Amended Technical Specification Pages

Page:
4
5a
27
29
32
45
46a
47
53
60
61
68

1. At least one door in each access opening is closed.

2. The standby gas treatment system is operable.

3. All automatic ventilation system isolation valves are operable or secured in the isolated position.

O. Operating Cycle - Interval between the end of one refueling outage and the end of the next subsequent refueling outage.

P. Refueling Outage - Refueling outage is the period of time between the shutdown of the unit prior to a refueling and the startup of the plant after that refueling. For the purpose of designating frequency of testing and surveillance, a refueling outage shall mean a regularly scheduled outage; however, where such outages occur within 11 months of completion of the previous refueling outage, the required surveillance testing need not be performed until the next regularly scheduled outage (Definitions U and V apply).

Q. Alteration of the Reactor Core - The act of moving any component in the region above the core support plate, below the upper grid and within the shroud. Normal control rod movement with the control rod drive hydraulic system is not defined as a core alteration. Normal movement of in-core instrumentation is not defined as a core alteration.

R. Reactor Vessel Pressure - Unless otherwise indicated, reactor vessel pressures listed in the Technical Specifications are those measured by the reactor vessel steam space detectors.

S. Thermal Parameters

1. Minimum Critical Power Ratio (MCPR) - the value of critical power ratio associated with the most limiting assembly in the reactor core. Critical Power Ratio (CPR) is the ratio of that power in a fuel assembly, which is calculated to cause some point in the assembly to experience boiling transition, to the actual assembly operating power.

2. Transition Boiling - Transition boiling means the boiling regime between nucleate and film boiling. Transition boiling is the regime in which both nucleate and film boiling occur intermittently with neither type being completely stable.

3. Total Peaking Factor - The ratio of the fuel rod surface heat flux to the heat flux of an average rod in an identical geometry fuel assembly operating at the core average bundle power.

U. Surveillance Frequency - Each Surveillance Requirement shall be performed within the specified surveillance interval with a maximum allowable extension not to exceed 25 percent of the specified surveillance interval.

The Surveillance Frequency establishes the limit for which the specified time interval for Surveillance Requirements may be extended. It permits an allowable extension of the normal surveillance interval to facilitate surveillance schedule and consideration of plant operating conditions that may not be suitable for conducting the surveillance; e.g., transient conditions or other ongoing surveillance or maintenance activities. It is not intended that this provision be used repeatedly as a convenience to extend surveillance intervals beyond that specified for surveillances that are not performed during refueling outages. The limitation of Definition "U" is based on engineering judgment and the recognition that the most probable result of any particular surveillance being performed is the verification of conformance with the Surveillance Requirements. This provision is sufficient to ensure that the reliability ensured through surveillance activities is not significantly degraded beyond that obtained from the specified surveillance interval.

V. Surveillance Interval - The surveillance interval is the calendar time between surveillance tests, checks, calibrations, and examinations to be performed upon an instrument or component when it is required to be operable. These tests may be waived when the instrument, component, or system is not required to be operable, but the instrument, component, or system shall be tested prior to being declared operable. The operating cycle interval is 24 months and the 25% tolerance given in Definition "U" is applicable.

W. Fire Suppression Water System - A fire suppression water system shall consist of: a water source(s); gravity tank(s) or pump(s); and distribution piping with associated sectionalizing control or isolation valves. Such valves shall include hydrant post indicator valves and the first valve ahead of the water flow alarm device on each sprinkler, hose standpipe or spray system riser.

X. Staggered Test Basis - A staggered test basis shall consist of: (a) a test schedule for n systems, subsystems, trains, or other designated components obtained by dividing the specified test interval into n equal subintervals; (b) the testing of one system, subsystem, train or other designated components at the beginning of each subinterval.

Y. Source Check - A source check shall be the qualitative assessment of channel response when the channel sensor is exposed to a radioactive source.

