails to Run
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001	, Fails to Run
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenar	ıce
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
105	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rob Building	om) Including Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails Demand	to Close on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001	, Fails to Run
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001	, Fails to Run
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenar	ıce
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling

IVICS	Results		EFN	DC030 FEC	,OL
No.	Prob.	%	Event	Description	
106	2.271E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fu Building	el
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand	
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run	
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to Run	
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
107	2.254E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fu Building	el
			JEB30AA018OFO	RCP Seal, RCP3 Nitrogen Supply Solenoid Valve JEB30AA018, Fails t Open on Demand	0
			JND10AP001EFR_D-123	CCF of MHSI Pumps to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
108	2.254E-11	0.04	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fu Building	el
			JEB40AA018OFO	RCP Seal, RCP4 Nitrogen Supply Solenoid Valve JEB40AA018, Fails t Open on Demand	0
			JND10AP001EFR_D-123	CCF of MHSI Pumps to Run	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
109	2.202E-11	0.04	IE FLD-TB	Initiator - Flood in the Turbine Building	
			OPD-SAC2H/SAC1H	Dependency (MED) Between OAs for Starting HVAC Maintenance Trai Recovering Room Cooling Locally	ns
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Norm SAC Safety Train	al
			QKA10GH001_FR_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Run	
110	2.184E-11	0.04	IE FLD-EFW	Initiator - EFW Pipe Break	
			OPF-EFW-1H	Operator Fails to Isolate Leaking EFW Tank and Initiate DWS Make-up	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			PAS	Proccess Automation System (PAS) Fails (Estimate)	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenand	се
111	2.156E-11	0.04	IE FLD-EFW	Initiator - EFW Pipe Break	
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand	
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
112	2.156E-11	0.04	IE FLD-EFW	Initiator - EFW Pipe Break	
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand	
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
113	2.156E-11	0.04	IE FLD-EFW	Initiator - EFW Pipe Break	
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand	
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	

114	2.156E-11	0.04	IE FLD-EFW	Initiator - EFW Pipe Break
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
115	2.136E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA018OFO	RCP Seal, RCP3 Nitrogen Supply Solenoid Valve JEB30AA018, Fails to Open on Demand
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
116	2.136E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA018OFO	RCP Seal, RCP4 Nitrogen Supply Solenoid Valve JEB40AA018, Fails to Open on Demand
			JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
117	2.081E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30 SSSF	Mechanical Failure of the Stand Still Seal for RCP3
			PED10AN002EFS_D-ALL	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
118	2.081E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40 SSSF	Mechanical Failure of the Stand Still Seal for RCP4
			PED10AN002EFS_D-ALL	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
119	2.049E-11	0.03	IE FLD-TB	Initiator - Flood in the Turbine Building
			EFWS PM4	EFWS Train 4 Unavailable due to Preventive Maintenance
			LAS11AP001EFR_D-123	CCF of EFWS Pumps to Run
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient
120	2.049E-11	0.03	IE FLD-TB	Initiator - Flood in the Turbine Building
			EFWS PM1	EFWS Train 1 Unavailable due to Preventive Maintenance
			LAS11AP001EFR_D-234	CCF of EFWS Pumps to Run
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient
121	2.049E-11	0.03	IE FLD-TB	Initiator - Flood in the Turbine Building
			EFWS PM2	EFWS Train 2 Unavailable due to Preventive Maintenance
			LAS11AP001EFR_D-134	CCF of EFWS Pumps to Run
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient
122	2.049E-11	0.03	IE FLD-TB	Initiator - Flood in the Turbine Building
			EFWS PM3	EFWS Train 3 Unavailable due to Preventive Maintenance
			LAS11AP001EFR_D-124	CCF of EFWS Pumps to Run
			OPE-FB-90M	Operator Fails to Initiate Feed & Bleed for Transient

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No.	Prob.	%	Event	Description	
123	2.018E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inclu Building	iding Fuel
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B	
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close Demand	e on
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	ng
124	2.018E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inclu	ıding Fuel
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B	
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40A Fails to Close on Demand	A020,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	ng
125	2.018E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inclu	ıding Fuel
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B	
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close Demand	e on
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	ng
126	2.018E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inclu	ıding Fuel
			CL-PS-B-SWCCF	SW CCF of Protection System diversity group B	
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30A Fails to Close on Demand	A020,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	ng
127	1.947E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inclu	ıding Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close Demand	e on
			LBA13AA001PFO_D-ALL	CCF to Open Main Steam Relief Isolation Valves	
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	ng
128	1.947E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inclu	iding Fuel
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40A Fails to Close on Demand	A020,
			LBA13AA001PFO_D-ALL	CCF to Open Main Steam Relief Isolation Valves	
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	ng
129	1.947E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inclu Building	ıding Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30A Fails to Close on Demand	A020,
			LBA13AA001PFO_D-ALL	CCF to Open Main Steam Relief Isolation Valves	
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	ng
130	1.947E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inclu	ıding Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close Demand	e on
			LBA13AA001PFO_D-ALL	CCF to Open Main Steam Relief Isolation Valves	
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	ng

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MCS F	Results		EPR	RDC050 FLOOD
No.	Prob.	%	Event	Description
139	1.806E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			JNG13AA005CFO_D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
140	1.806E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			JNG13AA005CFO_D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
141	1.806E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JNG13AA005CFO_D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
142	1.805E-11	0.03	IE FLD-EFW	Initiator - EFW Pipe Break
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020, Fails to Close on Demand
			PED10AN002EFS_D-ALL	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
143	1.805E-11	0.03	IE FLD-EFW	Initiator - EFW Pipe Break
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			PED10AN002EFS_D-ALL	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
144	1.805E-11	0.03	IE FLD-EFW	Initiator - EFW Pipe Break
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			PED10AN002EFS_D-ALL	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
145	1.805E-11	0.03	IE FLD-EFW	Initiator - EFW Pipe Break
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			PED10AN002EFS_D-ALL	CCF to Start Standby Cooling Tower Fans
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

IE FLD-SAB14 FB

QKA10AP107EFR

Run

OPF-SAC-2H

PAS

146

1.790E-11

0.03

Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel

SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107, Fails to

Operator Fails to Recover Room Cooling Locally

Proccess Automation System (PAS) Fails (Estimate)

MCS Results			EPR	RDC050	FLOOD	
No.	Prob.	%	Event	Description		
147	1.779E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room Building) Including Fuel	
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Demand	Close on	
			JND10AP001EFS_D-123	CCF of MHSI Pumps to Start		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal	Cooling	
148	1.779E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room Building) Including Fuel	
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JE Fails to Close on Demand	EB40AA020,	
			JND10AP001EFS_D-123	CCF of MHSI Pumps to Start		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal	Cooling	
149	1.779E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room Building) Including Fuel	
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Demand	Close on	
			JND10AP001EFS_D-123	CCF of MHSI Pumps to Start		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal	Cooling	
150	1.779E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room Building) Including Fuel	
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JE Fails to Close on Demand	B30AA020,	
			JND10AP001EFS_D-123	CCF of MHSI Pumps to Start		
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal	Cooling	
151	1.764E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room Building) Including Fuel	
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for SLOCA		
			OPF-RCP-10M	Operator Fails to Trip RCPs on a Loss of Seal Injection		
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally		
			PAS	Proccess Automation System (PAS) Fails (Estimate)		
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable due to Preventive	ve Maintenance	
152	1.754E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room Building) Including Fuel	
			LOOP24+REC	Loss Of Offsite Power During Mission Time and Failure of 1 Hour	Recovery Within	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally		
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start o	n Demand	
153	1.740E-11	0.03	IE FLD-TB	Initiator - Flood in the Turbine Building		
			BTD01_BATST_D-ALL	CCF of Safety Related Batteries on Demand		
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Ho Leading to Auto Scram	our for IEs	
154	1.717E-11	0.03	IE FLD-TB	Initiator - Flood in the Turbine Building		
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Ho Leading to Auto Scram	our for IEs	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally		
			QKA10GH001_FR_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Run		

INIC2 I	Results		EPR	(DC050	FLOOL
No.	Prob.	%	Event	Description	
155	1.616E-11	0.03	IE FLD-TB	Initiator - Flood in the Turbine Building	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Ho Leading to Auto Scram	ur for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FR	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Run	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive	e Maintenance
156	1.616E-11	0.03	IE FLD-TB	Initiator - Flood in the Turbine Building	
			LOOPCON+REC	Consequential LOOP and Failure of Recovery Within 1 Ho Leading to Auto Scram	ur for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Run	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive	e Maintenance
157	1.593E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Building	Including Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Demand	Close on
			LHSI PM1	LHSI Train 1 Unavailable due to Preventive Maintenance	
			PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal C	Cooling
158	1.593E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Building	Including Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Demand	Close on
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal C	Cooling
159	1.593E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Building	Including Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Demand	Close on
			LHSI PM1	LHSI Train 1 Unavailable due to Preventive Maintenance	
			PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal C	Cooling
160	1.593E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Building	Including Fuel
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEI Fails to Close on Demand	340AA020,
			LHSI PM1	LHSI Train 1 Unavailable due to Preventive Maintenance	
			PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal C	Cooling
161	1.593E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Building	Including Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEI Fails to Close on Demand	330AA020,
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal C	Cooling

IVICS I	resuits		EFF	KDC030	FLOOL
No.	Prob.	%	Event	Description	
162	1.593E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rob Building	om) Including Fuel
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB40AA020,
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenar	nce
			PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	eal Cooling
163	1.593E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Ro-Building	,
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB30AA020,
			LHSI PM1	LHSI Train 1 Unavailable due to Preventive Maintenan	ce
			PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	eal Cooling
164	1.593E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Robuilding	om) Including Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails Demand	to Close on
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenar	nce
			PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	eal Cooling
165	1.587E-11	0.03	IE FLD-EFW	Initiator - EFW Pipe Break	
			LOOPCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Leading to a Controlled Shutdown	Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Sta	rt on Demand
166	1.587E-11	0.03	IE FLD-EFW	Initiator - EFW Pipe Break	
			LOOPCSD+REC	Consequential LOOP and Failure of Recovery Within 1 Leading to a Controlled Shutdown	Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally	
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Sta	rt on Demand
167	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rob Building	om) Including Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Prevei	ntive Maintenance
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails Demand	to Close on
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valv Left in Wrong Position	/e JND10AA003,
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valv Left in Wrong Position	/e JND20AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
168	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Ro-Building	om) Including Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preven	ntive Maintenance
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB30AA020,
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valv Left in Wrong Position	/e JND10AA003,
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valv Left in Wrong Position	/e JND20AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling

MC2 I	Results		EP	RDC030	FLOOL
No.	Prob.	%	Event	Description	
169	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rob Building	om) Including Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preven	ntive Maintenance
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails Demand	to Close on
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valv Left in Wrong Position	/e JND10AA003,
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valv Left in Wrong Position	/e JND30AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
170	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Ro-Building	om) Including Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preven	ntive Maintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails Demand	to Close on
			JNG10AA006MEC3	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG Wrong Position	10AA006, Left in
			JNG20AA006MEC3	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG Wrong Position	20AA006, Left in
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
171	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rob Building	om) Including Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Prevei	ntive Maintenance
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB40AA020,
			JNG10AA006MEC3	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG Wrong Position	10AA006, Left in
			JNG20AA006MEC3	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG Wrong Position	20AA006, Left in
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
172	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rob Building	om) Including Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preven	ntive Maintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails Demand	to Close on
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valv Left in Wrong Position	/e JND10AA003,
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valv Left in Wrong Position	re JND20AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	eal Cooling
173	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rob Building	om) Including Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Prevei	ntive Maintenance
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB40AA020,
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valv Left in Wrong Position	/e JND10AA003,
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valv Left in Wrong Position	/e JND30AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling

MCS	Results		EF	PRDC050	FLOOL
No.	Prob.	%	Event	Description	
174	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Ma	aintenance
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Clos Demand	se on
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND Left in Wrong Position	10AA003,
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND3 Left in Wrong Position	30AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ling
175	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Ma	aintenance
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30 Fails to Close on Demand	AA020,
			JNG10AA006MEC3	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA0 Wrong Position	06, Left in
			JNG20AA006MEC3	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA0 Wrong Position	06, Left in
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ling
176	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Ma	aintenance
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Clos Demand	se on
			JNG10AA006MEC3	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA00 Wrong Position	06, Left in
			JNG20AA006MEC3	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA0 Wrong Position	06, Left in
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ling
177	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable due to Preventive Ma	aintenance
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30 Fails to Close on Demand	AA020,
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND Left in Wrong Position	10AA003,
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND3 Left in Wrong Position	30AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ing
178	1.550E-11	0.03	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable due to Preventive Ma	aintenance
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40 Fails to Close on Demand	AA020,
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND Left in Wrong Position	10AA003,
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND2 Left in Wrong Position	20AA003,
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cool	ling

FLOOD

IVICS I	Results		Er	ADC030	FLOOD
No.	Prob.	%	Event	Description	
179	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40 Fails to Close on Demand)AA020,
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND: Left in Wrong Position	20AA003,
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails t	to Run
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Coo	ling
180	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30 Fails to Close on Demand)AA020,
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND Left in Wrong Position	10AA003,
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to	to Run
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Coo	ling
181	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Clo Demand	se on
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND: Left in Wrong Position	20AA003,
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to	to Run
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Coo	ling
182	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Clo Demand	se on
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to	to Run
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND: Left in Wrong Position	30AA003,
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Coo	ling
183	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Clo Demand	se on
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails t	to Run
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND: Left in Wrong Position	30AA003,
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Coo	ling
184	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Inc Building	luding Fuel
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40 Fails to Close on Demand)AA020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails t	to Run
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND: Left in Wrong Position	20AA003,
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Coo	ling

MCS	Results		EI	PRDC050	FLOOD
No.	Prob.	%	Event	Description	
185	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Roo Building	om) Including Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB30AA020,
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valv Left in Wrong Position	e JND20AA003,
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001,	, Fails to Run
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenan	ice
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
186	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Rod Building	om) Including Fuel
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB40AA020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001,	, Fails to Run
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valv Left in Wrong Position	e JND30AA003,
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenan	ice
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
187	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Roc Building	om) Including Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV Fails to Close on Demand	JEB30AA020,
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valv Left in Wrong Position	e JND10AA003,
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001,	, Fails to Run
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenan	ice
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
188	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Roo Building	om) Including Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails Demand	to Close on
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valv Left in Wrong Position	e JND20AA003,
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001,	, Fails to Run
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenan	ice
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
189	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Roo Building	om) Including Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails Demand	to Close on
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valv Left in Wrong Position	e JND10AA003,
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001,	, Fails to Run
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenan	ice
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling
190	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Roo Building	om) Including Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails Demand	to Close on
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valv Left in Wrong Position	e JND10AA003,
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001,	, Fails to Run
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenan	ice
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Se	al Cooling

