ABB

June 10, 1994
LD-94-040

Docket 52-002

Attn: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: **Revision to Selected CESSAR-DC Parameters & Assumptions Addressed in Certified Design Material**

Reference: Letter, C.B. Brinkman (ABB-CE) to USNRC Document Control Desk, "Selected CESSAR-DC Parameters & Assumptions Addressed in Certified Design Material", LD-93-174, dated December 14, 1993

Dear Sirs:

Via the Reference letter, ABB Combustion Engineering provided a tabulation of selected CESSAR-DC parameters and assumptions which have been addressed in Certified Design Material for the System 80+ Standard Plant Design. Since the original submittal (which was applicable through Amendment U), two CESSAR-DC amendments have been or are about to be issued (Amendments V and W, respectively). In response to your inquiry, there have been no design changes or reanalyses which substantially affect the parameter and assumption tabulations in CESSASR-DC Tables 14.3-1 through 14.3-7. Only three minor modifications have been made to the original tabulation. The changes are indicated by bars in the right hand margin of the updated tabulation; provided in the enclosure to this letter.

If you have any questions please do not hesitate to contact me, or Mr. Stanley Ritterbusch of my staff at (203)285-5206.

Very truly yours,

COMBUSTION ENGINEERING, INC.

C.B. Brinkman, Director
Nuclear Systems Licensing

cc: P. Lang (DOE)
T. Boyce (NRC)
T. Wambach (NRC)

ABB Combustion Engineering Nuclear Power

Combustion Engineering, Inc.
P.O. Box 500
1000 Prospect Hill Rd.
Windsor, CT 06095
Telephone (203) 688-1911
Fax (203) 285-5203

D037

Enclosure to LD-94-040

ABB Combustion Engineering

System 80+ Standard Plant Design

Revision to Selected CESSAR-DC Parameters & Assumptions Addressed in Certified Design Material

Design Basis Accident Analysis

Paragraph		Assumption/Parameter Description		Related ITAAC
TABLE 5.4.13-1	-	The primary safety valves pass the minimum flow rate of 525,000 lbm/hr-valve (saturated steam at 2575 psia).		2.3.1
	-	Pressurizer Safety Valve: Set Pressure	2500 +/- 1% psia	2.3.1
	-	Pressurizer Safety Valve: Capacity at accumulation Pressure, each Valve	525000 lb/hr minimum	2.3.1
5.4.13.2	-	A total MSSV capacity of 19x10^6 lb/hr is required to maintain the peak secondary pressure below 110% of design.		2.8.2
TABLE 6.2.1-3	-	Containment Shell: Containment Atmosphere Design Basis Peak Pressure	53 psig	2.1.1 2.4.5
TABLE 6.2.1-18	-	In-Containment Refueling Water Storage Tank: IRWST Water Volume	495000 gal minimum	2.4.7
TABLE 6.2.1-19	-	Runout Flow Per Safety Injection Train	1232 gpm maximum	2.4.4
	-	Runout Flow Per Safety Injection Train	980 gpm minimum	2.4.4
	-	Containment Spray Pump: Flowrate Per Pump	6500 gpm maximum	2.4.6
	-	Containment Spray Pump: Flowrate Per Pump	5000 gpm minimum	2.4.6
	-	Containment Spray Heat Exchanger: Number of Heat Exchangers	2	2.4.6
	-	Containment Spray Heat Exchanger: Shell Side Flow	8000 gpm minimum	2.4.6
TABLE 6.2.1-20	-	Delay Time from CSAS to Spray Delivery	68 sec maximum	2.4.6
6.2.1.3.3	-	Main Feed Water Isolation Valve: MFIV Design Closure Time	5.0 sec maximum	2.8.6
6.2.1.4	-	Main Steam Isolation Valve: MSIV Design Closure Time	5.0 sec maximum	2.8.2
6.2.3.2	-	Annulus Space: Negative Pressure	-0.25 in (water gauge) minimum	2.4.2
6.2.6.1	-	The integrated containment leakage rate is less than 0.5% volume per day.		2.1.1
	-	Containment Vessel: Leak Rate	0.5 % volume/day maximum	2.1.1
6.3.3.2.2	*	The Engineered Safety Features Actuation System (ESFAS) sends a Safety Injection Actuation Signal (SIAS) to start the SIS pumps and open the SIS valves following a LOCA or transient. The SIAS is generated on low pressurizer pressure or high containment pressure.		2.4.4
	-	The SIS consists of four safety injection trains, each consisting of a safety injection pump and a safety injection tank.		2.4.4
	-	Diesel generators will provide power on LOAC		2.6.2
	-	There are four direct vessel injection points		2.4.4
6.3.3.3.2	-	Delay Time for SI Flow to Reactor Vessel After SIAS	40 sec maximum	2.4.4
TABLE 6.3.3.4-1	-	Emergency Feedwater Storage Tank: Emergency Feedwater Storage Tank Capacity	350000 gal/tank minimum	2.8.8
6.3.3.4.2	-	SITs can be vented or isolated		2.4.4
6.3.3.4.4	-	Alignment of SIS for hot and cold injection is possible		2.4.4
TABLE 15.0-3	-	Reactor Vessel: Coolant Flow Rate (% of 445600 gpm)	95 % minimum	2.3.1
15.1.2.1	-	Steam Generator: Maximum Auxiliary Feedwater Flow to Each Steam Generator	800 gpm maximum	2.8.8
TABLE 15.1.5-10	-	Main Steam Line: Blowdown Area for Each Steam Line	1.283 sq ft maximum	2.3.1
TABLE 15.1.5-11	-	Core: 100% Core Power	3914 MWt	1.2
TABLE 15.1.5-12	-	Atmospheric Dispersion Factor, 0-2 Hrs at EAB for SLBFLOPD and SLBZPLOPD Events	1.0 x 10^-3 sec/m^3	5.0
	-	Atmospheric Dispersion Factor, 0-8 Hr at LPZ for SLBFLOPD and SLBZPLOPD Events	1.35 x 10^-4 sec/m^3	5.0
TABLE 15.2.3-1	-	Main Steam Safety Valve: Main Steam Safety Valves - Open	1212 psia	2.8.2
TABLE 15.2.8-2	-	Emergency Feedwater Pump: Emergency Feedwater Flow Initiated to the Intact Steam Generators	500 gpm	2.8.8
	-	Main Steam Safety Valve: Main Steam Safety Valves - Open	1212 psia	2.8.2
TABLE 15.2.8-3	-	Dispersion Data (MDNBR) 2 hr eab	1.0 x 10^-3 sec/m^3	5.0
	-	Dispersion Data (Over Pressure) 2 hr eab	1.0 x 10^-3 sec/m^3	5.0

* PRA Assumption

Design Basis Accident Analysis

Paragraph	Assumption/Parameter Description		Related ITAAC
TABLE 15.2.8-3	- Dispersion Data (MDNBR) 8 hr lpz	1.35 x 10^-4 sec/m^3	5.0
	- Dispersion Data (Over Pressure) 8 hr lpz	1.35 x 10^-4 sec/m^3	5.0
TABLE 15.3.1-1	- Main Steam Safety Valve: MSSV Opening Pressure Setpoint	1212 psia maximum	2.8.2
15.3.1.3	- Each of the EFW pumps can provide 100% of the required EFW flow		2.8.8
TABLE 15.3.3-1	- Emergency feedwater is assumed to be automatically actuated on Steam Generator Low Level EFAS		2.8.8
	- An isolation valve (block valve) is located upstream of the ADV. The block valve can be closed manually from the control room.		2.8.2
	- Main Steam Safety Valve: MSSV Opening Pressure Setpoint	1212 psia maximum	2.8.2
15.3.3.1	- The ADVs are manually operated from the control room		2.8.2
	- Diesel generators provide power to the 4.16 kV safety buses		2.6.2
	- An ADV is located downstream of the MSSVs in each steam line		2.8.2
	- Each ADV discharges to the atmosphere		2.8.2
15.3.3.3.1	- An isolation valve (block valve) upstream of the ADV exists to be closed in case of the stuck open ADV		2.8.2
	- Reactor trip causes the turbine generator trip		2.8.1
TABLE 15.4.8-1	- Main Steam Safety Valve: Main Steam Safety Valves - Open	1212 psia	2.8.2
TABLE 15.4.8-3	- Atmospheric Dispersion Factors - LPZ (30 days)	2.2 x 10^-5 sec/m^3	5.0
	- Atmospheric Dispersion Factors - LPZ (1-4 days)	5.4 x 10^-5 sec/m^3	5.0
	- Containment Vessel: Leak Rate	0.5 % volume/day maximum	2.1.1
	- Atmospheric Dispersion Factors - EAB (0-2 hr)	1.0 x 10^-3 sec/m^3	5.0
	- Atmospheric Dispersion Factors - LPZ (0-8 hr)	1.35 x 10^-4 sec/m^3	5.0
	- Atmospheric Dispersion Factors - LPZ (8-24 hr)	1.0 x 10^-4 sec/m^3	5.0
15.5.1.1	- A SIAS actuates safety injection pumps and opens the corresponding discharge valves		2.4.4
TABLE 15.5.2-1	- Main Steam Safety Valve: MSSV Opening Pressure Setpoint	1212 psia maximum	2.8.2
TABLE 15.6.2-3	- Double-ended letdown line break size is assumed (0.01556 ft^2)		2.7.16
	- Letdown Line: Letdown Line Double Ended Break Size	0.01556 sq ft	2.7.16
15.6.2.1	- Three letdown line isolation valves in series are located within the containment		2.7.16
15.6.2.2	- The letdown line orifices are located within the containment downstream of the letdown heat exchanger		2.7.16
	- The hardware for DIAS (Discrete Indication and Alarm System) is seismically and environmentally qualified		2.5.3
TABLE 15.6.3-7	- Main Steam Safety Valve: MSSV Opening Pressure Setpoint	1212 psia maximum	2.8.2
15.6.3.2.2.1	- The turbine/generator trips on reactor trip		2.8.1
15.6.3.2.2.2	- The minimum capacity of each EFW storage tank of 350,000 gallons is more than enough to maintain the plant at hot standby for 8 hours		2.8.8
	- Each EFW storage tank is provided with an atmospheric vent to maintain atmospheric pressure inside the tank		2.8.8
	- Emergency Feedwater Tank: Emergency Feedwater Tank Volumetric Capacity	350000 gal minimum	2.8.8
15.6.3.2.3.1	- Emergency feedwater is actuated automatically to recover steam generator water level		2.8.8
15.6.3.3.3.1	- The Emergency Feedwater Actuation signal (EFAS) is generated on low SG level		2.5.1 2.5.2
	- The EFW flow is actuated on EFAS to restore the SG level		2.8.8
15.6.3.3.3.2	- The reactor trip automatically trips the turbine generator		2.8.1

