

Response to

Request for Additional Information No. 21, Revision 0

7/09/2008

U.S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 17.04 - Reliability Assurance Program (RAP)

Application Section: Tier 1 Section 3.2 and Tier 2 Section 17.4

SPLA Branch

Question 17.04-2:

In general, the RAP in principle, applies to both risk-significant active and passive SSCs. The purposes of RAP are to provide reasonable assurance that (SECY-95-132):

- a) a reactor is designed, constructed, and operated in a manner that is consistent with the assumptions and risk insights for these risk-significant SSCs,
- b) the risk-significant SSCs do not degrade to an unacceptable level during plant operations,
- c) the frequencies of transients that challenge SSCs are minimized, and
- d) the SSCs function reliably when challenged.

Please provide the basis for not including the risk-significant passive SSCs (e.g., piping, tanks, fire barriers). Include, in your discussion, how the purposes of RAP are met through other programs/requirements (e.g., inspections, monitoring) for the risk-significant passive SSCs.

Response to Question 17.04-2:

The full scope RAP will include passive components such as tanks and check valves that are modeled in the U.S. EPR probabilistic risk assessment (PRA) and identified as risk significant, or the ones that will be identified as risk-significant based on deterministic insights. However, piping will not be included in the RAP; it is assumed to be covered under the inservice inspection program (ASME Boiler and Pressure Vessel Code, Section XI).

Fire barriers are implicitly included in the current Fire PRA. The Fire PRA is based on a simplified bounding approach, where fires are modeled for an entire fire area (i.e., a location separated by three-hour fire barriers) assuming the worst PRA scenario resulting from the failure of all systems structures and components in the fire area.

The final list of risk significant SSC and how they are included in the RAP (based on both probabilistic and deterministic insights) or integrated into other operational programs, is a responsibility of the COL applicant (see COL item listed in FSAR Tier 2 Section 17.4.4).

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 17.04-3:

EPR FSAR Section 17.4 indicates that the risk-significant SSCs are identified by using the PRA Level 1 risk achievement worth (RAW) or Fussell-Vesely (FV) values. It should be noted that, an integrated assessment of internal events and external events would allow the expert panel to determine whether risk significance of the SSCs should be based on significance for individual hazards or from the overall integrated results.

- a) Please discuss how risk-significance evaluations considered integrated importance assessments (i.e., risk significance based on an overall assessment that combines the risk hazards). If integrated importance assessments were not considered in the risk significance evaluations, then provide the basis for not considering these integrated importance assessments or not incorporating them in the risk-significance evaluations.
- b) Provide the basis for not including PRA Level 2 importance assessment (RAW and FV) in RAP.

Response to Question 17.04-3:

a) Risk-significance evaluations, as presented in the tables associated with the response to Question 17.04-1 (Tables 17.04-1-1 through 17.04-1-6), are based on integrated importance assessments that include internal events, floods and fires at power and for shutdown. Therefore, Tables 17.04-1-1 through 17.04-1-6 present the probabilistic risk assessment (PRA) structures, systems and components (SSC) ranking based on the total core damage frequency (CDF) at power and shutdown.

The PRA SSC ranking based on the separated internal events, flood and fire CDFs, as well as all rankings based on the large release frequency (LRF) results, are presented in various tables in the U.S. EPR FSAR Tier 2, Chapter 19. In order to illustrate the PRA-based input to the reliability assurance program (RAP) program, all these tables and the associated rankings are combined into summary tables, described as follows:

- Table 17.04-3-1: PRA-based Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes)
- Table 17.04-3-2: PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations
- Table 17.04-3-3: PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2)

The bases for the important SSC selections are indicated by the shaded table cells (and the bolded importance measure values).

b) A Level 2 importance assessment is also included in the RAP program. Level 2 importance measures (based on the internal events, flood & fire LRFs) are presented in the various tables in the U.S. EPR FSAR Tier 2, Chapter 19 and summarized (based on the total LRF) in Tables 17.04-3-1 and 17.04-3-2.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
30QKA10GH001	SCWS, Train 1 Chiller Unit QKA10GH001	2.15E-01	2.89E-01	8.82E-02	1.39E-01	1.33E-01	FS
30QKA40GH001	SCWS, Train 4 Chiller Unit QKA40GH001	1.82E-01	2.98E-01	1.59E-02	4.96E-02	8.23E-02	FS
30XKA20	ELEC, Emergency Diesel Generator XKA20	1.28E-01	2.00E-01	1.53E-02	5.04E-02	4.66E-02	FR
30XKA30	ELEC, Emergency Diesel Generator XKA30	1.17E-01	2.01E-01	1.41E-02	1.64E-02	4.30E-02	FR
30XKA10	ELEC, Emergency Diesel Generator XKA10	1.06E-01	1.73E-01	1.61E-02	2.94E-02	3.36E-02	FR
30XKA40	ELEC, Emergency Diesel Generator XKA40	1.01E-01	1.78E-01	4.86E-03	9.60E-03	3.22E-02	FR
30LAS11AP001	EFWS, Train 1 Motor Driven Pump LAS11AP001	4.70E-02	7.03E-02	1.30E-02	2.08E-02	1.72E-02	FR
30PEB20AP001	ESWS, Train 2 Motor Driven Pump PEB20AP001	4.57E-02	3.41E-02	7.02E-02	5.64E-02	1.15E-02	FS
30JND10AP001	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001	4.53E-02	4.84E-02	1.29E-01	1.12E-02	2.42E-03	FR
30LAS41AP001	EFWS, Train 4 Motor Driven Pump LAS41AP001	4.32E-02	6.87E-02	1.19E-02	1.22E-02	3.10E-02	FR
30XKA50	ELEC, SBO Diesel Generator XKA50	4.25E-02	7.10E-02	3.27E-03	9.35E-03	1.44E-02	FR
30XKA80	ELEC, SBO Diesel Generator XKA80	3.95E-02	7.14E-02	2.02E-03	3.82E-04	9.92E-03	FR

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
30JND30AP001	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001	3.85E-02	4.61E-02	9.21E-02	7.16E-03	2.33E-03	FR
30PEB30AP001	ESWS, Train 3 Motor Driven Pump PEB30AP001	3.78E-02	3.59E-02	7.29E-02	2.86E-02	8.13E-03	FS
30JND20AP001	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001	3.77E-02	4.44E-02	9.27E-02	7.32E-03	2.27E-03	FR
30JND40AP001	MHSI, MHSI Train 4 Motor Driven Pump JND40AP001	3.15E-02	5.00E-02	2.65E-02	2.75E-03	9.40E-04	FR
31BTD01_BAT	ELEC, 250V 1E 2-hr Battery 31BTD01	2.76E-02	4.89E-02	1.53E-03	1.71E-03	1.27E-02	ST
34BTD01_BAT	ELEC, 250V 1E 2-hr Battery 34BTD01	2.74E-02	4.97E-02	1.17E-03	1.43E-04	1.70E-02	ST
30LBA13AA001	MSS, Train 1 MSRIV LBA13AA001	2.02E-02	2.60E-02	2.32E-03	1.70E-02	1.49E-02	FC,FO
30LBA33AA001	MSS, Train 3 MSRIV LBA33AA001	2.02E-02	2.60E-02	2.32E-03	1.70E-02	1.58E-02	FC,FO
30LBA23AA001	MSS, Train 2 MSRIV LBA23AA001	2.02E-02	2.59E-02	2.32E-03	1.70E-02	1.48E-02	FC,FO
30LAS31AP001	EFWS, Train 3 Motor Driven Pump LAS31AP001	1.99E-02	2.47E-02	1.10E-02	1.52E-02	1.27E-02	FR
30LAS21AP001	EFWS, Train 2 Motor Driven Pump LAS21AP001	1.99E-02	2.41E-02	1.10E-02	1.60E-02	9.63E-03	FR
30LBA40AA002	MSS, Train 4 Main Steam Isolation Valve LBA40AA002	1.99E-02	3.38E-02		4.02E-03	5.94E-02	CL,FC
30JNG13AA005	LHSI, CL1 First SIS Isolation Check Valve JNG13AA005	1.98E-02	2.84E-02	1.40E-02	7.72E-03	6.21E-03	FO

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
30PED10AN002	UHS, Cooling Tower Train 1 Cooling Fan PED10AN002	1.96E-02	8.15E-03	4.42E-02	2.99E-02	5.96E-03	FS
30JNG23AA005	LHSI, CL2 First SIS Isolation Check Valve JNG23AA005	1.87E-02	2.72E-02	1.21E-02	7.13E-03	6.10E-03	FO
30LBA43AA001	MSS, Train 4 MSRIV LBA43AA001	1.87E-02	2.58E-02	2.32E-03	1.28E-02	1.17E-02	FC,FO
30JNG33AA005	LHSI, CL3 First SIS Isolation Check Valve JNG33AA005	1.86E-02	2.74E-02	1.16E-02	6.63E-03	6.04E-03	FO
32BTD01_BAT	ELEC, 250V 1E 2-hr Battery 32BTD01	1.74E-02	3.13E-02	6.43E-04	4.69E-04	9.13E-03	ST
33BTD01_BAT	ELEC, 250V 1E 2-hr Battery 33BTD01	1.73E-02	3.13E-02	6.46E-04	1.73E-04	9.05E-03	ST
30PED20AN002	UHS, Cooling Tower Train 2 Cooling Fan PED20AN002	1.69E-02	9.12E-03	3.39E-02	2.36E-02	5.27E-03	FS
30JNG43AA005	LHSI, CL4 First SIS Isolation Check Valve JNG43AA005	1.68E-02	2.79E-02	4.13E-03	3.18E-03	5.61E-03	FO
30PED30AN002	UHS, Cooling Tower Train 3 Cooling Fan PED30AN002	1.57E-02	9.38E-03	2.97E-02	2.13E-02	4.94E-03	FS
30KAA12AA005	CCWS, Train 1 to LHSI HTX 10 Cooling MOV KAA12AA005	1.56E-02	8.10E-03	3.14E-02	2.25E-02	5.40E-03	FO
30SAC01AN001	SAC, Normal Air Supply Fan SAC01AN001	1.54E-02	1.94E-02	1.22E-02	9.99E-03	9.72E-03	FR
30SAC31AN001	SAC, Normal Air Exhaust Fan SAC31AN001	1.54E-02	1.94E-02	1.22E-02	9.99E-03	9.72E-03	FR
30QKA20GH001	SCWS, Train 2 Chiller Unit QKA20GH001	1.52E-02	8.16E-03	1.02E-02	2.86E-02	5.97E-03	FR

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
30QKA30GH001	SCWS, Train 3 Chiller Unit QKA30GH001	1.49E-02	8.69E-03	1.18E-02	2.61E-02	5.57E-03	FR
30SAC04AN001	SAC, Normal Air Supply Fan SAC04AN001	1.48E-02	1.96E-02	1.15E-02	8.01E-03	8.88E-03	FR
30SAC34AN001	SAC, Normal Air Exhaust Fan SAC34AN001	1.48E-02	1.96E-02	1.15E-02	8.01E-03	8.88E-03	FR
30QKA10AP107	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107	1.44E-02	1.95E-02	7.99E-03	8.32E-03	7.19E-03	FR
32BRA	ELEC, 480V MCC 32BRA	1.40E-02	3.24E-04	1.72E-05	4.13E-02	6.86E-03	FR
31BRA	ELEC, 480V MCC 31BRA	1.40E-02	2.60E-04	1.72E-05	4.13E-02	7.49E-03	FL
30KAA22AA005	CCWS, Train 2 to LHSI HTX 20 Cooling MOV KAA22AA005	1.38E-02	8.70E-03	2.50E-02	1.84E-02	4.97E-03	FO
30QKA40AP107	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107	1.36E-02	1.97E-02	6.82E-03	5.97E-03	6.35E-03	FS
30KAA32AA005	CCWS, Train 3 to LHSI HTX 30 Cooling MOV KAA32AA005	1.31E-02	8.88E-03	2.22E-02	1.69E-02	4.74E-03	FO
30JEB30AA010	RCP, RCP3 Leakoff Isolation MOV JEB30AA010	1.30E-02	1.02E-02	6.26E-02	2.50E-04	1.90E-03	FC
30JEB30AA020	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020	1.30E-02	1.02E-02	6.26E-02	2.50E-04	1.90E-03	FC
30JEB40AA010	RCP, RCP4 Leakoff Isolation MOV JEB40AA010	1.30E-02	1.02E-02	6.26E-02	2.50E-04	1.90E-03	FC
30JEB40AA020	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV	1.30E-02	1.02E-02	6.26E-02	2.50E-04	1.90E-03	FC

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
	JEB40AA020						
30LBA10AA002	MSS, Train 1 Main Steam Isolation Valve LBA10AA002	1.16E-02	1.48E-02		1.05E-02	3.72E-02	CL,FC
30LBA20AA002	MSS, Train 2 Main Steam Isolation Valve LBA20AA002	1.16E-02	1.48E-02		1.05E-02	3.72E-02	CL,FC
30LBA30AA002	MSS, Train 3 Main Steam Isolation Valve LBA30AA002	1.02E-02	1.48E-02		6.25E-03	3.66E-02	CL,FC
30JNG10AP001	LHSI, LHSI Train 1 Motor Driven Pump JNG10AP001	9.92E-03	4.08E-03	2.24E-02	1.51E-02	3.02E-03	FS
30PED40AN002	UHS, Cooling Tower Train 4 Cooling Fan PED40AN002	9.35E-03	8.11E-03	1.14E-02	1.07E-02	4.00E-03	FS
30KAA42AA005	CCWS, Train 4 to LHSI HTX 40 Cooling MOV KAA42AA005	9.18E-03	8.02E-03	1.13E-02	1.04E-02	4.14E-03	FO
30JMQ40AP001	SAHR, Motor Driven Pump JMQ40AP001	8.79E-03	1.59E-02	2.27E-05	2.13E-04	2.46E-03	FS
30JNG30AP001	LHSI, LHSI Train 3 Motor Driven Pump JNG30AP001	8.06E-03	3.99E-03	1.70E-02	1.16E-02	1.42E-03	FS
30SAC02AN001	SAC, Normal Air Supply Fan SAC02AN001	7.79E-03	8.52E-03	1.10E-02	5.49E-03	6.41E-03	FR
30SAC32AN001	SAC, Normal Air Exhaust Fan SAC32AN001	7.79E-03	8.52E-03	1.10E-02	5.49E-03	6.41E-03	FR
30PEB20AA005	ESWS, Train 2 Pump Discharge Isolation MOV PEB20AA005	7.74E-03	5.48E-03	1.59E-02	8.60E-03	1.31E-03	FO
30SAC03AN001	SAC, Normal Air Supply Fan SAC03AN001	7.64E-03	8.63E-03	1.09E-02	4.90E-03	6.39E-03	FR

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
30SAC33AN001	SAC, Normal Air Exhaust Fan SAC33AN001	7.64E-03	8.63E-03	1.09E-02	4.90E-03	6.39E-03	FR
30JNG10AA006	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA006	6.62E-03	8.02E-04	1.96E-02	1.17E-02	1.24E-03	MEC3
30LBA43AA101	MSS, Train 4 MSRCV LBA43AA101	6.49E-03	1.18E-02		2.81E-06	7.58E-03	FC
30JNG20AP001	LHSI, LHSI Train 2 Motor Driven Pump JNG20AP001	6.36E-03	3.82E-03	1.24E-02	8.40E-03	1.75E-03	FS
30LBA13AA712	MSS, Train 1a MSRIV Pneumatic Pilot Valve LBA13AA712	6.30E-03	8.62E-03	7.79E-04	4.42E-03	3.84E-03	FO
30LBA13AA713	MSS, Train 1a MSRIV Pneumatic Pilot Valve LBA13AA713	6.30E-03	8.62E-03	7.79E-04	4.42E-03	3.84E-03	FO
30LBA23AA712	MSS, Train 2a MSRIV Pneumatic Pilot Valve LBA23AA712	6.30E-03	8.62E-03	7.79E-04	4.42E-03	3.84E-03	FO
30LBA23AA713	MSS, Train 2a MSRIV Pneumatic Pilot Valve LBA23AA713	6.30E-03	8.62E-03	7.79E-04	4.42E-03	3.84E-03	FO
30LBA33AA712	MSS, Train 3a MSRIV Pneumatic Pilot Valve LBA33AA712	6.30E-03	8.62E-03	7.79E-04	4.42E-03	3.84E-03	FO
30LBA33AA713	MSS, Train 3a MSRIV Pneumatic Pilot Valve LBA33AA713	6.30E-03	8.62E-03	7.79E-04	4.42E-03	3.84E-03	FO
30LBA33AA716	MSS, Train 3b MSRIV Pneumatic Pilot Valve LBA33AA716	6.27E-03	8.64E-03	7.79E-04	4.33E-03	4.27E-03	FO
30LBA33AA717	MSS, Train 3b MSRIV Pneumatic Pilot Valve LBA33AA717	6.27E-03	8.64E-03	7.79E-04	4.33E-03	4.27E-03	FO
30LBA13AA716	MSS, Train 1b MSRIV Pneumatic Pilot Valve LBA13AA716	6.26E-03	8.62E-03	7.79E-04	4.32E-03	3.84E-03	FO