MCS Results	EPRDC050	FLOOD
MCS Results	EPRDC050	FLOC

IVICS F	resuits		EF	-KDC030	FLOOD
No.	Prob.	%	Event	Description	
191	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Includi Building	ing Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close of Demand	n
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to R	un
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND30A Left in Wrong Position	A003,
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
192	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Includi Building	ing Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA0 Fails to Close on Demand	020,
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to R	un
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND30A Left in Wrong Position	A003,
			MHSI PM1	MHSI Train 1 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
193	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Includi Building	ing Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA0 Fails to Close on Demand	020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to R	un
			JND30AA003MEC3	MHSI, MHSI Pump 30 Discharge MANUAL Check Valve JND30A Left in Wrong Position	A003,
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
194	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Includi Building	ing Fuel
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA0 Fails to Close on Demand	020,
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to R	un
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND20A Left in Wrong Position	A003,
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
195	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Includi Building	ing Fuel
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close of Demand	n
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10A Left in Wrong Position	A003,
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to R	un
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	
196	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Includi Building	ing Fuel
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close of Demand	n
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to R	un
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND20A Left in Wrong Position	A003,
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenance	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling	

MCS Results	EPRDC050	FLOOD
MCS Results	EPRDC050	FLOO

IVICS	Nesulis		L	FRDC030 TEOO
No.	Prob.	%	Event	Description
197	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10AA003, Left in Wrong Position
			JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001, Fails to Run
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenance
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
198	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40AA010, Fails to Close on Demand
			JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001, Fails to Run
			JND20AA003MEC3	MHSI, MHSI Pump 20 Discharge MANUAL Check Valve JND20AA003, Left in Wrong Position
			MHSI PM3	MHSI Train 3 Unavailable due to Preventive Maintenance
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
199	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30AA010, Fails to Close on Demand
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10AA003, Left in Wrong Position
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to Run
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
200	1.532E-11	0.02	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 or 4 (Pump Room) Including Fuel Building
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020, Fails to Close on Demand
			JND10AA003MEC3	MHSI, MHSI Pump 10 Discharge MANUAL Check Valve JND10AA003, Left in Wrong Position
			JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001, Fails to Run
			MHSI PM2	MHSI Train 2 Unavailable due to Preventive Maintenance
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a Loss of Seal Cooling

Minimal Cutsets

Top Event frequency F = 5.770E-08

No.	Freq.	%	Event	Description
1	3.388E-09	5.87	IE SD ULD DU D KBA14AA004EFC_E -ALL	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand) 3 CCF to Close CVCS Low Pressure Reducing Station MOVs
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
2	3.388E-09	5.87	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			KBA14AA004EFC_E -ALL	3 CCF to Close CVCS Low Pressure Reducing Station MOVs
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
3	2.461E-09	4.26	IE SD RHR CBD	Initiator - RHR in Power State CBd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
4	1.891E-09	3.28	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State Du (Demand)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
5	1.891E-09	3.28	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State CBd (Demand)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MOV KBA14AA004, Fails to Close on Demand
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop
6	1.845E-09	3.20	IE SD RHR CBU	Initiator - RHR in Power State CBu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
7	1.845E-09	3.20	IE SD RHR CAD	Initiator - RHR in Power State CAd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

MCS Results		EF	PRDCSD1	SHUTDOWN	
No.	Freq.	%	Event	Description	
8	1.230E-09	2.13	IE SD RHR CAU	Initiator - RHR in Power State CAu	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_D -ALL	OCCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
9	6.502E-10	1.13	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State	CBd (Demand)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MO Fails to Close on Demand	V KBA14AA004,
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KE to Close on Demand	A14AA106, Fails
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Re	ducing Station
10	6.502E-10	1.13	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State	Du (Demand)
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation MO Fails to Close on Demand	V KBA14AA004,
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV KE to Close on Demand	A14AA106, Fails
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressure Re	ducing Station
11	6.446E-10	1.12	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection S JNG10AA192, Premature Opening	Safety Valve
			D-ALL	CCF to Open LHSI/MHSI Common Injection Check \ Isolation Valves)	·
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
12	6.446E-10	1.12	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check \ Isolation Valves)	/alves (SIS First
			JNG30AA192SPO	LHSI, LHSI/RHR Train 30 Overpressure Protection S JNG30AA192, Premature Opening	Safety Valve
			OPF-ISORHRFD-CE	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
13	6.446E-10	1.12	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check \ Isolation Valves)	/alves (SIS First
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protection S JNG20AA192, Premature Opening	Safety Valve
			OPF-ISORHRFD-CE	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB
14	6.446E-10	1.12	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, Prem	nature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check \ Isolation Valves)	/alves (SIS First
			OPF-ISORHRFD-CE	B Operator Fails to Isolate RHR Flow Diversion (LOCA) in State CB

MCS Results			EI	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
15	6.446E-10	1.12	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNA30AA191SPO	RHR, LHSI Train 3 Safety Valve JNA30AA191,	Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Che Isolation Valves)	eck Valves (SIS First
			OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (L	OCA) in State CB
16	6.446E-10	1.12	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191,	. •
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Che Isolation Valves)	eck Valves (SIS First
			OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (L	OCA) in State CB
17	5.500E-10	0.95	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown S	State Du (Demand)
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressur	e Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop	
			PAS	Proccess Automation System (PAS) Fails (Estin	nate)
18	5.500E-10	0.95	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown S	State CBd (Demand)
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressur	e Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop	
			PAS	Proccess Automation System (PAS) Fails (Estin	nate)
19	4.835E-10	0.84	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protect JNG10AA192, Premature Opening	ion Safety Valve
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Che Isolation Valves)	eck Valves (SIS First
			OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (L	OCA) in State CB
20	4.835E-10	0.84	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Che Isolation Valves)	eck Valves (SIS First
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protect JNG20AA192, Premature Opening	ion Safety Valve
			OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (L	OCA) in State CB
21	4.835E-10	0.84	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protect JNG10AA192, Premature Opening	ion Safety Valve
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Che Isolation Valves)	eck Valves (SIS First
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (L	OCA) in State D
22	4.835E-10	0.84	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191,	Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Che Isolation Valves)	eck Valves (SIS First
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (L	OCA) in State D

MCS	MCS Results		EI	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
23	4.835E-10	0.84	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, P	· -
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Cher Isolation Valves)	ck Valves (SIS First
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LC	OCA) in State D
24	4.835E-10	0.84	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA191, P	
			D-ALL	CCF to Open LHSI/MHSI Common Injection Cher Isolation Valves)	·
			OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (LC	PCA) in State CB
25	4.835E-10	0.84	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, P	remature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Cher Isolation Valves)	ck Valves (SIS First
			OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (LC	OCA) in State CB
26	4.835E-10	0.84	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Chellsolation Valves)	ck Valves (SIS First
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Protectic JNG20AA192, Premature Opening	on Safety Valve
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LC	OCA) in State D
27	3.432E-10	0.59	IE SD RHR ISLOCA E	RHR ISLOCA During Shutdown State E	
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break	
			PAS	Proccess Automation System (PAS) Fails (Estima	ate)
			RHR TR2 PIPE BRK	Pipe Break in RHR Train 2	
28	3.432E-10	0.59	IE SD RHR ISLOCA E	RHR ISLOCA During Shutdown State E	
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break	
			PAS	Proccess Automation System (PAS) Fails (Estima	ate)
			RHR TR1 PIPE BRK	Pipe Break in RHR Train 1	
29	3.285E-10	0.57	IE SD RHR CBD	Initiator - RHR in Power State CBd	
			PEB10AP001EFS_I -ALL	OCCF of the ESWS Pumps to Start	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Faile Within 1 Hour	ure of Recovery
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Ru	ın
30	2.758E-10	0.48	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown St	•
			D-ALL	CCF to Open LHSI/MHSI Common Injection Chellsolation Valves)	·
			KBA14AA004EFC_I -ALL	B CCF to Close CVCS Low Pressure Reducing Sta	UON IVIOVS

SD LOOP24+REC

Within 1 Hour

Loss Of Offsite Power During Shutdown and Failure of Recovery

MCS Results			EF	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
	·		XKA10DFR_D -ALL	CCF of EDGs to Run	
38	1.891E-10	0.33	IE SD ULD CBD D KBA14AA106EFC	Initiator - Uncontrolled Level Drop in Shutdown CVCS, CVCS Low Power Reducing Station MC to Close on Demand	
			OPE-ISOCSLPRS PAS	Operator Fails to Isolate the CVCS Low Pressu Proccess Automation System (PAS) Fails (Esti	=
39	1.891E-10	0.33	IE SD ULD DU D KBA14AA106EFC	Initiator - Uncontrolled Level Drop in Shutdown CVCS, CVCS Low Power Reducing Station MC to Close on Demand	•
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressu	re Reducing Station
			PAS	Proccess Automation System (PAS) Fails (Esti	mate)
40	1.844E-10	0.32	IE SD ULD CBD D KBA14AA004PANS	Initiator - Uncontrolled Level Drop in Shutdown CVCS, LP Reducing Iso MOV KBA14AA004, F (Type AV42) Fails (Non-Self-Monitored)	
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressu	re Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop	
41	1.844E-10	0.32	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown	State Du (Demand)
			KBA14AA004PANS	CVCS, LP Reducing Iso MOV KBA14AA004, F (Type AV42) Fails (Non-Self-Monitored)	AC A Priority Module
			OPE-ISOCSLPRS	Operator Fails to Isolate the CVCS Low Pressu	re Reducing Station
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop	
42	1.669E-10	0.29	IE SD RHR CBD	Initiator - RHR in Power State CBd	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Fa Within 1 Hour	ailure of Recovery
			XKA10DFS_D -ALL	CCF of EDGs to Start	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to	Run
43	1.642E-10	0.28	IE SD RHR CAU	Initiator - RHR in Power State CAu	
			PEB10AP001EFS_D -ALL	CCF of the ESWS Pumps to Start	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Fa Within 1 Hour	ailure of Recovery
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to	Run
44	1.612E-10	0.28	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd	
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191,	Premature Opening
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Cl Isolation Valves)	neck Valves (SIS First
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D
45	1.612E-10	0.28	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd	
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protect JNG10AA192, Premature Opening	ction Safety Valve
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Cl Isolation Valves)	neck Valves (SIS First

OPF-ISORHRFD-D Operator Fails to Isolate RHR Flow Diversion (LOCA) in State D

MCS Results		EF	EPRDCSD1		
No.	Freq.	%	Event	Description	
46	1.612E-10	0.28	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd	4 D
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA19	•
			D-ALL	CCF to Open LHSI/MHSI Common Injection (Isolation Valves)	Check valves (515 First
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion	(LOCA) in State D
47	1.612E-10	0.28	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection (Isolation Valves)	Check Valves (SIS First
			JNG30AA192SPO	LHSI, LHSI/RHR Train 30 Overpressure Proto JNG30AA192, Premature Opening	ection Safety Valve
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion	(LOCA) in State D
48	1.612E-10	0.28	IE SD LOCA DD	Initiator - LOCA During Shutdown State Dd	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection (Isolation Valves)	Check Valves (SIS First
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Proto JNG20AA192, Premature Opening	ection Safety Valve
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion	(LOCA) in State D
49	1.539E-10	0.27	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdow	n State Du (Demand)
.0	1.0002 10	0.27		CCF to Open LHSI/MHSI Common Injection (Isolation Valves)	•
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolat Fails to Close on Demand	ion MOV KBA14AA004,
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop	p
50	1.539E-10	0.27	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdow	n State CBd (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection (Isolation Valves)	Check Valves (SIS First
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolat Fails to Close on Demand	ion MOV KBA14AA004,
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop	p
51	1.504E-10	0.26	IE SD RHR CBU	Initiator - RHR in Power State CBu	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Within 1 Hour	Failure of Recovery
			XKA10DFR_D -ALL	CCF of EDGs to Run	
			XKA50DFS	ELEC, SBO Diesel Generator XKA50, Fails to	Start on Demand
52	1.504E-10	0.26	IE SD RHR CAD	Initiator - RHR in Power State CAd	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Within 1 Hour	Failure of Recovery
			XKA10DFR_D -ALL	CCF of EDGs to Run	
			XKA50DFS	ELEC, SBO Diesel Generator XKA50, Fails to	Start on Demand
53	1.477E-10	0.26	IE SD LOCA E	Initiator - LOCA During Shutdown State E	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection (Isolation Valves)	Check Valves (SIS First
			SLOCA24	Small LOCA - 24 Hour	

Initiator - LOCA During Shutdown State CBd

MHSI, MHSI Pump 30 Discharge Manual CHECK Valve

IE SD LOCA CBD

JND30AA003CIR

60

1.074E-10

0.19

XKA50

DFS

ELEC, SBO Diesel Generator XKA50, Fails to Start on Demand

MCS F	Results		EF	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
75	8.137E-11	0.14	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Protection Sa JNG10AA192, Premature Opening	fety Valve
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged	
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
76	8.137E-11	0.14	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA191, Prema	ture Opening
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged	
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
77	8.058E-11	0.14	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JND20AA003CIR	MHSI, MHSI Pump 20 Discharge Manual CHECK Valv JND20AA003, Internal Rupture	/e
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valsolation Valves)	llves (SIS First
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State D
78	8.058E-11	0.14	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JND10AA003CIR	MHSI, MHSI Pump 10 Discharge Manual CHECK Valv JND10AA003, Internal Rupture	/e
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valsolation Valves)	alves (SIS First
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State D
79	8.058E-11	0.14	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JND20AA003CIR	MHSI, MHSI Pump 20 Discharge Manual CHECK Valv JND20AA003, Internal Rupture	/e
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valsolation Valves)	alves (SIS First
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
80	8.058E-11	0.14	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
	0.000	•	JND10AA003CIR	MHSI, MHSI Pump 10 Discharge Manual CHECK Valv JND10AA003, Internal Rupture	/e
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valsolation Valves)	alves (SIS First
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
81	8.004E-11	0.14	IE SD RHR CBD	Initiator - RHR in Power State CBd	
-				HDependency (MED) Between OAs for Starting HVAC I Trains Recovering Room Cooling Locally	Maintenance
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Normal SAC Safety Train	r Failure of
			SAC01AN001EFR_ D-ALL	CCF to Run Normal Air Supply Fans	