* PRA Assumption

Design Basis Accident Analysis

Paragraph		Assumption/Parameter Description		Related ITAAC
15.6.3.3.3.2	-	Main Steam Safety Valve: Maximum Allowable Pressure	110 % of design pressure maximum	2.8.2
15.6.5.2	-	Containment Leak Rate, Per Day, (during 1st 24 hours of LOCA) Expressed as a Percentage of Containment Volume Per Day	0.5 % nominal	2.1.1
15.6.5.3	-	Containment Leak Rate, Per Day, (during 1st 24 hours of LOCA) Expressed as a Percentage of Containment Volume Per Day	0.5 % nominal	2.1.1
TABLE 15A-10	-	Unfiltered Normal Air Intake Rate	2000 cfm maximum	2.7.17
	-	Post Accident Iodine Filter: Post Accident Intake and Recirculating Iodine Filter Efficiency - Elemental	95 % minimum	2.7.17
	-	Post Accident Iodine Filter: Post Accident Intake and Recirculating Iodine Filter Efficiency - Organic	95 % minimum	2.7.17
	-	Post Accident Iodine Filter: Post Accident Intake and Recirculating Iodine Filter Efficiency - Particulate	99 % minimum	2.7.17
	-	Control Room: Pressurization	1/8 in (water gauge) nominal	2.7.17

* PRA Assumption

Probabilistic Risk Assessment

Paragraph	Assumption/Parameter Description	Related ITAAC
19.6.3.1	* The main power system consists of the main generator, associated isolated phase buses, generator circuit breakers, three single phase unit main transformers, two unit auxiliary transformers, and two reserve auxiliary transformers	2.6.1
	* The 4.16 Kv non-class 1E power system consists of four switchgears and a non-class 1E alternate AC source. Two of the switchgears (i.e, X - non-safety switchgear and the X -permanent non-safety switchgear) are powered by one of the unit auxiliary transformers, while the other two switchgears (i.e., Y - non-safety switchgear and the Y - permanent non-safety switchgear) are powered by the other unit auxiliary transformer. The permanent non-safety switchgears can also be powered by the reserve auxiliary transformers and the alternate AC source.	2.6.1
	* Each division of the 4.16 Kv class 1E power has two switchgear. Both switchgears within a division are typically powered from their associated 4.16 Kv permanent non-safety 1E switchgear. Both switchgears can also be powered by the emergency diesel generator of the same division.	2.6.2
	* Each division of the 120 VAC class 1E power system has three inverters and associated buses. Each inverter within the division is powered from a separate 125 VDC class 1E bus in the same division of the EDS.	2.6.3
	* Each division of the 125 VDC class 1E power system has three battery chargers, three batteries, and three distribution centers (buses). Each battery charger is powered from a separate 480 VAC class 1E motor control center within the same division of the EDS. Each battery is sized to supply its emergency loads for a minimum of 2hrs without recharging.	2.6.3
	* The emergency diesel generators are physically and electrically isolated from each other.	2.6.2
	* Each emergency diesel generator is housed in Seismic Category I structure to guard against earthquakes, fires, and missiles.	2.6.2
	* The starting air storage capacity for each emergency diesel generator is sufficient for starting the diesel generator for a minimum of five times.	2.6.2
	* Each emergency diesel generator has a complete and separate fuel oil storage system. The storage system has sufficient fuel that allows the emergency diesel generator to operate supplying post DBA-LOCA loads for a time period of no less than seven days.	2.6.2
	* Each emergency diesel generator is automatically started and loaded by the Engineered Safety Feature - Component Control System (ESF-CCS).	2.6.2
	* The onsite EDS has two separate sources of offsite power. Each offsite power source (circuit) terminates at a separate switchyard. The switchyards are physically separated and electrically independent. The lines of the offsite power circuits are routed, to the extent practicable, such that the likelihood of losing both circuits due to a single event is minimized.	2.6.1
	* Each emergency diesel generator is adequately sized to provide power to two 4.16 Kv class 1E buses within the same division of the EDS.	2.6.2
	* Each of the 4.16 Kv class 1E switchgears is provided with appropriate incoming feeders from the emergency diesel generator, permanent non-safety switchgear, and the reserve auxiliary transformer. The incoming feed breakers for each 4.16 Kv class 1E bus are therefore interlocked to prevent more than one breaker from being closed at the same time.	2.6.2
	* If a plant trip occurs and if offsite power is available, offsite power is supplied to plant components by back-feed through the main transformers.	2.6.1

* PRA Assumption

Probabilistic Risk Assessment

Paragraph	Assumption/Parameter Description	Related ITAAC
19.6.3.1	* The emergency diesel generators are normally in standby mode when offsite power is available. During loss of offsite power events, the emergency diesel generators start automatically by the ESF-CCS. Following a loss of offsite power event, only one of the two emergency diesel generators is required to bring the plant to cold shutdown conditions and to maintain the plant in this shutdown condition.	2.6.2
	* On a LOOP, the AAC automatically starts and is available for automatic connection and loading of the X and/or Y - permanent non-safety loads, if either of the 4.16 Kv permanent non-safety buses become de-energized.	2.6.5
TABLE 19.6.3.1-1	* The RCGVS vent valves are powered from the 125 VDC class 1E power system.	2.4.1
	* The RDS bleed valves are powered from separate 125 VDC class 1E buses.	2.4.1
	* Each ADV is powered from a separate 125 VDC class 1E bus.	2.8.2
	* CCWS components in a division receive electrical power from the class 1E buses in their division.	2.7.6
	* The CCW pump motors in a division are powered from the 4.16KV Class 1E power system in their division. In a division, one CCW pump is powered from one Class 1E bus in that division and the other CCW pump motor is powered from the other Class 1E bus in that division.	2.7.6
	* Each SCS division is electrically powered from its assigned Class 1E bus.	2.3.2
	* The SCS pump motor in each division is powered from one of the two Class 1E 4.16 Kv safety buses for that division. Each SCS pump derives its 125 VDC control power from the Class 1E 125 VDC bus associated with the class 1E 4.16 Kv safety bus that provides its motive power.	2.3.2
	* The SCS pump motor in a each division is not powered from the same Class 1E 4.16 Kv bus as the CS pump motor in that division.	2.3.2
	* The two EFW pump controls in a given EFW division are supplied power from separate 125 VDC buses.	2.8.8
	* The EFW steam supply valves in an EFW division are supplied from the same 125 VDC bus.	2.8.8
	* The power operated controls for the EFW turbine pumps, turbine supply and bypass line valves and the EFW Isolation valve to the SG are powered from the same 125 VDC class 1E bus.	2.8.8
	* The CSS pump motor in each division is powered from one of the two vital Class 1E 4.16 Kv buses for that division. Each CSS pump derives its 125 VDC control power from the Class 1E 125 VDC bus associated with the class 1E 4.16 Kv bus that provides its motive power.	2.4.6
	* The CSS pump motor in a each division is not powered from the same Class 1E 4.16 Kv bus as the SCS pump motor in that division.	2.4.6
	* The 480 VAC motor power for CSS valves in a division will be derived from the 480 VAC MCCs and LCs associated with the class 1E 4.16 Kv vital bus that provides power to the pump motor for that division.	2.4.6
	* Each SIS division receives emergency 4.16 Kv power from the emergency diesel generator for that division.	2.4.4
	* Each SIS pump motor receives 4.16 Kv power from a separate 4.16 Kv bus.	2.4.4
	* The SIS pump control circuit for a given train is powered from the 125 VDC bus associated with the 4.16 Kv bus which provides motive power to the pump motor.	2.4.4
19.6.3.2	* The SSWS has two redundant and separate safety related divisions with heat dissipation capacity to achieve and maintain safe shutdown.	2.7.5
	* Each SSWS division has two SSW pumps per division.	2.7.5
	* SSWS components in a division receive electrical power from the class 1E buses in their division.	2.7.5
	* Manual Start and stop actuation of the SSW pumps is provided from the control room to override automatic actuation.	2.7.5

