TABLE 2.2.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
1. Intermediate Range Monitor		
a. Neutron Flux-High	≤ 120/125 divisions of full scale	≤ 122/125 divisions of full scale
b. Inoperative	NA	NA
2. Average Power Range Monitor:		
a. Neutron Flux-High Setdown	≤ 15% of RATED THERMAL POWER	≤ 20% of RATED THERMAL POWER
b. Flow Biased Simulated Thermal Power-High		
1) Flow Biased	≤ 0.66 W+64%, with a maximum of	≤ 0.66 W+67%, with a maximum of
2) High Flow Clamped	≤ 111.0% of RATED THERMAL POWER	≤ 113.0% of RATED THERMAL POWER
c. Neutron Flux-High	≤ 118.0% of RATED THERMAL POWER	≤ 120.0% of RATED THERMAL POWER
d. Inoperative	NA	NA
3. Reactor Vessel Steam Dome Pressure - High	≤ 1064.7 psig	≤ 1079.7 psig
4. Reactor Vessel Water Level - Low, Level 3	≥ 177.7 inches above top of active fuel*	≥ 177.1 inches above top of active fuel*
5. Reactor Vessel Water Level-High, Level 8	≤ 219.5 inches above top of active fuel*	≤ 220.1 inches above top of active fuel*
6. Main Steam Line Isolation Valve - Closure	≤ 8% closed	≤ 12% closed
7. ~~Main Steam Line Radiation - High~~ Deleted	~~≤ 3.0 x full power Background~~	~~≤ 3.6 x full power Background~~
8. Drywell Pressure - High	≤ 1.68 psig	≤ 1.88 psig

*See Bases Figure B 3/4 3-1.

TABLE 3.3.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	APPLICABLE OPERATIONAL CONDITIONS	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM (a)	ACTION
1. Intermediate Range Monitors:			
a. Neutron Flux - High	2	3	1
	3	3	2
	~~5~~(b)	3	3
b. Inoperative	2	3	1
	3, 4	3	2
	5	3	3
2. Average Power Range Monitor (c):			
a. Neutron Flux - High, Setdown	2	3	1
	3	3	2
	5(b)	3	3
b. Flow Biased Simulated Thermal Power - High	1	3	4
c. Neutron Flux - High	1	3	4
d. Inoperative	1, 2	3	1
	3	3	2
	5	3	3
3. Reactor Vessel Steam Dome Pressure - High	1, 2(d)	2	1
4. Reactor Vessel Water Level - Low, Level 3	1, 2	2	1
5. Reactor Vessel Water Level - High, Level 8	1(e)	2	4
6. Main Steam Line Isolation Valve - Closure	1(e)	4	4
7. ~~Main Steam Line Radiation - High~~ Deleted	~~1, 2(d)~~	~~2~~	~~5~~
8. Drywell Pressure - High	1, 2(f)	2	1

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

ACTION

ACTION 1 - Be in at least HOT SHUTDOWN within 12 hours.

ACTION 2 - Verify all insertable control rods to be inserted in the core and lock the reactor mode switch in the Shutdown position within one hour.

ACTION 3 - Suspend all operations involving CORE ALTERATIONS* and insert all insertable control rods within one hour.

ACTION 4 - Be in at least STARTUP within 6 hours.

ACTION 5 - ~~Be in STARTUP with the main steam line isolation valves closed within 6 hours or in at least HOT SHUTDOWN within 12 hours.~~ Deleted

ACTION 6 - Initiate a reduction in THERMAL POWER within 15 minutes and reduce turbine first stage pressure to less than the automatic bypass setpoint within 2 hours.

ACTION 7 - Verify all insertable control rods to be inserted within one hour.

ACTION 8 - Lock the reactor mode switch in the Shutdown position within one hour.

ACTION 9 - Suspend all operations involving CORE ALTERATIONS*, and insert all insertable control rods and lock the reactor mode switch in the Shutdown position within one hour.

*Except replacement of LPRM strings provided SRM instrumentation is OPERABLE per Specification 3.9.2.