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
30LBA13AA717	MSS, Train 1b MSRIV Pneumatic Pilot Valve LBA13AA717	6.26E-03	8.62E-03	7.79E-04	4.32E-03	3.84E-03	FO
30LBA23AA716	MSS, Train 2b MSRIV Pneumatic Pilot Valve LBA23AA716	6.26E-03	8.62E-03	7.79E-04	4.32E-03	3.84E-03	FO
30LBA23AA717	MSS, Train 2b MSRIV Pneumatic Pilot Valve LBA23AA717	6.26E-03	8.62E-03	7.79E-04	4.32E-03	3.84E-03	FO
30LBA43AA712	MSS, Train 4a MSRIV Pneumatic Pilot Valve LBA43AA712	6.26E-03	8.62E-03	7.79E-04	4.32E-03	3.84E-03	FO
30LBA43AA713	MSS, Train 4a MSRIV Pneumatic Pilot Valve LBA43AA713	6.26E-03	8.62E-03	7.79E-04	4.32E-03	3.84E-03	FO
30LBA43AA716	MSS, Train 4b MSRIV Pneumatic Pilot Valve LBA43AA716	6.26E-03	8.62E-03	7.79E-04	4.32E-03	3.84E-03	FO
30LBA43AA717	MSS, Train 4b MSRIV Pneumatic Pilot Valve LBA43AA717	6.26E-03	8.62E-03	7.79E-04	4.32E-03	3.84E-03	FO
30PEB30AA005	ESWS, Train 3 Pump Discharge Isolation MOV PEB30AA005	6.23E-03	5.57E-03	1.30E-02	4.93E-03	1.06E-03	FO
30JEB10AA010	RCP, RCP1 Leakoff Isolation MOV JEB10AA010	6.15E-03	1.10E-02	2.37E-04	1.91E-04	1.22E-03	FC
30JEB10AA020	RCP Seal, RCP1 Seal Nitrogen Venting Isolation MOV JEB10AA020	6.15E-03	1.10E-02	2.37E-04	1.91E-04	1.22E-03	FC
30JEB20AA010	RCP, RCP2 Leakoff Isolation MOV JEB20AA010	6.15E-03	1.10E-02	2.37E-04	1.91E-04	1.22E-03	FC
30JEB20AA020	RCP Seal, RCP2 Seal Nitrogen Venting Isolation MOV JEB20AA020	6.15E-03	1.10E-02	2.37E-04	1.91E-04	1.22E-03	FC

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
30JNG30AA006	LHSI, LHSI CL3 Discharge Manual CHECK Valve JNG30AA006	5.98E-03	2.17E-03	1.50E-02	9.07E-03	6.28E-04	MEC3
30JND10AA003	MHSI, MHSI Pump 10 Discharge Manual CHECK Valve JND10AA003	5.91E-03	2.66E-03	3.05E-02	2.62E-03	2.05E-04	MEC3
30QKA20AP107	SCWS, Train 2 Motor Driven Safety Chiller Pump QKA20AP107	5.51E-03	6.30E-03	6.32E-03	3.95E-03	3.56E-03	FR
30QKA30AP107	SCWS, Train 3 Motor Driven Safety Chiller Pump QKA30AP107	5.40E-03	6.39E-03	6.26E-03	3.49E-03	3.67E-03	FR
30JNG20AA006	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA006	5.27E-03	2.08E-03	1.32E-02	7.76E-03	7.52E-04	MEC3
30LBA41AA191	MSS, Train 4 Main Steam Safety Relief Valve LBA41AA191	4.15E-03	7.47E-03	3.95E-04	3.45E-05	1.17E-03	PO
30LBA42AA191	MSS, Train 4 Main Steam Safety Relief Valve LBA42AA191	4.15E-03	7.47E-03	3.95E-04	3.45E-05	1.17E-03	PO
30JND30AA003	MHSI, MHSI Pump 30 Discharge Manual CHECK Valve JND30AA003	3.84E-03	2.77E-03	1.66E-02	1.14E-03	1.49E-04	MEC3
30LBA11AA191	MSS, Train 1 Main Steam Safety Relief Valve LBA11AA191	3.62E-03	6.50E-03	3.95E-04	3.45E-05	5.52E-04	FO
30LBA12AA191	MSS, Train 1 Main Steam Safety Relief Valve LBA12AA191	3.62E-03	6.50E-03	3.95E-04	3.45E-05	5.52E-04	FO
30LBA21AA191	MSS, Train 2 Main Steam Safety Relief Valve LBA21AA191	3.62E-03	6.50E-03	3.95E-04	3.45E-05	5.52E-04	FO
30LBA22AA191	MSS, Train 2 Main Steam Safety Relief Valve LBA22AA191	3.62E-03	6.50E-03	3.95E-04	3.45E-05	5.52E-04	FO

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
30LBA31AA191	MSS, Train 3 Main Steam Safety Relief Valve LBA31AA191	3.62E-03	6.50E-03	3.95E-04	3.45E-05	5.52E-04	FO
30LBA32AA191	MSS, Train 3 Main Steam Safety Relief Valve LBA32AA191	3.62E-03	6.50E-03	3.95E-04	3.45E-05	5.52E-04	FO
30KAA20AP001	CCWS, Train 2 Motor Driven Pump KAA20AP001	3.51E-03	1.58E-03	1.01E-02	4.36E-03	2.09E-04	FS
30JND20AA003	MHSI, MHSI Pump 20 Discharge Manual CHECK Valve JND20AA003	3.48E-03	2.06E-03	1.67E-02	1.19E-03	1.30E-04	MEC3
30KAA30AP001	CCWS, Train 3 Motor Driven Pump KAA30AP001	3.12E-03	1.60E-03	9.01E-03	3.55E-03	1.68E-04	FS
30JEB30 SSSF	Stand Still Seal for RCP3	3.09E-03	2.30E-03	1.55E-02	3.21E-05	2.57E-04	SF
30JEB40 SSSF	Stand Still Seal for RCP4	3.09E-03	2.30E-03	1.55E-02	3.21E-05	2.57E-04	SF
30KBA32AP001	CVCS, HP Motor Driven Charging Pump KBA32AP001	2.75E-03	5.02E-03		4.84E-06	2.00E-04	FS
30PED10AN001	UHS, Cooling Tower Train 1 Cooling Fan PED10AN001	2.59E-03	1.43E-03	5.42E-03	3.51E-03	7.44E-04	FR
31BDA	ELEC, 6.9kV SWGR 31BDA	2.09E-03		0.00E+00	6.25E-03	6.81E-04	FL
31BDB	ELEC, 6.9kV SWGR 31BDB	1.96E-03	2.75E-05	3.03E-05	5.79E-03	6.81E-04	FL
31BMB	ELEC, 480V Load Center 31BMB	1.96E-03	2.75E-05	3.03E-05	5.79E-03	6.81E-04	FL
31BMT02	ELEC, 6.9kV-480V Transformer 31BMT02	1.96E-03	2.75E-05	3.03E-05	5.79E-03	6.81E-04	FL

Table 17.04-3-1—Important SSC based on the FV Values, from Total, Internal Events, Fire, Flood and Total Level 2 Evaluations (including dominant failure modes) (11 Sheets)

Component ID	Component Description	FV Based on Total CDF	FV Based on Internal Events CDF	FV Based on Flood CDF	FV Based on Fire CDF	Level 2 FV Based on Total LRF	Dominant Failure Mode(s) ₁
31BDC	ELEC, 6.9kV SWGR 31BDC	1.95E-03	2.75E-05	3.03E-05	5.78E-03	6.81E-04	FL
32BDB	ELEC, 6.9kV SWGR 32BDB	1.95E-03	1.64E-05	2.85E-05	5.80E-03	6.81E-04	FL
32BMB	ELEC, 480V Load Center 32BMB	1.95E-03	1.64E-05	2.85E-05	5.80E-03	6.81E-04	FL
32BMT02	ELEC, 6.9kV-480V Transformer 32BMT02	1.95E-03	1.64E-05	2.85E-05	5.80E-03	6.81E-04	FL
30BRW10BUW11	ELEC, 24V DC I&C Power Rack 31BRW10/31BUW11	1.95E-03	4.57E-05	2.85E-05	5.74E-03	1.35E-03	FL
30BRW32BUW33	ELEC, 24V DC I&C Power Rack 32BRW32/32BUW33	1.95E-03	3.48E-05	2.85E-05	5.75E-03	1.35E-03	FL
30JNG10AA104	LHSI, LHSI Pump 10 Throttle Control MOV JNG10AA104	1.79E-03	7.08E-05	5.02E-03	3.49E-03	1.71E-04	CF
30JEB30AA018	RCP Seal, RCP3 Nitrogen Supply Solenoid Valve JEB30AA018	1.37E-03	9.83E-04	7.10E-03	5.97E-06	8.27E-05	FO
30JEB40AA018	RCP Seal, RCP4 Nitrogen Supply Solenoid Valve JEB40AA018	1.37E-03	9.83E-04	7.10E-03	5.97E-06	8.27E-05	FO

Note 1

Failure Modes Definitions:

- CF = Fails to Control Flow
- CL = Fails to Remain Open, Spurious Operation
- FC = Fails to Close on Demand
- FL = Fails during Operation
- FO = Fails to Open on Demand
- FR = Fails to Run
- FS = Fails to Start on Demand

MEC3 = Left in Wrong Position, Non-Monitored

PO = Premature Opening

SF = Seal Failure

ST = Fails on Demand

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
31BDA	ELEC, 6.9kV SWGR 31BDA	88.2		1.0	261.3	29.4	
31BDB	ELEC, 6.9kV SWGR 31BDB	82.6	2.1	2.3	242.3	29.4	
31BMB	ELEC, 480V Load Center 31BMB	82.6	2.1	2.3	242.3	29.4	
31BMT02	ELEC, 6.9kV-480V Transformer 31BMT02	82.6	2.1	2.3	242.3	29.4	
31BDC	ELEC, 6.9kV SWGR 31BDC	82.4	2.1	2.3	241.9	29.4	
32BDB	ELEC, 6.9kV SWGR 32BDB	82.4	1.7	2.2	242.6	29.4	
32BMB	ELEC, 480V Load Center 32BMB	82.4	1.7	2.2	242.6	29.4	
32BMT02	ELEC, 6.9kV-480V Transformer 32BMT02	82.4	1.7	2.2	242.6	29.4	
30BRW10BUW11	ELEC, 24V DC I&C Power Rack 31BRW10/31BUW11	82.3	2.9	2.2	240.2	57.1	
30BRW32BUW33	ELEC, 24V DC I&C Power Rack 32BRW32/32BUW33	82.2	2.5	2.2	240.4	57.1	
31BDB1BMT02	ELEC, 6.9kV SWGR 31BDB to Transformer 31BMT02 Circuit Breaker	80.5	1.0	1.2	238.2	28.5	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
31BDC_1BDB1	ELEC, 6.9kV SWGR 31BDC to 6.9kV SWGR 31BDB Circuit Breaker	80.5	1.0	1.2	238.2	28.5	
31BDC_1BDB2	ELEC, 6.9kV SWGR 31BDC to 6.9kV SWGR 31BDB Circuit Breaker	80.5	1.0	1.2	238.2	28.5	
31BMT021BMB	ELEC, Transformer 31BMT02 to 480V Load Center 31BMB Circuit Breaker	80.5	1.0	1.2	238.2	28.5	
32BDB2BMT02	ELEC, 6.9kV SWGR 32BDB to Transformer 32BMT02 Circuit Breaker	80.5	1.0	1.2	238.2	28.5	
32BMT022BMB	ELEC, Transformer 32BMT02 to 480V Load Center 32BMB Circuit Breaker	80.5	1.0	1.2	238.2	28.5	
32BRA	ELEC, 480V MCC 32BRA	80.1	3.1	1.1	233.8	41.5	
31BRA	ELEC, 480V MCC 31BRA	79.9	2.7	1.1	233.8	45.1	
31BRU011BRA	ELEC, Inverter 31BRU01 to 480V MCC 31BRA Circuit Breaker	77.6	1.0		229.9	31.5	
32BRU012BRA	ELEC, Inverter 32BRU01 to 480V MCC 32BRA Circuit Breaker	77.6	1.0		229.9	28.5	
32BDA	ELEC, 6.9kV SWGR 32BDA	41.4	1.2	1.2	121.2	14.8	
32BDA_2BDB1	ELEC, 6.9kV SWGR 32BDA to 6.9kV SWGR 32BDB Circuit Breaker	40.5	1.0		118.9	14.8	
32BDA_2BDB2	ELEC, 6.9kV SWGR 32BDA to 6.9kV SWGR 32BDB Circuit Breaker	40.5	1.0		118.9	14.8	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30LAR10BB001	EFWS, Train 1 EFW Storage Tank LAR10BB001	21.6	33.8	11.8	5.1	1.0	
30LAR20BB001	EFWS, Train 2 EFW Storage Tank LAR20BB001	21.6	33.8	11.8	5.1	1.0	
30LAR30BB001	EFWS, Train 3 EFW Storage Tank LAR30BB001	21.6	33.8	11.8	5.1	1.0	
30LAR40BB001	EFWS, Train 4 EFW Storage Tank LAR40BB001	21.6	33.8	11.8	5.1	1.0	
34BUC	ELEC, 250V DC Bus 34BUC	18.8	33.3	1.4	1.1	2.5	
30QKA10GH001	SCWS, Train 1 Chiller Unit QKA10GH001	18.4	18.5	6.7	23.1	9.4	299.7
30QKA10AP107	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107	17.7	17.3	5.6	22.5	8.0	3736.0
30SAC01AN001	SAC, Normal Air Supply Fan SAC01AN001	17.0	17.5	3.8	20.9	8.5	3768.0
30SAC31AN001	SAC, Normal Air Exhaust Fan SAC31AN001	17.0	17.5	3.8	20.9	8.5	3768.0
30QKA40GH001	SCWS, Train 4 Chiller Unit QKA40GH001	15.9	18.7	2.2	16.1	6.9	299.7
34BDA	ELEC, 6.9kV SWGR 34BDA	15.8	22.7		9.6	1.8	
30SAC04AN001	SAC, Normal Air Supply Fan SAC04AN001	15.5	18.0	2.0	16.0	6.4	3768.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30SAC34AN001	SAC, Normal Air Exhaust Fan SAC34AN001	15.5	18.0	2.0	16.0	6.4	3768.0
30QKA40AP107	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107	15.3	17.8	1.9	16.0	6.0	3736.0
30QKA10AA101	SCWS, Train 1 Chiller By-pass MOV QKA10AA101	13.8	13.0	3.1	18.8	1.0	
30QKC10AA101	SCWS, Return from SAC Div 1 MOV QKC10AA101	13.8	13.0	3.1	18.8	1.0	
30SAC01AA003	SAC, Normal Air Inlet Motor Operated Damper SAC01AA003	13.8	13.0	3.1	18.8	1.0	
30SAC31AA002	SAC, Normal Air Exhaust Motor Operated Damper SAC31AA002	13.8	13.0	3.1	18.8	1.0	
30QKA10AA003	SCWS, Train 1 Safety Chiller Pump Discharge Check Valve QKA10AA003	13.4	15.5	2.9	18.8	3.0	193.7
30SAC01AA005	SAC, Normal Air Inlet Supply Fan Discharge Check Damper SAC01AA005	13.4	15.5	2.9	18.8	3.0	193.7
30SAC31AA003	SAC, Normal Air Exhaust Supply Fan Discharge Check Damper SAC31AA003	13.4	12.4	2.9	18.8	1.0	184.4
31BTD01_BAT	ELEC, 250V 1E 2-hr Battery 31BTD01	13.3	21.7	2.2	3.4	5.4	39,960.0
34BTD01_BAT	ELEC, 250V 1E 2-hr Battery 34BTD01	13.2	23.0	1.7	1.1	12.0	39,960.0
30BRW70BUW71	ELEC, 24V DC I&C Power Rack 34BRW70/34BUW71	12.7	17.7	2.2	8.2	197.0	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30KAB20AA192	CCWS, CCWS CH2 Return Safety Valve KAB20AA192	12.7	17.7	1.8	8.4	3.3	
30KAB20AA193	CCWS, FPCS Train 2 Cooling Header Safety Valve KAB20AA193	12.7	17.7	1.8	8.4	3.3	
30KAB30AA192	CCWS, CCWS CH2 RCP3/4 TB Return Safety Valve KAB30AA192	12.7	17.7	1.8	8.4	3.3	
30KAB70AA191	CCWS, CVCS HP Cooler 2 Return Safety Valve KAB60AA191	12.7	17.7	1.8	8.4	3.3	
30QKA40AA101	SCWS, Train 4 Chiller By-pass MOV QKA40AA101	12.2	13.0	1.4	14.7	1.0	
30QKC40AA101	SCWS, Return from SAC Div 4 MOV QKC40AA101	12.2	13.0	1.4	14.7	1.0	
30SAC04AA003	SAC, Normal Air Inlet Motor Operated Damper SAC04AA003	12.2	13.0	1.4	14.7	1.0	
30SAC34AA002	SAC, Normal Air Exhaust Motor Operated Damper SAC34AA002	12.2	13.0	1.4	14.7	1.0	
30QKA40AA003	SCWS, Train 4 Safety Chiller Pump Discharge Check Valve QKA40AA003	11.9	15.6	1.5	14.7		193.7
30SAC04AA005	SAC, Normal Air Inlet Supply Fan Discharge Check Damper SAC04AA005	11.9	15.6	1.5	14.7	2.7	193.7
30SAC34AA003	SAC, Normal Air Exhaust Supply Fan Discharge Check Damper SAC34AA003	11.9	12.4	1.4	14.7	1.0	184.4
31BDA_1BDC1	ELEC, 6.9kV SWGR 31BDA to 6.9kV SWGR 31BDC Circuit Breaker	11.1			31.1	3.4	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
31BDA_1BDC2	ELEC, 6.9kV SWGR 31BDA to 6.9kV SWGR 31BDC Circuit Breaker	11.1	1.4	1.0	31.1	3.4	2.5
31BNB01	ELEC, 480V MCC 31BNB01	9.9	16.6	1.8	1.9	4.0	
31BUC	ELEC, 250V DC Bus 31BUC	9.7	15.7	1.7	2.8	2.1	
34BNB01	ELEC, 480V MCC 34BNB01	9.7	16.7	1.5	1.1	3.5	
30LBA40AA002	MSS, Train 4 Main Steam Isolation Valve LBA40AA002	8.7	14.8		1.3	10.8	221.0
30LBA41AA191	MSS, Train 4 Main Steam Safety Relief Valve LBA41AA191	8.4	14.6			9.6	328.2
30LBA42AA191	MSS, Train 4 Main Steam Safety Relief Valve LBA42AA191	8.4	14.6			9.6	328.2
31BTD01	ELEC, 250V Battery 31BTD01 Circuit Breaker	7.7	12.4	1.6	2.3	1.0	
34BTD01	ELEC, 250V Battery 34BTD01 Circuit Breaker	7.3	12.4	1.4	1.0	1.0	
30KAB10AA192	CCWS, CCWS CH1 Return Safety Valve KAB10AA192	6.3	1.2	3.9	15.5	1.8	
30KAB10AA193	CCWS, FPCS Train 1 Cooling Header Safety Valve KAB10AA193	6.3	1.2	3.9	15.5	1.8	
30KAB30AA191	CCWS, CCWS CH1 RCP1/2 TB Return Safety Valve KAB30AA191	6.3	1.2	3.9	15.5	1.8	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30KAB60AA191	CCWS, CVCS HP Cooler 1 Return Safety Valve KAB60AA191	6.3	1.2	3.9	15.5	1.8	
34BDD	ELEC, 6.9kV SWGR 34BDD	5.9	9.9			1.0	
34BMD	ELEC, 480V Load Center 34BMD	5.9	9.9			1.0	
34BMT04	ELEC, 6.9kV-480V Transformer 34BMT04	5.9	9.9			1.0	
34BRB	ELEC, 480V MCC 34BRB	4.9	5.2	14.0	1.2	1.9	
34BDB	ELEC, 6.9kV SWGR 34BDB	4.8	2.4	2.2	9.7	2.4	
34BMB	ELEC, 480V Load Center 34BMB	4.8	2.4	2.2	9.7	2.4	
34BMT02	ELEC, 6.9kV-480V Transformer 34BMT02	4.8	2.4	2.2	9.7	2.4	
34BDC	ELEC, 6.9kV SWGR 34BDC	4.8	2.4	2.2	9.6	2.4	
30JEB30AA010	RCP, RCP3 Leakoff Isolation MOV JEB30AA010	4.7	3.9	18.9	1.1	1.5	4.7
30JEB30AA020	RCP Seal, RCP3 Seal Nitrogen Venting Isolation MOV JEB30AA020	4.7	3.9	18.9	1.1	1.5	4.7
30JEB40AA010	RCP, RCP4 Leakoff Isolation MOV JEB40AA010	4.7	3.9	18.9	1.1	1.5	4.7