* PRA Assumption

Probabilistic Risk Assessment

Paragraph		Assumption/Parameter Description	Related ITAAC
19.6.3.2	*	The two SSW divisions are physically separated and protected such that a fire or flood in one division will not affect the SSW pumps in the other division.	2.7.5
19.6.3.3	*	The CCWS has two redundant and separate safety-related divisions with heat dissipation capacity to achieve and maintain safe shutdown.	2.7.6
	*	Each CCWS division has two CCW pumps per division.	2.7.6
	*	The ESF Actuation System signals isolate the non-safety related portion of the CCWS following an accident condition, except cooling for the RCPs, charging pump motor coolers, and charging pump miniflow heat exchangers.	2.7.6
	*	CCWS components in a division receive electrical power from the class 1E buses in their division.	2.7.6
	*	The CCW pump motors in a division are powered from the 4.16KV Class 1E power system in their division. In a division, one CCW pump is powered from one Class 1E bus in that division and the other CCW pump motor is powered from the other Class 1E bus in that division.	2.7.6
	*	Manual Start and stop actuation of the CCW pumps is provided from the control room to override automatic actuation.	2.7.6
	*	Each CCWS division has two redundant heat exchangers.	2.7.6
	*	The two divisions of CCWS are physically separated.	2.1.3
19.6.3.4	*	Sufficient instrumentation is provided in the control room to monitor and control the IAS.	2.7.10
19.6.3.6	*	The Safety Injection System (SIS) has four redundant pump trains arranged in two independent divisions.	2.4.4
	*	The two SIS divisions are completely physically separated from each other outside containment.	2.4.4
	*	Each SIS pump train consists of one SIS pump and its associated valves, piping, and instrumentation.	2.4.4
	*	Each SIS division receives emergency 4.16 Kv power from the emergency diesel generator for that division.	2.4.4
	*	Each SIS pump motor receives 4.16 Kv power from a separate 4.16 Kv bus.	2.4.4
	*	The SIS pump control circuit for a given train is powered from the 125 VDC bus associated with the 4.16 Kv bus which provides motive power to the pump motor.	2.4.4
	*	Each SIS pump train has an independent suction line connection to the IRWST.	2.4.4
	*	The Engineered Safety Features Actuation System (ESFAS) sends a Safety Injection Actuation Signal (SIAS) to start the SIS pumps and open the SIS valves following a LOCA or transient. The SIAS is generated on low pressurizer pressure or high containment pressure.	2.4.4
19.6.3.7	*	The Alternate Protection System (APS) provides an alternate means of generating a reactor trip signal and an alternate feedwater actuation signal.	2.5.4
	*	The APS monitors the pressurizer pressure and generates a reactor trip signal if the RCS pressure exceeds a predetermined value. Similarly, an alternate feedwater actuation signal is generated if the steam generator level decreases below a predetermined value.	2.5.4
	*	The EFWS has two redundant divisions for supplying feedwater to the steam generators for RCS heat removal such that shutdown cooling entry conditions can be met.	2.8.8
	*	One EFWS division, including its water source, supplies feedwater to one Steam Generator (SG).	2.8.8
	*	Each EFWS division has two EFW pumps, each with a pump driver diverse from the other.	2.8.8
	*	In each EFWS division, the two EFW pump discharge pipes are joined together inside containment to a single pipe that connects to the SG downcomer feedwater line.	2.8.8
	*	The EFW pumps in one division can supply feedwater to the SG in the other division through a pipe having at least two normally closed isolation valves installed.	2.8.8

* PRA Assumption

Probabilistic Risk Assessment

Paragraph	Assumption/Parameter Description	Related ITAAC
19.6.3.7	* Each EFW Storage Tank (EFWST) can be supplied by gravity flow from the Condensate Water Storage Tank (CST). This source is isolated by at least two normally closed isolation valves.	2.7.8 2.8.8
	* The EFW turbine-driven pump in each division is supplied with steam from the SG in its division.	2.8.8
	* The valves that control the supply of steam to the EFW turbine pumps fail to the open position upon loss of motive power.	2.8.8
	* The EFWS is actuated by a EFAS and a APS actuation signal (Low SG Water Level).	2.8.8
	* Each EFW line has a cavitating venturi to prevent runout flow.	2.8.8
	* Upon receipt of an actuation signal, the EFWS: a. Starts the associated motor-driven pump, b. De-energizes the solenoid to open the associated turbine steam supply bypass valve, c. De-energizes the solenoid to open the associated turbine steam supply valve, d. Opens the associated EFW isolation valves to the appropriate SG, e. (EFWS) Opens flow control valves 104 & 106 or 105 & 107.	2.8.8
	* Each EFW division provides at least 500 gpm to either Steam Generator.	2.8.8
	* Installed instrumentation provides the capability to monitor the performance of the system and the major components from the control room.	2.8.8
	* Each EFW pump can deliver EFW flow to the SGs when the SG pressure is at the Main Steam Safety Valve (MSSV) setpoint.	2.8.8
	* Each EFWST has a safety-related volume of at least 350,000 gallons.	2.8.8
	* Each EFW subdivision receives power from its associated Class 1E buses.	2.8.8
	* The two EFW pump controls in a given EFW division are supplied power from separate 125 VDC buses.	2.8.8
	* The EFW steam supply valves in an EFW division are supplied from the same 125 VDC bus.	2.8.8
	* The power operated controls for the EFW turbine pumps, turbine supply and bypass line valves and the EFW Isolation valve to the SG are powered from the same 125 VDC class 1E bus.	2.8.8
	* Each EFW pump can provide 100% of the required EFW flow.	2.8.8
19.6.3.9	* The SCS has two seperate and redundant divisions each with heat removal capacity to cool and maintain the RCS in cold shutdown conditions.	2.3.2
	* Each SCS division has one SCS pump and one SCS heat exchanger.	2.3.2
	* The SCS pumps can be aligned to the IRWST.	2.3.2
	* The SCS discharge valves to the RCS are not interlocked on RCS pressure and can be opened when the RCS pressure is less than or equal to the SCS pump shutoff head.	2.3.2
	* The SCS pump in each division can be aligned to back up the Containment Spray (CS) pump in that division for containment spray operation.	2.3.2 2.4.6
	* The valve isolating the SCS pump suction from the IRWST is capable of passing flow in either direction.	2.3.2 2.4.6
	* The CSS pump in each division can be aligned to back up the SCS pump in that division to provide IRWST inventory cooling.	2.3.2 2.4.6
	* Each SCS division is electrically powered from its assigned Class 1E bus.	2.3.2
	* The SCS can be aligned for shutdown cooling operation from the control room.	2.3.2
	* The SCS pump motor in each division is powered from one of the two Class 1E 4.16 Kv safety buses for that division. Each SCS pump derives its 125 VDC control power from the Class 1E 125 VDC bus associated with the class 1E 4.16 Kv safety bus that provides its motive power.	2.3.2

* PRA Assumption

Probabilistic Risk Assessment

Paragraph		Assumption/Parameter Description	Related ITAAC
19.6.3.9	*	The SCS pump motor in a each division is not powered from the same Class 1E 4.16 Kv bus as the CS pump motor in that division.	2.3.2
	*	Installed instrumentation provides the capability to monitor the performance of the system and the major components from the control room.	2.3.2
	*	The RCS can be brought from hot shutdown to cold shutdown conditions using only one SCS train.	2.3.2
19.6.3.10	*	The RCGVS has vent valves to vent the pressurizer and the head of the reactor vessel.	2.4.1
	*	The vent paths from the pressurizer and reactor vessel are capable of being discharged to the reactor drain tank or the IRWST.	2.4.1
	*	The RCGVS vent valves are powered from the 125 VDC class 1E power system.	2.4.1
	*	The Rapid Depressurization System (RDS) or Bleed System has two separate and redundant trains.	2.4.1
	*	Each train of the RDS has two bleed valves in series.	2.4.1
	*	The RDS bleed valves are powered from separate 125 VDC class 1E buses.	2.4.1
	*	The RDS discharges to the In-Containment Water Storage Tank (IRWST).	2.4.1
	*	The RDS is manually initiated from the control room.	2.4.1
	*	The SDS valves are remote manually operated.	2.4.1
	*	One of the two RDS trains is capable of rapidly depressurizing the RCS.	2.4.1
19.6.3.11	*	The Reactor Protection System (RPS) has four redundant channels.	2.5.1
	*	The RPS communicates with the Reactor Trip Switchgear System and the Engineered Safety Features - Component Control System (ESF-CCS) which enables them to actuate mitigating systems when demanded.	2.5.1
	*	Loss of 120 VAC vital power to two RPS channels causes a plant trip to occur.	2.5.1
	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
	*	Instrumentation is provided to adequately monitor plant parameters.	2.5.1
	*	A reactor trip signal can be generated using any two of the four RPS channels.	2.5.1
	*	The Alternate Protection System (APS) provides an alternate means of generating a reactor trip signal and an alternate feedwater actuation signal.	2.5.4
	*	The APS monitors the pressurizer pressure and generates a reactor trip signal if the RCS pressure exceeds a predetermined value. Similarly, an alternate feedwater actuation signal is generated if the steam generator level decreases below a predetermined value.	2.5.4
19.6.3.12	*	The Engineered Safety Features Actuation System (ESFAS) has at least two redundant trains to generate the following engineered safety feature signal: Safety Injection Actuation Signal (SIAS), Containment Spray Actuation Signal (CSAS), Containment Isolation Actuation Signal (CIAS), Main Steam Isolation Signal (MSIS), Emergency Feedwater Actuation Signal (EFAS).	2.4.5 2.5.2
	*	The ESFAS actuates the Engineered Safety Features (ESF) systems when demanded.	2.4.5
19.6.3.13	*	The Containment Spray System (CSS) has two independent redundant divisions for supplying containment spray flow.	2.4.6
	*	Each CSS division has one CSS pump and one CSS heat exchanger.	2.4.6
	*	The CSS pump in each division can be aligned to back up the SCS pump in that division for shutdown cooling operation.	2.3.2
	*	The crossover valve between the inlet to the CSS heat exchanger and the SCS heat exchanger in a given division is capable of passing flow in either direction.	2.3.2 2.4.6
	*	The CSS pump and heat exchanger in each division can be aligned to discharge back to the IRWST to provide cooling for the IRWST inventory.	2.4.6
	*	The CSS pump's NPSH is adequate to prevent pump cavitation and failure if the IRWST inventory is saturated.	2.4.6