TABLE 3.3.1-2

REACTOR PROTECTION SYSTEM RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME (Seconds)
1. Intermediate Range Monitors:	
a. Neutron Flux - High	NA
b. Inoperative	NA
2. Average Power Range Monitor*:	
a. Neutron Flux - High, Setdown	NA
b. Flow Biased Simulated Thermal Power - High	$\leq$ 0.09**
c. Neutron Flux - High	$\leq$ 0.09
d. Inoperative	NA
3. Reactor Vessel Steam Dome Pressure - High	$\leq$ 0.35
4. Reactor Vessel Water Level - Low, Level 3	$\leq$ 1.05
5. Reactor Vessel Water Level - High, Level 8	$\leq$ 1.05
6. Main Steam Line Isolation Valve - Closure	$\leq$ 0.06
7. ~~Main Steam Line Radiation - High~~ Deleted	~~NA~~
8. Drywell Pressure - High	NA
9. Scram Discharge Volume Water Level - High	NA
10. Turbine Stop Valve - Closure	$\leq$ 0.06
11. Turbine Control Valve Fast Closure, Valve Trip System Oil Pressure - Low	$\leq$ 0.07#
12. Reactor Mode Switch Shutdown Position	NA
13. Manual Scram	NA

*Neutron detectors are exempt from response time testing. Response time shall be measured from the detector output or from the input of the first electronic component in the channel.

**Not including simulated thermal power time constant, 6 ± 0.6 seconds.

#Measured from start of turbine control valve fast closure.

TABLE 4.3.1.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION[a]	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
1. Intermediate Range Monitors:				
a. Neutron Flux - High	S/U,S,(b)	S/U[c], W	R	2
	S	W	R	3, 4, 5
b. Inoperative	NA	W	NA	2, 3, 4, 5
2. Average Power Range Monitor:(f)				
a. Neutron Flux - High, Setdown	S/U,S,(b)	S/U[c], W	SA	2
	S	W	SA	3, 5
b. Flow Biased Simulated Thermal Power - High	S,D[h]	W	W[d][e], SA[m], R[i]	1
c. Neutron Flux - High	S	W	W[d], SA	1
d. Inoperative	NA	W	NA	1, 2, 3, 5
3. Reactor Vessel Steam Dome Pressure - High	S	M	R[g]	1, 2[j]
4. Reactor Vessel Water Level - Low, Level 3	S	M	R[g]	1, 2
5. Reactor Vessel Water Level - High, Level 8	S	M	R[g]	1
6. Main Steam Line Isolation Valve - Closure	NA	M	R	1
7. ~~Main Steam Line Radiation - High~~	Deleted			
	~~S~~	~~M~~	~~R~~	~~1, 2[j]~~
8. Drywell Pressure - High	S	M	R[g]	1, 2[l]
9. Scram Discharge Volume Water Level - High				
a. Level Transmitter	S	M	R[g]	1, 2, 5[k]
b. Float Switches	NA	M	R	1, 2, 5[k]

TABLE 3.3.2-1

ISOLATION ACTUATION INSTRUMENTATION

TRIP FUNCTION	VALVE GROUPS OPERATED BY SIGNAL	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM (a)	APPLICABLE OPERATIONAL CONDITION	ACTION
1. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level - Low, Level 2	1,5,7,8	2	1, 2, 3 and #	20
b. Drywell Pressure - High	1,2,5,8,9(b)(c)	2	1, 2, 3	20
c. Containment and Drywell Purge Exhaust Plenum Radiation - High	8	2(g)	1, 2, 3 and *	21
d. Reactor Vessel Water Level - Low, Level 1	2(b)(c)	2	1, 2, 3 and #	20
e. Manual Initiation	1,2,5,7,8,9	2(k)	1, 2, 3 and *	22
2. MAIN STEAM LINE ISOLATION				
a. Reactor Vessel Water Level - Low, Level 1	6	2	1, 2, 3	20
b. Main Steam Line Radiation - High	6(d)	2(d)	~~1, 2~~ ***	~~23~~ 29
c. Main Steam Line Pressure - Low	6	2	1	24
d. Main Steam Line Flow - High	6	2/line	1, 2, 3	23
e. Condenser Vacuum - Low	6	2	1, 2**, 3**	23
f. Main Steam Line Tunnel Temperature - High	6	2	1, 2, 3	23
g. Main Steam Line Tunnel Δ Temperature - High	6	2	1, 2, 3	23
h. Turbine Building Main Steam Line Temperature - High	6	2	1, 2, 3	23
i. Manual Initiation	6	2	1, 2, 3	22

TABLE 3.3.2-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

ACTION

ACTION 20 - In OPERATIONAL CONDITION 1, 2 or 3, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours. In OPERATIONAL CONDITION #, suspend CORE ALTERATIONS and operations with a potential for draining the reactor vessel.

ACTION 21 - Close the affected system isolation valve(s) within one hour or:
a. In OPERATIONAL CONDITION 1, 2 or 3, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
b. In Operational Condition *, suspend CORE ALTERATIONS, handling of irradiated fuel in the primary containment and operations with a potential for draining the reactor vessel.

ACTION 22 - Restore the manual initiation function to OPERABLE status within 48 hours or:
a. In OPERATIONAL CONDITION 1, 2, or 3, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
b. In OPERATIONAL CONDITION *, suspend CORE ALTERATIONS, operations with a potential for draining the reactor vessel, and handling of irradiated fuel in the primary containment.