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30JEB40AA020	RCP Seal, RCP4 Seal Nitrogen Venting Isolation MOV JEB40AA020	4.7	3.9	18.9	1.1	1.5	4.7
31BTB01_BAT	ELEC, 250V Non 1E 12-hr Battery 31BTB01	4.6	7.3	2.3	1.1	3.9	4.6
33BDB	ELEC, 6.9kV SWGR 33BDB	4.6	2.0	2.2	9.7	1.8	
33BMB	ELEC, 480V Load Center 33BMB	4.6	2.0	2.2	9.7	1.8	
33BMT02	ELEC, 6.9kV-480V Transformer 33BMT02	4.6	2.0	2.2	9.7	1.8	
30BRW52BUW53	ELEC, 24V DC I&C Power Rack BRW52/BUW53	4.5	2.7	2.2	8.2	29.6	
32BTB01_BAT	ELEC, 250V Non 1E 12-hr Battery 32BTB01	4.5	7.0	2.6	1.2	4.0	4.5
34BRA	ELEC, 480V MCC 34BRA	4.4	6.8		1.8	13.8	
30PEB10AP001	ESWS, Train 1 Motor Driven Pump PEB10AP001	4.4	1.5	4.8	9.5	1.1	15.1
30QKA20GH001	SCWS, Train 2 Chiller Unit QKA20GH001	4.3	1.5	1.5	9.9	2.1	20.2
30SAC02AN001	SAC, Normal Air Supply Fan SAC02AN001	4.2	1.4	1.4	9.9	2.1	3768.0
30SAC32AN001	SAC, Normal Air Exhaust Fan SAC32AN001	4.2	1.4	1.4	9.9	2.1	3768.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30QKA20AP107	SCWS, Train 2 Motor Driven Safety Chiller Pump QKA20AP107	4.2	1.4	1.3	9.8	2.0	3736.0
30JEB30 SSSF	Stand Still Seal for RCP3	4.2	3.4	17.0	1.0	1.3	4.2
30JEB40 SSSF	Stand Still Seal for RCP4	4.2	3.4	17.0	1.0	1.3	4.2
32BUD	ELEC, Non 1E 250V DC Distribution Panel 32BUD	4.1	5.2	7.7		1.0	
30KAA10AP001	CCWS, Train 1 Motor Driven Pump KAA10AP001	3.9	1.1	3.8	8.6	1.0	14.3
30QKA30GH001	SCWS, Train 3 Chiller Unit QKA30GH001	3.9	1.6	1.4	8.5	2.1	20.2
34BDA_4BDD1	ELEC, 6.9kV SWGR 34BDA to 6.9kV SWGR 34BDD Circuit Breaker	3.9	6.2			1.0	
34BDA_4BDD2	ELEC, 6.9kV SWGR 34BDA to 6.9kV SWGR 34BDD Circuit Breaker	3.9	6.2			1.0	
34BDD4BMT04	ELEC, 6.9kV SWGR 34BDD to Transformer 34BMT04 Circuit Breaker	3.9	6.2			1.0	
34BMT044BMD	ELEC, Transformer 34BMT04 to 480V Load Center 34BMD Circuit Breaker	3.9	6.2			1.0	
30SAC03AN001	SAC, Normal Air Supply Fan SAC03AN001	3.8	1.5	1.1	8.5	2.0	3768.0
30SAC33AN001	SAC, Normal Air Exhaust Fan SAC33AN001	3.8	1.5	1.1	8.5	2.0	3768.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30JEB30AA018	RCP Seal, RCP3 Nitrogen Supply Solenoid Valve JEB30AA018	3.8	3.0	15.5	1.0	1.2	3.8
30JEB40AA018	RCP Seal, RCP4 Nitrogen Supply Solenoid Valve JEB40AA018	3.8	3.0	15.5	1.0	1.2	3.8
30QKA30AP107	SCWS, Train 3 Motor Driven Safety Chiller Pump QKA30AP107	3.8	1.5	1.1	8.5	2.0	3736.0
31BUD	ELEC, Non 1E 250V DC Distribution Panel 31BUD	3.8	5.9	1.7		1.0	
30KAA22AA101	CCWS, Common Header 1 QKA20 Chiller Return 3-Way MOV KAA22AA101	3.6	1.0	1.0	8.7	1.0	
30QKA20AA003	SCWS, Train 2 Safety Chiller Pump Discharge Check Valve QKA20AA003	3.6	1.2	1.0	8.7	1.0	193.7
30QKA20AA101	SCWS, Train 2 Chiller By-pass MOV QKA20AA101	3.6	1.0	1.0	8.7	1.0	
30QKC20AA101	SCWS, Return from SAC Div 2 MOV QKC20AA101	3.6	1.0	1.0	8.7	1.0	
30SAC02AA003	SAC, Normal Air Inlet Motor Operated Damper SAC02AA003	3.6	1.0	1.0	8.7	1.0	
30SAC02AA005	SAC, Normal Air Inlet Supply Fan Discharge Check Damper SAC02AA005	3.6	1.2	1.0	8.7	1.0	193.7
30SAC32AA002	SAC, Normal Air Exhaust Motor Operated Damper SAC32AA002	3.6	1.0	1.0	8.7	1.0	
30SAC32AA003	SAC, Normal Air Exhaust Supply Fan Discharge Check Damper SAC32AA003	3.6	1.0	1.0	8.7	1.0	184.4

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
31BRB	ELEC, 480V MCC 31BRB	3.6	5.4	2.0	1.1	1.9	
33BDB3BMT02	ELEC, 6.9kV SWGR 33BDB to Transformer 33BMT02 Circuit Breaker	3.5	1.0	1.2	8.4	1.0	
33BMT023BMB	ELEC, Transformer 33BMT02 to 480V Load Center 33BMB Circuit Breaker	3.5	1.0	1.2	8.4	1.0	
34BDB4BMT02	ELEC, 6.9kV SWGR 34BDB to Transformer 34BMT02 Circuit Breaker	3.5	1.0	1.2	8.4	1.0	
34BDC_4BDB1	ELEC, 6.9kV SWGR 34BDC to 6.9kV SWGR 34BDB Circuit Breaker	3.5	1.0	1.2	8.4	1.0	
34BDC_4BDB2	ELEC, 6.9kV SWGR 34BDC to 6.9kV SWGR 34BDB Circuit Breaker	3.5	1.0	1.2	8.4	1.0	
34BMT024BMB	ELEC, Transformer 34BMT02 to 480V Load Center 34BMB Circuit Breaker	3.5	1.0	1.2	8.4	1.0	
34BDA_4BDC1	ELEC, 6.9kV SWGR 34BDA to 6.9kV SWGR 34BDC Circuit Breaker	3.5			8.4	1.0	
34BDA_4BDC2	ELEC, 6.9kV SWGR 34BDA to 6.9kV SWGR 34BDC Circuit Breaker	3.5	1.4	1.0	8.4	1.0	2.5
30KAA32AA101	CCWS, Common Header 2 QKA30 Chiller Return 3-Way MOV KAA32AA101	3.3	1.0	1.0	7.9	1.0	
30QKA30AA003	SCWS, Train 3 Safety Chiller Pump Discharge Check Valve QKA30AA003	3.3	1.2	1.0	7.9	1.0	193.7
30QKA30AA101	SCWS, Train 3 Chiller By-pass MOV QKA30AA101	3.3	1.0	1.0	7.9	1.0	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30QKC30AA101	SCWS, Return from SAC Div 3 MOV QKC30AA101	3.3	1.0	1.0	7.9	1.0	
30SAC03AA003	SAC, Normal Air Inlet Motor Operated Damper SAC03AA003	3.3	1.0	1.0	7.9	1.0	
30SAC03AA005	SAC, Normal Air Inlet Supply Fan Discharge Check Damper SAC03AA005	3.3	1.2	1.0	7.9	1.0	193.7
30SAC33AA002	SAC, Normal Air Exhaust Motor Operated Damper SAC33AA002	3.3	1.0	1.0	7.9	1.0	
30SAC33AA003	SAC, Normal Air Exhaust Supply Fan Discharge Check Damper SAC33AA003	3.3	1.0	1.0	7.9	1.0	184.4
30PEB20AP001	ESWS, Train 2 Motor Driven Pump PEB20AP001	3.2	2.6	5.4	3.3	1.4	29.0
32BRU03	ELEC, Inverter 32BRU03	3.1	3.3	8.2		1.0	3.1
31BNB02	ELEC, 480V MCC 31BNB02	3.1	3.3	2.6	2.8	1.0	
30PEB20AA005	ESWS, Train 2 Pump Discharge Isolation MOV PEB20AA005	3.1	2.5	5.3	3.3	1.4	
32BRC	ELEC, 480V MCC 32BRC	2.9	3.2	7.3		1.0	
32BRU0301	ELEC, Inverter 32BRU03 Bypass Switch 32BRU0301	2.9	3.2	7.3		1.0	
30LBA43AA101	MSS, Train 4 MSRCV LBA43AA101	2.9	4.4		1.0	3.2	2.9

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30PEB30AP001	ESWS, Train 3 Motor Driven Pump PEB30AP001	2.8	2.6	4.6	2.4	1.3	29.0
30JEB10AA010	RCP, RCP1 Leakoff Isolation MOV JEB10AA010	2.8	4.2	1.1	1.1	1.3	2.8
30JEB10AA020	RCP Seal, RCP1 Seal Nitrogen Venting Isolation MOV JEB10AA020	2.8	4.2	1.1	1.1	1.3	2.8
30JEB20AA010	RCP, RCP2 Leakoff Isolation MOV JEB20AA010	2.8	4.2	1.1	1.1	1.3	2.8
30JEB20AA020	RCP Seal, RCP2 Seal Nitrogen Venting Isolation MOV JEB20AA020	2.8	4.2	1.1	1.1	1.3	2.8
30LBA10AA002	MSS, Train 1 Main Steam Isolation Valve LBA10AA002	2.8	1.0		6.2	1.7	221.0
30LBA20AA002	MSS, Train 2 Main Steam Isolation Valve LBA20AA002	2.8	1.0		6.2	1.7	221.0
30PEB30AA005	ESWS, Train 3 Pump Discharge Isolation MOV PEB30AA005	2.7	2.5	4.5	2.3	1.3	
30JNG10AC001	LHSI, LHSI Train 1 HTX JNG10AC001	2.6		1.1	5.9	1.0	
31BDD	ELEC, 6.9kV SWGR 31BDD	2.6		1.0	5.8	1.0	
31BMD	ELEC, 480V Load Center 31BMD	2.6	1.0	1.0	5.8	1.0	
31BMT04	ELEC, 6.9kV-480V Transformer 31BMT04	2.6	1.0	1.0	5.8	1.0	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
33BDA	ELEC, 6.9kV SWGR 33BDA	2.5	1.3	1.2	5.0	1.0	
30LAS11AP001	EFWS, Train 1 Motor Driven Pump LAS11AP001	2.5	3.3	1.2	1.5	1.4	282.9
30QNA22AN001	OCWS, Train 2A Chiller Unit QNA22AN001	2.4	3.6	1.1	1.0	1.5	2.4
30QNA23AN001	OCWS, Train 1B Chiller Unit QNA23AN001	2.4	3.6	1.1	1.0	1.5	2.4
33BRA	ELEC, 480V MCC 33BRA	2.4	3.1		1.8	13.8	
30JEB10 SSSF	Stand Still Seal for RCP1	2.4	3.5	1.0	1.0	1.2	2.4
30JEB20 SSSF	Stand Still Seal for RCP2	2.4	3.5	1.0	1.0	1.2	2.4
30JEB30AA019	RCP Seal, RCP3 Nitrogen Supply Check Valve JEB30AA019	2.4	1.8	9.4	1.0	1.0	2.4
30JEB40AA019	RCP Seal, RCP4 Nitrogen Supply Check Valve JEB40AA019	2.4	1.8	9.4	1.0	1.0	2.4
30PED10AN002	UHS, Cooling Tower Train 1 Cooling Fan PED10AN002	2.4	1.1	5.1	3.5	1.3	366.7
30LAS41AP001	EFWS, Train 4 Motor Driven Pump LAS41AP001	2.3	3.3	1.1	1.2	1.7	282.9
31BRU03	ELEC, Inverter 31BRU03	2.3	3.3	1.6		1.0	2.3

