Table 7.1-3—DCS Functional Requirements Allocation Matrix
Sheet 1 of 2

Functional Requirements	DCS Subsystem								
	SICS	PICS	DAS	PS	SAS	RCSL	PAS	SCDS	PACS
Process Control Functions (NSR)									
Non-reactivity related		X					X	X	X
Reactivity related (with rods)		X				X		X	
Reactivity related (without rods)[1]		X				X	X	X	X
Process Limitation Functions (NSR)									
Non-reactivity related		X					X	X	X
Reactivity related (with rods)		X				X		X	
Reactivity related (without rods)[1]		X				X	X	X	X
Reactor Trip (SR)	X			X				X	
ESF Actuation (SR)	X			X				X	X
Safety Controls (SR)									
Automatic[2]	X				X			X	X
Manual Grouped Control[3]	X	X			X		X		X
Manual Component Control[4]	X	X					X		X
Safety Interlocks[5, 6] (SR)	X			X	X			X	X
Severe Accident Controls[7] (NSR)	X	X					X		X
Diverse Reactor Trip (NSR)	X		X					X	
Diverse ESF Actuation (NSR)	X		X					X	X
Process Indications[8] (NSR)		X					X	X	X

Table 7.1-3—DCS Functional Requirements Allocation Matrix
Sheet 2 of 2

Functional Requirements	DCS Subsystem								
	SICS	PICS	DAS	PS	SAS	RCSL	PAS	SCDS	PACS
PAM Indications (SR and NSR)									
PAM Type A[9]	X	X					X	X	X
PAM Type B[9]	X	X					X	X	X
PAM Type C[9]	X	X					X	X	X
PAM Type D		X					X		
PAM Type E		X					X		
Severe Accident Indications[10] (NSR)	X	X					X	X	X
Alarms[11] (NSR)	X	X	X	X	X	X	X	X	

Notes:

1. Process control and limitation functions that are reactivity related and command actuators other than control rods (e.g., reactor boron water makeup) are allocated to RCSL and PAS. RCSL performs the bulk of the logic, and then sends the specific actuator command (i.e., open/close) to the PAS. This provides a common actuator interface from the PICS.

2. Safety automatic control functions are allocated to SICS if an operator interface is needed for the function (e.g., auto/manual transfer).

3. Safety-related manual grouped controls are allocated to two different paths, which are:

   – SICS -> SAS -> PACS (credited path).

   – PICS -> PAS -> PACS (duplicated path provided so the operator can perform these functions on PICS).

4. Safety-related manual component controls are allocated to two different paths, which are:

   – SICS -> PACS (credited path).

- PICS -> PAS -> PACS (duplicated path provided so the operator can perform these functions on PICS).

5. Safety interlock functions are allocated to SICS if an operator interface is needed for the function (e.g., validating a permissive to enable an interlock).

6. The interlock is allocated to PS if it relies on a permissive that resides in the PS (e.g., P14 permissive for RHR interlock). Otherwise, the interlock is allocated to SAS. This minimizes wiring between the PS and SAS.

7. Severe accident controls are allocated to two different paths, which are:

   - SICS -> PACS (credited path).

   - PICS -> PAS -> PACS (duplicated path provided so the operator can perform these functions on PICS).

8. Process indications are routed as follows:

   - PAS -> PICS (path used if the signal is needed only in PAS).

   - SCDS or PACS (for actuator feedback) -> PAS -> PICS -> (path used if the signal is needed in multiple DCS subsystems).

9. PAM Type A-C indications are allocated to two different paths, which are:

   - SCDS or PACS (for actuator feedback) -> SICS (credited path).

   - SCDS or PACS (for actuator feedback) -> PAS -> PICS (duplicated path provided so the operator can monitor these parameters on PICS).

10. Severe accident indications are allocated to two different paths, which are:

    - SCDS or PACS (for actuator feedback) -> SICS (credited path).

    - SCDS or PACS (for actuator feedback) -> PAS -> PICS (duplicated path provided so the operator can monitor these parameters on PICS).

11. The alarms are provided on PICS. These alarms are generated in the PS, SAS, RCSL, DAS (sent to PAS via HW link), or PAS. A limited number of alarms are provided on SICS. These alarms are generated in DAS, PS, or SAS.

Table 7.1-4—DCS Interface Matrix
Sheet 1 of 4

From	To	Type	Basis
SICS (MCR)	DAS	Hardwired	Manual diverse reactor trip, diverse ESF actuation, diverse ESF resets, diverse permissives
	PS	Hardwired	Manual reactor trip, ESF actuation, ESF resets, permissives
	SAS	Hardwired	Signals to interface with automatic functions (e.g., auto/manual switchover) and manual grouped commands for SAS functions
	PACS	Hardwired	Manual component level control commands, Operational I&C Disable
SICS (RSS)	DAS	Hardwired	MCR-RSS Transfer
	PS	Hardwired	Manual reactor trip, limited ESF resets, limited permissives, MCR-RSS Transfer
	SAS	Hardwired	MCR-RSS Transfer
	PACS	Hardwired	MCR-RSS Transfer
	PICS	Hardwired	MCR-RSS Transfer
PICS	RCSL	Data	Signals to interface with automatic functions (e.g., auto/manual switchover), manual grouped commands for RCSL functions, manual controls for individual rods
	TG I&C	Data	Manual commands related to Turbine Generator operation
	PAS	Data	Signals to interface with automatic functions, manual grouped commands, manual component control commands
	Plant Business Networks	Data	Information to transfer to plant business networks for use by plant staff.

