

TABLE 2.2.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>
1. Intermediate Range Monitor, Neutron Flux - High	\leq 120/125 divisions of full scale	\leq 122/125 divisions of full scale
2. Average Power Range Monitor:		
a. Neutron Flux-High, Setdown	\leq 15% of RATED THERMAL POWER	\leq 20% of RATED THERMAL POWER
b. Flow Biased Simulated Thermal Power - High		
1) Flow Biased	\leq 0.66W + 51%, with a maximum of	\leq 0.66W + 54%, with a maximum of
2) High Flow Clamped	\leq 113.5% of RATED THERMAL POWER	\leq 115.5% of RATED THERMAL POWER
c. Fixed Neutron Flux - High	\leq 118% of RATED THERMAL POWER	\leq 120% of RATED THERMAL POWER
d. Inoperative	N.A.	N.A.
3. Reactor Vessel Steam Dome Pressure - High	\leq 1037 psig	\leq 1057 psig
4. Reactor Vessel Water Level - Low, Level 3	\geq 13.0 inches above instrument zero*	\geq 11.0 inches above instrument zero
5. Main Steam Line Isolation Valve - Closure	\leq 10.0% closed	\leq 12.5% closed
6. Main Steam Line Radiation - High	\leq 3.0 x full power background	\leq 3.6 x full power background

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

LIMITING SAFETY SYSTEM SETTINGS

BASES

REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS (Continued)

4. Reactor Vessel Water Level-Low

The reactor vessel water level trip setpoint 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. 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 scheme anticipates the pressure and flux transients which could follow MSIV closure and thereby protects reactor vessel pressure and fuel thermal/hydraulic Safety Limits.

6. Main Steam Line Radiation-High

~~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.~~

7. Primary Containment Pressure-High

High pressure in the drywell could indicate a break in the primary pressure boundary systems. The reactor is tripped in order to minimize the possibility of fuel damage and reduce the amount of energy being added to the coolant. The trip setting was selected as low as possible without causing spurious trips.

TABLE 3.3.1-1 (Continued)
REACTOR PROTECTION SYSTEM INSTRUMENTATION

<u>FUNCTIONAL UNIT</u>	<u>APPLICABLE OPERATIONAL CONDITIONS</u>	<u>MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM (a)</u>	<u>ACTION</u>
6. Main Steam Line Radiation - High	1, 2(e)	2	5
7. Primary Containment Pressure - High	1, 2(f)	2(g)	1
8. Scram Discharge Volume Water Level - High			
a. Level Transmitter	1, 2 5(h)	2 2	1 3
b. Float Switch	1, 2 5(h)	2 2	1 3
9. Turbine Throttle Valve - Closure	1(i)	4(j)	6
10. Turbine Governor Valve Fast Closure, Valve Trip System Oil Pressure - Low	1(i)	2(j)	6
11. Reactor Mode Switch Shutdown Position	1, 2 3, 4 5	1 1 1	1 7 3
12. Manual Scram	1, 2 3, 4 5	2 2 2	1 8 9

CONTROLLED COPY

CONTROLLED COPY

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 1 hour.
- ACTION 3 - Suspend all operations involving CORE ALTERATIONS* and insert all insertable control rods within 1 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.~~
- ACTION 6 - Initiate a reduction in THERMAL POWER within 15 minutes and reduce turbine first stage pressure to ≤ 165 psig, equivalent to THERMAL POWER less than 30% of RATED THERMAL POWER, within 2 hours.
- ACTION 7 - Verify all insertable control rods to be inserted within 1 hour.
- ACTION 8 - Lock the reactor mode switch in the Shutdown position within 1 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 1 hour.

*Except movement of IRM, SRM or special movable detectors, or replacement of LPRM strings provided SRM instrumentation is OPERABLE per Specification 3.9.2.

CONTROLLED COPY

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

TABLE NOTATIONS

- (a) A channel may be placed in an inoperable status for up to six hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.
- (b) The "shorting links" shall be removed from the RPS circuitry prior to and during the time any control rod is withdrawn* and shutdown margin demonstrations are being performed per Specification 3.10.3.
- (c) An APRM channel is inoperable if there are less than 2 LPRM inputs per level or less than 14 LPRM inputs to an APRM channel.
- (d) This function shall be automatically bypassed when the reactor mode switch is not in the Run position and reactor pressure < 1037 psig.
- ~~(e) This function is not required to be OPERABLE when the reactor pressure vessel head is removed per Specification 3.10.1.~~
- (f) This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required.
- (g) Also actuates the standby gas treatment system.
- (h) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.
- (i) This function shall be automatically bypassed when turbine first stage pressure is < 165 psig, equivalent to THERMAL POWER less than 30% of RATED THERMAL POWER.
- (j) Also actuates the EOC-RPT system.