* PRA Assumption

Probabilistic Risk Assessment

Paragraph	Assumption/Parameter Description	Related ITAAC
19.6.3.13	* Installed instrumentation provides the capability to monitor CSS flow rates and the performance of major components. This instrumentation provides positive indication that pumps have started and valves have actuated properly.	2.4.6
	* The CSS pump motor in each division is powered from one of the two vital Class 1E 4.16 Kv buses for that division. Each CSS pump derives its 125 VDC control power from the Class 1E 125 VDC bus associated with the class 1E 4.16 Kv bus that provides its motive power.	2.4.6
	* The CSS pump motor in a each division is not powered from the same Class 1E 4.16 Kv bus as the SCS pump motor in that division.	2.4.6
	* The 480 VAC motor power for CSS valves in a division will be derived from the 480 VAC MCCs and LCs associated with the class 1E 4.16 Kv vital bus that provides power to the pump motor for that division.	2.4.6
	* The CSS pump discharge line in each division has a mini-flow line to prevent damaging the CSS pump in that division by operating it against a closed line. The valves in this line are normally open.	2.4.6
	* The CSS pumps are automatically started and the CSS header valves are automatically opened by CSAS.	2.4.6
	* The CSS can be manually started for spray operation from the control room.	2.4.6
	* Installed instrumentation provides the capability to monitor the performance of the system and the major components from the control room.	2.4.6
	* The CSS pumps are provided with heat exchangers in the mini-flow recirculation lines.	2.4.6
	* Each CSS pump can provide 100% of the required delivery of borated water from the IRWST to the containment spray nozzles.	2.4.6
19.6.3.16	* Operator must open the HVT spillway motor-operated valves and the reactor cavity spillway motor-operated valves. This is done from the control room.	2.4.7
19.6.4.1	* The SCS has two separate and redundant divisions each with heat removal capacity to cool and maintain the RCS in cold shutdown conditions.	2.3.2
	* Each SCS division has one SCS pump and one SCS heat exchanger.	2.3.2
	* The SCS pumps can be aligned to the IRWST.	2.3.2
	* The SCS discharge valves to the RCS are not interlocked on RCS pressure and can be opened when the RCS pressure is less than or equal to the SCS pump shutoff head.	2.3.2
	* The SCS pump in each division can be aligned to back up the Containment Spray (CS) pump in that division for containment spray operation.	2.3.2 2.4.6
	* The valve isolating the SCS pump suction from the IRWST is capable of passing flow in either direction.	2.3.2 2.4.6
	* The CSS pump in each division can be aligned to back up the SCS pump in that division to provide IRWST inventory cooling.	2.3.2 2.4.6
	* Each SCS division is electrically powered from its assigned Class 1E bus.	2.3.2
	* The SCS can be aligned for shutdown cooling operation from the control room.	2.3.2
	* The SCS pump motor in each division is powered from one of the two Class 1E 4.16 Kv safety buses for that division. Each SCS pump derives its 125 VDC control power from the Class 1E 125 VDC bus associated with the class 1E 4.16 Kv safety bus that provides its motive power.	2.3.2
	* The SCS pump motor in a each division is not powered from the same Class 1E 4.16 Kv bus as the CS pump motor in that division.	2.3.2
	* Installed instrumentation provides the capability to monitor the performance of the system and the major components from the control room.	2.3.2
	* The RCS can be brought from hot shutdown to cold shutdown conditions using only one SCS train.	2.3.2

* PRA Assumption

Probabilistic Risk Assessment

Paragraph	Assumption/Parameter Description	Related ITAAC
19.6.4.2	* The SCS has two separate and redundant divisions each with heat removal capacity to cool and maintain the RCS in cold shutdown conditions.	2.3.2
	* Each SCS division has one SCS pump and one SCS heat exchanger.	2.3.2
	* The SCS pumps can be aligned to the IRWST.	2.3.2
	* The SCS discharge valves to the RCS are not interlocked on RCS pressure and can be opened when the RCS pressure is less than or equal to the SCS pump shutoff head.	2.3.2
	* The SCS pump in each division can be aligned to back up the Containment Spray (CS) pump in that division for containment spray operation.	2.3.2 2.4.6
	* The valve isolating the SCS pump suction from the IRWST is capable of passing flow in either direction.	2.3.2 2.4.6
	* The CSS pump in each division can be aligned to back up the SCS pump in that division to provide IRWST inventory cooling.	2.3.2 2.4.6
	* Each SCS division is electrically powered from its assigned Class 1E bus.	2.3.2
	* The SCS can be aligned for shutdown cooling operation from the control room.	2.3.2
	* The SCS pump motor in each division is powered from one of the two Class 1E 4.16 Kv safety buses for that division. Each SCS pump derives its 125 VDC control power from the Class 1E 125 VDC bus associated with the class 1E 4.16 Kv safety bus that provides its motive power.	2.3.2
	* The SCS pump motor in a each division is not powered from the same Class 1E 4.16 Kv bus as the CS pump motor in that division.	2.3.2
	* Installed instrumentation provides the capability to monitor the performance of the system and the major components from the control room.	2.3.2
	* The RCS can be brought from hot shutdown to cold shutdown conditions using only one SCS train.	2.3.2
19.6.4.5	* The blowdown line containment isolation valves are closed automatically by EFAS, MSIS, and CIAS, [illegible].	2.8.7
19.6.4.6	* The MSIVs fail close upon loss of control power. The MSIVs close automatically upon receipt of a Main Steam Isolation Signal (MSIS).	2.8.2
	* Each ADV is powered from a separate 125 VDC class 1E bus.	2.8.2
19.7.3.1.1	* A plant Fire Hazards Analysis considers potential fire hazards.	2.7.24
19.7.3.1.5	* A plant Fire Hazards Analysis considers potential fire hazards.	2.7.24
19.7.4.1	* Flood barriers provide divisional and quadrant separation up to the 70' elevation. Failure of largest storage tank within a division will not flood above the 70' level.	2.3.2 2.4.4 2.4.6 2.8.8
	* It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The equipment within the Component Cooling Water Heat Exchanger structure was assumed to be divisionally separated by a wall such that a flood in one division will not affect the other division.	2.1.3

* PRA Assumption

Probabilistic Risk Assessment

Paragraph	Assumption/Parameter Description	Related ITAAC
19.7.4.1	* The divisional flood barrier between redundant divisions of safety related equipment is an important design feature which ensures that flooding of both divisions of safety related equipment will not occur.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The divisional separation of redundant safety related equipment in the Component Cooling Water Heat Exchanger structure and the station service water pump structure is also an important design feature. This ensures that flooding of both divisions of Component Cooling Water Heat Exchangers and station service water pumps will not occur.	2.1.3 2.3.2 2.4.6 2.8.8
19.8.1.2	* Availability of mitigating equipment following fires can be maximized if separation is maintained between equipment within a quadrant. This will increase the number of success paths available for responding to the event and result in a decrease in risk.	2.7.24
19.8.4.3	* Propagation of fires between quadrants is assumed to be impossible based on their separation by three hour rated fire barriers. Fire doors between quandrants are three hour rated fire doors and are assumed to be closed during all shutdown operations. These doors specifically include those between Fire Areas 38 and 41 and Fire Areas 39 and 40, as shown in Figure 9.5.1-2.	2.7.24
	* Propagation of fires between divisions is assumed to be impossible based on their separation by three hour rated fire barriers. The barriers have no communicating openings below 70 feet elevation and all penetrations within the barriers are sealed with assemblies qualified to maintain the integrity of the three hour rating.	2.7.24
19.8.4.4	* It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The equipment within the Component Cooling Water Heat Exchanger structure was assumed to be divisionally separated by a wall such that a flood in one division will not affect the other division.	2.1.3
	* The divisional flood barrier between redundant divisions of safety related equipment is an important design feature which ensures that flooding of both divisions of safety related equipment will not occur.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The divisional separation of redundant safety related equipment in the Component Cooling Water Heat Exchanger structure and the station service water pump structure is also an important design feature. This ensures that flooding of both divisions of Component Cooling Water Heat Exchangers and station service water pumps will not occur.	2.1.3 2.3.2 2.4.6 2.8.8
TABLE 19.8A.1-1	* Make SCS pumps interchangeable with containment spray pumps to provide further redundancy.	2.3.2 2.4.6
	* Monitor SCS pump motor current, flowrate, discharge pressure and suction pressure to provide reliable cooling status	2.3.2

* PRA Assumption

Probabilistic Risk Assessment

Paragraph	Assumption/Parameter Description		Related ITAAC
TABLE 19.8A.1-1	* CCW availability improved by two redundant divisions with two pumps each.		2.7.6
	* Loss of shutdown cooling by compartment flooding and spills reduced by division and quadrant separation by flood barriers.		2.3.2
19.8A.2.3.3.2	* SCS suction lines do not contain any LOOP seals. The suction piping arrangement allows self venting. This feature allows SCS pumps to be restarted without requiring complicated venting procedures.		2.3.2
	- Containment Spray Pump: Number of Pumps	2	2.4.6
19.8A.2.7.3.1	* All fire barriers which provide separation between the two divisions are rated for at least 3 hours. It was assumed that all fire doors and penetrations within the fire barriers are maintained during power operation to prevent the propagation of fire from one area to the next.		2.1.1 2.7.24 2.8.2 2.8.6
	* The propagation of a fire from one division to the next is prevented by the divisional separation of redundant safety related equipment with a 3 hour fire barrier which is maintained during power operation.		2.1.1 2.7.24
	* It was assumed that there are no doors or passageways connecting the divisions of safety related equipment up to elevation 70+0.		2.1.1 2.7.24
TABLE 19.8A.2.8-1	* Monitored Parameter- SCS flowrate, Instrument Type- Flowmeter, Instrument Function- Decay heat removal system performance, Range- Bounds SCS pump flow range, Comments- One located in each SCS return line to the RCS. Can be used to measure CSP flow if CSPs are used for SCS.		2.3.2
	* Monitored Parameter- SCS pump/CS pump discharge pressure, Instrument Type- Pressure sensor, Instrument Function- Measures individual pump discharge pressures., Comments- One instrument located at the discharge to each pump. Identifies individual pump status.		2.3.2
	* Monitored Parameter- SCS pump/CS pump motor current, Instrument Type- Ammeter, Instrument Function- Measure current drawn by pump motor. Fluctuations show air entrainment., Comments- Confirms pump status		2.3.2
	* Monitored Parameter- SCS pump/CS pump suction pressure, Instrument Type- Pressure sensor, Instrument Function- Measure pump suction pressure in each pump., Comment- One instrument located at the suction of each pump. Identifies individual pump status.		2.3.2
	* Monitored Parameter- SCHX inlet and return line temperature, Instrument Type- Temperature sensor, Instrument Function- Measures temperature in the suction and discharge lines of the shutdown cooling heat exchanger, Comments- Temperature indication only available when SCS is operational.		2.3.2
19.8A.2.8.3.2.5.2	* Individual alarm inputs to the shutdown cooling alarm tiles include: low shutdown cooling pump header pressure, low shutdown cooling flow, higher shutdown cooling heat exchanger outlet temperature, shutdown cooling pump motor current deviation.		2.3.2
19.8A.2.8.3.2.5.3	* Discrete indicators are provided on the Nuplex 80+ control room stations to provide the operator with information that (1) is frequently used to assess system level performance and (2) allows continued operation if the data processing system should become unavailable		2.5.3
	* Discrete indicator displays to support shutdown cooling for key parameters are on the engineered safety feature panel. These include: Shutdown Cooling System (per train), Inlet Temperature, Outlet Temperature, Heat Exchanger Inlet Temperature, Heat Exchanger Outlet Temperature, Pump Motor Current, Flow, Pump Header Pressure, Reactor Coolant System, Pressurizer Level, Reactor Coolant System Level, Pressure, Core Exit Temperature, Refueling Cavity Level		2.5.3
19.8A.2.13			