Table 7.1-4—DCS Interface Matrix
Sheet 2 of 4

From	To	Type	Basis
DAS	SICS	Hardwired	Provide information to SICS regarding DAS operation (e.g., DAS reactor trip initiated)
	PAS	Hardwired	Provide DAS information to PAS for display on PICS, provide signals to PAS to coordinate logic on diverse reactor trip or ESF actuation
	RTB	Hardwired	Diverse reactor trip signal
	CRDCS	Hardwired	Diverse reactor trip signal
	TG I&C	Hardwired	Diverse turbine trip signal
	PACS	Hardwired	Diverse ESF actuation signals
PS	SICS	Hardwired	Provide information to SICS regarding PS operation (e.g., PS reactor trip initiated)
	SICS	Data	Provide information to QDS for graphical display and trends
	PICS	Data	Provide information to PICS regarding PS operation (e.g., PS reactor trip initiated)
	SAS	Hardwired	Initiate ESF controls following ESF actuation
	PAS	Hardwired	Provide signals to PAS to coordinate logic on reactor trip or ESF actuation
	RTB	Hardwired	Reactor trip signal
	CRDCS	Hardwired	Reactor trip signal
	TG I&C	Hardwired	Turbine trip signal
	PACS	Hardwired	ESF actuation signals

Table 7.1-4—DCS Interface Matrix
Sheet 3 of 4

From	To	Type	Basis
SAS	SICS	Hardwired	Provide information to SICS regarding SAS operation (e.g., PS reactor trip initiated)
	PICS	Data	Provide information to PICS regarding SAS operation (e.g., PS reactor trip initiated)
	PAS	Hardwired	Provide for coordination of logic between SAS and PAS (if needed)
	PACS	Hardwired	Safety control signals
RCSL	PICS	Data	Provide information to PICS regarding RCSL operation (e.g., ACT control mode)
	PAS	Hardwired	Provide command signals for actuators used in RCSL functions other than control rods (e.g., RBMWS components for Boron control)
	CRDCS	Hardwired	Actuation commands for control rods
	TG I&C	Hardwired	Turbine actuation signals related to reactivity control and limitation functions
PAS	PICS	Data	Provide process and safety indications to PICS, provide information to PICS regarding PAS operation (e.g., auto/manual status, etc)
	PACS	Data	Actuator commands
	Actuators/ Black Boxes	Hardwired	Actuator commands
	TG I&C	Hardwired	TG I&C actuation commands
SCDS	SICS	Hardwired	Distribute DCS input signals to SICS
	DAS	Hardwired	Distribute DCS input signals to DAS
	PS	Hardwired	Distribute DCS input signals to PS

Table 7.1-4—DCS Interface Matrix
Sheet 4 of 4

From	To	Type	Basis
SCDS (cont)	SAS	Hardwired	Distribute DCS input signals to SAS
	RCSL	Hardwired	Distribute DCS input signals to RCSL
	PAS	Hardwired	Distribute DCS input signals to PAS
PACS	SICS	Hardwired	Actuator checkbacks
	SAS	Hardwired	Actuator checkbacks
	PAS	Data	Actuator checkbacks
Sensors/ Black Boxes	SCDS	Hardwired	Send signals to the DCS for distribution to multiple DCS subsystems
	PAS	Hardwired	Send non-safety related signals to the DCS if only needed in PAS
Actuators/ Black Boxes	PACS	Hardwired	Actuator checkbacks
	PAS	Hardwired	Actuator checkbacks
CRDCS	RCSL	Hardwired	Control rod checkbacks
TG I&C	RCSL	Hardwired	Turbine generator information needed in RCSL functions (e.g., 1st stage pressure)
	PAS	Hardwired	Turbine generator information needed in PAS functions
	PICS	Data	Indications and actuator checkbacks for equipment controlled by TG I&C

Notes:

1. Table 7.1-3 shows the major internal and external DCS interfaces needed for monitoring and control of the plant. Additional interfaces may be necessary, such as those interfaces that are necessary to implement testing, bypassed and

inoperable status, data storage (time stamping) requirements. Additional interfaces not defined in Table 7.1-3 that are needed to fulfill requirements is implemented using the following rules:

– The interfaces are hardwired.

– The interfaces between safety and non-safety systems will be implemented using qualified electrical isolation devices in accordance with the applicable regulatory requirements and codes and standards.

2. Each entry in the DCS interface matrix shows interfaces in a unidirectional fashion, even though interfaces may be bidirectional. For example, Figure 7.1-2 shows bidirectional hardwired connections between PS and SICS. Table 7.1-4 shows two entries for this, one for the interface from SICS to PS, and one for the interface from PS to SICS.