MCS	Results		EI	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
82	8.004E-11	0.14	IE SD RHR CBD	Initiator - RHR in Power State CBd	
			OPD-SAC2H/SAC1	HDependency (MED) Between OAs for Starting HVAC I Trains Recovering Room Cooling Locally	Maintenance
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains Afte Normal SAC Safety Train	r Failure of
			SAC31AN001EFR_ D-ALL	CCF to Run Normal Air Exhaust Fans	
83	7.599E-11	0.13	IE SD RHR CBU	Initiator - RHR in Power State CBu	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 3 During Non-SBO Conditions	on 4 to Divison
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Sta	rt on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Within 1 Hour	f Recovery
			XKA10DFR_[-234	CCF of EDGs to Run	
84	7.599E-11	0.13	IE SD RHR CAD	Initiator - RHR in Power State CAd	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 3 During Non-SBO Conditions	on 4 to Divison
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Sta	rt on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Within 1 Hour	f Recovery
			XKA10DFR_[-234	CCF of EDGs to Run	
85	7.521E-11	0.13	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valsolation Valves)	alves (SIS First
			JNG20AA004EOP	LHSI, LHSI Train 2 to Tangential Miniflow Motor Opera JNG20AA004, Fails to Remain Closed (SO)	ated CV
			OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
86	7.521E-11	0.13	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valsolation Valves)	alves (SIS First
			JNG30AA003EOP	LHSI, LHSI Trn 3 to Radial Miniflow Motor Operated C JNG30AA003, Fails to Remain Closed (SO)	heck VIv
			OPF-ISORHRFD-CI	B Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
87	7.521E-11	0.13	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG13AA005CFO_ D-ALL	Isolation Valves)	·
			JNG30AA001EOP	LHSI, LHSI Pump 30 Suction from IRWST MOV JNG3 to Remain Closed (SO)	30AA001, Fails
			OPF-ISOIRWSTFD- CB	 Operator Fails to Isolate RHR Suction to IRWST (Valv JNGX0AA001) in CB 	e

MCS	Results		EF	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
88	7.521E-11	0.13	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check V Isolation Valves)	alves (SIS First
			JNG30AA004EOP	LHSI, LHSI Train 3 to Tangential Miniflow Motor Oper JNG30AA004, Fails to Remain Closed (SO)	rated CV
			OPF-ISORHRFD-CE	B Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
89	7.521E-11	0.13	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG10AA003EOP	LHSI, LHSI Trn 1 to Radial Miniflow Motor Operated O JNG10AA003, Fails to Remain Closed (SO)	Check VIv
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check V Isolation Valves)	alves (SIS First
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
90	7.521E-11	0.13	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG13AA005CFO_ D-ALL		alves (SIS First
			JNG20AA001EOP	LHSI, LHSI Pump 20 Suction from IRWST MOV JNG: to Remain Closed (SO)	20AA001, Fails
			OPF-ISOIRWSTFD- CB	Operator Fails to Isolate RHR Suction to IRWST (Valv JNGX0AA001) in CB	ve
91	7.521E-11	0.13	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG10AA001EOP	LHSI, LHSI Pump 10 Suction from IRWST MOV JNG to Remain Closed (SO)	10AA001, Fails
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check V Isolation Valves)	alves (SIS First
			OPF-ISOIRWSTFD- CB	Operator Fails to Isolate RHR Suction to IRWST (Valv JNGX0AA001) in CB	ve
92	7.521E-11	0.13	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG10AA004EOP	LHSI, LHSI Trn 1 to Radial Miniflow Motor Operated (JNG10AA004, Fails to Remain Closed (SO)	Check VIv
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check V Isolation Valves)	alves (SIS First
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
93	7.521E-11	0.13	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
		0.10	JNG13AA005CFO_ D-ALL		alves (SIS First
			JNG20AA003EOP	LHSI, LHSI Trn 2 to Radial Miniflow Motor Operated (JNG20AA003, Fails to Remain Closed (SO)	Check VIv
			OPF-ISORHRFD-CE	B Operator Fails to Isolate RHR Flow Diversion (LOCA)	in State CB
94	7.136E-11	0.12	IE SD RHR CAU	Initiator - RHR in Power State CAu	
		-		Operator Fails to Xtie Division 1 to Division 2 or Division 3 During SBO Considitions	on 4 to Divison
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Within 1 Hour	of Recovery
			XKA10DFR_C	O CCF of EDGs to Run	
	B		XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run	0= 440-

OPE-ISOCSLPRS

Operator Fails to Isolate the CVCS Low Pressure Reducing Station

				Within 1 Hour	,
			XKA10DFR_I -123	D CCF of EDGs to Run	
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40	, Fails to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails	to Run
108 6.103E-11	-11 0.11	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	ı	
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Pro JNG10AA192, Premature Opening	otection Safety Valve
			JNK10AT001SPG_ -ALL	P CCF of IRWST Sump Strainers - Plugged	
			OPF-ISORHRFD-C	B Operator Fails to Isolate RHR Flow Diversio	n (LOCA) in State CB
	RAI 227 Ques	stion 19-285 Appendix	B: Top 200 Core Damag	ge Cutsets	Page B-89 of 130

MCS F	Results		EF	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
109	6.103E-11	0.11	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNA10AA191SPO	RHR, LHSI Train 1 Safety Valve JNA10AA19	1, Premature Opening
			JNK10AT001SPG_F -ALL	PCCF of IRWST Sump Strainers - Plugged	
				3 Operator Fails to Isolate RHR Flow Diversion	n (LOCA) in State CB
110	6.103E-11	0.11	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Prot JNG20AA192, Premature Opening	ection Safety Valve
			JNK10AT001SPG_F -ALL	CCF of IRWST Sump Strainers - Plugged	
				3 Operator Fails to Isolate RHR Flow Diversion	n (LOCA) in State CB
111	6.103E-11	0.11	IE SD LOCA DU	Initiator I OCA During Chutdown State Du	
111	0.103E-11	0.11	JNA10AA191SPO	Initiator - LOCA During Shutdown State Du RHR, LHSI Train 1 Safety Valve JNA10AA19	1 Premature Opening
				CCF of IRWST Sump Strainers - Plugged	71, 1 remature Opening
			-ALL	oci oi iittio otampottamoro i laggott	
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion	n (LOCA) in State D
112	6.103E-11	0.11	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA19	1, Premature Opening
			JNK10AT001SPG_F -ALL	PCCF of IRWST Sump Strainers - Plugged	
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion	ı (LOCA) in State D
113	6.103E-11	0.11	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNA20AA191SPO	RHR, LHSI Train 2 Safety Valve JNA20AA19	91, Premature Opening
			JNK10AT001SPG_F -ALL	PCCF of IRWST Sump Strainers - Plugged	
			OPF-ISORHRFD-CE	Operator Fails to Isolate RHR Flow Diversion	n (LOCA) in State CB
114	6.103E-11	0.11	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNG20AA192SPO	LHSI, LHSI/RHR Train 20 Overpressure Prot JNG20AA192, Premature Opening	tection Safety Valve
			JNK10AT001SPG_F -ALL	P CCF of IRWST Sump Strainers - Plugged	
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion	n (LOCA) in State D
115	6.103E-11	0.11	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNG10AA192SPO	LHSI, LHSI/RHR Train 10 Overpressure Prot JNG10AA192, Premature Opening	tection Safety Valve
			JNK10AT001SPG_F -ALL	PCCF of IRWST Sump Strainers - Plugged	
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion	n (LOCA) in State D

Isolation Valves)

JNGX0AA001) in D

OPF-ISOIRWSTFD- Operator Fails to Isolate RHR Suction to IRWST (Valve

D-ALL

MCS F	Results		EP	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
123	5.640E-11	0.10	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection C Isolation Valves)	Check Valves (SIS First
			JNG20AA003EOP	LHSI, LHSI Trn 2 to Radial Miniflow Motor Ope JNG20AA003, Fails to Remain Closed (SO)	erated Check VIv
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion ((LOCA) in State CB
124	5.640E-11	0.10	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNG10AA004EOP	LHSI, LHSI Trn 1 to Radial Miniflow Motor Ope JNG10AA004, Fails to Remain Closed (SO)	erated Check VIv
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection C Isolation Valves)	Check Valves (SIS First
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion ((LOCA) in State CB
125	5.640E-11	0.10	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection C Isolation Valves)	Check Valves (SIS First
			JNG20AA003EOP	LHSI, LHSI Trn 2 to Radial Miniflow Motor Ope JNG20AA003, Fails to Remain Closed (SO)	erated Check VIv
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion	(LOCA) in State D
126	5.640E-11	0.10	IE SD LOCA CAD	Initiator - LOCA During Shutdown State CAd	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection C Isolation Valves)	Check Valves (SIS First
			JNG20AA001EOP	LHSI, LHSI Pump 20 Suction from IRWST MC to Remain Closed (SO)	DV JNG20AA001, Fails
			OPF-ISOIRWSTFD- CA	Operator Fails to Isolate RHR Suction to IRWS JNGX0AA001) in CA	ST (Valve
127	5.640E-11	0.10	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection C Isolation Valves)	Check Valves (SIS First
			JNG20AA001EOP	LHSI, LHSI Pump 20 Suction from IRWST MC to Remain Closed (SO)	DV JNG20AA001, Fails
			OPF-ISOIRWSTFD- D	Operator Fails to Isolate RHR Suction to IRWS JNGX0AA001) in D	ST (Valve
128	5.640E-11	0.10	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection C Isolation Valves)	Check Valves (SIS First
			JNG20AA001EOP	LHSI, LHSI Pump 20 Suction from IRWST MC to Remain Closed (SO)	OV JNG20AA001, Fails
			OPF-ISOIRWSTFD- CB	Operator Fails to Isolate RHR Suction to IRWS JNGX0AA001) in CB	ST (Valve
129	5.640E-11	0.10	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNG10AA003EOP	LHSI, LHSI Trn 1 to Radial Miniflow Motor Ope JNG10AA003, Fails to Remain Closed (SO)	erated Check VIv
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection C Isolation Valves)	Check Valves (SIS First
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion ((LOCA) in State D

MCS	Results		EF	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
130	5.640E-11	0.10	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNG10AA004EOP	LHSI, LHSI Trn 1 to Radial Miniflow Motor Oper JNG10AA004, Fails to Remain Closed (SO)	rated Check VIv
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Ch Isolation Valves)	neck Valves (SIS First
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (L	LOCA) in State D
131	5.640E-11	0.10	IE SD LOCA CAD	Initiator - LOCA During Shutdown State CAd	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Ch Isolation Valves)	neck Valves (SIS First
			JNG30AA001EOP	LHSI, LHSI Pump 30 Suction from IRWST MOV to Remain Closed (SO)	/ JNG30AA001, Fails
			OPF-ISOIRWSTFD- CA	Operator Fails to Isolate RHR Suction to IRWS JNGX0AA001) in CA	T (Valve
132	5.640E-11	0.10	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNG10AA003EOP	LHSI, LHSI Trn 1 to Radial Miniflow Motor Oper JNG10AA003, Fails to Remain Closed (SO)	rated Check VIv
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Ch Isolation Valves)	neck Valves (SIS First
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (L	LOCA) in State CB
133	5.640E-11	0.10	IE SD LOCA DU	Initiator - LOCA During Shutdown State Du	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Ch Isolation Valves)	neck Valves (SIS First
			JNG20AA004EOP	LHSI, LHSI Train 2 to Tangential Miniflow Motor JNG20AA004, Fails to Remain Closed (SO)	r Operated CV
			OPF-ISORHRFD-D	Operator Fails to Isolate RHR Flow Diversion (L	LOCA) in State D
134	5.640E-11	0.10	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Ch Isolation Valves)	neck Valves (SIS First
			JNG20AA004EOP	LHSI, LHSI Train 2 to Tangential Miniflow Motor JNG20AA004, Fails to Remain Closed (SO)	r Operated CV
			OPF-ISORHRFD-CE	3 Operator Fails to Isolate RHR Flow Diversion (L	LOCA) in State CB
135	5.640E-11	0.10	IE SD LOCA CBU	Initiator - LOCA During Shutdown State CBu	
			JNG10AA001EOP	LHSI, LHSI Pump 10 Suction from IRWST MOV to Remain Closed (SO)	/ JNG10AA001, Fails
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Ch Isolation Valves)	neck Valves (SIS First
			OPF-ISOIRWSTFD- CB	Operator Fails to Isolate RHR Suction to IRWS JNGX0AA001) in CB	T (Valve
136	5.640E-11	0.10	IE SD LOCA CAD	Initiator - LOCA During Shutdown State CAd	
			JNG10AA001EOP	LHSI, LHSI Pump 10 Suction from IRWST MOV to Remain Closed (SO)	/ JNG10AA001, Fails
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Ch Isolation Valves)	neck Valves (SIS First
			OPF-ISOIRWSTFD- CA	Operator Fails to Isolate RHR Suction to IRWS JNGX0AA001) in CA	T (Valve

MCS F	Results		EF	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
137	5.372E-11	0.09	IE SD RHR CBD	Initiator - RHR in Power State CBd	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001	, Fails to Run
			SA-ESWS UHS4 SBO	Failure of SA-ESWS/UHS4 in SBO Conditions	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Faile Within 1 Hour	ure of Recovery
			XKA10DFR_C -ALL	CCF of EDGs to Run	
138	5.336E-11	0.09	IE SD RHR CBU	Initiator - RHR in Power State CBu	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Faile Within 1 Hour	ure of Recovery
			XKA10DFR_[-ALL	CCF of EDGs to Run	
			XKA50DFR_E -ALL	3 CCF of SBO DGs to Run	
139	5.336E-11	0.09	IE SD RHR DU	Initiator - RHR in Power State Du	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Faile Within 1 Hour	ure of Recovery
			XKA10DFR_C -ALL	CCF of EDGs to Run	
			XKA50DFR_E -ALL	3 CCF of SBO DGs to Run	
140	5.336E-11	0.09	IE SD RHR CAD	Initiator - RHR in Power State CAd	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Faile Within 1 Hour	ure of Recovery
			XKA10DFR_C -ALL	CCF of EDGs to Run	
			XKA50DFR_E -ALL	3 CCF of SBO DGs to Run	
141	5.292E-11	0.09	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown S	tate CBd (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Che Isolation Valves)	ck Valves (SIS First
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation Fails to Close on Demand	MOV KBA14AA004,
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV to Close on Demand	/ KBA14AA106, Fails
142	5.292E-11	0.09	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown S	tate Du (Demand)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Che Isolation Valves)	ck Valves (SIS First
			KBA14AA004EFC	CVCS, Low Pressure Reducing Station Isolation Fails to Close on Demand	MOV KBA14AA004,
			KBA14AA106EFC	CVCS, CVCS Low Power Reducing Station MOV to Close on Demand	/ KBA14AA106, Fails
143	5.148E-11	0.09	IE SD RHR ISLOCA CBU	RHR ISLOCA During Shutdown State CBu	
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break	
			PAS	Proccess Automation System (PAS) Fails (Estima	ate)
			RHR TR1 PIPE BRK	Pipe Break in RHR Train 1	