* PRA Assumption

Probabilistic Risk Assessment

Paragraph		Assumption/Parameter Description		Related ITAAC
19.8A.2.13	*	Flood barriers provide divisional and quadrant separation up to the 70' elevation. Failure of largest storage tank within a division will not flood above the 70' level.		2.3.2 2.4.4 2.4.6 2.8.8
	*	Door closed sensors will be provided on flood doors with indications available at a monitored location.		2.1.1
19.8A.2.13.3	*	Flood barriers provide divisional and quadrant separation up to the 70' elevation. Failure of largest storage tank within a division will not flood above the 70' level.		2.3.2 2.4.4 2.4.6 2.8.8
	*	Door closed sensors will be provided on flood doors with indications available at a monitored location.		2.1.1
	*	It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.		2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
19.8A.4.1.2	-	Emergency Feedwater Cavitating Venturi: Flowrate, Emergency Feedwater	800 gpm maximum	2.8.8
19.8A.7.2.7	*	The integration evident in the Nuplex 80+ displays and Mode dependent alarms contributes to plant safety by reducing the historically common personnel errors during Mode changes and outages		2.5.3
19.11.3.4.2	*	At least 80 hydrogen ignitors are provided		2.4.3
19.11.3.6.2	*	The reactor cavity sump has a minimum thickness of 3 feet.		2.1.1
19.11.3.6.2.6	*	The reactor cavity sump has a minimum thickness of 3 feet.		2.1.1
19.11.3.8.1	-	Containment Shell: Containment Atmosphere Design Basis Peak Pressure	53 psig	2.1.1 2.4.5
19.15.3.2	*	If a fire occurs inside the main control room and the operator determines that the control room should be evacuated, it is assumed that the operator will trip the reactor and transfer control to the Remote Shutdown Room prior to evacuation.		2.5.2
	*	The main control room and the remote shutdown room are located at different elevations and in different fire areas. Since the main control room ventilation system is separate from the ventilation system for the remote shutdown room, and the stairwells connecting these rooms are pressurized, it was assumed that smoke, hot gases, or fire suppressants cannot migrate from one room to the next.		2.1.1 2.7.24
	*	Both the remote shutdown room and the main control room are protected by 3 hour fire walls and 3 hour fire doors. It is therefore assumed that a fire that originates in an area outside the main control room area will not threaten the habitability of the control room. Only fires that originate inside the control room may force its evacuation.		2.1.1 2.7.24
	*	All fire barriers which provide separation between the two divisions are rated for at least 3 hours. It was assumed that all fire doors and penetrations within the fire barriers are maintained during power operation to prevent the propagation of fire from one area to the next.		2.1.1 2.7.24 2.8.2 2.8.6

* PRA Assumption

Probabilistic Risk Assessment

Paragraph	Assumption/Parameter Description	Related ITAAC
19.15.3.2	* The propagation of a fire from one division to the next is prevented by the divisional separation of redundant safety related equipment with a 3 hour fire barrier which is maintained during power operation.	2.1.1 2.7.24
19.15.3.3	* It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* It was assumed that there are no doors or passageways connecting the divisions of safety related equipment up to elevation 70+0.	2.1.1 2.7.24
	* The equipment within the Component Cooling Water Heat Exchanger structure was assumed to be divisionally separated by a wall such that a flood in one division will not affect the other division	2.1.3
	* The divisional flood barrier between redundant divisions of safety related equipment is an important design feature which ensures that flooding of both divisions of safety related equipment will not occur.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The divisional separation of redundant safety related equipment in the Component Cooling Water Heat Exchanger structure and the station service water pump structure is also an important design feature. This ensures that flooding of both divisions of Component Cooling Water Heat Exchangers and station service water pumps will not occur.	2.1.3 2.3.2 2.4.6 2.8.8
	* All safety related structures are designed to withstand the static and dynamic forces of flooding. Therefore, the structural wall between the Nuclear Annex and the Turbine Building will not fail.	2.1.1 2.1.3 2.1.4
19.15.3.4	* The System 80+ class 1E electrical distribution system is provided with protection schemes which conform to the requirements of IEEE STD-741-1986. The protective schemes are designed to isolate faulted equipment from the rest of the system to minimize the effect of the fault and to maximize the availability of the remaining equipment. The basic schemes consist of ground fault protection, instantaneous overcurrent and timed overcurrent protection. In developing the Seismic Margin Assessment models, it was assumed that the seismic failure of equipment in the electrical distribution system were "open circuit" failures. Implicit within this assumption is the assumption that if a "hot short" failure were to occur, the appropriate circuit interrupter(s) would open on overcurrent to prevent "backward" propagation of the fault.	2.6.1 2.6.3

* PRA Assumption

Shutdown Risk

Paragraph	Assumption/Parameter Description		Related ITAAC
19.8.1.2	* Availability of mitigating equipment following fires can be maximized if separation is maintained between equipment within a quadrant. This will increase the number of success paths available for responding to the event and result in a decrease in risk.		2.7.24
19.8.4.3	* Propagation of fires between quadrants is assumed to be impossible based on their separation by three hour rated fire barriers. Fire doors between quandrants are three hour rated fire doors and are assumed to be closed during all shutdown operations. These doors specifically include those between Fire Areas 38 and 41 and Fire Areas 39 and 40, as shown in Figure 9.5.1-2.		2.7.24
	* Propagation of fires between divisions is assumed to be impossible based on their separation by three hour rated fire barriers. The barriers have no communicating openings below 70 feet elevation and all penetrations within the barriers are sealed with assemblies qualified to maintain the integrity of the three hour rating.		2.7.24
19.8.4.4	* It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.		2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The equipment within the Component Cooling Water Heat Exchanger structure was assumed to be divisionally separated by a wall such that a flood in one division will not affect the other division.		2.1.3
	* The divisional flood barrier between redundant divisions of safety related equipment is an important design feature which ensures that flooding of both divisions of safety related equipment will not occur.		2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The divisional separation of redundant safety related equipment in the Component Cooling Water Heat Exchanger structure and the station service water pump structure is also an important design feature. This ensures that flooding of both divisions of Component Cooling Water Heat Exchangers and station service water pumps will not occur.		2.1.3 2.3.2 2.4.6 2.8.8
TABLE 19.8A.1-1	* Make SCS pumps interchangeable with containment spray pumps to provide further redundancy.		2.3.2 2.4.6
	* Monitor SCS pump motor current, flowrate, discharge pressure and suction pressure to provide reliable cooling status		2.3.2
	* CCW availability improved by two redundant divisions with two pumps each.		2.7.6
	* Loss of shutdown cooling by compartment flooding and spills reduced by division and quadrant separation by flood barriers.		2.3.2
19.8A.2.3.3.2	* SCS suction lines do not contain any LOOP seals. The suction piping arrangement allows self venting. This feature allows SCS pumps to be restarted without requiring complicated venting procedures.		2.3.2
19.8A.2.7.3.1	Containment Spray Pump: Number of Pumps	2	2.4.6

* PRA Assumption

Shutdown Risk

Paragraph	Assumption/Parameter Description	Related ITAAC
19.8A.2.7.3.1	* All fire barriers which provide separation between the two divisions are rated for at least 3 hours. It was assumed that all fire doors and penetrations within the fire barriers are maintained during power operation to prevent the propagation of fire from one area to the next.	2.1.1 2.7.24 2.8.2 2.8.6
	* The propagation of a fire from one division to the next is prevented by the divisional separation of redundant safety related equipment with a 3 hour fire barrier which is maintained during power operation.	2.1.1 2.7.24
	* It was assumed that there are no doors or passageways connecting the divisions of safety related equipment up to elevation 70+0.	2.1.1 2.7.24
TABLE 19.8A.2.8-1	* Monitored Parameter- SCS flowrate, Instrument Type- Flowmeter, Instrument Function- Decay heat removal system performance, Range- Bounds SCS pump flow range, Comments- One located in each SCS return line to the RCS. Can be used to measure CSP flow if CSPs are used for SCS.	2.3.2
	* Monitored Parameter- SCS pump/CS pump discharge pressure, Instrument Type- Pressure sensor, Instrument Function- Measures individual pump discharge pressures., Comments- One instrument located at the discharge to each pump. Identifies individual pump status.	2.3.2
	* Monitored Parameter- SCS pump/CS pump motor current, Instrument Type- Ammeter, Instrument Function- Measure current drawn by pump motor. Fluctuations show air entrainment., Comments- Confirms pump status	2.3.2
	* Monitored Parameter- SCS pump/CS pump suction pressure, Instrument Type- Pressure sensor, Instrument Function- Measure pump suction pressure in each pump., Comment- One instrument located at the suction of each pump. Identifies individual pump status.	2.3.2
	* Monitored Parameter- SCHX inlet and return line temperature, Instrument Type- Temperature sensor, Instrument Function- Measures temperature in the suction and discharge lines of the shutdown cooling heat exchanger, Comments- Temperature indication only available when SCS is operational.	2.3.2
19.8A.2.8.3.2.5.2	* Individual alarm inputs to the shutdown cooling alarm tiles include: low shutdown cooling pump header pressure, low shutdown cooling flow, higher shutdown cooling heat exchanger outlet temperature, shutdown cooling pump motor current deviation.	2.3.2
19.8A.2.8.3.2.5.3	* Discrete indicators are provided on the Nuplex 80+ control room stations to provide the operator with information that (1) is frequently used to assess system level performance and (2) allows continued operation if the data processing system should become unavailable	2.5.3
	* Discrete indicator displays to support shutdown cooling for key parameters are on the engineered safety feature panel. These include: Shutdown Cooling System (per train), Inlet Temperature, Outlet Temperature, Heat Exchanger Inlet Temperature, Heat Exchanger Outlet Temperature, Pump Motor Current, Flow, Pump Header Pressure, Reactor Coolant System, Pressurizer Level, Reactor Coolant System Level, Pressure, Core Exit Temperature, Refueling Cavity Level	2.5.3
19.8A.2.13	* Flood barriers provide divisional and quadrant separation up to the 70' elevation. Failure of largest storage tank within a division will not flood above the 70' level.	2.3.2 2.4.4 2.4.6 2.8.8
	* Door closed sensors will be provided on flood doors with indications available at a monitored location.	2.1.1
19.8A.2.13.3		