PNPS Table 3.1.1 REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Operable Inst. Channels per Trip System (1) Minimum	Avail.	Trip Function	Trip Level Setting	Modes in Which Function Must Be Operable: Refuel (7)	Startup/Hot Standby	Run	Action (1)
1	1	Mode Switch in Shutdown		X	X	X	A
1	1	Manual Scram		X	X	X	A
		IRM					
3	4	High Flux	≤120/125 of full scale	X	X	(5)	A
3	4	Inoperative		X	X	(5)	A
		APRM					
2	3	High Flux	(15)	(17)	(17)	X	A or B
2	3	Inoperative	(13)	X	X(9)	X	A or B
2	3	High Flux (15%)	≤15% of Design Power	X	X	(16)	A or B
2	2	High Reactor Pressure	≤1063.5 psig	X(10)	X	X	A
2	2	High Drywell Pressure	≤2.22 psig	X(8)	X(8)	X	A
2	2	Reactor Low Water Level	≥11.7 In. Indicated Level	X	X	X	A
		SDIV High Water Level:	≤39 Gallons	X(2)	X	X	A
2	2	East					
2	2	West					
2	2	Main Condenser Low Vacuum	≥23 In. Hg Vacuum	X(3)	X(3)	X	A or C
2	2	Main Steam Line High Radiation	≤7X Normal Full Power Background (18)	X	X	X(18)	A or C
4	4	Main Steam Line Isolation Valve Closure	≤10% Valve Closure	X(3)(6)	X(3)(6)	X(6)	A or C
2	2	Turbine Control Valve Fast Closure	≥150 psig Control Oil Pressure at Acceleration Relay	X(4)	X(4)	X(4)	A or D
4	4	Turbine Stop Valve Closure	≤10% Valve Closure	X(4)	X(4)	X(4)	A or D

NOTES FOR TABLE 3.1.1 (Cont'd)

2. Permissible to bypass, with control rod block, for reactor protection system reset in refuel and shutdown positions of the reactor mode switch.
3. Permissible to bypass when reactor pressure is <576 psig.
4. Permissible to bypass when turbine first stage pressure is less than 112 psig.
5. IRM's are bypassed when APRM's are onscale and the reactor mode switch is in the run position.
6. The design permits closure of any two lines without a scram being initiated.
7. When the reactor is subcritical, fuel is in the reactor vessel and the reactor water temperature is less than 212 F, only the following trip functions need to be operable:

    A. Mode switch in shutdown
    B. Manual scram
    C. High flux IRM
    D. Scram discharge volume high level
    E. APRM (15%) high flux scram

8. Not required to be operable when primary containment integrity is not required.
9. Not required while performing low power physics tests at atmospheric pressure during or after refueling at power levels not to exceed 5 MW(t).
10. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.
11. Deleted
12. Deleted
13. An APRM will be considered inoperable if there are less than 2 LPRM inputs per level or there is less than 50% of the normal complement of LPRM's to an APRM.
14. Deleted
15. The APRM high flux trip level setting shall be as specified in the CORE OPERATING LIMITS REPORT, but shall in no case exceed 120% of rated thermal power.
16. The APRM (15%) high flux scram is bypassed when in the run mode.
17. The APRM flow biased high flux scram is bypassed when in the refuel or startup/hot standby modes.
18. Within 24 hours prior to the planned start of hydrogen injection with the reactor power at greater than 20% rated power, the normal full power radiation background level and associated trip setpoints may be changed based on a calculated value of the radiation level expected during the injection of hydrogen. The background radiation level and associated trip setpoints may be adjusted based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip setpoints shall be set within 24 hours of re-establishing normal radiation levels after completion of hydrogen injection and prior to withdrawing control rods at reactor power levels below 20% rated power.

TABLE 4.1.2

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION

MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Calibration Test (5)	Minimum Frequency (2)
IRM High Flux	Comparison to APRM on Controlled Shutdowns	Note (4)
	Full Calibration	Once per Operating Cycle
APRM High Flux		
Output Signal	Heat Balance	Once every 3 Days
Flow Bias Signal	Calibrate Flow Comparator and Flow Bias Network	At Least Once Every 18 Months
	Calibrate Flow Bias Signal (1)	Every 3 Months
LPRM Signal	TIP System Traverse	Every 1000 Effective Full Power Hours
High Reactor Pressure	Note (7)	Note (7)
High Drywell Pressure	Note (7)	Note (7)
Reactor Low Water Level	Note (7)	Note (7)
High Water Level in Scram Discharge Tanks	Note (7)	Note (7)
Turbine Condenser Low Vacuum	Note (7)	Note (7)
Main Steam Line Isolation Valve Closure	Note (6)	Note (6)
Main Steam Line High Radiation	Standard Current Source (3)	Every 3 Months
Turbine First Stage Pressure Permissive	Note (7)	Note (7)
Turbine Control Valve Fast Closure	Standard Pressure Source	Every 3 Months
Turbine Stop Valve Closure	Note (6)	Note (6)
Reactor Pressure Permissive	Note (7)	Note (7)