Table 7.1-5—SAS Automatic Safety Function
Sheet 1 of 46

System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Annulus Ventilation System (AVS)	Accident Filtration Train Heater Control	The AVS has a safety-related function to maintain capability of the iodine absorbers to remove iodine from the annulus exhaust air. The radiological filter air heaters are used to limit the relative humidity to a maximum of 70% when the AVS accident trains are in operation (RG 1.52 and ASME N509-89).	NO	N/A	N/A	The I&C associated with the AVS is described in Sections 6.2.3 and 6.5.1.
Annulus Ventilation System (AVS)	Accident Train Switchover	The AVS has a safety related function to maintain a negative pressure (GDC 16, GDC 43, Containment Leakage Testing per 10 CFR 50 Appendix J, and NRC RG 1.52 Rev 3 to provide filtration of Engineered Safety Feature Atmospheric Cleanup). In case of a failure during accident operation of an operating accident filtration train, and a negative pressure is not being maintained in the annulus, operation shall be switched to the non-operating accident filtration train to maintain a negative pressure.	NO	N/A	N/A	The I&C associated with the AVS is described in Sections 6.2.3 and 6.5.1.

Table 7.1-5—SAS Automatic Safety Function
Sheet 2 of 46

System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Component Cooling Water System (CCWS)	CCWS Common 1.b Automatic Backup Switchover of Train 1 to Train 2	The CCWS has a safety-related function to remove heat from safety-related components (GDC 44). The safety-related function to perform an automatic switchover from Train 1 to Train 2 verifies that the CCWS is capable of fulfilling its safety-related function to remove heat from safety-related components on the CCWS Common 1.a and 1.b.	(1) Div 2 to Div 1 - To switch from Train 1 to Train 2 requires a low Surge Tank Level in Div 2 : (2) Close Train 1 supply and return valves by removing power from the valves associated pilot valves that are powered via Div 1, 2, 3, and 4: (3) Div 1 to Div 2 - Verify Train 1 1.b supply and return valves are closed prior to Train 2 supply and return valves opening (i.e. interlock function)): (4) Open Train 2 supply and return valves by applying power to the valves associated pilot valves that are powered via Div 1, 2, 3, and 4	Discrete	Vote	The I&C associated with the CCWS is described in Section 9.2.2

Table 7.1-5—SAS Automatic Safety Function
Sheet 3 of 46

System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Component Cooling Water System (CCWS)	CCWS Common 1.b Automatic Backup Switchover of Train 2 to Train 1	The CCWS has a safety-related function to remove heat from safety-related components (GDC 44). The safety-related function to perform an automatic switchover from Train 2 to Train 1 verifies that the CCWS is capable of fulfilling its safety-related function to remove heat from safety-related components on the CCWS Common 1.a and 1.b.	Similar to Train 1 to Train 2 Switchover	Discrete	Vote	The I&C associated with the CCWS is described in Section 9.2.2.
Component Cooling Water System (CCWS)	CCWS Common 2.b Automatic Backup Switchover of Train 3 to Train 4	The CCWS has a safety-related function to remove heat from safety-related components (GDC 44). The safety-related function to perform an automatic switchover from Train 3 to Train 4 verifies that the CCWS is capable of fulfilling its safety-related function to remove heat from safety-related components on the CCWS Common 2.a and 2.b.	Similar to Train 1 to Train 2 Switchover, but for Train 3 to Train 4	Discrete	Vote	The I&C associated with the CCWS is described in Section 9.2.2.

Table 7.1-5—SAS Automatic Safety Function
Sheet 4 of 46

System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Component Cooling Water System (CCWS)	CCWS Common 2.b Automatic Backup Switchover of Train 4 to Train 3	The CCWS has a safety-related function to remove heat from safety-related components (GDC 44). The safety-related function to perform an automatic switchover from Train 4 to Train 3 verifies that the CCWS is capable of fulfilling its safety-related function to remove heat from safety-related components on the CCWS Common 2.a and 2.b.	Similar to Train 1 to Train 2 Switchover, but for Train 4 to Train 3	Discrete	Vote	The I&C associated with the CCWS is described in Section 9.2.2.
Component Cooling Water System (CCWS)	CCWS Emergency Temperature Control	The CCWS has a safety-related function to remove heat from safety-related components (GDC 44). The safety-related function to control the CCWS heat exchanger (HX) outlet temperature is required to maintain the temperature of the cooling water within its limits. This verifies that the CCWS is capable of fulfilling its safety relegated function to remove heat from safety-related components.	NO	N/A	N/A	The I&C associated with the CCWS is described in Section 9.2.2.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Component Cooling Water System (CCWS)	CCWS Emergency Leak Detection	The CCWS has a safety-related function to remove heat from safety-related components (GDC 44). The safety-related function for emergency leak detection maintains the required cooling water inventory that supports the safety-related function to remove heat using indications to detect leaks and isolate them (GDC 44).	NO	N/A	N/A	The I&C associated with the CCWS is described in Section 9.2.2.