* PRA Assumption

Shutdown Risk

Paragraph		Assumption/Parameter Description		Related ITAAC
19.8A.2.13.3	*	Flood barriers provide divisional and quadrant separation up to the 70' elevation. Failure of largest storage tank within a division will not flood above the 70' level.		2.3.2 2.4.4 2.4.6 2.8.8
	*	Door closed sensors will be provided on flood doors with indications available at a monitored location.		2.1.1
	*	It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.		2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
19.8A.4.1.2	-	Emergency Feedwater Cavitating Venturi: Flowrate, Emergency Feedwater	800 gpm maximum	2.8.8
19.8A.7.2.7	*	The integration evident in the Nuplex 80+ displays and Mode dependent alarms contributes to plant safety by reducing the historically common personnel errors during Mode changes and outages		2.5.3

* PRA Assumption

Severe Accident

Paragraph		Assumption/Parameter Description		Related ITAAC
19.6.3.16	*	Operator must open the HVT spillway motor-operated valves and the reactor cavity spillway motor-operated valves. This is done from the control room.		2.4.7
19.11.3.4.2	*	At least 80 hydrogen ignitors are provided		2.4.3
19.11.3.6.2	*	The reactor cavity sump has a minimum thickness of 3 feet.		2.1.1
19.11.3.6.2.6	*	The reactor cavity sump has a minimum thickness of 3 feet.		2.1.1
19.11.3.8.1	-	Containment Shell: Containment Atmosphere Design Basis Peak Pressure	53 psig	2.1.1 2.4.5

* PRA Assumption

Flood Protection

Paragraph		Assumption/Parameter Description		Related ITAAC
3.4.1	-	Maximum Flood Level Below Grade	1 ft maximum	5.0
3.4.2	*	All safety related structures are designed to withstand the static and dynamic forces of flooding. Therefore, the structural wall between the Nuclear Annex and the Turbine Building will not fail.		2.1.1 2.1.3 2.1.4
3.4.4.1	*	Flood barriers provide divisional and quadrant separation up to the 70' elevation. Failure of largest storage tank within a division will not flood above the 70' level.		2.3.2 2.4.4 2.4.6 2.8.8
	*	Door closed sensors will be provided on flood doors with indications available at a monitored location.		2.1.1
	*	It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.		2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	*	The equipment within the Component Cooling Water Heat Exchanger structure was assumed to be divisionally separated by a wall such that a flood in one division will not affect the other division.		2.1.3
	*	The divisional flood barrier between redundant divisions of safety related equipment is an important design feature which ensures that flooding of both divisions of safety related equipment will not occur.		2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	*	The divisional separation of redundant safety related equipment in the Component Cooling Water Heat Exchanger structure and the station service water pump structure is also an important design feature. This ensures that flooding of both divisions of Component Cooling Water Heat Exchangers and station service water pumps will not occur.		2.1.3 2.3.2 2.4.6 2.8.8
19.7.4.1	*	Flood barriers provide divisional and quadrant separation up to the 70' elevation. Failure of largest storage tank within a division will not flood above the 70' level.		2.3.2 2.4.4 2.4.6 2.8.8
	*	It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.		2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	*	The equipment within the Component Cooling Water Heat Exchanger structure was assumed to be divisionally separated by a wall such that a flood in one division will not affect the other division.		2.1.3

* PRA Assumption

Flood Protection

Paragraph	Assumption/Parameter Description	Related ITAAC
19.7.4.1	* The divisional flood barrier between redundant divisions of safety related equipment is an important design feature which ensures that flooding of both divisions of safety related equipment will not occur.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The divisional separation of redundant safety related equipment in the Component Cooling Water Heat Exchanger structure and the station service water pump structure is also an important design feature. This ensures that flooding of both divisions of Component Cooling Water Heat Exchangers and station service water pumps will not occur.	2.1.3 2.3.2 2.4.6 2.8.8
19.8.4.4	* It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The equipment within the Component Cooling Water Heat Exchanger structure was assumed to be divisionally separated by a wall such that a flood in one division will not affect the other division.	2.1.3
	* The divisional flood barrier between redundant divisions of safety related equipment is an important design feature which ensures that flooding of both divisions of safety related equipment will not occur.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The divisional separation of redundant safety related equipment in the Component Cooling Water Heat Exchanger structure and the station service water pump structure is also an important design feature. This ensures that flooding of both divisions of Component Cooling Water Heat Exchangers and station service water pumps will not occur.	2.1.3 2.3.2 2.4.6 2.8.8
19.8A.2.13	* Flood barriers provide divisional and quadrant separation up to the 70' elevation. Failure of largest storage tank within a division will not flood above the 70' level.	2.3.2 2.4.4 2.4.6 2.8.8
	* Door closed sensors will be provided on flood doors with indications available at a monitored location.	2.1.1
19.8A.2.13.3	* Flood barriers provide divisional and quadrant separation up to the 70' elevation. Failure of largest storage tank within a division will not flood above the 70' level.	2.3.2 2.4.4 2.4.6 2.8.8
	* Door closed sensors will be provided on flood doors with indications available at a monitored location.	2.1.1

* PRA Assumption

Flood Protection

Paragraph	Assumption/Parameter Description	Related ITAAC
19.8A.2.13.3	* It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
19.15.3.3	* It was assumed that the primary means of flood control in the Nuclear Annex and Reactor Building is provided by the divisional wall which serves as a barrier between redundant divisions of safety related equipment.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* It was assumed that there are no doors or passageways connecting the divisions of safety related equipment up to elevation 70+0.	2.1.1 2.7.24
	* The equipment within the Component Cooling Water Heat Exchanger structure was assumed to be divisionally separated by a wall such that a flood in one division will not affect the other division.	2.1.3
	* The divisional flood barrier between redundant divisions of safety related equipment is an important design feature which ensures that flooding of both divisions of safety related equipment will not occur.	2.3.2 2.4.4 2.4.6 2.8.2 2.8.6 2.8.8
	* The divisional separation of redundant safety related equipment in the Component Cooling Water Heat Exchanger structure and the station service water pump structure is also an important design feature. This ensures that flooding of both divisions of Component Cooling Water Heat Exchangers and station service water pumps will not occur.	2.1.3 2.3.2 2.4.6 2.8.8
	* All safety related structures are designed to withstand the static and dynamic forces of flooding. Therefore, the structural wall between the Nuclear Annex and the Turbine Building will not fail.	2.1.1 2.1.3 2.1.4

* PRA Assumption

Fire Protection

Paragraph		Assumption/Parameter Description	Related ITAAC
FIGURE 9.5.1-2	*	All fire barriers which provide separation between the two divisions are rated for at least 3 hours. It was assumed that all fire doors and penetrations within the fire barriers are maintained during power operation to prevent the propagation of fire from one area to the next.	2.1.1 2.7.24 2.8.2 2.8.6
	*	The propagation of a fire from one division to the next is prevented by the divisional separation of redundant safety related equipment with a 3 hour fire barrier which is maintained during power operation.	2.1.1 2.7.24
	*	It was assumed that there are no doors or passageways connecting the divisions of safety related equipment up to elevation 70+0.	2.1.1 2.7.24
FIGURE 9.5.1-3	*	The main control room and the remote shutdown room are located at different elevations and in different fire areas. Since the main control room ventilation system is separate from the ventilation system for the remote shutdown room, and the stairwells connecting these rooms are pressurized, it was assumed that smoke, hot gases, or fire suppressants cannot migrate from one room to the next.	2.1.1 2.7.24
	*	Both the remote shutdown room and the main control room are protected by 3 hour fire walls and 3 hour fire doors. It is therefore assumed that a fire that originates in an area outside the main control room area will not threaten the habitability of the control room. Only fires that originate inside the control room may force its evacuation.	2.1.1 2.7.24
	*	All fire barriers which provide separation between the two divisions are rated for at least 3 hours. It was assumed that all fire doors and penetrations within the fire barriers are maintained during power operation to prevent the propagation of fire from one area to the next.	2.1.1 2.7.24 2.8.2 2.8.6
	*	The propagation of a fire from one division to the next is prevented by the divisional separation of redundant safety related equipment with a 3 hour fire barrier which is maintained during power operation.	2.1.1 2.7.24
FIGURE 9.5.1-5	*	All fire barriers which provide separation between the two divisions are rated for at least 3 hours. It was assumed that all fire doors and penetrations within the fire barriers are maintained during power operation to prevent the propagation of fire from one area to the next.	2.1.1 2.7.24 2.8.2 2.8.6
	*	The propagation of a fire from one division to the next is prevented by the divisional separation of redundant safety related equipment with a 3 hour fire barrier which is maintained during power operation.	2.1.1 2.7.24
FIGURE 9.5.1-6	*	The main control room and the remote shutdown room are located at different elevations and in different fire areas. Since the main control room ventilation system is separate from the ventilation system for the remote shutdown room, and the stairwells connecting these rooms are pressurized, it was assumed that smoke, hot gases, or fire suppressants cannot migrate from one room to the next.	2.1.1 2.7.24
	*	Both the remote shutdown room and the main control room are protected by 3 hour fire walls and 3 hour fire doors. It is therefore assumed that a fire that originates in an area outside the main control room area will not threaten the habitability of the control room. Only fires that originate inside the control room may force its evacuation.	2.1.1 2.7.24
9.5.1.1.2	-	Manual pull stations or individual fire detectors provide fire detection capability and can be used to initiate fire alarms.	2.7.24
9.5.1.7.1			