ACTION 23 - Be in at least STARTUP with the associated isolation valves closed within 6 hours or be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

ACTION 24 - Be in at least STARTUP within 6 hours.

ACTION 25 - Verify SECONDARY CONTAINMENT INTEGRITY with the annulus exhaust gas treatment system operating within one hour.

ACTION 26 - Restore the manual initiation function to OPERABLE status within 8 hours or close the affected system isolation valves within 1 hour and declare the affected system inoperable.

ACTION 27 - Close the affected system isolation valves within one hour and declare the affected system inoperable.

ACTION 28 - Within one hour lock the affected system isolation valves closed, or verify, by remote indication, that the valve(s) is closed and electrically disarmed, or isolate the penetration(s) and declare the affected system inoperable.

ACTION 29 - Close the associated isolation valves within 6 hours or be in at least HOT SHUTDOWN within 12 hours.

NOTES

* When handling irradiated fuel in the primary containment and during CORE ALTERATIONS and operations with a potential for draining the reactor vessel.

** When any turbine stop valve is greater than 90% open and/or the key locked Condenser Low Vacuum Bypass Switch is in the normal position.

\# During CORE ALTERATIONS and operations with a potential for draining the reactor vessel.

*** OPERATIONAL CONDITION 1 or 2 when the mechanical vacuum pump lines are not isolated.

TABLE 3.3.2-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION
ACTION

NOTES (Continued)

(a) A channel may be placed in an inoperable status for up to 2 hours for required surveillance without placing the trip system in the tripped condition provided at least one other OPERABLE channel in the same trip system is monitoring that parameter.

(b) Also actuates the standby subsystem of the annulus exhaust gas treatment system.

(c) Also actuates the control room emergency filtration system in the recirculation mode of operation.

(d) ~~Also trips and isolates the mechanical vacuum pumps.~~

(e) Closes only RWCU system isolation valve(s) 1G33-F004 (SLCS Pump A) and 1G33-F001 (SLCS Pump B).

(f) Manual initiation isolates 1E51-F064 and 1E51-F031 only and only following manual or automatic initiation of the RCIC system.

(g) Containment and Drywell Purge System inboard and outboard isolation valves each use a separate two out of two isolation logic.

(h) Requires RCIC system steam supply pressure - low coincident with drywell pressure high to isolate valve 1E51-F077.

(i) For this signal, one trip system has two channels which close valves 1E51-F063 and 1E51-F076 while the other trip system has two channels which close valve 1E51-F064.

(j) Isolates both RHR and RCIC.

(k) There is only one (1) RCIC manual initiation channel for valve group 9.

This Trip Function no longer isolates the Main Steam Lines. The only isolation is of the mechanical vacuum pump lines (valves 1N62-F130A and B), using a single trip system consisting of two channels configured in a one-out-of-two logic.

TABLE 3.3.2-3

ISOLATION SYSTEM INSTRUMENTATION RESPONSE TIME

TRIP FUNCTION	RESPONSE TIME (Seconds)#
1. PRIMARY CONTAINMENT ISOLATION	
a. Reactor Vessel Water Level - Low, Level 2	NA
b. Drywell Pressure - High	NA
c. Containment and Drywell Purge Exhaust Plenum Radiation - High(b)	$\leq 10^{(a)}$
d. Reactor Vessel Water Level - Low, Level 1	NA
e. Manual Initiation	NA
2. MAIN STEAM LINE ISOLATION	
a. Reactor Vessel Water Level - Low, Level 1	$\leq 1.0^{*}/\leq 10^{(a)**}$
b. Main Steam Line Radiation - High	~~$\leq 1.0^{*}/\leq 10^{(a)**}$~~ NA
c. Main Steam Line Pressure - Low	$\leq 1.0^{*}/\leq 10^{(a)**}$
d. Main Steam Line Flow - High	$\leq 0.5^{*}/\leq 10^{(a)**}$
e. Condenser Vacuum - Low	NA
f. Main Steam Line Tunnel Temperature - High	NA
g. Main Steam Line Tunnel Δ Temperature - High	NA
h. Turbine Building Main Steam Line Temperature - High	NA
i. Manual Initiation	NA
3. SECONDARY CONTAINMENT ISOLATION	
a. Reactor Vessel Water Level - Low, Level 2	NA
b. Drywell Pressure - High	NA
c. Manual Initiation	NA
4. REACTOR WATER CLEANUP SYSTEM ISOLATION	
a. Δ Flow - High	NA
b. Δ Flow Timer	NA
c. Equipment Area Temperature - High	NA
d. Equipment Area Δ Temperature - High	NA
e. Reactor Vessel Water Level - Low, Level 2	NA
f. Main Steam Line Tunnel Ambient Temperature - High	NA
g. Main Steam Line Tunnel Δ Temperature - High	NA
h. SLCS Initiation	NA
i. Manual Initiation	NA