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30KAA12AA005	CCWS, Train 1 to LHSI HTX 10 Cooling MOV KAA12AA005	2.3	1.1	4.9	3.4	1.2	367.5
30JEB30AP001	ELEC, 13.8kV SWGR 33BBC Circuit Breaker for RCP JEB30AP001	2.3	1.2	6.5	2.6	1.0	2.3
30JEB40AP001	ELEC, 13.8kV Bus BBH Circuit Breaker for RCP JEB40AP001	2.3	1.2	6.5	2.6	1.0	2.3
35BBA	ELEC, 13.8kV SWGR 35BBA	2.3	2.8		2.0	1.0	
35BFE	ELEC, 480V Load Center 35BFE	2.3	2.8		2.0	1.0	
35BFT05	ELEC, 13.8kV-480V Transformer 35BFT05	2.3	2.8		2.0	1.0	
30KAA10BB001	CCWS, Train 1 Surge Tank KAA10BB001	2.3		1.0	4.8	1.0	
30QNA22AP033	OCWS, Train 2A Motor Driven Chiller Unit Pump QNA22AP033	2.3	3.3	1.1	1.0	1.1	2.3
30QNA23AP043	OCWS, Train 1B Motor Driven Chiller Unit Pump QNA23AP043	2.3	3.3	1.1	1.0	1.1	2.3
31BRC	ELEC, 480V MCC 31BRC	2.3	3.2	1.4		1.0	
31BRU0301	ELEC, Inverter 31BRU03 Bypass Switch 31BRU0301	2.3	3.2	1.4		1.0	
34BNB02	ELEC, 480V MCC 34BNB02	2.3	3.2	1.0	1.1	1.2	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
33BDA_3BDB1	ELEC, 6.9kV SWGR 33BDA to 6.9kV SWGR 33BDB Circuit Breaker	2.2	1.0		4.7	1.0	
33BDA_3BDB2	ELEC, 6.9kV SWGR 33BDA to 6.9kV SWGR 33BDB Circuit Breaker	2.2	1.0		4.7	1.0	
30JNG10AA104	LHSI, LHSI Pump 10 Throttle Control MOV JNG10AA104	2.2	1.0	4.3	3.3	1.1	
30KAA20AP001	CCWS, Train 2 Motor Driven Pump KAA20AP001	2.2	1.4	4.6	2.6	1.0	24.5
30JEB10AA018	RCP Seal, RCP1 Nitrogen Supply Solenoid Valve JEB10AA018	2.2	3.1	1.0	1.0	1.1	2.2
30JEB20AA018	RCP Seal, RCP2 Nitrogen Supply Solenoid Valve JEB20AA018	2.2	3.1	1.0	1.0	1.1	2.2
30LAR11AA103	EFWS, Train 1 SG Pressure Control MOV LAR11AA103	2.2	3.0	1.1	1.3	1.2	
30LAR11AA105	EFWS, Train 1 SG Level Control MOV LAR11AA005	2.2	3.0	1.1	1.3	1.2	
30PEB20AA007	ESWS, Train 2 Manual Valve PEB20AA007	2.1	1.7	3.1	2.5	1.1	
30PEB20AA009	ESWS, Train 2 Manual Valve PEB20AA009	2.1	1.7	3.1	2.5	1.1	
30PEB20AA010	ESWS, Train 2 Manual Valve PEB20AA010	2.1	1.7	3.1	2.5	1.1	
30LAR41AA103	EFWS, Train 4 SG Pressure Control MOV LAR41AA103	2.1	2.9	1.1	1.2	1.3	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30LAR41AA105	EFWS, Train 4 SG Level Control MOV LAR41AA005	2.1	2.9	1.1	1.2	1.3	
32BNB02	ELEC, 480V MCC 32BNB02	2.1	1.6	2.9	2.6	1.0	
30KAA10AA112	CCWS, Train 1 Heat Exchanger Bypass MOV KAA10AA112	2.1		1.0	4.2	1.0	
30PEB10AA005	ESWS, Train 1 Pump Discharge Isolation MOV, PEB10AA005	2.1			4.2	1.0	
30PEB10AA010	UHS, Cooling Tower Train 1 Spray MOV PEB10AA010, Fails to Remain Open (SO)	2.1			4.2	1.0	
30PEB10AA011	UHS, Cooling Tower Train 1 Bypass Line MOV PEB10AA011, Internal Rupture	2.1			4.2	1.0	
30XKA20	ELEC, Emergency Diesel Generator XKA20	2.1	2.5	1.2	1.6	1.4	518.2
30JNG13AA005	LHSI, CL1 First SIS Isolation Check Valve JNG13AA005	2.0	1.1	5.1	2.4	1.0	3040.0
30PED10AN001	UHS, Cooling Tower Train 1 Cooling Fan PED10AN001	2.0	1.1	3.8	3.0	1.1	370.0
30LAB31AA001	FWS, HP Heater Train 1 Bypass Pneumatic Valve LAB31AA001	2.0	1.7	2.0	2.4	1.0	
30LAB31AA002	FWS, HP Heater Train 1 Bypass Pneumatic Valve LAB31AA002	2.0	1.7	2.0	2.4	1.0	
30LAB32AA001	FWS, HP Heater Train 2 Bypass Pneumatic Valve LAB32AA001	2.0	1.7	2.0	2.4	1.0	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30LAB32AA002	FWS, HP Heater Train 2 Bypass Pneumatic Valve LAB32AA002	2.0	1.7	2.0	2.4	1.0	
30PGB19AA191	CLCWS, Safety Valve PGB19AA191	2.0	1.7	2.0	2.4	1.0	
33BRB	ELEC, 480V MCC 33BRB	2.0	1.6	6.8		1.0	
30KAA10AC001	CCWS, Train 1 HTX 10 KAA10AC001	2.0	1.0	1.0	3.9	1.0	
31BDA_1BDD1	ELEC, 6.9kV SWGR 31BDA to 6.9kV SWGR 31BDD Circuit Breaker	2.0		1.0	3.9	1.0	
31BDA_1BDD2	ELEC, 6.9kV SWGR 31BDA to 6.9kV SWGR 31BDD Circuit Breaker	2.0		1.0	3.9	1.0	
31BDD1BMT04	ELEC, 6.9kV SWGR 31BDD to Transformer 31BMT04 Circuit Breaker	2.0	1.0	1.0	3.9	1.0	
31BMT041BMD	ELEC, Transformer 31BMT04 to 480V Load Center 31BMD Circuit Breaker	2.0	1.0	1.0	3.9	1.0	
35BBG	ELEC, 6.9kV SWGR 35BBG	2.0	2.8			1.0	
35BBT07	ELEC, 13.8kV-6.9kV Transformer 35BBT07	2.0	2.8			1.0	
36BBA	ELEC, 13.8kV SWGR 36BBA	2.0	2.8			1.0	
36BBG	ELEC, 6.9kV SWGR 36BBG	2.0	2.8			1.0	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
36BBT07	ELEC, 13.8kV-6.9kV Transformer 36BBT07	2.0	2.8			1.0	
36BFE	ELEC, 480V Bus 36BFE	2.0	2.8			1.0	
36BFT05	ELEC, 13.8kV-480V Transformer 36BFT05	2.0	2.8			1.0	
30KAA30AP001	CCWS, Train 3 Motor Driven Pump KAA30AP001	2.0	1.5	3.9	2.1	1.0	24.5
30PED20AN002	UHS, Cooling Tower Train 2 Cooling Fan PED20AN002	1.9	1.3	3.5	2.5	1.1	366.7
30JNG10AP001	LHSI, LHSI Train 1 Motor Driven Pump JNG10AP001	1.9	1.1	3.4	2.9	1.1	339.3
30PEB40AP001	ESWS, Train 4 Motor Driven Pump PEB40AP001	1.9	2.6	1.0	1.1	1.0	15.1
30XKA30	ELEC, Emergency Diesel Generator XKA30	1.9	2.5	1.2	1.2	1.4	518.2
30JEB10AP001	ELEC, 13.8kV SWGR 31BBC Circuit Breaker for RCP JEB10AP001	1.9	2.6			1.0	1.9
30JEB20AP001	ELEC, 13.8kV SWGR 32BBC Circuit Breaker for RCP JEB20AP001	1.9	2.6			1.0	1.9
30KAA22AA005	CCWS, Train 2 to LHSI HTX 20 Cooling MOV KAA22AA005	1.9	1.2	3.4	2.5	1.1	367.5
30JNG33AA005	LHSI, CL3 First SIS Isolation Check Valve JNG33AA005	1.8	1.3	3.7	2.0	1.0	3040.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30PEB30AA007	ESWS, Train 3 Manual Valve PEB30AA007	1.8	1.7	2.6	1.7	1.1	
30PEB30AA009	ESWS, Train 3 Manual Valve PEB30AA009	1.8	1.7	2.6	1.7	1.1	
30PEB30AA010	ESWS, Train 3 Manual Valve PEB30AA010	1.8	1.7	2.6	1.7	1.1	
30JNG20AA104	LHSI, LHSI Pump 20 Throttle Control MOV JNG20AA104	1.8	1.2	3.0	2.4	1.1	
30JNG10AA006	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA006	1.8	1.1	3.4	2.4	1.2	310.6
30KBA31AP001	CVCS, HP Motor Driven Charging Pump KBA31AP001	1.8			3.3	1.1	1.8
30LAR11AA001	EFWS, Train 1 Pump Suction Manual Valve LAR11AA001	1.8	2.3	1.0	1.1	1.0	
33BNB02	ELEC, 480V MCC 33BNB02	1.8	1.6	2.4	1.7	1.1	
30KAA12AA011	CCWS, LHSI HTX 10 Cooling Manual Valve KAA12AA011	1.8		2.7	2.7	1.0	
30QKC10AA026	SCWS, LHSI Pump 10 Motor Cooling Manual Valve QKC10AA026	1.8	1.0	2.7	2.7	1.0	
30QKC10AA027	SCWS, LHSI Pump 10 Sealing Fluid Cooling Manual Valve QKC10AA027	1.8	1.0	2.7	2.7	1.0	
30JNG23AA005	LHSI, CL2 First SIS Isolation Check Valve JNG23AA005	1.8	1.3	3.6	1.9	1.0	3040.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30LAR41AA001	EFWS, Train 4 Pump Suction Manual Valve LAR41AA001	1.7	2.3	1.0	1.1	1.2	
30KAA20AA005	CCWS, Discharge from CCW HTX 20 Manual Valve KAA20AA005	1.7	1.2	3.1	2.1	1.0	
30KAA20AA007	CCWS, Pump 20 Cooling Manual Valve KAA20AA007	1.7	1.2	3.1	2.1	1.0	
30KAA20AA008	CCWS, Pump 20 Cooling Manual Valve KAA20AA008	1.7	1.2	3.1	2.1	1.0	
30KAA20AA011	CCWS, Pump 20 Suction from CCST Manual Valve KAA20AA011	1.7	1.2	3.1	2.1	1.0	
30KAA20AA015	CCWS, Pump 20 Suction Manual Valve KAA20AA015	1.7	1.2	3.1	2.1	1.0	
30KAA20AA018	CCWS, Pump 20 Discharge Manual Valve KAA20AA018	1.7	1.2	3.1	2.1	1.0	
30KAA20AA140	CCWS, Pump 20 Cooling Manual Valve KAA20AA140	1.7	1.2	3.1	2.1	1.0	
30JNG30AA006	LHSI, LHSI CL3 Discharge Manual CHECK Valve JNG30AA006	1.7	1.3	2.8	2.1	1.1	310.6
30PED30AN002	UHS, Cooling Tower Train 3 Cooling Fan PED30AN002	1.7	1.3	2.7	2.1	1.1	366.7
30JND10AP001	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001	1.7	1.3	4.8	1.3	1.0	447.0
30PED20AN001	UHS, Cooling Tower Train 2 Cooling Fan PED20AN001	1.7	1.2	2.7	2.2	1.0	370.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30KAA32AA005	CCWS, Train 3 to LHSI HTX 30 Cooling MOV KAA32AA005	1.7	1.3	2.6	2.0	1.1	367.5
30KBA31AA191	CVCS, Train 1 Charging Pump 31 Safety Valve KBA31AA191	1.7			3.1	1.0	
32BRC_4BRB1	ELEC, 480V MCC 32BRC to 480V MCC 34BRB Circuit Breaker	1.7	1.7	3.7		1.0	
32BRC_4BRB2	ELEC, 480V MCC 32BRC to 480V MCC 34BRB Circuit Breaker	1.7	1.7	3.7		1.0	
32BRU032BRC	ELEC, Inverter 32BRU03 to 480V MCC 32BRC Circuit Breaker	1.7	1.7	3.7		1.0	
32BUD2BRU03	ELEC, 250V Bus 32BUD to Inverter 32BRU03 Circuit Breaker	1.7	1.7	3.7		1.0	
30JND10AA003	MHSI, MHSI Pump 10 Discharge Manual CHECK Valve JND10AA003	1.7	1.3	4.7	1.3	1.0	420.5
30KAA40AP001	CCWS, Train 40 Motor Driven Pump KAA40AP001	1.7	2.2		1.0	1.0	14.3
30PEB20AA004	ESWS, Train 2 Pump Discharge Check Valve PEB20AA004	1.6	1.4	1.7	2.1	1.0	320.8
30JNG20AA006	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA006	1.6	1.3	2.6	1.9	1.1	310.6
30JNG20AP001	LHSI, LHSI Train 2 Motor Driven Pump JNG20AP001	1.6	1.1	2.4	2.1	1.0	339.3
30LBA30AA002	MSS, Train 3 Main Steam Isolation Valve LBA30AA002	1.6	1.0		2.7	1.2	221.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30JNG30AA104	LHSI, LHSI Pump 30 Throttle Control MOV JNG30AA104	1.6	1.2	2.3	2.0	1.0	
31BTB01	ELEC, 250V Battery 31BTB01 Circuit Breaker	1.6	2.1	1.0	1.0	1.0	
32BTB01	ELEC, 250V Battery 32BTB01 Circuit Breaker	1.6	2.1	1.0	1.0	1.0	
30KAA30AA005	CCWS, Discharge from CCW HTX 30 Manual Valve KAA30AA005	1.6	1.2	2.6	1.7	1.0	
30KAA30AA007	CCWS, Pump 30 Cooling Manual Valve KAA30AA007	1.6	1.2	2.6	1.7	1.0	
30KAA30AA008	CCWS, Pump 30 Cooling Manual Valve KAA30AA008	1.6	1.2	2.6	1.7	1.0	
30KAA30AA011	CCWS, Pump 30 Suction from CCST Manual Valve KAA30AA011	1.6	1.2	2.6	1.7	1.0	
30KAA30AA015	CCWS, Pump 30 Suction Manual Valve KAA30AA015	1.6	1.2	2.6	1.7	1.0	
30KAA30AA018	CCWS, Pump 30 Discharge Manual Valve KAA30AA018	1.6	1.2	2.6	1.7	1.0	
30KAA30AA140	CCWS, Pump 30 Cooling Manual Valve KAA30AA140	1.6	1.2	2.6	1.7	1.0	
30KAA10AA004	CCWS, Train 1 Discharge from CCW HTX 10 Check Valve KAA10AA004	1.5		1.0	2.6	1.0	20.7
30PEB10AA004	ESWS, Train 1 Pump Discharge Check Valve PEB10AA004	1.5			2.6	1.0	320.8

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30BDT01	ELEC, Aux Transformer 30BDT01	1.5			2.6	1.0	
30KAA22AA007	CCWS, LHSI Pump 20 Cooling Manual Valve KAA22AA007	1.5	1.1	2.0	2.0	1.0	
30KAA22AA010	CCWS, LHSI Pump 20 Cooling Manual Valve KAA22AA010	1.5	1.1	2.0	2.0	1.0	
30KAA22AA011	CCWS, LHSI HTX 20 Cooling Manual Valve KAA22AA011	1.5	1.1	2.0	2.0	1.0	
30KAA22AA116	CCWS, LHSI Pump 20 Motor Cooling Manual Valve KAA22AA116	1.5	1.1	2.0	2.0	1.0	
30KAA22AA127	CCWS, LHSI Pump 20 Sealing Fluid Cooling Manual Valve KAA22AA127	1.5	1.1	2.0	2.0	1.0	
32BRC_3BRB1	ELEC, 480V MCC 32BRC to 480V MCC 33BRB Circuit Breaker	1.5	1.4	3.7		1.0	
32BRC_3BRB2	ELEC, 480V MCC 32BRC to 480V MCC 33BRB Circuit Breaker	1.5	1.4	3.7		1.0	
30BDT01_1BDA	ELEC, Aux Transformer 30BDT01 to 6.9kV SWGR 31BDA Circuit Breaker	1.5	1.1	1.1	2.5	1.0	379.4
30PED30AN001	UHS, Cooling Tower Train 3 Cooling Fan PED30AN001	1.5	1.2	2.0	1.8	1.0	370.0
30JND30AP001	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001	1.5	1.3	3.0	1.1	1.0	447.0
30JND30AA003	MHSI, MHSI Pump 30 Discharge Manual CHECK Valve JND30AA003	1.4	1.3	3.0	1.1	1.0	420.5

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30JND20AP001	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001	1.4	1.2	3.1	1.2	1.0	447.0
30SAC05AN001	SAC, Maintenance Division Air Supply Fan SAC05AN01	1.4	1.0	1.2	2.1	1.6	1.6
30SAC35AN001	SAC, Maintenance Division Air Exhaust Fan SAC35AN01	1.4	1.0	1.2	2.1	1.6	1.6
30JNG10AA009	LHSI, LHSI Pump 10 Discharge Check Valve JNG10AA009	1.4	1.0	1.3	2.1	1.0	310.6
30JNG10AA011	LHSI, LHSI Pump 10 Discharge Check Valve JNG10AA011	1.4	1.0	1.3	2.1	1.0	310.6
30KAA12AA012	CCWS, Train 1 LHSI HTX Discharge Check Valve KAA12AA012	1.4		1.3	2.1	1.0	316.2
30QKC10AA028	SCWS, Train 1 Discharge of LHSI Pump Seal Cooler Check Valve QKC10AA028	1.4	1.0	1.3	2.1	1.0	1.4
30JND20AA003	MHSI, MHSI Pump 20 Discharge Manual CHECK Valve JND20AA003	1.4	1.2	3.0	1.1	1.0	420.5
30JND10AA001	MHSI, MHSI Pump 10 Suction Manual Valve JND10AA001	1.3	1.0	2.9	1.1	1.0	
30KAA12AA006	CCWS, MHSI Pump 10 Cooling Manual Valve KAA12AA006	1.3	1.0	2.9	1.1	1.0	
30KAA12AA009	CCWS, MHSI Pump 10 Cooling Manual Valve KAA12AA009	1.3	1.0	2.9	1.1	1.0	
30KAA12AA115	CCWS, MHSI Pump 10 Cooling Manual Control Valve KAA12AA115	1.3	1.0	2.9	1.1	1.0	

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
30JND20AA001	MHSI, MHSI Pump 20 Suction Manual Valve JND20AA001	1.2	1.0	2.1	1.1	1.0	
30JND30AA001	MHSI, MHSI Pump 30 Suction Manual Valve JND30AA001	1.2	1.0	2.1	1.1	1.0	
30KAA22AA006	CCWS, MHSI Pump 20 Cooling Manual Valve KAA22AA006	1.2	1.0	2.1	1.1	1.0	
30KAA22AA009	CCWS, MHSI Pump 20 Cooling Manual Valve KAA22AA009	1.2	1.0	2.1	1.1	1.0	
30KAA22AA115	CCWS, MHSI Pump 20 Cooling Manual Valve KAA22AA115	1.2	1.0	2.1	1.1	1.0	
30KAA32AA006	CCWS, MHSI Pump 30 Cooling Manual Valve KAA32AA006	1.2	1.0	2.1	1.1	1.0	
30KAA32AA009	CCWS, MHSI Pump 30 Cooling Manual Valve KAA32AA009	1.2	1.0	2.1	1.1	1.0	
30KAA32AA115	CCWS, MHSI Pump 30 Cooling Manual Control Valve KAA32AA115	1.2	1.0	2.1	1.1	1.0	
30QNA21AN001	OCWS, Train 1A Chiller Unit QNA21AN001	1.2	1.0	1.4	1.3	2.2	1.3
30QNA24AN001	OCWS, Train 2B Chiller Unit QNA24AN001	1.2	1.0	1.4	1.3	2.2	1.3
30QKA40AA108	SCWS, Train 4 Safety Chiller Pump Discharge Check Valve QKA40AA108					2.7	
CLE22EQ011LV60NS	ALU-A1 Train 1 Protection System Computer Processors (Non-Self-						201.9

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
	Monitored)						
CLE22EQ021LV60NS	ALU-A2 Train 1 Protection System Computer Processors (Non-Self-Monitored)						201.9
CLF22EQ011LV60NS	ALU-A1 Train 2 Protection System Computer Processors (Non-Self-Monitored)						201.9
CLF22EQ021LV60NS	ALU-A2 Train 2 Protection System Computer Processors (Non-Self-Monitored)						201.9
CLG22EQ011LV60NS	ALU-A1 Train 3 Protection System Computer Processors (Non-Self-Monitored)						201.9
CLG22EQ021LV60NS	ALU-A2 Train 3 Protection System Computer Processors (Non-Self-Monitored)						201.9
CLH22EQ011LV60NS	ALU-A1 Train 4 Protection System Computer Processors (Non-Self-Monitored)						201.9
CLH22EQ021LV60NS	ALU-A2 Train 4 Protection System Computer Processors (Non-Self-Monitored)						201.9
CLE22EQ011LV60SM	ALU-A1 Train 1 Protection System Computer Processors (Self-Monitored)						101.2