PNPS TABLE 3.2.A

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Operable Instrument Channels Per Trip System (1) Minimum	Available	Instrument	Trip Level Setting	Action (2)
2(7)	2	Reactor Low Water Level	≥11.7" indicated level (3)	A and D
1	1	Reactor High Pressure	≤110 psig	D
2	2	Reactor Low-Low Water Level	at or above -46.3 in. indicated level (4)	A
2	2	Reactor High Water Level	≤45.3" indicated level (5)	B
2(7)	2	High Drywell Pressure	≤2.22 psig	A
2	2	High Radiation Main Steam Line Tunnel (9)	≤7 times normal rated full power background	B
2	2	Low Pressure Main Steam Line	≥810 psig (8)	B
2(6)	2	High Flow Main Steam Line	≤140% of rated steam flow	B
2	2	Main Steam Line Tunnel Exhaust Duct High Temperature	≤170°F	B
2	2	Turbine Basement Exhaust Duct High Temperature	≤150°F	B
1	1	Reactor Cleanup System High Flow	≤300% of rated flow	C
2	2	Reactor Cleanup System High Temperature	≤150°F	C

3. Instrument set point corresponds to 130.96 inches above top of active fuel. |

4. Instrument set point corresponds to 79.96 inches above top of active fuel. |

5. Not required in Run Mode (bypassed by Mode Switch).

6. Two required for each steam line.

7. These signals also start SBGTS and initiate secondary containment isolation.

8. Only required in Run Mode (interlocked with Mode Switch).

9. Within 24 hours prior to the planned start of hydrogen injection with the reactor power at greater than 20% rated power, the normal full power radiation background level and associated trip setpoints may be changed based on a calculated value of the radiation level expected during the injection of hydrogen. The background radiation level and associated trip setpoints may be adjusted based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip setpoints shall be set within 24 hours of re-establishing normal radiation levels after completion of hydrogen injection and prior to withdrawing control rods at reactor power levels below 20% rated power.

TABLE 3.2.B

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum # of Operable Instrument Channels Per Trip System (1)	Trip Function	Trip Level Setting	Remarks
2	Reactor Low-Low Water Level	at or above -46.3 in. indicated level (4)	1. In conjunction with Low Reactor Pressure, initiates Core Spray and LPCI. 2. In conjunction with High Drywell Pressure, 120 second time delay and LPCI or Core spray pump interlock initiates Auto Blowdown (ADS). 3. Initiates HPCI; RCIC. 4. Initiates starting of Diesel Generators.
2	Reactor High Water Level	$\leq$ +45.3" indicated level	Trips HPCI and RCIC turbines.
1	Reactor Low Level (inside shroud)	$\geq$307" above vessel zero (approximately 2/3 core height)	Prevents inadvertent operation of containment spray during accident condition.
2	Containment High Pressure	$1 < p < 2$ psig	Prevents inadvertent operation of containment spray during accident condition.

NOTES FOR TABLE 3.2.B

1. Whenever any CSCS subsystem is required by Section 3.5 to be operable, there shall be two (Note 5) operable trip systems. If the first column cannot be met for one of the trip systems, that system shall be repaired or the reactor shall be placed in the Cold Shutdown Condition within 24 hours after this trip system is made or found to be inoperable.

2. Close isolation valves in RCIC subsystem.

3. Close isolation valves in HPCI subsystem.

4. Instrument set point corresponds to 79.96 inches of active fuel.

5. RCIC has only one trip system for these sensors.

TABLE 4.2.A

MINIMUM TEST AND CALIBRATION FREQUENCY FOR PCIS

	Instrument Channel (5)	Instrument Functional Test	Calibration Frequency	Instrument Check
1)	Reactor High Pressure	(1)	Once/3 months	None
2)	Reactor Low-Low Water Level	Once/3 Months (7)	(7)	Once/day
3)	Reactor High Water Level	Once/3 Months (7)	(7)	Once/day
4)	Main Steam High Temp.	(1)	Once/3 months	None
5)	Main Steam High Flow	(1) (7)	(7)	Once/day
6)	Main Steam Low Pressure	Once/3 Months (7)	(7)	Once/day
7)	Reactor Water Cleanup High Flow	(1)	Once/3 months	Once/day
8)	Reactor Water Cleanup High Temp.	(1)	Once/3 months	None