Table 7.1-5—SAS Automatic Safety Function
Sheet 6 of 46

System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Component Cooling Water System (CCWS)	CCWS Switchover Valve Interlock	The CCWS has a safety-related function to remove heat from safety-related components (GDC 44). The interlock function is required to verify that the two trains connected to their common headers remain separated and each are able to provide their corresponding LHSI HX with the required flow for heat removal. Removing heat from the LHSI HX is a safety-related function.	If the either of the supply and return valves for a given Train (1 or 2, 3 or 4) are open with respect to a given header (1.a, 1.b, 2.a, or 2.b) then the other corresponding train supply and return valves are given a close command. Train 1 valves are in Div 1, Train 2 valves in Div 2 and so on. Therefore, the signals are sent across divisions for the close command discussed. Hence, the on coming trains supply and return valves are not allowed to open until the corresponding off going trains supply and return valves are closed.	Discrete	Vote	The I&C associated with the CCWS is described in Sections 7.6 and 9.2.2.

Table 7.1-5—SAS Automatic Safety Function
Sheet 7 of 46

System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Component Cooling Water System (CCWS)	CCWS RCP Thermal Barrier Containment Isolation Valve Interlock	The CCWS has a safety-related function to remove heat from safety-related components (GDC 44). The interlock function is required to verify that the Common 1.b and 2.b headers remain separated and each of their trains are able to provide their corresponding LHSI HX with the required flow for heat removal. Removing heat from the LHSI HX is a safety-related function.	The Inner and Outer Containment Isolation Valves are powered from different divisions. For the Common 1.b header, the outer valves (supply and return) are supplied by Div 1 and the inner valves by Div 4. The opposite is true for the Common 2.b header. To be able to switch between headers, at least one of the supply valves (outer or inner) and one of the return valves (outer or inner) must be closed. Therefore, the state (open or closed) of these valves must be communicated across divisions.	Discrete	Vote	The I&C associated with the CCWS is described in Sections 7.6 and 9.2.2.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Component Cooling Water System (CCWS)	CCWS Switchover Valves Leakage or Failure	The CCWS has a safety-related function to remove heat from SAS components (GDC 44). The safety-related function for switchover valve leakage or failure isolates the CCWS trains from their common headers to verify that each train is able to provide their corresponding LHSI HX with the required flow for heat removal. Removing heat from the LHSI HX is a safety-related function.	This function looks at surge tank level in the two corresponding Trains (Trains 1 and 2, Trains 3 and 4) that feed a common header. If the surge tank level in the on-line train is lowering while the surge tank level the off-line train is rising then a seat leakage on one of the off line train switchover valves is likely. Therefore, interdivisional communication is required since information from more than one division is being utilized.	Discrete	Vote	The I&C associated with the CCWS is described in Section 9.2.2.

Table 7.1-5—SAS Automatic Safety Function
Sheet 9 of 46

System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Component Cooling Water System (CCWS)	CCWS Condenser Supply Water Flow Control	The CCWS has a safety-related function that controls CCWS flow to the SCWS condenser and provides a heat sink for heat rejection, therefore providing reasonable assurance that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	NO	NA	NA	The I&C associated with the CCWS is described in Section 9.2.2.
Emergency Feedwater System (EFWS)	SG Closed Loop Level Control	The EFWS has a safety-related function to: 1. Provide flow to the steam generators to restore and maintain decay heat removal from the RCS to assist in the cool down and depressurization of the RCS to the RHRS entry conditions following AOOs and PAs.	NO	N/A	N/A	The I&C associated with the EFWS is described in Sections 7.3 and 10.4.9.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
		2. Maintain the water inventory in the steam generators following a LOOP, and the resulting loss of MFW, for decay heat removal. The safety-related function to provide SG Closed Loop Level Control verifies that the EFWS is capable of fulfilling its safety-related function of maintaining the SG water inventory for decay heat removal, following a LOOP and the resulting loss of MFW.				
Emergency Feedwater System (EFWS)	EFW Pump Flow Control	The EFWS has a safety-related function to: 1. Provide flow to the SGs to restore and maintain decay heat removal from the RCS to assist in the cool down and depressurization of the RCS to the RHRS entry conditions following AOOs and PAs.	NO	N/A	N/A	The I&C associated with the EFWs is described in Sections 7.3 and 10.4.9.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
		2. Maintain the water inventory in the steam generators following a LOOP, and the resulting loss of MFW, for decay heat removal. The safety-related function to provide EFW pump flow control to maintain EFWS pump flow at the design flow verifies that the EFWS is capable of fulfilling its safety-related function of providing flow to the steam generators, below the maximum allowable flow rate to a depressurized SG, to support its safe shut down capabilities.				
Essential Service Water System (ESWS)	Automatic ESWS Actuation from CCWS Start	The ESWS has a safety-related function to remove heat from safety-related components (GDC 44). The Automatic ESWS Actuation from CCWS Start function removes heat from the CCWS (Trains 2 and 3) and the EDGs ensuring the ESWS is capable of fulfilling its safety-related function to remove heat from the corresponding CCWS train.	NO	N/A	N/A	The I&C associated with the ESWS is described in Section 9.2.1.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Essential Service Water Pump Building Ventilation System (ESWPBVS)	Remove Heat Generated by Essential Service Water Equipment	The ESWPBVS has an safety-related function that maintains ambient conditions for safety-related components during normal operation (GDC 4, GDC 17).	NO	N/A	N/A	The I&C associated with the ESWS systems is described in Section 9.4.11.
Fuel Building Ventilation System (FBVS)	Safety-related Room Heater Control	The FBVS has an safety-related function that maintains the room ambient conditions for safety-related boron rooms during normal operation, abnormal operation, and postulated accident events (GDC 27, GDC 60, GDC 61).	NO	N/A	N/A	The I&C associated with the FBVS system is described in Section 9.4.2
Fuel Building Ventilation System (FBVS)	Maintain Ambient Conditions for EBS and FPCS pump rooms (Recirculation Coolers)	The FBVS has an safety-related function that maintains the room ambient conditions in the extra borating system pump rooms and fuel pool cooling system pump rooms during normal operation, abnormal operation, and postulated accident events (GDC 27, GDC 60, GDC 61).	NO	N/A	N/A	The I&C associated with the FBV system is described in Section 9.4.2.