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
CLE22EQ021LV60SM	ALU-A2 Train 1 Protection System Computer Processors (Self-Monitored)						101.2
CLF22EQ011LV60SM	ALU-A1 Train 2 Protection System Computer Processors (Self-Monitored)						101.2
CLF22EQ021LV60SM	ALU-A2 Train 2 Protection System Computer Processors (Self-Monitored)						101.2
CLG22EQ011LV60SM	ALU-A1 Train 3 Protection System Computer Processors (Self-Monitored)						101.2
CLG22EQ021LV60SM	ALU-A2 Train 3 Protection System Computer Processors (Self-Monitored)						101.2
CLH22EQ011LV60SM	ALU-A1 Train 4 Protection System Computer Processors (Self-Monitored)						101.2
CLH22EQ021LV60SM	ALU-A2 Train 4 Protection System Computer Processors (Self-Monitored)						101.2
CLE24EQ001LV60NS	ALU-B1 Train 1 Protection System Computer Processors (Non-Self-Monitored)						2921.0
CLE24EQ002LV60NS	ALU-B2 Train 1 Protection System Computer Processors (Non-Self-Monitored)						2921.0
CLF24EQ001LV60NS	ALU-B1 Train 2 Protection System Computer Processors (Non-Self-Monitored)						2921.0
CLF24EQ002LV60NS	ALU-B2 Train 2 Protection System Computer Processors (Non-Self-Monitored)						2921.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
	Monitored)						
CLG24EQ001LV60NS	ALU-B1 Train 3 Protection System Computer Processors (Non-Self-Monitored)						2921.0
CLG24EQ002LV60NS	ALU-B2 Train 3 Protection System Computer Processors (Non-Self-Monitored)						2921.0
CLH24EQ001LV60NS	ALU-B1 Train 4 Protection System Computer Processors (Non-Self-Monitored)						2921.0
CLH24EQ002LV60NS	ALU-B2 Train 4 Protection System Computer Processors (Non-Self-Monitored)						2921.0
CLE24EQ001LV60SM	ALU-B1 Train 1 Protection System Computer Processors (Self-Monitored)						2889.0
CLE24EQ002LV60SM	ALU-B2 Train 1 Protection System Computer Processors (Self-Monitored)						2889.0
CLF24EQ001LV60SM	ALU-B1 Train 2 Protection System Computer Processors (Self-Monitored)						2889.0
CLF24EQ002LV60SM	ALU-B2 Train 2 Protection System Computer Processors (Self-Monitored)						2889.0
CLG24EQ001LV60SM	ALU-B1 Train 3 Protection System Computer Processors (Self-Monitored)						2889.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
CLG24EQ002LV60SM	ALU-B2 Train 3 Protection System Computer Processors (Self-Monitored)						2889.0
CLH24EQ001LV60SM	ALU-B1 Train 4 Protection System Computer Processors (Self-Monitored)						2889.0
CLH24EQ002LV60SM	ALU-B2 Train 4 Protection System Computer Processors (Self-Monitored)						2889.0
CLE21EQ002LV60NS	APU-2 Protection Train 1 System Computer Processors (Non-Self-Monitored)						201.9
CLF21EQ002LV60NS	APU-2 Protection Train 2 System Computer Processors (Non-Self-Monitored)						201.9
CLG21EQ002LV60NS	APU-2 Protection Train 3 System Computer Processors (Non-Self-Monitored)						201.9
CLH21EQ002LV60NS	APU-2 Protection Train 4 System Computer Processors (Non-Self-Monitored)						201.9
CLE21EQ002LV60SM	APU-2 Protection Train 1 System Computer Processors (Self-Monitored)						101.2
CLF21EQ002LV60SM	APU-2 Protection Train 2 System Computer Processors (Self-Monitored)						101.2
CLG21EQ002LV60SM	APU-2 Protection Train 3 System Computer Processors (Self-Monitored)						101.2

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
CLH21EQ002LV60SM	APU-2 Protection Train 4 System Computer Processors (Self-Monitored)						101.2
CLE23EQ001LV60NS	APU-3 Protection Train 1 System Computer Processors (Non-Self-Monitored)						402.5
CLF23EQ001LV60NS	APU-3 Protection Train 2 System Computer Processors (Non-Self-Monitored)						402.5
CLG23EQ001LV60NS	APU-3 Protection Train 3 System Computer Processors (Non-Self-Monitored)						402.5
CLH23EQ001LV60NS	APU-3 Protection Train 4 System Computer Processors (Non-Self-Monitored)						402.5
CLE23EQ001LV60SM	APU-3 Protection Train 1 System Computer Processors (Self-Monitored)						394.0
CLF23EQ001LV60SM	APU-3 Protection Train 2 System Computer Processors (Self-Monitored)						394.0
CLG23EQ001LV60SM	APU-3 Protection Train 3 System Computer Processors (Self-Monitored)						394.0
CLH23EQ001LV60SM	APU-3 Protection Train 4 System Computer Processors (Self-Monitored)						394.0
CLE23EQ002LV60NS	APU-4 Protection Train 1 System Computer Processors (Non-Self-Monitored)						2064.0

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
CLF23EQ002LV60NS	APU-4 Protection Train 2 System Computer Processors (Non-Self-Monitored)						2064.0
CLG23EQ002LV60NS	APU-4 Protection Train 3 System Computer Processors (Non-Self-Monitored)						2064.0
CLH23EQ002LV60NS	APU-4 Protection Train 4 System Computer Processors (Non-Self-Monitored)						2064.0
CLE23EQ002LV60SM	APU-4 Protection Train 1 System Computer Processors (Self-Monitored)						2045.0
CLF23EQ002LV60SM	APU-4 Protection Train 2 System Computer Processors (Self-Monitored)						2045.0
CLG23EQ002LV60SM	APU-4 Protection Train 3 System Computer Processors (Self-Monitored)						2045.0
CLH23EQ002LV60SM	APU-4 Protection Train 4 System Computer Processors (Self-Monitored)						2045.0
CL-PS-A-SWCCF	Protection System diversity group A Software						274.3
CL-PS-B-SWCCF	Protection System diversity group B Software						3009.0
CL-TXS-OSCCF	TXS operating system software or multiple diversity groups						23,510.0
JEF10CP801-SNPFL	Train 1 Pressurizer (RCS) pressure sensor						426.1

Table 17.04-3-2—PRA-based Important SSC based on the RAW Values, from Total, Internal Events, Fire, Flood, Total Level 2 and Common Cause Evaluations (33 Sheets)

Component ID	Component Description	RAW Based on Total CDF	RAW Based on Internal Events CDF	RAW Based on Flood CDF	RAW Based on Fire CDF	Level 2 RAW Based on Total LRF	Common Cause RAW Based on Total CDF
JEF10CP803-SNPFL	Train 2 Pressurizer (RCS) pressure sensor						426.1
JEF10CP805-SNPFL	Train 3 Pressurizer (RCS) pressure sensor						426.1
JEF10CP807-SNPFL	Train 4 Pressurizer (RCS) pressure sensor						426.1
LBA40CP811-SNPFL	Train 1 SG4 pressure sensors						2037.0
LBA40CP821-SNPFL	Train 2 SG4 pressure sensors						2037.0
LBA40CP831-SNPFL	Train 3 SG4 pressure sensors						2037.0
LBA40CP841-SNPFL	Train 4 SG4 pressure sensors						2037.0

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
BDT01_BDA_BFO_D-ALL	Common Cause Factor (CCF) to Open Normal Supply 6.9kV Circuit Breakers from Aux. Xfrm to Safety Related SWGRs	BDT01_1BDABFO	ELEC, Aux Transformer 30BDT01 to 6.9kV SWGR 31BDA Circuit Breaker
		BDT01_3BDABFO	ELEC, Aux Transformer 30BDT01 to 6.9kV SWGR 33BDA Circuit Breaker
		BDT02_2BDABFO	ELEC, Aux Transformer 30BDT02 to 6.9kV SWGR 32BDA Circuit Breaker
		BDT02_4BDABFO	ELEC, Aux Transformer 30BDT02 to 6.9kV SWGR 34BDA Circuit Breaker
BDT02_BDA-BFO_D-ALL	CCF to Open Backup Supply 6.9kV Circuit Breakers from Aux. Xfrm to Safety Related SWGRs	BDT01_2BDABFO	ELEC, Aux Transformer 30BDT01 to 6.9kV SWGR 32BDA Circuit Breaker
		BDT01_4BDABFO	ELEC, Aux Transformer 30BDT01 to 6.9kV SWGR 34BDA Circuit Breaker
		BDT02_1BDABFO	ELEC, Aux Transformer 30BDT02 to 6.9kV SWGR 31BDA Circuit Breaker
		BDT02_3BDABFO	ELEC, Aux Transformer 30BDT02 to 6.9kV SWGR 33BDA Circuit Breaker
BTD01_BAT__ST_D-ALL	CCF of Safety Related Batteries on Demand	31BTD01_BATST	ELEC, 250V 1E 2-hr Battery 31BTD01
		32BTD01_BATST	ELEC, 250V 1E 2-hr Battery 32BTD01
		33BTD01_BATST	ELEC, 250V 1E 2-hr Battery 33BTD01
		34BTD01_BATST	ELEC, 250V 1E 2-hr Battery 34BTD01
JNA10AA001EFO_D-ALL	CCF to Open LHSI Pump Suction from RCS MOVs	JNA10AA001EFO	RHR, LHSI Pump 10 Hot Leg Isolation MOV JNA10AA001
		JNA20AA001EFO	RHR, LHSI Pump 20 Hot Leg Isolation MOV JNA20AA001
		JNA30AA001EFO	RHR, LHSI Pump 30 Hot Leg Isolation MOV JNA30AA001
		JNA40AA001EFO	RHR, LHSI Pump 40 Hot Leg Isolation MOV JNA40AA001
JNA10AA002EFO_D-ALL	CCF to Open LHSI Pump Suction from RCS Angled MOVs	JNA10AA002EFO	RHR, LHSI Pump 10 Hot Leg Isolation MOV JNA10AA002

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		JNA20AA002EFO	RHR, LHSI Pump 20 Hot Leg Isolation MOV JNA20AA002
		JNA30AA002EFO	RHR, LHSI Pump 30 Hot Leg Isolation MOV JNA30AA002
		JNA40AA002EFO	RHR, LHSI Pump 40 Hot Leg Isolation MOV JNA40AA002
JNA10AA003EFO_D-ALL	CCF to Open LHSI Pump Suction from RCS MOVs	JNA10AA003EFO	RHR, LHSI Pump 10 Hot Leg Suction from RCS MOV JNA10AA003
		JNA20AA003EFO	RHR, LHSI Pump 20 Hot Leg Suction from RCS MOV JNA20AA003
		JNA30AA003EFO	RHR, LHSI Pump 30 Hot Leg Suction from RCS MOV JNA30AA003
		JNA40AA003EFO	RHR, LHSI Pump 40 Hot Leg Suction from RCS MOV JNA40AA003
JND10AA003CFO_D-ALL	CCF to Open MHSI Pump Discharge Motor Operated CHECK Valves	JND10AA003CFO	MHSI, MHSI Pump 10 Discharge Manual CHECK Valve JND10AA003
		JND20AA003CFO	MHSI, MHSI Pump 20 Discharge Manual CHECK Valve JND20AA003
		JND30AA003CFO	MHSI, MHSI Pump 30 Discharge Manual CHECK Valve JND30AA003
		JND40AA003CFO	MHSI, MHSI Pump 40 Discharge Manual CHECK Valve JND40AA003
JND10AA007CFO_D-ALL	CCF to Open MHSI Discharge CVs (CIVs)	JND10AA007CFO	MHSI, MHSI Pump 10 Discharge Check Valve JND10AA007 (CIV)
		JND20AA007CFO	MHSI, MHSI Pump 20 Discharge Check Valve JND20AA007 (CIV)
		JND30AA007CFO	MHSI, MHSI Pump 30 Discharge Check Valve JND30AA007 (CIV)
		JND40AA007CFO	MHSI, MHSI Pump 40 Discharge Check Valve JND40AA007 (CIV)
JND10AP001EFR_D-ALL	CCF of MHSI Pumps to Run	JND10AP001EFR	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		JND20AP001EFR	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001
		JND30AP001EFR	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001
		JND40AP001EFR	MHSI, MHSI Train 4 Motor Driven Pump JND40AP001
JND10AP001EFS_D-ALL	CCF of MHSI Pumps to Start	JND10AP001EFS	MHSI, MHSI Train 1 Motor Driven Pump JND10AP001
		JND20AP001EFS	MHSI, MHSI Train 2 Motor Driven Pump JND20AP001
		JND30AP001EFS	MHSI, MHSI Train 3 Motor Driven Pump JND30AP001
		JND40AP001EFS	MHSI, MHSI Train 4 Motor Driven Pump JND40AP001
JNG10AA001EFC_D-ALL	CCF to Close LHSI Pump Suction from IRWST MOVs	JNG10AA001EFC	LHSI, LHSI Pump 10 Suction from IRWST MOV JNG10AA001
		JNG20AA001EFC	LHSI, LHSI Pump 20 Suction from IRWST MOV JNG20AA001
		JNG30AA001EFC	LHSI, LHSI Pump 30 Suction from IRWST MOV JNG30AA001
		JNG40AA001EFC	LHSI, LHSI Pump 40 Suction from IRWST MOV JNG40AA001
JNG10AA004EFC_D-ALL	CCF to Close LHSI to Tangential Miniflow MOTOR Operated Check Valves	JNG10AA004EFC	LHSI, LHSI Train 1 to Tangential Miniflow MOTOR OPERATED CV JNG10AA004
		JNG20AA004EFC	LHSI, LHSI Train 2 to Tangential Miniflow MOTOR OPERATED CV JNG20AA004
		JNG30AA004EFC	LHSI, LHSI Train 3 to Tangential Miniflow MOTOR OPERATED CV JNG30AA004
		JNG40AA004EFC	LHSI, LHSI Train 4 to Tangential

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
			Miniflow MOTOR OPERATED CV JNG40AA004
JNG10AA006CFO_D-ALL	CCF to Open LHSI Check Valves (SIS Second Isolation Valves)	JNG10AA006CFO	LHSI, LHSI CL1 Discharge Manual CHECK Valve JNG10AA006
		JNG20AA006CFO	LHSI, LHSI CL2 Discharge Manual CHECK Valve JNG20AA006
		JNG30AA006CFO	LHSI, LHSI CL3 Discharge Manual CHECK Valve JNG30AA006
		JNG40AA006CFO	LHSI, LHSI CL4 Discharge Manual CHECK Valve JNG40AA006
JNG10AA009CFO_D-ALL	CCF to Open LHSI Discharge CVs (CIVs)	JNG10AA009CFO	LHSI, LHSI Pump 10 Discharge Check Valve JNG10AA009
		JNG20AA009CFO	LHSI, LHSI Pump 20 Discharge Check Valve JNG20AA009
		JNG30AA009CFO	LHSI, LHSI Pump 30 Discharge Check Valve JNG30AA009
		JNG40AA009CFO	LHSI, LHSI Pump 40 Discharge Check Valve JNG40AA009
JNG10AA011CFO_D-ALL	CCF to Open LHSI Discharge Check Valves	JNG10AA011CFO	LHSI, LHSI Pump 10 Discharge Check Valve JNG10AA011
		JNG20AA011CFO	LHSI, LHSI Pump 20 Discharge Check Valve JNG20AA011
		JNG30AA011CFO	LHSI, LHSI Pump 30 Discharge Check Valve JNG30AA009
		JNG40AA011CFO	LHSI, LHSI Pump 40 Discharge Check Valve JNG40AA011
JNG10AP001EFR_D-ALL	CCF of LHSI Pumps to Run	JNG10AP001EFR	LHSI, LHSI Train 1 Motor Driven Pump JNG10AP001
		JNG20AP001EFR	LHSI, LHSI Train 2 Motor Driven Pump JNG20AP001
		JNG30AP001EFR	LHSI, LHSI Train 3 Motor Driven Pump JNG30AP001

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		JNG40AP001EFR	LHSI, LHSI Train 4 Motor Driven Pump JNG40AP001
JNG10AP001EFS_D-ALL	CCF of LHSI Pumps to Start	JNG10AP001EFS	LHSI, LHSI Train 1 Motor Driven Pump JNG10AP001
		JNG20AP001EFS	LHSI, LHSI Train 2 Motor Driven Pump JNG20AP001
		JNG30AP001EFS	LHSI, LHSI Train 3 Motor Driven Pump JNG30AP001
		JNG40AP001EFS	LHSI, LHSI Train 4 Motor Driven Pump JNG40AP001
		JNG40AP001EFS	LHSI, LHSI Train 4 Motor Driven Pump JNG40AP001
JNG13AA005CFO_D-ALL	CCF to Open LHSI/MHSI Common Injection Check Valves (SIS First Isolation Valves)	JNG13AA005CFO	LHSI, CL1 First SIS Isolation Check Valve JNG13AA005
		JNG23AA005CFO	LHSI, CL2 First SIS Isolation Check Valve JNG23AA005
		JNG33AA005CFO	LHSI, CL3 First SIS Isolation Check Valve JNG33AA005
		JNG43AA005CFO	LHSI, CL4 First SIS Isolation Check Valve JNG43AA005
JNK10AT001SPG_P-ALL	CCF of IRWST Sump Strainers - Plugged	JNK10AT001SPG	IRWST, SIS Sump Strainer to MHSI/LHSI Train 1 Pumps JNK10AT001
		JNK10AT002SPG	IRWST, SIS Sump Strainer to MHSI/LHSI Train 2 Pumps JNK10AT002
		JNK10AT003SPG	IRWST, CVCS Sump Strainer JNK10AT003
		JNK11AT001SPG	IRWST, SIS Sump Strainer to MHSI/LHSI Train 4 Pumps JNK11AT001
		JNK11AT002SPG	IRWST, SIS Sump Strainer to MHSI/LHSI Train 3 Pumps JNK11AT002