*Not required for control rods removed per Specification 3.9.10.1 or 3.9.10.2.

TABLE 3.3.1-2

REACTOR PROTECTION SYSTEM RESPONSE TIMES

<u>FUNCTIONAL UNIT</u>	<u>RESPONSE TIME (Seconds)</u>
1. Intermediate Range Monitors:	
a. Neutron Flux - High	N.A.
b. Inoperative	N.A.
2. Average Power Range Monitor*:	
a. Neutron Flux - Upscale, Setdown	N.A.
b. Flow Biased Simulated Thermal Power - Upscale	6±1**
c. Fixed Neutron Flux - Upscale	< 0.09
d. Inoperative	N.A.
3. Reactor Vessel Steam Dome Pressure - High	< 0.55
4. Reactor Vessel Water Level - Low, Level 3	< 1.05
5. Main Steam Line Isolation Valve - Closure	< 0.06
6. Main Steam Line Radiation - High	N.A.
7. Primary Containment Pressure - High	N.A.
8. Scram Discharge Volume Water Level - High	
a. Level Transmitter	N.A.
b. Float Switch	N.A.
9. Turbine Throttle Valve - Closure	≤ 0.06
10. Turbine Governor Valve Fast Closure, Trip Oil Pressure - Low	< 0.08#
11. Reactor Mode Switch Shutdown Position	N.A.
12. Manual Scram	N.A.

*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.

**Including simulated thermal power time constant.

#Measured from start of turbine control valve fast closure.

TABLE 4.3.1.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION^(a)</u>	<u>OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED</u>
1. Intermediate Range Monitors:				
a. Neutron Flux - High	S/U(b), S S	S/U(c), W W	R R	2 3, 4, 5
b. Inoperative	N.A.	W	N.A.	2, 3, 4, 5
2. Average Power Range Monitor ^(f) :				
a. Neutron Flux - Upscale, Setdown	S/U(b), S S	S/U(c), W W	SA SA	2 3, 5
b. Flow Biased Simulated Thermal Power - Upscale	S,D(g)	S/U(c), Q	W(d)(e), SA, R(h)	1
c. Fixed Neutron Flux - Upscale	S	S/U(c), Q	W(d), SA	1
d. Inoperative	N.A.	Q	N.A.	1, 2, 3, 5
3. Reactor Vessel Steam Dome Pressure - High	S	Q	R	1, 2
4. Reactor Vessel Water Level - Low, Level 3	S	Q	R	1, 2
5. Main Steam Line Isolation Valve - Closure	N.A.	Q	R	1
6. Main Steam Line Radiation - High	S	Q	R	1, 2(i)
7. Primary Containment Pressure - High	N.A.	Q	R	1, 2

WASHINGTON NUCLEAR - UNIT 2

3/4 3-7

AMENDMENT NO. 90

CONTROLLED COPY

CONTROLLED COPY

TABLE 4.3.1.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

- (a) Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (b) The IRM and SRM channels shall be determined to overlap for at least 1/2 decade during each startup after entering OPERATIONAL CONDITION 2 and the IRM and APRM channels shall be determined to overlap for at least 1/2 decade during each controlled shutdown, if not performed within the previous 7 days.
- (c) Within 24 hours prior to startup, if not performed within the previous 7 days.
- (d) This calibration shall consist of the adjustment of the APRM channel to conform to the power values calculated by a heat balance during OPERATIONAL CONDITION 1 when THERMAL POWER > 25% of RATED THERMAL POWER. Adjust the APRM channel if the absolute difference is greater than 2% of RATED THERMAL POWER. Any APRM channel gain adjustment made in compliance with Specification 3.2.2 shall not be included in determining the absolute difference.
- (e) This calibration shall consist of the adjustment of the APRM flow biased channel to conform to a calibrated flow signal.
- (f) The LPRMs shall be calibrated at least once per 1000 effective full power hours (EFPH) using the TIP system.
- (g) Measure and compare core flow to rated core flow.
- (h) This calibration shall consist of verifying the 6 ± 1 second simulated thermal power time constant.
- ~~(i) This function is not required to be OPERABLE when the reactor pressure vessel head is removed per Specification 3.10.1.~~
- (j) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