MCS F	Results		EPRDCSD1			
No.	Freq.	%	Event	Description		
144	5.148E-11	0.09	IE SD RHR ISLOCA CAD	RHR ISLOCA During Shutdown State CAd 2		
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break		
			PAS	Proccess Automation System (PAS) Fails (Estimate)		
			RHR TR1 PIPE BRK	Pipe Break in RHR Train 1		
145	5.148E-11	0.09	IE SD RHR ISLOCA DU	RHR ISLOCA During Shutdown State Du		
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break		
			PAS	Proccess Automation System (PAS) Fails (Estimate)		
			RHR TR1 PIPE BRK	Pipe Break in RHR Train 1		
146	5.148E-11	0.09	IE SD RHR ISLOCA CAD	RHR ISLOCA During Shutdown State CAd 2		
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break		
			PAS	Proccess Automation System (PAS) Fails (Estimate)		
			RHR TR4 PIPE BRK	Pipe Break in RHR Train 4		
147	5.148E-11	0.09	IE SD RHR ISLOCA CAD	RHR ISLOCA During Shutdown State CAd 2		
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break		
			PAS	Proccess Automation System (PAS) Fails (Estimate)		
			RHR TR3 PIPE BRK	Pipe Break in RHR Train 3		
148	5.148E-11	0.09	IE SD RHR ISLOCA DU	RHR ISLOCA During Shutdown State Du		
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break		
			PAS	Proccess Automation System (PAS) Fails (Estimate)		
			RHR TR2 PIPE BRK	Pipe Break in RHR Train 2		
149	5.148E-11	0.09	IE SD RHR ISLOCA CAD	RHR ISLOCA During Shutdown State CAd 2		
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break		
			PAS	Proccess Automation System (PAS) Fails (Estimate)		
			RHR TR2 PIPE BRK	Pipe Break in RHR Train 2		
150	5.148E-11	0.09	IE SD RHR ISLOCA CBU	RHR ISLOCA During Shutdown State CBu		
			OPF-ISORHRBRK	Operator Fails to Isolate RHR Pipe Break		
			PAS	Proccess Automation System (PAS) Fails (Estimate)		
			RHR TR2 PIPE BRK	Pipe Break in RHR Train 2		

SHUTDOWN

151	5.066E-11	0.09	IE SD RHR CAU	Initiator - RHR in Power State CAu
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 2 or Division 4 to Divison 3 During Non-SBO Conditions
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_0 -234	O CCF of EDGs to Run
152	4.977E-11	0.09	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			SAC31AN001EFR_ D-123	CCF to Run Normal Air Exhaust Fans
153	4.977E-11	0.09	IE SD RHR CBD	Initiator - RHR in Power State CBd
			OPD-SAC2H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
			SAC01AN001EFR_ D-123	CCF to Run Normal Air Supply Fans
154	4.699E-11	0.08	IE SD RHR CBU	Initiator - RHR in Power State CBu
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_0 -123	O CCF of EDGs to Run
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
155	4.699E-11	0.08	IE SD RHR CAD	Initiator - RHR in Power State CAd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR_0 -123	CCF of EDGs to Run
			XKA40DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run
156	4.699E-11	0.08	IE SD RHR CAD	Initiator - RHR in Power State CAd
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to Run
			XKA10DFR_0 -234	CCF of EDGs to Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run

MCS F	Results		EI	PRUCSU1	SHUIDOWN
No.	Freq.	%	Event	Description	
157	4.699E-11	0.08	IE SD RHR CBU	Initiator - RHR in Power State CBu	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_[-134	O CCF of EDGs to Run	
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to	Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
158	4.699E-11	0.08	IE SD RHR CBU	Initiator - RHR in Power State CBu	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_[-124	OCCF of EDGs to Run	
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to	Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
159	4.699E-11	0.08	IE SD RHR CBU	Initiator - RHR in Power State CBu	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to	Run
			XKA10DFR_[-234	OCCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
160	4.699E-11	0.08	IE SD RHR CAD	Initiator - RHR in Power State CAd	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_[-134	CCF of EDGs to Run	
			XKA20DFR	ELEC, Emergency Diesel Generator XKA20, Fails to	Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
161	4.699E-11	0.08	IE SD RHR CAD	Initiator - RHR in Power State CAd	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_[-124	OCCF of EDGs to Run	
			XKA30DFR	ELEC, Emergency Diesel Generator XKA30, Fails to	Run
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
162	4.477E-11	0.08	IE SD ULD CBD D	Initiator - Uncontrolled Level Drop in Shutdown State	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Isolation Valves)	Valves (SIS First
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop	
			PAS	Proccess Automation System (PAS) Fails (Estimate)
163	4.477E-11	0.08	IE SD ULD DU D	Initiator - Uncontrolled Level Drop in Shutdown State	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Isolation Valves)	Valves (SIS First
			OPF-ULD	Operator Fails to Stop Draindown at Mid-Loop	
			PAS	Proccess Automation System (PAS) Fails (Estimate)

				SD LOOP2	4+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
				XKA40	_DFR	ELEC, Emergency Diesel Generator XKA40, Fails to Run
165	4.029E-11	0.07		IE SD RHR	CAD	Initiator - RHR in Power State CAd
				LAS11AP00	01EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Run
				SA-ESWS I SBO	UHS4	Failure of SA-ESWS/UHS4 in SBO Conditions
				SD LOOP2	4+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
				XKA10 -ALL	DFR_C	CCF of EDGs to Run
166	4.029E-11	0.07		IE SD RHR	CBU	Initiator - RHR in Power State CBu
				LAS11AP00	01EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails to Run
				SA-ESWS I SBO	UHS4	Failure of SA-ESWS/UHS4 in SBO Conditions
				SD LOOP2	4+REC	Loss Of Offsite Power During Shutdown and Failure of Recovery Within 1 Hour
				XKA10 -ALL	DFR_C	CCF of EDGs to Run
167	4.002E-11	0.07		IE SD RHR	CAU	Initiator - RHR in Power State CAu
				OPD-SAC2	H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
				OPF-SAC-1	1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
				SAC01AN0 D-ALL	01EFR_	CCF to Run Normal Air Supply Fans
168	4.002E-11	0.07		IE SD RHR	CAU	Initiator - RHR in Power State CAu
				OPD-SAC2	H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
				OPF-SAC-1	1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
				SAC31AN0 D-ALL	01EFR_	CCF to Run Normal Air Exhaust Fans
169	3.846E-11	0.07		IE SD RHR	CBD	Initiator - RHR in Power State CBd
				OPD-SAC2	:H/SAC1I	HDependency (MED) Between OAs for Starting HVAC Maintenance Trains Recovering Room Cooling Locally
				OPF-SAC-1	1H	Operator Fails to Start Maintenance HVAC Trains After Failure of Normal SAC Safety Train
				QKA10AP1 D-ALL	07EFR_	CCF of SCWS Pumps to Run
170	3.809E-11	0.07		IE SD RHR	DU	Initiator - RHR in Power State Du
			1.270E-07	KAA10AP0 D-ALL	01EFRS	CCF of the CCWS Pumps to Run
				OPF-LHSIF	RHR-DU	Operator Fails to Start LHSI Pump in DU, given a loss of RHR

MCS F	Results		EF	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
171	3.777E-11	0.07	IE SD RHR ISLOCA E	RHR ISLOCA During Shutdown State E	
			JNA10AA001EFC	RHR, LHSI Pump 10 Hot Leg Isolation MOV JNA10AA Close on Demand	001, Fails to
			JNA10AA002EFC	RHR, LHSI Pump 10 Hot Leg Isolation MOV JNA10AA Close on Demand	002, Fails to
			RHR TR1 PIPE BRK	Pipe Break in RHR Train 1	
172	3.777E-11	0.07	IE SD RHR ISLOCA E	RHR ISLOCA During Shutdown State E	
			JNA20AA001EFC	RHR, LHSI Pump 20 Hot Leg Isolation MOV JNA20AA Close on Demand	001, Fails to
			JNA20AA002EFC	RHR, LHSI Pump 20 Hot Leg Isolation MOV JNA20AA Close on Demand	002, Fails to
			RHR TR2 PIPE BRK	Pipe Break in RHR Train 2	
173	3.760E-11	0.07	IE SD LOCA CAU	Initiator - LOCA During Shutdown State CAu	
			JNG10AA001EOP	LHSI, LHSI Pump 10 Suction from IRWST MOV JNG10 to Remain Closed (SO)	0AA001, Fails
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valsolation Valves)	ves (SIS First
			OPF-ISOIRWSTFD- CA	Operator Fails to Isolate RHR Suction to IRWST (Valve JNGX0AA001) in CA)
174	3.760E-11	0.07	IE SD LOCA CAU	Initiator - LOCA During Shutdown State CAu	
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injection Check Va Isolation Valves)	ves (SIS First
			JNG20AA001EOP	LHSI, LHSI Pump 20 Suction from IRWST MOV JNG20 to Remain Closed (SO)	OAA001, Fails
			OPF-ISOIRWSTFD- CA	Operator Fails to Isolate RHR Suction to IRWST (Valve JNGX0AA001) in CA)
175	3.733E-11	0.06	IE SD RHR CBU	Initiator - RHR in Power State CBu	
			OPD-SAC2H/SAC1H	HDependency (MED) Between OAs for Starting HVAC Marrians Recovering Room Cooling Locally	laintenance
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Normal SAC Safety Train	Failure of
			SAC01AN001EFR_ D-123	CCF to Run Normal Air Supply Fans	
176	3.733E-11	0.06	IE SD RHR CBU	Initiator - RHR in Power State CBu	
			OPD-SAC2H/SAC1H	HDependency (MED) Between OAs for Starting HVAC Marrians Recovering Room Cooling Locally	laintenance
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Normal SAC Safety Train	Failure of
			SAC31AN001EFR_ D-123	CCF to Run Normal Air Exhaust Fans	

Operator Fails to Isolate RHR Pipe Break

Pipe Break in RHR Train 2

Proccess Automation System (PAS) Fails (Estimate)

ISLOCA CAU OPF-ISORHRBRK

RHR TR2 PIPE

PAS

BRK

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MCS F	Results		EI	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
191	3.133E-11	0.05	IE SD RHR CAU	Initiator - RHR in Power State CAu	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_[-123	D CCF of EDGs to Run	
			XKA40DFR XKA50DFR	ELEC, Emergency Diesel Generator XKA40, Fails to ELEC, SBO Diesel Generator XKA50, Fails to Run	o Run
192	3.133E-11	0.05	IE SD RHR CAU SD LOOP24+REC	Initiator - RHR in Power State CAu Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_[-134	O CCF of EDGs to Run	
			XKA20DFR XKA50DFR	ELEC, Emergency Diesel Generator XKA20, Fails to ELEC, SBO Diesel Generator XKA50, Fails to Run	o Run
193	3.133E-11	0.05	IE SD RHR CAU	Initiator - RHR in Power State CAu	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_[-124	O CCF of EDGs to Run	
			XKA30DFR XKA50DFR	ELEC, Emergency Diesel Generator XKA30, Fails to ELEC, SBO Diesel Generator XKA50, Fails to Run	o Run
194	3.133E-11	0.05	IE SD RHR CAU	Initiator - RHR in Power State CAu	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10, Fails to	o Run
			XKA10DFR_[-234	O CCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50, Fails to Run	
195	2.955E-11	0.05	IE SD LOCA CBD	Initiator - LOCA During Shutdown State CBd	
			JNG13AA005CFO_ D-ALL	Isolation Valves)	Valves (SIS First
			SLOCA24	Small LOCA - 24 Hour	
196	2.953E-11	0.05	IE SD RHR CBD	Initiator - RHR in Power State CBd	
			31BTB01_BATST	ELEC, 250V Non 1E 12-hr Battery 31BTB01, Fails of	on Demand
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_[-ALL	O CCF of EDGs to Run	
197	2.941E-11	0.05	IE SD RHR CBD	Initiator - RHR in Power State CBd	
			31BTD01_BATST	ELEC, 250V 1E 2-hr Battery 31BTD01, Fails on Der	
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure Within 1 Hour	of Recovery
			XKA10DFR_[-ALL	O CCF of EDGs to Run	

MCS R	esults		EF	PRDCSD1	SHUTDOWN
No.	Freq.	%	Event	Description	
198	2.922E-11	0.05	IE SD RHR CBD	Initiator - RHR in Power State CBd	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001, Fails	to Run
			SD LOOP24+REC	Loss Of Offsite Power During Shutdown and Failure of Within 1 Hour	Recovery
			XKA10DFR_D -ALL	CCF of EDGs to Run	
			XKA80DFR	ELEC, SBO Diesel Generator XKA80, Fails to Run	
199	2.885E-11	0.05	IE SD RHR CAD	Initiator - RHR in Power State CAd	
			OPD-SAC2H/SAC1F	HDependency (MED) Between OAs for Starting HVAC Natrains Recovering Room Cooling Locally	laintenance
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Normal SAC Safety Train	Failure of
			QKA10AP107EFR_ D-ALL	CCF of SCWS Pumps to Run	
200	2.885E-11	0.05	IE SD RHR DU	Initiator - RHR in Power State Du	
			OPD-SAC2H/SAC1H	HDependency (MED) Between OAs for Starting HVAC N Trains Recovering Room Cooling Locally	laintenance
			OPF-SAC-1H	Operator Fails to Start Maintenance HVAC Trains After Normal SAC Safety Train	Failure of

QKA10AP107EFR_ CCF of SCWS Pumps to Run

D-ALL

Minimal Cutsets

Top Event probability Q = 5.264E-07

No.	Prob.	%	Event	Description
1	3.200E-08	6.08	IE FLD-ANN ALL	Initiator - Flood in the RB Annulus (Contained)
			PROB ANNULUS	Probability that the Annulus connection boxes will withstand a contained Flood
2	2.626E-08	4.99	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Rooms With Spurious Opening of 1 MSRIV
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/FW Valve Room
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/FW Valve Room
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hours
3	2.520E-08	4.79	IE FIRE-MCR	Initiator - Fire in the Main Control Room
			OPE-MCR-RSS-90N	MOperator Fails to Transfer to the RSS in 90 Mins Given A MCR Fire
4	1.220E-08	2.32	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS_ B-ALL	CCF of the Air Cooled SCWS Chiller Units to Start
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
5	1.148E-08	2.18	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001, Fails to Start on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
6	1.148E-08	2.18	IE LOOP	Initiator - Loss Of Offsite Power
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001, Fails to Start on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
7	7.800E-09	1.48	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Safeguard Building
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Locally
			PAS	Process Automation System (PAS) Fails (Estimate)
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance