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		JNK11AT003SPG	IRWST, SAHR Sump Strainer JNK11AT003
KAA10AA004CFO_D-ALL	CCF to Open CCWS HTX Discharge Check Valves	KAA10AA004CFO	CCWS, Train 1 Discharge from CCW HTX 10 Check Valve KAA10AA004
		KAA20AA004CFO	CCWS, Train 2 Discharge from CCW HTX 20 Check Valve KAA20AA004
		KAA30AA004CFO	CCWS, Train 3 Discharge from CCW HTX 30 Check Valve KAA30AA004
		KAA40AA004CFO	CCWS, Train 4 Discharge from CCW HTX 40 Check Valve KAA40AA004
KAA10AP001EFR_B-ALL	CCF of CCWS Pumps 1 and 4 to Run (Normally Running)	KAA10AP001EFR	CCWS, Train 1 Motor Driven Pump KAA10AP001
		KAA40AP001EFR	CCWS, Train 40 Motor Driven Pump KAA40AP001
KAA12AA005EFO_D-ALL	CCF to Open CCWS to LHSI HTX Cooling MOV	KAA12AA005EFO	CCWS, Train 1 to LHSI HTX 10 Cooling MOV KAA12AA005
		KAA22AA005EFO	CCWS, Train 2 to LHSI HTX 20 Cooling MOV KAA22AA005
		KAA32AA005EFO	CCWS, Train 3 to LHSI HTX 30 Cooling MOV KAA32AA005
		KAA42AA005EFO	CCWS, Train 4 to LHSI HTX 40 Cooling MOV KAA42AA005
KAA12AA012CFO_D-ALL	CCF to Open CCWS from LHSI HTX Discharge Check Valve	KAA12AA012CFO	CCWS, Train 1 LHSI HTX Discharge Check Valve KAA12AA012
		KAA22AA012CFO	CCWS, Train 2 Discharge of LHSI HTX Check Valve KAA22AA012
		KAA32AA012CFO	CCWS, Train 3 to LHSI Cooling Check Valve KAA32AA012
		KAA42AA012CFO	CCWS, Train 4 to LHSI HTX Check Valve KAA42AA012
KAA20AP001EFR_B-ALL	CCF of CCWS Pumps 2 and 3 to Run (Standby)	KAA20AP001EFR	CCWS, Train 2 Motor Driven Pump KAA20AP001

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		KAA30AP001EFR	CCWS, Train 3 Motor Driven Pump KAA30AP001
KAA20AP001EFS_B-ALL	CCF of CCWS Pumps 2 and 3 to Start (Standby)	KAA20AP001EFS	CCWS, Train 2 Motor Driven Pump KAA20AP001
		KAA30AP001EFS	CCWS, Train 3 Motor Driven Pump KAA30AP001
KAA22AA014CFO_B-ALL	CCF to Open CCWS Discharge of LHSI Pump Seal Cooler Check Valves	KAA22AA014CFO	CCWS, Train 2 Discharge of LHSI Pump Seal Cooler Check Valve KAA22AA014
		KAA32AA014CFO	CCWS, Train 3 Discharge of LHSI Seal Cooler Check Valve KAA32AA014
LAS11AP001EFR_D-ALL	CCF of EFWS Pumps to Run	LAS11AP001EFR	EFWS, Train 1 Motor Driven Pump LAS11AP001
		LAS21AP001EFR	EFWS, Train 2 Motor Driven Pump LAS21AP001
		LAS31AP001EFR	EFWS, Train 3 Motor Driven Pump LAS31AP001
		LAS41AP001EFR	EFWS, Train 4 Motor Driven Pump LAS41AP001
LAS11AP001EFS_D-ALL	CCF of EFWS Pumps to Start	LAS11AP001EFS	EFWS, Train 1 Motor Driven Pump LAS11AP001
		LAS21AP001EFS	EFWS, Train 2 Motor Driven Pump LAS21AP001
		LAS31AP001EFS	EFWS, Train 3 Motor Driven Pump LAS31AP001
		LAS41AP001EFS	EFWS, Train 4 Motor Driven Pump LAS41AP001
LBA10AA002PFC_D-ALL	CCF to Close Main Steam Isolation Valves	LBA10AA002PFC	MSS, Train 1 Main Steam Isolation Valve LBA10AA002
		LBA20AA002PFC	MSS, Train 2 Main Steam Isolation Valve LBA20AA002

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		LBA30AA002PFC	MSS, Train 3 Main Steam Isolation Valve LBA30AA002
		LBA40AA002PFC	MSS, Train 4 Main Steam Isolation Valve LBA40AA002
LBA11AA191SFO_H-ALL	CCF to Open Main Steam Safety Relief Valves	LBA11AA191SFO	MSS, Train 1 Main Steam Safety Relief Valve LBA11AA191
		LBA12AA191SFO	MSS, Train 1 Main Steam Safety Relief Valve LBA12AA191
		LBA21AA191SFO	MSS, Train 2 Main Steam Safety Relief Valve LBA21AA191
		LBA22AA191SFO	MSS, Train 2 Main Steam Safety Relief Valve LBA22AA191
		LBA31AA191SFO	MSS, Train 3 Main Steam Safety Relief Valve LBA31AA191
		LBA32AA191SFO	MSS, Train 3 Main Steam Safety Relief Valve LBA32AA191
		LBA41AA191SFO	MSS, Train 4 Main Steam Safety Relief Valve LBA41AA191
		LBA42AA191SFO	MSS, Train 4 Main Steam Safety Relief Valve LBA42AA191
LBA13AA001PFO_D-ALL	CCF to Open Main Steam Relief Isolation Valves	LBA13AA001PFO	MSS, Train 1 MSRIV LBA13AA001
		LBA23AA001PFO	MSS, Train 2 MSRIV LBA23AA001
		LBA33AA001PFO	MSS, Train 3 MSRIV LBA33AA001
		LBA43AA001PFO	MSS, Train 4 MSRIV LBA43AA001
MSRIVSCPFO_P-ALL	CCF to Open Main Steam Relief Isolation Pneumatic Pilot Valves	LBA13AA712PFO	MSS, Train 1a MSRIV Pneumatic Pilot Valve LBA13AA712
		LBA13AA713PFO	MSS, Train 1a MSRIV Pneumatic Pilot Valve LBA13AA713
		LBA13AA716PFO	MSS, Train 1b MSRIV Pneumatic Pilot Valve LBA13AA716
		LBA13AA717PFO	MSS, Train 1b MSRIV Pneumatic Pilot Valve LBA13AA717

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		LBA23AA712PFO	MSS, Train 2a MSRIV Pneumatic Pilot Valve LBA23AA712
		LBA23AA713PFO	MSS, Train 2a MSRIV Pneumatic Pilot Valve LBA23AA713
		LBA23AA716PFO	MSS, Train 2b MSRIV Pneumatic Pilot Valve LBA23AA716
		LBA23AA717PFO	MSS, Train 2b MSRIV Pneumatic Pilot Valve LBA23AA717
		LBA33AA712PFO	MSS, Train 3a MSRIV Pneumatic Pilot Valve LBA33AA712
		LBA33AA713PFO	MSS, Train 3a MSRIV Pneumatic Pilot Valve LBA33AA713
		LBA33AA716PFO	MSS, Train 3b MSRIV Pneumatic Pilot Valve LBA33AA716
		LBA33AA717PFO	MSS, Train 3b MSRIV Pneumatic Pilot Valve LBA33AA717
		LBA43AA712PFO	MSS, Train 4a MSRIV Pneumatic Pilot Valve LBA43AA712
		LBA43AA713PFO	MSS, Train 4a MSRIV Pneumatic Pilot Valve LBA43AA713
		LBA43AA716PFO	MSS, Train 4b MSRIV Pneumatic Pilot Valve LBA43AA716
		LBA43AA717PFO	MSS, Train 4b MSRIV Pneumatic Pilot Valve LBA43AA717
MSRIVSOOFO_P-ALL	CCF to Open Main Steam Relief Isolation Solenoid Pilot Valves	LBA13AA722OFO	MSS, Train 1a MSRIV Solenoid Pilot Valve LBA13AA722
		LBA13AA723OFO	MSS, Train 1a MSRIV Solenoid Pilot Valve LBA13AA723
		LBA13AA726OFO	MSS, Train 1b MSRIV Solenoid Pilot Valve LBA13AA726
		LBA13AA727OFO	MSS, Train 1b MSRIV Solenoid Pilot Valve LBA13AA727

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		LBA23AA722OFO	MSS, Train 2a MSRIV Solenoid Pilot Valve LBA23AA722
		LBA23AA723OFO	MSS, Train 2a MSRIV Solenoid Pilot Valve LBA23AA723
		LBA23AA726OFO	MSS, Train 2b MSRIV Solenoid Pilot Valve LBA23AA726
		LBA23AA727OFO	MSS, Train 2b MSRIV Solenoid Pilot Valve LBA23AA727
		LBA33AA722OFO	MSS, Train 3a MSRIV Solenoid Pilot Valve LBA33AA722
		LBA33AA723OFO	MSS, Train 3a MSRIV Solenoid Pilot Valve LBA33AA723
		LBA33AA726OFO	MSS, Train 3b MSRIV Solenoid Pilot Valve LBA33AA726
		LBA33AA727OFO	MSS, Train 3b MSRIV Solenoid Pilot Valve LBA33AA727
		LBA43AA722OFO	MSS, Train 4a MSRIV Solenoid Pilot Valve LBA43AA722
		LBA43AA723OFO	MSS, Train 4a MSRIV Solenoid Pilot Valve LBA43AA723
		LBA43AA726OFO	MSS, Train 4b MSRIV Solenoid Pilot Valve LBA43AA726
		LBA43AA727OFO	MSS, Train 4b MSRIV Solenoid Pilot Valve LBA43AA727
		PEB10AA004CFO_D-ALL	CCF to Open ESWS Pump Discharge Check Valves
PEB20AA004CFO	ESWS, Train 2 Pump Discharge Check Valve PEB20AA004		
PEB30AA004CFO	ESWS, Train 3 Pump Discharge Check Valve PEB30AA004		
PEB40AA004CFO	ESWS, Train 4 Pump Discharge Check Valve PEB40AA004		

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
PEB10AP001EFR_B-ALL	CCF of ESWS Pumps 1 and 4 to Run (Normally Running)	PEB10AP001EFR	ESWS, Train 1 Motor Driven Pump PEB10AP001
		PEB40AP001EFR	ESWS, Train 4 Motor Driven Pump PEB40AP001
PEB20AP001EFR_B-ALL	CCF of ESWS Pumps 2 and 3 to Run (Standby)	PEB20AP001EFR	ESWS, Train 2 Motor Driven Pump PEB20AP001
		PEB30AP001EFR	ESWS, Train 3 Motor Driven Pump PEB30AP001
PEB20AP001EFS_B-ALL	CCF of ESWS Pumps 2 and 3 to Start (Standby)	PEB20AP001EFS	ESWS, Train 2 Motor Driven Pump PEB20AP001
		PEB30AP001EFS	ESWS, Train 3 Motor Driven Pump PEB30AP001
PED10AN001EFR_D-ALL	CCF to Run Normally Running Cooling Tower Fans	PED10AN001EFR	UHS, Cooling Tower Train 1 Cooling Fan PED10AN001
		PED20AN001EFR	UHS, Cooling Tower Train 2 Cooling Fan PED20AN001
		PED30AN001EFR	UHS, Cooling Tower Train 3 Cooling Fan PED30AN001
		PED40AN001EFR	UHS, Cooling Tower Train 4 Cooling Fan PED40AN001
PED10AN001EFS_D-ALL	CCF to Re-Start Normally Running Cooling Tower Fans	PED10AN001EFS	UHS, Cooling Tower Train 1 Cooling Fan PED10AN001
		PED20AN001EFS	UHS, Cooling Tower Train 2 Cooling Fan PED20AN001
		PED30AN001EFS	UHS, Cooling Tower Train 3 Cooling Fan PED30AN001
		PED40AN001EFS	UHS, Cooling Tower Train 4 Cooling Fan PED40AN001
PED10AN002EFR_D-ALL	CCF to Run Standby Cooling Tower Fans	PED10AN002EFR	UHS, Cooling Tower Train 1 Cooling Fan PED10AN002
		PED20AN002EFR	UHS, Cooling Tower Train 2 Cooling Fan PED20AN002

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		PED30AN002EFR	UHS, Cooling Tower Train 3 Cooling Fan PED30AN002
		PED40AN002EFR	UHS, Cooling Tower Train 4 Cooling Fan PED40AN002
PED10AN002EFS_D-ALL	CCF to Start Standby Cooling Tower Fans	PED10AN002EFS	UHS, Cooling Tower Train 1 Cooling Fan PED10AN002
		PED20AN002EFS	UHS, Cooling Tower Train 2 Cooling Fan PED20AN002
		PED30AN002EFS	UHS, Cooling Tower Train 3 Cooling Fan PED30AN002
		PED40AN002EFS	UHS, Cooling Tower Train 4 Cooling Fan PED40AN002
QKA10AA003CFO_D-ALL	CCF to Open SCWS Pump Discharge Check Valves	QKA10AA003CFO	SCWS, Train 1 Safety Chiller Pump Discharge Check Valve QKA10AA003
		QKA20AA003CFO	SCWS, Train 2 Safety Chiller Pump Discharge Check Valve QKA20AA003
		QKA30AA003CFO	SCWS, Train 3 Safety Chiller Pump Discharge Check Valve QKA30AA003
		QKA40AA003CFO	SCWS, Train 4 Safety Chiller Pump Discharge Check Valve QKA40AA003
QKA10AP107EFR_D-ALL	CCF of SCWS Pumps to Run	QKA10AP107EFR	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107
		QKA20AP107EFR	SCWS, Train 2 Motor Driven Safety Chiller Pump QKA20AP107
		QKA30AP107EFR	SCWS, Train 3 Motor Driven Safety Chiller Pump QKA30AP107
		QKA40AP107EFR	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107
QKA10AP107EFS_D-ALL	CCF of SCWS Pumps to Start	QKA10AP107EFS	SCWS, Train 1 Motor Driven Safety Chiller Pump QKA10AP107
		QKA20AP107EFS	SCWS, Train 2 Motor Driven Safety Chiller Pump QKA20AP107

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
		QKA30AP107EFS	SCWS, Train 3 Motor Driven Safety Chiller Pump QKA30AP107
		QKA40AP107EFS	SCWS, Train 4 Motor Driven Safety Chiller Pump QKA40AP107
QKA10GH001_FR_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Run	QKA10GH001_FR	SCWS, Train 1 Chiller Unit QKA10GH001
		QKA40GH001_FR	SCWS, Train 4 Chiller Unit QKA40GH001
QKA10GH001_FS_B-ALL	CCF of the Air Cooled SCWS Chiller Units to Start	QKA10GH001_FS	SCWS, Train 1 Chiller Unit QKA10GH001
		QKA40GH001_FS	SCWS, Train 4 Chiller Unit QKA40GH001
QKA20GH001_FR_B-ALL	CCF of the CCWS Cooled SCWS Chiller Units to Run	QKA20GH001_FR	SCWS, Train 2 Chiller Unit QKA20GH001
		QKA30GH001_FR	SCWS, Train 3 Chiller Unit QKA30GH001
SAC01AA005CFO_D-ALL	CCF to Open Normal SAC Supply Fan Discharge Check Dampers	SAC01AA005CFO	SAC, Normal Air Inlet Supply Fan Discharge Check Damper SAC01AA005
		SAC02AA005CFO	SAC, Normal Air Inlet Supply Fan Discharge Check Damper SAC02AA005
		SAC03AA005CFO	SAC, Normal Air Inlet Supply Fan Discharge Check Damper SAC03AA005
		SAC04AA005CFO	SAC, Normal Air Inlet Supply Fan Discharge Check Damper SAC04AA005
SAC01AN001EFR_D-ALL	CCF to Run Normal Air Supply Fans	SAC01AN001EFR	SAC, Normal Air Supply Fan SAC01AN001
		SAC02AN001EFR	SAC, Normal Air Supply Fan SAC02AN001
		SAC03AN001EFR	SAC, Normal Air Supply Fan SAC03AN001
		SAC04AN001EFR	SAC, Normal Air Supply Fan SAC04AN001

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
SAC01AN001EFS_D-ALL	CCF to Start Normal Air Supply Fans	SAC01AN001EFS	SAC, Normal Air Supply Fan SAC01AN001
		SAC02AN001EFS	SAC, Normal Air Supply Fan SAC02AN001
		SAC03AN001EFS	SAC, Normal Air Supply Fan SAC03AN001
		SAC04AN001EFS	SAC, Normal Air Supply Fan SAC04AN001
SAC31AA003CFO_D-ALL	CCF to Open Normal Air Exhaust Fan Discharge Check Damper	SAC31AA003CFO	SAC, Normal Air Exhaust Supply Fan Discharge Check Damper SAC31AA003
		SAC32AA003CFO	SAC, Normal Air Exhaust Supply Fan Discharge Check Damper SAC32AA003
		SAC33AA003CFO	SAC, Normal Air Exhaust Supply Fan Discharge Check Damper SAC33AA003
		SAC34AA003CFO	SAC, Normal Air Exhaust Supply Fan Discharge Check Damper SAC34AA003
SAC31AN001EFR_D-ALL	CCF to Run Normal Air Exhaust Fans	SAC31AN001EFR	SAC, Normal Air Exhaust Fan SAC31AN001
		SAC32AN001EFR	SAC, Normal Air Exhaust Fan SAC32AN001
		SAC33AN001EFR	SAC, Normal Air Exhaust Fan SAC33AN001
		SAC34AN001EFR	SAC, Normal Air Exhaust Fan SAC34AN001
SAC31AN001EFS_D-ALL	CCF to Start Normal Air Exhaust Fans	SAC31AN001EFS	SAC, Normal Air Exhaust Fan SAC31AN001
		SAC32AN001EFS	SAC, Normal Air Exhaust Fan SAC32AN001
		SAC33AN001EFS	SAC, Normal Air Exhaust Fan SAC33AN001
		SAC34AN001EFS	SAC, Normal Air Exhaust Fan SAC34AN001