TABLE 3.3.2-1

ISOLATION ACTUATION INSTRUMENTATION

<u>TRIP FUNCTION</u>	<u>VALVE GROUPS OPERATED BY SIGNAL</u>	<u>MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM (a)</u>	<u>APPLICABLE OPERATIONAL CONDITION</u>	<u>ACTION</u>
1. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level				
1) Low, Level 3	5(g)	2	1, 2, 3	20
2) Low Low, Level 2	1, 2, 4	2	1, 2, 3	20
b. Drywell Pressure - High	4, 5(b)(g)	2	1, 2, 3	20
c. Main Steam Line				
1) Radiation - High	1(c)	2	1, 2, 3	21
	2(c)	2	1, 2, 3	22
2) Pressure - Low	1	2	1	23
3) Flow - High	1	2(d)	1, 2, 3	21
d. Main Steam Line Tunnel				
Temperature - High	1	2	1, 2, 3	21
e. Main Steam Line Tunnel				
Δ Temperature - High	1	2	1, 2, 3	21
f. Condenser Vacuum - Low	1	2	1, 2*, 3*	21
g. Manual Initiation	1	2/group	1, 2, 3	24
	2	1/group	1, 2, 3	24
	5(b)(g)	1/group	1, 2, 3	24
2. SECONDARY CONTAINMENT ISOLATION				
a. Reactor Building Vent				
Exhaust Plenum				
Radiation - High	3(b)(e)	2	1, 2, 3, and **	25
b. Drywell Pressure - High	3(b)(e)	2	1, 2, 3	25
c. Reactor Vessel Water				
Level - Low Low, Level 2	3(b)(e)	2	1, 2, 3, and #	25
d. Manual Initiation	3(b)	1/group	1, 2, 3	24
	3(b)	1/group	**	24

CONTROLLED COPY

CONTROLLED COPY

TABLE 3.3.2-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

ACTION STATEMENTS

- ACTION 20 - Be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.
- ACTION 21 - 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 22 - Close the affected system isolation valves within 1 hour and declare the affected system inoperable.
- ACTION 23 - Be in at least STARTUP within 6 hours.
- ACTION 24 - Restore the manual initiation function to OPERABLE status within 8 hours or close the affected system isolation valves within the next hour and declare the affected system inoperable or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- ACTION 25 - Establish SECONDARY CONTAINMENT INTEGRITY with the standby gas treatment system operating within 1 hour.
- ACTION 26 - Lock close or close, as applicable, the affected system isolation valves within 1 hour and declare the affected system inoperable.

TABLE NOTATIONS

*May be bypassed with reactor steam pressure \leq 1037 psig and all turbine stop valves closed.

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

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

(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 gas treatment system.

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

(d) A channel is OPERABLE if 2 of 4 detectors in that channel are OPERABLE.

(e) Also actuates secondary containment ventilation isolation dampers per Table 3.6.5.2-1.

(f) Closes only RWCU system outboard isolation valve RWCU-V-4.

(g) Only valves RHR-V-123A and RHR-V-123B in Valve Group 5 are required for primary isolation.

(h) Manual initiation isolates RCIC-V-8 only and only with a coincident reactor vessel level-low, level 3.

(i) Not required for RHR-V-8 when control is transferred to the alternate remote shutdown panel during operational conditions 1, 2 & 3 and the isolation interlocks are bypassed. When RHR-V-8 control is transferred to the remote shutdown panel under operational modes 1, 2, and 3 the associated key lock switch will be locked with the valve in the closed position. Except RHR-V-8 can be returned to, and operated from, the control room, with the interlocks and automatic isolation capability reestablished in operational conditions 2 and 3 when reactor pressure is less than 135 psig.