MCS F	Results		E	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
8	6.822E-09	1.30	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
Ū	0.0222 00			OCCF of MHSI Pumps to Run	,
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for	r SLOCA
9	6.659E-09	1.26	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
			LBA13AA001PFO_[-ALL	OCCF to Open Main Steam Relief Isolation \	•
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for S	SLOCA
10	6.178E-09	1.17	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
			JNG13AA005CFO_ D-ALL	CCF to Open LHSI/MHSI Common Injectio	•
11	6.133E-09	1.17	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	guard Building 1 (or 4)
			32BRARFR	ELEC, 480V AC to 24V DC Rectifier for MC Fails to Run	CC 32BRA Control Power,
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
12	6.133E-09	1.17	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	guard Building 1 (or 4)
12	0.1002 00	1.17	31BRARFR	ELEC, 480V AC to 24V DC Rectifier for MC Fails to Run	• • • • • • • • • • • • • • • • • • • •
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	•
13	5.594E-09	1.06	IE LOOP	Initiator - Loss Of Offsite Power	
			BTD01_BATST_[-ALL	OCCF of Safety Related Batteries on Demar	nd
14	5.000E-09	0.95	IE SLBI	Initiator - Steam Break Inside Containment	
			CL-PS-B-SWCCF	SW CCF of Protection System diversity gro	oup B
15	4.320E-09	0.82	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	guard Building 1 (or 4)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable d Maintenance	ue to Preventive
			LOOPFCSD+REC	Consequential LOOP and Failure of Recoving Leading to a Controlled Shutdn	ery Within 1 Hour for Fire
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 3 During Non-SBO Conditions	2 or Division 4 to Divison
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
16	3.936E-09	0.75	IE SGTR	Initiator - Steam Generator Tube Rupture	
			LBA40AA002PFC	MSS, Train 4 Main Steam Isolation Valve L Close on Demand	BA40AA002, Fails to
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hou	urs
17	3.932E-09	0.75	IE LOMFW	Initiator - Total Loss of Main Feedwater	
			STUCK ROD	Stuck Control Rods	

MCS	Results		E	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
18	3.388E-09	0.64	IE SGTR	Initiator - Steam Generator Tube Ruptur	re
			LBA43AA101EFC	MSS, Train 4 MSRCV LBA43AA101, Fa	ails to Close on Demand
			OPD-RHR4H/SGTR 1H	Dependency (MED) Between Operator and Initiating RHR	Actions for Stabilizing SGTR
			OPF-SGTR-1H	Operator Fails to Isolate SGTR and Initia	ate Cooldown
19	3.325E-09	0.63	IE LOC	Initiator - Loss of Main Condenser (Inclu	udes MSIV Closure etc.)
			STUCK ROD	Stuck Control Rods	
20	2.880E-09	0.55	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Sa	afeguard Building 1 (or 4)
			EDG PM2	EDG Train 2 Unavailable due to Preven	tive Maintenance
			LOOPFCSD+REC	Consequential LOOP and Failure of Re IEs Leading to a Controlled Shutdn	covery Within 1 Hour for Fire
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Divis 3 During Non-SBO Conditions	sion 2 or Division 4 to Divison
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Giv	en a Loss of Seal Cooling
21	2.808E-09	0.53	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any	Safeguard Building
			LOOPFCSD+REC	Consequential LOOP and Failure of Re IEs Leading to a Controlled Shutdn	covery Within 1 Hour for Fire
			OPF-SAC-2H	Operator Fails to Recover Room Coolin	g Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailab Maintenance	le due to Preventive
22	2.715E-09	0.52	IE GT	Initiator - General Transient (Includes T	urbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Re Leading to Auto Scram	
			OPF-SAC-2H	Operator Fails to Recover Room Coolin	g Locally
			QKA10GH001_FS_ B-ALL	CCF of the Air Cooled SCWS Chiller Ur	nits to Start
23	2.555E-09	0.49	IE GT	Initiator - General Transient (Includes T	urbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Re Leading to Auto Scram	covery Within 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Coolin	g Locally
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH0	01, Fails to Start on Demand
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailab Maintenance	le due to Preventive
24	2.555E-09	0.49	IE GT	Initiator - General Transient (Includes T	urbine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Re Leading to Auto Scram	covery Within 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Coolin	g Locally
			QKA40GH001_FS SAC01/QKA10 PM1	SCWS, Train 4 Chiller Unit QKA40GH0 Normal SAC01/QKA10 Train Unavailab Maintenance	
25	2.269E-09	0.43	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Dia	meter)
			MSRIVSCPFO_P-A LL	CCF to Open Main Steam Relief Isolation	on Pneumatic Pilot Valves
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed to	or SLOCA

MCS F	Results		E	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
26	2.262E-09	0.43	IE FLD-SAB14 FB	Initiator - Flood in Safeguard Building 1 Fuel Building	1 or 4 (Pump Room) Including
			OPF-SAC-2H	Operator Fails to Recover Room Cooli	ng Locally
			PAS	Proccess Automation System (PAS) Fa	ails (Estimate)
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailal Maintenance	ble due to Preventive
27	2.083E-09	0.40	IE LBOP	Initiator - Loss of Balance of Plant - Clo Aux Cooling Water	osed Loop Cooling Water or
			STUCK ROD	Stuck Control Rods	
20	1 0025 00	0.30		Initiator Fire in Curitahagar Basm of C	Cofoguerd Duilding 1 (or 1)
28	1.983E-09	0.38	IE FIRE-SAB14-AC LOOPFCSD+REC	Initiator - Fire in Switchgear Room of S	= ' '
			LOOPFC3D+REC	Consequential LOOP and Failure of ReIEs Leading to a Controlled Shutdn	ecovery within I Hour for Fire
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Divi 3 During Non-SBO Conditions	ision 2 or Division 4 to Divison
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Gi	ven a Loss of Seal Cooling
			XKA20DFR	ELEC, Emergency Diesel Generator X	KA20, Fails to Run
29	1.854E-09	0.35	IE LOOP	Initiator - Loss Of Offsite Power	
23	1.004€ 00	0.00	OPF-SAC-2H	Operator Fails to Recover Room Cooli	ng Locally
			QKA10GH001 FS	SCWS, Train 1 Chiller Unit QKA10GH0	•
			QKA40GH001 FS	SCWS, Train 4 Chiller Unit QKA40GH0	
			REC OSP 2HR	Failure to Recover Offsite Power Withi	
30	1.848E-09	0.35	IE LOOP	Initiator - Loss Of Offsite Power	
			REC OSP 2HR	Failure to Recover Offsite Power Withi	n 2 Hours
			XKA10DFR_C -ALL	CCF of EDGs to Run	
			XKA50DFR	ELEC, SBO Diesel Generator XKA50,	Fails to Run
			XKA80DFR	ELEC, SBO Diesel Generator XKA80,	Fails to Run
31	1.756E-09	0.33	IE LOOP	Initiator - Loss Of Offsite Power	
0.	1.1002 00	0.00	OPF-SAC-2H	Operator Fails to Recover Room Cooli	ng Locally
			QKA10GH001_FR_	CCF of the Air Cooled SCWS Chiller U	•
			B-ALL		0.11
			REC OSP 2HR	Failure to Recover Offsite Power Withi	n 2 Hours
32	1.652E-09	0.31	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooli	ng Locally
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH	001, Fails to Run
			REC OSP 2HR	Failure to Recover Offsite Power Withi	n 2 Hours
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailal Maintenance	ble due to Preventive
			. 171 1	mantonano	
33	1.652E-09	0.31	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooli	ng Locally
			QKA40GH001_FR	SCWS, Train 4 Chiller Unit QKA40GH	001, Fails to Run
			REC OSP 2HR	Failure to Recover Offsite Power Withi	n 2 Hours
			SAC01/QKA10	Normal SAC01/QKA10 Train Unavailal	ble due to Preventive
			PM1	Maintenance	

No. 34	Prob. 1.540E-09	% 0.29	Event IE LOOP 34BTD01_BATST OPF-SAC-2H REC OSP 2HR SAC01/QKA10 PM1	Description Initiator - Loss Of Offsite Power ELEC, 250V 1E 2-hr Battery 34BTD01, Fails on Demand Operator Fails to Recover Room Cooling Locally Failure to Recover Offsite Power Within 2 Hours Normal SAC01/QKA10 Train Unavailable due to Preventive Maintenance
35	1.540E-09	0.29	IE LOOP 31BTD01_BATST OPF-SAC-2H REC OSP 2HR SAC04/QKA40 PM4	Initiator - Loss Of Offsite Power ELEC, 250V 1E 2-hr Battery 31BTD01, Fails on Demand Operator Fails to Recover Room Cooling Locally Failure to Recover Offsite Power Within 2 Hours Normal SAC04/QKA40 Train Unavailable due to Preventive Maintenance
36	1.485E-09	0.28	CVCS VCT LBA13AA001PFO_I -ALL	Initiator - Fire in Switchgear Room of Safeguard Building 1 (or 4) CVCS Switchover to IRWST May Not Be Required CCF to Open Main Steam Relief Isolation Valves Probability of Seal LOCA Occurring Given a Loss of Seal Cooling
37	1.359E-09	0.26	IE LOOP REC OSP 2HR SBODG8 PM4 XKA10DFR_C -ALL XKA50DFR	Initiator - Loss Of Offsite Power Failure to Recover Offsite Power Within 2 Hours SBO-DG Train 4 Unavailable due to Preventive Maintenance CCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Run
38	1.359E-09	0.26	IE LOOP EFWS PM4 REC OSP 2HR XKA10DFR_C -ALL XKA50DFR	Initiator - Loss Of Offsite Power EFWS Train 4 Unavailable due to Preventive Maintenance Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run ELEC, SBO Diesel Generator XKA50, Fails to Run
39	1.359E-09	0.26	IE LOOP REC OSP 2HR SBODG5 PM1 XKA10DFR_C -ALL XKA80DFR	Initiator - Loss Of Offsite Power Failure to Recover Offsite Power Within 2 Hours SBO-DG Train 1 Unavailable due to Preventive Maintenance CCF of EDGs to Run ELEC, SBO Diesel Generator XKA80, Fails to Run
40	1.359E-09	0.26	IE LOOP EFWS PM1 REC OSP 2HR XKA10DFR_C -ALL XKA80DFR	Initiator - Loss Of Offsite Power EFWS Train 1 Unavailable due to Preventive Maintenance Failure to Recover Offsite Power Within 2 Hours CCF of EDGs to Run ELEC, SBO Diesel Generator XKA80, Fails to Run

MCS	Results		E	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
41	1.222E-09	0.23	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
			KAA12AA005EFO_I -ALL	DCCF to Open CCWS to LHSI HTX Cooling	MOV
			SAHR PM4	SAHR Train Unavailable due to Preventive	Maintenance
42	1.212E-09	0.23	IE IND SGTR	Initiator - Induced Steam Generator Tube F	Rupture
			OPE-RHR-4H	Operator Fails to Initiate RHR Within 4 Hou	urs
43	1.023E-09	0.19	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
			PED10AN002EFS_I -ALL	DCCF to Start Standby Cooling Tower Fans	
			SAHR PM4	SAHR Train Unavailable due to Preventive	Maintenance
44	9.820E-10	0.19	IE LOOP	Initiator - Loss Of Offsite Power	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 I	Hours
			XKA10DFR_0 -ALL	CCF of EDGs to Run	
			XKA50DFR_E -ALL	3 CCF of SBO DGs to Run	
45	9.600E-10	0.18	IF FIRE-SAR14-AC	Initiator - Fire in Switchgear Room of Safe	guard Building 1 (or 4)
	0.0000	0.10	31BDB OFL	ELEC, 6.9kV SWGR 31BDB, Fails During	=
			CVCS VCT	CVCS Switchover to IRWST May Not Be F	
			OPF-XTIE BC	Operator Fails to Align Backup Battery Cha	•
				Probability of Seal LOCA Occurring Given	=
46	9.600E-10	0.18	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	guard Building 1 (or 4)
			32BDBOFL	ELEC, 6.9kV SWGR 32BDB, Fails During	Operation
			CVCS VCT	CVCS Switchover to IRWST May Not Be F	Required
			OPF-XTIE BC	Operator Fails to Align Backup Battery Cha	arger to BUC Bus
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
47	9.600E-10	0.18	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	5 ,
			32BMT02TFL CVCS VCT	ELEC, 6.9kV-480V Transformer 32BMT02 CVCS Switchover to IRWST May Not Be F	· • •
			OPF-XTIE BC	Operator Fails to Align Backup Battery Cha	·
			PROB SEAL LOCA		-
48	9.600E-10	0.18	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	guard Building 1 (or 4)
			32BMBOFL	ELEC, 480V Load Center 32BMB, Fails Du	uring Operation
			CVCS VCT	CVCS Switchover to IRWST May Not Be F	Required
			OPF-XTIE BC	Operator Fails to Align Backup Battery Cha	arger to BUC Bus
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
49	9.600E-10	0.18		Initiator - Fire in Switchgear Room of Safe	= ' '
			31BDAOFL	ELEC, 6.9kV Switchgear 31BDA, Fails Dui	• ,
			OPF-XTLDSBO-NS C	Operator Fails to Connect and Load SBO I Non-SBO Conditions	DGs to Div 1 or 4 During
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling

OPF-SAC-2H

QKA10AP107EFS

REC OSP 2HR

SAC04/QKA40

PM4

Operator Fails to Recover Room Cooling Locally

Failure to Recover Offsite Power Within 2 Hours

Normal SAC04/QKA40 Train Unavailable due to Preventive

to Start on Demand

Maintenance

SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107, Fails

MCS	Results		E	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
58	9.116E-10	0.17	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling	Locally
			QKA40AP107EFS	SCWS, Train 4 Motor Driven Safety Chille to Start on Demand	er Pump QKA40AP107, Fails
			REC OSP 2HR	Failure to Recover Offsite Power Within 2	2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable Maintenance	due to Preventive
59	8.970E-10	0.17	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diam	neter)
			CL-PS-B-SWCCF	SW CCF of Protection System diversity g	roup B
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed fo	r SLOCA
60	8.970E-10	0.17	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Dian	neter)
			CL-PS-B-SWCCF	SW CCF of Protection System diversity g	roup B
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown f	for SLOCA
61	8.963E-10	0.17	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling	Locally
			QKA10GH001_FR_ B-ALL	CCF of the Air Cooled SCWS Chiller Unit	ts to Run
62	8.854E-10	0.17		Initiator - Fire in Switchgear Room of Safe	
			CVCS VCT	CVCS Switchover to IRWST May Not Be	·
			KAA12AA005EFO_I -ALL	DCCF to Open CCWS to LHSI HTX Coolin	ng MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	n a Loss of Seal Cooling
63	8.810E-10	0.17	IE LBOP	Initiator - Loss of Balance of Plant - Close Aux Cooling Water	ed Loop Cooling Water or
			OPF-SAC-2H	Operator Fails to Recover Room Cooling	Locally
			SAC31AN001EFR_ D-ALL	CCF to Run Normal Air Exhaust Fans	
64	8.810E-10	0.17	IE LBOP	Initiator - Loss of Balance of Plant - Close Aux Cooling Water	ed Loop Cooling Water or
			OPF-SAC-2H	Operator Fails to Recover Room Cooling	Locally
			SAC01AN001EFR_ D-ALL	CCF to Run Normal Air Supply Fans	
65	8.433E-10	0.16	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling	Locally
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH00	1, Fails to Run
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable Maintenance	due to Preventive
66	8.433E-10	0.16	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling	Locally
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH00	1, Fails to Run
			SAC03/QKA30 PM3	Normal SAC03/QKA30 Train Unavailable Maintenance	due to Preventive

SAC31AN001EFR

SAC, Normal Air Exhaust Fan SAC31AN001, Fails to Run

MCS F	Results		EF	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
75	8.256E-10	0.16	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 I	Hours
			SAC01AN001EFR	SAC, Normal Air Supply Fan SAC01AN00	1, Fails to Run
			SAC04/QKA40	Normal SAC04/QKA40 Train Unavailable of	due to Preventive
			PM4	Maintenance	
76	7.943E-10	0.15	IE LOOP	Initiator - Loss Of Offsite Power	
70	7.943L-10	0.13	OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
				SCWS, Train 4 Chiller Unit QKA40GH001,	•
			QNA400110011 ANS	(Type AV42) Fails (Non-Self-Monitored)	1 AC AT Hority Module
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 I	Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable of Maintenance	due to Preventive
77	7.943E-10	0.15	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			QKA10GH001PANS	SCWS, Train 1 Chiller Unit QKA10GH001, (Type AV42) Fails (Non-Self-Monitored)	PAC A Priority Module
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 I	Hours
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable of Maintenance	due to Preventive
70	7.0505.40	0.45	IE 01 00A	Jaikinton Oncelli I OOA (O CAn O In alt Diagram	4
78	7.856E-10	0.15	IE SLOCA CCWS/ESWS PM3	Initiator - Small LOCA (0.6 to 3-Inch Diame	·
			CCVVS/ESVVS PIVIS	CCWS/ESWS Train 3 Pump Unavailable d Maintenance	lue to Preventive
			LOOPCONL+REC	Consequential LOOP and Failure of Recov LOCA IEs	very Within 1 Hour for
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for	SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 3 During Non-SBO Conditions	2 or Division 4 to Divison
			XKA20DFR	ELEC, Emergency Diesel Generator XKA2	0, Fails to Run
79	7.856E-10	0.15	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable d Maintenance	lue to Preventive
			LOOPCONL+REC	Consequential LOOP and Failure of Recov LOCA IEs	very Within 1 Hour for
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for	SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 3 During Non-SBO Conditions	2 or Division 4 to Divison
			XKA30DFR	ELEC, Emergency Diesel Generator XKA3	0, Fails to Run
80	7.798E-10	0.15	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
				CCF of IRWST Sump Strainers - Plugged	

MCS F	Results		El	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
81	7.747E-10	0.15	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS1	1AP001, Fails to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling	Locally
			REC OSP 2HR	Failure to Recover Offsite Power Within 2	2 Hours
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable Maintenance	e due to Preventive
			XKA20DFR	ELEC, Emergency Diesel Generator XKA	A20, Fails to Run
82	7.747E-10	0.15	IE LOOP	Initiator - Loss Of Offsite Power	
			LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS4	1AP001, Fails to Run
			OPF-SAC-2H	Operator Fails to Recover Room Cooling	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2	2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable Maintenance	e due to Preventive
			XKA30DFR	ELEC, Emergency Diesel Generator XKA	A30, Fails to Run
83	7.564E-10	0.14	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diar	neter)
				CCF to Open Main Steam Relief Isolation	·
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for	or SLOCA
84	7.519E-10	0.14	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diar	neter)
			LOOPCONL+REC	Consequential LOOP and Failure of RecLOCA IEs	overy Within 1 Hour for
			XKA10DFR_D -ALL	CCF of EDGs to Run	
85	7.412E-10	0.14	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Saf	eguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be	Required
			PED10AN002EFS_[-ALL	DCCF to Start Standby Cooling Tower Far	ns
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Give	n a Loss of Seal Cooling
86	7.052E-10	0.13	IE FIRE-PZR	Initiator - Fire in the Pressurizer Compart of 1 PSRV	ment With Spurious Opening
			LBA13AA001PFO_C -ALL	OCCF to Open Main Steam Relief Isolation	n Valves
87	6.948E-10	0.13	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Saf	eguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be	Required
			LBA13AA001PFO_0 -124	OCCF to Open Main Steam Relief Isolation	n Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Give	n a Loss of Seal Cooling
88	6.774E-10	0.13	IE GT	Initiator - General Transient (Includes Tu	rbine Trip and Reactor Trip)
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS	(SLB & ATWS)
			STUCK ROD	Stuck Control Rods	

MCS Results			E	PRDC050	TOTAL At Power CDF	
No.	Prob.	%	Event	Description		
89	6.723E-10	0.13	IE SLBI	Initiator - Steam Break Inside Containmen	nt	
			SG4 PRES CCF-ALL	CCF of SG4 pressure sensors		
90	6.297E-10	0.12	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Opening of 1 MSRIV	e Rooms With Spurious	
			LBA10AA002PFC	MSS, Train 1 Main Steam Isolation Valve Close on Demand	LBA10AA002, Fails to	
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/	FW Valve Room	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/	FW Valve Room	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
91	6.297E-10	0.12	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Opening of 1 MSRIV	e Rooms With Spurious	
			LBA20AA002PFC	MSS, Train 2 Main Steam Isolation Valve Close on Demand	LBA20AA002, Fails to	
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/	FW Valve Room	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/	FW Valve Room	
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS (SLB & ATWS)	
92	6.074E-10	0.12	IE LOOP	Initiator - Loss Of Offsite Power		
			CL-TXS-OSCCF	SW CCF of TXS operating system or mul	tiple diversity groups	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2	Hours	
93	5.760E-10	0.11	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	eguard Building 1 (or 4)	
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable Maintenance		
			LOOP24+REC	Loss Of Offsite Power During Mission Tin Within 1 Hour	ne and Failure of Recovery	
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 3 During Non-SBO Conditions	on 2 or Division 4 to Divison	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Giver	n a Loss of Seal Cooling	
94	5.760E-10	0.11	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	eguard Building 1 (or 4)	
			EDG PM1	EDG Train 1 Unavailable due to Preventiv	ve Maintenance	
			LOOPFCSD+REC	Consequential LOOP and Failure of Reco	overy Within 1 Hour for Fire	
			OPF-XTLDSBO-NS C	Operator Fails to Connect and Load SBO Non-SBO Conditions	DGs to Div 1 or 4 During	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Giver	n a Loss of Seal Cooling	
95	5.755E-10	0.11	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valve Opening of 1 MSRIV	e Rooms With Spurious	
			KAA12AA005EFO_I -ALL	DCCF to Open CCWS to LHSI HTX Coolin	g MOV	
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS/	FW Valve Room	
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS/	FW Valve Room	

MCS Results		E	PRDC050	TOTAL At Power CDF	
No.	Prob.	%	Event	Description	
96	5.736E-10	0.11	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building)
			LOOPCON+REC	Consequential LOOP and Failure of Re- Leading to Auto Scram	covery Within 1 Hour for IEs
			XKA10DFR_C -ALL	CCF of EDGs to Run	
97	5.723E-10	0.11	IE FLD-TB	Initiator - Flood in the Turbine Building	
			OPF-SAC-2H	Operator Fails to Recover Room Coolin	g Locally
			SAC01AN001EFR_ D-ALL	CCF to Run Normal Air Supply Fans	
98	5.723E-10	0.11	IE FLD-TB	Initiator - Flood in the Turbine Building	
			OPF-SAC-2H	Operator Fails to Recover Room Coolin	g Locally
			SAC31AN001EFR_ D-ALL	CCF to Run Normal Air Exhaust Fans	
99	5.622E-10	0.11	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Coolin	g Locally
			QKA10AP107EFR	SCWS, Train 1 Motor Driven Safety Chi to Run	iller Pump QKA10AP107, Fails
			REC OSP 2HR	Failure to Recover Offsite Power Within	2 Hours
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailab Maintenance	le due to Preventive
100	5.622E-10	0.11	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room Coolin	g Locally
			QKA40AP107EFR	SCWS, Train 4 Motor Driven Safety Chi to Run	iller Pump QKA40AP107, Fails
			REC OSP 2HR	Failure to Recover Offsite Power Within	2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailab Maintenance	le due to Preventive
101	5.460E-10	0.10	IE FLD-EFW	Initiator - EFW Pipe Break	
			OPF-SAC-2H	Operator Fails to Recover Room Coolin	g Locally
			PAS	Proccess Automation System (PAS) Fa	ils (Estimate)
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailab Maintenance	le due to Preventive
102	5.358E-10	0.10	IE SLBO	Initiator - Steam Break Downstream of I	MSIV
			LBA10AA002PFC_C -ALL	OCCF to Close Main Steam Isolation Val	ves
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS	S (SLB & ATWS)
103	5.237E-10	0.10	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Dia	ameter)
			EDG PM2	EDG Train 2 Unavailable due to Preven	tive Maintenance
			LOOPCONL+REC	Consequential LOOP and Failure of ReLOCA IEs	covery Within 1 Hour for
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed f	for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Divis 3 During Non-SBO Conditions	sion 2 or Division 4 to Divison
			XKA30DFR	ELEC, Emergency Diesel Generator XK	KA30, Fails to Run

MCS Results			EF	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
104	5.237E-10	0.10	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inc	ch Diameter)
			EDG PM3	EDG Train 3 Unavailable due to P	Preventive Maintenance
			LOOPCONL+REC	Consequential LOOP and Failure LOCA IEs	of Recovery Within 1 Hour for
			OPE-FB-40M	Operator Fails to Initiate Feed & B	Bleed for SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to 3 During Non-SBO Conditions	Division 2 or Division 4 to Divison
			XKA20DFR	ELEC, Emergency Diesel General	tor XKA20, Fails to Run
105	5.059E-10	0.10	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room	n of Safeguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May	Not Be Required
			MSRIVSCPFO_P-A LL	CCF to Open Main Steam Relief Is	solation Pneumatic Pilot Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring	ng Given a Loss of Seal Cooling
106	5.016E-10	0.10	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room (Cooling Locally
			REC OSP 2HR	Failure to Recover Offsite Power \	Within 2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unav Maintenance	vailable due to Preventive
			SAC34AN001EFS	SAC, Normal Air Exhaust Fan SAC Demand	C34AN001, Fails to Start on
107	5.016E-10	0.10	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room 0	Cooling Locally
			REC OSP 2HR	Failure to Recover Offsite Power \	Within 2 Hours
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unav Maintenance	vailable due to Preventive
			SAC31AN001EFS	SAC, Normal Air Exhaust Fan SAC Demand	C31AN001, Fails to Start on
108	5.016E-10	0.10	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room 0	Cooling Locally
			REC OSP 2HR	Failure to Recover Offsite Power \	Within 2 Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unav Maintenance	vailable due to Preventive
			SAC04AN001EFS	SAC, Normal Air Supply Fan SAC	04AN001, Fails to Start on Demand
109	5.016E-10	0.10	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-SAC-2H	Operator Fails to Recover Room 0	Cooling Locally
			REC OSP 2HR	Failure to Recover Offsite Power \	Within 2 Hours
			SAC01AN001EFS	SAC, Normal Air Supply Fan SAC	01AN001, Fails to Start on Demand
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unav Maintenance	vailable due to Preventive
110	4.979E-10	0.09	IE SLBO	Initiator - Steam Break Downstrea	m of MSIV
				CCF to Close Main Steam Isolatio	on Valves
			OPF-EBS-30M	Operator Fails to Manually Actuate	e EBS (SLB & ATWS)

MCS Results		EI	PRDC050	TOTAL At Power CDF	
No.	Prob.	%	Event	Description	
111	4.979E-10	0.09	IE SLBO	Initiator - Steam Break Downstream of M	SIV
			LBA10AA002PFC_0 -123	CCF to Close Main Steam Isolation Valve	es
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS	(SLB & ATWS)
112	4.979E-10	0.09	IE SLBO	Initiator - Steam Break Downstream of M	SIV
			LBA10AA002PFC_0 -234	CCF to Close Main Steam Isolation Valve	es
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS	(SLB & ATWS)
113	4.979E-10	0.09	IE SLBO	Initiator - Steam Break Downstream of M	SIV
			LBA10AA002PFC_E -124	CCF to Close Main Steam Isolation Valve	es
			OPF-EBS-30M	Operator Fails to Manually Actuate EBS	(SLB & ATWS)
114	4.818E-10	0.09	IE FIRE-MS-VR	Initiator - Fire in One of Two MF/MS Valv Opening of 1 MSRIV	e Rooms With Spurious
			MSIV TR3 ISO-FIRE	MSIV 3 Fails to Isolate Due to Fire in MS	/FW Valve Room
			MSIV TR4 ISO-FIRE	MSIV 4 Fails to Isolate Due to Fire in MS	/FW Valve Room
			PED10AN002EFS_I -ALL	DCCF to Start Standby Cooling Tower Far	ns
115	4.800E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Saf	eguard Building 1 (or 4)
			32BDA OFL	ELEC, 6.9kV SWGR 32BDA, Fails During	g Operation
			CVCS VCT	CVCS Switchover to IRWST May Not Be	= •
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 3 During Non-SBO Conditions	on 2 or Division 4 to Divison
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Give	n a Loss of Seal Cooling
116	4.780E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Saf	eguard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be	Required
			JNG13AA005CFO_ D-123	CCF to Open LHSI/MHSI Common Inject	tion Check Valves
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Give	n a Loss of Seal Cooling
117	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Saf	eguard Building 1 (or 4)
			CLE24EQ001LB02N S	I Digital output module fails (non-self-moni	itored)
			CLE24EQ002LB02N S	N Digital output module fails (non-self-moni	itored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be	Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Give	n a Loss of Seal Cooling
118	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Saf	eguard Building 1 (or 4)
			CLF24EQ001LB01N S	I Digital output module fails (non-self-moni	itored)
			CLF24EQ002LB02N S	I Digital output module fails (non-self-moni	itored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be	Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Give	n a Loss of Seal Cooling