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
SAC61AH001EFS_D-ALL	CCF to Start EFW Pump Room Ventilation Fans	SAC61AN001EFS	SAC, EFW Pump Room Ventilation Fan SAC61AN001
		SAC62AN001EFS	SAC, EFW Pump Room Ventilation Fan SAC62AN001
		SAC63AN001EFS	SAC, EFW Pump Room Ventilation Fan SAC63AN001
		SAC64AN001EFS	SAC, EFW Pump Room Ventilation Fan SAC64AN001
XKA10____DFR_D-ALL	CCF of EDGs to Run	XKA10____DFR	ELEC, Emergency Diesel Generator XKA10
		XKA20____DFR	ELEC, Emergency Diesel Generator XKA20
		XKA30____DFR	ELEC, Emergency Diesel Generator XKA30
		XKA40____DFR	ELEC, Emergency Diesel Generator XKA40
XKA10____DFS_D-ALL	CCF of EDGs to Start	XKA10____DFS	ELEC, Emergency Diesel Generator XKA10
		XKA20____DFS	ELEC, Emergency Diesel Generator XKA20
		XKA30____DFS	ELEC, Emergency Diesel Generator XKA30
		XKA40____DFS	ELEC, Emergency Diesel Generator XKA40
XKA10_1BDABFO_D-ALL	CCF to Close EDG Supply Breakers	XKA10_1BDABFC	ELEC, EDG XKA10 to 6.9kV SWGR 31BDA Circuit Breaker
		XKA20_2BDABFC	ELEC, EDG XKA20 to 6.9kV SWGR 32BDA Circuit Breaker
		XKA30_3BDABFC	ELEC, EDG XKA30 to 6.9kV SWGR 33BDA Circuit Breaker
		XKA40_4BDABFC	ELEC, EDG XKA40 to 6.9kV SWGR 34BDA Circuit Breaker

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
I&C CCF ID	I&C CCF Description	I&C Basic Event ID	I&C Component Description
ALU-A CCF NS-ALL	CCF of ALU-A Protection System Computer Processors (Non-Self-Monitored)	CLE22EQ011LV60NS	Processing module (non-self-monitored)
		CLE22EQ021LV60NS	Processing module (non-self-monitored)
		CLF22EQ011LV60NS	Processing module (non-self-monitored)
		CLF22EQ021LV60NS	Processing module (non-self-monitored)
		CLG22EQ011LV60NS	Processing module (non-self-monitored)
		CLG22EQ021LV60NS	Processing module (non-self-monitored)
		CLH22EQ011LV60NS	Processing module (non-self-monitored)
		CLH22EQ021LV60NS	Processing module (non-self-monitored)
ALU-A CCF SM-ALL	CCF of ALU-A Protection System Computer Processors (Self-Monitored)	CLE22EQ011LV60SM	Processing module (self-monitored)
		CLE22EQ021LV60SM	Processing module (self-monitored)
		CLF22EQ011LV60SM	Processing module (self-monitored)
		CLF22EQ021LV60SM	Processing module (self-monitored)
		CLG22EQ011LV60SM	Processing module (self-monitored)
		CLG22EQ021LV60SM	Processing module (self-monitored)
		CLH22EQ011LV60SM	Processing module (self-monitored)
		CLH22EQ021LV60SM	Processing module (self-monitored)
ALU-B CCF NS-ALL	CCF of ALU-B Protection System Computer Processors (Non-Self-Monitored)	CLE24EQ001LV60NS	Processing module (non-self-monitored)
		CLE24EQ002LV60NS	Processing module (non-self-monitored)
		CLF24EQ001LV60NS	Processing module (non-self-monitored)
		CLF24EQ002LV60NS	Processing module (non-self-monitored)
		CLG24EQ001LV60NS	Processing module (non-self-monitored)
		CLG24EQ002LV60NS	Processing module (non-self-monitored)
		CLH24EQ001LV60NS	Processing module (non-self-monitored)
		CLH24EQ002LV60NS	Processing module (non-self-monitored)
ALU-B CCF SM-ALL	CCF of ALU-B Protection System Computer Processors (Self-	CLE24EQ001LV60SM	Processing module (self-monitored)
		CLE24EQ002LV60SM	Processing module (self-monitored)

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
	Monitored)	CLF24EQ001LV60SM	Processing module (self-monitored)
		CLF24EQ002LV60SM	Processing module (self-monitored)
		CLG24EQ001LV60SM	Processing module (self-monitored)
		CLG24EQ002LV60SM	Processing module (self-monitored)
		CLH24EQ001LV60SM	Processing module (self-monitored)
		CLH24EQ002LV60SM	Processing module (self-monitored)
APU2 CCF NS-ALL	CCF of APU-2 Protection System Computer Processors (Non-Self-Monitored)	CLE21EQ002LV60NS	Processing module (non-self-monitored)
		CLF21EQ002LV60NS	Processing module (non-self-monitored)
		CLG21EQ002LV60NS	Processing module (non-self-monitored)
		CLH21EQ002LV60NS	Processing module (non-self-monitored)
APU2 CCF SM-ALL	CCF of APU-2 Protection System Computer Processors (Self-Monitored)	CLE21EQ002LV60SM	Processing module (self-monitored)
		CLF21EQ002LV60SM	Processing module (self-monitored)
		CLG21EQ002LV60SM	Processing module (self-monitored)
		CLH21EQ002LV60SM	Processing module (self-monitored)
APU3 CCF NS-ALL	CCF of APU-3 Protection System Computer Processors (Non-Self-Monitored)	CLE23EQ001LV60NS	Processing module (non-self-monitored)
		CLF23EQ001LV60NS	Processing module (non-self-monitored)
		CLG23EQ001LV60NS	Processing module (non-self-monitored)
		CLH23EQ001LV60NS	Processing module (non-self-monitored)
APU3 CCF SM-ALL	CCF of APU-3 Protection System Computer Processors (Self-Monitored)	CLE23EQ001LV60SM	Processing module (self-monitored)
		CLF23EQ001LV60SM	Processing module (self-monitored)
		CLG23EQ001LV60SM	Processing module (self-monitored)
		CLH23EQ001LV60SM	Processing module (self-monitored)
APU4 CCF NS-ALL	CCF of APU-4 Protection System Computer Processors (Non-Self-Monitored)	CLE23EQ002LV60NS	Processing module (non-self-monitored)
		CLF23EQ002LV60NS	Processing module (non-self-monitored)
		CLG23EQ002LV60NS	Processing module (non-self-monitored)
		CLH23EQ002LV60NS	Processing module (non-self-monitored)
APU4 CCF SM-ALL	CCF of APU-4 Protection System Computer Processors (Self-	CLE23EQ002LV60SM	Processing module (self-monitored)
	Monitored)	CLF23EQ002LV60SM	Processing module (self-monitored)

Table 17.04-3-3—PRA-based Important Common Cause Groups and Associated Components (components are also included in Table 17.04-3-2 (18 Sheets))

CCF ID	CCF Description	CCF Element Basic Event ID	Component Description
	Monitored)	CLG23EQ002LV60SM	Processing module (self-monitored)
		CLH23EQ002LV60SM	Processing module (self-monitored)
PZR PRES CCF-ALL	CCF of pressurizer (RCS) pressure sensors	JEF10CP801-SNPFL	PZR pressure (NR) sensor (includes transmitter)
		JEF10CP803-SNPFL	PZR pressure (NR) sensor (includes transmitter)
		JEF10CP805-SNPFL	PZR pressure (NR) sensor (includes transmitter)
		JEF10CP807-SNPFL	PZR pressure (NR) sensor (includes transmitter)
SG4 LVL CCF-ALL	CCF of SG4 level sensors (WR & NR)	JEA40CL801-SNLFL	SG-4 (NR) level sensor (includes transmitter)
		JEA40CL802-SNLFL	SG-4 (NR) level sensor (includes transmitter)
		JEA40CL803-SNLFL	SG-4 (NR) level sensor (includes transmitter)
		JEA40CL804-SNLFL	SG-4 (NR) level sensor (includes transmitter)
		JEA40CL809-SNLFL	SG 4 level (wr) (includes transmitter)
		JEA40CL810-SNLFL	SG 4 level (wr) (includes transmitter)
		JEA40CL811-SNLFL	SG 4 level (wr) (includes transmitter)
		JEA40CL812-SNLFL	SG 4 level (wr) (includes transmitter)
SG4 PRES CCF-ALL	CCF of SG4 pressure sensors	LBA40CP811-SNPFL	SG 4 pressure (includes transmitter)
		LBA40CP821-SNPFL	SG 4 pressure (includes transmitter)
		LBA40CP831-SNPFL	SG 4 pressure (includes transmitter)
		LBA40CP841-SNPFL	SG 4 pressure (includes transmitter)

Question 17.04-5:

EPR FSAR Section 17.4.2.2 provides the threshold criteria of RAW and FV used to identify the risk-significant SSCs, but not the common-cause. Please provide the common cause threshold criteria (as discussed in AREVA's response to RAI #5, Question 17.04-1) in Section 17.4.2.2.

Response to Question 17.04-5:

The threshold criterion for common-cause is 20. Guidance for all threshold criteria was based on Section 5.1 of document NEI 00-04, Rev. 0, "10 CFR 50.69 SSC Categorization Guideline", July 2005. U.S. EPR FSAR, Tier 2 Section 17.4.2.2 will be revised to include this common-cause threshold criteria.

FSAR Impact:

U.S. EPR FSAR, Tier 2, Section 17.4.2.2 will be revised as described in the response and indicated on the enclosed markup.

Question 17.04-6:

EPR FSAR, Section 17.4.2.2 states that “The selection of risk-significant SSCs uses a combination of probabilistic and deterministic insights such as PRA analytical results, industry experience, regulations, expert panel process, and engineering judgment to identify and prioritize the SSCs.”

It is unclear as to whether these deterministic insights are included in the risk-significant SSCs determination process or not. Neither EPR FSAR nor AREVA’s response to RAI #5, Question 17.04-1 clearly discusses the inclusion of deterministic insights.

Please indicate the SSCs identified as risk-significant by the deterministic insights and their basis.

Response to Question 17.04-6:

Deterministic insights in the risk-significant structures, systems and components (SSC) determination process is incorporated by using an expert panel. The panel function is to determine if the SSC that are categorized as not risk significant (NRS) based on the probabilistic ranking should be categorized as risk significant based on various deterministic criteria. These criteria could include, but are not limited to, the following:

- A contribution to the initiators.
- An implicit contribution to the CDF.
- An implicit contribution to the LRF.
- A contribution to seismic margin analysis, performance history/operating experience of the component.
- Technical Specifications considerations for the component.
- Detection of component failures.
- The effect of component failure on the other systems.

The expert panel has evaluated each system to determine the safety significance of the system. The results of this evaluation are presented in the response to Question 17.04-7.

In order to clarify a use of the deterministic insights in the risk-significant SSC determination, the U.S. EPR approach to the reliability assurance program (RAP) is summarized as follows:

1. A description of the RAP program, including both probabilistic and deterministic approaches, is provided in the U.S. EPR FSAR Tier 2, Section 17.4.
2. A comprehensive list of the risk-significant SSC based on the probabilistic results from the design certification PRA is summarized in Tables 17.04-3-1 through 17.04-3-3, provided in the response to Question 17.04-3)
3. Based on the expert panel meeting, multiple systems are added to the PRA based system list, as presented in Table 17.04-7-1.

4. The final list of the risk significant SSC, including both probabilistic and deterministic insights is the responsibility of the COL applicant.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 17.04-7:

It is unclear as to whether an expert panel reviewed the categorization of SSCs determined to be not risk-significant (NRS) from the quantified PRA results, PRA-based seismic margins analysis, and other external events. Note that, the expert panel plays an important role in reviewing the information that lead to these NRS determinations (e.g., assure the basis used in the categorization is technically adequate, review defense-in-depth implications, review safety margin implications, for additional information see Sections 9.2.2 and 9.2.3 of NEI 00-04, Revision 0 as referenced in the AREVA’s response to Question 17.04-1). This is particularly important for those safety-related SSCs determined to be NRS.

Please confirm whether an expert panel was used to review the categorization of SSCs that were determined to be NRS based on PRA quantitative results and what SSCs were added due to the expert panel review.

Response to Question 17.04-7:

As discussed in the response to Question 17.04-6, an expert panel has reviewed the categorization of the U.S. EPR systems determined to be not risk-significant from the quantified PRA results on the system level. The expert panel has determined that multiple systems should be further considered for the RAP program evaluation on the component/structure level.

The systems that have been added based on the expert panel review, and the reasons for adding them are presented in Table 17.04-7-1.

**Table 17.04-7-1—Systems Added to the RAP Program by the Expert Panel
 (3 Sheets)**

Systems Added From Initiating Event Consideration	Systems Added from Seismic Margin Analysis	Systems Added from Level 2 Consideration	I&C Systems (Implicitly or Explicitly in PRA)	SSCs Implicitly in the PRA
		Combustible Gas Control System		
	Safety Injection Accumulators			
	Extra Borating System			
	Emergency Power Generating Buildings			
	Nuclear Island Structural System (Reactor, Fuel, Safeguard Buildings)			
	Essential Service Water Pump Structure			

**Table 17.04-7-1—Systems Added to the RAP Program by the Expert Panel
 (3 Sheets)**

Systems Added From Initiating Event Consideration	Systems Added from Seismic Margin Analysis	Systems Added from Level 2 Consideration	I&C Systems (Implicitly or Explicitly in PRA)	SSCs Implicitly in the PRA
	Essential Service Water Cooling Tower Structure			
Main Feedwater System				
Feedwater Heating System				
SG Blowdown				
Containment Building Ventilation System				
		Annulus Ventilation System		
				Safeguard Building Controlled Area Ventilation System
				Fuel Building Ventilation System
				Diesel Building Ventilation System
		Liquid Waste Storage and Processing System		
		Gaseous Waste Processing System		
Switchyard & Offsite Power System				
			Process Automation System	
			Process Information & Control System	
				Communication System
Turbine – Generator Instrumentation & Control				

**Table 17.04-7-1—Systems Added to the RAP Program by the Expert Panel
 (3 Sheets)**

Systems Added From Initiating Event Consideration	Systems Added from Seismic Margin Analysis	Systems Added from Level 2 Consideration	I&C Systems (Implicitly or Explicitly in PRA)	SSCs Implicitly in the PRA
			Safety Automation System	
			Safety Information & Control System	
				Main Control Room
				Remote Shutdown Station
			Incore Instrumentation System	
			Excore Instrumentation System	
		Radiation Monitoring System		
		Hydrogen Monitoring System		
			Priority & Actuator Control System	
			Reactor Control, Surveillance & Limitation System	
				Control Rod Drive Control System
		Reactor Pressure Vessel Level Measurement System		

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 17.04-8:

Please provide the process which was developed for selection and qualification of the expert panel members as mentioned in Section 17.4.2.3.

Response to Question 17.04-8:

The selection of the expert panel members for the reliability assurance program (RAP) is similar to the process outlined in ASME RA-Sb-2005. The expert panel is selected based on level of experience and knowledge of a particular technical area of relevance to the issue. These experts evaluate all potential inputs from technical or program documentation and regulatory guidance (if applicable), and provide their own input and input from their representation of their community. The facilitator/integrator is responsible for aggregating the judgments and community distributions of the experts so as to develop the composite distribution of the informed technical community.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 17.04-9:

Please describe the treatment of EPR PRA undeveloped events in the RAP. Note that, an undeveloped event may represent: multiple failure modes of a single component, a single train of components, multiple components in parallel, and so on.

Response to Question 17.04-9:

The treatment of the risk significant undeveloped events was to assign the associated importance measure to the corresponding structures, systems and components (SSC), if applicable. For example, for preventive maintenance (PM) undeveloped events that would fail a single train, the Fussel-Vesely (FV) of the PM undeveloped event is added to a selected component that would fail the same train. In cases of an undeveloped event that failed multiple components in parallel, the FV is added to each associated component.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 17.04-10:

Section 19.1.5 indicates that the PRA-based seismic margins approach was used to evaluate the risk due to seismic events. According to SECY 93-087, this method identifies potential design-specific seismic vulnerabilities that may be useful in developing the RAP. Please describe how seismic SSCs are addressed in RAP, if not, justify their exclusion.

Response to Question 17.04-10:

For the purposes of the reliability assurance program (RAP), important seismic structures, systems and components (SSC) are identified as those which are credited in response to a seismic event and are Seismic Category I, with some Seismic Category II SSC also credited. In the probabilistic risk assessment (PRA) model, modified to enable modeling of seismic initiating events, these SSC provide success paths after a seismic initiating event. Identified SSC are included in the RAP based on their importance in mitigating seismic events.

The SSC credited after a seismic initiating event are listed below:

- AC emergency power (switchgear trains 31/32/33/34 BDA).
- Emergency diesel generators (EDG).
- Safety-related batteries.
- Instrumentation and control (I&C) (reactor protection system (RPS), control rod, reactor internals or fuel assemblies, reactor trip breakers).
- Emergency feedwater (EFW).
- Main steam relief train (MSRT).
- Essential service water system (ESWS).
- Component cooling water system (CCWS).
- Safety-related switchgear rooms and EFW pumphouse heating, ventilation and air conditioning (HVAC) (system SAC) and the related safety chilled water (system QKA) trains.
- Medium head safety injection (MHSI).
- Low head safety injection (LHSI).
- Standstill seal system (SSSS).
- Pressurizer safety relief valves (PSRV).
- Severe accident depressurization valves (SADV).
- Accumulators.
- Extra borating system (EBS).
- Reactor internals.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 17.04-11:

(Follow-up to Question 17-04-1) The following questions and findings relate to AREVA's response to RAI #5, Question 17-04-1.