	Logic System Functional Test (4) (6)	Frequency
1)	Main Steam Line Isolation Vvs. Main Steam Line Drain Vvs. Reactor Water Sample Vvs.	Once/18 months
2)	RHR - Isolation Vv. Control Shutdown Cooling Vvs. Head Spray Discharge to Radwaste	Once/18 months
3)	Reactor Water Cleanup Isolation	Once/18 months
4)	Drywell Isolation Vvs. TIP Withdrawal Atmospheric Control Vvs. Sump Drain Valves	Once/18 months
5)	Standby Gas Treatment System Reactor Building Isolation	Once/18 months

TABLE 4.2.B

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

	Instrument Channel (5)	Instrument Functional Test	Calibration Frequency	Instrument Check
1)	Reactor Water Level	Once/3 Months (7)	(7)	Once/day
2)	Drywell Pressure	(1) (7)	(7)	Once/day
3)	Reactor Pressure	(1) (7)	(7)	Once/day
4)	Auto Sequencing Timers	NA	Once/operating cycle	None
5)	ADS - LPCI or CS Pump Disch. Pressure Interlock	(1)	Once/3 months	None
6)	Start-up Transf. (4160V)			
	a. Loss of Voltage Relays	Monthly	Once/operating cycle	None
	b. Degraded Voltage Relays	Monthly	Once/operating cycle	None
7)	Trip System Bus Power Monitors	Once/operating cycle	NA	Once/day
8)	Recirculation System d/p	(1)	Once/3 months	Once/day
9)	Core Spray Sparger d/p	NA	Once/operating cycle	Once/day
10)	Steam Line High Flow (HPCI & RCIC)	(1)	Once/3 months	None
11)	Steam Line High Temp. (HPCI & RCIC)	(1)	Once/3 months	None
12)	Safeguards Area High Temp.	(1)	Once/3 months	None
13)	RCIC Steam Line Low Pressure	(1)	Once/3 months	None
14)	HPCI Suction Tank Levels	(1)	Once/3 months	None
15)	Emergency 4160V Buses A5 & A6 Loss of Voltage Relays	Monthly	Once/operating Cycle	None

Amendment No. 42, 61, 99, 148

BASES:

3.2 In addition to reactor protection instrumentation which initiates a reactor scram, protective instrumentation has been provided which initiates action to mitigate the consequences of accidents which are beyond the operator's ability to control, or terminates operator errors before they result in serious consequences. This set of specifications provides the limiting conditions of operation for the primary system isolation function, initiation of the core cooling systems, control rod block, and standby gas treatment systems. The objectives of the Specifications are, (i) to assure the effectiveness of the protective instrumentation when required by preserving its capability to tolerate a single failure of any component of such systems even during periods when portions of such systems are out of service for maintenance, and (ii) to prescribe the trip settings required to assure adequate performance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

Some of the settings on the instrumentation that initiate or control core and containment cooling have tolerances explicitly stated where the high and low values are both critical and may have a substantial effect on safety. The set points of other instrumentation, where only the high or low end of the setting has a direct bearing on safety, are chosen at a level away from the normal operating range to prevent inadvertent actuation of the safety system involved and exposure to abnormal situations.

Actuation of primary containment valves is initiated by protective instrumentation shown in Table 3.2.A which senses the conditions for which isolation is required. Such instrumentation must be available whenever primary containment integrity is required.

The instrumentation which initiates primary system isolation is connected in a dual bus arrangement.

The low water level instrumentation set to trip at 130.96 inches above the top of the active fuel closes all isolation valves except those in Groups 1, 4 and 5. This trip setting is adequate to prevent core uncovery in the case of a break in the largest line assuming a 60 second valve closing time. Required closing times are less than this.

The low low reactor water level instrumentation is set to trip when reactor water level is 79.96 inches above the top of the active fuel (-46.3" on the instrument). This trip closes Main Steam Line Isolation.