* PRA Assumption

Fire Protection

Paragraph		Assumption/Parameter Description		Related ITAAC
9.5.1.7.1	-	The motor-driven fire pump and the diesel-driven fire pump are separated by a three-hour fire rated barrier.		2.7.24
	-	The electric motor-driven fire pump is powered from a permanent non-safety bus.		2.7.24
	-	The diesel and motor-driven fire pumps are designed to meet the largest design demand of any sprinkler, pre-action, or deluge system plus 500 gpm for manual hoses.		2.7.24
	-	Fire Protection Water Supply Tank: volume	300000 gal	2.7.24
	-	Diesel Driven Fire Pump: fuel supply duration	8 hr	2.7.24
9.5.1.7.4	-	The standpipe systems in the Nuclear Annex and Reactor Building, along with their back-up water supply, are classified as Seismic Category I.		2.7.24
	-	Seismic Fire Water Supply Tank: capacity	18000 gal	2.7.24
9.5.1.7.6	-	Fire Detection Alarm System Power Supply: Battery Backup Duration	24 hr	2.7.24
9.5.1.12	*	A plant Fire Hazards Analysis considers potential fire hazards.		2.7.24
19.7.3.1.1	*	A plant Fire Hazards Analysis considers potential fire hazards.		2.7.24
19.7.3.1.5	*	A plant Fire Hazards Analysis considers potential fire hazards.		2.7.24
19.8.4.3	*	Propagation of fires between quadrants is assumed to be impossible based on their separation by three hour rated fire barriers. Fire doors between quandrants are three hour rated fire doors and are assumed to be closed during all shutdown operations. These doors specifically include those between Fire Areas 38 and 41 and Fire Areas 39 and 40, as shown in Figure 9.5.1-2.		2.7.24
	*	Propagation of fires between divisions is assumed to be impossible based on their separation by three hour rated fire barriers. The barriers have no communicating openings below 70 feet elevation and all penetrations within the barriers are sealed with assemblies qualified to maintain the integrity of the three hour rating.		2.7.24
19.8A.2.7.3.1	*	All fire barriers which provide separation between the two divisions are rated for at least 3 hours. It was assumed that all fire doors and penetrations within the fire barriers are maintained during power operation to prevent the propagation of fire from one area to the next.		2.1.1 2.7.24 2.8.2 2.8.6
	*	The propagation of a fire from one division to the next is prevented by the divisional separation of redundant safety related equipment with a 3 hour fire barrier which is maintained during power operation.		2.1.1 2.7.24
	*	It was assumed that there are no doors or passageways connecting the divisions of safety related equipment up to elevation 70+0.		2.1.1 2.7.24
19.15.3.2	*	If a fire occurs inside the main control room and the operator determines that the control room should be evacuated, it is assumed that the operator will trip the reactor and transfer control to the Remote Shutdown Room prior to evacuation.		2.5.2
	*	The main control room and the remote shutdown room are located at different elevations and in different fire areas. Since the main control room ventilation system is separate from the ventilation system for the remote shutdown room, and the stairwells connecting these rooms are pressurized, it was assumed that smoke, hot gases, or fire suppressants cannot migrate from one room to the next.		2.1.1 2.7.24
	*	Both the remote shutdown room and the main control room are protected by 3 hour fire walls and 3 hour fire doors. It is therefore assumed that a fire that originates in an area outside the main control room area will not threaten the habitability of the control room. Only fires that originate inside the control room may force its evacuation.		2.1.1 2.7.24

* PRA Assumption

Fire Protection

Paragraph		Assumption/Parameter Description	Related ITAAC
19.15.3.2	*	All fire barriers which provide separation between the two divisions are rated for at least 3 hours. It was assumed that all fire doors and penetrations within the fire barriers are maintained during power operation to prevent the propagation of fire from one area to the next.	2.1.1 2.7.24 2.8.2 2.8.6
	*	The propagation of a fire from one division to the next is prevented by the divisional separation of redundant safety related equipment with a 3 hour fire barrier which is maintained during power operation.	2.1.1 2.7.24

Anticipated Transients Without Scram

Paragraph		Assumption/Parameter Description	Related ITAAC
7.1.1.1.1	-	The digital equipment and software used in the PCS/P-CCS are diverse from that used in the PPS and ESF-CCS.	2.5.4
7.1.2.10	-	Electrical isolation devices are provided at PPS interfaces with the Power Control System, the Discrete Indication and Alarm System - Channel N and the Data Processing System and between the signal conditioning equipment and the Discrete Indication and Alarm System - Channel P	2.5.1
	-	Electrical isolation devices are provided between the PCS/P-CCS and the protection system signal conditioning equipment for each protection signal provided to them.	2.5.4
	-	The four ESF-CCS divisions are physically separated and electrically isolated.	2.5.2
	-	Where the ESF-CCS and the process control system interface to the same component, electrical isolation devices are provided between the process control system and the shared component.	2.5.2
	-	Electrical isolation devices are provided at ESF-CCS interfaces with the DIAS-N, the DPS, the P-CCS, the control and display interface devices, the master transfer switches, and between the signal conditioning equipment and the DIAS-P.	2.5.2
7.2.1.1	*	The RPS communicates with the Reactor Trip Switchgear System and the Engineered Safety Features - Component Control System (ESF-CCS) which enables them to actuate mitigating systems when demanded.	2.5.1
	*	Instrumentation is provided to adequately monitor plant parameters.	2.5.1
	*	A reactor trip signal can be generated using any two of the four RPS channels.	2.5.1
	-	The four PPS channels are physically separated and electrically isolated.	2.5.1
	-	Upon coincidence of two like signals indicating a condition requiring a reactor trip, the PPS logic initiates a reactor trip.	2.5.1
	-	Instrumentation is provided to adequately monitor plant parameters and initiate Reactor Trip and Engineered Safety Features Actuation Signals.	2.5.1
7.2.1.1.1.1	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.2	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.3	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.4	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.5	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.6	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.7	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.8	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.9	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.10	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
7.2.1.1.1.11	*	The RPS has the capability of generating an automatic or manual reactor trip signal.	2.5.1
	-	The RTSG can be tripped manually from the Main Control Room or the Remote Shutdown Room.	2.5.1
7.2.1.1.2	-	The digital equipment and software used in the PCS/P-CCS are diverse from that used in the PPS and ESF-CCS.	2.5.4
7.2.1.1.2.1	-	Electrical isolation devices are provided between the PCS/P-CCS and the protection system signal conditioning equipment for each protection signal provided to them.	2.5.4
7.2.1.1.3	*	A reactor trip signal can be generated using any two of the four RPS channels.	2.5.1
7.2.1.1.5	-	A bistable trip channel bypass can be activated in only one channel at a time.	2.5.1
	-	The PPs automatically removes an operating bypass if the plant approaches conditions for which the associated trip function is designed to provide protection.	2.5.1
7.2.1.1.7 7.2.1.1.8	*	The Reactor Protection System (RPS) has four redundant channels.	2.5.1

* PRA Assumption

Anticipated Transients Without Scram

Paragraph	Assumption/Parameter Description	Related ITAAC
7.2.1.1.8	- The digital equipment and software used in the PCS/P-CCS are diverse from that used in the PPS and ESF-CCS.	2.5.4
7.2.1.1.9	- PPS Interface and Test Processor provides maintenance and test capability.	2.5.1
7.2.1.1.9.2	- Bistable trip limit logic can be tested.	2.5.1
7.2.1.1.9.5	- Each reactor trip switchgear breaker can be tripped by either an undervoltage or a shunt trip.	2.5.1
7.2.1.1.9.6	- Each reactor trip switchgear breaker can be tripped by either an undervoltage or a shunt trip.	2.5.1
7.2.1.1.9.8	- The PPS initiates reactor trip and ESF system actuations within allocated response times.	2.5.1
7.2.1.1.10	- Each PPS channel is powered from its respective Class 1E bus.	2.5.1
7.2.4	- The digital equipment and software used in the PCS/P-CCS are diverse from that used in the PPS and ESF-CCS.	2.5.4
7.3.1.1	- The ESF-CCS includes component control logic, signal conditioning equipment, control and display interface devices, master transfer switches and diverse manual actuation switches. The ESF-CCS interfaces to ESF components and associated sensors, the PPS, the P-CCS, the PCS, the DIAS, and the DPS.	2.5.2
	- Each division of the ESF-CCS has the following elements: - selective 2-out-of-4 logic, - component control logic, - process instrumentation, - signal conditioning equipment, - maintenance and test panel, - control and display interface devices, - master transfer switch.	2.5.2
	- The operator interface devices of the ESF-CCS in the MCR provide for automatic and manual control of ESF systems and components.	2.5.2
	- Each ESF-CCS division's maintenance and test panel provides capability to transfer control from the MCR to the remote shutdown panel for its respective ESF-CCS division and to transfer control back to the MCR for its respective ESF-CCS division.	2.5.2
	- Diverse manual actuation switches are provided as an alternate means for manual actuation of ESF components in two divisions of the ESF-CCS as follows: - 2 trains of safety injection, - 1 train of containment spray, - 1 train of emergency feedwater to each steam generator - 1 main steam isolation valve in each main steam line, - 1 isolation valve in each containment air purge line, - 1 letdown isolation valve.	2.5.2
	- Electrical isolation devices are provided at ESF-CCS interfaces with the DIAS-N, the DPS, the P-CCS, the control and display interface devices, the master transfer switches, and between the signal conditioning equipment and the DIAS-P.	2.5.2
	- Software programmable processors are arranged in primary and standby processor configuration within each ESF-CCS division.	2.5.2
	- ESFAS functions are divided into ESF-CCS distributed segments with two separate multiplexers per segment which receive PPS initiation signals.	2.5.2
	- Separation is provided between safety critical ESFAS processing functions and auxiliary functions of man-machine interfaces, data communications, and automatic testing.	2.5.2