MCS Results		EF	PRDC050	TOTAL At Power CDF	
No.	Prob.	%	Event	Description	
119	4.697E-10	0.09		Initiator - Fire in Switchgear Room of Safeg Digital output module fails (non-self-monitor	= ' '
			CLE24EQ002LB01N	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Re	equired
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
120	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLF24EQ001LB02N S	Digital output module fails (non-self-monitor	red)
			CLF24EQ002LB03N S	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Re	equired
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
121	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLE24EQ001LB03N S	Digital output module fails (non-self-moniton	red)
			CLE24EQ002LB03N S	Digital output module fails (non-self-moniton	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Re	•
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
122	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLE24EQ001LB01N S	Digital output module fails (non-self-moniton	red)
			CLE24EQ002LB03N S	Digital output module fails (non-self-moniton	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be Re	equired
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
123	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLF24EQ001LB03N S	Digital output module fails (non-self-monitor	red)
			CLF24EQ002LB01N S	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
124	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLF24EQ001LB03N S	Digital output module fails (non-self-monitor	red)
			CLF24EQ002LB03N S	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	•
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling

MCS F	lesults		EF	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
125	4.697E-10	0.09		Initiator - Fire in Switchgear Room of Safeg Digital output module fails (non-self-monitor	= ' '
			_	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	equired
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
126	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLF24EQ001LB01N S	Digital output module fails (non-self-monitor	red)
			CLF24EQ002LB01N S	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	equired
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
127	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLE24EQ001LB03N S	Digital output module fails (non-self-monitor	red)
			CLE24EQ002LB02N S	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	equired
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
128	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLF24EQ001LB03N S	Digital output module fails (non-self-monitor	red)
			CLF24EQ002LB02N S	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	equired
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
129	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLF24EQ001LB02N S	Digital output module fails (non-self-monitor	red)
			CLF24EQ002LB02N S	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	equired
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
130	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			CLF24EQ001LB01N S	Digital output module fails (non-self-monitor	red)
			CLF24EQ002LB03N S	Digital output module fails (non-self-monitor	red)
			CVCS VCT	CVCS Switchover to IRWST May Not Be R	equired
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling

MCS F	Results		EF	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
131	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	guard Building 1 (or 4)
			CLE24EQ001LB01N S	Digital output module fails (non-self-monito	ored)
			CLE24EQ002LB01N S	Digital output module fails (non-self-monito	ored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be F	Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
132	4.697E-10	0.09		Initiator - Fire in Switchgear Room of Safe	= ' '
				Digital output module fails (non-self-monito	ored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be F	Required
				Probability of Seal LOCA Occurring Given	
133	4.697E-10	0.09	IE EIDE-SAR14-AC	Initiator - Fire in Switchgear Room of Safe	guard Building 1 (or 4)
100	4.007 L-10	0.03		Digital output module fails (non-self-monitor	= ' '
			CLF24EQ002LB01N S	Digital output module fails (non-self-monito	ored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be F	Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
134	4.697E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	guard Building 1 (or 4)
			CLE24EQ001LB02N S	Digital output module fails (non-self-monito	ored)
			CLE24EQ002LB03N S	Digital output module fails (non-self-monito	ored)
			CVCS VCT	CVCS Switchover to IRWST May Not Be F	Required
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
135	4.609E-10	0.09	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	guard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be F	Required
			PED10AN002EFS_0 -123	OCCF to Start Standby Cooling Tower Fans	
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
136	4.535E-10	0.09	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Sa	afeguard Building
			LOOPFCSD+REC	Consequential LOOP and Failure of Recoving Leading to a Controlled Shutdn	ery Within 1 Hour for Fire
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001,	Fails to Start on Demand
137	4.321E-10	0.08	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
			CCWS/ESWS PM3	CCWS/ESWS Train 3 Pump Unavailable of Maintenance	lue to Preventive
			JND10AP001EFR_D -124	CCF of MHSI Pumps to Run	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown fo	r SLOCA

MCS F	Results		E	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
138	4.321E-10	0.08	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
			CCWS/ESWS PM2	CCWS/ESWS Train 2 Pump Unavailable d Maintenance	lue to Preventive
			JND10AP001EFR_0 -134	OCCF of MHSI Pumps to Run	
			OPE-FCD-40M	Operator Fails to Initiate Fast Cooldown for	r SLOCA
139	4.234E-10	0.08	IE LBOP	Initiator - Loss of Balance of Plant - Closed Aux Cooling Water	Loop Cooling Water or
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			QKA10AP107EFR_ D-ALL	CCF of SCWS Pumps to Run	
140	4.215E-10	0.08	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM4	EFWS Train 4 Unavailable due to Preventi	ve Maintenance
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001,	
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 I	
			XKA30DFR	ELEC, Emergency Diesel Generator XKA3	0, Fails to Run
141	4.215E-10	0.08	IE LOOP	Initiator - Loss Of Offsite Power	
			EFWS PM1	EFWS Train 1 Unavailable due to Preventi	ve Maintenance
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001,	Fails to Start on Demand
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 I	Hours
			XKA20DFR	ELEC, Emergency Diesel Generator XKA2	0, Fails to Run
142	4.214E-10	0.08	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	•
			SAC02/QKA20 PM2	Normal SAC02/QKA20 Train Unavailable of Maintenance	due to Preventive
			SAC34AN001EFR	SAC, Normal Air Exhaust Fan SAC34AN00	01, Fails to Run
143	4.214E-10	0.08	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			SAC03/QKA30 PM3	Normal SAC03/QKA30 Train Unavailable of Maintenance	due to Preventive
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN00	01, Fails to Run
144	4.214E-10	0.08	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable of Maintenance	due to Preventive
			SAC04AN001EFR	SAC, Normal Air Supply Fan SAC04AN00	1, Fails to Run
145	4.214E-10	0.08	IE FIRE-SWGR	Initiator - Fire in the Switchgear Building	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable of Maintenance	due to Preventive
			SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN00	01, Fails to Run

Maintenance

PM3

MCS F	Results		EF	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
163	3.966E-10	0.08	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			LOOPFCSD+REC	Consequential LOOP and Failure of Recover IEs Leading to a Controlled Shutdn	ery Within 1 Hour for Fire
			OPF-XTLDSBO-NS C	Operator Fails to Connect and Load SBO D Non-SBO Conditions	Gs to Div 1 or 4 During
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
			XKA10DFR	ELEC, Emergency Diesel Generator XKA10), Fails to Run
164	3.959E-10	0.08	IE GT	Initiator - General Transient (Includes Turbi	ne Trip and Reactor Trip)
			BTD01_BATST_C -ALL	CCF of Safety Related Batteries on Deman	d
			LOOPCON+REC	Consequential LOOP and Failure of Recove Leading to Auto Scram	ery Within 1 Hour for IEs
165	3.908E-10	0.07	IE GT	Initiator - General Transient (Includes Turbi	ne Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recover Leading to Auto Scram	ery Within 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Lo	ocally
			QKA10GH001_FR_ B-ALL	CCF of the Air Cooled SCWS Chiller Units t	to Run
166	3.840E-10	0.07	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safeg	uard Building 1 (or 4)
			EDG PM2	EDG Train 2 Unavailable due to Preventive	Maintenance
			LOOP24+REC	Loss Of Offsite Power During Mission Time Within 1 Hour	and Failure of Recovery
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 3 During Non-SBO Conditions	2 or Division 4 to Divison
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given a	a Loss of Seal Cooling
167	3.746E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			OPF-XTLDSBO-2H	Operator Fails to Connect and Load SBO D	Gs to Div 1 and 4
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 H	lours
			XKA10DFR_D -ALL	CCF of EDGs to Run	
168	3.744E-10	0.07	IE FIRE-SAB-MECH	Initiator - Fire in the Pump Room of Any Sat	feguard Building
			LOOP24+REC	Loss Of Offsite Power During Mission Time Within 1 Hour	and Failure of Recovery
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Lo	ocally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable de Maintenance	ue to Preventive
169	3.677E-10	0.07	IE GT	Initiator - General Transient (Includes Turbi	ne Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recover Leading to Auto Scram	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling Lo	ocally
			QKA40GH001_FR	SCWS, Train 4 Chiller Unit QKA40GH001,	Fails to Run
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable de Maintenance	ue to Preventive

MCS R	esults		EF	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
170	3.677E-10	0.07	IE GT	Initiator - General Transient (Includes Turb	ine Trip and Reactor Trip)
			LOOPCON+REC	Consequential LOOP and Failure of Recov Leading to Auto Scram	ery Within 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001,	Fails to Run
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable d Maintenance	lue to Preventive
171	3.632E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			31BNB01RFR	ELEC, 480V AC to 24V DC Rectifier for MC Power, Fails to Run	CC 31BNB01 Control
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 H	Hours
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable d Maintenance	lue to Preventive
172	3.632E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
	0.0022	0.0.	34BNB01RFR	ELEC, 480V AC to 24V DC Rectifier for MC Power, Fails to Run	CC 34BNB01 Control
			OPF-SAC-2H	Operator Fails to Recover Room Cooling L	ocally
			REC OSP 2HR	Failure to Recover Offsite Power Within 2 H	Hours
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable d Maintenance	lue to Preventive
173	3.620E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB10AA010EFC	RCP, RCP1 Leakoff Isolation MOV JEB10A	AA010, Fails to Close on
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for Conditions	r RCP During SBO
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 H	Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run	
174	3.620E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB30AA010EFC	RCP, RCP3 Leakoff Isolation MOV JEB30A	AA010, Fails to Close on
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for Conditions	r RCP During SBO
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 H	Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run	
175	3.620E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB10AA020EFC	RCP Seal, RCP1 Seal Nitrogen Venting Iso Fails to Close on Demand	olation MOV JEB10AA020,
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for Conditions	r RCP During SBO
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1 H	Hour
			XKA10DFR_D	CCF of EDGs to Run	

-ALL

MCS F	Results		Ef	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
176	3.620E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB20AA020EFC	RCP Seal, RCP2 Seal Nitrogen Venting Is Fails to Close on Demand	solation MOV JEB20AA020,
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for Conditions	or RCP During SBO
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1	Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run	
177	3.620E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB40AA010EFC	RCP, RCP4 Leakoff Isolation MOV JEB40 Demand	AA010, Fails to Close on
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for Conditions	or RCP During SBO
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1	Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run	
178	3.620E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB40AA020EFC	RCP Seal, RCP4 Seal Nitrogen Venting Is Fails to Close on Demand	solation MOV JEB40AA020,
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for Conditions	or RCP During SBO
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1	Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run	
179	3.620E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB30AA020EFC	RCP Seal, RCP3 Seal Nitrogen Venting Is Fails to Close on Demand	solation MOV JEB30AA020,
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for Conditions	or RCP During SBO
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1	Hour
			XKA10DFR_D -ALL	CCF of EDGs to Run	
180	3.620E-10	0.07	IE LOOP	Initiator - Loss Of Offsite Power	
			JEB20AA010EFC	RCP, RCP2 Leakoff Isolation MOV JEB20 Demand	AA010, Fails to Close on
			OPE-FCD-40MSBO	Operator Fails to Initiate Fast Cooldown for Conditions	or RCP During SBO
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
			REC OSP 1HR	Failure to Recover Offsite Power Within 1	Hour

XKA10____DFR_D CCF of EDGs to Run

-ALL

MCSI	Results		El	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
181	3.607E-10	0.07	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	guard Building 1 (or 4)
			CVCS VCT	CVCS Switchover to IRWST May Not Be I	Required
			KAA12AA005EFO_[-123	DCCF to Open CCWS to LHSI HTX Cooling	g MOV
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
182	3.606E-10	0.07	IE SLOCA	Initiator - Small LOCA (0.6 to 3-Inch Diame	eter)
			LOOPCONL+REC	Consequential LOOP and Failure of Reco LOCA IEs	very Within 1 Hour for
			OPE-FB-40M	Operator Fails to Initiate Feed & Bleed for	SLOCA
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 3 During Non-SBO Conditions	n 2 or Division 4 to Divison
			XKA20DFR	ELEC, Emergency Diesel Generator XKA	20, Fails to Run
			XKA30DFR	ELEC, Emergency Diesel Generator XKA	30, Fails to Run
183	3.518E-10	0.07	IE FIRE-SAB14-AC	Initiator - Fire in Switchgear Room of Safe	guard Building 1 (or 4)
			LOOPFCSD+REC	Consequential LOOP and Failure of Reco IEs Leading to a Controlled Shutdn	very Within 1 Hour for Fire
			OPF-XTDIV-NSC	Operator Fails to Xtie Division 1 to Division 3 During Non-SBO Conditions	n 2 or Division 4 to Divison
			PEB20AP001EFS	ESWS, Train 2 Motor Driven Pump PEB20 Demand	0AP001, Fails to Start on
			PROB SEAL LOCA	Probability of Seal LOCA Occurring Given	a Loss of Seal Cooling
184	3.467E-10	0.07	IE LOMFW	Initiator - Total Loss of Main Feedwater	
			LOOPCON+REC	Consequential LOOP and Failure of Recordenating to Auto Scram	very Within 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling I	Locally
			QKA10GH001_FS_ B-ALL	CCF of the Air Cooled SCWS Chiller Units	s to Start
185	3.428E-10	0.07	IE GT	Initiator - General Transient (Includes Turk	oine Trip and Reactor Trip)
			31BTD01_BATST	ELEC, 250V 1E 2-hr Battery 31BTD01, Fa	
			LOOPCON+REC	Consequential LOOP and Failure of Reco Leading to Auto Scram	
			OPF-SAC-2H	Operator Fails to Recover Room Cooling I	Locally
			SAC04/QKA40 PM4	Normal SAC04/QKA40 Train Unavailable Maintenance	due to Preventive
186	3.428E-10	0.07	IE GT	Initiator - General Transient (Includes Turk	oine Trip and Reactor Trip)
			34BTD01_BATST	ELEC, 250V 1E 2-hr Battery 34BTD01, Fa	ails on Demand
			LOOPCON+REC	Consequential LOOP and Failure of Reco Leading to Auto Scram	very Within 1 Hour for IEs
			OPF-SAC-2H	Operator Fails to Recover Room Cooling I	Locally
			SAC01/QKA10 PM1	Normal SAC01/QKA10 Train Unavailable Maintenance	due to Preventive
187	3.342E-10	0.06	IE SLBI	Initiator - Steam Break Inside Containmen	t
.01	0.0122 10	3.55	APU4 CCF NS-ALL		