Attachment C to BECo Letter 93-072

Marked-Up Pages

1. At least one door in each access opening is closed.

2. The standby gas treatment system is operable.

3. All automatic ventilation system isolation valves are operable or secured in the isolated position.

O. Operating Cycle - Interval between the end of one refueling outage and the end of the next subsequent refueling outage.

P. Refueling Outage - Refueling outage is the period of time between the shutdown of the unit prior to a refueling and the startup of the plant after that refueling. For the purpose of designating frequency of testing and surveillance, a refueling outage shall mean a regularly scheduled outage; however, where such outages occur within 8 months of the completion of the previous refueling outage, the required surveillance testing need not be performed until the next regularly scheduled outage. (Definitions U and V apply)

Q. Alteration of the Reactor Core - The act of moving any component in the region above the core support plate, below the upper grid and within the shroud. Normal control rod movement with the control rod drive hydraulic system is not defined as a core alteration. Normal movement of in-core instrumentation is not defined as a core alteration.

R. Reactor Vessel Pressure - Unless otherwise indicated, reactor vessel pressures listed in the Technical Specifications are those measured by the reactor vessel steam space detectors.

S. Thermal Parameters

1. Minimum Critical Power Ratio (MCPR) - the value of critical power ratio associated with the most limiting assembly in the reactor core. Critical Power Ratio (CPR) is the ratio of that power in a fuel assembly, which is calculated to cause some point in the assembly to experience boiling transition, to the actual assembly operating power.

2. Transition Boiling - Transition boiling means the boiling regime between nucleate and film boiling. Transition boiling is the regime in which both nucleate and film boiling occur intermittently with neither type being completely stable.

3. Total Peaking Factor - The ratio of the fuel rod surface heat flux to the heat flux of an average rod in an identical geometry fuel assembly operating at the core average bundle power.

~~Amendment No. 15~~

U. Surveillance Frequency - Each Surveillance Requirement shall be performed within the specified surveillance interval with a maximum allowable extension not to exceed 25 percent of the specified surveillance interval.

The Surveillance Frequency establishes the limit for which the specified time interval for Surveillance Requirements may be extended. It permits an allowable extension of the normal surveillance interval to facilitate surveillance schedule and consideration of plant operating conditions that may not be suitable for conducting the surveillance; e.g., transient conditions or other ongoing surveillance or maintenance activities. It is not intended that this provision be used repeatedly as a convenience to extend surveillance intervals beyond that specified for surveillances that are not performed during refueling outages. The limitation of Definition "U" is based on engineering judgment and the recognition that the most probable result of any particular surveillance being performed is the verification of conformance with the Surveillance Requirements. This provision is sufficient to ensure that the reliability ensured through surveillance activities is not significantly degraded beyond that obtained from the specified surveillance interval.

V. Surveillance Interval - The surveillance interval is the calendar time between surveillance tests, checks, calibrations, and examinations to be performed upon an instrument or component when it is required to be operable. These tests may be waived when the instrument, component, or system is not required to be operable, but the instrument, component, or system shall be tested prior to being declared operable. The operating cycle interval is ~~18~~ 24 months and the 25% tolerance given in Definition "U" is applicable.

W. Fire Suppression Water System - A fire suppression water system shall consist of: a water source(s); gravity tank(s) or pump(s); and distribution piping with associated sectionalizing control or isolation valves. Such valves shall include hydrant post indicator valves and the first valve ahead of the water flow alarm device on each sprinkler, hose standpipe or spray system riser.

X. Staggered Test Basis - A staggered test basis shall consist of: (a) a test schedule for n systems, subsystems, trains, or other designated components obtained by dividing the specified test interval into n equal subintervals; (b) the testing of one system, subsystem, train or other designated components at the beginning of each subinterval.

Y. Source Check - A source check shall be the qualitative assessment of channel response when the channel sensor is exposed to a radioactive source.