Table 7.1-5—SAS Automatic Safety Function
Sheet 13 of 46

System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Fuel Pool Cooling and Purification System (FPCPS)	Fuel Pool Cooling Pump Trip On Low SFP Level	The FPCPS has a safety-related function to: 1. Remove decay heat from the spent fuel pool during normal plant operation, outages, AOOs, and PAs. 2. Provide containment isolation by closure of the reactor pool purification supply and return containment isolation valves. 3. Preclude, by design, the drain down of the spent fuel pool (SFP) below its required level to verify that the spent fuel remains covered with water during storage conditions. 4. Provide SFP make-up capability (Seismic Category I water sources, pump, and piping) to compensate for normal SFP evaporation for up to seven days.	NO	N/A	N/A	The I&C associated with the FPCPS is described in Section 9.1.3.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
		5. Provide isolation capability of non-safety-related FPCPS piping from the reactor building transfer compartment, the fuel building transfer compartment and cask loading pit (per 10 CFR 50.34(a)(1) or 10 CFR 100.11). The safety-related function to trip the FPC pump on low level verifies that the FPCPS is capable of fulfilling its safety-related function of precluding the drain down of the SFP to eliminate the potential for fuel damage and its consequences.				

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
In-Containment Refueling Water Storage Tank System (IRWST)	IRWST Boundary Isolation for Preserving IRWST Water Inventory	The IRWST has a safety-related function to isolate the IRWST for purposes of preserving the IRWST water inventory to support the safety-related function of controlling core reactivity (via safety injection) by closing the IRWST isolation valves. This preserves IRWST inventory for long term availability of safety injection, given a pipe failure in a connected non-safety related system.	Interdivisional communications is required because an IRWST low level discrete signal is generated in each division, and 2/4 voting logic is used to close IRWST isolation valves in Division 1 and 4.	Discrete	Vote	The I&C associated with the IRWST is described in Section 6.3
Main Control Room Air Conditioning System (CRACS)	Iodine Filtration Train Heater Control	The CRACS has an safety-related function to preheat the inlet air in order to reduce the airborne moisture prior to entry into the carbon bed within the filter unit. Carbon filter heaters shut down when the respective inlet or outlet dampers are not fully open. The heaters will turn off if the carbon filtration unit fan stops, the carbon filter inlet isolation damper is not open or the carbon filter outlet isolation damper is not open.	NO	N/A	N/A	The I&C associated with the CRACS systems is described in Sections 6.5.1 and 9.4.1.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Main Control Room Air Conditioning System (CRACS)	Heater Control for Outside Inlet Air	The CRACS has an safety-related function to preheat the outside air to verify that the inlet air temperature is not less than 37°F (GDC 19). Inlet air which bypasses the iodine filtration unit is heated by an electric heater for temperature control. Heating of the outside air is performed by multi-stage heaters located in each outside air intake duct.	NO	N/A	N/A	The I&C associated with the CRACS systems is described in Sections 6.5.1 and 9.4.1.
Main Control Room Air Conditioning System (CRACS)	Pressure Control	The CRACS has safety-related function to verify the MCR is maintained at a positive pressure with respect to the ambient air pressure in adjacent areas (GDC 19). Differential pressure sensors sense the pressure difference between the MCR and the pressure in a reference space.	NO	N/A	N/A	The I&C associated with the CRACS systems is described in Sections 6.5.1 and 9.4.1.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Main Control Room Air Conditioning System (CRACS)	Cooler Temperature Control	The CRACS has safety-related functions that verifies that the air supply temperature is maintained within the preset temperature range (GDC 19). A control signal is developed when the supply air temperature exceeds a preset temperature set point of 58°F. The control signal is used to adjust cooler outlet SCWS control valves to maintain the air supply temperature.	NO	N/A	N/A	The I&C associated with the CRACS systems is described in Sections 6.5.1 and 9.4.1.
Main Steam System (MSS)	Steam Generator MSRCV Regulation during Standby Position Control	The MSS has a safety-related function supporting the removal of decay heat and other residual heat from the reactor core (GDC 34). The function modulates the MSRCV to its standby control position, so in the event of an overpressure transient the MSRCVs will already be in its required relieving position.	NO	N/A	N/A	The I&C associated with the MSS is described in Sections 7.3 and 10.3.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Main Steam System (MSS)	Steam Generator MSRCV Regulation during Pressure Control	The MSS has a safety-related function supporting the removal of decay heat and other residual heat from the reactor core (GDC 34). The function modulates the MSRCV to its required position in order to reduce secondary side pressure of the steam generators during overpressure events.	The MSRIV closed position is detected via 2 out of 4 voting (the position switches are associated with Div 1 through 4).	Discrete	Vote	The I&C associated with the MSS is described in Sections 7.3 and 10.3.
Safeguard Building Controlled-Area Ventilation System (SBVS)	SIS/RHRS Pump Rooms Heat Removal	The SBVS has an safety-related function that maintains ambient conditions for safety-related components during normal operation (GDC 60, GDC 61).	NO	N/A	N/A	The I&C associated with the SBVS system is described in Section 9.4.5.
Safeguard Building Controlled-Area Ventilation System (SBVS)	SIS/RHRS Valve Rooms Heat Removal	The SBVS has an safety-related function that maintains ambient conditions for safety-related components during normal operation (GDC60, GDC61).	NO	N/A	N/A	The I&C associated with the SBVS system is described in Section 9.4.5.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Supply and Recirculation Exhaust Air Flow Control	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Supply and Recirculation Exhaust Air Flow Control function supports this system safety function by controlling supply, exhaust, and recirculation flow as required to maintain ambient temperature and air quality (via filtration) within applicable limits for safety-related equipment located within the Safeguard Building areas and rooms.	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Supply Fan Safe Shut-off	The SBVSE has an safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). An inadvertent stopping of the supply fan, due to a spurious system action, may cause the SBVSE for a given division to become inoperable. Therefore, to mitigate the risk of system spurious actions, this function is to be designated as safety-related (IEEE 603).	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Recirculation/ Exhaust Fan Safe Shut-off	The SBVSE has an safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). An inadvertent stopping of the recirculation/ exhaust fan, due to a spurious system action, may cause the SBVSE for a given division to become inoperable. Therefore, to mitigate the risk of system spurious actions, this function is to be designated as safety-related (IEEE 603).	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Exhaust Fan Safe Shut-off	The SBVSE has an safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). An inadvertent stopping of the exhaust fan, due to a spurious system action, may cause the SBVSE for a given division to become inoperable. Therefore, to mitigate the risk of system spurious actions, this function is to be designated as safety-related (IEEE 603).	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Supply Air Temperature	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Supply Air Temperature function supports this system safety function by maintaining supply air temperature (downstream of heaters) as required to maintain ambient temperature within applicable limits for safety-related equipment located within the Safeguard Building areas and rooms.	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Freeze Protection – Supply Air Temperature	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Freeze Protection Supply Air Temperature function supports this system safety function by maintaining supply air temperature (downstream of heaters) as required to maintain ambient temperature within applicable limits for safety-related equipment located within the Safeguard Building areas and rooms.	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Freeze Protection – Heat Tracing	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Freeze Protection - Heat Tracing function supports this system safety function by preventing ice build-up on the louver bars (i.e. mitigating the risk of not having available makeup air).	