- a) In general, the response provides the component importance evaluation results, but not the list of risk-significant SSCs . Please provide a comprehensive list of the SSCs designated as risk significant including both probabilistic and deterministic insights. For the identified risk-significant SSCs , describe (i) the process to determine dominant failure modes that considered industry experience, analytical models, and applicable requirements, and (ii) key assumptions and risk insights from probabilistic, deterministic, or other methods.
- b) Tables 17.04-1-3 and 17.04-1-6 rank some risk-significant SSCs through the common cause failure (CCF) identification and component descriptions, rather than specific component identification numbers. As a result, it is unclear as to what specific components are in RAP. Please clearly describe the risk-significant SSCs through the use of text descriptions and specific component identification numbers.
- c) Explain why the internal flooding and internal fire importance evaluation results are not discussed in the response.
- d) Explain why the RAW and FV values shown in Tables 17.04-1-1 through 17.04-1-6 do not match the corresponding RAW and FV values provided in EPR FSAR Chapter 19.
- e) In EPR PRA, some initiating event (IE) frequencies were calculated using fault trees, describe how the RAW and FV values of the SSCs modeled in these IE fault trees were calculated and incorporated into the RAP. Otherwise, provide the basis for not including these SSCs in RAP.
- f) In the response, first paragraph, Item 2 states that "This reflects the relative increase in CDF/LERF that would exit it..." Please confirm whether this reference is to "LERF" or "LRF."
- g) The main control room and remote shutdown panels are not identified as risk-significant in the response. Please provide the basis for considering these SSCs as not risk-significant. Include in your discussion the associated risk importance measures (e.g., RAW and FV values) as applicable, consideration of deterministic methods, and the expert panel's deliberation for not including these components in RAP.

Response to Question 17.04-11:

a) A comprehensive list of the SSC designated as risk significant based on the probabilistic insights are provided in the response to Question 17.04-3. The systems to be added to this list based on the expert panel inputs, and the basis for the inclusion, are defined in Table 17.04-7-1. A final list of the risk significant SSC including both probabilistic and deterministic insights is the responsibility of the COL applicant (see COL item listed in FSAR Tier 2 Section 17.4.4).

Dominant failure modes based on the probabilistic insights are identified in Table 17.04-3-1 in the response to Question 17.04-3. The PRA input to determine dominant failure modes is based on selecting the failure mode that contributes the maximum FV to a component's total FV. In cases of a component having multiple conflicting failure modes (e.g., failure to close

versus failure to open), both failure modes are presented in the table. Key assumptions and risk insights from the PRA model are presented in Chapter 19 of the U.S. EPR FSAR.

b) Table 17.04-3-3 in the response to Question 17.04-3 defines for each risk-significant common cause group associated components with identification numbers and description. These SSC are also included in Table 17.04-3-2 in the response to Question 17.04-3, in order to identify if the SSC risk-significance is associated with the common cause group risk-significance.

c) As discussed in the response to Question 17.04-3, the probabilistic SSC ranking based on the internal events, flood and fire CDFs and LRFs results, are presented in the various Chapter 19 tables in the U.S. EPR FSAR. All SSC and the corresponding rankings are summarized in the tables in the response to Question 17.04-3.

d) Tables 17.04-1-1 through 17.04-1-6 are based on the total CDF FV and RAW importance measures. The RAW and FV values provided in the EPR FSAR Chapter 19 are separated for the internal events, internal flooding, and internal fire CDFs.

e) The FV and RAW importance measures of the SSC modeled in the IE fault trees are not calculated for at power PRA model, because they are not provided as output from the RS software. For at shutdown model, these importance measures are calculated in the RS software and presented in Table 17.04-1-5. The systems that contribute to the initiators are added to the RAP program by the expert panel as presented in Table 17.04-7-1. An approach to provide a ranking of the SSC due to contribution to the initiators is illustrated in Table 17.04-11-1 below, which summarizes the initiating events that contribute more than 1% to the corresponding CDF. Four of the initiating events presented in Table 17.04-11-1 are modeled by fault trees (31BDA, LBOP, LOCCW-ALL and LOCCW-CH1L).

f) This reference is to "LRF".

g) The main control room and remote shutdown panels, as SSC implicitly modeled in the PRA, are added to the RAP program by the expert panel as presented in Table 17.04-7-1.

Table 17.04-11-1—Important Initiating Events and Associated SSC (2 Sheets)

IE ID	Initiating Event Description	Associated SSC to be Considered in the RAP Program	Contr. to Total CDF (%)	Contr. to Internal Events CDF (%)	Contr. to Fire Events CDF (%)	Contr. to Flood Events CDF (%)
31BDA	Loss of 6.9kV Power from Bus 31BDA	6.9KV Busses and Supplies	0.9%	1.5%		
ATWS	Anticipated Transient Without Scram	Control Rod Drive Control System Reactor Protection System	1.8%	3.1%		
GT	General Transient (includes Turbine Trip and Reactor Trip)	Turbine – Generator Instrumentation & Control Main Control Room I&C systems, where failure results in reactor trip	4.8%	8.5%		
LBOP	Loss of Balance of Plant (Closed Cooling Water (CLCWS) or Service Water (SWS))	Main Feedwater System Feedwater Heating System Closed Cooling Water System Normal Heatsink Circulating Water System Auxiliary Cooling Water System	1.1%	1.9%		
LOC	Loss of Main Condenser (Includes MSIV Closure)	Main Steam System Normal Heatsink Circulating Water System	0.6%	1.1%		
LOCCW-ALL	LOCCW-ALL - Loss of CCWS/ESWS Total Loss of 4 Divisions	CCW System ESW System	0.7%	1.2%		
LOCCW-CH1L	LOCCW-CH1L - Loss of CCWS/ESWS - Leak in Common Header 1	CCW System Relief Valves	1.5%	2.7%		
LOMFW	Total Loss of Main Feedwater	Main Feedwater System Feedwater Heating System	1.0%	1.8%		
LOOP	Loss Of Offsite Power	Switchyard & Offsite Power System	28.0%	46.1%		
SGTR	Steam Generator Tube Rupture	NA	2.2%	3.9%		
SLBI	SLBI - Steam Break Inside Containment	SG Blowdown Main Steam System	2.2%	3.9%		

Table 17.04-11-1—Important Initiating Events and Associated SSC (2 Sheets)

IE ID	Initiating Event Description	Associated SSC to be Considered in the RAP Program	Contr. to Total CDF (%)	Contr. to Internal Events CDF (%)	Contr. to Fire Events CDF (%)	Contr. to Flood Events CDF (%)
SLBO	SLBO - Steam Break Downstream of MSIV	Main Steam System	0.7%	1.2%		
SLOCA	Small LOCA (0.6 to 3-inch Diameter)	Reactor Coolant System - PSRVs	9.0%	15.8%		
FIRE-MCR	Fire in the Main Control Room	Main Control Room/Remote Shutdown Station	4.5%		14.0%	
FIRE-MS-VR	Fire in one of the 2 MF/MS valve rooms w/ spurious opening of 1 MSRV	NA	6.1%		18.9%	
FIRE-SAB14-AC	Fire in Switchgear Room of Safeguard Building 4 (or 1)	Fire Barriers and Protection in the associated buildings	14.0%		43.6%	
FIRE-SAB-MECH	Fire in the Pump Room of Any Safeguard Building	Fire Barriers and Protection in the associated buildings	2.8%		8.9%	
FIRE-SWGR	Fire in the Switchgear Building	Fire Barriers and Protection in the associated buildings	3.8%		11.9%	
FLD-ANN ALL	Flood in RB Annulus (contained)	RB Annulus structure	5.7%			50.0%
FLD-EFW	EFW-caused flood in the Safeguard Building 1 or 4 including Fuel Building	EFW Tanks	1.3%			11.3%
FLD-SAB14 FB	Flood in the Safeguard Building 1 or 4 (Pump Room) including Fuel Building, excluding EFW-caused floods	Flood Barriers and Protection in the associated buildings	3.7%			32.3%
FLD-TB	Flood in the Turbine Building	Flood Barriers and Protection in the associated buildings	0.7%			6.3%

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 17.04-12:

SECY 95-132, Page 14 states that an application for advanced reactor design certification must contain a list of the structures, systems, and components designated as risk significant. Accordingly, please include a list of risk-significant SSCs in EPR FSAR Section 17.4.

Response to Question 17.04-12:

The lists of the PRA significant SSC are provided in the response to Question 17.04-3 and in the response to Question 17.04-1.

SRP NUREG-0800, Section 17.4, indicates the anticipated or expected scope of the reliability assurance program (RAP) to be addressed within the design certification and combined license (COL) applications. In the standard review plan (SRP) acceptance criteria, the expectation is that the COL applicant provides the list of structures, systems and components (SSC) within the RAP. That is, the SRP NUREG-0800 (March 2007) states that the COL application should contain a COL action item for the site-specific list of SSC in the RAP and a configuration control process for maintaining the list of SSC within the scope of RAP. A COL item is provided in the U.S. EPR FSAR Tier 2, Section 17.4.2, that requires the applicant to provide the list of SSC within the RAP. Configuration control is discussed in U.S. EPR FSAR Tier 2, Section 17.4.3. As additional information, the systems added to the RAP by the expert panel are provided in the response to Question 17.04-7.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 17.04-13:

EPR FSAR Tier 1 Section 3.2, to be consistent with other sections, the abbreviation of “structures, systems, and components” should be changed to “SSCs.”

Response to Question 17.04-13:

As shown in Tier 2, Table 1.1-1 of the U.S. EPR FSAR, the abbreviation for Structures, Systems, and Components is SSC. To be consistent with Tier 2, the Tier 1 abbreviation for Structures, Systems, and Components has been changed from SSCs to SSC in Tier 1, Table 1.3-1. Other instances of SSCs in Tier 1 have also been changed to SSC.

FSAR Impact:

Due to the magnitude of the number of pages affected, U.S. EPR FSAR markup pages are not provided with this response. This editorial change will be incorporated into the U.S. EPR FSAR, Revision 1.

Question 17.04-14:

EPR FSAR Tier 1 Section 3.2 states “The RAP provides reasonable assurance that the reactor design meets the four preceding considerations in the areas of design, procurement, fabrication, construction, and preoperational testing activities and programs.” Accordingly, should it be five preceding considerations (design, procurement, fabrication, construction, and preoperational testing) instead of four?

Response to Question 17.04-14:

To avoid confusion, the word “four” has been deleted from the text in U.S. EPR FSAR Tier 1, Section 3.2 and in Tier 2, Section 17.4.1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 17.4.1 and U.S. EPR FSAR Tier 1, Section 3.2 will be revised as described in the response and indicated on the enclosed markup.

Question 17.04-15:

The following questions and findings relate to EPR FSAR Tier 1 Section 3.2, Table 3.2-1.

- a) First column should clearly provide the design commitment, i.e., reasonable assurance that the design of risk-significant SSCs is consistent with their assumptions.
- b) Second column should provide more details on the inspection/test activities.
- c) Third column should describe the acceptance criteria, i.e., designated reliability/HCLPF.

Response to Question 17.04-15:

Maintaining the overall plant reliability is the basis for the design commitment in U.S. EPR FSAR Tier 1, Section 3.2 and the revised ITAAC listed below. Changes in the reliability of the individual components are acceptable as long as overall plant safety performance is not affected, and therefore are not addressed separately in Tier 1. Details on individual structures, systems and components (SSC) are provided as described in the responses to RAI questions 17.04-01, 17.04-03, 17.04-07, and 17.04-11.

Commitment Wording	Inspections, Tests, or Analysis	Acceptance Criteria
A Reliability Assurance Program exists and provides reasonable assurance that the overall plant reliability is maintained.	Inspection will be performed for the existence of a Reliability Assurance Program.	A Reliability Assurance Program provides reasonable assurance that the overall plant reliability is maintained.

FSAR Impact:

The U.S. EPR FSAR, Tier 1, Table 3.2-1 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

3.2 Reliability Assurance Program

1.0 Description

The Reliability Assurance Program (RAP) is implemented as an integral part of the design process and is implemented during the detailed design phase prior to initial fuel load. The RAP evaluates and sets priorities for the structures, systems, and components (SSC) in the design, based on their degree of risk significance.

The objective of the RAP is to provide reasonable assurance that risk-significant SSC are designed such that: (1) assumptions from the risk analysis are maintained, (2) SSC when challenged, function in accordance with the assumed reliability, (3) SSC whose failure could result in a reactor trip, function in accordance with the assumed reliability, and (4) maintenance actions to achieve the assumed reliability are identified.

The RAP provides reasonable assurance that the reactor design meets the ~~four~~ preceding considerations in the areas of design, procurement, fabrication, construction, and preoperational testing activities and programs.

17.04-14

2.0 Inspections, Tests, Analyses, and Acceptance Criteria

Table 3.2-1 specifies the inspections, tests, analyses, and associated acceptance criteria for the RAP.

Table 3.2-1—Inspections, Tests, Analyses and Acceptance Criteria

Commitment <u>Wording</u>	Inspections, Tests <u>or</u> <u>Analysis</u>s	Acceptance Criteria
<p>†—A Reliability Assurance Program exists <u>and provides reasonable assurance that the overall plant reliability is maintained.</u></p>	<p>Inspection will be performed <u>for the existence of a Reliability Assurance Program.</u></p>	<p>A Reliability Assurance Program exists <u>provides reasonable assurance that the overall plant reliability is maintained.</u></p>

↑
17.04-15

17.4 Reliability Assurance Program

The reliability assurance program (RAP) applies to the systems, structures, and components (SSCs) that are identified as risk-significant (or significant contributors to plant safety) as determined by using probabilistic, deterministic, and other methods of analysis, including information obtained from sources such as the plant-specific and site-specific probabilistic risk analysis (PRA), industry operating experience, relevant component failure databases and expert panels. Implementing the RAP will enhance safety by focusing on design resources for risk-significant SSCs and on maintaining the reliability of such SSCs during the design and operation stages of the plant.

17.4.1 Reliability Assurance Program Scope, Stages, and Goals

The purpose of the RAP for the U.S. EPR is to provide reasonable assurance of the following considerations:

- The plant is designed, constructed and operated consistent with assumptions and risk insights for risk-significant SSCs.
- Risk-significant SSCs are selected and maintained so that they do not degrade to an unacceptable level during the life of the plant.
- The frequency of challenges (transients) to risk-significant SSCs is minimized.
- These SSCs will function reliably when challenged.

The RAP is implemented as an integral part of the design process and is implemented during the detailed design phase so that the important U.S. EPR reliability assumptions of the PRA are considered throughout the course of plant life.

The RAP is implemented in two stages. The first stage applies to reliability assurance activities that occur before the initial fuel load. The objective of the RAP during the first stage is to provide reasonable assurance that the reactor design meets the four preceding considerations in the areas of design, procurement, fabrication, construction, and preoperational testing activities and programs. The assumed reliability of SSCs in the design stage will be realistic and achievable.

The second stage of the RAP applies to reliability assurance activities for an operating plant. During the second stage of the RAP, the goal is to verify that the reliability of the SSCs within the scope of the RAP is maintained during plant operation. The activities for the second stage will be integrated into relevant existing programs, such as maintenance rule, surveillance testing, inservice inspection, inservice testing, and quality assurance (QA). Individual component reliability may change throughout the course of plant life because of a number of factors, including aging and changes in

four

17.04-14

The design changes that affect the PRA model are reviewed and appropriate revisions are prepared in accordance with the PRA update process.

17.4.2.2 SSC Identification and Prioritization

The first task of the RAP is to identify the risk-significant ~~SSCs~~SSC that are to be included in the scope of the program. A table that includes a list of design-specific ~~SSCs~~SSC is included in the RAP. This preliminary list is prepared and controlled under the RAP program. This list is updated when the plant-specific PRA is developed. The selection of risk-significant ~~SSCs~~SSC uses a combination of probabilistic and deterministic insights such as PRA analytical results, industry experience, regulations, expert panel process, and engineering judgment to identify and prioritize the ~~SSCs~~SSC.

The Level 1 PRA provides an evaluation of the accident sequences from initiating events and failures of safety functions that lead to core damage. The analysis of external events considers events caused externally to systems associated with power or plant shutdown operations. These events include internal fire, high winds, internal flooding, and seismic margins. Level 2 risk significance is determined qualitatively by identifying dominant contributors to severe accidents and offsite fission product releases.

Risk-significant ~~SSCs~~SSC can be judged by using the PRA Level 1 model based on the risk achievement worth (RAW), common cause failure (CCF) RAW, or Fussell-Vesely ~~worth~~ (FV~~W~~) of the respective ~~SSCs~~SSC. Components with an RAW value of two or greater, a CCF RAW value of 20 or greater, or FV~~W~~ of 0.005 or greater can be considered risk-significant. The RAW of a component is the factor by which the plant core damage frequency increases if the component reliability is assigned the value of 1.0 (assumed guaranteed to fail). The CCF RAW of a common cause group is the factor by which the plant core damage frequency increases if the common cause group probability of failure is set to 1 (common cause failure is assumed to occur). FV~~W~~ is a measure of the component's contribution to the overall core damage frequency.

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17.4.2.3 Expert Panel

An expert panel is established to assess the qualitative and quantitative inputs related to risk-significant ~~SSCs~~SSC. A preliminary list of risk-significant ~~SSCs~~SSC is developed using a combination of probabilistic and deterministic insights. This includes information obtained from sources, such as design-specific PRA, nuclear plant operating experience, relevant component failure databases.

The expert panel will use their expertise and PRA insights to develop the list of the risk-significant ~~SSCs~~SSC. The panel members will use input from the specific risk importance calculational methods (i.e., FV~~W~~ and RAW) to determine risk-significant ~~SSCs~~SSC. Each calculational method will identify a different set of ~~SSCs~~SSC based on