MCS F	Results		El	PRDC050	TOTAL At Power CDF
No.	Prob.	%	Event	Description	
188	3.342E-10	0.06	IE SLBI	Initiator - Steam Break Inside Co	ontainment
			ALU-B CCF NS-ALL	CCF of ALU-B Protection System (Non-Self-Monitored)	m Computer Processors
189	3.341E-10	0.06	IE LOOP LAS11AP001EFR LAS21AP001EFR OPF-SAC-2H REC OSP 2HR SAC04/QKA40 PM4	Initiator - Loss Of Offsite Power EFWS, Train 1 Motor Driven Pur EFWS, Train 2 Motor Driven Pur Operator Fails to Recover Room Failure to Recover Offsite Power Normal SAC04/QKA40 Train Uni Maintenance	mp LAS21AP001, Fails to Run n Cooling Locally r Within 2 Hours
190	3.341E-10	0.06	IE LOOP LAS31AP001EFR LAS41AP001EFR OPF-SAC-2H REC OSP 2HR SAC01/QKA10 PM1	Initiator - Loss Of Offsite Power EFWS, Train 3 Motor Driven Pur EFWS, Train 4 Motor Driven Pur Operator Fails to Recover Room Failure to Recover Offsite Power Normal SAC01/QKA10 Train Uni Maintenance	mp LAS41AP001, Fails to Run n Cooling Locally r Within 2 Hours
191	3.326E-10	0.06	IE LOMFW CF LOMFW/SSS OPF-SAC-2H SAC31AN001EFR_ D-ALL	Initiator - Total Loss of Main Fee Common Factor LOMFW/SSS Operator Fails to Recover Room CCF to Run Normal Air Exhaust	n Cooling Locally
192	3.326E-10	0.06	IE LOMFW CF LOMFW/SSS OPF-SAC-2H SAC01AN001EFR_ D-ALL	Initiator - Total Loss of Main Fee Common Factor LOMFW/SSS Operator Fails to Recover Room CCF to Run Normal Air Supply F	n Cooling Locally
193	3.262E-10	0.06	IE LOMFW LOOPCON+REC OPF-SAC-2H QKA10GH001_FS SAC04/QKA40 PM4	Leading to Auto Scram Operator Fails to Recover Room	e of Recovery Within 1 Hour for IEs Cooling Locally 10GH001, Fails to Start on Demand
194	3.262E-10	0.06	IE LOMFW LOOPCON+REC OPF-SAC-2H QKA40GH001_FS SAC01/QKA10 PM1	Leading to Auto Scram Operator Fails to Recover Room	e of Recovery Within 1 Hour for IEs Cooling Locally 40GH001, Fails to Start on Demand

DFR

Leading to Auto Scram

DFR D CCF of EDGs to Run

LOOPCON+REC

SBODG8 PM4

XKA10

XKA50

-ALL

Consequential LOOP and Failure of Recovery Within 1 Hour for IEs

SBO-DG Train 4 Unavailable due to Preventive Maintenance

ELEC, SBO Diesel Generator XKA50, Fails to Run

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 Group 23 represents cutsets resulting from an SLBO, followed by a CCF to close MSIVs resulting in all four SGs uncontrolled blowdown, and with operator failure to initiate EBS and control reactivity.



• The important CDF sequences for internal events are presented in Table 19.1-127—U.S. EPR Important Sequences — Level 1 Internal Events. The "important" CDF sequences are defined as those sequences with a sequence frequency greater than one percent of total at-power CDF, as presented in Section 19.1.8.1. For each sequence, Table 19.1-127 gives corresponding event tree, sequence number, event tree sequence identifier, the sequence frequency, and a brief description. It also connects the sequence to the corresponding cutset group in Table 19.1-7, which gives a more detailed description of the sequences.

19.1.4.1.2.4 Significant SSC, Operator Actions and Common Cause Events

Table 19.1-8—U.S. EPR Risk-Significant Equipment based on FV Importance - Level 1 Internal Events through Table 19.1-11—U.S. EPR Risk-Significant Human Actions based on RAW Importance - Level 1 Internal Events shows the important contributors to the internal CDF. Importance is based on the Fussell-Vesely (FV) importance measure (FV \geq 0.005), or the risk achievement worth (RAW) importance measure (RAW \geq 2).

- Table 19.1-8 shows the risk-significant structures, systems and components (SSC) based on the FV importance measure. The components with the highest FV are the EDG trains and air chiller unit trains. The most important SSC can be explained by a high LOOP contribution to the total CDF and by an importance of the HVAC system in the SB 1 and SB 4 (the location of the running CCW pumps).
- Table 19.1-9—U.S. EPR Risk-Significant Equipment based on RAW Importance Level 1 Internal Events shows the risk-significant SSC based on the RAW importance measure. The two most important events are the EFW storage tanks and 250V DC buses. Their high RAW rank can be explained by their high reliability and by a high consequence of their failures. A failure (a leak) of an EFW tank, if not isolated, would disable all EFW; failure of the Division 4 DC Bus would disable all Division 4 after a LOOP, and would also disable fault isolations in this division (all breaks are assumed to occur in Division 4)
- Table 19.1-10—U.S. EPR Risk-Significant Human Actions based on FV
 Importance Level 1 Internal Events shows the risk-significant human actions
 based on FV importance. The most important operator action based on the FV is
 the operator failure to recover room cooling locally given the loss of ventilation.
 This importance illustrates the importance of the HVAC system. This action, that
 follows any failure of ventilation to the SBs, shows in cutsets that contribute 43
 percent to the total CDF.
- Table 19.1-11—U.S. EPR Risk-Significant Human Actions based on RAW Importance Level 1 Internal Events shows the risk-significant human actions based on RAW importance. The most important human action based on RAW is, again, the operator failure to recover room cooling locally given the loss of



specific failure pattern 1 above, a loss of Divisions 1 and 4, associated with the running CCW trains, could, if not recovered in time, lead to a loss of two additional safety divisions. All EFW and the possibility to perform feed-and-bleed will be lost, leading to core damage.

Group 5 represents a sequence with a loss of all feedwater and an operator failure to initiate feed and bleed. A flood in the TB disables the MFW and the SSS, followed by an independent CCF of the EFW pumps to start.

Groups 6, 8, 9 and 10 represent the RCP seal LOCA sequences following a flood in the SB 1 or SB 4 including the FB. As explained in flood-specific failure pattern 1 above, a flood in SB 1 or SB 4 results directly in a loss of CCW CH2 and consequently in a loss of seal cooling to two RCPs (the seal injection is disabled because of the flood propagation to the FB, which hosts the CVCS). A failure to isolate seals for one of those two RCPs leads to a seal LOCA with an assumed probability of 0.2. The mechanism by which mitigation of the seal LOCA is failed differs slightly between these groups. It involves either a failure of long-term cooling of the IRWST by the LHSI heat exchanger (the SAHRS is unavailable due to the flood), or failure of MHSI to inject. In Table 19.1-41, which accounts for the top 100 cutsets, seal LOCA sequences contribute to 6.4 percent of the flooding CDF. Overall, a consequential seal LOCA accounts for about 30 percent of the flooding CDF.

Groups 7 and 12 represent sequences when floods caused by pipe breaks in the EFWS result in a complete loss of feedwater. Since the four EFW tanks are connected and are required for a successful core cooling during a 24-hour mission time, a break in any of the trains has the potential to drain the full inventory unless the operator isolates the break and initiates makeup with the demineralized water system (DWS). The DWS is a non-safety system that relies on offsite power. Therefore, a consequential LOOP following the flooding event will fail the makeup. Since it also fails the MFWS and the SSS, all feedwater is lost. Failure of feed-and-bleed, either due to an operator failure to initiate the action (Group 7) or due to a failure of required systems (Group 12, a CCF of all EDGs to run), results in core damage.

Group 11 represents a single cutset that combines a flood in SB 4, with independent failures of HVAC to Division 2, MHSI pump Division 1, and PAS (disables MFW and SSS). This leads to a failure of three divisions (2, 3 and 4), a failure of MSRTs because of electrical dependencies (see Section 19.1.4.1.1.3), and only one EFW train being available when two are needed to remove decay heat through MSSVs. Feed and bleed fails because the only available MHSI pump fails independently.

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The important CDF sequences for internal floods are presented in Table 19.1-128— U.S. EPR Important Sequences – Level 1 Flooding Events. The "important" CDF sequences are defined as those sequences with a sequence frequency greater than one percent of total at-power CDF, as presented in Section 19.1.8.1. For each sequence,



Table 19.1-127—U.S. EPR Important Sequences – Level 1 Internal Events
Sheet 1 of 3

Corresponding Cutsets	Group Number	1,2	18, 19	9,10	∞I	4	5,6	<u>15</u>
Correspond	<u>Table</u> Number	<u>19.1-7</u>	19.1-7	19.1-7	19.1-7	<u>19.1-7</u>	19.1-7	19.1-7
	Description	A LOOP event, no recovery of OSP in 2 hours; followed by failures of EFW system and pressure relief for feed and bleed function (dominated by HVAC related failures).	A plant trip with a consequential LOOP (no recovery) and subsequent MFW and SSS failures, followed by failures of EFW system and pressure relief for feed and bleed function (dominated by HVAC related failures).	An SLOCA event with failures of SSS and EFW systems (dominated by a failure of PCD function); followed by an operator failure to initiate F&B.	An SLOCA event with a failure of all MHSI system, followed by an operator failure to initiate FCD.	A LOOP event, no recovery of OSP in 2 hours; with a failure of all EDGs and both SBO DGs leading to a total blackout.	A LOOP event, no recovery of OSP in 2 hours; with a failure of all EDGs (SBO conditions). followed by a EFW system failure (F&B is not possible in SBO conditions).	An SLBI event, followed by a failure of all MS/ FW isolation (dominated by common cause software failure of protection system group B).
	Seq. Fred (1/yr)	8.58E-08	2.02E-08	1.95E-08	1.73E-08	1.66E-08	1.12E-08	<u>1.04E-08</u>
	RS Seguence ID	LOOP-REC LOOP-EFW-PBL	GT-MFW-SSS- EFW-PBL	SLOCA-SSS- EFW-OP FB	SLOCA-MHSI-OP FCD	LOOP-EDG-REC LOOP-SBO	LOOP-EDG-REC LOOP-EFW	SLBI-MSIV ISO(3)-FW ISO
	Seq. Num	17	15	17	34	45	44	40
	Event Tree	<u>1000</u>	IJ	SLOCA	SLOCA	<u>100P</u>	LOOP	STBI

Tier 2

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Table 19.1-127—U.S. EPR Important Sequences – Level 1 Internal Events Sheet 2 of 3

					Corresponding Cutsets	ing Cutsets
Event Tree	Seq. Num	RS Sequence ID	Seq. Freq (1/yr)	Description	<u>Table</u> Number	Group Number
SGTR	18	SGTR-SG ISO-OP RHR	9.72E-09	An SGTR event with a failure to isolate the faulted SG and operator failure to depressurize RCS and initiate RHR.	19.1-7	<u>16</u>
ATWS	<u>12</u>	ATWS-PSR	9.36E-09	An ATWS event, pressure relief was not credited for ATWS events w/o MFW	19.1-7	17
LOOP	53	LOCA-REC LOCA-REC LOOP-OP FCD	7.24E-09	A LOOP event, no recovery of OSP in 2 hours, with a failure of all EDGs (SBO conditions). followed by a seal LOCA and operator failure to initiate a FCD (MHSI not available in SBO conditions).	19.1-7	7
<u>TD</u>	14	GT-MFW-SSS- EFW-MHSI 01	6.78E-09	A plant trip with a consequential LOOP (no recovery) and subsequent MFW and SSS failures, followed by failures of EFW and MHSI system (MHSI is failing a feed and bleed function).	19.1-7	20, 21
SLBI	17	SLBI-FW ISO- EFW	6.78E-09	An SLBI event, followed by a failure of FW isolation and EFW (F&B not credited)		
<u>STBI</u>	30	SLBI-MSIV ISO- FW ISO-EFW	6.49E-09	An SLBI event, followed by a failure of one MS line and FW isolation (2 SG blowing down) and EFW failure (F&B not credited)		
LOOP	11	LOOP-REC LOOP-EFW- LHSI-SAHR	6.39E-09	A LOOP event, no recovery of OSP in 2 hours, with failure of EFW, feed and bleed fails by lack of long term heat removal (no LHSI or SAHRS)		





Table 19.1-127—U.S. EPR Important Sequences — Level 1 Internal Events
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					Correspond	Corresponding Cutsets
Event Tree	Seq.	RS Segmented ID	Seq. Freq	Description	<u>Table</u> Number	Group
SLOCA	<u>20</u>	SLOCA-MHSI- ACC	6.24E-09	An SLOCA event, with a failure of MHSI system and accumulators (dominated by a failure to open MHSI/ACC/LHSI common discharge check valves).	19.1-7	
<u>LOOP</u>	<u>56</u>	LOOP-EDG-I&C	5.63E-09	A LOOP event where a loss of all 1E 2hr batteries prevents starting of EDGs and results in loss of all instrumentation. Given that no instrumentation is available, OSP recoveries or SBO DGs (controlled from 12-hour batteries) are not credited.	19.1-7	<u>හ</u>
LOOP	30	LOOP-RCP LOCA-REC LOOP-EFW-OP FB	5.48E-09	A LOOP event, no recovery of OSP in 2 hours, followed by an RCP LOCA, a failure of EFW and an operator failure to initiate feed and bleed.		
LOOP	<u>29</u>	LOOP-RCP LOCA-REC LOOP-EFW-PBL	5.38E-09	A LOOP event, no recovery of OSP in 2 hours, followed by an RCP LOCA, and failures of EFW system and pressure relief for feed and bleed function.		
<u>100P</u>	<u>52</u>	LOOP-EDG-RCP LOCA-REC LOOP-EFW	5.31E-09	A LOOP event, no recovery of OSP in 2 hours, with a failure of all EDGs (SBO conditions). followed by an RCP LOCA, and a failure of EFW		