TABLE 4.3.2.1-1

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
1. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level - Low, Level 2	S	M	R(b)	1, 2, 3 and #
b. Drywell Pressure - High	S	M	R(b)	1, 2, 3
c. Containment and Drywell Purge Exhaust Plenum Radiation - High	S	M	R	1, 2, 3 and *
d. Reactor Vessel Water Level - Low, Level 1	S	M	R(b)	1, 2, 3 and #
e. Manual Initiation	NA	R	NA	1, 2, 3 and *
2. MAIN STEAM LINE ISOLATION				
a. Reactor Vessel Water Level - Low, Level 1	S	M	R(b)	1, 2, 3
b. Main Steam Line Radiation - High	S	M	P	~~1, 2~~ ~~***~~
c. Main Steam Line Pressure - Low	S	M	R(b)	1
d. Main Steam Line Flow - High	S	M	R(b)	1, 2, 3
e. Condenser Vacuum - Low	S	M	R(b)	1, 2**, 3**
f. Main Steam Line Tunnel Temperature - High	S	M	R	1, 2, 3
g. Main Steam Line Tunnel Δ Temperature - High	S	M	R	1, 2, 3
h. Turbine Building Main Steam Line Temperature - High	S	M	R	1, 2, 3
i. Manual Initiation	NA	R	NA	1, 2, 3

TABLE 4.3.2.1-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
6. RHR SYSTEM ISOLATION				
a. RHR Equipment Area Ambient Temperature - High	S	M	R	1, 2, 3
b. RHR Equipment Area Δ Temperature - High	S	M	R	1, 2, 3
c. RHR/RCIC Steam Line Flow - High	S	M	R(b)	1, 2, 3
d. Reactor Vessel Water Level - Low, Level 3	S	M	R(b)	1, 2, 3
e. Reactor Vessel (RHR Cut-in Permissive) Pressure - High	S	M	R(b)	1, 2, 3
f. Drywell Pressure - High	S	M	R(b)	1, 2, 3
g. Manual Initiation	NA	R	NA	1, 2, 3

*When handling irradiated fuel in the primary containment and during CORE ALTERATIONS and operations with a potential for draining the reactor vessel.
**When any turbine stop valve is greater than 90% open and/or the key locked bypass switch is in the normal position.
#During CORE ALTERATION and operations with a potential for draining the reactor vessel.
(a) Each train or logic channel shall be tested at least every other 31 days.
(b) Calibrate trip unit setpoint at least once per 31 days.

*** OPERATIONAL CONDITION 1 or 2 when the mechanical vacuum pump lines are not isolated.

LIMITING SAFETY SYSTEM SETTINGS

BASES

REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS (Continued)

4. Reactor Vessel Water Level-Low

The reactor vessel water level trip setpoint has been used in transient analyses dealing with coolant inventory decrease. The scram setting was chosen far enough below the normal operating level to avoid spurious trips but high enough above the fuel to assure that there is adequate protection for the fuel and pressure limits.

5. Reactor Vessel Water Level-High

A reactor scram from high reactor water level, approximately two feet above normal operating level, is intended to offset the addition of reactivity effect associated with the introduction of a significant amount of relatively cold feedwater. An excess of feedwater entering the vessel would be detected by the level increase in a timely manner. This scram feature is only effective when the reactor mode switch is in the Run position because at THERMAL POWER levels below 10% to 15% of RATED THERMAL POWER, the approximate range of power level for changing to the Run position, the safety margins are more than adequate without a reactor scram.

6. Main Steam Line Isolation Valve-Closure

The main steam line isolation valve closure trip was provided to limit the amount of fission product release for certain postulated events. The MSIV's are closed automatically from measured parameters such as high steam flow, ~~high steam line radiation,~~ low reactor water level, high steam tunnel temperature and low steam line pressure. The MSIV's closure scram anticipates the pressure and flux transients which could follow MSIV closure and thereby protects reactor vessel pressure and fuel thermal/hydraulic Safety Limits.

7. ~~Main Steam Line Radiation-High~~ Deleted

~~The main steam line radiation detectors are provided to detect a gross failure of the fuel cladding. When the high radiation is detected, a trip is initiated to reduce the continued failure of fuel cladding. At the same time the main steam line isolation valves are closed to limit the release of fission products. The trip setting is high enough above background radiation levels to prevent spurious trips yet low enough to promptly detect gross failures in the fuel cladding.~~