PNPS Table 3.1.1 REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Operable Inst. Channels per Trip System (1) Minimum	Avail.	Trip Function	Trip Level Setting	Modes in Which Function Must Be Operable: Refuel (7)	Startup/Hot Standby	Run	Action (1)
1	1	Mode Switch in Shutdown		X	X	X	A
1	1	Manual Scram		X	X	X	A
		IRM					
3	4	High Flux	≤120/125 of full scale	X	X	(5)	A
3	4	Inoperative		X	X	(5)	A
		APRM					
2	3	High Flux	(15)	(17)	(17)	X	A or B
2	3	Inoperative	(13)	X	X(9)	X	A or B
2	3	High Flux (15%)	≤15% of Design Power	X	X	(16)	A or B
2	2	High Reactor Pressure	≤1085 psig 1063.5	X(10)	X	X	A
2	2	High Drywell Pressure	≤2.5 psig 2.22	X(8)	X(8)	X	A
2	2	Reactor Low Water Level	≥9 In. Indicated Level 11.7	X	X	X	A
		SDIV High Water Level:	≤39 Gallons	X(2)	X	X	A
2	2	East					
2	2	West					
2	2	Main Condenser Low Vacuum	≥23 In. Hg Vacuum	X(3)	X(3)	X	A or C
2	2	Main Steam Line High Radiation	≤7X Normal Full Power Background (18)	X	X	X(18)	A or C
4	4	Main Steam Line Isolation Valve Closure	≤10% Valve Closure	X(3)(6)	X(3)(6)	X(6)	A or C
2	2	Turbine Control Valve Fast Closure	≥150 psig Control Oil Pressure at Acceleration Relay	X(4)	X(4)	X(4)	A or D
4	4	Turbine Stop Valve Closure	≤10% Valve Closure	X(4)	X(4)	X(4)	A or D

NOTES FOR TABLE 3.1.1 (Cont'd)

2. Permissible to bypass, with control rod block, for reactor protection system reset in refuel and shutdown positions of the reactor mode switch.
3. Permissible to bypass when reactor pressure is ~~<500~~ 546 psig.
4. Permissible to bypass when turbine first stage pressure is less than ~~305~~ 112 psig.
5. IRM's are bypassed when APRM's are onscale and the reactor mode switch is in the run position.
6. The design permits closure of any two lines without a scram being initiated.
7. When the reactor is subcritical, fuel is in the reactor vessel and the reactor water temperature is less than 212 F, only the following trip functions need to be operable:

    A. Mode switch in shutdown
    B. Manual scram
    C. High flux IRM
    D. Scram discharge volume high level
    E. APRM (15%) high flux scram

8. Not required to be operable when primary containment integrity is not required.
9. Not required while performing low power physics tests at atmospheric pressure during or after refueling at power levels not to exceed 5 MW(t).
10. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.
11. Deleted
12. Deleted
13. An APRM will be considered inoperable if there are less than 2 LPRM inputs per level or there is less than 50% of the normal complement of LPRM's to an APRM.
14. Deleted
15. The APRM high flux trip level setting shall be as specified in the CORE OPERATING LIMITS REPORT, but shall in no case exceed 120% of rated thermal power.
16. The APRM (15%) high flux scram is bypassed when in the run mode.
17. The APRM flow biased high flux scram is bypassed when in the refuel or startup/hot standby modes.
18. Within 24 hours prior to the planned start of hydrogen injection with the reactor power at greater than 20% rated power, the normal full power radiation background level and associated trip setpoints may be changed based on a calculated value of the radiation level expected during the injection of hydrogen. The background radiation level and associated trip setpoints may be adjusted based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip setpoints shall be set within 24 hours of re-establishing normal radiation levels after completion of hydrogen injection and prior to withdrawing control rods at reactor power levels below 20% rated power.

TABLE 4.1 2

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION

MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Calibration Test (5)	Minimum Frequency (2)
IRM High Flux	Comparison to APRM on Controlled Shutdowns	Note (4)
	Full Calibration	Once/Operating Cycle
APRM High Flux		
Output Signal	Heat Balance	Once every 3 Days
Flow Bias Signal	Calibrate Flow Comparator and Flow Bias Network	~~Each Refueling Outage~~
	Calibrate Flow Bias Signal (1)	Every 3 Months
LPRM Signal	TIP System Traverse	Every 1000 Effective Full Power Hours
High Reactor Pressure	Note (7)	Note (7)
High Drywell Pressure	Note (7)	Note (7)
Reactor Low Water Level	Note (7)	Note (7)
High Water Level in Scram Discharge Tanks	Note (7)	Note (7)
Turbine Condenser Low Vacuum	Note (7)	Note (7)
Main Steam Line Isolation Valve Closure	Note (6)	Note (6)
Main Steam Line High Radiation	Standard Current Source (3)	Every 3 Months
Turbine First Stage Pressure Permissive	Note (7)	Note (7)
Turbine Control Valve Fast Closure	Standard Pressure Source	Every 3 Months
Turbine Stop Valve Closure	Note (6)	Note (6)
Reactor Pressure Permissive	Note (7)	Note (7)