TABLE 3.3.2-2

ISOLATION ACTUATION INSTRUMENTATION SETPOINTS

<u>TRIP FUNCTION</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
1. <u>PRIMARY CONTAINMENT ISOLATION</u>		
a. Reactor Vessel Water Level		
1) Low, Level 3	> 13.0 inches*	> 11.0 inches
2) Low Low, Level 2	> -50 inches*	> -57 inches
b. Drywell Pressure - High	< 1.68 psig	< 1.88 psig
c. Main Steam Line		
1) Radiation - High	< 3.0 x full power background	< 3.6 x full power background
2) Pressure - Low	> 831 psig	> 811 psig
3) Flow - High	< 105.5 psid	< 108 psid
d. Main Steam Line Tunnel		
Temperature - High	< 164°F	< 170°F
e. Main Steam Line Tunnel		
Δ Temperature - High	< 80°F	< 90°F
f. Condenser Vacuum - Low	> 23 inches Hg absolute pressure	> 24.5 inches Hg absolute pressure
g. Manual Initiation	N.A.	N.A.
2. <u>SECONDARY CONTAINMENT ISOLATION</u>		
a. Reactor Building Vent		
Exhaust Plenum		
Radiation - High	< 13.0 mR/h	< 16.0 mR/h
b. Drywell Pressure - High	< 1.68 psig	< 1.88 psig
c. Reactor Vessel Water		
Level - Low Low, Level 2	> -50 inches*	> -57 inches
d. Manual Initiation	N.A.	N.A.

CONTROLLED COPY

CONTROLLED COPY

TABLE 3.3.2-3

ISOLATION SYSTEM INSTRUMENTATION RESPONSE TIME

<u>TRIP FUNCTION</u>	<u>RESPONSE TIME (Seconds)#</u>
<u>1. PRIMARY CONTAINMENT ISOLATION</u>	
a. Reactor Vessel Water Level	N.A.
1) Low, Level 3	$\leq 1.0^*/\leq 13(a)^{**}$
2) Low Low, Level 2	
b. Drywell Pressure - High	$\leq 13(a)$
c. Main Steam Line	
1) Radiation - High(b)	$\leq 1.0^*/\leq 13(a)^{**}$
2) Pressure - Low	$\leq 1.0^*/\leq 13(a)^{**}$
3) Flow - High	$\leq 0.5^*/\leq 13(a)^{**}$
d. Main Steam Line Tunnel Temperature - High	N.A.
e. Main Steam Line Tunnel Δ Temperature - High	N.A.
f. Condenser Vacuum - Low	N.A.
g. Manual Initiation	N.A.
<u>2. SECONDARY CONTAINMENT ISOLATION</u>	
a. Reactor Building Vent Exhaust Plenum	
Radiation - High(b)	$\leq 13(a)$
b. Drywell Pressure - High	$\leq 13(a)$
c. Reactor Vessel Water Level - Low Low, Level 2	$\leq 13(a)$
d. Manual Initiation	N.A.
<u>3. REACTOR WATER CLEANUP SYSTEM ISOLATION</u>	
a. Δ Flow - High	$\leq 13(a)^{##}$
b. Heat Exchanger Area Temperature - High	N.A.
c. Heat Exchanger Area Ventilation	
Δ Temp. - High	N.A.
d. Pump Area Temperature - High	N.A.
e. Pump Area Ventilation Δ Temp. - High	N.A.
f. SLCS Initiation	N.A.
g. Reactor Vessel Water Level - Low Low, Level 2	$\leq 13(a)$
h. RWCU/RCIC Line Routing Area Temperature -	
High	N.A.
i. RWCU Line Routing Area Temperature - High	N.A.
j. Manual Initiation	N.A.

TABLE 4.3.2.1-1

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>TRIP FUNCTION</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>	<u>OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED</u>
<u>1. PRIMARY CONTAINMENT ISOLATION</u>				
a. Reactor Vessel Water Level-				
1) Low, Level 3	S	M	R	1, 2, 3
2) Low Low, Level 2	N.A.	M	R	1, 2, 3
b. Drywell Pressure - High	N.A.	M	R	1, 2, 3
c. Main Steam Line				
1) Radiation - High	S	M	R	1, 2, 3
2) Pressure - Low	N.A.	M	R	1
3) Flow - High	S	M	R	1, 2, 3
d. Main Steam Line Tunnel				
Temperature - High	N.A.	SA	R	1, 2, 3
e. Main Steam Line Tunnel				
Δ Temperature - High	N.A.	SA	R	1, 2, 3
f. Condenser Vacuum - Low	N.A.	M	R	1, 2*, 3*
g. Manual Initiation	N.A.	R	N.A.	1, 2, 3
<u>2. SECONDARY CONTAINMENT ISOLATION</u>				
a. Reactor Building Vent				
Exhaust Plenum				
Radiation - High	S	M	R	1, 2, 3, and **
b. Drywell Pressure - High	N.A.	M	R	1, 2, 3
c. Reactor Vessel Water				
Level - Low Low, Level 2	N.A.	M	R	1, 2, 3, and #
d. Manual Initiation	N.A.	R	N.A.	1, 2, 3, and **

CONTROLLED COPY



11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

1