* PRA Assumption

Anticipated Transients Without Scram

Paragraph	Assumption/Parameter Description	Related ITAAC
7.3.1.1	- Networks exhibit deterministic performance since all data is updated continuously and not dependent on parameter changes of state.	2.5.2
	- Actuation of master transfer switches at either exit of the main control room transfers control capability from the ESF-CCS control and display interface devices depicted in the main control room to those in the remote shutdown room. Indication of the transfer status is provided in the main control room.	2.5.2
	- Prior to transfer of control to the remote shutdown room, control actions in the remote shutdown room do not cause the ESF-CCS to generate the associated control signals.	2.5.2
7.3.1.1.2	- Each division of the ESF-CCS has the following elements: - selective 2-out-of-4 logic, - component control logic, - process instrumentation, - signal conditioning equipment, - maintenance and test panel, - control and display interface devices, - master transfer switch.	2.5.2
7.3.1.1.2.1	- The following ESFAS signals can be manually actuated at the Main Control Room: - Safety Injection Actuation Signal - Containment Spray Actuation Signal - Containment Isolation Signal - Main Steam Isolation Signal - Emergency Feedwater Actuation Signal	2.5.1
7.3.1.1.2.2	- Each ESF-CCS division receives 4 channels of initiation signals from the PPS which are processed using selective 2-out-of-4 logic to generate actuation signals for the ESF systems controlled by that division.	2.5.2
	- ESFAS functions are divided into ESF-CCS distributed segments with two separate multiplexers per segment which receive PPS initiation signals.	2.5.2
7.3.1.1.2.3	- The ESF-CCS provides control capability and, upon receipt of initiation signals from the PPS, automatically generates actuation signals to the following non-ESF systems: - annulus ventilation system, - component cooling water system, - onsite power system, - diesel generators, - control complex ventilation system.	2.5.2
	- Upon receipt of ESF initiation signals for safety injection, containment spray, or emergency feedwater, the ESF-CCS initiates an automatic start of the diesel generators and automatic load sequencing of ESF loads.	2.5.2
	- Upon detecting loss of power to Class 1E division buses, the ESF-CCS automatically initiates startup of the respective diesel generators, shedding of electrical load, transfer of Class 1E bus connections to the diesel generators, and sequencing to the reloading of safety-related loads to the Class 1E bus.	2.5.2
	- Upon ESF actuation, the normal load sequence is interrupted and priority is given to loading the actuated ESF systems and associated safety-related systems.	2.5.2
	- The diesel loading sequence logic responds to loss of electrical power busses.	2.5.2

* PRA Assumption

Anticipated Transients Without Scram

Paragraph		Assumption/Parameter Description	Related ITAAC
7.3.1.1.5	*	The Engineered Safety Features Actuation System (ESFAS) has at least two redundant trains to generate the following engineered safety feature signal: Safety Injection Actuation Signal (SIAS), Containment Spray Actuation Signal (CSAS), Containment Isolation Actuation Signal (CIAS), Main Steam Isolation Signal (MSIS), Emergency Feedwater Actuation Signal (EFAS).	2.4.5 2.5.2
	-	Each ESF-CCS division is powered from its respective Class 1E bus.	2.5.2
	-	Software programmable processors are arranged in primary and standby processor configuration within each ESF-CCS division.	2.5.2
7.3.1.1.6	-	The digital equipment and software used in the PCS/P-CCS are diverse from that used in the PPS and ESF-CCS.	2.5.4
	-	Diverse manual actuation switches are provided as an alternate means for manual actuation of ESF components in two divisions of the ESF-CCS as follows: - 2 trains of safety injection, - 1 train of containment spray, - 1 train of emergency feedwater to each steam generator - 1 main steam isolation valve in each main steam line, - 1 isolation valve in each containment air purge line, - 1 letdown isolation valve.	2.5.2
	-	The diverse manual actuation switches provide signals to the lowest level in the ESF-CCS digital equipment. Communication of the signals from the switches is diverse from the software used in the higher levels of the ESF-CCS.	2.5.2
	-	Algorithm execution in Nuplex 80+ control and protection systems is deterministic.	2.5.2
	-	Actuation of the switches provides a signal which overrides the higher level signals to actuate the associated ESF component or components.	2.5.2
	-	Diverse manual actuations status indication is provided in the MCR.	2.5.2
7.3.1.1.8	-	Periodic testing to verify operability of the ESF-CCS can be performed with the reactor at power or when shutdown without interfering with the protective function of the system.	2.5.2
	-	Capability is provided for testing all functions from ESF initiating signals received from the PPS through to the actuation of protective system equipment.	2.5.2
7.3.1.1.8.4	-	The ESF-CCS provides control capability and, upon receipt of initiation signals from the PPS, automatically generates actuation signals to the following ESF systems within allocated response times: - safety injection system, - containment isolation system, - containment spray system - main steam isolation, and - emergency feedwater system	2.5.2
7.3.1.1.8.5	-	The ESF-CCS provides control capability and, upon receipt of initiation signals from the PPS, automatically generates actuation signals to the following ESF systems within allocated response times: - safety injection system, - containment isolation system, - containment spray system - main steam isolation, and - emergency feedwater system.	2.5.2

* PRA Assumption

Anticipated Transients Without Scram

Paragraph		Assumption/Parameter Description	Related ITAAC
7.3.1.1.8.6	-	The ESF-CCS provides control capability and, upon receipt of initiation signals from the PPS, automatically generates actuation signals to the following ESF systems within allocated response times: - safety injection system, - containment isolation system, - containment spray system - main steam isolation, and - emergency feedwater system.	2.5.2
7.3.1.1.8.8	-	The PPS initiates reactor trip and ESF system actuations within allocated response times.	2.5.1
	-	The ESF-CCS provides control capability and, upon receipt of initiation signals from the PPS, automatically generates actuation signals to the following ESF systems within allocated response times: - safety injection system, - containment isolation system, - containment spray system - main steam isolation, and - emergency feedwater system.	2.5.2
7.3.1.1.8.9	-	The ESF-CCS provides control capability and, upon receipt of initiation signals from the PPS, automatically generates actuation signals to the following ESF systems within allocated response times: - safety injection system, - containment isolation system, - containment spray system - main steam isolation, and - emergency feedwater system.	2.5.2
7.3.1.1.10	-	A SIAS actuates safety injection pumps and opens the corresponding discharge valves	2.4.4
	-	The ESF-CCS provides control capability and, upon receipt of initiation signals from the PPS, automatically generates actuation signals to the following ESF systems within allocated response times: - safety injection system, - containment isolation system, - containment spray system - main steam isolation, and - emergency feedwater system.	2.5.2
	-	The ESF-CCS provides control capability and, upon receipt of initiation signals from the PPS, automatically generates actuation signals to the following non-ESF systems: - annulus ventilation system, - component cooling water system, - onsite power system, - diesel generators, - control complex ventilation system.	2.5.2
7.3.1.1.10.1	*	The ESFAS actuates the Engineered Safety Features (ESF) systems when demanded.	2.4.5
7.3.1.1.10.2	*	The ESFAS actuates the Engineered Safety Features (ESF) systems when demanded.	2.4.5
7.3.1.1.10.3	*	The ESFAS actuates the Engineered Safety Features (ESF) systems when demanded.	2.4.5

* PRA Assumption

Anticipated Transients Without Scram

Paragraph		Assumption/Parameter Description	Related ITAAC
7.3.1.1.10.4	*	The ESFAS actuates the Engineered Safety Features (ESF) systems when demanded.	2.4.5
7.3.1.1.10.5	*	The ESFAS actuates the Engineered Safety Features (ESF) systems when demanded.	2.4.5
	-	The interlock on the EFW isolation valves automatically closes the isolation valves on high SG levels when an Emergency Feedwater Actuation Signal is not present.	2.5.2
7.7.1.1.11	*	The Alternate Protection System (APS) provides an alternate means of generating a reactor trip signal and an alternate feedwater actuation signal.	2.5.4
	*	The APS monitors the pressurizer pressure and generates a reactor trip signal if the RCS pressure exceeds a predetermined value. Similarly, an alternate feedwater actuation signal is generated if the steam generator level decreases below a predetermined value.	2.5.4
	*	The EFWS is actuated by a EFAS and a APS actuation signal (Low SG Water Level).	2.8.8
	-	The DIAS and DPS provide for monitoring: - safety-related plant process display instrumentation - reactor trip system status - engineered safety feature system status - CEA position - post-accident monitoring of plant safety functions - status of plant operating mode-related bypasses - core cooling status prior to & following an accident - PPS status information - ESF-CCS status information - PCS/P-CCS status information	2.5.3
	-	The digital equipment and software used in the PCS/P-CCS are diverse from that used in the PPS and ESF-CCS.	2.5.4
	-	The PCS/P-CCS provide control interfaces for the following control functions: - reactivity control using control element assemblies, - reactor power cutback, - power change limiter, - pressurizer pressure and level, - main feedwater flow, - steam bypass flow, - boron concentration, - alternate reactor trip actuation, - alternate emergency feedwater actuation.	2.5.4
	-	The circuits used for alternate actuation of reactor trip, turbine trip and emergency feedwater are independent and diverse from the protection system actuation circuits.	2.5.4
	-	The PCS/P-CCS provide the following information to the DIAS: - alternate reactor trip status, - alternate feedwater actuation signal status, - pressurizer pressure, and - steam generator 1 and 2 levels.	2.5.4
7.7.1.1.11.1	-	The digital equipment and software used in the PCS/P-CCS are diverse from that used in the PPS and ESF-CCS.	2.5.4
	-	Electrical isolation devices are provided between the PCS/P-CCS and the protection system signal conditioning equipment for each protection signal provided to them.	2.5.4

* PRA Assumption

Anticipated Transients Without Scram

Paragraph	Assumption/Parameter Description	Related ITAAC
7.7.1.1.11.1	- Where the ESF-CCS and the process control system interface to the same component, electrical isolation devices are provided between the process control system and the shared component.	2.5.2
	- Electrical isolation devices are provided at ESF-CCS interfaces with the DIAS-N, the DPS, the P-CCS, the control and display interface devices, the master transfer switches, and between the signal conditioning equipment and the DIAS-P.	2.5.2

* PRA Assumption

Total Number of Items: &total_items

*** END OF REPORT ***