AT LEAST ONCE EVERY 18 MONTHS

PNPS TABLE 3.2.A

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Operable Instrument Channels Per Trip System (1) Minimum	Available	Instrument	Trip Level Setting	Action (2)
2(7)	2	Reactor Low Water Level	≥11.7" ~~≥9"~~ indicated level (3)	A and D
1	1	Reactor High Pressure	≤110 psig	D
2	2	Reactor Low-Low Water Level	at or above -46.3 ~~-49~~ in. indicated level (4)	A
2	2	Reactor High Water Level	≤45.3" ~~≤48"~~ indicated level (5)	B
2(7)	2	High Drywell Pressure	≤2.22 ~~≤2.5~~ psig	A
2	2	High Radiation Main Steam Line Tunnel (9)	≤7 times normal rated full power background	B
2	2	Low Pressure Main Steam Line	≥810 ~~≥880~~ psig (8)	B
2(6)	2	High Flow Main Steam Line	≤140% of rated steam flow	B
2	2	Main Steam Line Tunnel Exhaust Duct High Temperature	≤170°F	B
2	2	Turbine Basement Exhaust Duct High Temperature	≤150°F	B
1	1	Reactor Cleanup System High Flow	≤300% of rated flow	C
2	2	Reactor Cleanup System High Temperature	≤150°F	C

3. Instrument set point corresponds to ~~120.26~~ 130.96 inches above top of active fuel.

4. Instrument set point corresponds to ~~77.26~~ 79.96 inches above top of active fuel.

5. Not required in Run Mode (bypassed by Mode Switch).

6. Two required for each steam line.

7. These signals also start SBGTS and initiate secondary containment isolation.

8. Only required in Run Mode (interlocked with Mode Switch).

9. Within 24 hours prior to the planned start of hydrogen injection with the reactor power at greater than 20% rated power, the normal full power radiation background level and associated trip setpoints may be changed based on a calculated value of the radiation level expected during the injection of hydrogen. The background radiation level and associated trip setpoints may be adjusted based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip setpoints shall be set within 24 hours of re-establishing normal radiation levels after completion of hydrogen injection and prior to withdrawing control rods at reactor power levels below 20% rated power.

PNPS

TABLE 3.2.B

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum # of Operable Instrument Channels Per Trip System (1)	Trip Function	Trip Level Setting	Remarks
2	Reactor Low-Low Water Level	at or above ~~-49~~ -46.3 in. indicated level (4)	1. In conjunction with Low Reactor Pressure, initiates Core Spray and LPCI. 2. In conjunction with High Drywell Pressure, 120 second time delay and LPCI or Core Spray pump interlock initiates Auto Blowdown (ADS). 3. Initiates HPCI; RCIC. 4. Initiates starting of Diesel Generators.
2	Reactor High Water Level	≤ ~~+48"~~ +45.3" indicated level	Trips HPCI and RCIC turbines.
1	Reactor Low Level (inside shroud)	≥307" above vessel zero (approximately 2/3 core height)	Prevents inadvertent operation of containment spray during accident condition.
2	Containment High Pressure	1 < p < 2 psig	Prevents inadvertent operation of containment spray during accident condition.

NOTES FOR TABLE 3.2.B

1. Whenever any CSCS subsystem is required by Section 3.5 to be operable, there shall be two (Note 5) operable trip systems. If the first column cannot be met for one of the trip systems, that system shall be repaired or the reactor shall be placed in the Cold Shutdown Condition within 24 hours after this trip system is made or found to be inoperable.