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Supply Air Temperature Control for Cooling	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Supply Air Temperature Control for Cooling function supports this system safety function by maintaining a constant air temperature as required to maintain ambient temperature within applicable limits for safety-related equipment located within the Safeguard Building areas and rooms.	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Supply Air Temperature Control for Supply Air Heating	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Supply Air Temperature Control for Supply Air Heating function supports this system safety function by maintaining a minimal air temperature as required to maintain ambient temperature within applicable limits for safety-related equipment located within the Safeguard Building areas and rooms.	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Battery Room Temperature Control	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Battery Room Temperature Control function supports this system safety function by maintaining battery room ambient temperature within applicable limits.	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Battery Room Supply Air Temperature	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Battery Room Supply Air Temperature function supports this system safety function by maintaining battery room ambient temperature within applicable limits.	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Emergency Feedwater Pump Room Heat Removal	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Emergency Feedwater Pump Room Heat Removal function supports this system safety function by removing heat from the pump room and maintaining room temperature within a temperature band for safety-related equipment.	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Electrical Division of Safeguard Building Ventilation System (SBVSE)	Component Cooling Water System Rooms Heat Removal	The SBVSE has a safety-related function to ventilate and maintain acceptable ambient temperature in the Safeguard Building areas and rooms ventilated by the system (GDC 4, GDC 17). The Component Cooling Water System Rooms Heat Removal function supports this system safety function by removing heat from the applicable rooms and maintaining room temperature within a temperature band for safety-related equipment.	NO	N/A	N/A	The I&C associated with the SBVSE is described in Section 9.4.6.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 1 to Train 2 Switchover on Train 1 Low Evaporator Flow	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 1 is associated with Div 1 and Train 2 with Div 2. Div 1 and Div 2 are cross connected. When switching between trains (due to system faults - e.g., low evaporator flow) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 2 to Train 1 Switchover on Train 2 Low Evaporator Flow	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 1 is associated with Div 1 and Train 2 with Div 2. Div 1 and Div 2 are cross connected. When switching between trains (due to system faults - e.g., low evaporator flow) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 3 to Train 4 Switchover on Train 3 Low Evaporator Flow	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions per (GDC 44).	Train 3 is associated with Div 3 and Train 4 with Div 4. Div 3 and Div 4 are cross connected. When switching between trains (due to system faults - e.g., low evaporator flow) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 4 to Train 3 Switchover on Train 4 Low Evaporator Flow	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 3 is associated with Div 3 and Train 4 with Div 4. Div 3 and Div 4 are cross connected. When switching between trains (due to system faults - e.g., low evaporator flow) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 1 to Train 2 Switchover on Train 1 Chiller Black Box Internal Fault	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 1 is associated with Div 1 and Train 2 with Div 2. Div 1 and Div 2 are cross connected. When switching between trains (due to system faults - chiller black box internal fault) an auto-start of the standby train occurs. A verification of prerequisites is required to provide reasonable assurance that the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 2 to Train 1 Switchover on Train 2 Chiller Black Box Internal Fault	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 1 is associated with Div 1 and Train 2 with Div 2. Div 1 and Div 2 are cross connected. When switching between trains (due to system faults - chiller black box internal fault) an auto-start of the standby train occurs. A verification of prerequisites is required to provide reasonable assurance that the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 3 to Train 4 Switchover on Train 3 Chiller Black Box Internal Fault	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 3 is associated with Div 3 and Train 4 with Div 4. Div 3 and Div 4 are cross connected. When switching between trains (due to system faults - chiller black box internal fault) an auto-start of the standby train occurs. A verification of prerequisites is required to provide reasonable assurance that the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 4 to Train 3 Switchover on Train 4 Chiller Black Box Internal Fault	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 3 is associated with Div 3 and Train 4 with Div 4. Div 3 and Div 4 are cross connected. When switching between trains (due to system faults - chiller black box internal fault) an auto-start of the standby train occurs. A verification of prerequisites is required to provide reasonable assurance that the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 2 to Train 1 Switchover on Loss of Ultimate Heat Sink (LUHS)/ CCWS	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 1 is associated with Div 1 and Train 2 with Div 2. Div 1 and Div 2 are cross connected. When switching between Trains (due to an external system fault (loss of CCW = LUHS)) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 3 to Train 4 Switchover on Loss of Ultimate Heat Sink (LUHS)/ CCWS	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 3 is associated with Div 3 and Train 4 with Div 4. Div 3 and Div 4 are cross connected. When switching between Trains (due to an external system fault (loss of CCW = LUHS)) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 1 to Train 2 Switchover on LOOP Re-start Failure	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions per (GDC 44).	Train 1 is associated with Div 1 and Train 2 with Div 2. Div 1 and Div 2 are cross connected. When switching between trains (re-start failure of the previous operating train or with its corresponding EDG) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 2 to Train 1 Switchover on LOOP Re-start Failure	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 1 is associated with Div 1 and Train 2 with Div 2. Div 1 and Div 2 are cross connected. When switching between trains (re-start failure of the previous operating train or with its corresponding EDG) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 3 to Train 4 Switchover on LOOP Re-start Failure	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 3 is associated with Div 3 and Train 4 with Div 4. Div 3 and Div 4 are cross connected. When switching between trains (re-start failure of the previous operating train or with its corresponding EDG) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Train 4 to Train 3 Switchover on LOOP Re-start Failure	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The automatic switchover function verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	Train 3 is associated with Div 3 and Train 4 with Div 4. Div 3 and Div 4 are cross connected. When switching between trains (re-start failure of the previous operating train or with its corresponding EDG) an auto-start of the standby train occurs. A verification of prerequisites is required to make sure the on-coming train is in ready standby mode and that the appropriate cross-tie valves are in the open position.	Discrete	Vote	The I&C associated with the SCWS is described in Section 9.2.8.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Chilled Water System (SCWS)	SCWS Chiller Evaporator Water Flow Control (Trains 1 and 4)	The SCWS has an safety-related function 1) to transfer heat loads from safety-related SSC to a heat sink under both normal operating and accident conditions, 2) component redundancy for performance of safety functions assuming a single, active component failure coincident with the loss of offsite power, and 3) the capability to isolate components, systems, or piping, if required, so system safety functions are not compromised. The SCWS Chiller Evaporator Water Flow Control function prevents freezing at the evaporator coil and therefore, verifies that the SCWS is capable of fulfilling these safety-related functions (GDC 44).	NO	NA	NA	The I&C associated with the SCWS is described in Section 9.2.8.

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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Injection and Residual Heat Removal System (SIS/ RHRS)	Automatic RHRS Flow Rate Control	The SIS/RHRS has a safety-related function to provide the RCS RHR in order to reach cold shutdown, refueling modes and to control primary temperature. The function to automatically control the flow rate of the RHRS supports the safety-related function of providing RHR by modulating the bypass control valve ensuring a constant flow rate through the LHSI pump.	NO	NA	NA	The I&C associated with the SIS/RHRS is described in Section 5.4.7 and 6.3.
Safety Injection and Residual Heat Removal System (SIS/ RHRS)	Automatic Trip of LHSI Pump (in RHR Mode) on Low ΔPsat	The SIS/RHRS has a safety-related function to provide the RCS RHR in order to reach cold shutdown, refueling modes and to control primary temperature. The function to automatically trip the LHSI pump upon a low ΔPsat signal supports the safety-related function of providing RHR by maintaining LHSI pump operability by shutting down the pump to prevent pump damage due to inadequate NPSH or unavailability due to steam binding following a failure that results in RCS conditions approaching saturation.	Interdivisional communications is required because a low ΔPsat discrete signal is generated in each division, and 2/4 voting logic is used to trip the LHSI pump.	Discrete	Vote	The I&C associated with the SIS/RHRS is described in Section 5.4.7 and 6.3.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Injection and Residual Heat Removal System (SIS/ RHRS)	Automatic Trip of LHSI Pump (in RHR Mode) on Low Loop Level	The SIS/RHRS has a safety-related function to provide the RCS RHR in order to reach cold shutdown, refueling modes and to control primary temperature. The function to automatically trip the LHSI pump upon a low RCS loop level signal supports the safety-related function of providing RHR by maintaining LHSI pump operability by shutting down the pump to prevent pump damage or unavailability due to air binding following a failure that results in low RCS loop level.	Interdivisional communications is required because a low RCS loop level discrete signal is generated in each division, and 2/4 voting logic is used to trip the LHSI pump.	Discrete	Vote	The I&C associated with the SIS/RHRS is described in Section 5.4.7 and 6.3.