2. Close isolation valves in RCIC subsystem.

3. Close isolation valves in HPCI subsystem.

4. Instrument set point corresponds to ~~77.26~~ 79.96 inches of active fuel.

5. RCIC has only one trip system for these sensors.

PNPS

TABLE 4.2.A

MINIMUM TEST AND CALIBRATION FREQUENCY FOR PCIS

Instrument Channel (5)	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Reactor High Pressure	(1)	Once/3 months	None
2) Reactor Low-Low Water Level	~~(1)~~ (7)	(7)	Once/day
3) Reactor High Water Level	~~(1)~~ (7)	(7)	Once/day
4) Main Steam High Temp.	(1)	Once/3 months	None
5) Main Steam High Flow	(1) (7)	(7)	Once/day
6) Main Steam Low Pressure	~~(1)~~ (7)	(7)	Once/day
7) Reactor Water Cleanup High Flow	(1)	Once/3 months	Once/day
8) Reactor Water Cleanup High Temp.	(1)	Once/3 months	None

Once/3 months

Logic System Functional Test (4) (6)	Frequency
1) Main Steam Line Isolation Vvs. Main Steam Line Drain Vvs. Reactor Water Sample Vvs.	Once/18 months
2) RHR - Isolation Vv. Control Shutdown Cooling Vvs. Head Spray Discharge to Radwaste	Once/18 months
3) Reactor Water Cleanup Isolation	Once/18 months
4) Drywell Isolation Vvs. TIP Withdrawal Atmospheric Control Vvs. Sump Drain Valves	Once/18 months
5) Standby Gas Treatment System Reactor Building Isolation	Once/18 months

TABLE 4.2.B

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

	Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1)	Reactor Water Level	~~(1)~~ Once/3 months (7)	(7)	Once/day
2)	Drywell Pressure	(1) (7)	(7)	Once/day
3)	Reactor Pressure	(1) (7)	(7)	Once/day
4)	Auto Sequencing Timers	NA	Once/Operating Cycle	None
5)	ADS - LPCI or CS Pump Disch. Pressure Interlock	(1)	Once/3 months	None
6)	Start-up Transf. (4160V)			
	a. Loss of Voltage Relays	Monthly	Once/Operating Cycle	None
	b. Degraded Voltage Relays	Monthly	Once/Operating Cycle	None
7)	Trip System Bus Power Monitors	Once/operating cycle	NA	Once/day
8)	Recirculation System d/p	(1)	Once/3 months	Once/day
9)	Core Spray Sparger d/p	NA	Once/Operating Cycle	Once/day
10)	Steam Line High Flow (HPCI & RCIC)	(1)	Once/3 months	None
11)	Steam Line High Temp. (HPCI & RCIC)	(1)	Once/3 months	None
12)	Safeguards Area High Temp.	(1)	Once/3 months	None
13)	RCIC Steam Line Low Pressure	(1)	Once/3 months	None
14)	HPCI Suction Tank Levels	(1)	Once/3 months	None
15)	Emergency 4160V Buses A5 & A6 Loss of Voltage Relays	Monthly	Once/Operating Cycle	None

BASES:

3.2 In addition to reactor protection instrumentation which initiates a reactor scram, protective instrumentation has been provided which initiates action to mitigate the consequences of accidents which are beyond the operator's ability to control, or terminates operator errors before they result in serious consequences. This set of specifications provides the limiting conditions of operation for the primary system isolation function, initiation of the core cooling systems, control rod block and standby gas treatment systems. The objectives of the Specifications are (i) to assure the effectiveness of the protective instrumentation when required by preserving its capability to tolerate a single failure of any component of such systems even during periods when portions of such systems are out of service for maintenance, and (ii) to prescribe the trip settings required to assure adequate performance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

Some of the settings on the instrumentation that initiate or control core and containment cooling have tolerances explicitly stated where the high and low values are both critical and may have a substantial effect on safety. The set points of other instrumentation, where only the high or low end of the setting has a direct bearing on safety, are chosen at a level away from the normal operating range to prevent inadvertent actuation of the safety system involved and exposure to abnormal situations.

Actuation of primary containment valves is initiated by protective instrumentation shown in Table 3.2.A which senses the conditions for which isolation is required. Such instrumentation must be available whenever primary containment integrity is required.

The instrumentation which initiates primary system isolation is connected in a dual bus arrangement.

The low water level instrumentation set to trip at ~~128.26~~ 130.96 inches above the top of the active fuel closes all isolation valves except those in Groups 1, 4 and 5. This trip setting is adequate to prevent core uncovery in the case of a break in the largest line assuming a 60 second valve closing time. Required closing times are less than this.

The low low reactor water level instrumentation is set to trip when reactor water level is ~~77.26~~ 79.96 inches above the top of the active fuel (~~-49"~~ -46.3 on the instrument). This trip closes Main Steam Line Isolation

Attachment D to BECo Letter 93-072

Sample Calculation