Table 7.1-5—SAS Automatic Safety Function
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System[1]	Function Name[2]	Function Safety Basis[3]	Interdivisional Communications[4]	Type of Data[5]	Signal Selection Type[6]	FSAR Section Referenced
Safety Injection and Residual Heat Removal System (SIS/ RHRS)	LHSI Valves Actuation Based on RHRS Alignment	The SIS/RHRS has a safety-related function to provide RCS RHR in order to reach the cold shutdown, refueling modes and to control primary temperature. The function to actuate the LHSI valves supports the safety-related function of RHR by closing the LHSI suction isolation, radial miniflow line check, and tangential miniflow check valves upon RHRS alignment to the RCS thereby preventing diversion of water from the RCS to the IRWST.	NO	NA	NA	The I&C associated with the SIS/RHRS is described in Section 5.4.7 and 6.3.

Notes:

1. System – Mechanical system described in the referenced FSAR section.
2. Function Name – The automatic safety-related function is controlled by SAS in each mechanical system.
3. Function Safety Basis – Safety-related functions that provide reasonable assurance of either:
   - The integrity of the reactor coolant pressure boundary.
   - The capability to shut down the reactor and maintain it in a safe shutdown condition.
   - The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures.
4. Interdivisional Communication – Point-to-point data communications between different safety divisions of SAS.

5. Type of Data – Analog or Discrete Signal.

6. Signal Selection Type – Vote means if two or more out of the four (or three) inputs are TRUE, then the output will be TRUE, otherwise output is FALSE.

Table 7.1-6—Function Processor Operational States
Sheet 1 of 2

CPU State	CPU Operation	CPU Output	State Use	CPU Operability[1]	Maintenance Bypass
Cyclic processing state	Processor operates normally	Active	Normal operation	Operable	No
Parameterization state	Processor operates normally	Active	Modify predefined, changeable parameters	Inoperable	No
Functional test state	Cyclic processing of the function diagrams is initially stopped and can be controlled at the SU	Hardwired Outputs: Set to failsafe state. The default failsafe state is 0 for digital outputs and low for analog outputs, and can be user defined if other failsafe states are needed. Data Outputs: Data messages are transmitted with test status and are discarded by receiving CPUs in cyclic processing and parameterization states. They are evaluated by receiving CPUs that are also in functional test state. They are not processed by receiving CPUs that are in diagnosis state.	Modify parameters and control function processor outputs	Inoperable	Yes

Table 7.1-6—Function Processor Operational States
Sheet 2 of 2

CPU State	CPU Operation	CPU Output	State Use	CPU Operability[1]	Maintenance Bypass
Diagnosis state	All service commands are supported without any restrictions. The cyclic processing of the function diagrams is initially stopped and can be controlled at the SU	Hardwired Outputs: Set to failsafe state. The default failsafe state is 0 for digital outputs and low for analog outputs, and can be user defined if other failsafe states are needed. Communication Module: Data messages are disabled. No messages are sent from the CPU in diagnosis state. Receiving CPUs will respond to this as a loss of communications.	Application software can be loaded and state used to troubleshoot	Inoperable	Yes

Notes:

1. With regards to Technical Specifcations.

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